ATHKIAJAS:
A CYPRIOT FLINTKNAPPER AND THE
THRESHING SLEDGE INDUSTRY

John Whittaker

ABSTRACT

The Cypriot threshing sledge supported one of the last flintknapping industries around the Mediterranean. Interviews with a former athkiajas (knapper) and others depict a simple, efficient, and highly specialized flintknapping technology, which was part of a complex of traditional agricultural practices. Within this industry can be seen temporal, regional, and individual variation, which is now difficult to document. The flintknapping and other crafts involved were also performed at several levels of specialization.

INTRODUCTION

Around the Mediterranean, threshing sledges studded with flint supported one of the few flintknapping industries to last into the industrial age. Although threshing sledge knapping industries were apparently widespread, they have been only sparsely recorded. There are published studies of aspects of these industries from Turkey (Bordaz 1965, 1969), and brief reports or mentions relating to Turkey (Forde 1931), Greece, Spain and Portugal (Hornell 1930, 1931), Palestine (Turkowski 1969), and elsewhere (see Pearlman 1984). David Pearlman's ethnography of Cypriot knappers (Pearlman 1984) is the most detailed work on any of the threshing sledge industries, and others have reported briefly on the Cypriot industry (Hornell 1930; Fox 1984; Fox and Pearlman 1987; McCartney 1993). Now almost 50 years have passed since threshing sledge manufacture perished as a viable occupation. Many of Pearlman and Fox's informants have died, and the traditional agriculture of which threshing sledges were a part has receded even further from the minds of the living and the scholarly record.

It is worth revisiting the Cypriot knapping industry in light of the limited opportunity for further ethnographic recording and for several points about knapping and specialized crafts that it illuminates. In the course of other work in Cyprus, I had the opportunity to interview a number of old villagers who remembered threshing sledges in their context of traditional agricultural practices and past village life. With the help of David Pearlman I was also able to relocate one of his previous informants, a knapper who once made and repaired threshing sledges. Alphredhos Andreou talked about the life of an athkiajas, and demonstrated his flintknapping technique. I will focus on this informant, Alphredhos Andreou, with frequent supplementary information from others I interviewed. Most of the information I collected agrees with Pearlman's more thorough treatment, but there are some interesting divergences.

THE DHOUKANI THRESHING SLEDGE

Cypriot threshing sledges, called dhoukan or voukan, were part of a traditional and ancient complex of specialized threshing equipment which was supplanted in the 1950s by tractor-powered mechanical threshers. These mechanical threshers are still in wide use, as many fields are too small or remote for modern harvesters. There are even a few old folk who still reap their grain with a sickle. However, modern combines are becoming common, and will eventually take over. Along with the dhoukanes perished the threshing floors (alonias), wooden forks for winnowing (thimmakia), ox teams for traction, and other specialized equipment.

The dhoukan itself was usually made of a pair of heavy pine boards 1.5 to 2.0 meters long, and
together about 60 cm wide (Figure 1). The boards are held together by dowels in the edges, and crosspieces on the upper surface, to which are also attached the chain or rope connected to the yoke. The front of the boards turns up slightly, and the bend is often reinforced with sheet metal. Some informants said this was to prevent wear, while others claimed it made the grain flow more smoothly under the sledge. A series of slots are cut into the bottom of the boards to hold the flint flakes, which are hammered into place and may be held purely by friction, or secured with melted pine pitch, tar, or sulphur. The dhoukanes I examined had 10-13 columns of flints down the board’s length, and 8-13 rows across on each board, or about 160 to 338 flints. Alphredhos Andreou said 200 to 300 flints were typical. Each row and column was offset from the ones next to it (Figure 2). A typical sledge would weigh about 50 kg.

In threshing, sheaves of grain were opened and spread in a deep layer on the aloni. Alonia are small fields, usually round and walled, with a prepared surface of clay, lime plaster, bedrock, or flagstones. Oxen, horses, or mules, singly or in pairs, drew the dhoukan around and around the aloni. The sharp flints separated the grain from the chaff and broke the straw into small bits.

**ALPHREDOS ANDREOU, ATHKIAJAS**

Alphredhos Andreou of Anarita village was one of the men who made and repaired dhoukanes, an athkikas or athkiajas¹. Pearlman (1984: 213)

---

**Figure 1.** A typical dhoukani, in the collections of Cyprus American Archaeological Research Institute

**Figure 2.** A part of the underside of the same dhoukani as in Figure 1, showing flints and slots. There are traces of tar or pitch on the surface.
derives the word from *athkikopetra* or *athkiaitchi*, meaning chert. We can approximate it as "knapper," although in earlier times *athkiakadhes* knapped only flints for *dhoukanes*, and possibly strike-a-lights, and they were often the carpenters who made the rest of the sledge, as well.

Mr. Andreou was 66 years old at the time of my interview in July, 1995. He was the youngest of the knappers interviewed by Pearman in 1982-1983, the only survivor today, and perhaps the last living *athkiajas*. He said he learned by apprenticing himself to a knapper named Miltiadis from Lapithos in northern Cyprus, when he was only 12 years old. This would have been around 1940, in the closing days of the craft, and his account illustrates some aspects system.

It is worth noting at this point that he had to think hard about the name of his master, wavering between Miltiades and Proxenos, before settling on the former. He told Pearman in 1983 that his master's name was Loizos and he started his apprenticeship at age 14 and stayed 4 years (Pearman 1984:222-227). Another of Pearlman's informants remembered a knapper named Proxenos from Lapithos who had an apprentice named Alphredhos from Anarita. The evident uncertainty of some 50-year old memories should sound a warning note about ethnographic reconstructions, as well as reminding a professor like myself that we may not live forever in the minds of our students.

Pearman (1984:126) recognized several centers of the knapping and *dhoukan* industry in Cyprus (Figure 3). There were several villages around Lapithos in northern Cyprus, another at Pano Panagia in the Paphos district, and a cluster of villages that he considered minor centers near Lefkara in south central Cyprus. *Dhoukanes* made in all these centers were widely traded. The professional *athkiakadhes* were mostly itinerant craftsmen who, according to Mr. Andreou, did not travel to sell their sledges. Instead, middlemen bought *dhoukanes* from the workshops and sold them in the villages, often at the *panagoria*, the annual festivals for villages' patron saints, which were a major occasion for exchanges of all kinds of goods. The knappers themselves traveled to obtain flint, to maintain their business contacts, and to repair sledges. Repairs were often the major part of their income.

The northern knappers did not have good local flint sources, and frequently exploited those in the south. Alphredhos Andreou's master Loizos or Miltiades often came to Anarita to collect flint, and

![Figure 3. Map of Cyprus, showing place names mentioned in the text.](image)
Mr. Andreou began by helping him collect flint. He says he recognized right away that this could be a profitable career, and after a couple years went north as an apprentice. They followed a yearly round that seems to have been typical. Chert was most often collected in the spring, in part because the rain and runoff would wash the rocks in the drainages and fields used by the knappers and make the chert more recognizable (Pearlman 1984:151). Most of the knapping was done at the source, and bags of flakes would be loaded on donkeys. The knappers could spend a month or so collecting material and knapping, and then travel home over the course of the summer, stopping at villages along the way to repair dhoukanes in time for the threshing season, which was June and July (Ionas 1992). The rest of the year would be spent in their home village making sledges using the rest of their flint supply. Pearlman suggests that dhoukanes needed yearly maintenance, but according to Andreou, a dhoukan needed to be repaired about every two years. Accordingly, he had no fixed route, but did not return to villages he had serviced the year before.

Mr. Andreou took us out to the local fields near Anarita, where he collected chert. There were numerous nodules and blocks of a brown to black chert of variable quality. I asked if there were different names for different materials. He said all the stone was athkidakopetra (chert), and good stone was "clear, like water." The majority of the nodules in the field were too fractured to be useful, and he strolled around the field tapping them or striking off flakes to select good nodules (Figure 4). As an apprentice, this had been his major job. He collected material while his master sat under a tree and knapped, at the edge of a field so the waste would not get in the way of the farmer, and so the knappers would not have to look through the debris again when collecting more chert. He said his master did not train him in knapping, "He ordered me to find rocks, and would not let me cut them. But when he was busy I went and did it anyway, until I learned."

After a couple of years as an apprentice, "my master did not want to let me go, but I left in the middle of the night and came to Polis Chrysochou (Polis). He wanted me to come back, but I would not go, I said 'what, are you crazy -- I have my own business now.'" When Andreou set up on his own, he did not make dhoukanes, but only repaired them.

Athkidakades from one village would often travel and work together, but Pearlman did not find any evidence that knappers from different centers ever cooperated. Knappers collecting flint did not pay land owners or own chert resources. The northern knappers seem to have avoided the chert outcrops immediately around the southern knapping center of Pano Panagia.

Mr. Andreou remembers a strong commercial and aesthetic rivalry between southern and northern knappers. I asked him why northern knappers worked in the south, especially when their dhoukanes were more expensive than the Panagiotes' dhoukanes (Pearlman 1984). He said the Panagiotes were "no good, blind," and his contempt was plain. I asked about specific differences. He claimed that the dhoukanes from Panagia

Figure 4. Alphredhos Andreou detaching a flake from a block of chert in the field near Anarita.
were smaller; but more importantly, the Panagiotes did not understand how to cut the holes to hold the flints. According to him, the slots should be cut so that they are wider at the bottom than at the top: the stone is inserted so that the thick edge of the flake is down, and the sharp edge faces out. In contrast, "the Panagiotes had a funny system. They cut them so the holes are wider at the top, and the flints have to go in with the narrow edge down, so of course they fell out!" I suspect this is an exaggeration. Andreou said the Panagiotes would put the stones in with the wood wet so it would shrink around them, and they would also melt resin or sulphur and pour it on them to hold them in. However, with the friction of use the resin would melt and the flints would come out. Andreou claimed he had once won a bet with some villagers who said his stones would fall out without resin, but "I drove my dhoukani through the plateia (plaza), and all around the church." When used on a threshing floor, the dhoukani is riding on a thick layer of grain and straw, and the stones should not have much contact with the ground, so this seems to have been an effective test. When he turned his sledge over to show that all the flints were still there "after that, no one wanted those no-good Panagia dhoukanes!"

Resin or sulphur can be seen on many extant dhoukanes, but in Pearlman's interviews, two of his Panagiote informants explicitly denied using resin. It would be interesting to examine the regional, individual, and temporal variation in Cypriot dhoukanes, but although there are many specimens on display in museums and forgotten in barns, few have enough documentation. Many will also have been the work of several men -- made by one, or two if a carpenter and a knapper worked together, and later repaired by one or several. Some of the farmers I talked to indicated that local carpenters also made dhoukanes, which were fitted with flints when the athkiajadhes came to town. Mr. Andreou agreed that this was the case in some areas, but that the carpenters who made sledges were not just any carpenter. A special chisel was used in cutting the slots (Pearlman 1984:98-101; Hornell 1930:138), which suggests that dhoukani carpentry was specialized.

The dozen or so dhoukanes that I examined closely showed differences in size, numbers of flints, materials, size and retouch patterns of the flints, presence of resin or other adhesives, and details of the carpentry. After talking to Andreou, I examined the slots on several dhoukanes. They all appeared to be vertical and about the same width at top and bottom. The flints were simply hammered in, as can be seen in the film by Ronen (n.d.), and held in place by friction and the springiness of the wood. Adhesives were an additional reinforcement on some.

CYPRIOT KNAPPING

Alphredhos Andreou demonstrated his knapping technique, working on the stone of an old olive mill in a field in front of his house (Figure 5). He had two hammers. They were not his old tools, and were "not quite right." One was a large ball peen hammer head welded to a pipe handle. This

![Figure 5. Alphredhos Andreou trimming a flake on his pad. Clockwise from his hands are a pile of flakes with some retouched ones on the edge away from him; two partially worked cores, the second of which is shown in Figure 6; five blocks of flint from two different nodules; and his large hammer.](image-url)
was what he used for testing nodules in the field (Figure 4) and for breaking them up into large flakes and blocks that could be used as cores. He said the tool should have been heavier and with a longer handle; the head should have a hammer on one end and a short pick on the other. His second hammer was a short length of iron rod welded to a pipe handle to make a T-shape. He did all his flaking and trimming with this. It was somewhat heavier than a tack hammer, and was not especially well balanced. The trimming of flakes, he said, should have been done with a hammer that had an edge like a chisel.

The proper equipment can be seen in the brief film by Ronen (n.d.), in use by one of Pearlman's informants, Grigoris Hadjiagathangelou. He came originally from Kazaphani in the north, and died in 1989 (Pearlman, personal communication). He was making small versions of dhoukanes for tourist sales into the 1980s (Pearlman 1984:280-287).

In the film he used the pick hammer to break up nodules. His flaking hammer was a well-made and about the size of a tack hammer, with a wooden handle and a bipointed head. The two equally long polls are both round in cross-section and slightly mushroomed from use. He trimmed flakes with a light hammer having a flat chisel head on each end, rather like the hammers used by British knappers for knapping gunflints from the parent blades. A slightly heavier hammer, like that used for flaking but with shorter polls, was used for hammering the flints into place, and also for retouching the working edge once the flint was set in its slot.

Alphredhos Andreou was a proficient knapper, and it was evident that in his prime he would have been extremely fast and efficient. He held the core in his left palm, protecting his hand with a sheet of inner tube rubber with a hole, through which he inserted his index finger to keep it in place (Figure 6).

The three cores he worked for me were thick flakes. On each, the interior fracture surface served as the platform for the entire series of flakes (Figure 7). He worked around the core, striking a regular series of flakes with relatively little waste, each blow being preceded by an aiming tap on the platform. Successful flakes he tossed into a pile in front of him, where he said he would have had a basket in the old days. Waste he just dropped out of his hand onto the ground. He prepared the core only by occasionally trimming the edge with short

![Figure 6. Mr. Andreou knapping flakes from the core shown in Figure 7.](image)
strokes. Platforms on the flakes are thus all plain, and the exterior platform angle (between the core surface and the exterior of the flake) is relatively low, usually between 50 and 60 degrees (Table 1). The core maintains a flattened conical form, but toward the end, the flakes have thicker platforms with steeper angles and the core is almost completely flaked away before discard. Mr. Androu's flakes were fairly regular, averaging 56 mm long and 37 mm wide, which would be retouched down to an average of 49 mm long and 28 mm wide (Figure 8).

The assemblage of flakes collected from Alphredhos Androu is similar in metric attributes to 17 specimens recorded from recent alonia or given me by locals (Figure 9). They are also similar to flakes made by Hadjiagathangelou (Pearlman 1984) and by two Panagia knappers (Fox 1984), as well as flakes on five dhoukani fragments from Souskto measured by McCartney (1993). Table 1 shows means and standard deviations for these assemblages, but some caution is appropriate in interpreting them. The assemblages are all small, and those from Fox and Pearlman's work appear to include both desirable flakes and rejected pieces, which they refer to as "debitage." The large average size of their flakes shows that neither of them can have included all the waste produced by the knappers.

I measured maximum length parallel to the working edge of the flake, which was the axis of flaking on all pieces except in 4 specimens from the alonia. The greater width and larger standard deviations in length and width in the Fox and Pearlman samples may have been caused by measuring all flakes in their flaking orientation, despite the likelihood that they would be reoriented for use, as well as the inclusion of unretouched flakes, finished flakes, and rejects.

McCartney's data came from five dhoukani fragments that varied in a number of attributes and are probably the work of different craftsmen, but all were flakes that had been selected and actually used. Her sample is the largest and covers an extensive range of variation, and thus is probably the best characterization of dhoukani flakes available.

Pearlman comments on the consistency with which his knappers produced flakes around 45 mm long, coinciding with the blade of the chisel.
<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Length</th>
<th>Width</th>
<th>Thickn.</th>
<th>EPA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Andreou - flakes</strong></td>
<td>6</td>
<td>56</td>
<td>37</td>
<td>11</td>
<td>59</td>
</tr>
<tr>
<td>(mean) standard deviation</td>
<td></td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td><strong>Andreou - retouched</strong></td>
<td>8</td>
<td>49</td>
<td>28</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>(mean) stand. dev.</td>
<td></td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td><strong>from alonia</strong></td>
<td>22</td>
<td>46</td>
<td>28</td>
<td>11</td>
<td>69</td>
</tr>
<tr>
<td>(mean) standard deviation</td>
<td></td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td><strong>Hadjlagathangelou</strong></td>
<td>12</td>
<td>44</td>
<td>44</td>
<td>11</td>
<td>75</td>
</tr>
<tr>
<td>* (mean) stand. dev.</td>
<td></td>
<td>7</td>
<td>8</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td><strong>Michael</strong></td>
<td>17</td>
<td>38</td>
<td>37</td>
<td>17</td>
<td>57</td>
</tr>
<tr>
<td>** (mean) stand. dev.</td>
<td></td>
<td>14</td>
<td>13</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td><strong>Spatalos</strong></td>
<td>25</td>
<td>37</td>
<td>41</td>
<td>13</td>
<td>51</td>
</tr>
<tr>
<td>** (mean) stand. dev.</td>
<td></td>
<td>15</td>
<td>18</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td><strong>Souskliou 1</strong></td>
<td>19</td>
<td>36</td>
<td>32</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>*** (mean) stand.dev.</td>
<td></td>
<td>9</td>
<td>8</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Souskliou 2</strong></td>
<td>9</td>
<td>34</td>
<td>27</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>(mean) stand. dev.</td>
<td></td>
<td>13</td>
<td>8</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Souskliou 3</strong></td>
<td>75</td>
<td>40</td>
<td>25</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>(mean) stand. dev.</td>
<td></td>
<td>8</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Souskliou 4</strong></td>
<td>22</td>
<td>36</td>
<td>26</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>(mean) stand. dev.</td>
<td></td>
<td>6</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Souskliou 5</strong></td>
<td>91</td>
<td>36</td>
<td>27</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>(mean) stand. dev.</td>
<td></td>
<td>9</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

* (Pearlman 1984:292), 5 flakes, 7 "debitage" pieces.
** (Fox 1984:66): "debitage" apparently included both flakes and waste flakes, but
large average size means not all debitage was included.
*** All Souskliou material concerns flakes from dhoukaní fragments (McCartney
1993: Tables 2-4)

Table 1. Metric Attributes for dhoukaní flakes from several assemblages. Measurements are
in millimeters, except for Exterior Platform Angle (EPA), which is in degrees.

used to cut slots for them, but it is also clear that
there was some random variation. In addition, his
informants stated that larger flakes were put at
the back of dhoukaníes, and smaller ones toward
the front. This is also documented by McCartney’s
work, as is the considerable amount of variability
in flake dimensions and other attributes.

I was unable to collect Andreou’s debitage as
systematically as I would have liked, but Tables 2
and 3 characterize two stages in the knapping
process. Debitage was sorted into maximum di-

...
ample. Seven platforms, mostly small, had crushed at impact. Most flakes have prominent bulbs, often with a strong cone and ring-crack, and sometimes with a streak of iron from the metal hammer. None of the flakes that were considered good enough for dhoukani use are included in this assemblage.

There was probably a large amount of variation in knapping procedure among knappers, as well as between knapping centers. Hadjigathangelou sometimes knapped unifacial cores such as those knapped by Andreou (Ronen n.d.), but sometimes he made more irregular bifacial cores (Pearlman 1984). The four Panagia knappers seen on Ronen’s film varied too. One worked mostly unifacially, but eventually turned the core over; two others worked bifacially and less regularly; and the fourth could barely remove a flake. According to Pearlman (personal communication), the first was Michalis Spatalos, one of his athkiaka informants, and the other three had never really been professional athkiakadhes. Mr. Andreou was trying to give me a good demonstration, and probably would have
Table 2. Debitage from making *dhoukani* flakes, Alphredhos Andreou, 1995.

<table>
<thead>
<tr>
<th>Size (cm)</th>
<th>Complete or Proximal Fl.</th>
<th>Distal Flake or Fragment</th>
<th>Irregular &quot;Shatter&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>2</td>
<td>44</td>
<td>8</td>
</tr>
<tr>
<td>1-2</td>
<td>6</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>2-3</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3-4</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4-5</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-6</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-7</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Debitage from trimming *dhoukani* flakes, Alphredhos Andreou, 1995.

<table>
<thead>
<tr>
<th>Size (cm)</th>
<th>Complete or Proximal Fl.</th>
<th>Distal Flake or Fragment</th>
<th>Irregular &quot;Shatter&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>.2-.5</td>
<td>8</td>
<td>91</td>
<td>37</td>
</tr>
<tr>
<td>.5-.1</td>
<td>37</td>
<td>46</td>
<td>23</td>
</tr>
<tr>
<td>1-.2</td>
<td>12</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 4. Retouch on recent *dhoukani* flakes

<table>
<thead>
<tr>
<th>Cutting Edge</th>
<th>Unretouched</th>
<th>Bifacial</th>
<th>Unifacial Dorsal</th>
<th>Unifacial Ventral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dull Edge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unretouched</td>
<td>6</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bifacial</td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Unifacial</td>
<td></td>
<td>3</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Dorsal</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unifacial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Souskou 1.5*</td>
<td>94</td>
<td>28</td>
<td>19</td>
<td>57</td>
</tr>
</tbody>
</table>

* (McCartney 1993: Table 15)

worked less systematically when a piece of material required it.

I tried to elicit some specialized terminology, but was not very successful. Mr. Andreou used the verb *koua*/*na kops* when he talked of knapping; the usual translation is "to cut." A flint was just *petra*, the same word used for a stone. The debitage was *skata*, waste or shit, or *abominaria*. Both of these terms sound a bit emotional to English speakers, but were not said with any particular force, and are not specialized knapping terms. The core when discarded was just *skata*, too; he apparently had no technical vocabulary for such things as cores, flakes, or bulbs of percussion. This contrasts with other specialized knapping industries in modern times, such as the British gunflint makers (Sketchly 1879), who had an extensive technical vocabulary describing different tools, types and qualities of flint, and manufacturing processes. I wonder if such jargon was already dying out when Mr. Andreou was trained, as a youth a long time ago during the last gasp of the industry. Alternatively, he may simply have forgotten, or it may never have developed.

The flakes were struck off in a regular series, ideally leaving each flake with one sharp edge and one thick edge where the median ridge from previous flaking was close to the margin of the flake. This is the form in which most material would be transported. Before inserting the flakes into a *dhoukani*, the thicker margin would be trimmed to fit the slot. Mr. Andreou trimmed them unifacially, laying them flat on the olive mill stone and striking the interior of the flake with short, rapid blows. As mentioned, he was not using the proper hammer, and he complained that the millstone was too hard, eventually laying his rubber pad on it, as shown in Figure 5. Ordinarily, he
said, he would have trimmed the flakes on the wood of the *dhoukani*.

Table 3 shows the debitage from trimming the back edge of acceptable flakes. Flakes are small, and the numerous additional bits less than .2 cm in maximum dimension were not counted. About half of the platforms on the proximal flakes were crushed; the others showed traits similar to the larger flake platforms. Many of the whole flakes were as wide as they were long.

There was evidently some variation in procedure here, too. Ronen’s film shows Grigoris Hadjiagathangelou trimming one flake by free-hand percussion just after he detached it. Later he trimmed others with the chisel-edged hammer, while holding them on the knapping hammer, which lay on the *dhoukani*.

Twenty-two *dhoukani* flakes given me or collected from various *aionia* are described in Table 4. On only four of them was the dull edge dorsally retouched as Andreou does it. His finished flakes are rather irregular, and would also have had the cutting edge straightened and leveled by retouching once they were in place. In Ronen’s film, Hadjiagathangelou retouches the cutting edges bifacially with the same hammer that drives the flint into its socket, a process that also can be seen to detach flakes from the edge. Although Mr. Andreou and other informants made a point of telling me how sharp the flints were, sharpness must not be really very crucial. Hammering the flints into the *dhoukani* and rough retouching with a metal hammer leave them jagged as often as sharp.

If used long enough, *dhoukani* flakes develop a heavy “sickle sheen” polish on protrusions, allowing the cutting edge to be identified, even when both edges are retouched. If they stay in place long enough, the edges of used *dhoukani* flakes may be thoroughly rounded and dulled. Whallon (1978) and Crawford (1935) described this pattern of wear in detail, but it does not develop on all *dhoukani* flakes. McCartney (1993) considered retouch on *dhoukani* flake edges to be evidence of “retooling,” but neither Andreou nor any of my other informants suggested that the flakes in place in a *dhoukani* would be sharpened during repairs. Repairs were always described as necessary “because the flints fall out.”

**THE TRADE**

One of the advantages of ethnoarchaeology is that one can find out how artisans felt about their craft. Mr. Andreou said that knapping was a good trade: “Even as a boy I could see it was a good business, there was money in it, you could earn your bread.” In fact, he claimed that he earned more money than most men.

The other men in Anarita today were very aware of Alphredhos’ former trade, and he was proud and pleased to show it off to us. His days as a knapper were important to him and he enjoyed remembering them, although they could not have lasted more than about 10 years, and were now some 40 years distant. All my informants agreed that threshing sledges became obsolete in the early 1950s: “When the threshing machines came, slowly, slowly the business disappeared.” When I asked if he was sorry, he shrugged and said “That’s the way it was.” I asked what he felt back on, and he explained that he had other skills: “I have had a hundred jobs!” He used his training in carpentry for awhile, and said that that was what many *athkiakadhes* would have done. He also played the lute, going from village to village to perform at weddings. At one time he also raised pigs, and he showed us his current businesses, which include a fertilizer and feed factory, an irrigated farm and citrus grove, and a number of trucks. His later success lends weight to his opinion that knapping was a good trade.

Traditional Cypriot agriculture would have supported a lot of knappers at one time. Most village families grew grain for their own use and trade, and each family had its own *dhoukani*, or sometimes two. Alphredhos said he had had over 3000 customers at one time, which implies that he was a busy man around harvest time. The chert resources should have been very important, as the distances traveled by knappers to access them also show, although knappers seem to have lacked any system of exclusive rights.

The *dhoukani* industry in Cyprus also shows that there are many ways to divide up a specialized craft and, within a single industry, there may be many levels of specialization. There were full-time *athkiakadhes* who constructed the entire *dhoukani* from tree to timber, nodule to flake, wood and stone to threshing sledge. Others, like the young Alphredhos Andreou, specialized full-time in re-
pairs and knapping. According to him, there were also some carpenters who specialized in making the sledge itself, but did not knap or insert the stones. Some of my informants said that village carpenters sometimes made sledges, although Andreou disagreed. Crawford (1935) saw a dhoukani made by "the village carpenter who also made the wooden parts of plows" in the northern village of Agios Ambrosios. This carpenter also set the flints in the sledge, but Crawford did not record whether he knapped them himself. Many of Pearlman's informants were not athkiakades, but had made flints to repair their own dhoukanes. A number of my informants claimed that their villages had knappers, mostly men with other jobs who also repaired dhoukanes.

As a result of this diversity, the artifacts themselves vary on many dimensions. Regional styles, individual preferences, and temporal change are all present, but are obscured by lack of data and by the probability that any single dhoukani shows the work of many hands.

Some of the variation in the information recorded by myself and others may result from the haze that 50 years casts on all memories. Ethnoarchaeological studies reveal organizational details and emotive aspects of material culture. Some of these are inaccessible to archaeology, while others offer a range of possibilities to consider and hypotheses to test. Some of the questions raised by the diversity of informants' memories can no longer be asked directly, an the sands of time are running out for the Cypriot knapping industry, as they already have for so many others.

ACKNOWLEDGMENTS

Thanks are due first to Alphredhos Andreou, whose hospitality and skill I will always remember. Many other Cypriot elders were gracious to an inquisitive stranger, and their help, too, is much appreciated. The Karoalis family provided much help and hospitality; Aphrodite and Maria Karoalis ably translated interviews, despite the difficulties of village dialect and esoteric technical questions. David Pearman's work launched my interest, and his contacts and advice led me in the right direction. David Swiny, Vathoulla Moustoukki, and Nancy Serwint made resources at the Cyprus American Archaeological Research Institute available. The Hewlett Foundation grant to my wife, Kathy Kamp, through Grinnell College indirectly supported my presence in Cyprus, and the Grinnell Faculty Grant Board provided funds to pursue this research. Amy Henderson drew the artifacts and map. The comments of David Pearlman, Ralph Luebben, and Curt Runnels improved this paper.

NOTE:

1 I have tried to spell the Greek words phonetically. The more proper spelling and pronunciation is athkiakas, but many villagers used a strong "J" sound instead of "k"; athkiakos or athkiakas. I have also used correct plurals, but not changed cases.

REFERENCES CITED

Bordaz, Jacques

Crawford, O.G.S.

Forde, C. D.
1931 Threshing Sledges in the Bosphorus Region. Man 30:144.

Fox, William A.

Fox, William A., and David Pearlman

Hornell, J.
1931 The Distribution of the Threshing Sledge. Man 31:32.

Ioannis Ioannis

McCartney, Carole

Pearman, David A.
CORRELATION OF MAYA LITHIC AND GLYPHIC DATA

Marc Thompson

ABSTRACT

Celts are temporally and spatially ubiquitous throughout the Maya Lowlands. Because of recent technological analyses and abundant depictions in various media such as ancient books, carvings and pottery, the uses and functions of these implements are partially understood. Here an attempt is made to bridge the gap between lithic and glyptic analysis, including iconography, to present a fuller picture of the ancient meaning of the lithic hallmark of the Lowland Maya.

INTRODUCTION

That the pre-Conquest lowlanders usually prepared their plots by the slash-and-burn method is certain, but exactly how large trees were felled prior to the adoption of copper axes in the post-Classic (and steel ones in Colonial days) is unclear; perhaps they were merely ringed and left to die (Coe 1993:166).

The statement by the Halach uinic (grand sachem) of Mesoamerican archaeologists will serve to demonstrate what I perceive to be a rift between "dirt" archaeologists and those who explore the realms of iconography and religion. The former are primarily interested in excavated data (tangibles). These are interpreted by scientific methods to determine their function and the physical behavior associated with them in ancient cultures. The latter tend to focus on the meanings of images (intangibles) and how these functioned with respect to cognitive behavior in ancient ideologies. Some archaeologists work in both arenas with multiple paradigms. Michael Coe and David Freidel are outstanding practitioners in Mesoamerican studies (see References). However, many field workers still look with disdain upon those who study the cosmological spheres of extinct cultures. As was explained to me by a colleague, "You can't excavate religion." Even archaeologists who have demonstrated success in these areas express reservations: "it is difficult, if not impossible, to reconstruct the belief system of a prehistoric population" (Crown 1994:5). Certainly the task may be a daunting one, especially in the absence of written records. However, comparison of cross-cultural and cognate images from historic cultures can inform about prehistoric ideologies (e.g., Carrasco 1990, for Mesoamerica; Thompson 1994, for the Southwest).

The introductory quotation by Coe suggests that, despite our best efforts at analysis, interpre-