

EXCAVATIONS AT PORTO CHELI AND VICINITY, PRELIMINARY REPORT, II: THE FRANCHTHI CAVE, 1967-1968

(PLATES 93-100)

EXCAVATION in the Franchthi Cave¹ was undertaken for the first time in the summer of 1967 as part of the investigations conducted by Indiana University and the University of Pennsylvania in the neighborhood of modern Porto Cheli at the southern tip of the Argolid.² Work was resumed on a larger scale in 1968, and plans were under way at the time of this writing for a third campaign in the summer of 1969.³

THE SITE

The cave is located at the western end of a high and rugged headland known locally as Franchthi (sometimes Fragthi), directly across the bay from the village of Koilada and about four kilometers north-northwest of Kranidi. The site has a

¹ For brief notices summarizing the results of the 1967 season, see T. W. Jacobsen, "The Franchthi Cave, A Stone Age Site in Southern Greece," *Archaeology*, XXII, 1969, pp. 4-9, and T. W. Jacobsen, "Investigations at Porto Cheli-Halieis, 1967," *Δελτ.*, XXIII, 1968, *Xρον.* pp. 145-148. A summary of the results of the 1968 season can be found in T. W. Jacobsen, "Investigations at Porto Cheli, 1968," *Δελτ.*, XXIV, 1969, *Xρον.* (in press at the time of this writing).

² Michael H. Jameson of the University of Pennsylvania and the writer are co-directors of the project as a whole. The writer has also served as field director.

³ Since the excavations have been conducted under the aegis of the American School of Classical Studies in Athens in cooperation with the Greek Archaeological Service, we are especially grateful to Dr. Henry S. Robinson, past Director of the American School, and Mrs. Evangelia Protonotariou-Deilaki, Ephor of Antiquities for the Argolid-Corinthia, for their cooperation and assistance during the past two years. The finds from the excavations are housed in the storerooms of the Archaeological Museum in Nauplion.

Financial support for the project has been generously provided by the Indiana University Foundation, the University of Pennsylvania, the National Endowment for the Humanities (1967) and the Triopian Foundation (1968). We should also like to thank the Esso-Pappas Company of Greece for its continuing interest in our project.

Staff-members during the past two seasons have included: Mr. James Carpenter (1968), Mr. Patrick Carter (1968), Mr. Stephen Diamant (1968), Mr. and Mrs. James Dirksen (1967), Miss Sara C. Dublin, Dr. Robert J. Giegengack (1968), Mr. Jeffrey Klein (1968), Mr. Merle Langdon (1968), Dr. Frederick R. Matson, Marian Holland McAllister, Dr. Paul Mellars (1968), Mr. and Mrs. Sebastian Payne, Mr. and Mrs. Peter Smith (1968), Miss Marion Symington (1967), and Miss Karen D. Vitelli (1968). Mr. D. Yiakoumis (1967) and Mr. G. Papantonio (1968) have represented the Ephor, and Mr. Nikolaos Didaskalou has served as conservator during both seasons. The drawings appearing in this report were done by Mrs. McAllister (plans) and Miss Vitelli (objects).



commanding position overlooking the entrance to the bay to the south and west of the headland and the small island of Koronis (now owned by Mr. Livanos) directly opposite the headland. The mouth of the cave (Pl. 93, a) is situated about 12.50 m. above the modern sea level and opens up roughly to the northwest. There is a small rocky terrace in front of the cave and, beneath it, the present surface slopes rather gently down to the shore, some 50 m. away. The base of this slope, just above the water's edge, has been heavily eroded by the winter's waves, thus exposing abundant remains of prehistoric occupation: obsidian, bones and numerous potsherds of the Neolithic period.

The cave itself was formed in a mass of crystalline limestone probably of the Miocene period and is oriented approximately northwest-southeast (Fig. 1).⁴ Its overall depth exceeds 150 m., while the full width of its mouth is about 30 m. At the very back of the cave is a small pool (1 m. above sea level) which may be connected with a subterranean water supply recently located elsewhere in the headland.⁵ Whether or not this pool served the prehistoric occupants of the cave is not known, but there is certainly no lack of fresh water in the headland today. A number of springs gush forth from the rocks just below sea level at several points along the shore below the site.

It is too early to say with certainty when or by what means the Franchthi Cave was formed, but the excavations have already demonstrated that rockfalls of varying intensity occurred several times during the course of its history. Massive rubble resulting from the collapse of the brow has restricted the entrance to a comparatively narrow passage at the western side of the mouth (Pl. 93, b), but the most massive rockfall is that which fell from the ceiling and resulted in the formation of a "window" in the roof near the center of the cave (Pl. 93, c).⁶ It now appears that the major collapses of roof and brow took place at some time near the end of the period of most intensive occupation in the cave, possibly during the Late Neolithic period.

THE EXCAVATIONS

Because of the presence of heavy rockfall in the inner part of the cave, it has been necessary to restrict excavation to an area 20-40 m. deep in the front part of the cave and to the small terrace in front of the cave (Fig. 2). Four soundings—B (2.50 m. x 5 m.), C (1 m. x 1.50 m.), D (1 m. x 1.50 m.) and E (4 m. x 4.50 m.)—were made on the terrace during the course of the 1967 season. Each was carried down to a level of heavy rockfall (presumably associated with the collapse of the brow

⁴ Note that the heights above sea level in Fig. 1 have been corrected from those given on the plan published in *Archaeology*, XXII, 1969, p. 5.

⁵ Quarrying operations at the eastern end of the headland exposed during the summer of 1968 an enormous subterranean cavern filled with water to a very substantial depth.

⁶ The window is represented by the broken line near the middle of the western wall in Fig. 1.

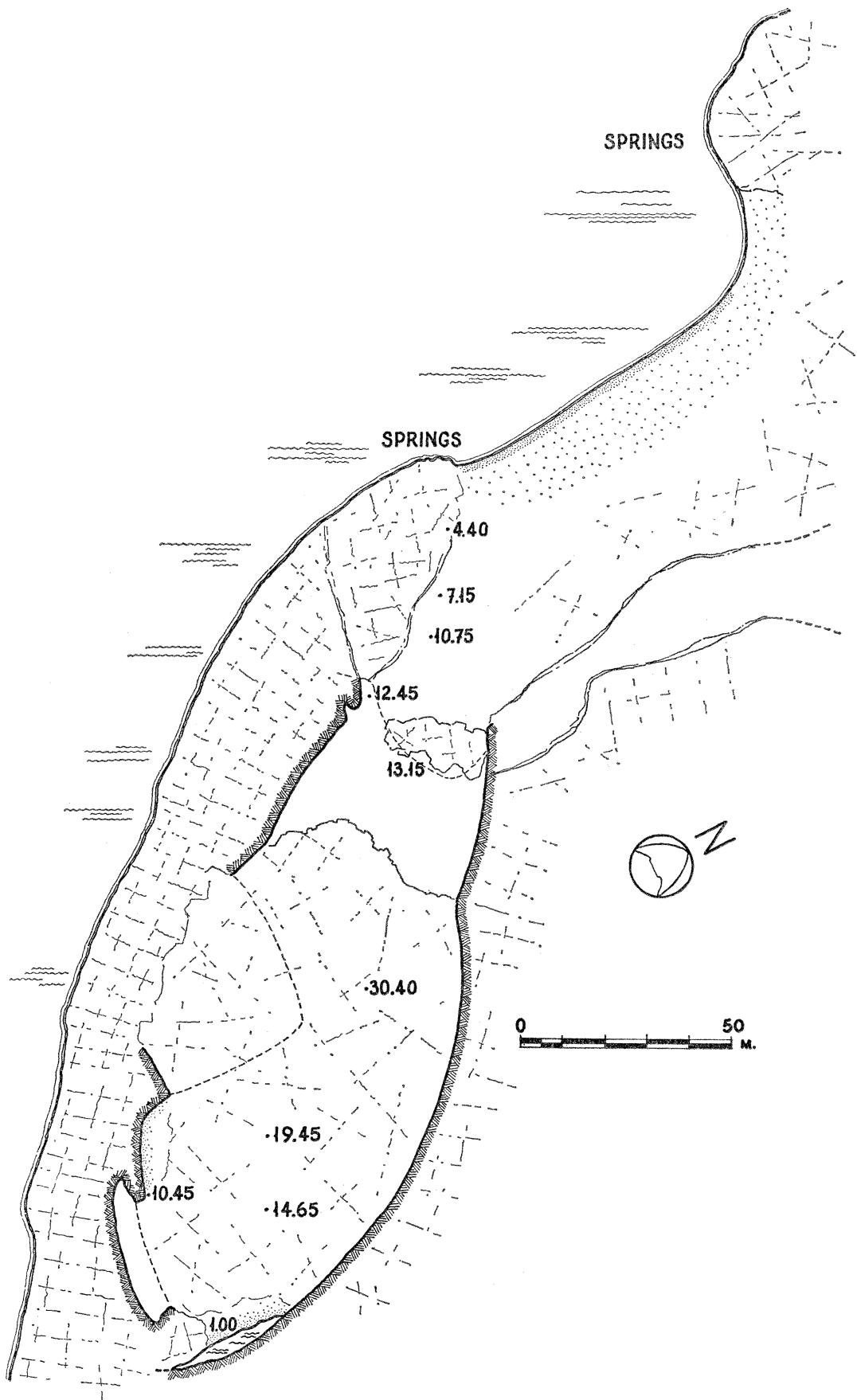


FIG. 1. Plan of Franchthi Cave and Immediate Environs.

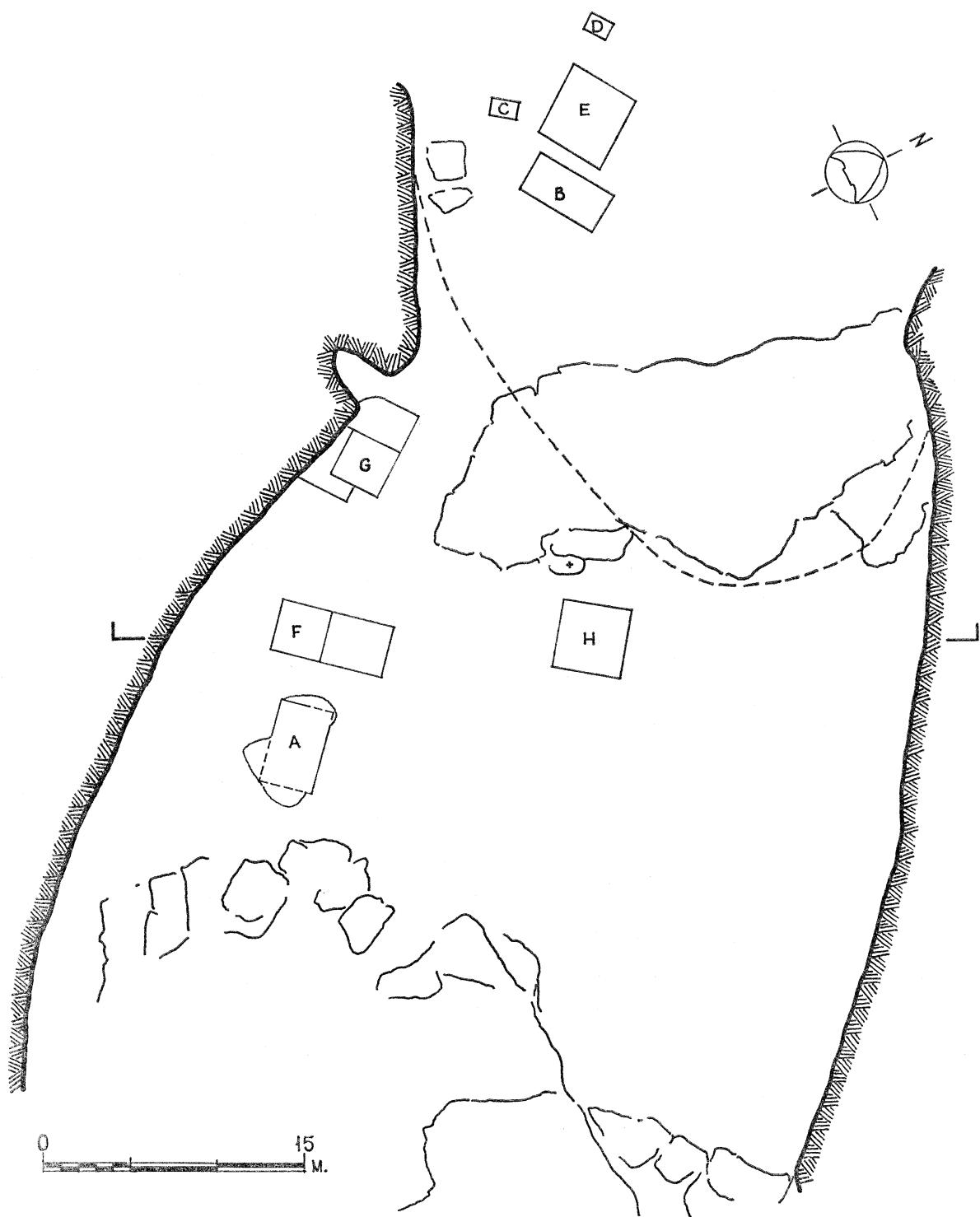


FIG. 2. Plan of Excavated Portion of Franchthi Cave.

of the cave) which lay between *ca.* 0.30 m. and *ca.* 1 m. below the modern surface; but the excavations were forced to cease at that point because of the difficulty in penetrating the rocky mass. The finds from these shallow soundings included material of Neolithic, Classical and post-Classical times.

The major effort during the past two seasons, therefore, has been concentrated upon the investigation of the front part of the cave, the area extending from the mouth back to the beginning of the massive rockfall from the roof. The modern surface of this area is quite irregular, sloping in all directions from a central "cone" over 13 m. above sea level down to a level adjacent to the cave walls 2 m. or more lower (Pl. 93, d). Although there may have been slight variation from period to period, this general conformation seems to have existed throughout the inhabited history of the cave as far as it is now known.

Basically, four deep trenches or pits have been opened in the front part of the cave (Fig. 2; Pls. 93, b, d, 94, a). The first (A) lies about 12 m. south of the central cone at a height of just over 11 m. above sea level. The dimensions of Pit A were originally 3 m. x 5 m.; but, after the removal of an enormous boulder and many accompanying stones of smaller size at a depth of *ca.* 2.50 m. (all presumably due to the collapse of the roof), approximately half of the trench served as a terrace to render access to the deep pit more easy and safe. The excavations ultimately reached a maximum depth of slightly over 6 m. (*ca.* 5 m. above sea level) and revealed a stratified deposit extending apparently uninterrupted from later Mesolithic through Neolithic, above which was a mixed surface deposit including material of post-Classical times. Although the stratigraphic record of Pit A has proved to be of considerable value for an understanding of the relative sequence at this site, excavation was discontinued there at the end of the 1967 season because of the serious danger of rockfall from the upper portions of the exposed trench walls.⁷

Pit F (3 m. x 3 m.) was opened in 1967 just to the northwest of Pit A. Excavation was initially confined to the mixed surface layer resting upon the level of medium-sized stones first observed in Pit A, but the excavated area was extended to the northeast (F-1) in 1968. The combined cutting (F/F-1, 3 m. x 6.50 m.) was then carried down well into the pure Neolithic layers reaching a depth of *ca.* 3 m. (*ca.* 8.20 m. above sea level). At this point excavation was restricted roughly to the southwestern half of the pit, which was subdivided into four quadrants (A-D) in order to examine more carefully the interface between the ceramic and aceramic levels recognized elsewhere in 1967. The quadrants were excavated individually, and excavation was suspended only after the aceramic deposit had been securely reached (maximum depth of *ca.* 4.80 m., or *ca.* 6.40 m. above sea level). Pit F/F-1 produced

⁷ This danger existed to some extent in all the deep pits because of the proximity of the heaviest concentration of rubble to the loose surface soil.

what appears to be a continuous stratigraphic sequence from the very end of Mesolithic through Neolithic, a sequence very similar to that revealed in Pit A.

Pit G (originally 3 m. x 3 m.), begun during the 1967 season, lies at the entrance to the cave. A subsequent extension toward the near-by cave wall was created to facilitate access to the deep pit, which reached a maximum depth of *ca.* 5.75 m. (*ca.* 6.70 m. above sea level) and well into the Mesolithic deposit during the first season. The excavated area was further extended to the northwest, west and southwest (G-1) in 1968 in order to permit the opening of a deeper sounding (1.50 m. x 2.50 m.) below the level reached in 1967. Plate 94, a illustrates a portion of the deep sounding at the depth of *ca.* 6.75 m. (The gritty character of the "floor" of the excavated area at this point is due to the appearance of a stratum of heavily crushed shell.) This sounding was ultimately divided into two parts; one half was continued down to a maximum depth of *ca.* 9.50 m. (*ca.* 3 m. above sea level), the deepest penetration in the Franchthi Cave up to now (Fig. 3).⁸ A level of heavy rockfall lay at the base of Pit G/G-1, but bedrock has yet to be reached. Although this basal level bears a certain resemblance to that at the bottom of Pit H, additional study of the material from it will be necessary before its relationship to what lies above it or to the basal level in Pit H can be determined. It is clear, however, that it underlay a deep deposit of the Mesolithic period, which was in turn covered by a substantial accumulation of the Neolithic period. Unlike Pits A and F/F-1, however, the sequence from Mesolithic through Neolithic does not appear to be continuous in G/G-1, for there seems to be a hiatus at the end of the Mesolithic.⁹ This too remains to be fully explained.

The only entirely new area opened in 1968 was Pit H, northeast of G/G-1 and on the cone near the mouth of the cave. Pit H originally measured 4 m. x 4 m. but, at a depth of *ca.* 3.50 m., the excavated area was reduced to a smaller sounding (1.80 m. x 2.50 m.). Subsequently (at a depth of *ca.* 5 m.) this sounding was halved, and one half (A, 1.25 m. x 1.80 m.) was carried down to a maximum depth of *ca.* 7.50 m. (*ca.* 6 m. above sea level). Pit H produced considerable evidence of Neolithic and Mesolithic occupation not unlike that of Pit G/G-1; but of most interest was the exposure at a depth of 6.00-6.50 m. of a stratum with a dense accumulation of shells (appearing to be almost exclusively land snails¹⁰) beneath which was a layer of rocky reddish clay quite different from preceding strata and accompanied by an abrupt faunal change.¹¹ Because of the very limited area in which the latter level has been exposed, a proper explanation of it must await the results of further excavation and additional study of the material found therein.

⁸ It is for this reason that the section in Figure 3, which is not entirely representative of the stratigraphy of the site as a whole, was selected for illustration in this preliminary report.

⁹ See below, p. 352.

¹⁰ This identification remains subject to a thorough study of the molluscan material from the site by Dr. N. J. Shackleton in 1969 (see below, p. 380).

¹¹ For a discussion of the faunal remains from the deep sounding in Pit H, see below, pp. 353-354.

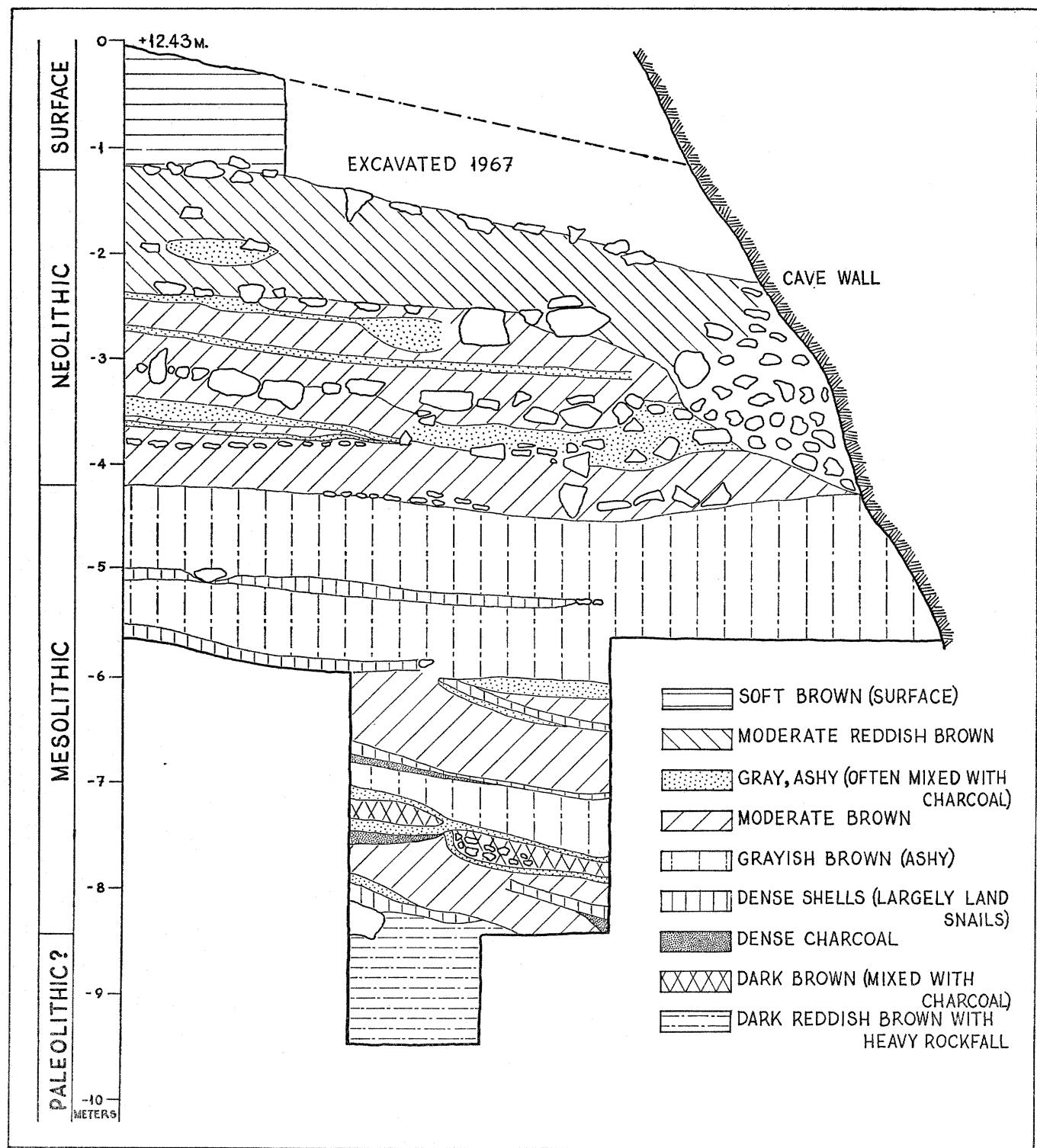


FIG. 3. Section of South Face of Pit G/G-1.

Before turning to the remains themselves, some additional remarks about the methods of recovery are perhaps in order here. The excavation was carried out by means of a series of arbitrary "units" of varying thicknesses dug as much as possible according to the stratigraphy of each pit. The thickness of most units (which may consist of more than one "spit" or "pass") was about 0.10 m., but some (especially in the deep soundings in Pits F/F-1, G/G-1, and H) were less than that and others (often in areas where an abundance of fallen stone made excavation difficult) more than that.¹² (Reference will be made in the following paragraphs to many of the units by number. Although it can generally be understood that the units are in consecutive sequence, those bearing higher numbers being stratigraphically lower than those with lower numbers, the reader should be warned that such is not the case in every instance.) With the exception of the soundings (B-E) on the terrace in front of the cave, all excavated earth was passed through a sieve of one kind or another.¹³ Although various combinations of sieving procedures were tried, special attention was always given to earth from levels where small objects (e.g. Mesolithic microliths) might be likely to turn up. Finally, a certain uniformity in the description of color changes of the soil was effected during the 1968 season by the use of Munsell color charts given to each of the excavation supervisors.¹⁴

Of the following sections summarizing the excavated remains from the cave, the first two, reports on the animal bones and the flaked stone industries, were prepared by Mr. Sebastian Payne of Cambridge University and Dr. Paul Mellars of the University of Newcastle-upon-Tyne, respectively.

ANIMAL BONES

Caution: It should be stressed that this is only a preliminary report. Much of the bone has not yet been cleaned and has only been cursorily examined.

¹² Measurements were taken at two points in each pit from a fixed datum, except in the deep soundings in Pits F/F-1, G/G-1, and H where depths were recorded at all four corners of the excavated area. The latter procedure proved to be far more satisfactory than the former and will therefore be followed exclusively during the 1969 campaign.

¹³ Three types of sieves have been used during the two seasons. A vertical "throw screen" with a 0.015 m. mesh was used exclusively during the 1967 season. During the very early part of the 1968 season, a horizontal sieve consisting of three superimposed trays with meshes of 0.027 m., 0.01 m. and 0.007 m. was tried but found wanting. This was largely replaced by a horizontal "shaker" sieve adapted by Mr. Payne from a type devised by Professor C. B. M. McBurney. This also consisted of three superimposed trays, but the meshes of each tray were smaller (0.012 m., 0.006 m. and 0.0035 m.) and the structure of the sieve itself was more sturdy. Two sieves of this type were employed for the most critical areas excavated in 1968 and will continue to be used in subsequent excavations on the site. (See Pl. 93, d for an illustration of these sieves in use.)

¹⁴ Identification of soil colors was also complicated by the problem of lighting in the cave, especially in the deepest soundings. Virtually no artificial light was employed during the 1967 season, but as many as four kerosene lamps of 500 c.p. each were used in each of the pits excavated in 1968. A small generator for producing electric light will also be used in 1969.

Four soundings have yielded sequences through a considerable depth of deposit: Pits A, F/F-1, G/G-1, and H. A major problem in treatment is posed by the lack of direct stratigraphic connection between these trenches: the major faunal and artifactual changes are such that broad-scale correlation between the pits is almost certainly reliable, but fine-scale correlation is much more difficult. For this reason the sequence is described in broad outline only.

THE NEOLITHIC FAUNA

In each pit a clear division is marked by the appearance of sheep and goat; above this point the bone samples are dominated by these animals. Units G-1: 6-18, which have large quantities of Middle Neolithic pottery, are typical of these upper units. The animals identified are as follows:

G-1:6-18

Sheep (*Ovis*) and Goat (*Capra*): predominant, usually 70% and often as much as 85% of the identifiable mammal bones. Both present, sheep commoner than goat. Bones decrease gradually in size from bottom to top. At least 50% immature animals.

Pig (*Sus*): fairly common, 5-15%.

Bovid (*Bos*): usually 5-10%, fairly small size.

Red deer (*Cervus elaphus*): ca. 5%.

Also present in small quantities are hare (*Lepus*), fox (*Vulpes*), a canid (*Canis*), bird bones, and fragments of tortoise carapace (*Testudo*).

Fish vertebrae, of quite large size, are frequent (5-10% of the total bulk of the sample).

This composition is characteristic of all Early and Middle Neolithic units. In accordance with current criteria and assumptions, most workers would identify the sheep, goat, pig, bovid, and canid as domestic. Such an economy, based largely on the domestic animals, with sheep and goat playing an important part, is a familiar pattern in Neolithic Greece.

Below these Neolithic units lies a series of units with a very different composition. Red deer is predominant, and there is no trace of sheep or goat. The condition of the bones in these units is very different from that of the bones in the overlying Neolithic. The Neolithic bones are hard, white or pale brown in color, and rarely show traces of burning. Long bones are always broken, but smaller bones, such as phalanges, are usually unbroken. In contrast, the bones of the underlying units are softer, darker in color, and often show traces of burning. They are very fragmented; even phalanges and calcanea are broken open, and, indeed, are rarely found unbroken!

In all four pits the transition between the Neolithic and the underlying sequence is fairly abrupt. Units with predominant sheep and goat (e.g. G-1:18-19), and units with no sheep/goat bones (e.g. G-1:22 downward),¹⁵ are separated by a few units with predominant red deer, but a few sheep/goat bones (e.g. G-1:20-21). In these

¹⁵ There are a few sheep/goat bones in G-1:26-27, which, as explained below (note 17), can be discounted.

units, there is a clear contrast in condition between the few sheep/goat bones, whose condition resembles that of the overlying Neolithic units, and the remainder of the bones, whose condition resembles that of the underlying units. I feel that these units are not truly transitional, but probably are a mixture of two different assemblages, either because excavation did not exactly follow the junction between two layers, or because a few bones were trodden into the underlying sediments.

In each of the four pits, as has been stated, there is a similar faunal change. However, whereas in the front two pits (G/G-1 and H) pottery diminishes and disappears at about the same place as the sheep/goat bones, in the two pits further back (A and F/F-1) pottery decreases and disappears above the point where the faunal change occurs. This is best seen in Pit A, where a series of units with negligible amounts of pottery (which according to the excavator are almost certainly intrusive)¹⁶ contain abundant sheep and goat bones (A:63-65). Sheep/goat bones then decrease (A:66) and disappear (A:67) in the same way as in the other pits. Similar results were obtained in Pit F/F-1, where this aceramic zone with abundant sheep/goat bones is thinner but was isolated with greater precision. A depositional hiatus is thus indicated in Pits H and G/G-1 at this period.

THE MESOLITHIC FAUNA

In Pits A and F/F-1 excavation stopped just below the interface. In Pits G/G-1 and H excavation continued much deeper. Units G-1: 22-65 form a long sequence through this part of the deposits. The animals identified are as follows:

G-1: 22-65

Red deer (*Cervus elaphus*) : predominant, usually 75% and often as much as 85% of the identifiable mammal bones. Mainly adult animals.

Fox (*Vulpes*) : present throughout (usually 5-10%), slightly commoner lower down.

Pig (*Sus*) : occurs sporadically throughout, slightly commoner lower down. Always less than 5%.

Bovid (*Bos* or *Bison*) : occurs only in G-1: 31-36, where it is 10-20%. Much larger than the Neolithic bovid.

Also present in small quantities are hare (*Lepus*), a small felid (*Felis*), and a large canid (probably *Canis lupus*) in G-1: 22. A few sheep/goat bones in G-1: 26 and 27 can be discounted.¹⁷

Fish vertebrae, of large size, are abundant in the upper part of this series: in some units they form more than half the total bulk of recovered bone (e.g. G-1: 35, 37). They decrease abruptly in quantity in G-1: 50-51; and none are found below this point.

¹⁶ Units A:63-65 accounted for a total thickness of 0.47-0.48 m. of deposit and produced only five small potsherds (one of which was of Late Neolithic, another of Middle Neolithic date). (T. W. J.)

¹⁷ Just before G-1: 26 was excavated an overhanging boulder was removed, and, in the process, fell into the trench, together with a lot of deposit. This was removed before excavation continued, but the sherds and sheep/goat bones found in G-1: 26-27 were almost certainly impacted into the deposit during the operation.

Thus in the lower part of this series subsistence was based on the red deer, and in the upper part on red deer and fish. It is suggestive that obsidian (see below, p. 355) becomes much commoner a little above (G-1: 46) the point at which fish appears (G-1: 50-51). The fauna does not seem to indicate a climate colder than the present, and is probably early Postglacial in date. On the basis of current criteria and assumptions there are no domestic animals in these levels.

A similar series of units was encountered in Pit H, in the sequence H: 42, 44-52, 53A1-56A4. The fauna closely resembles that in G-1: 22-65. Again fish bones are abundant in the upper part, grow much scarcer (H: 49-50), and (except for a few in H: 53A2 and 53A3) are absent below.

THE PLEISTOCENE FAUNA

Below H: 56A4, the series H: 57A1-60A10 contains a very different faunal assemblage from any found higher up. These units come from a layer of reddish clay quite unlike any of the strata above. The bones are in general either rather soft, or heavily concreted. They are pale in color, and contrast in this way with the bones in the Mesolithic levels. Units H: 57A2-59A3 can be taken as representative of this horizon; Unit H: 57A1 appears to be an interface mixture, with bones in two different conditions of preservation. Units H: 60A1-60A10 contain very few bones; such bones as there are in these units are not significantly different from those in H: 57A2-59A3. The animals identified are as follows:

H: 57A2-59A3

Deer (probably *Cervus elaphus*) : abundant throughout and larger than the deer in the Post-glacial levels.

Equid (probably *Equus hydruntinus*) : common throughout.

Bovid (*Bos* or *Bison*) : common in the lower part (H: 58A5-59A3).

Large caprine (probably *Capra ibex*) : sporadic.

Also present in small quantities are hare (*Lepus*) and pig (*Sus*).

This fauna closely resembles the Würmian faunas of South Italy (Romanelli) and Epiros (Kastritsa), and is almost certainly of this date. Human activity is attested by cut-marks on the bones.

A similar red clay was reached in Pit G/G-1:66 and 67. The bone samples are small, but there are a number of equid bones.

Thus, at Franchthi Cave, excavation has revealed a sequence which appears to stretch from the Pleistocene to the Neolithic. The considerable depth of deposit makes this record potentially very sensitive: the rate of accumulation seems to have been rapid, and conditions of preservation are reasonably good. The value of the site will be considerably enhanced if pollen is well preserved, and if other specialist studies give good results.

For the last ten years, a major preoccupation of prehistoric research has been the search for the origins of agriculture and the Neolithic way of life, and the eluci-

dation of the process of expansion of Neolithic technology. In the classic zone of Southwest Asia these changes were taking place around the beginning of the Holocene, during a period of considerable climatic change. Unfortunately, the coincidence of climatic and economic change in Southwest Asia makes it difficult to distinguish archaeologically between their effects. In Europe, however, the change to a Neolithic way of life happens later than the rapid postglacial warming, and we have the opportunity to compare the two changes, each isolated from the other. Sites at which a record of both changes is preserved are rare, and it is this that makes Franchthi Cave a key site.

S. P.

THE FLAKED STONE INDUSTRIES

It has already been noted that a clear division within the Franchthi succession is marked by the appearance of sheep and goat; this is taken to define the interface between the "Mesolithic" and "Neolithic" horizons. The flaked stone industries are therefore considered primarily in terms of these two broad cultural or stratigraphic units.

MESOLITHIC INDUSTRIES

The principal samples of Mesolithic material examined were those obtained from the lowermost 45 units (units 22-67) of Pit G-1. This succession yielded a substantial number of artifacts (over 5,000 pieces, including 912 retouched specimens) and appears to cover a considerable span of time. Of the material from other trenches, only that from the basal units of Pit H (units 57A2-59A3) was examined in detail; for reasons already explained, these levels appear to relate to an early phase of deposition which is not represented clearly in Pit G-1.¹⁸

G-1: 22-67

Throughout the pre-Neolithic levels the stone artifacts were manufactured predominantly from three main varieties of raw material—red flint, gray flint, and gray or gray-green "chert." All these materials display a considerable degree of variability. The gray flint is particularly variable and many of the pieces have a mottled gray and yellow or gray and pink appearance. The quality of the material is also uneven; while some of the flint (especially the red variety) has a smooth, shiny texture and appears to flake fairly well, much of it has a coarser, granular appearance and was clearly not ideal for tool manufacture. On the basis of existing information, little can be said regarding the precise origins of these materials; however, the bulk of the red and gray flint, which accounts for the majority of the artifacts in all the horizons, was probably obtained from fairly local sources.

¹⁸ Units 66 and 67 at the base of Pit G-1 may contain material of this age, but these levels produced only seven pieces of flaked stone.

Of particular interest is the clearly documented occurrence of obsidian in the pre-Neolithic levels. In fact, use of this material is attested with certainty only in the upper half of the Mesolithic succession; with the exception of isolated fragments from units 49, 51 and 52, all of the 96 pieces of obsidian recovered from the Mesolithic levels in G-1 were found in units 22-45. However, the consistency with which the material occurred in these horizons leaves little doubt as to its indigenous, *in situ* status, and this point is confirmed beyond dispute by two further observations: (1) Among the obsidian specimens from the Mesolithic horizons characteristic blades and fragments of blades are entirely lacking; this may be contrasted with the fact that in the overlying Neolithic levels blades and blade segments account for over 30% of the obsidian artifacts recovered. (2) The obsidian artifacts from the Mesolithic levels include four very typical microlithic "trapeze" forms; this type of implement has not so far been recorded in any of the Neolithic horizons on the site.

As far as the writer can ascertain, this is the first time that the presence of obsidian has been recorded in a stratified pre-Neolithic context in the Aegean. The close correspondence between the appearance of this material in the Franchthi succession and the earliest evidence for fishing activities at the site is an interesting feature to which attention has already been drawn. However, the source from which the obsidian was obtained remains to be ascertained.

Viewed in broad terms, the typology of the retouched tools conveys a strong impression of uniformity from the bottom to the top of the Mesolithic succession. In all the levels the bulk of the retouched pieces consists of short flakes bearing one or more clearly defined notches (Fig. 4, Nos. 1-5). Frequencies of such pieces (expressed as percentages of the total retouched and/or utilized specimens) vary between 58% and 75% in different parts of the sequence. Multiple examples are common and in some cases up to seven clear indentations can be observed on a single flake. To judge by their abundance, these notched and denticulated implements must have played an important part in the economy of the Mesolithic groups who occupied the cave, and yet the intended function of the tools remains, for the present, unknown.

Apart from notches, other well-defined implement types are poorly represented in the Mesolithic levels. Under the heading "retouched and utilized knives" are grouped flakes with one or more sharp, regular edges which bear clear signs of utilization and which appear to have been used for cutting or sawing (Fig. 4, Nos. 10, 11); examples of such pieces were found in almost all the stratigraphic units. Small, finely-pointed awls were recovered from units 39 and 40, and characteristic "splintered blades" ("lames ecaillées") from units 35 and 61 (Fig. 4, No. 12). A negative feature of the assemblage to which particular attention should be drawn is the marked scarcity of two tool-types which are generally abundant in late Palaeolithic and Mesolithic industries—typical end-scrapers and burins. The Mesolithic levels of G-1 produced only three or four fully characteristic examples of the former type (Fig. 4,

Nos. 6, 7) and only a single convincing burin (Fig. 4, No. 8); certain other pieces may conceivably represent attempts at manufacturing these types, but these must be regarded at best as atypical specimens.

The most interesting tools recovered from the Mesolithic levels are the "microlithic" forms. True microliths, in the sense of small steeply-backed bladelets, are represented by 15 examples from G-1 (Fig. 4, Nos. 14-17). While precise classification is difficult, one of the pieces may be described as a "triangle," another as a "crescent," three as "obliquely-blunted-points," four as "rods retouched along a single edge" and six as "rods or points retouched on two edges." All of the pieces are manufactured from flint, none from obsidian. An interesting feature, the significance of which is hard to assess, is that the stratigraphic distribution of these forms appears to be confined to the middle part of the Mesolithic succession. All of the pieces were localized between units 27 and 46 with an apparent concentration in units 34-40. Possibly the analysis of material from other trenches will throw more light on the meaning of this observation.

Well characterized microlithic "trapeze" forms were recovered from units 37, 39, 41 (2 pieces), 46, 47 and 52 (Fig. 4, Nos. 18-21). It will be noted that the vertical distribution of these pieces is similar, though not identical, to that of the other microliths referred to above. Four of the trapezes are manufactured from obsidian and three from flint. The occurrence of these forms in horizons dated by radiocarbon to the eighth millennium B.C. is especially noteworthy.

"Backed blades" of medium to large dimensions are virtually lacking from the industry. Three or four pieces from units 36, 39 and 45 might be assigned broadly to this category but these are all poorly characterized specimens; none of the pieces could be described as a "Gravette point."

Turning from typology to techniques of manufacture, attention should be drawn to the marked scarcity of well-made blades in the Mesolithic horizons. One or two specimens would seem to indicate that the technique of blade production was in fact known, but the overwhelming majority of the artifacts (both retouched and unretouched) consist of small, rather formless flakes. The same feature is reflected in the shapes of the cores; of 160 cores and "core-lumps" recovered from the levels under review, only three or four at most were intended for the production of blades. The bulk of the cores are of irregular, "globular" form, showing evidence of flaking from several different directions. It is pertinent to inquire how far the poor representation of blade technique may be due to the scarcity of good-quality raw material, occurring in the form of large nodules, within the vicinity of the site.

Finally, reference should be made to two artifacts, found near the base of G-1, which seem conspicuously out of place in a Mesolithic assemblage. One of these is a flake with a carefully faceted striking platform found in unit 63; the other is a typical "discoid" core (Fig. 4, No. 13) found in the level immediately above (unit

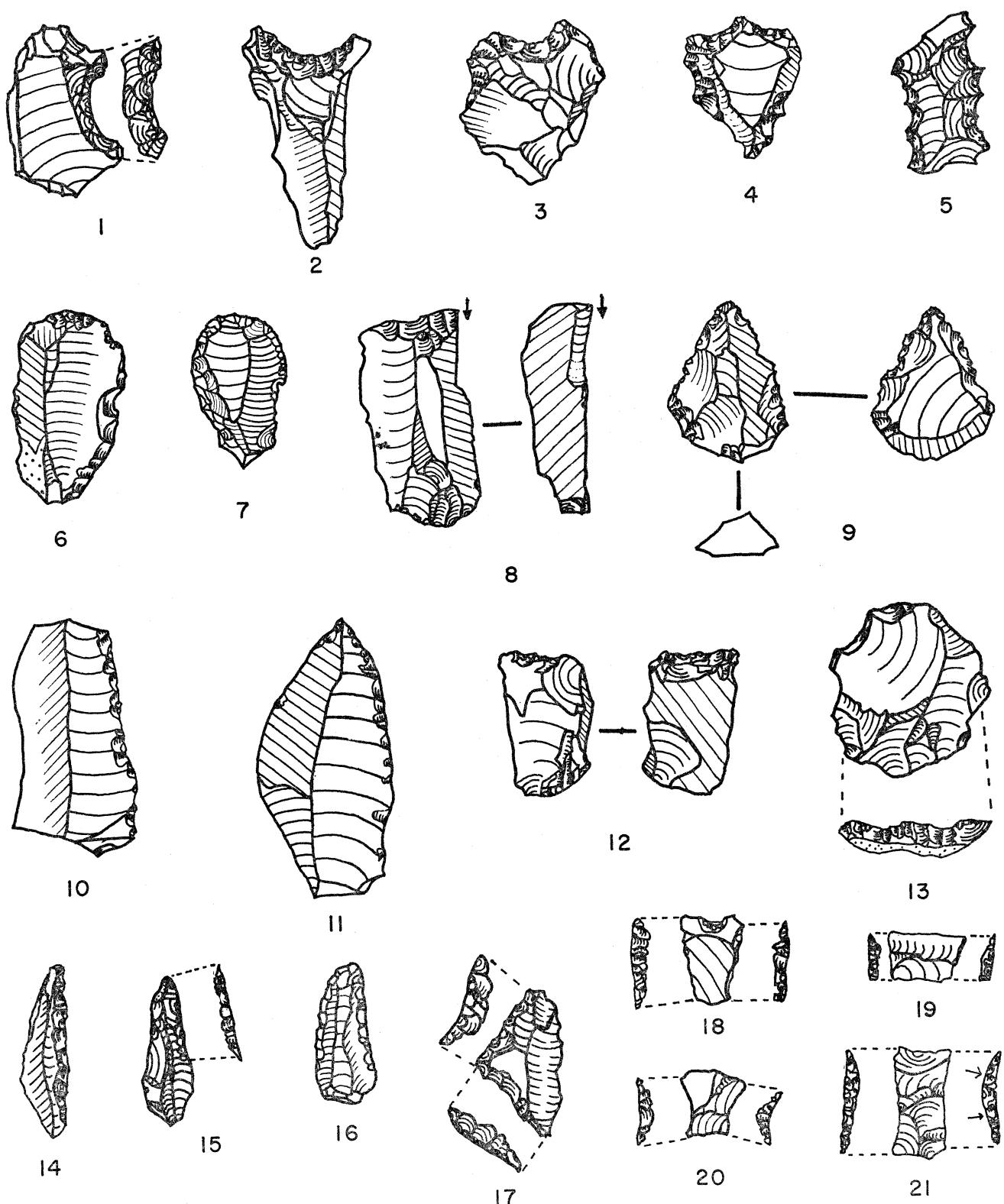


FIG. 4. Flaked Stone Artifacts from Mesolithic Levels. Nos. 4, 18, 20, 21 of obsidian, others of flint (1:1).

62). The nature of both of these pieces is strongly suggestive of a Mousterian, or at least Middle Palaeolithic, context. That the pieces are in fact intrusive in the Mesolithic horizons is supported by the somewhat worn, "rolled" condition of the faceted-platform flake, and by the lustered appearance of the discoid core. One obvious possibility is that these two specimens derive from much earlier cultural deposits which exist, or at one time existed, in some other part of the site. Alternatively it is just conceivable that they derive from an entirely different site and were brought into the cave by the Mesolithic occupants themselves.

H: 57A2-59A3

On the basis of the faunal evidence, the material from the basal levels of Pit H (units 57A2-59A3) represents a relatively early phase of occupation of which only very slight traces were found in Pit G-1. Unfortunately, the number of stone artifacts recovered from these units is rather small, a total of only 74 pieces. Nevertheless it is significant that of the 17 pieces which bear clear signs of retouch and/or utilization, ten represent single or multiple notches; the remainder are simply utilized knives. There are therefore some grounds for thinking that the industry contained in these levels, which are probably of late Pleistocene age, may not be substantially different from that found in the later Mesolithic horizons in Pit G-1.

NEOLITHIC INDUSTRIES

Samples of Neolithic material were examined from three of the excavated areas: G-1: 2-19; F/F-1: 20-41A4/44B4/43C2/42D; and A: 63-65. It should be noted that flaked stone artifacts were in general much less abundant in these levels than they were in the Mesolithic horizons below; consequently, the extent to which one can make reliable observations with regard to the quantitative aspects of the data is limited.

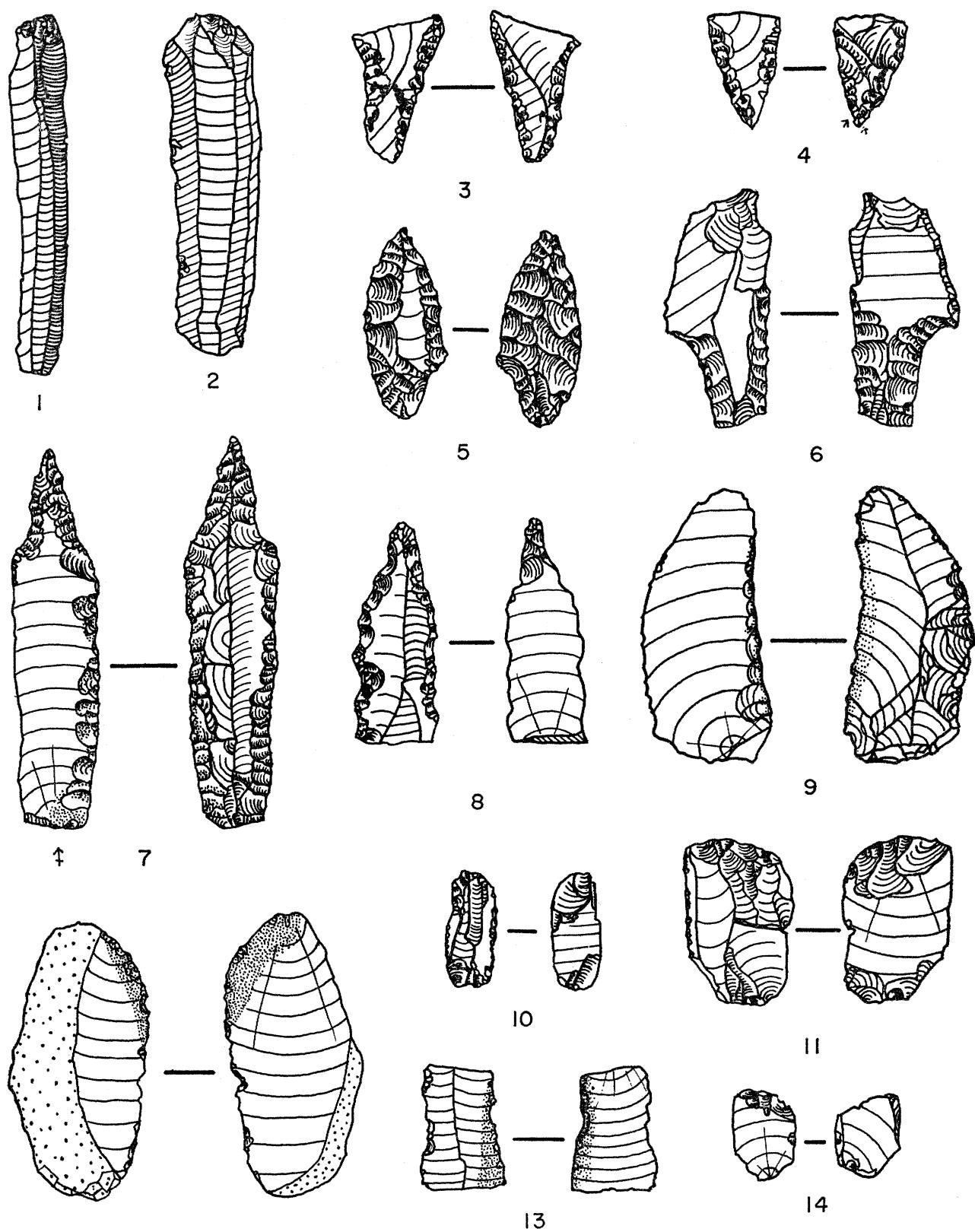
The majority of the artifacts examined so far derives from levels which are tentatively classified on the basis of pottery typology as either "Middle Neolithic" or "transitional Middle to Late Neolithic." By far the predominant raw material represented in all these horizons is obsidian; artifacts of this material account for 75-80% of the samples analyzed from both Pits G-1 and F/F-1. The primary objective in the working of obsidian was evidently the production of fine, regular, elongated blades (Fig. 5, Nos. 1, 2). As noted earlier, over 30% of the obsidian artifacts recovered from the levels under review represent typical blades or blade segments. The majority of these pieces appear to have been used, presumably as knives or razors, without any further retouch. The relative scarcity of small flakes of obsidian could be taken to indicate that much of the working of this material was undertaken away from the site; nevertheless, the presence of three very characteristic "core trimming" products would suggest that at least some of the flaking was carried out within the cave itself.

Although much less abundant than obsidian, flint was certainly employed as a raw material in the Middle Neolithic horizons. Much of this material appears to have been obtained from the same sources as that employed in the Mesolithic levels; however, particular attention should be drawn to the appearance in the Neolithic horizons of a distinctive, translucent, "honey-colored" variety of flint (Pl. 94, b). This material evidently possessed excellent flaking qualities and seems to have been especially favored for the manufacture of retouched tools; to judge by the scarcity of "waste" fragments it does not appear to have been extensively worked on the site, and may well have been imported from a relatively distant source.

The principal forms of retouched and/or utilized implements represented in the material analyzed are as follows: *Arrowheads*: eight specimens, including four of "transverse" type (Fig. 5, Nos. 3, 4; Pl. 94, b, upper right) and four of "tanged" (or "shouldered") form (Fig. 5, Nos. 5, 6); four of the arrowheads (including three transverse forms) are manufactured from honey flint; only one is of obsidian. *Flint flakes and blade-segments showing "sickle-gloss"*: six pieces, including at least three of honey flint (Fig. 5, Nos. 12, 13). *Awls*: two elongated, carefully-worked specimens; one is of obsidian (Fig. 5, No. 8), the other of good quality red-brown flint (Fig. 5, No. 7). *Splintered blades*: three very characteristic specimens of normal dimensions (Fig. 5, No. 11) plus at least 30 examples of what appears to be a distinct microlithic variant of the same type (Fig. 5, Nos. 10, 14); all the pieces are of obsidian. *Backed blades*: one rather broad specimen made of flint (Fig. 5, No. 9), and one of obsidian. *End-scraper*: a single, incomplete specimen. *Notched and denticulated forms*: nine or ten reasonably well characterized pieces, principally of flint.

With regard to the stratigraphic distribution of the above types, the only point worth noting is that all four of the transverse arrowheads were recovered from levels which produced exclusively Middle Neolithic pottery; by contrast, three of the four tanged forms were found in horizons which yielded a mixture of Middle and Late Neolithic elements. Attention may also be drawn to the fact that three of the arrowheads (all of honey flint) show clear traces of some kind of resin adhering to the surface; this presumably gives some indication as to how the tools were originally hafted. The most curious feature of the material under review is the abundance of microlithic "splintered blades"; the intended function of these pieces is, to say the least, enigmatic.

Levels tentatively classified on ceramic grounds as "Early Neolithic" in Pit F/F-1 produced only a very limited number of flaked stone artifacts, 64 pieces in all. In connection with this material, however, two points of considerable interest should be noted. First, in contrast to the situation observed in the Middle Neolithic horizons, the majority of the artifacts recovered from the Early Neolithic levels are of flint; the proportion of obsidian pieces falls from 75% in the Middle Neolithic deposits to 23% in the Early Neolithic horizons. Second, of the ten artifacts from the Early



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FIG. 5. Flaked Stone Artifacts from Neolithic Levels. Nos. 1, 2, 5, 8,
10, 11, 14 of obsidian, others of flint (1:1).

Neolithic levels which are clearly retouched, eight are notched forms; of the two remaining pieces, one is an atypical backed-knife and the other a small splintered blade.

It will be apparent that in both of the above features, the dominance of flint over obsidian, and the strong representation of notched forms, the material from the Early Neolithic horizons is more similar to that from the underlying Mesolithic deposits than to that from the Middle Neolithic levels above. However, it is important to note that the artifacts from the Early Neolithic horizons also comprise four very characteristic obsidian blades; such pieces have not so far been encountered in any of the Mesolithic levels at the site.

Very similar features are apparent in the material from the "Aceramic Neolithic" horizons in Pits F/F-1 and A. (It will be recalled that these levels yielded abundant bones of sheep and goat but negligible amounts of pottery.) Of the 70 flaked stone artifacts recovered from these units, 61 (87%) are of flint and 11 (65% of the retouched/utilized pieces) are notched or denticulated tools. The presence of two typical microliths, an obliquely blunted point and a crescent, may also be noted. The material again contrasts with that from the Mesolithic horizons in the presence of three obsidian blades.

In considering the possible relationships between the Neolithic and Mesolithic occupations at Franchthi it is evident that the foregoing observations are potentially of very great interest. It must be emphasized, however, that more rigorous analysis of both the typological and stratigraphic data will be required before any firm conclusions with regard to this aspect of the succession can be drawn.

P. M.

THE NEOLITHIC POTTERY

As at most Neolithic sites, pottery has been far and away the most common class of finds in the Franchthi Cave. Virtually all of the material belongs to the Neolithic period since there was only a very thin scatter of Late Bronze Age and post-Bronze Age potsherds on the surface and in the uppermost mixed layers.

Although the material has yet to be studied in detail, the following discussion will use as its basis Weinberg's tripartite division of Neolithic ceramics which at least for the present is broadly applicable.¹⁹ Yet it should be pointed out that the transitions from one phase to the next still remain somewhat blurred, both typologically and stratigraphically. Therefore it is quite possible that further excavation and study of the material will alter the existing picture especially with respect to the precise lines of demarcation between these phases.

EARLY NEOLITHIC

Although remains of E. N. type have turned up in all four of the deep pits, this level is relatively thin and the excavated area has been comparatively small. As a

¹⁹ S. S. Weinberg, "The Stone Age in the Aegean," *C.A.H.*, I² (fasc. 36), Cambridge, 1965.

result, E. N. pottery is very definitely the least abundant of the Neolithic wares from this site. Since the E. N. deposit has been most accurately isolated in the four quadrants of the deep sounding in Pit F/F-1, the remains from that area will serve as the basis for the following observations.

The pottery most characteristic of this period is a burnished monochrome ware (Pls. 94, c, 95, a). The fabric of this ware is gritty and slightly spongy, usually darkish in color (especially at the core); and the interiors are frequently blackened. The exterior surfaces are most often brownish or reddish brown though the color may vary from buff to black, not uncommonly on the same pot.²⁰ The repertory of shapes seems to be virtually restricted to the deep hemispherical bowl and the hole-mouth jar. Plain rims are most typical, bases (a few ring bases) rare, and handles (an occasional horizontal lug pierced vertically) even rarer. Aside from an occasional plastic rib or knob, burnishing is the only form of surface treatment. The quality of the burnishing varies from rather careless or streaky to very careful and complete. It regularly covers the whole exterior of the vessel but often extends to a narrow band just inside the lip.

Patterned ware does not appear until the very end of the E. N. phase and then only in very small quantities. The fabric is regularly spongy, the surface pitted and light in color (though the core is usually darker). The very simple rectilinear patterns are usually applied in a reddish brown paint to the burnished but unslipped surface of the vessel. Although this ware is clearly different (particularly in its fabric) from the patterned ware of the following period, it has been found up to now only in the units which comprise the transition from E. N. to M. N.

No pottery bearing incised or impressed decoration has yet been found among the E. N. remains from the Franchthi Cave.

MIDDLE NEOLITHIC

By far the largest class of pottery from this site is that of the M. N. period. All areas excavated in the cave produced substantial deposits of this period; and after further study of the material, it may well be possible to subdivide the whole into two or more phases.

As suggested above, there is some evidence pointing to a ceramic continuity from E. N. to M. N. This is perhaps best demonstrated by the continued appearance of a spongy monochrome ware of a generally gray to tan fabric. The interior and exterior surfaces of these vases seem to be more pitted than before, but, in the absence of the finer burnishing of the previous period, they are frequently smoothed

²⁰ A few fragments of a handsome black ware (Pl. 95, a, upper right), generally superior in fabric and surface treatment, may prove upon further study to be a late development of the burnished monochrome ware. At present it seems to encompass the transition to "Middle Neolithic."

by " paring " with a small blunt instrument. The shapes, especially the hole-mouthed jar and deep bowls, appear to be in the tradition of the E. N. period.

But that which most characterizes the new phase is the introduction of a monochrome slipped ware which certainly anticipates (and is probably related to) the characteristic M. N. " glazed " ware (Urfirnis). Although this slip on occasion has what appears to be a natural sheen, most often it is thin and dull and gives the appearance of having been swabbed on the vessel with a cloth.²¹ Though still gritty, the fabric is generally superior to that of the previous period: it is harder and more thoroughly baked (it is probably also fired at higher temperatures), its color generally ranging between buff and orange-red throughout. The interiors of closed shapes may still be quite pitted but they frequently show signs of scraping; while the exposed surfaces are generally more carefully smoothed, often by means of the same kind of paring as appears on the spongy ware. The color of the slip itself is usually orange to red but it may be darker (brown to black), and it is not uncommon to see the color vary from red to black on the same vase.

The variety of shapes associated with the thin slipped ware seems to be slightly greater than that recognized for the previous period. The globular jar with low collar (Pl. 95, b, right) is now common, while the deep bowl with ring-base (Fig. 6, No. 1) would appear to be a development of the E. N. deep bowl. Ring-bases are now more common, and low conical bases make their first appearance. Flat bases have not been found. Handles also appear more frequently, most being of the pierced-lug variety. There is also some evidence to indicate that the vessels with deeply scored interiors, so well known from other M. N. sites in the Peloponnesos, first make their appearance at this time (Pl. 96, a, lower left).²²

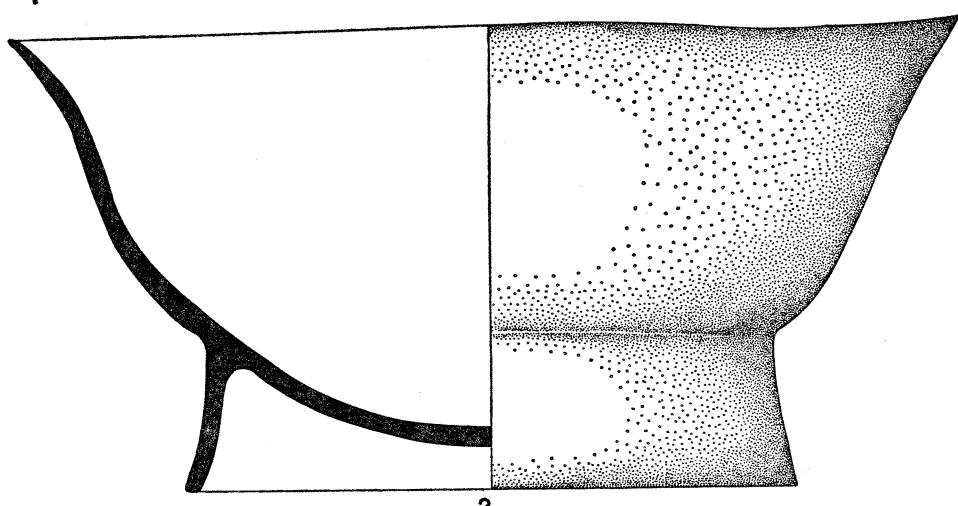
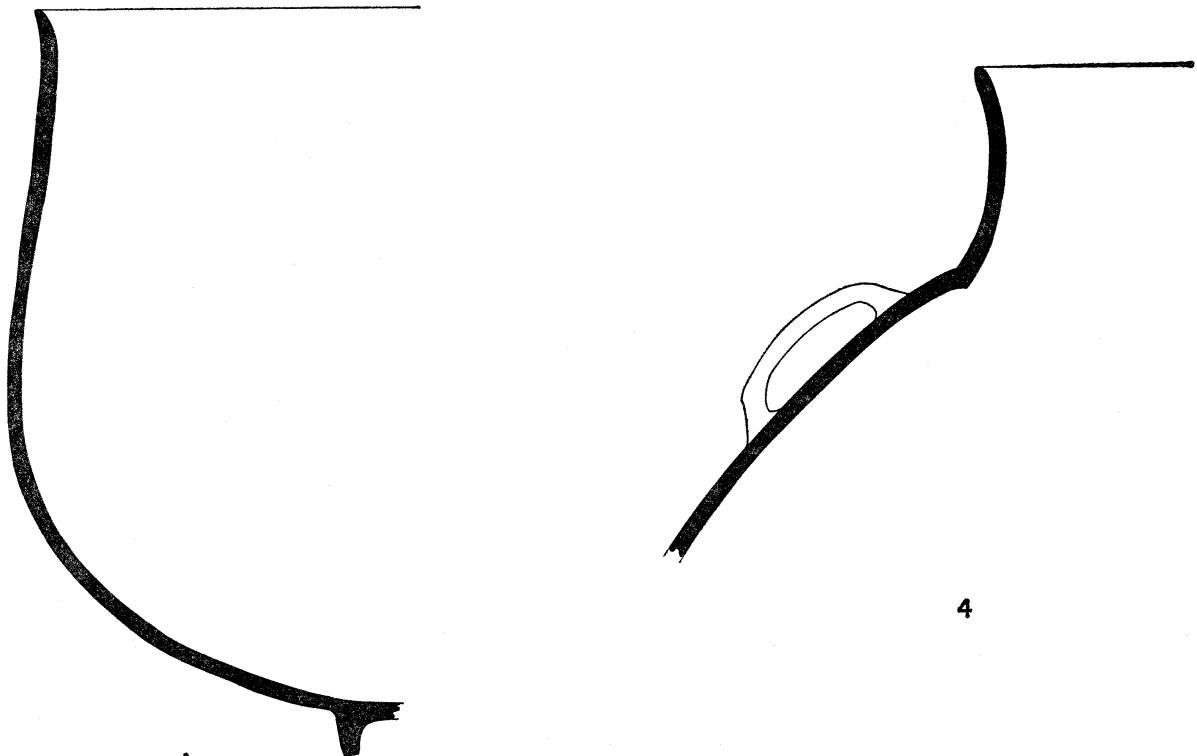
Apparently contemporaneous with and probably related to the monochrome slipped ware is a new patterned ware which now begins to appear in very small quantities. As direct successor of the spongy patterned ware of later E. N., its decorative motifs continue to be of the very simple linear variety.²³ It is easily distinguished from the earlier patterned ware, however, by the definite similarity of fabric and paint to the M. N. monochrome slipped ware. Like the latter, the paint is most often reddish in color but it can vary to black on the same vase. There is also the occasional piece that shows a patch of what appears to be natural sheen in conjunction with the basically lusterless paint.

At this stage of the study, the general impression resulting from a review of the

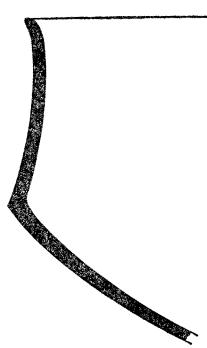
²¹ In the light of the obvious similarities between the fabrics and the manner of application of this slip and the Neolithic Urfirnis, one is puzzled by the difference in surface finish of the two wares. Several explanations seem to be possible, but Professor F. R. Matson is now examining selected potsherds from the site with this problem in mind. Cf. Caskey's comments, *Hesperia*, XXVII, 1958, p. 137, note 22.

²² Cf. examples from Lerna: *Hesperia*, XXVI, 1957, pl. 48, e, and XXVII, 1958, pl. 38, b.

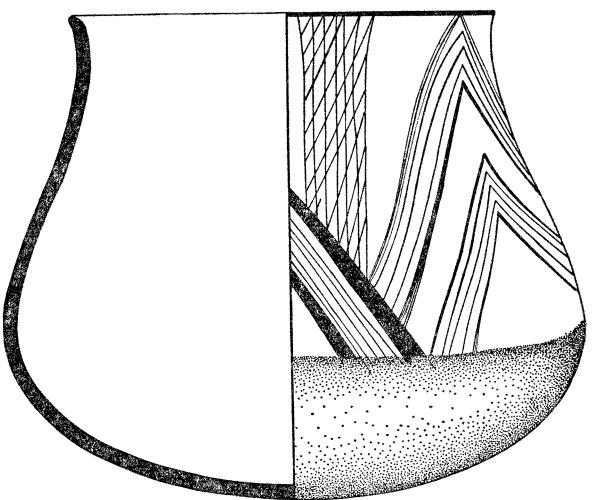
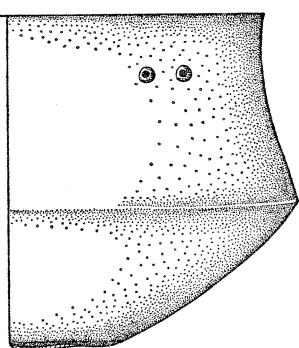
²³ Cf. *Hesperia*, XXVII, 1958, pl. 36, g-h.



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FIG. 6. Profiles of Middle Neolithic Shapes (1:3).

abundant M. N. pottery from the Franchthi Cave is that the monochrome slipped ware and the associated patterned ware evolve gradually into the well-known monochrome and patterned varieties of Neolithic Urfirnis ware. Although the lusterless slip or paint never totally disappears, it seems as if the evolution was reasonably complete before the middle of the period.²⁴ In any event, by the middle of the period the distinctive ware so ably described by Weinberg²⁵ was certainly flourishing.

Little needs to be added here to Weinberg's description of the fabric and appearance of Urfirnis ware, but a few additional observations might be made about the shapes employed since our excavations have produced a comparatively large number of partially or wholly restored vases. Certain shapes, particularly the collared jar (Pl. 95, b, left), continue from an earlier time, but one of the most striking aspects of the "high" Urfirnis period is the appearance of so many new shapes. Several varieties of carinated bowls are found (Fig. 6, No. 3; Pl. 95, c, left). This shape, as others of this period, can be decorated either in monochrome or with patterns. (When patterned, the decoration is regularly limited to the zone above the carination.) The piriform jar, either with or without conical base, is also common (Fig. 6, No. 5; Pl. 95, c, right). One of the most interesting shapes to appear at this time is the pedestalled bowl, or "fruitstand," which occurs in several sizes and shapes (Pl. 97, a). The pedestals themselves are often decorated with a series of cutout patterns (most often triangular in form, rarely circular), but they may also have patterns (in a variety of combinations) done in what might be called a "reverse-punctate" technique (Pl. 96, a, middle, right). As has been suggested by others, the latter must have been produced while the clay was still soft.²⁶ Although the bowl of our most completely restored fruitstand is of the monochrome type, the interiors of such bowls were frequently decorated with rather elaborate linear patterns (cf. Pl. 96, b, upper row, second from right). There is as yet no evidence to indicate that the pedestals ever bore patterned decoration. This shape continued to be used throughout the balance of the M. N. period and undoubtedly evolved into the fruitstand with slimmer pedestal of the L. N. period. Another shape frequently encountered in the M. N. levels at this site is the handleless cup or small bowl (Pls. 96, c and 96, a, upper right). Although vessels with handles are not exceedingly common at this time, we have fragments of several larger vases (often patterned) that might be called "shoulder-handled amphorae" (e.g. Fig. 6, No. 4). Finally, several fragments of a long-handled scoop or ladle, done both in monochrome and patterned Urfirnis, belong to this

²⁴ A radiocarbon date from Pit A, unit 56 (P-1399, see below) belongs to about this time.

²⁵ S. S. Weinberg, "Remains from Prehistoric Corinth," *Hesperia*, VI, 1937, pp. 500-503, and *op. cit.*, pp. 37-39. A sherd of monochrome Urfirnis, bevelled on both sides of one end so as to make a scraping tool (Pl. 96, a, upper right), was found in an early L. N. unit of Pit A. Could this be the type of broad scraping implement that Weinberg has in mind for finishing the surface of Urfirnis pottery?

²⁶ Cf. examples from Lerna: *Hesperia*, XXVII, 1958, p. 138, pl. 38, e-f.

period (Pl. 97, b). These, then, are some of the M. N. shapes already recognized; it is not unlikely that others will emerge as the examination of the material continues.

It would be premature at this time to attempt to discuss in detail the various patterns appearing on Urfirnis ware. Suffice it to say that, in spite of the fact that the vast majority are of rectilinear type, considerable variety was achieved by the M. N. vase-painters. Moreover, there is evidence to support the conclusions reached by the excavators of Lerna that there appears to be a stylistic development from the simple to the more complex in the patterned ware of this period.²⁷ The sherds illustrated on Plate 96, b will give some small indication of the types of M. N. motifs used. Yet one vase (Pl. 95, c, right) deserves special attention because of its unique position in the development of M. N. vase-painting in southern Greece. Although the decoration of this vase is clearly within the geometric tradition of the period, it stands out because it seems to be more than just a combination of chevrons, triangles and parallel lines (all perfectly good M. N. motifs). Indeed, it strikes the writer as a primitive attempt (seemingly the first in Neolithic vase-painting) to represent a form of architecture. It is unclear whether the main motif is meant to represent a hut with pitched roof or a less permanent structure rather more like an American "tepee" (which might better explain the antenna-like appendages on the roof), but even the filling ornaments seem to have an architectural character. This vase, then, is of considerable importance not only for the history of Neolithic vase-painting (where representational decoration is rare enough), but it provides another bit of evidence for our understanding of the development of prehistoric architecture as well.²⁸

Finally, it might be added that a few other types of surface decoration are used at this time in addition to the painted patterns, reverse-punctate designs and cutouts. Most notable of these are applied hemispherical pellets, conical knobs and triangular ribs, all of which may have been inspired by the plastic decoration on E. N. vases. Simple linear decoration incised with a very sharp tool on monochrome Urfirnis ware is known but extremely rare (Pl. 96, a, upper left). It might also be noted that the inner surfaces of many large vases bear large spots or blotches of lusterless red paint (we call it "dapping"), which may be accidental rather than intentional (Pl. 96, a, lower middle).

At the height of the period, Urfirnis ware reaches its peak: the patterned variety accounts for about 20% of the bulk of the pottery in these units, while the fine monochrome ware may reach 50% or more. From this point to the end of the period the percentage of patterned Urfirnis appears to decline gradually, but its place is taken

²⁷ *Ibid.*, p. 137, pl. 36, f-g.

²⁸ It is most interesting that a complete terracotta "house-model," also suggesting the existence of a pitched roof, was recently found at a site near ancient Krannon, northwest of Larisa. Although a surface find, it has been dated on stylistic grounds to the M. N. period. G. Ch. Chourmouziades, Πηγαίνοντα Νεολιθικής οἰκίσκου, 'Αρχ. 'Αθ., II, 1969, pp. 36-39.

by an extremely interesting new technique: "burnished Urfirnis" (Pl. 97, c, all except upper right). Although the details of this technique are still not entirely clear, basically it appears to be a matter of combining the use of burnishing with the Urfirnis paint. Several combinations are used: irregular "strokes" or "scribble" burnishing; a more regularized attempt to produce simple rectilinear patterns, or a combination of the two. Burnished Urfirnis appears to continue into the Late Neolithic period at the Franchthi Cave, and it is tempting to regard it as the forerunner of the pattern-burnished wares known from this and other L. N. sites.

Most of the shapes typical of the "high" Urfirnis phase continue in use to the end of the M. N. period: the carinated bowls (Pl. 97, c, bottom middle), piriform jars (Pl. 97, c, far left), fruitstands with cutout decoration (Pl. 97, a), etc. Yet there also appears to be a tendency at this time to produce slightly more graceful shapes, e.g. bowls with a gentle S-curve profile (Fig. 6, No. 2).

LATE NEOLITHIC

Substantial quantities of L. N. remains have been found in all areas excavated at this site, yet—presumably because of both natural and manmade disturbances in the uppermost levels—²⁹ only a fraction of the material has been isolated as uncontaminated. This material comes principally from Pits A and F/F-1.

The beginning of the L. N. period is characterized by the first appearance of pottery bearing patterned decoration done in a dull (matt) paint. This ware appears only in very small quantities at the outset but gradually increases in frequency and ultimately accounts for at least 15-20% of the total bulk of pottery from the more advanced units. Although finer pieces certainly exist (Pl. 98, a, lower right), at least some of these may be imports, for much of the matt-painted ware from the site is of rather inferior quality. The clay is less well purified than that of the M. N. period, the surfaces (especially the exterior) less carefully finished and the firing less thorough. The fabric tends to vary in color from buff to brown (frequently darker at the core), while the color of the paint may be orange, red or black (sometimes all appear on the same vase). The patterns (Pl. 98, a) are generally very simple and often quite carelessly executed; some must have their origins in the M. N. repertory. The majority are rectilinear (zigzag lines in an open field or pendant, parallel straight lines and crosshatching), but curvilinear patterns (wavy lines and swags) also appear. It is not uncommon to have a painted band on the inside and outside of the lips of open shapes. The repertory of shapes include the fruitstand (Fig. 7,

²⁹ "Manmade" disturbances perhaps consist largely of modern excavation of the surface deposit for sheep/goat dung which is then sold to farmers as fertilizer. (The writer was told by a local resident that two large burlap bags of this material could be purchased for 50 drachmae.) "Natural" disturbances in the later levels may well be the result of the collapses of the roof and brow of the cave (stimulated by an earthquake?) as suggested above. Special attention will be given to these later levels during the course of the excavations in 1969.

No. 6), large jugs with handles from lip to shoulder (Fig. 7, No. 5) and open bowls with incurved rims (Fig. 7, Nos. 3, 7); but a frequently appearing shape at this site is the cup with offset rim and "hourglass" handle (Fig. 7, Nos. 1-2; Pl. 98, a, lower left). Although pieces bearing polychrome decoration (patterns in red and black paint on a light ground) appear in some of the same units as matt-painted ware, they are relatively uncommon.

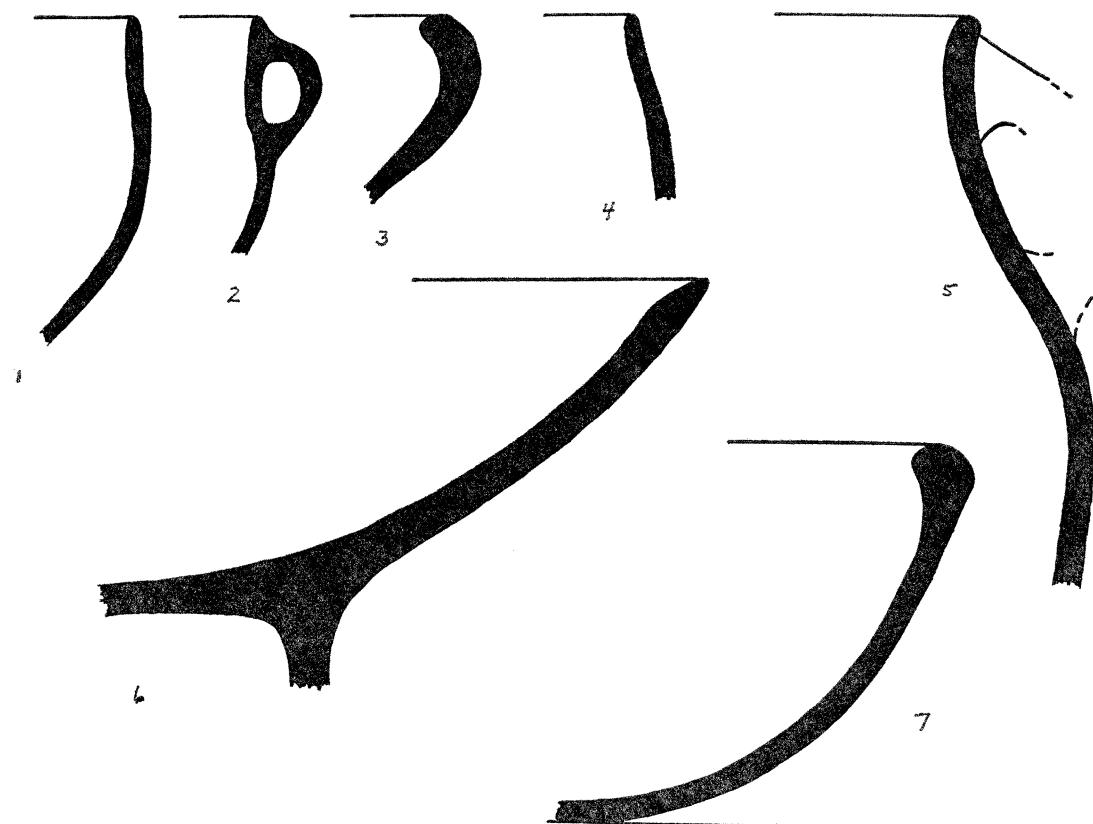


FIG. 7. Profiles of Late Neolithic Shapes (1:2).

Another class of pottery that occurs in association with matt-painted ware (though it seems to have appeared slightly earlier than the latter) is a fine black burnished ware. Although the fabric is usually gray or grayish tan in color, the exposed surfaces are regularly burnished to a lustrous black. Moreover, it is not uncommon to find pieces decorated with linear patterns in a fugitive white (often preserved as a dull gray) matt paint.³⁰ In addition to painted patterns, this ware may also have incised or punctate decoration filled with a chalky white substance. Although

³⁰ A few pieces also bear traces of a fugitive pinkish paint, sometimes in conjunction with the white paint.

this ware has been preserved for the most part only in fragments, it is reasonably clear that many of the shapes have their origins in the M. N. period, e.g. carinated bowls and piriform jars. Yet one of the most impressive of all the restored vases from this site is a very large necked-jar (there is no evidence of its having had handles) belonging to this ware (Fig. 8). In spite of the fact that half (or possibly less than

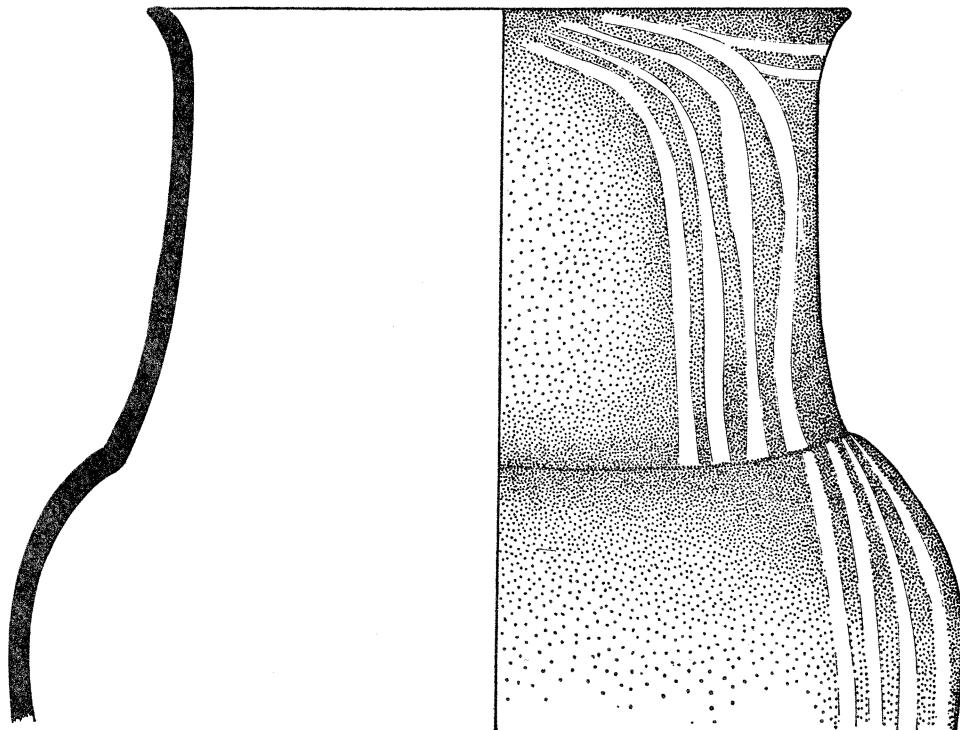


FIG. 8. Profile of Large Late Neolithic Vase (1:4).

half) of its original height has been preserved, it still stands nearly 0.40 m. high and is over 0.50 m. broad. Its entire exterior surface was carefully burnished before being decorated by a series of parallel lines in dull white paint. It is quite remarkable that such a large vessel (presumably used for storage) should have been decorated in such a careful manner.

One of the most characteristic features of the L. N. levels is the dramatic increase in the amount of coarse ware found. Truly coarse pottery had been rare in the preceding periods, but in some of the more advanced L. N. units it accounts for as much as 50% of the total bulk of potsherds. The fabric is generally crumbly, not well purified and incompletely fired; it is usually orange to brown in color though the core is frequently darker. Larger shapes seem to be most common though we have been able to restore a small handleless cup. Bases are usually flat or slightly sunken, but there is a great variety in the kinds of handles used. Ledge-and lug-

handles are common, as are loop handles of various sizes. The latter are not infrequently adorned with knobbed or horned appendages. Although surface decoration is not common, several joining fragments of what must have been a large storage vessel bear a double-coil spiral in relief, part of which is decorated with thumb impressions. Coarse ware of this type seems to be especially abundant in the mixed surface levels.

Some evidence pointing to a direct continuity between the Middle and Late Neolithic periods has already been cited. Not only does burnished Urfirnis ware, which begins in later M. N., continue to flourish at least in the early stages of L. N., but our excavations have indicated that monochrome Urfirnis ware continued to be produced in substantial quantities throughout much of this period as well. Although this phenomenon seems to be contrary to present thinking based on observations elsewhere,⁸¹ there is no evidence as yet to indicate that its occurrence in the Franchthi Cave is due to any irregularities in the stratigraphy, at least for the earlier L. N. period. It should be noted, however, that the quality of the L. N. "glaze" is generally inferior to that of the best M. N. Urfirnis, and in that sense it is somewhat reminiscent of the thin slipped ware which introduces the M. N. period at this site.

In addition to the above, other wares characteristic of L. N. sites elsewhere have also turned up in our excavations. These include pattern-burnished ware (Pl. 98, a, upper right), pink or orange crusted ware and simple incised ware. None, however, has yet been found in sufficient quantities to merit discussion in this report.

OTHER FINDS

A great variety of finds other than those already considered have turned up in the excavations of 1967-1968. These include hundreds of objects of ground and polished stone, clay, bone and shell. Since it would be inappropriate in a report of this scope to attempt to provide a detailed account of these objects, the following should give the reader at least some impression of the variety of the finds.

GROUND AND POLISHED STONE

Scores of ground stone implements—querns, rubbing stones, hammerstones, mortars and pestles—, generally made of the coarser rocks (e.g. sandstone, limestone, diorite), have been inventoried. Although many others remain to be properly recorded, it may be said that the majority were found in association with pottery of M. N. and L. N. types.

Some 40 fragmentary or complete examples of polished stone celts have now been inventoried (Pl. 98, b). Although several have yet to be examined by a geologist, felsitic porphyry and serpentinite appear to be the most common rocks from which

⁸¹ S. S. Weinberg, *C.A.H.*, I², p. 44. Cf. also S. S. Weinberg, "Excavations at Prehistoric Elateia, 1959," *Hesperia*, XXXI, 1962, pp. 179-182.

they were made. The celts display considerable variety in terms of their size and shape (axes and chisels are certainly represented), but no chronological patterns have yet become apparent. It is significant that most (25) have been found in M. N. or L. N. contexts, and none can yet be securely assigned to an earlier period.

Although evidence for the use of stone vessels is rare, six fragments have turned up in the two campaigns (only five of which are illustrated in Pl. 98, c). With the exception of one fragment (Pl. 98, c, lower right: body sherd with traces of a double-pierced lug-handle), which comes from the upper mixed level in Pit A, all have been found in association with M. N. pottery. Indeed, most appear to belong to a very early stage of that period. In addition to the handle fragment, the pieces include two body sherds, two rim fragments (Pl. 98, c, upper left and upper right) and a complete disc base (Pl. 98, c, lower left). It is not yet certain that all are of marble.

The 1968 campaign produced an excellent example of a fragmentary human figurine (Pl. 99, a, above). It is made of a slightly translucent white marble (or possibly alabaster), which has been very well polished, and consists of the head, neck and one shoulder of a human figure. The head and neck assume a conical shape, while the only facial feature is a prominent, beak-like nose. This piece is also assignable to a very early stage of the M. N. period. Of similar date are three apparently related pieces whose use remains unexplained (Pl. 99, a, bottom). The two nearly complete examples are representations of the lower half of the human body (perhaps the larger is a female, the smaller a male) and were clearly meant to be so since there is nothing to indicate that they have been broken at the waist. Both have horizontal ledges, pierced vertically for suspension, at the back of the waist; and all bear incised linear decoration on the front. The material of only one of the pieces (Pl. 99, a, lower center) has been directly examined by a geologist, who described it as calcite. Whether these curious pieces were used possibly as stamp seals, simply as decorative ornaments, or (perhaps most likely) served an amuletic or talismanic purpose is still uncertain. In so far as the writer has been able to ascertain, comparable examples are not known from other Neolithic sites in Greece.

Finally, our excavations have also produced a large number of stone ornaments, particularly perforated beads and pendants (Pl. 98, d). Many are made of the softer stones (e.g. steatite or soapstone) and most display finely polished surfaces. They usually have one or two perforations, though some (e.g. Pl. 98, d, upper center and lower center) also show signs of incomplete drill-holes. Of those coming from secure contexts, most belong to the M. N. and L. N. periods. Yet a simple but well preserved piece from Pit H (Pl. 98, d, lower center) is of special interest since it was found in a late *Mesolithic* context. Objects of this type are rare in the Mesolithic levels at this site.³²

³² Also of later Mesolithic date is a rather amorphous limestone pebble, possibly artificially perforated, from Pit G/G-1.

CLAY

Among the numerous objects of clay from the excavations in the Franchthi Cave, the most interesting is a group of some 10 fragmentary terracotta figurines. The majority are representations of humans (of those whose sex is reasonably clear, all are female), but at least one (a head of a horned animal) is zoomorphic. Unfortunately most were found in the uppermost mixed levels; and, of those illustrated on Plate 99, b, only one (upper right) comes from a secure context. It belongs to the M. N. period and is of some importance since it is the only example of a fully steatopygous female figurine of the well-known "Mother Goddess" type yet found at this site. Only half of the mid-section (portions of the waist, hips, buttocks and pubic triangle) has been preserved, suggesting that the original had perhaps been made in sections. A small strip of clay had been applied to the waist, possibly representing a roll of fat, while the entire exterior surface was covered by a thin application of Urnfirnis varying from brown to black in color. It is probable that this figure, like so many others from Neolithic contexts in Greece, was originally represented in a standing posture.

The remaining objects of clay include a number (25-30) of coarse undecorated "spindle-whorls" of conical and biconical shape, virtually all of which come from L. N. or upper mixed levels; a few perforated "weights" of spherical shape; one fragmentary sling bullet, which can be no later than early M. N.; and one cylindrical "bead" of M. N. date.

BONE AND SHELL

Nearly two hundred objects of worked bone and shell have already been inventoried, and it is very likely that many more fragments will turn up as the material continues to be studied.

At the moment, objects of worked bone are most abundant. The assemblage includes objects of personal adornment (beads and pendants), a fragmentary figurine (?), and numerous implements of various kinds (points or awls, chisels, "spatulae" or scrapers, a fragmentary fishhook?). The latter group is especially large as over 150 complete or fragmentary bone tools have now been recorded.³³ Among these, the majority consists of points or awls, which have been found in contexts assignable to all periods represented at the site, from Mesolithic through Neolithic. Polished points of the Neolithic period, often fashioned from sheep/goat metapodial bones, are particularly common (Pl. 100, d). (On the other hand, intentionally perforated "needles" are absent.) Aside from the preparation of the point itself, other forms of surface treatment are uncommon. Yet at least one fragmentary example (Pl. 100, d, right) has two grooves or notches cut into either side of its shaft near

³³ It is hoped that Mrs. Rosemary Payne will be able to prepare the final publication of the bone tools.

the distal end, but it is impossible to say at present whether they were intended to serve a decorative or functional purpose.

A small number of objects (all fragmentary) were made from delicate pieces of marine shell. Most had been pierced by one or two holes and seem to have been used as personal ornaments, perhaps as simple pendants or strung as part of a necklace or bracelet. All were found in the Neolithic levels. [See below, Appendix I, pp. 379-380.]

BURIALS

Four examples of inhumation burial were discovered in the course of the 1967-1968 seasons, but only three of these can be securely assigned to the prehistoric period.³⁴ At the time of this writing none of the skeletal remains had been examined by a specialist, but they were in the process of being transferred from the Nauplion Museum to Athens where they were to be studied for publication by Dr. J. L. Angel in the summer of 1969. [See below, Appendix II, pp. 380-381.]

NEOLITHIC

The excavations have produced the remains of two human burials clearly assignable to the Neolithic period.³⁵ The first, in a poor state of preservation, was found at a depth of *ca.* 4.70 m. in Pit A during the 1967 campaign, and the second (Pl. 100, a) was exposed last season in quadrants A and D in the deep sounding of Pit F/F-1 at a depth of *ca.* 4.40 m. It is likely that both belong to the E. N. period.³⁶

The two burials have much in common. Both are inhumations of children (the precise age and sex of which are still undetermined) buried in tightly contracted positions. Both bodies had been laid out in a north-south orientation, with the heads to the south. However, the child in Pit A seems to have been lying on its left side with its head propped up by a small heap of pebbles, while that of Pit F/F-1 was found lying on its back with no evidence of a stone "pillow." Although there can be little doubt that these represent burials, the limits of the pits in which they must have been buried were not entirely clear. Neither burial produced any recognizable offerings.

³⁴ The fourth, a well-preserved adult inhumation, was found in the uppermost mixed level (0.30-0.45 m. below the modern surface) of one of the soundings (E) on the terrace in front of the cave. It does not appear, however, to be ancient.

³⁵ During the course of his examination of the animal bones, Mr. Payne noted the presence of an occasional human bone in some of the Neolithic units. This should perhaps not be regarded as surprising since the Neolithic peoples of Greece (especially during the earlier part of the period) seem to have regularly buried their dead within the area inhabited by the living, and the earth of this living area must have been constantly disturbed in various ways by them. (Cf. also the rather casual treatment of the dead by the E. N. inhabitants of Nea Nikomedeia, R. J. Rodden, "Excavations at the Early Neolithic Site at Nea Nikomedeia, Greek Macedonia (1961 season)," *Pro.Preh.Soc.*, XXVIII, 1962, p. 286.)

³⁶ A radiocarbon sample (P-1394) from the unit directly below the skeleton in Pit A has been analyzed by the Radiocarbon Laboratory of the University of Pennsylvania. See below, p. 375.

MESOLITHIC

One of the most significant discoveries in these excavations was the exposure in 1968 of a complete adult (probably male) skeleton of the Mesolithic period in Pit G/G-1 (Pl. 100, b, c). It had been laid out in a north-south orientation (head towards the south but facing east) with the knees drawn up in a loosely contracted position. The arms and hands had been placed over the chest of the somewhat twisted torso. The head lay at a depth of *ca.* 7.60 m., the feet at *ca.* 7.45 m. The skeleton was surrounded and at least partially covered by many small stones and seems to lie in a shallow depression in which some evidence of burning was also present.³⁷ Although the earth around the skeleton contained a number of whole and crushed shells (most appear to be land snail but there was at least one murex), no recognizable offerings were found.

It is not necessary to stress the obvious anthropological and archaeological importance of this discovery. Not only is this the oldest complete skeleton ever found in Greece, but it is the only burial of this period yet known from the Aegean Basin. Needless to say, the results of Dr. Angel's study of the remains are eagerly awaited.³⁸

RADIOCARBON DETERMINATIONS

A total of 17 samples has now been submitted to the Radiocarbon Laboratory of the University of Pennsylvania for C-14 analysis.³⁹ Although some were found to be too small for proper analysis and others still remain to be processed, the following is a list of the results available at the time of this writing. The samples are listed as much as possible according to the stratigraphy of the site, from late to early. Those with asterisks have been treated for humic acid contamination.⁴⁰ All dates given are B.C.

<i>U. of Pa.</i>		5568	5730
<i>Lab. No.</i>	<i>Franchthi Context</i>	<i>half-life</i>	<i>half-life</i>
P-1399 *	Pit A, unit 56, Middle Neolithic	5244±112	5460±115

³⁷ The radiocarbon determination P-1519 (see below, p. 375) is derived from this deposit.

³⁸ It is important to note that additional human bones (probably belonging to more than one individual) turned up in the stratum of very moist brownish earth at a depth of *ca.* 8.00-8.50 m. in Pit G/G-1. There was no obvious indication that these bones were part of a formal burial (or burials), but it is hoped that Dr. Angel's examination of them will help to provide an explanation of their presence.

³⁹ We should like to take this opportunity to thank Dr. E. K. Ralph and her colleagues at the Laboratory for their cooperation and promptness in processing these samples.

⁴⁰ It is important to note that Miss Ralph considers samples that have received NaOH pre-treatment for removal of humic contaminants more reliable than those without such treatment. For a discussion of treatment with NaOH, see E. L. Kohler and E. K. Ralph, "C-14 Dates for Sites in the Mediterranean Area," *A.J.A.*, LXV, 1961, pp. 357-367.

<i>U. of Pa.</i>		5568	5730
<i>Lab. No.</i>	<i>Franchthi Context</i>	<i>half-life</i>	<i>half-life</i>
P-1525	Pit F/F-1, unit 42 B 1 Early Neolithic	5754±81	5986±83
P-1394 *	Pit A, unit 63 Aceramic Neolithic	5844±140	6078±144
P-1398 *	Pit G, unit 31, Mesolithic	7148±139	7421±143
P-1517 *	Pit G/G-1, unit 39 Mesolithic	7084±108	7356±111
P-1518 *	Pit G/G-1, unit 46 Mesolithic	6988±100	7257±103
P-1518A	Same	6767±110	7029±113
P-1519 *	Pit G/G-1, unit 60 Mesolithic	7314±144	7592±148
P-1522 *	Pit H, unit 61 B 1 Mesolithic	7348±130	7627±134

SUMMARY

After two seasons of excavation in four deep pits in the Franchthi Cave, a continuous stratigraphic sequence has come to light that is up to now unique for Greece. Although the full sequence has not been revealed in any one pit, it has been possible to reconstruct it broadly on the basis of correlations between the four excavated areas.⁴¹ It might be appropriate, then, to summarize this sequence as it now appears to us, but it must be borne in mind that at least some of the following impressions may need to be revised as the excavations and the study of the remains continue.

The earliest habitation level has been found near the mouth of the cave (in Pits H and, perhaps, G/G-1). Not only is this level stratigraphically distinct from that which lies above it, but it has also produced a faunal assemblage entirely different from anything that follows. Indeed, the faunal remains suggest that it is to be associated with the last (Würmian) Glacial period, a time when the site must have been some distance away from the sea.⁴² In view of the limited extent of the excavations in this level, there is little that can be added now apart from the fact that the inhabitants of the cave seem to have supported themselves exclusively by hunting and food collecting at this time.

⁴¹ In addition to the absence of certain levels in some of the soundings, it should also be noted that the rate of sedimentation clearly varied from one part of the cave to another. Therefore the deposits of most phases vary in thickness from pit to pit.

⁴² The level of the sea would have of course been much lower during glacial maxima. Dr. Giegengack has in fact suggested, on the basis of the modern depth of the bay of Koilada, that the island of Koronis would have been part of the mainland and the bay probably no more than a broad shallow valley during Late Würm. This may at least in part explain the lack of evidence of fishing at this time.

The next stage in the sequence, the Mesolithic, is characterized by a Postglacial fauna and is rather more fully documented. It has been found in all four soundings in the cave, but the deepest and most complete deposits again occur in Pits G/G-1 and H. The Mesolithic inhabitants of the cave still seem to have been active hunters (red deer was their chief prey), but at some time towards the middle of the period they also began to fish, perhaps as a result of their proximity to the sea due to the Postglacial rise of sea level. Life appears to have been fairly simple at this time. The Mesolithic tool kit consisted predominantly of notched flakes of flint whose function is still uncertain, a few bone tools and a very few implements of ground stone. "Luxury objects," such as beads or pendants, are rare; and the one complete Mesolithic burial suggests that elaborate preparations were not made for the disposal of the dead. It is of considerable interest, however, that the use of obsidian first occurs during this period, indeed, at about the same time as the people of Franchthi were beginning to fish. Since the only known (local) sources of this material are to be found in the Cyclades, it is tempting to regard this as the first solid piece of evidence pointing to the existence of sea travel and trade in the Aegean.⁴⁸

An abrupt faunal change also signals the beginning of the next stage, a period which has been provisionally termed "Aceramic Neolithic."⁴⁴ The significant change is the sudden appearance of sheep and goat, not sporadically but in substantial quantities, for the first time at this site. That this phase is devoid of pottery seems clear enough from the levels in which it has been isolated in Pits A and F/F-1, but whether or not the faunal change is accompanied by animal-domestication (one of the traditional criteria for identifying the Neolithic) it is impossible to say until the material has been studied in greater detail.⁴⁵ Although the tool kit remains much the same as it had been in the previous period, a slight increase in the percentage of obsidian used and the first appearance of obsidian blades are worthy of note.

The Early Neolithic period, also largely confined to Pits A and F/F-1, is char-

⁴⁸ The recent work of Colin Renfrew and his colleagues on the sources of obsidian in the Mediterranean and the Near East has been of great value. See, for example, J. R. Cann and C. Renfrew, "The Characterization of Obsidian and its Application to the Mediterranean Region," *Pro. Preh. Soc.*, XXX, 1964, pp. 111-133, and C. Renfrew, J. R. Cann and J. E. Dixon, "Obsidian in the Aegean," *B.S.A.*, LX, 1965, pp. 225-247. (It is hoped that Renfrew will be able to analyze samples of obsidian from the Franchthi Cave.)

The island of Melos, apparently the chief source of Aegean obsidian, only lies some 75-80 statute miles southeast of the southern tip of the Argolid, but it is difficult to imagine the Mesolithic mariners plying the direct route between the two points since this route would traverse open sea through its full extent. It is perhaps more likely (at least for this early date) that whatever shipping passed between the Argolid and Melos would have gone by way of the Saronic Gulf, southern Attica and the westernmost islands of the Cycladic group.

⁴⁴ "Terminal Aceramic," in some ways preferable, was also used in one preliminary note (*Δελτ.*, XXIII, 1968).

⁴⁵ Nor is there as yet any substantial evidence indicating the existence of plant domestication or cereal production apart from a single stone grinder or pounder from Pit A.

acterized by the introduction of pottery. Although it is simple and does not display a wide variety of forms, this pottery is by no means primitive or crude and seems to reflect a well established ceramic tradition. On the other hand, the manner of burial is reminiscent of the Mesolithic practice; and the flaked stone tools again show little change from the past. Yet the first appearance of blades with sickle gloss is noteworthy, and, when coupled with the predominance of sheep and goat in the faunal assemblage, it appears that the economic life of the settlement was now based to a large extent upon herding and agriculture.

That such was the case for the Middle Neolithic period is beyond all reasonable doubt. The presence of sickle blades and numerous ground stone implements presumably for the preparation of cereals probably indicates that the lowlands to the northeast and south of the headland were now being extensively tilled; and the faunal remains suggest that sheep and goats were being herded. But perhaps most indicative of the new way of life was the increasing amount of free time available to devote to things other than simply procuring a food supply. The arts and crafts reached an extremely high level of competence at this time, indeed the highest achieved by the Neolithic peoples of Greece. The replacement of local flint by imported obsidian as the principal raw material for the production of flaked stone tools suggests that sea travel and trade were well established and flourishing. Intercourse was in fact so active that elements of a culture that seems to have been particularly at home in the northeastern Peloponnesos soon reached much of the rest of southern Greece, central Greece and even Thessaly.⁴⁶ This was clearly the high point in the history of the Franchthi Cave. Middle Neolithic remains have been found in substantial quantities in all of the excavated areas.

Although the Late Neolithic period is not so well represented, enough has been preserved to suggest a general cultural and economic continuity from Middle Neolithic but a gradual deterioration at the same time. This appears to be the last period when caves were commonly used on the Greek mainland,⁴⁷ and it is certainly the last major phase in the occupation of the Franchthi Cave. Scattered finds from the surface deposits indicate that the site had been visited at least during Mycenaean, Geometric, Classical, Roman and later times, but there is as yet no reason to attach any special importance to the later activity at the site.⁴⁸ We can not yet be sure about the causes for the abandonment of the cave at the end of the Neolithic period—whether the occupants might have been frightened off by the great collapse of the

⁴⁶ The heartland of this culture seems to have been in the Argolid, Corinthia and perhaps eastern Arcadia. Cf. J. L. and E. G. Caskey, "The Earliest Settlements at Eutresis," *Hesperia*, XXIX, 1960, p. 159, and S. S. Weinberg, *C.A.H.*, I², pp. 37-40.

⁴⁷ A survey of the use of prehistoric caves on mainland Greece suggests that cave-occupation was especially intense during the Late Neolithic period. The writer intends to deal with the matter of prehistoric caves on the mainland in more detail elsewhere.

⁴⁸ There is, for example, no evidence to indicate that it served as a cult place in later times.

roof which seems to have occurred at about that time, or they were simply conforming to changing patterns of settlement brought about by the Bronze Age—, but it is not unlikely that the Bronze Age successor to the Franchthi Cave is to be found on the low promontory of Ayios Ioannis, a short distance to the northeast of the headland. Here may well lie the site of Homeric Mases.⁴⁹

The Franchthi Cave has proved to be a site of outstanding importance for an understanding of early Greek prehistory. Its deep Mesolithic deposit is virtually a "first" for Greece, especially since it will now be possible to fix it with some chronological reliability by means of a series of radiocarbon dates.⁵⁰ Its Neolithic deposit will also be the first dated sequence from southern Greece. But that which makes the site particularly important is its stratigraphic continuity. For the first time in Greece, we have an opportunity to expose an apparently continuous stratigraphic sequence from late Pleistocene through Mesolithic and the critical transition to Neolithic down to the end of the Stone Age. If this sequence can be securely established and well dated, and if it can then be tied in with the very important Palaeolithic sequence established by Higgs in northwestern Greece,⁵¹ we shall have perhaps provided at least a base from which to expand our investigation of the darkest periods of Greek prehistory.

[The following brief appendices were prepared by Dr. Nicholas J. Shackleton of Cambridge University and Dr. J. Lawrence Angel of the Smithsonian Institution. Their observations were made during the summer of 1969, after the remainder of this article had been submitted for publication. The author wishes to express his thanks to Mrs. L. S. Meritt for allowing them to be included herein.]

⁴⁹ The site was certainly occupied in Mycenaean (notably L. H. III B) and Classical times, to judge from surface finds made by the writer and other members of the staff. See also R. Hope Simpson, *A Gazetteer and Atlas of Mycenaean Sites*, London, 1965, p. 22 (no. 29). (Cf. Jameson's remarks on the location of Mases in "Part I" of this report, above, p. 313.)

⁵⁰ Yet it should be noted that this is not the first reported occurrence of Mesolithic remains in Greece. Cf. Weinberg, *C.A.H.*, I², pp. 8-9, and D. R. Theochares, 'Η Ανγή τῆς Θεσσαλικῆς Προϊστορίας, Volos, 1967, pp. 35-43. Attention must also be drawn to the important results of the recent excavations on the low mound of Sidari, Kerkyra, by A. Sordinas. A level now identified as Mesolithic produced a C-14 determination of 5870 ± 340 b.c. (5570 half-life). Cf. A. Sordinas, Προϊστορικὴ Ἔρευνα στὴν Κέρκυρα κατὰ τὸ 1965, Κερκυραϊκὰ Χρονικά, XI, 1965, pp. 141-148 and Προϊστορικὴ Ἔρευνα στὴν Κέρκυρα τὸ 1966, Κερκυραϊκά Χρονικά, XIV, 1968, pp. 77-83.

⁵¹ Cf. the excellent series of articles entitled, "The Climate, Environment and Industries of Stone Age Greece" (Parts I-III) by E. S. Higgs and others in *Pro. Preh. Soc.*, XXX, 1964, pp. 199-244; XXXII, 1966, pp. 1-29; and XXXIII, 1967, pp. 1-29. Although the two excavated shelters, Asprochaliko and Kastritsa, do not seem to have produced clear cut evidence of Mesolithic occupation, a useful Palaeolithic sequence (with C-14 determinations) has been established. Of considerable interest also are the results of core-borings for pollen made in a marsh near Ioannina. A radiocarbon date of 8250 ± 90 b.c. was associated with a level corresponding to the beginning of the Postglacial period in this sequence.

APPENDIX I: PRELIMINARY OBSERVATIONS ON THE MARINE SHELLS

FOOD

The Palaeolithic (H: 58) is dominated by *Patella* (limpet) and *Monodonta* (top-shell). Practically every *Monodonta* (a snail-shaped shell) examined was broken at the tip, suggesting that this was the preferred way of eating them. The Mesolithic in G-1 is dominated by *Patella* in the lower part, and by *Cerithium* in the upper part. The latter is a longer and more pointed snail-like shell. Average specimens might be 0.04-0.05 m. long, but practically all the Mesolithic examples had been broken in half, again suggesting the preferred method of eating the animal. In the Neolithic levels the range of shellfish species which are presumed to have been eaten is much greater; in addition to those mentioned above, *Cerastoderma* (cockles), *Venerupis* (carpet shells), *Arca* (Noah's ark shells) and *Ostrea* (oysters) are abundant at different levels. On the basis of the small sample so far examined, there is certainly an indication that different species were preferred (or readily abundant) at different stages in Neolithic time, but until the same sequence has been established in several different parts of the cave, we will not know whether or not these changes are real.

DECORATION

The site has produced two really striking features as regards the decorative use of shells. In Mesolithic levels (both in G-1 and areas excavated in 1969) there are enormous numbers of *Neritea* shells. (Over 700 were recovered in one area excavated in 1969.) Well over half of these appear to have been pierced, suggesting that they may have been used as beads. In early Late Neolithic, examples of mussel spoons of the type described from Saliagos have been found. Unfortunately only fragments have turned up so far, but they nevertheless deserve attention. The Mediterranean *Mytilus* (mussel) is of course a well known shellfish. At this site five fragments have been found; every one is worked in the same way as the Saliagos examples. It seems therefore as if *Mytilus* was collected specifically for this purpose, as was the case at Saliagos. In addition, it is possible that the very large number of *Donax* shells found in the Late Neolithic levels (nearly 900 from a relatively small area excavated in 1969) may have been collected for decorative reasons. These are the small bivalves of various attractive colors which are so common on many sandy beaches in Greece (practically all the color is lost in the course of time), and although they are surely edible, they are so small that it is questionable whether they are actually worth eating. However, this conclusion is entirely speculative; the condition of the shells is equally consistent with their having been dug from the sand and eaten, and their having been collected empty on the beaches.

ENVIRONMENT

The beach near the mouth of the cave is very stony. The author of this note has not as yet been able to search any of the near-by coastlines for sand, but it is clear that the Neolithic people, at any rate, had easy access to sandy beaches in which to dig for the sand-burrowing *Cerastoderma* and *Venerupis*; whether the Mesolithic people had not discovered the sand-burrowers, or preferred to gather shellfish from the rocks, or did not have easy access to sandy beaches, we cannot say at present.

[NOTE: Although the present comments are restricted to marine shells, it should be pointed out that the thick shell deposits described in the text are indeed dominated by land snails, as the excavators suggest.]

N. J. S.

APPENDIX II: HUMAN SKELETAL MATERIAL FROM FRANCHTHI CAVE

In G-1: 65 of earlier Mesolithic date scattered human bones occurred mixed with animal bones. I grouped the former into a number of skeletons: 2 *Fr*, a man of about 34, very short (about 1.56 m.) and muscular, with an exostosis on his femur, a vertical scar down his right jaw ramus (below the ear), and very wide angular chin; 3 *Fr*, a slightly older woman, very short (about 1.35 m.) with slight arthritic lipping of vertebrae and joints and pubic edge ridges suggesting 3-5 births; 4 *Fr*, a girl about 20, likewise small, with pubic symphysis having one posterior tubercle (1-2 births ?) and injured knuckles of left hand; 5 *Fr*, a woman in her twenties, likewise small (about 1.39 m.); 6 *Fr*, an apparently healthy child of 1-1 ½; and 7 *Fr* and 8 *Fr*, female and male young adult burned bones. Since a number of bones of these skeletons (of foot, ankle, knee, wrist, and elbow) were cemented together lightly by soil matrix (limey ?) these people must have decayed as whole individuals, not necessarily buried deeply (or at all ?). Later Mesolithic occupation must have disturbed them, apparently burned some of them, and introduced animal parts.

In G-1: 60, also of Mesolithic date, 1 *Fr* is the extraordinarily complete skeleton of a formal burial (Pl. 100, b, c). He is a young man about 25, as notably short as the others (almost 1.58 m.), robust but less specially muscular, with a healed fracture of the left thumb saddle joint and small depressed scar on the right frontal boss. Next to this in the center of his forehead and also above the left browridge are two circular to elliptical fractures of the skull (of about 15 mm. radius) which depressed the outer table 2 mm. This damage occurred when the head was intact (bending fractures with probable *contre-coup* effect) and was the probable cause of death.

At a higher level, during the Early Neolithic occupation, there occurred in A: 62 and F/F-1: 41 D (Pl. 100, a) two complete burials: 11 *Fr*, a 5-year old girl (??),

and 12 Fr, an 8-year old boy(??). An examination of these and scattered remains excavated in 1969 (13 Fr-17 Fr) indicates that the remains of this date are mainly of children, and the adults are fractions as at Lerna and in part at Nea Nikomedea.

These Mesolithic and Early Neolithic samples raise at least two important problems: (1) the state of health of the population transitional between Upper Palaeolithic hunting and later settled farming economies; and (2) the degree and process of genetic continuity between Upper Palaeolithic local groups (not yet known in Greece) and the early farmers in the East Mediterranean.

(1) Porotic hyperostosis is an increase in thickness of the part of the skull wall which makes red blood cells plus a porousness of the outer table, and it affects Mesolithic males 1 Fr and 2 Fr and Early Neolithic children 11 Fr and 12 Fr, but not Mesolithic females 3 Fr and 4 Fr. The vertex area of the male skulls is 9 mm. thick, of which over 5 mm. is diploic, in contrast to about 6 mm. and 2.7 mm. respectively in modern Americans (Terry collection), suggesting a 90% increase in blood-forming tissue as a response to anemia, perhaps thalassemia. This fits hypotheses on the early origin and spread of *falciparum* malaria (J. L. Angel, "Porotic Hyperostosis, Anemias, Malaria and Marshes in the Prehistoric Eastern Mediterranean," *Science*, CLIII, 1966, pp. 760-763). But malaria alone could scarcely depress stature 0.15-0.20 m. (though lines of growth interruption appear on teeth and long bones) in a group with good protein diet. I suspect that isolation and local microevolution also reduced body size or that the sample is atypical.

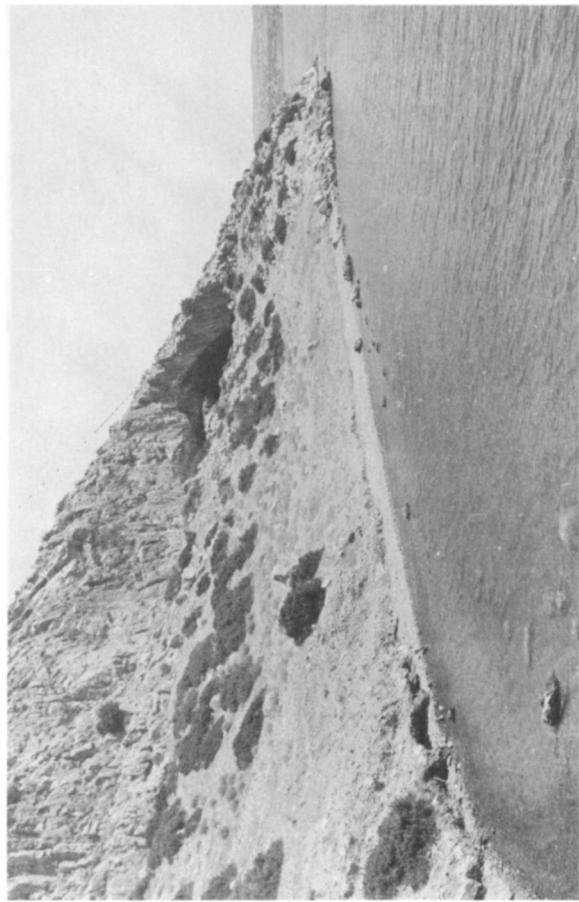
(2) The Basic White (A 3) physical type of 1 Fr and 2 Fr and the others lies between Téviec and Natufians—less linear than the latter—and predicts a major tendency within Early Neolithic and later populations in Greece, and it is interesting that reduction in mouth size has begun, though teeth of 1 Fr still exceed modern teeth.

For the opportunity to study this unique early human material I am most grateful to Professor Thomas W. Jacobsen, and to the authorities at the Nauplion Museum and the Byzantine Museum and the American School of Classical Studies at Athens.

J. L. A.

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a. Franchthi Cave from Northwest



b. Franchthi Cave, View of Mouth from Interior



c. Franchthi Cave, View of Portion of Rockfall and "Window" from Mouth



d. Franchthi Cave, View of Central Cone and Portions of Pits H, F/F-1, and A from Mouth

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PLATE 94



a. Pit G/G-1, Deep Sounding at Depth of *ca.* 6.75 m. (Unit 49)

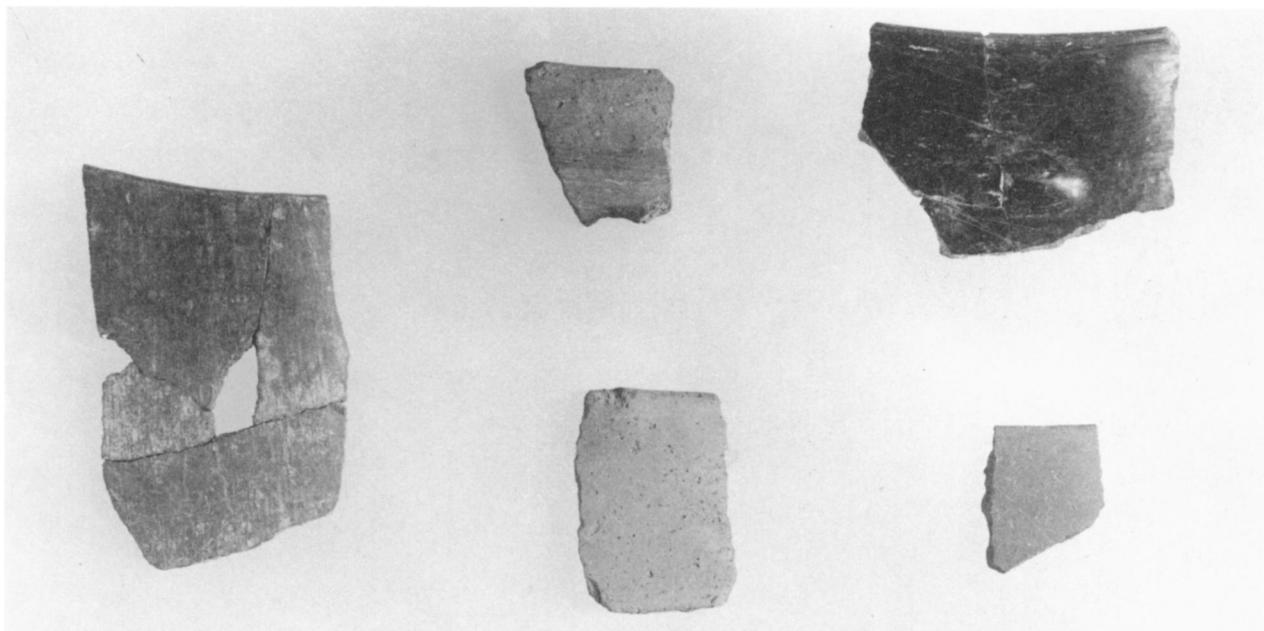


b. Neolithic Tools of Honey Flint

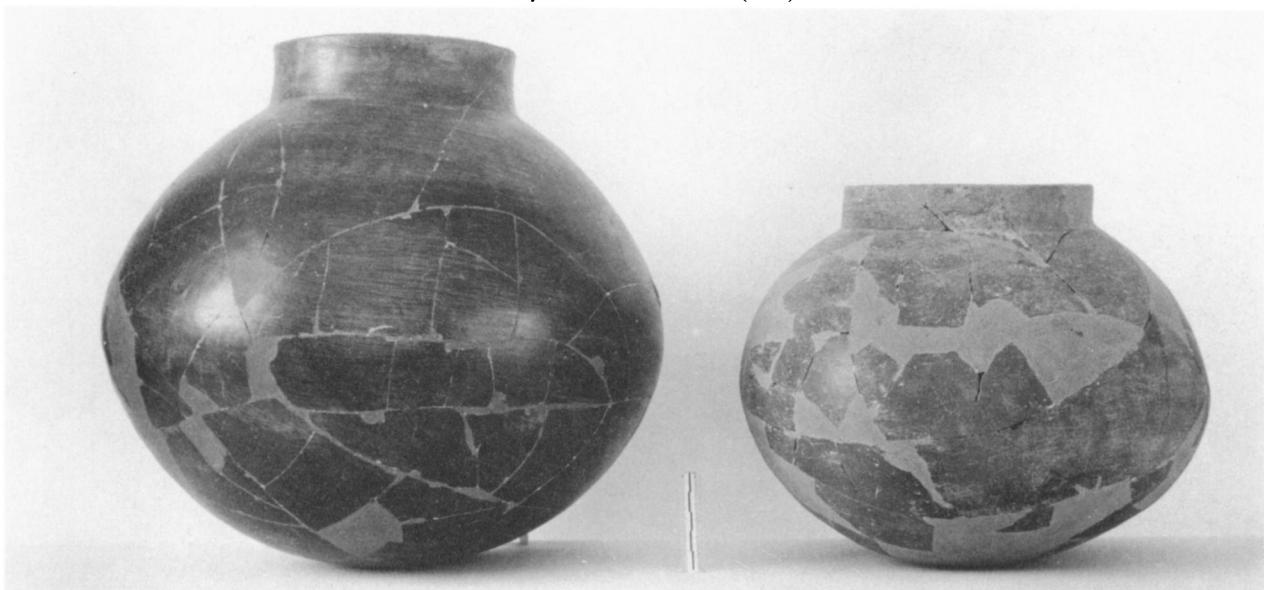


c. Early Neolithic Bowls

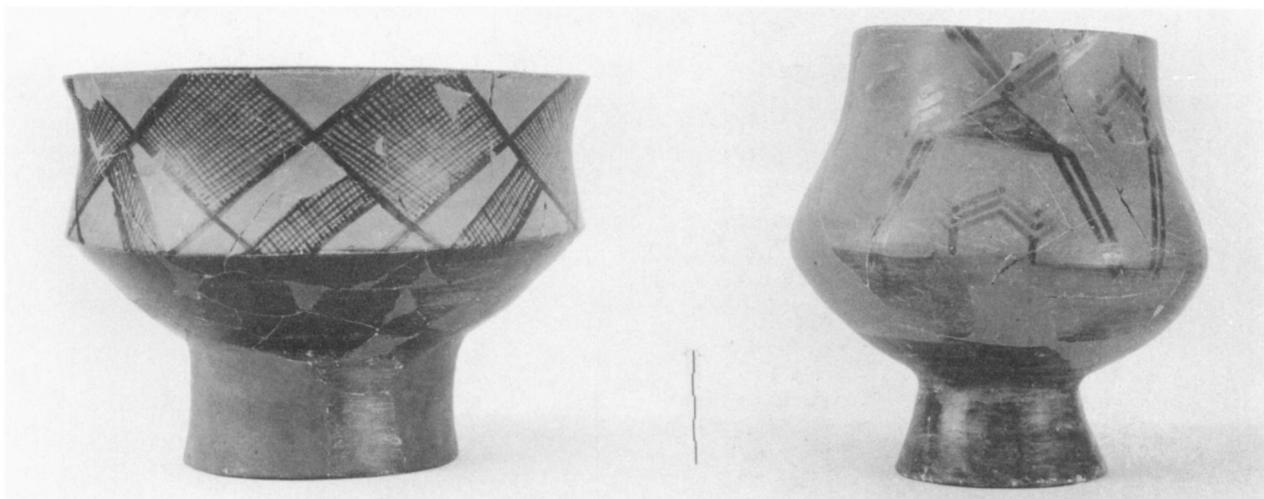
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a. Early Neolithic Sherds (1:2)



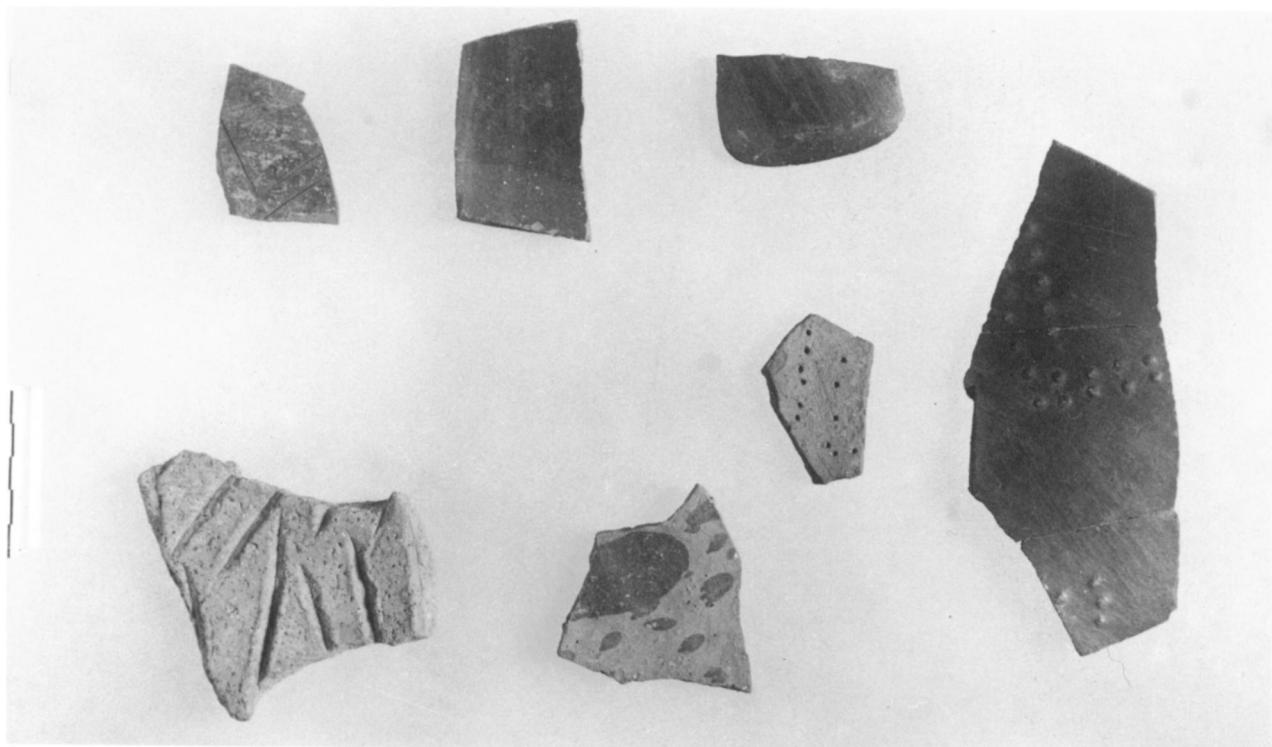
b. Middle Neolithic Collared Jars



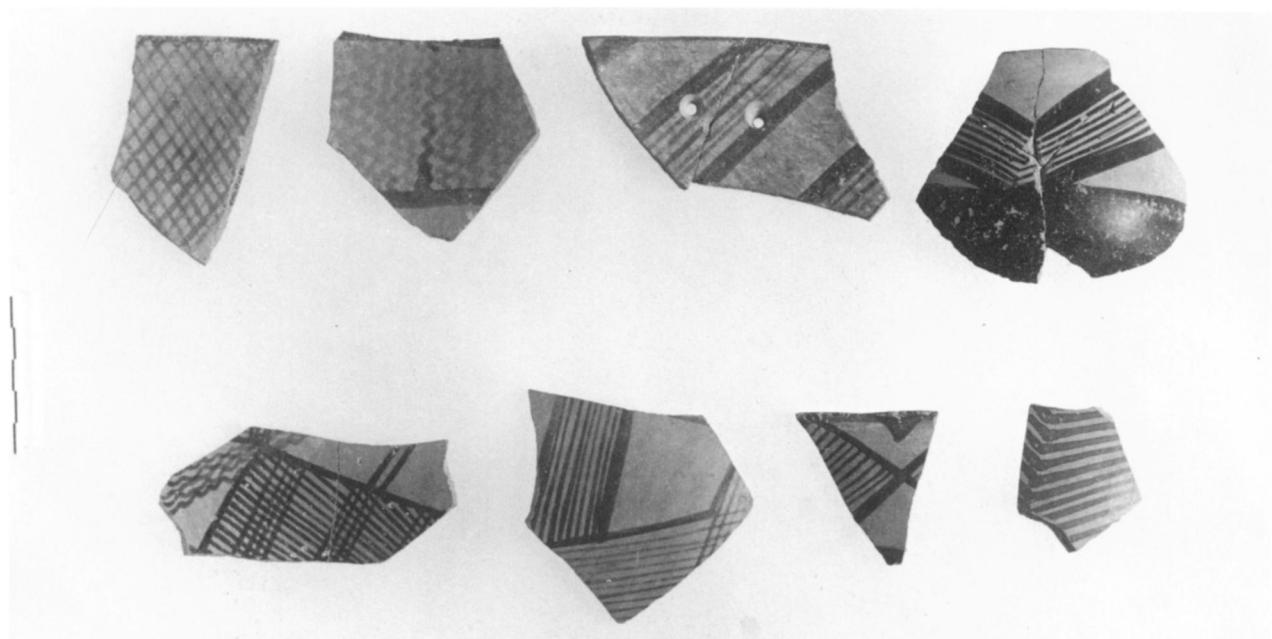
c. Middle Neolithic Patterned Vases

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PLATE 96



a. Middle Neolithic Sherds



b. Middle Neolithic Patterned Sherds

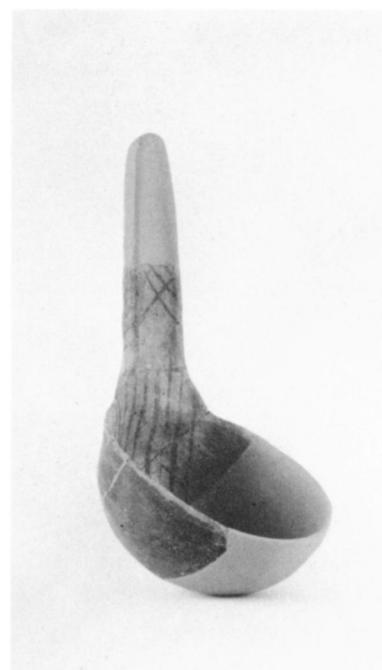


c. Middle Neolithic Handleless Cups/Bowls

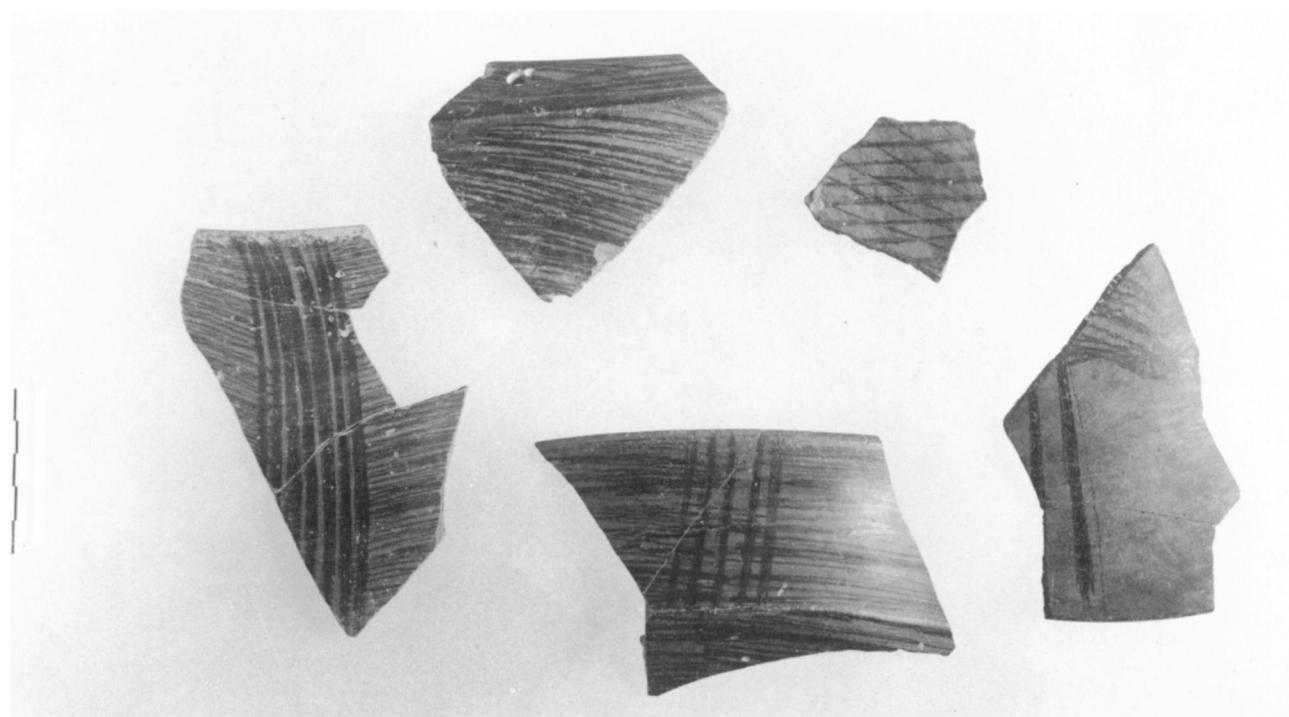
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a. Middle Neolithic Fruitstands



b. Middle Neolithic Ladle



c. Middle and Late Neolithic Sherds with Burnishing

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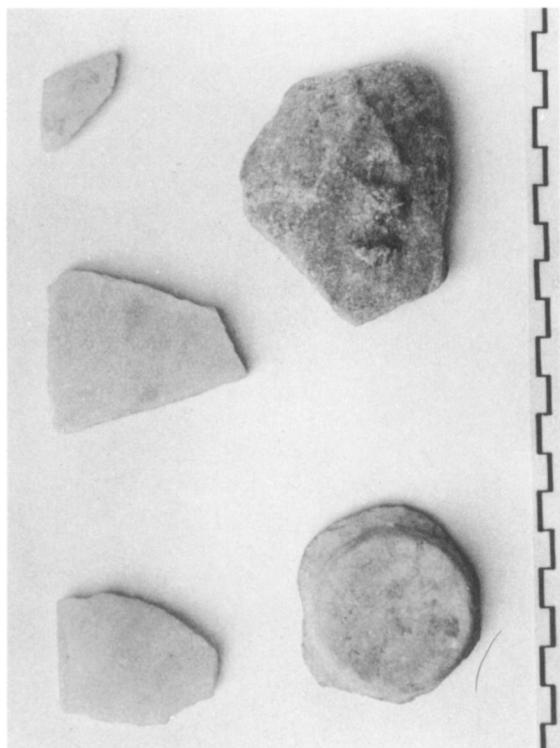
a. Late Neolithic Patterned Shards (1:2)

b. Neolithic Celts

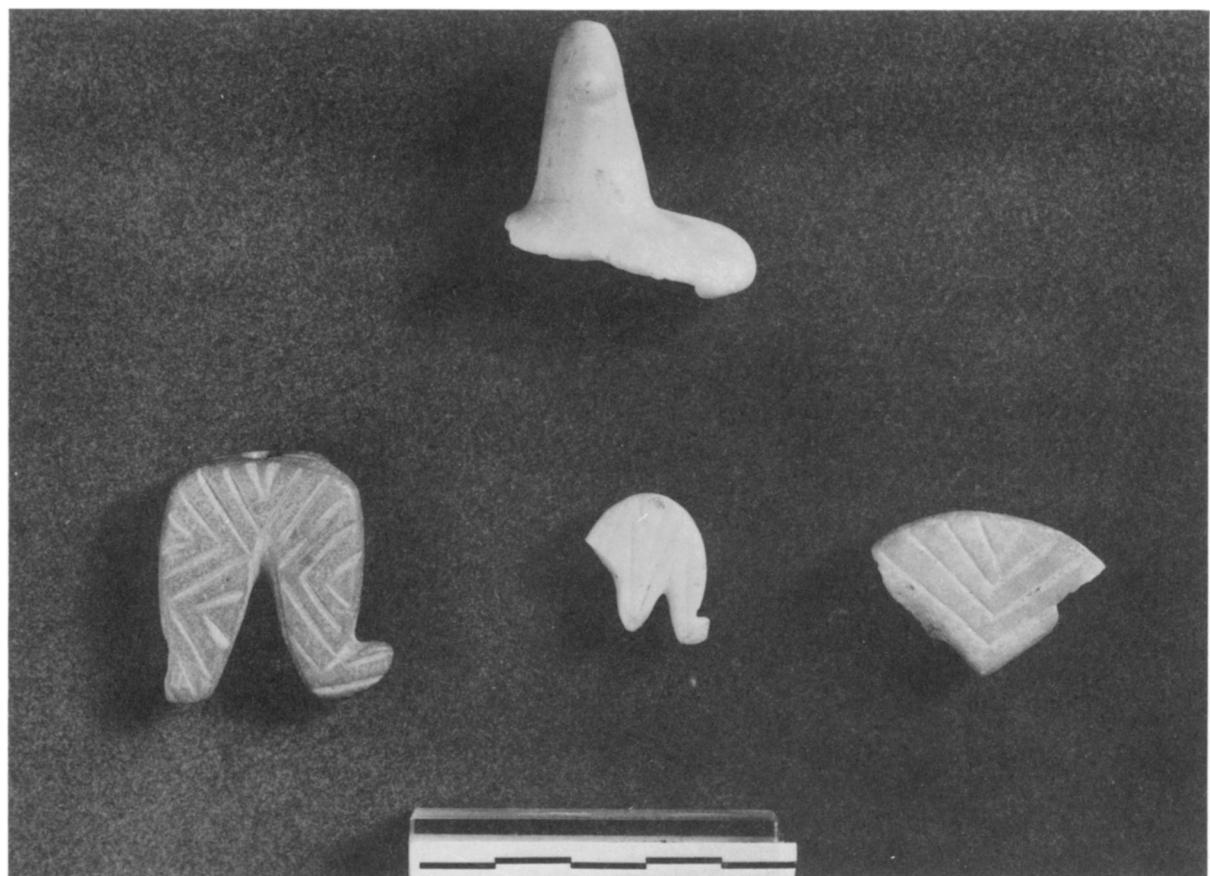


d. Middle Neolithic Stone Objects

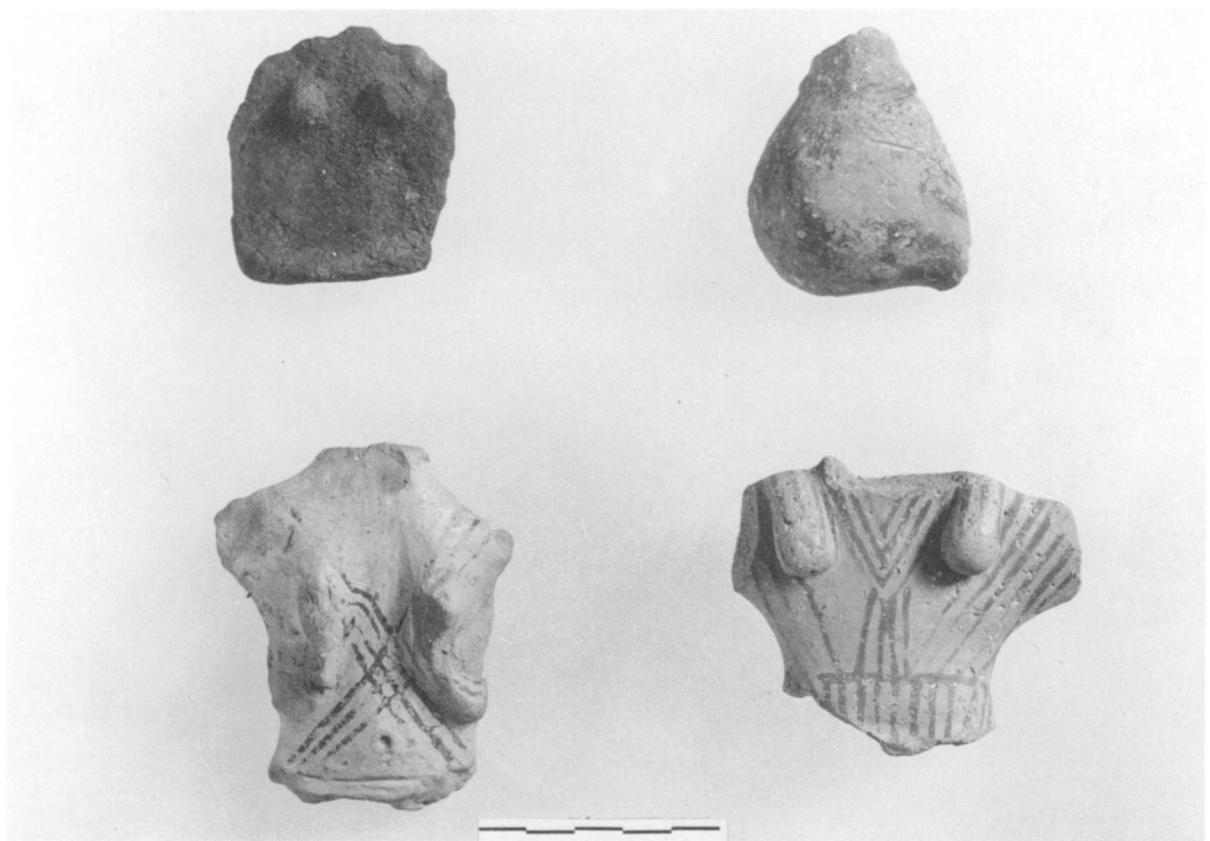
c. Fragments of Neolithic Stone Vessels



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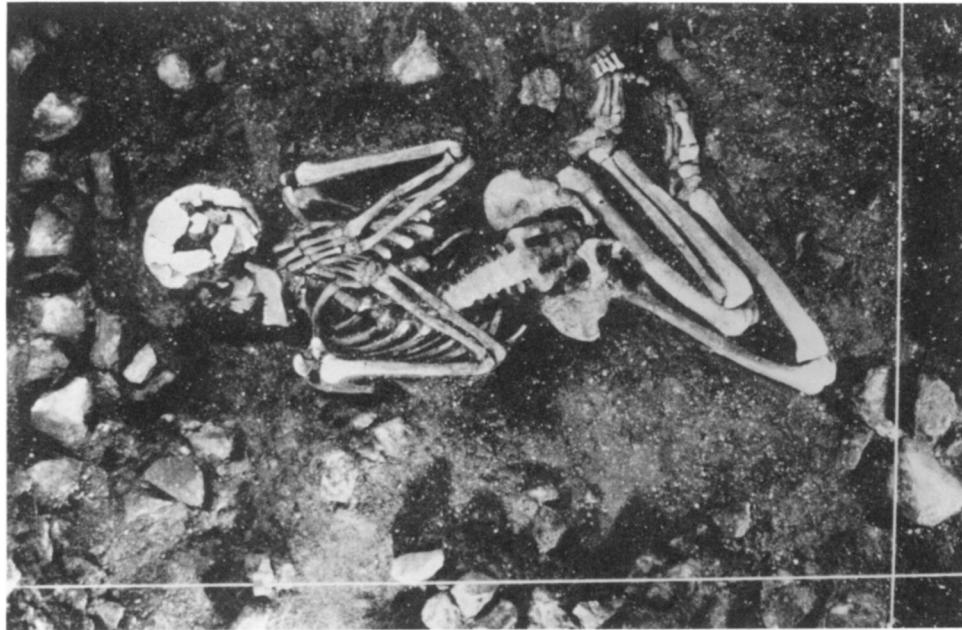


a. Mesolithic and Neolithic Stone Ornaments



b. Fragments of Neolithic Terracotta Figurines

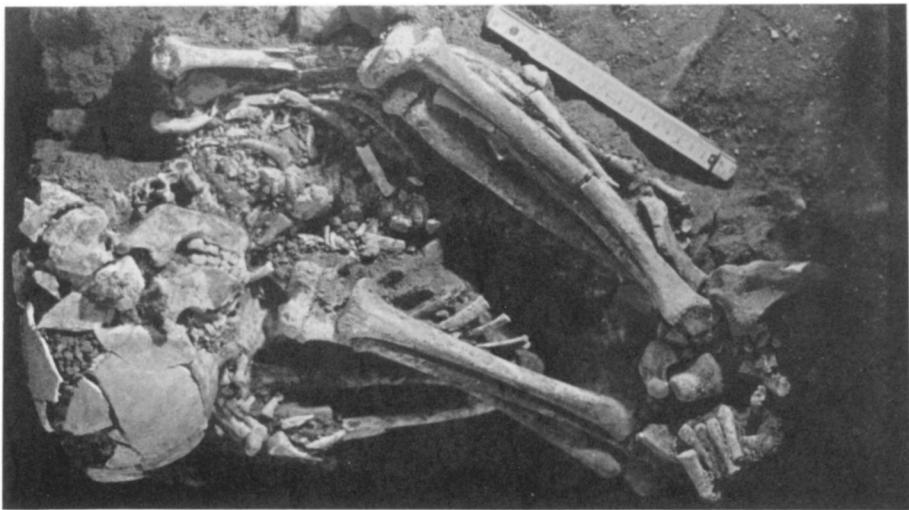
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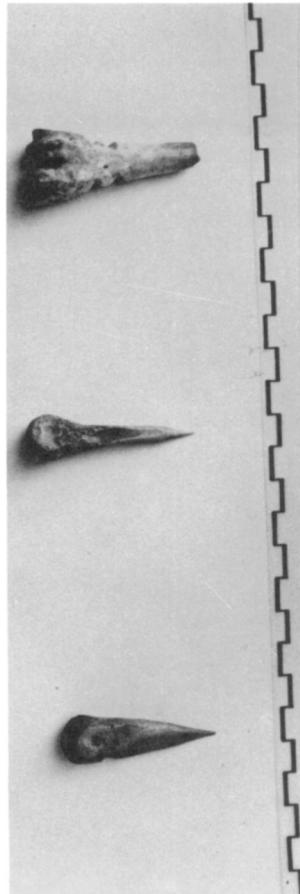
c. Pit G/G-1, Mesolithic Burial after Removal of Stones (1:11)



b. Pit G/G-1, Mesolithic Burial before Removal of Stones (1:12)



a. Pit F/F-1, Early Neolithic Burial



d. Neolithic Bone Points



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