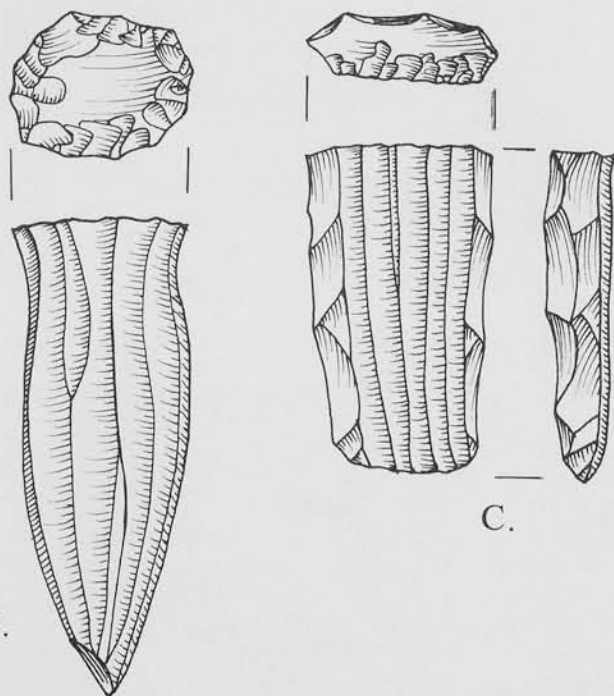


## THE ARCHAEOLOGICAL SURVEY: Chipped Stone

David Van Horn



A.



C.

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Core Types:  
A, amorphous =  
Palaeolithic;  
B, conical = Neolithic;  
C, tabular = Bronze Age.

It was very clear from the outset of the Argolid Exploration Project's first intensive survey season in 1972 that many chipped stone tools would be recovered, but I had no idea of how important these tools would prove to be when we first began to study them. In this brief article, I intend only to outline some of the highlights of a few of the lithic industries we sampled. Before doing so, it may be well to sketch the range of our knowledge of local lithics prior to the beginning of the survey.

Our knowledge of the chipped stone tools of the area had depended upon the collections recovered from the prehistoric levels of the Franchthi Cave. Fortunately, this cave contained extensive stratified deposits dating from Late Pleistocene times all the way through the Late Neolithic Period (about 20,000 to 3000 B.C.). Thanks to T. W. Jacobsen's excavations, large samples of securely dated lithic material from all phases of the Franchthi stratigraphy were available for comparison with the surface finds from the survey.

The Franchthi material proved invaluable but not always in the way we had expected. At first, it was hoped that most of the survey's lithic finds could be identified directly with stratified tools from the cave. In the case of some of the Late Neolithic tools, this proved to be the case. However, the Upper Palaeolithic chipped stone tools from Franchthi bore little resemblance to Palaeolithic finds subsequently made by the survey. More importantly, no stratified Bronze Age material (about 3000 to 1100 B.C.) was known from Franchthi. This caused difficulty since a very large portion of the lithic material found by the survey proved to be of Bronze Age date. Late in the season, we came to feel that we needed some stratified Bronze Age stone tools to compare to our surface finds and I requested permission to examine the stone tools from the excavations at Lerna at the head of the Argolic Gulf, some 40 km. north-west of our area. Professors J. L. Caskey and Elizabeth C. Banks very kindly arranged for

me to see the material from Lerna and this proved to be an enlightening experience.

During the 1972 survey season, a total of 5,525 specimens of chipped stone was recovered. Stone tools were by far the most common artifact found on the surface. Moreover, at many sites stone tools were the only artifacts present. We catalogued chipped stone from sixty-seven different sites which ranged in date from Palaeolithic to Bronze Age. For the purposes of this article, I shall discuss three of these sites in terms of a few of the lithic artifacts which they produced: (1) the Katafiki, (2) the Dhídhima sink-hole, and (3) Pétres. The bulk of the material from these sites is now known to date from Palaeolithic, Late Neolithic, and Early Bronze Age times respectively.

The Katafiki is a spectacular, deep, winding gorge which passes between the Ermióni and Fournoi valleys. Since these two valleys transect the Hermionid from coast to coast, the Katafiki is located in a most strategic position. It is still used by pedestrians passing from Ermióni to Fournoi. The vegetation of the Katafiki is luxuriant even today and, perhaps most important, fresh water is available in the gorge all year long. Moreover, the steep walls of the gorge combined with its other features suggest that the Katafiki would have been an ideal hunting place in prehistoric times. Finally, I should mention that most of the sedimentation within and at either end of the gorge is in the form of talus slopes. The talus soil is a bright red color which the survey staff came to identify with Pleistocene deposits.

Three hundred and sixty-one pieces of chipped stone were found at the Katafiki in 1972, most being recovered from the talus slopes. All of these tools were manufactured from local chert. Most of them fall into one of four general categories: (1) points of various types, (2) blades and bladelets, (3) scrapers of various types, and (4) cores.

It is not my purpose here to attempt to describe the lithic industries in detail. Rather, I hope only to illustrate how sites of various dates may be easily distinguished on the basis of the chipped stone tools which they contain. For this purpose, it will be sufficient to discuss only the points and the cores although the other sorts of tools may also be chronologically diagnostic.

Palaeolithic cores in the southern Argolid are generally of the "amorphous" (also called "globular") type (Fig. 1a). This term is used to designate cores which have not been worked according to any systematic scheme. Rather, amorphous cores were simply flaked in any manner which happened to be convenient for the knapper. There is no predicting what any particular amorphous core will look like as a result of the haphazard way in which they

were worked. Even the Palaeolithic blades were often produced from such cores. As we shall see shortly, cores changed radically by Neolithic times.

Points are of great interest because they are easily recognized and because particular shapes tended to be popular over particular periods of time. Bronze Age, Neolithic, and Palaeolithic points are all different. I employ the term "point" rather than "projectile point" or "arrowhead" because the actual function of these tools is not always absolutely certain. Of the two Palaeolithic points from the Katafiki illustrated (Fig. 5), one surface of each has been extensively retouched and this is the surface which is referred to as "facial." The opposite (ventral) surfaces have not been retouched. Therefore, these points are referred to as "unifacial." One of the two (Fig. 5b) has a roughly symmetrical, triangular shape with no barbs or notch in its base. Such points are called "straight-based points." The other piece is not symmetrical—rather it has a swelling or shoulder on one side of its base. Examples of this type are called "single-shouldered points." Straight-based and single-shouldered points are known from Neolithic times in the Argolid but they are very rare. Moreover, Neolithic points are always bi-facial (retouched on both surfaces).

The presence of the points and the amorphous cores suggested that the Katafiki tools were Palaeolithic. Other data help to corroborate this conclusion. Not only can the tool types themselves be diagnostic of the date of a site but so also is the material from which the tools were made. Three types of material were generally used to manufacture chipped stone tools during the prehistory of the Argolid: (1) local chert, (2) imported flint (from an unknown source outside of the southern Argolid), and (3) obsidian. The latter was probably imported from the island of Melos, 120 km. away. The excavations at the Franchthi Cave showed that obsidian did not appear until Upper Mesolithic times (about 7000 B.C.) and imported flints did not appear prior to Neolithic times. Since all of the tools from the Katafiki were manufactured from local chert, it was possible to determine, on the basis of the raw material alone, that the Katafiki had either a Lower Mesolithic or a Palaeolithic industry. Finally, the Pleistocene soil in which many of the tools were found confirmed a Palaeolithic date for the bulk of the artifacts. Therefore, considerations of provenience, typology, and raw material all helped us to date the stone tools from the Katafiki.

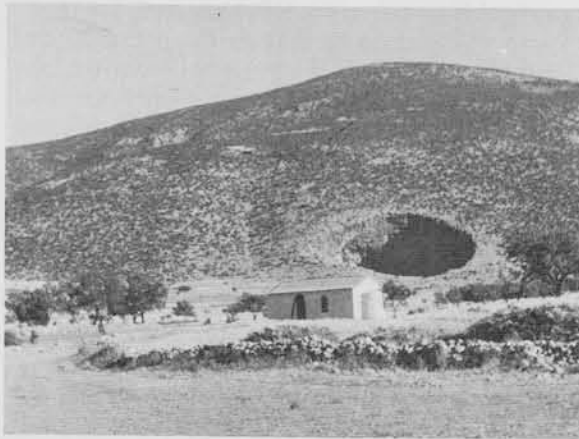
Let us now contrast the Katafiki tools with a Late Neolithic collection. Neolithic sites were found only rarely during the 1972 season. The most dramatic of these was a Late Neolithic site known as the "Dhídhima sink-hole."



2 Van Horn (center) and friends reenact the Mesolithic discovery of obsidian on the island of Melos.

3 The Dhídhmia sinkhole.

4 Detail from inlaid sword from Mycenae (XVI century B.C.) showing bowman in a lion hunt. At this time bronze arrow plates were coming to replace stone points.



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David Van Horn studied at the University of California, Santa Barbara, and at the University of Pennsylvania in the Department of Classical Archaeology, where he is writing his doctoral dissertation on Bronze Age stone and metal tools of the Argolid. He has excavated in the United States and Italy as well as at Franchthi.

The sink-hole is a large circular cavity in the side of a hill which borders the Dhídhima valley. Apparently, there was once a large hollow within the hill and the roof of this cavity collapsed leaving a gaping hole in the hillside. Several other sink-holes are found in the vicinity.

There can be no doubt that the bottom of the sink-hole was occupied during Late Neolithic times since sherds of that period are found in the bottom of the hole and since lithic material is very abundant both within the hole itself and around its immediate perimeter.

How does the industry of the sink-hole differ from the Palaeolithic industry at the Katafíki? The most obvious, and perhaps most important, difference is that sixty-six percent of the two hundred and four lithic pieces collected at the sink-hole were manufactured from obsidian. This material is far superior to flint or chert for the manufacture of certain types of tools. It is especially useful for manufacturing blades because it is easier to flake than chert and because it rarely contains any cracks or impurities.

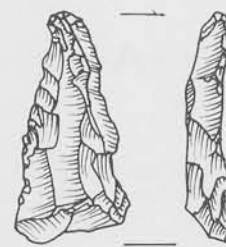
Eighteen blades or blade fragments were found at the Dhídhima sink-hole. Any one of these blades is a finer specimen than the finest Palaeolithic blade from the Katafíki in terms of straightness of edge and symmetrical regularity. No cores were found at the sink-hole but several Late Neolithic blade cores are known from Franchthi. These are always of the conical type. With such a core, blades could be struck off one after another, for the scars left by each blade after its removal provided ridges ("arises") which acted as guide lines to facilitate the striking of subsequent blades. No such efficient system was known in Palaeolithic times in the southern Argolid and so the presence of obsidian blades (or blade cores) assures the finder that he is dealing with post-Pleistocene material. Obsidian blades continued to be manufactured into the Bronze Age but the system for manufacturing them changed, as we shall see.

Late Neolithic points are entirely different from any which occur earlier or later. They are tanged (i.e., stemmed) and have two small barbs, one protruding from each side of the tang as seen in Fig. 6a. Three points were found at the sink-hole. Two of these were fragmentary (though one fragment had the tang and barbs preserved) while the third is complete. Stratified Late Neolithic examples of the same type of point are not uncommon at Franchthi.

It is clear that both the points and the cores as well as the selection of raw material all changed dramatically between Late Palaeolithic and Late Neolithic times. Lithic technology continued to advance during the Bronze Age. This became especially clear to



A.



B.



5 Palaeolithic points from the Katafíki gorge.

us after our attention had been called to an Early Bronze Age site on the edge of the village of Fournoi by Nicolas Gavrielides, a member of our project who had been studying the cultural ecology of olive culture in that village.

This site is in an olive orchard called Pétres ("Rocks") by the people of Fournoi because several large boulders rest on one of its margins. These are the only distinguishing topographical features of the site. However, one need only to look down at the ground at Pétres to be confronted with literally thousands of obsidian flakes. In fact, there are so many that the survey staff never attempted to do more than sample the industry.

In order to control the sample, a five-by-five meter grid was surveyed over the site and samples were selected from alternate squares. Much detailed data was produced by this process. Here I describe only the blade cores and a single point found at Pétres. Before doing so, however, I should remark that 98.7 percent of the 2,920 pieces of chipped stone recovered there were manufactured from obsidian! So far as I know, no other site of any date in the Argolid has ever produced such a high proportion of obsidian. However, other Bronze Age sites we discovered also had very high proportions of obsidian and it is safe to say that the relative quantity of obsidian is, in itself, a good index of the approximate date of a surface site. Sites dating back to before Upper Mesolithic times possess no obsidian whatsoever. The material becomes increasingly common up until the Early Bronze Age (roughly 3000-2000 B.C.) when it may constitute over ninety-five percent of the raw material for manufacturing chipped stone tools.

The industry at Pétres was not rich in blades. Nonetheless, our sample included one hundred and seventy. The survey team was somewhat perplexed by the fact that these blades at first appeared to be similar to Late Neolithic specimens. But when we examined the cores, it became obvious that an entirely new blade core type was present. This was the "flat" or "tabular" core (Fig. 1c). These tabular cores were worked on one or both flat surfaces with the blades being removed in rows across the face(s) of the core.

The tabular cores represent a technological advance over the old Neolithic conical cores for several reasons. One is that tabular cores are more economical since they can be flaked down to almost nothing before they are exhausted. Another advantage of the tabular core is that it produces blades which are straighter in section (compare the curve of the profile of the core in Fig. 1b with that in Fig. 1c). Subsequent study has confirmed our hypothesis that these tabular blade cores were unknown in the Argolid prior to the outset of the Bronze Age. I have seen tabular

cores from several other Bronze Age sites in the Argolid and these include Lerna, Tiryns, and Mycenae as well as other surface sites examined by our project.

Finally, we come to the points. One point fragment was found at Pétres (Fig. 6b). This point was not even recognized as such until I had the fortunate opportunity to examine the lithic collection from Lerna. There, I saw that the Bronze Age industry included tangless barbed or "hollow-based" points. Such points are also known from Mycenae and there can be no doubt that they are a Bronze Age type in the Argolid. Moreover, they are entirely distinct from any of the earlier versions which we have seen.

The actual functions of the tools we have been discussing are not definitely known. Nonetheless, a few general observations may be made. While it is not certain that the bow and arrow were even known in Greece prior to Middle Bronze Age times (about 2000 B.C.), it seems likely that many of the Late Neolithic and Bronze Age "points" which we have been discussing actually functioned as arrowheads. The tangs on the Late Neolithic points would be ideal for insertion into a hollow shaft and the size of the points is compatible with such a function. Moreover, these points are sometimes found in the field where there is little or no suggestion of prehistoric settlement, even of a temporary nature.

The Bronze Age points with their hollow base are thought by some to be the prototypes of the metal "arrowplates" which appear in the Argolid as early as the Middle Bronze Age. Whether or not the Palaeolithic points are actually arrowheads is open to controversy. In my personal opinion, they are not (I see no reason to assume that the bow and arrow were even known in the Argolid during Pleistocene times).

The cores were not useful tools in themselves (although I have seen cores which appeared to have been used as tools after they had been exhausted as cores). On the other hand, the potential usefulness of the tools which they produced cannot be over-emphasized. Prior to the introduction of metal, stone was the only material from which a very hard, sharp cutting edge could be manufactured. The potential usefulness of the cutting edge is boundless and plays an integral role in man's ability to alter his environment. In fact, the cutting edge can be regarded as the essential tool in the advancement of technology.

In the development of core styles from the old amorphous cores found in the Katafiki to the fine tabular blade cores such as those found at Pétres, one can see the development of the cutting edge over time. The shapes and sizes of the edges on flakes obtained from amorphous cores were almost impossible to predetermine with any accuracy. The devel-

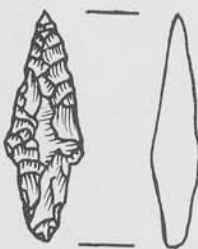
opment of the conical blade core which appears in Neolithic times in the Argolid enabled the knapper to rapidly produce a succession of long blades, each of which had two sharp cutting edges (thus achieving more efficient use of his time and raw material). The tabular core of the Bronze Age produced even greater efficiency of use of material. I regard it as certain that products of the Neolithic cores played an important role in the agricultural revolution thought to have taken place at the outset of the Neolithic Period. For example, long straight blades are needed for efficient reaping and shearing.

We can summarize what we have learned about the local lithic technology in terms of raw materials, tool production and tool typology. All of the earliest tools were manufactured from local cherts, inferior in knapping quality to the imported materials that became available later. Obsidian, the most important of these, appeared in Upper Mesolithic times and became increasingly common until the Early Bronze Age when the vast majority of tools were manufactured from it. The relative proportion of obsidian in an industry is a useful and generally reliable index of the date of the site.

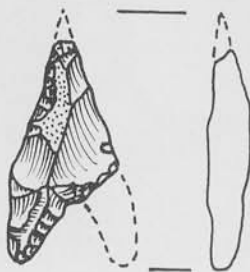
Methods of production also improved (though it is important to realize that these were integrally involved with improvements in raw material). Symmetrical cores intended for the systematic production of blades do not appear until Neolithic times. Neolithic examples of such cores are conical in shape. The system was improved upon at the beginning of the Early Bronze Age through the introduction of the tabular blade core which produced straighter blades with greater economy of raw material.

Tool styles also changed as I have attempted to illustrate with the example of the points. Palaeolithic points seem to have been unifacial and had no barbs or tangs. The style had changed to a tanged type by Late Neolithic times and to a broad, hollow-based barbed point by the Bronze Age.

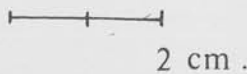
I have only highlighted the kinds of information that can be gathered from lithic surface finds. We are still engaged in evaluating some of the data collected in 1972, but an overall perspective of the development of local prehistoric technology is beginning to emerge.



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B.



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6  
Tanged Late Neolithic  
points.