ÇAkMAK REVISITED:
TURKISH FLINTKNAPPERS
TODAY

by

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Abstract

Flintknappers from the village of Çakmak in western Turkey made flint blades for threshing sledges until the early 1980s. Former knappers are still able to provide a description of mining, knapping, and distribution, consistent with information collected by previous archaeologists. Informants agree that the mines provided an excellent living but, compared to a similar village industry making gunflints at Brandon, England, there is little local or national interest in Çakmak's now extinct craft. The social and symbolic meanings of stone tool technologies to their practitioners are separate from simple economic concerns and the encouragement of external forces may be necessary to maintain these meanings.

Few opportunities remain to follow the declining fortunes of stone tool industries in the modern world. Knappers in the Turkish village of Çakmak, observed occasionally over a span of 40 years in the last decades of their profession, offer some insights into how one of the last traditions of lithic manufacture obtained raw material, worked stone, and distributed the products. The knappers also illustrate some of the regular technological and social changes that occur as technologies become obsolete, and some of the difficulties in studying a technology when it survives primarily in the memories of a dwindling number of artisans. Comparison with a different lithic industry at Brandon, England, where gunflints were made (Skertchly 1879; Clarke 1935; Gould 1981; Whittaker 2001), suggests circumstances under which knapping retained or lost social meaning as the technology itself became obsolete.

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Like gunflints, manufacture of chipped stone inserts for threshing sledges is one of the last links with prehistoric stone tool technologies. Threshing sledges are simple in concept, but represent an early complex processing technology. The most common form in historic times is a heavy wooden sledge with flint flakes or blades set in slots cut in the underside (Figures 1, 2).

The sledge is drawn by animals over the harvested grain laid on a prepared surface, and breaks up the straw into fine chaff while detaching the grain, which can then be separated from the chaff by winnowing (Figure 3). In Turkey, the word for a threshing sledge is most often düven, although there are variants. The threshing sledge is an ancient technology, known to the Romans as the tribulum (White 1967), and mentioned in the Old Testament (Isaiah 41.15-16, New Revised Standard Version Bible). Based on textual references, iconography, and archaeological blades, Anderson (2003) has reconstructed and tested a Mesopotamian form. Elsewhere, threshing sledge blades identified by characteristic wear patterns

Figure 1. Underside of a typical threshing sledge, (collections of ODTU, Mid-East Technical University).

Figure 2. The flint teeth in the threshing sledge. These are made from typical greenish Çakmak material.
appear as early as the Chalcolithic or even Neolithic (Anderson 1994, 1999; Skakun 1999, 2003).

Archaeological finds associated with the threshing sledge include prepared floors (Whittaker 1999, 2003) and stone blades which develop distinctive wear (Whallon 1978; Fox 1984; McCartney 1993; Anderson 1994; Kardulias and Yerkes 1995; Gurova 2001; Anderson et al. 2004). In recent times, threshing sledges have been reported all around the Mediterranean, sometimes with metal replacing the flint (Hornell 1930, 1931; Forde 1931; Myres 1931; Luquet and Rivet 1933; Crawford 1935; Bordaz 1965, 1969; Turkowski 1969; Oliveira et al. 1983; Fox 1984; Pearlman 1984; Darwish 1986; Fox and Pearlman 1989; Mingote Calderon 1990; Del Rey and Alvarez 1994; Ataman 1999; Skakun 1999; Karimali 2005).

In the 1960s, Jacques Bordaz (1965, 1969) published two articles reporting on threshing sledges and their makers. He and his wife also produced a short film (Bordaz and Bordaz 1973). This was a period of heightened archaeological interest in experiments and ethnographic observations of stone tools, and Bordaz (1969) published a description of the knapping industry partly to make a technological point. Prehistoric blade technologies were often assumed to use indirect percussion to achieve the precision necessary for regular blades, but modern knappers demonstrated that a consistent blade industry was possible with direct hard hammer (in this case, iron) percussion.

In 1980, Jurgen Weiner visited Çakmak while helping to prepare a German exhibit and volume on "5000 Years of Flint Mining." His interest was in documenting the mining technology, and showing that it was similar to that seen in prehistoric European flint mines (Weiner 1981). At that time, the knapping industry was moribund.

Our interest in revisiting Çakmak after 27 years was to see what was left after all the knappers had presumably abandoned the trade. Small scale
"cottage industries" were a common feature of the social and economic landscape of many societies, but are increasingly in decline under the pressure of social and technological changes and the global availability of cheap mass-produced goods. In effect, we see this paper as part of a longitudinal study of the functioning and demise of a particular craft, and its place in a regional system of village-based craft specialties. This is essentially a preliminary report on work we hope to continue. Rare technological survivals such as the Çakmak lithic industry can be effectively studied through the lenses of archaeology, which are particularly good for examining technological processes and historical time depth, and ethnography, which adds social and emotive aspects.

In Çakmak, we talked to Mr. Ramazan Emeksiz, and in the nearby town of Harmancık, we interviewed Mr. Nihat Yılmaz. Both of these men are now retired knappers in their 60s. We were not able to get a full demonstration of knapping techniques, but both showed us enough to prove that they knew what they were talking about, and their accounts agreed in most essentials. Mr. Emeksiz still uses his knowledge of knapping to manufacture stone blocks for use in ball mills grinding ingredients for Turkey's ceramic industry. Our description of the flint trade is assembled from these interviews, as well as from comments from other locals who remembered the knappers and the use of threshing sledges, but were not involved in the knapping. Without their hospitality and cooperation, none of this research would have been possible.

One of the pleasures of ethnoarchaeology is talking to people about their material culture. To preserve their voices, we present some of the information in the form of edited transcriptions of our conversations as we describe the geological context, the technological processes, and the social and economic organization of the knapping industry. These transcriptions also attempt to convey some of the difficulty of reconstructing an entire system from the idiosyncratic memories of informants. Finally, we introduce some thoughts on the processes of technological obsolescence and how the meanings attached to a craft can affect its survival and memorialization.

RAW MATERIALS AND MINING

The small village of Çakmak in northwest Turkey (Figure 4) will not be found on most maps. It is about 50 km almost due south of the city of Bursa, about two hours by road, between the towns of Orhaneli and Harmancık. Harmancık, about 8 km south of Çakmak, is a market town through which many of Çakmak's flints passed on their way to the consumer.

Turkey is geologically complex, having been cobbled together in the Early Tertiary from colliding continental fragments, leaving zones with different Palaeozoic and Mesozoic geological histories separated by plate boundaries, and with lots of tectonic activity. Çakmak is in an area known as the Tavsanlı Zone, "a subducted passive continental margin" dominated by Mesozoic metaclastic blueschists and marbles. Further volcanism and metamorphism in the Cretaceous produced basalts and ophiolitic rocks (Okay 2004). According to geologist Mehmet Duru at the government geological survey, this was followed much later by a Miocene lake basin, which produced lacustrine limestones interfingered with deposits from continued volcanic activity, referred to as the Odaköy Formation.

The cherts exploited at Çakmak formed in the limestones. Some appear to have formed by the usual sedimentary/segregational processes, while others, notably the green cherts described in more detail later, appear to be at least partly hydrothermal in origin or to have been affected by metamorphic processes. Chromium is mined from the metamorphic formations nearby, and according to analyses by Ellery Frahm at the University of Minnesota, the green color of some of the Çakmak chert comes from traces of chromium.

In other words, these are relatively young cherts in a localized calcareous environment surrounded by contemporary and much older volcanic and metamorphic material. The knapping quality of the chert is similar to that of cherts from other formations elsewhere in Turkey, but the color and chemical composition seem to be distinctive and the Çakmak chert resources are unusual in the geology of the region.

Mr. Emeksiz took us to see the former chert mines on the flanks of a low mountain about 2 km south and east of the village. Weiner (1981) gives
the mountain's local name as Düven Taşı Ocağı, meaning "threshing sledge stone place," which could refer to the mines themselves as much as to the mountain. The mines visibly cover a large area in a forest of 40-50 year old pines. There are hundreds of semi-filled shafts surrounded by piles of flint rubble. Our visit was short, and the frequent sounds of gunfire from hunters in the woods convinced us that this was not a good time to do a thorough exploration and map.

In the 1950s to 1970s, when Emeksiz and Yılmaz were knappers, the mines must have been worked continually. Mr. Emeksiz said the village population had been around 1100, and was now about 120. Mr. Yılmaz said "in those days in the village there were 80 houses and in every house there were 3 men, all the men were working [in the flint trade]." Later he gave a much smaller estimate. Turkish census data (State Institute of Statistics 1970:150, 1985:10) show a village population of 552 for Çakmak in 1970 and 533 in 1985.

The men worked in teams, usually in groups of relatives and friends. Some of them were knappers, while others mostly dug. Team membership shifted from time to time, especially when an old mine was finished and a new one started; it fluctuated according to the demands of the mine, other opportunities, personal relations, and so on. According to Ramazan Emeksiz:

Sometimes we worked 3 or 4 of us as or taşı (partners), for example, two people dig the land in order to get the stone, two of them work by the mine and knap the stone. If the mine is close, sometimes five or six people work. The knapper is usta, the master, but the digger just digs. Everybody has his own skill.

Both men agreed that knapping was the job that required the most skill and had the most prestige, but that profits were divided equally among the team.

When we asked if women were involved at all, Mr. Emeksiz replied with some scorn at our simplicity: "It is not a job for women. They can't do it. They didn't help. A woman works in the gardens, in the farms. Knapping stone is a man's job! How could they carry the stones?" His wife and daughter, who were serving us lunch at the time and looked perfectly capable, did not comment.
Boys, however, began at a young age. Both knappers said they started working with their fathers and other relatives as their “masters” at 11 or 12. They carried water, made tea, and performed other chores. Mr. Emekşiz said he learned to knot by watching, but Mr. Yılmaz said his master would make him knot a few kilograms of stone a day, apparently instructing him in the process.

The mining must have been laborious (Figure 5). With pick and shovel the miners would dig a shaft 2–3 m wide straight down from the surface. Under the thin mantle of soil was limestone bedrock. In the area of former mining where a recent quarry operation had been working the bedrock with dynamite and bulldozers, the exposed rock was tough limestone with a high silica content. Nihat Yılmaz described the mines in some detail:

There are three different levels of stone. The first is kapak taş [lid or top stone], the second is kabakaya [coarse/rough rock/stone] and the third is maden taş [mine stone]. The top kapak taş is not very useful; the second one is kabakaya; it can be used, but then the maden comes, it is the good one.

_JW:_ is it green? [Showing him a specimen].
_NY:_ Yes, it is green, or a kind of blue like the blue of the clouds. The first one (layer) is the third quality, and the third (layer) is the first quality.
_KK:_ So they were using only maden to make döven stone?
_NY:_ No, all were used, but the first kapak taş was the cheapest. But we sold all of them. You can find a good stone in one meter, or two meters, or three meters... you never know where you get the stone.

The levels of different chert were apparently separated by layers of useless limestone. Stone quality in the debitage piles varied from rather coarse, tough, grainy material, which is usually grey or whitish, to finer flints which fracture cleanly and are often grey or light brown, although we saw a few dark grey and black pieces. These often seemed to have been nodular, with thin limey cortical surfaces. The maden taş however, is distinctive. The best pieces are hard, fine-grained to homogeneous, and pale green to greenish-white, but the waste includes material that is the color of jade or malachite, and grades into stuff so glassy and soft that it is not suitable for knapping. Some of this appears to have been deposited in thin bands, probably by hydrothermal processes. The debitage on the surface today is dominated by greenish flint, because that is what was dug last and piled on top of the spoil heaps. The greenish cherts from the mines seem unusual and distinctive, while other cherts there look similar to chert from many other sources.

_EY:_ When you get down in the mine, were you also digging to the sides?
_NY:_ When you have a good stone you follow it, to right or left... and continue down until we get the maden stone. For example we find kapak taş, we take it out, then we continue digging and we reach to the kabakaya, and we work there, then we continue digging and get to the maden and take it out, but if we

_Figure 5._ Mining at Çakmak in 1980. Note the single-pointed picks. Photo by Jurgen Weiner.
can’t find it, we leave the mine and pass to another.

[We inquired about light and supporting the roof of tunnels.]

NY: For example, we have found a very rich vein of stone. We will make walls with the waste stone, to support the roof, and we continue digging. For example we dig 10 meters downwards, then all around is dark, and we don’t have electricity. We had oil lamps, we put a piece of cloth into the oil and we used it as a light, we put it on a secure place; it gives light to the area that we dig.

JW: How long did it take, digging a mine?

NY: That depended on the mine. For example sometimes we would work 3-5 months for kapak taşı, or a year, then, kabakaya taşı, if it is good also, we take it out, and finish it, then we get to the maden stone and we finish it too, then we pass to another mine. For example in our mines we worked 3-5 years.

Mr. Emeksziz also said a mine would be used for three to five years, and should produce 100 kg of flint a day if the stone was good.

Ropes and ladders were used for climbing in and out and removing stone. No one mentioned the stages cut in the sides of mineshafts or the kind of timber platforms that are documented for some European flint mines (Russell 2000:101-107), but something of the sort is visible in unpublished photographs by Bordaz in the University of Pennsylvania Museum archives. As Weiner (1981) points out, in most respects the mines were probably very like the Neolithic flint mines at Grimes Graves in England and others all over Europe, which are also similar to those worked in the gunflint industry at Brandon, England, and elsewhere. We were unable to examine an open mine. Many of the shafts we saw had been completely filled by erosion and intentional dumping of debris from later shafts, and in some cases apparently by later bulldozer work in the forest. A few remain as dangerous pits up to 5 m deep, rimmed by piles of coarse debitage.

KNAPPING AND PRODUCTION

Most of the knapping seems to have been done at the mines. Yilmaz and Emeksziz described the same knapping process recorded by Bordaz and Weiner. Seated on the ground, the knappers used a large iron hammer (tokmak) to break up the pieces of flint from the mines into core sizes of 30

Figure 6. Krapper breaking up large blocks of flint with an iron club-shaped hammer. Between the two knappers is one of the smaller hammers for knapping the blades. Photographed 1980 by Jurgen Weiner.
cm or less and discarded the waste (Figure 6). Yılmaz said there were two sizes of these hammers, the *büyük tokmak* ("big hammer," 5 kg) and the *küçük tokmak* ("small hammer," 2 kg). Next, a pointed iron hammer (*çekirge*) was used to strike short blades from a more-or-less conical core.

We had hoped to get a full demonstration, but that proved impossible. Mr. Emeksz had disposed of his tools long ago - that part of his life was past and he seemed surprised at our persistence in asking about such obsolete and irrelevant things. However, he used a small iron sledge hammer, which he said was much too big, to show us how flakes were struck from a core. Mr. Yılmaz, on the other hand, still had one of his knapping hammers, but he had injured his hand the day before. He had no good flint, but selected a coarse piece from a pile of stones collected from the surface of a field and intended for a wall. He broke it up on the ground with a large sledge hammer (the *büyük tokmak*), then sat to demonstrate flaking (Figure 7). His hammer is identical to those shown in Bordaz (1969), and he said it weighed about 2 kg (Bordaz gives 3 lbs). Mr. Yılmaz said that, in his knapping days, he bought the iron and made his own hammers, which implies that he had a forge. Whittaker, the knapper among us, tried the hammer. It is considerably heavier than most knappers today would use for similar tasks, but the weight and the sharp points allow a slow blow with minimal stress to the hand. Both men said they would have protected the left hand, holding the core, with gloves or leather pads, as recorded by Bordaz. The unretouched blade, 5-8 cm long, was the finished product of the knappers.

Bordaz (1969:76) emphasized the regularity of the conical cores and flakes made at Çakmak, comparing them to Upper Paleolithic blade industries (Figure 8). The cores we saw in the debitage piles were variable (Figure 9). Most had a single platform, but were worked around only part of the perimeter, the rest being unusable stone. We
Figure 8. Flakes in a knapper’s bucket at Çakmak, photographed by Jacques Bordaz, 1970, University of Pennsylvania, Museum archives. Are the nice blades set upright around the rim merely for the photograph, or do they serve some purpose, such as preventing tossed flakes from bouncing out of the can?

Figure 9. Typical cores from the debitage piles at Çakmak, 2007.
were unable to systematically record or collect debitage. The most obvious material on the surface is composed of large fragments and flakes from initial removal of unusable stone in preparing cores, but in some areas there were concentrations of finer debris from blade production. The blades we have seen at the Çakmak mines and in threshing sledges elsewhere do not impress us with their regularity. They were made efficiently, but there was no point in producing very long or very regular blades when nothing more than about 8 cm would be used in a döven. As the blades would be roughly shaped and retouched to fit in a sledge, straight sharp edges were irrelevant, too.

As knapping was done at the mines, the knappers built shelters of stone with pine-branch roofs in which to work during bad weather. Weiner photographed remains of these (Figures 6, 10), and obtained a description of the workers' shelters, while both structures and patterns of debris could still be distinguished (Weiner 1981:385; translation from the German by Ralph Luebben):

Two types of work debris, based on size, can be distinguished. The larger type of debris is associated with a hut-like structure in which a flint worker could work in bad weather and be protected. A low wall supported a flat roof made of wood and branches, which has deteriorated. A small opening on a long side served as the entrance. On the opposite long side, a window-like opening was left just below the roof. While he worked, the flint knapper sat just under the opening with his back to the wall. All the waste of flake production, ie poor raw materials, irregular flakes, or broken cores were thrown over the shoulder of the chipper and through the window to the outside. Over time, a typical long oval mound built up. Today it allows the identification of places of waste associated with a worker's hut, even when the hut construction itself can barely be identified. Soot on the wall in one corner identifies the corner fireplace used to heat the hut.

Shelters also protected freshly dug flint from drying too quickly. We were unable to distinguish any structural remains at the mines today. There were obvious traces of bulldozer clearance and leveling in places, and Ramazan showed us an area where the upper levels of flint and bedrock have been quarried using dynamite and machinery. For a few years, a ceramic company worked here, mining material to be made into blocks for lining ball mills (see below), but they stopped about 10 years ago.
The situation at Çakmak should remind us archaeologists that extractive industries can be organized in many different ways. At Melos, for contrast, Torrence (1986) argued that extensive obsidian exploitation was mostly by unrestricted, non-specialist visitors who removed material after only limited processing. At Brandon, specialized miners dug the flint for the gunflint knappers to work, and all knapping was done away from the mines. The nearby Neolithic mines at Grimes Graves, however, were the sites of initial axe shaping and other knapping (Mercer and Saville 1981; Russell 2000). We should probably expect that prehistoric mines, especially those located far from settlements, would often be associated with facilities for miners and knappers, perhaps as ephemeral as those at Çakmak.

**MARKETING**

As the knappers produced blades at the mines, they were loaded into cans and bags, and transported on donkeys down the mountain to the village. As in mining and knapping, the different stages in the production of any artifact can be allocated in many ways to more or less specialized workers. The villagers in Çakmak did not make threshing sledges. However, there seem to have been carpenters in most villages who did. In Cyprus (Whittaker 1996, 2000, 2003), there were also some villages with access to good pine forests that did not make flints but specialized in the woodwork for sledges, and this may have been the case in Turkey as well. The sledge maker was usually the one who retouched the flint blades to fit and hammered them into slots in the sledge. The sledge-maker recorded by Bordaz (1969) in Konya drove his iron chisel into a block of wood and used the butt end as an anvil on which to retouch the blades with a small metal hammer.

Sledge makers and flint merchants came to Çakmak or the nearby market town of Harmançık to buy flints. The knappers apparently sold mostly to merchants who distributed the flints all over Turkey. Harmançık was a center, with a market in front of the mosque where stone merchants offered their wares to döven makers. Mr. Yılmaz remembered three merchants who came to buy flints for resale in Aşeron (160 km SE of Harmançık), Kastamonu (NE of Ankara, ca 600 km from Harmançık), and other cities.

Our informants agreed with Bordaz that Çakmak supplied most of the döven flints for Turkey, but in his unpublished notes at the University of Pennsylvania Museum, Bordaz mentioned two other production centers that he heard about, but did not visit. We find it hard to believe that there were not other knapping centers. Other formations around Anatolia produce cherts, and there are apparently other villages named Çakmak, which would be worth investigating. However, it is true that we have seen döven with the characteristic green flints in antique shops and museums from the west coast to Cappadocia. Sabine Beckman (personal communication 2008) believes that the limited threshing sledge tradition in Crete was transplanted from Turkey during Ottoman rule in the 19th century, and has shown us greenish flints that appear to be Çakmak material. Many of the less distinctive flints in Turkish sledges could also come from Çakmak, although we also see blades of dark, coarse cherts that appear to be different. Unfortunately, most current owners of döven often do not know exactly where they came from, let alone the sources of flints that would have been replaced over the years of use.

There must have been millions of threshing sledges in Turkey at one time. They would serve many years, but new ones were constantly needed, and lost flints would need to be replaced often, every other year or so to judge by Cypriot parallels (Whittaker 1996). The knappers were very productive, but production is hard to quantify. Mr. Yılmaz, who was the master knapper of his team, said he used to knap 150 kg of flints a day, but had one friend who could do up to 325 kg a day. Bordaz (1969:77) estimates that a knapper would produce almost 250 kg of blades a day if there was enough flint, and half that if the flint had to be mined at the same time. He estimated village production at about 500 tons per year. According to Mr. Emeksiz, there were 50 or 60 blades in a kg. A döven would have from 300 to 700 flints; the specimen pictured (Figures 1, 2) is typical, with about 420.

The estimates of our informants that up to three men from 80 households worked at once must be tempered by several considerations. Most families relied on subsistence farming as well as knapping, and Bordaz was told that the knapping was partly seasonal; when he visited the mines at Çakmak, it seems he found only two men at work. Both Mr. Emeksiz and Mr. Yılmaz said that a mine would be
worked pretty continuously, although the whole team would not always be there. Both were explicit that, although the villagers farmed, the flint trade was more profitable and more time was devoted to it.

RE: If they reach to the good stone, they get 100 kilos per day, 72 tons in two years.
JW: They didn’t work every day?
RE: They worked every day, only on Fridays we didn’t work.
JW: Even while farming also they worked in the mines?
RE: The person who works here is always in the mine, he is ortaka, partner, he cannot leave the mine. The customers always ask for stone, so the ortaka has to work every day. Not everybody can do this job.

Not everybody is easy to interview, either. Live informants often shed light on the emotional and symbolic aspects of technology that are elusive to archaeologists, but although we obtained good information on the economic benefits of knapping, the knappers were matter-of-fact and brusque about their feelings for the job. We were having a rather too-rapid tour of the mining area, led by Mr. Emeksiz:

KK: Ask Ramazan Bey, when he was doing the job, did he like it? Did it make money?
EY: [asks the question]
RE: Of course, my daughter, as you like your job!
EY: [The anthropologist temporarily employed as an accountant]. I don’t like my job.
RE: If you don’t like your job you should be a guide, then you will like it.
EY: Ok! but did you like your job?
RE: Of course, my daughter. My accountant is also in Bursa, he is good, he does a good job.
EY: I also work well, but I don’t like it.
RE: I know a man, he works as a guide and he earns 10,000 in a short time. I know somebody who works in Yenisehir, I sometimes go there…
JW: Ask him, when he was making döven stone was it profitable or a good job to do?

RE: In Harmancık [area] there are 34 villages, but Çakmak stone is the only good stone. Here 12 men worked in stone, they were earning very good money in those days… In a government job the daily wage was 150 kurus, but we were earning 12 or 12.5 lira per day… [in other words, 8 times the government worker’s wage].
We were selling 1 kilo for 40 kurus, we were selling 100 kilo sacks, so 100 kilo was 4 lira.
JW: Ask how many döven stones were in a kilo or sack?
RE: Depends, 50 or 60 depending on the size of the stone. Let’s go, I have to go…

Mr. Yılmaz was also pretty practical:

JW: Knapping was a good job? Was it profitable?
NY: It was our place to earn money to buy our bread. Now I’m asking you, I have a son 18 years old. In those days a wedding was 1500 lira, what young man can earn that money in 4 months? In 1968 I had my wedding and I paid 1400 lira, and I earned it back in 4 months! Now a wedding costs 40,000 lira and how can a man earn that in such a short time?

All the informants, knappers and residents of Harmancık agreed that Çakmak was the richest village around because of its knapping specialty. We tried to get at the emotive aspects of knapping another way, by asking about the changes that accompanied the decline of the industry as mechanical threshers replaced the döven in the 1960s and 1970s. Nihat Yılmaz stopped knapping döven stones in 1977, and used his savings to buy a grocery business. He is now retired, with a nice house in Harmancık.

Ramazan Emeksiz said his knapping lasted until 1985, but meanwhile he was turning his knapping skills to a related trade, which he still pursues. Using a small sledge hammer and a chisel, he shapes coarse chert into rectangular blocks that he says are used to grind glass in producing the fine ceramics for which the nearby region around Kutahya is known (Figure 11). Apparently, the blocks are used as lining and media in the cylinders
responsible for the more recent mechanical quarrying in the former flint mine area, which he said was exploiting only the superficial stone and ignoring the better material that occurred deeper.

We tried to ask him how he felt about the changes in village life and his trades:

RE: Many people didn’t have lands so they moved to Bursa. They had to find jobs in cities, in factories.

EY: Did it affect social life in the village?

RE: Yes, it affected the people who had to go, had to work as workers in the factories.

EY: Yes, but you, how were you affected? People who stayed in the village? You continued living here, and the population of the village decreased, how were you affected?

RE: Why should I be affected?!

EY: Because they were your friends, you were sharing things with them...

RE: No, if they were good people we thought “why did they have to leave,” if they were not good neighbors, we thought “it is nice that they went.”

To this it should be added that our other informants felt that Çakmak today has a local reputation as a village in disarray, with troubled characters and relationships.

**EVALUATIONS**

Threshing sledge blades and gunflints are examples of lithic technologies that survived into modern industrial times because they were the most efficient tools to perform a highly specialized function. Gunflints were the universal firearm ignition system until replaced by percussion caps and cartridges in the middle 19th century, and flint and steel fire starting kits, as well as flintlock guns, continued to be used well after that. Threshing sledges were used all around the Mediterranean. They could be armed with metal teeth, or even just lumps of basalt, but knapped blades can be mass produced much faster and more cheaply than metal ones.

Both industries were entangled with a host of supporting and consumer technologies: the iron
tools of knapping and mining, the sledges and muskets that used the flints, and so on. As threshing sledges and flintlocks were replaced by more modern technologies, knapping perished. With it went the skills, the specialized vocabularies, the economic networks, and ultimately the village populations supported by these specialized trades. Knapping is only one example among many of world-wide trends in the replacement of local specialists whose hand work may even supply international markets, but who fall victims to more efficient industrial mass production.

We were struck by the obscurity of the flintknapping industry in Turkey. In England, gunflint knapping was a comparable trade, and the village of Brandon, like Çakmak, housed a prosperous community of specialists. The gunflint industry is very well documented, although that trade really ended almost 100 years ago, and the last traditional knapper died in 1996. But gunflint knapping at Brandon (and elsewhere) attracted the attention of archaeologists (Skertchly 1879; Clarke 1935; Gould 1981), it is well represented in museums, and it is still a source of prouful heritage in Brandon (Whittaker 2001). A sign showing knappers at work is prominent in the village square, the local museum at the "Brandon Heritage Center" showcases the gunflint industry, and you can have a pint at The Flintknappers, where the last group of knappers worked in a shed behind the pub until the 1960s. There are no such monuments in Çakmak.

There are a number of reasons why the gunflint industry is more memorialized than the threshing sledge industry. For one thing, it caught the eye of archaeologists in the 19th century as interest in technological experimentation was beginning. Not coincidentally, the gunflint knappers began to make fake antiquities, imitations, and sets of "traditional" products for collectors and museums as the demand for flints to use in guns crashed. This market in turn was made possible by the symbolic associations of gunflints with martial equipment and imperial glory, as well as by marketable claims to being "Britain’s Oldest Industry." It was associated not just with the muskets that conquered the world, but with the stone age Britons who erected Stonehenge (Whittaker 2001).

In contrast, although many archaeologists have noticed threshing sledges, little attention was paid to the associated knapping industries, and we found no reports from Turkey until Bördaş published in 1969. This was during the so-called "New Archaeology" period, when our field was turning its attention to the problems of social organization and cultural change. Archaeologists began to realize that such topics could be attacked only through more detailed reconstruction of subsistence and adaptation, which in turn required thorough ethnarchaeological and experimental understanding of flintknapping and other technologies. In Turkey the knapping trade was perhaps too ordinary, too "village" and "old fashioned" to be worth commemorating in a modernizing nation, and too everyday and agricultural or technological to be studied by folklorists.4 The sources of archaeological obsidian have been studied, but much less is known of flint sources (Balkan-Atli 1994). An international congress of geologists on a field trip spent two days examining exposures and evidence of tectonic processes in the volcanic and metamorphic rocks along the roads near Harmanek (Okay 2004), but passed within a few kilometers of Çakmak without noting the geology of one of Turkey’s ancient and characteristic industries.

The craftsmen in any trade have different feelings about their work. Nihat Yılmaz, like his Cypriot counterpart Alphredhos Andreou (Whittaker 1996) and Fred Avery, the last Brandon gunflint knapper (Whittaker 2001), spoke of knapping as just a job, albeit a good one. However, all of these men retained some of their tools and skills, and were pleased to tell us about their knapping careers. Avery plainly continued to knap not just for the part-time income, but because it was part of his identity and the heritage of his family and home village. Ramazan Emeksiz, on the other hand, had not only moved on to other trades, but apparently gave up his tools and the associated identity 5 without regret, even though he continued to work in a related craft.

Even though more than 20 years have passed since the doven flint trade ended, it is still possible to get a fairly coherent picture of the industry from living informants. Aspects of the production technology, economic setting, distributive mechanisms, organization of labor, and even some of the ephemeral details such as technical terms for stone can still be recovered. That is the optimistic view.
From a gloomier perspective, we regret that, on this occasion, we could not do a detailed map of the mines, or a thorough debitage analysis. All of these would be useful. For that matter, an excavation might even be useful someday. How much flint did Çakmak produce? How many mine shafts are there? Even today the piles of debitage obscured under pine needles, and the spread of the mining area across the mountain slope, testify to a massive industrial effort, difficult to quantify (Figure 12).

How old is this industry? Mr. Yılmaz thought the village was 600 years old, although that was probably just a guess. All informants agreed that the knapping went back beyond memory, many generations. A rapid, superficial “reconstructive ethnoarchaeology” of the knapping trade like this leaves many details unclear and questions unanswered. There is no substitute for good participant observation with a modern archaeological knapper working for an extended period with an active threshing sledge knapping industry. That opportunity is long past; as in most archaeology, we do the best we can with what remains.

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NOTES

1 Roughly 29 degrees 10 min N-S and 39 degrees 15 min E-W.

2 General Directorate of Mineral Research and Exploration (Maden Tettik ve Arama Genel Müdürlüğü).
We follow common archaeological usage in calling the siliceous stone from limestone formations chert, while flint is more specifically the closely similar material from chalk formations, and more generally an inclusive term for both stones and the tools made of them.

Our access to anthropological literature in Turkish has been limited, but this is the opinion of Turkish colleagues as well.

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