Threshing sledges and threshing floors in Cyprus

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Résumé
Les aires aménagées et utilisées avec des traîneaux à dépiquer étaient communes dans l'agriculture méditerranéenne traditionnelle. À Chypre, des dhoukanes (traîneaux) et des alonia (aires) ont été en usage jusque dans les années 1950. Les artefacts et le souvenir des fermiers nous permettent d'étudier tant la technologie, l'organisation sociale, le sens, que la variabilité rencontrée dans certaines pratiques agricoles chypriotes. À leur tour, ceux-ci peuvent éclairer des pratiques agricoles anciennes et leurs vestiges matériels. Cet article abordera deux aspects : d'une part la fabrication des éléments de traîneaux à dépiquer par les tailleurs de silex, et, d'autre part les aires de battage elles-mêmes, qui, bien que très répandues dans le monde méditerranéen, n'ont pas retenu l'attention des archéologues.

Abstract
Prepared threshing floors, used with flint-toothed threshing sledges drawn by animals, were common in traditional Mediterranean agriculture. In Cyprus, dhoukanes (sledges) and alonia (floors) were in use until the 1950's. Artifacts and the memory of farmers allow us to examine technology, social organization, meaning and variation in some Cypriot farming practices. In turn, these provide insights into ancient agriculture and its material remains. The focus here is on two aspects : the manufacture of the sledges by specialist flint workers, and the floors themselves, which are common but neglected features throughout Mediterranean archaeology.

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Fig. 1. Two threshing sledges with typical teams at work on a circular, terraced threshing floor somewhere in Cyprus at around the turn of the 19th-20th centuries (photo by E. Gjerstad, Cyprus American Archaeological Research Institute collection).

The use of a threshing sledge studded with flint on a prepared floor was a common agricultural technique all around the Mediterranean until a few decades ago. Threshing sledges have ancient origins, probably in the Bronze Age or earlier (Anderson, 1994, 1999; Anderson, Chabot, 2001; Anderson, Inizan, 1994; Skakun, 1992). They appear in the Bible (Isaiah 41.15-16) and the English word « tribulation » comes from the Latin term for a threshing sledge, « tribulum », which makes for a rather harrowing metaphor.

There are two aspects I wish to discuss in the context of Cypriot ethnoarchaeology: the manufacture of threshing sledges and especially the flints for them, and the threshing floors on which they are used. I will use a brief Cypriot example, of which I have published more details elsewhere (Whittaker, 1996, 1999, 2000) to illustrate some general points about agricultural technology, in particular, how agricultural equipment and features can reflect aspects of social and economic organization (fig. 1).

Ethnoarchaeological studies of traditional agriculture are one of the best ways to understand the links between archaeologically relevant patterns in the material world, and the social forms that structure them. It also offers the chance to put a human face on technology, reaching some of the emotive and symbolic aspects of material culture that are so important to people, and so difficult for purely archaeological techniques to access. Although traditional agriculture is waning on Cyprus, some aspects are still practiced, and the older generation remembers
many things that are no longer common. The consensus among older Cypriot farmers is that the threshing sledge became obsolete in the 1950s. My information comes from a number of mostly elderly informants consulted during the summer of 1995.

Archaeological attention to threshing sledges has generally focused on the manufacture of the stone inserts (Ataman, 1999; Bordaz, 1965, 1969; Bordaz, Bordaz, 1974; Fox, 1984; Fox, Pearlman, 1987; Hornell, 1930; Kardulas, Yerkes, 1996; McCartney, 1993; Pearlman, 1984; Ronen, 1989; Torrence, 1986; Weiner, 1981; Whallon, 1978; Whittaker, 1996), probably because lithic artifacts are a traditional province of archaeology, which are durable and distinctive, and because there are few remaining stone tool traditions that can be studied ethno-graphically. The typical Cypriot threshing sledge, called a *dhoukani* or *voukani*, is constructed of 2 pine boards about 1.5-2.0 m long, fixed side by side to form a sledge some 60 cm wide (fig. 2). The front end turns up slightly, and on the upper
surface are fixed at least a couple of cross boards that hold the sledge together and to which are attached the traces. Into the underside of the sledge are cut slots, and flint flakes are hammered into these, and sometimes additionally stabilized with pine resin or asphalt. Typically there are 200 to 300 flakes (fig. 3).

The dhounaki was made by an « athkiajas ». The term best translates as « flintknapper » but many were also carpenters. Alphredhos Andreou was perhaps the last living athkiajas. I located him with the assistance of David Pearlman, for whom he had been an important source when Pearlman (1984) wrote a thesis on the threshing sledge industry some years earlier. M. Andreou was 66 when we interviewed him at his home in Anarita in 1995, and died in 1997. He began his career as an apprentice to a man named Miltiadis when he was 12. Miltiadis came from Lapithos in northern Cyprus, which was one of the centers of dhounaki manufacture, the other most important one being the village of Pano Panagia in the Paphos district (Pearlman, 1984). The northern athkiajas, although they had good resources of wood, had no flint in their district, so came south to collect stone in the areas around Lefkara and Anarita (fig. 4).

The athkiajas often led a partly itinerant existence, collecting flint in the spring and making a stock of blades for the threshing sledges, then traveling around to a number of villages repairing sledges in time for the late summer threshing. In the winter he would return to his home village and make sledges, which he might sell himself, or sell through a middle man who took them to village fairs.
The knapping technique used in Cyprus was simple (fig. 5). The *dhoukani* flakes tend to be longer than they are wide, but they are not really blades in the usual archaeological sense of the term. They are struck from unifacial or multidirectional cores with minimal platform preparation, using metal hammers, and then trimmed to fit the slots in the sledge (fig. 6). M. Andreou demonstrated for us, and was still quite adept despite a gap of more than 30 years between his career as an *athkiajas* and our interview.

The *athkiajas* had a kit of specialized equipment (Whittaker, 1996), which is only approximated in the photograph, as M. Andreou no longer had his original kit, and had to put together a set of tools to demonstrate the craft to us. A large hammer served to break up nodules, and he used the small round hammer for knapping the flakes, trimming their edges, and setting them in the sockets. Originally, he would have had a small chisel-edged hammer for trimming, and also a special chisel for cutting slots in the boards.

Traditional subsistence agriculture has almost by definition been considered a non-specialist activity. In Cyprus as elsewhere, much of the population was involved, at least some of the time, in producing their own food. However, the technological support for many subsistence activities may come from specialized

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**Fig. 5.** Alphredhos Andreou trimming sledge flakes with his small hammer. Moving clockwise from his left are a pile of flakes, two cores, five blocks of flint, and his large hammer.

**Fig. 6.** One of Alphredhos Andreou’s cores in the center, platform down, with three untrimmed flakes below, and and 6 old, worn dhoukani flakes above.
craftsmen. Archaeologists often believe that in prehistoric agricultural societies, stone tools such as axes (Hester, Shafer, 1991; Lewenstein, 1987), hoes (Cobb, 2000), and cutting blades (Hester, 1979) are likely to be produced by some sort of specialist. Although the expectation of specialist involvement is often based on evidence of large-scale manufacture, the fact that relatively few archaeologists make stone tools, and thus they seem esoteric and difficult, also plays a part. In the metal-using cultures of more recent time, casting and forging require not only expertise, but also relatively complex facilities. The ethnographic record of threshing sledge manufacture in Cyprus, however, shows that even within a single society, there are a number of ways a specialist stone tool industry can be organized.

Alphredhos Andreou illustrates this. As a 12-year old apprentice, he helped his master by collecting stone while Miltiadis knapped it. He told us that Miltiadis was not interested in teaching him, but he learned how to knap anyway, and when he felt he could be independent, ran away « in the night » and set himself up as an athkiajas in the town of Polis. However, where Miltiadis apparently followed the seasonal round described above, and performed all the steps of dhoukani manufacture himself, Andreou never built sledges. He confined himself to repairing them, but claims that he knew right away that this would be a successful trade for him. Every village family would have had a dhoukani or two, and he said they generally needed repair, at least replacement of flints, about every other year. His circuit of local villages in southern Cyprus took him to about 3000 customers, which must have kept him pretty busy around harvest time. He said not only did he « earn his bread », but in fact made more than most men. As he successfully moved on to other trades when threshing sledges became obsolete, and was a visibly prosperous business man when I interviewed him, his judgement should be trusted.

From M. Andreou and others we learned that the athkiajas trade included men who constructed the entire sledge, like Miltiadis, men like Alphredhos who specialized in flintknapping and repairs, carpenters in the north who made the wooden elements, but not the flints, and farmers who were not athkiajas, but who knew enough about knapping to make flints when needed. When David Pearlman was engaged in his research, he produced a short film of Cypriot knappers. In one segment, a group of men from Pano Panagia can be seen. In this center of knapping they all claimed to have been athkiajas, but it is obvious that their skills range from competence, to clumsiness, to total ineptitude, and Pearlman told me that he felt some had attempted to impress him by claiming skills they never really mastered.

While archaeologists have examined threshing sledges and their flint components in some detail, with few exceptions (Avner, 1998; Murray, Kardulias, 1986; Whitelaw, 1991; Young, 1956) little attention has been paid to the prepared floors on which the threshing takes place. This is the more surprising as these are relatively large and durable features of the economic landscape, which should be highly visible in the archaeological record, and which reflect aspects of the social and economic organization of crop processing.
Before tractor-powered mechanical threshing machines came to Cyprus in the 1950s, several threshing techniques were used for a variety of crops. Treading with animals and flailing were known, and we even heard that some farmers laid grain on the highway to be threshed by passing cars. However, the sledge seems to have been the dominant technique, certainly the one that our informants were most familiar with. I was told that some crops, especially pulses, were more often threshed by flail or animal treading, but grain, an important crop for most families, was almost always processed with a dhoukani, because it was desirable to cut up the chaff, which became animal feed.

In order to use a dhoukani effectively, you need a threshing floor, called aloni (plural alonia) in Cyprus. I will briefly describe alonia in two different village groups, to give some idea of range of variation and relevant features, interpreted through the comments of the old farmers I interviewed.

Alonia are being obliterated in modern times, because they are no longer needed for threshing with machines. Around many villages they are being lost as small fields are combined into larger units for mechanical agriculture, or villas spring up around the edges of villages with the decline in traditional life and the rise of a tourist economy. Galataria has a surviving set of threshing floors which are typical in form but unusually well-built (fig. 7).

Galataria in 1960 had a population of around 200, and each family should have had an aloni, so there should have been 40-50 alonia. After the island was divided in 1974, the Turkish part of the population left, and now the young folk are mostly moving to the coast where the jobs are, so in 1995 there were only about 70 elders left in Galataria. Many of the alonia had been destroyed since they became less important after the 1950’s, but the cluster we recorded at the north end of the village survived because it is on a hill slope, difficult to convert to other purposes, and the floors are owned by a number of different people, making it difficult to combine the land.

There were 10 floors in this cluster at Galataria, of which 7 are shown on the plan (fig. 8). All are roughly round, and about 12-18 m in diameter. The walls and floors are built of local limestone slabs, and the floors are terraced into the hillside. To understand them better, let us discuss the processing of grain.

In the field, grain was harvested with sickles, men doing most of the cutting, while women tied up the sheaves. Donkeys or carts brought the sheaves to the threshing floor, where they were spread out in a layer about 30 cm deep. It made good sense to have the alonia near the village for ease of transporting grain and chaff to storage, and bringing animals and dhoukanes to and from the floors. As at
Galataria, *alonia* were often clustered, because the process of threshing and winnowing often involved cooperative labor and socializing. It was important work, and while some informants emphasized that it was monotonous, hot and dusty, it was also a time when villagers rejoiced at the harvest and worked together. The threshing sledges were driven around and around the floor over the grain. The driver stood or sat on the sledge, which could be additionally weighted by stones, or by children who were pleased to be released from school for the harvest. The more nostalgic farmers remembered threshing in the cool of night, and singing as they drove the *dhoukanes* around the floors under the moon. One woman told us of her future husband, who courted her with songs from the *alonia* while she wove cloth for her trousseau at the window in her family’s house upslope.

When the grain was threshed, groups of neighbors winnowed each others’ grain in turn, recompensed by meals. Winnowing required good breezes and dry weather, so it was important to finish the work efficiently. The architecture and location of floors reflects this: clustering for cooperation, and a tendency to be built in the open, on ridge tops or hill sides. The downwind side is usually low,
while the upwind edge of the floor is either terraced into the hill as at Galataria, or walled to catch the chaff. The individual floors also defined property rights and kept each family's grain separate. The chaff could be removed immediately, but apparently the grain had to stay on the floor until taxes were assessed. During the British mandate the tax was supposed to be 1 part in 10; local folklore remembered the earlier Ottoman days as even worse.

Floor size and construction might reflect other social aspects. The Galataria alonia were unusually elaborate compared to others we saw, but the Galatarians told us this did not reflect wealth, just pride in their grain. A flagstone surface helped keep the grain clean and was easier to maintain, but other floors might have packed earth, limestone bedrock, or lime plastered surfaces. The alonia at Galataria, like most, were intended for a single dhoukani, but larger floors could accommodate two or even more at once.

Neo Chorio village had alonia much like those at Galataria, of which we found several survivors, less clustered and walled with stone but with lime plaster floors. However there were also two which make a useful contrast to the normal form (fig. 9). About one km outside the village, were two large threshing floors side by side. They were rectangular, and each about 40 m on a side, and surrounded by walls. The open front was terraced above the lane, and the back was built up with a wall a meter high. According to locals, these had been built by the richest man in the village, probably in the early 1900s. He was the head of the village, and owned a great deal of land, most of which was worked by tenant farmers. His granddaughter remembered that several dhoukanes would thresh at once on these large floors, processing her grandfather's grain. Similarly, large threshing floors seem to have been used at some of the rich Ottoman estates in Cyprus.

**Fig. 9.** Plan of two large alonia near Neo Chorio. Trees are carob (C), lentisk bush (L), and olive (O). Aloni 6 at Galataria, looking toward the village. The road has cut the edge of the aloni, which is now used for storing farm equipment.
Even when alonia survive as archaeological features suitable for interpretation, some basic information may be hard to obtain. Dating is a problem as artifacts on and around are often sparse and ambiguous (Murray, Kardulias, 1986). Although threshing sledge flints develop distinctive wear (Anderson, Chabot, 2001; Kardulias, Yerkes, 1996; McCartney, 1993), such flints are not uncommon in villages and fields as well as at _alonia_. Although threshing floors have been associated with Classic period farms in Greece and Neolithic villages in Israel, I know of no dates earlier than Medieval times claimed for Cypriot floors and _dhoukani_ flaking sites (Rupp et al., 1984), and the antiquity of threshing practices there is hard to establish. Floors may also have very long use-lives. Avner (1998) suggests several centuries of use for Bronze Age floors in Israel, and documents modern use of prehistoric floors. With further attention to excavation of threshing floors and their associations, local chronologies could probably be established in Cyprus and elsewhere, but little of the necessary work has been done.

Although few archaeologists have attempted to interpret them or even to describe them, the recognition and study of threshing floors could help understand a number of issues related to the history of agriculture, the variations in agricultural technology, and the social organization of agricultural production.

Threshing floors have been used as evidence of specific kinds of agriculture and specific agricultural techniques: they are everywhere associated with grain agriculture, although legumes and some other crops may also be processed on them. In Cyprus and elsewhere, _alonia_ are associated with the use of threshing sledges, which in turn imply a late survival of lithic technology, and a complex system of artisans and markets. Mediterranean threshing floors were often used with animals to thresh the grain by trampling, and sledges, where present, obviously imply the use of animal traction. Thus if very early threshing floors can be recognized, they may reflect on the development of work animals. Whallon (1978, p. 320) believes that sledges also imply free-threshing wheats, and Anderson (1999) considers threshing sledges a response to the domestication of oxen and the development of a solid rachis in domestic grains. The use of a flint-armed sledge may reflect the advantages of chopping chaff finely for animal feed or mud-brick temper.

The presence of threshing floors associated with other features has been used in a number of instances to argue for the importance of grain production as opposed to other activities (Rackham, Moody, 1992; Whitelaw, 1991; Young, 1956). With more systematic data we ought to be able to relate variations in threshing floors to other aspects of agricultural practice. Size and surface preparation are two attributes likely to be significant. In Cyprus, the size of _alonia_ relates in part to the number of sledges that are to be used on them. Very small threshing floors (6-7.5 m diameter) such as Whitelaw (1991) reports for Keos, may be intended for threshing by animal trampling without sledges, or with flails, although larger floors (20 m diameter) are also reported in areas where sledges are not used (Murray, Kardulias, 1986). My informants in Cyprus did not attach special significance to different _alonia_ surfacing techniques, other than to claim
that flagstones made for cleaner grain. However, different surfaces may pose advantages for particular threshing techniques or specific crops.

The social organization of agricultural production is also likely to be reflected in the arrangement of facilities. The presence of large, multiple, or elaborate threshing floors may indicate wealth, as suggested by Lohman (1992). The example of the large alonia at Neo Chorio makes this interpretation seem plausible, although large or multiple floors could also indicate high productivity or cooperative labor, as suggested by the informants at Galataria. Cypriot threshing floors seem to have been built and owned by individual families or groups of kin, but large floors or complexes of floors could theoretically be built and controlled by a community, an economic elite, or an establishment such as a monastery or estate. Palmer (1998, p. 152) notes a change in Jordan from communal village threshing floors to smaller individual floors built close to fields. She does not explain this, but it may relate to increasing private ownership of land. Threshing floors also reflect more general settlement patterns. Archaeological and historic Greek examples (Lohman, 1992; Murray, Kardulas, 1986; Whitelaw, 1991; Young, 1956) occurred singly or in pairs with individual farms or estates. The Cypriot examples I examined were clustered around more nucleated settlements.

As other papers in this volume show, the interpretive potential of all kinds of agricultural practices, features, facilities and tools should not be neglected. All are parts of the complex webs of traditional life, supported by other technologies and the artisans who make them, shaped by functional practicality and the social forms of the people who use them. Ethnoarchaeological studies are especially urgent as modern agriculture and global economies shoulder aside older practices, and the generations who used the esoteric technology of the past join their ancestors.

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