



POTTERS' CANAANEAN FLINT BLADES DURING THE EARLY BRONZE AGE.

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ABSTRACT

A sample of glossed and non-glossed Canaanite blades from the Early Bronze Age Ib–II site of Qiryat Ata, northern Israel, was the subject of a use-wear analysis. This research comprised microscopic analysis and a series of experiments based on the microscopic use-wear detected to reconstruct the function of the archaeological Canaanite blades. Two main activities were reconstructed in the analysis: one related to plant processing, including cereal harvesting and threshing; and the other, which is the focus of this article, was related to pottery processing. Several experiments using experimental flint blades were carried out, including processing clay on a potter's wheel, and processing by hand. The results indicated that the microscopic traces on the blades were produced by contact with moist coarse-tempered clay, especially for smoothing by hand, as in the initial stages of pottery processing and shaping. Reconstructing the potters' use of Canaanite blades indicated that ceramic tools were locally produced at Qiryat Ata. Reconstruction also contributed to the understanding of the complexity involved in models related to Canaanite blade production and distribution.

KEYWORDS: Qiryat Ata; Canaanite blades; Use-wear analysis; Potters' flint tools; Early Bronze Age Ia-II; pottery production; moist coarse-tempered clay

INTRODUCTION

Researchers have long been drawn to investigate the nature of Canaanite flint blades. With their exceptional morphology, they were first recognized at the beginning of the 20th century by Macalister (1912) as 'ribbon knives' in the lithic assemblage of Tel Gezer, central Israel. After a century, Canaanite flint blades are still considered by researchers to be a product of the elaborate flint-knapping technology that emerged during the Early Bronze Age period of the Near East (Rosen 1997).

Their production was no ordinary process, as opposed to the local ad hoc industry which prevailed at that time. To produce such long and straight blades, usually averaging about 2 cm in width, and sometimes achieving lengths of more than 15 cm (Rosen, 1997: 46), required task-specific techniques (Anderson *et al.*, 2004; Betts, 1992; Chabot, 2002: 47-100; Pelegrin, 2006; Shimelmitz *et al.*, 2000; Shimelmitz, forthcoming). These unique blades were manufactured by specialist knappers in workshops which were sometimes located near the flint outcrops (for example: Behm-Blancke, 1992; Edens, 2000; Futato, 1990; Hartenberger *et al.*, 1998; Shimelmitz *et al.* 2000). From these workshops, the Canaanite blades were distributed by the various exchange networks to their destined agriculturalist consumers in the villages and cities of the period (Rosen, 1997: 106).

Considering their uniqueness, a functional research was carried out in order to reconstruct the use of Canaanite flint blades. A sample of Canaanite blades from the Early Bronze Age site of Qiryat Ata (northern Israel) was subjected to use-wear analysis, combining microscopic scanning with experimentation. The focus of this paper is to present the unique traces associated with pottery processing, and the experiments done to test this hypothesized activity. Other results will be presented briefly.

THE ARCHAEOLOGICAL SITE

The modern city of Qiryat Ata is located in the Zebulun Valley, lower western Galilee, in northern Israel (Fig. 1).



Figure 1. Location of sites mentioned in the text

Early Bronze Age remains have been known in this area since the 1940's, and extensive salvage excavations have been conducted since 1990 as a result of growing modern construction activities (Golani, 2003; Fantalkin, 2000). The Canaanite blades that were the subject of the research were found at one of the excavated areas in 1996 (Eisenberg, forthcoming 2013), a small area measuring 10x10 m, situated on a moderate slope descending from west to east at the western edge of modern agricultural fields. A few architectural features dated to the Early Bronze Age Ib-II (3,300–2,750 BCE) were unearthed in this area, including a public building, sections of walls of curvilinear and rectilinear structures, and a section of the city's fortification wall and the wall street along it (Fig. 2).

The excavation yielded a small flint assemblage that included only 215 pieces. Despite the limited size of the assemblage, the composition of the tool category represents a typical Early Bronze Age 'tool kit' (Rosen, 1997:106), which is

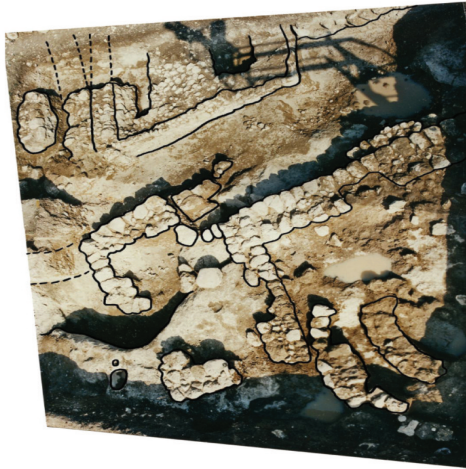


Figure 2. Aerial photograph of the excavated area

characterized by the three main technological components: the Canaanite blade industry, the tabular scrapers industry, and the *ad hoc* industry. The composition of the assemblage is also similar to that of an extensive flint assemblage previously published from other excavated areas in Qiryat Ata (Bankirer, 2003), as well as to the lithic assemblages from other contemporary sites in northern Israel, such as Tel Qashish (Rosen, 2003), Megiddo (Blockman and Groman-Yaroslavski, 2006) and Bet Yerah (Bankirer, 2006).

The Canaanite blade industry is represented solely by Canaanite blades. Canaanite cores and related core trimming elements are absent from this assemblage, and also from other assemblages at Qiryat Ata (Bankirer, 2003: 180). This supports the model of trade and specialization related to the Canaanite blade industry (Rosen, 1989; 1997: 107–108). The nearest documented Canaanite blade workshop is located at Har Haruvim, less than 30 km to the southeast (Meyerhof, 1960; Shimelmitz et al., 2000). This workshop might have been a distribution source for the Qiryat Ata consumers.

USE-WEAR ANALYSIS METHODOLOGY

Use-wear analysis – *tracéologie* in French terminology – is macroscopic and microscopic analysis of wear-traces preserved on the flint tools. Wear traces are approached through the basics of tribology, which is the study of the interacting mechanics in the process of friction, lubrication, and wear (Adams, 2002). Wear is defined as attrition of material caused by use, producing distinctive traces; and tribology techniques are employed in order to understand the processes that generate them. When flint tools are in frictional contact during use on a particular material, the distinctive combinations of the properties of the material (e.g. moisture, elasticity, resistance, abrasion, cohesion, mineral content, etc.) generate diagnostic microwear on the surfaces in contact (Méry et al., 2007: 1109). Interpretation of the results is based on large numbers of experiments using replicated tools, and factors involved in the process of use-wear formation are recorded and compared to the archaeological pieces.

Since the introduction of the 'Keeley method' (Keeley, 1980), use-wear analysis has been a method for distinguishing worked materials by different wear types (for example, woody or non-woody, bone, antler, hide, or flesh). It also provides information on the functional parts of a tool and the motion employed, and traces are also produced by prehension and hafting; therefore hafting materials and grip methods are also inferred (Rots, 2010).

In this research, the two traditional techniques were employed. The first is the 'Low Power Technique' (LPT), which is used for observing wear-traces on the macro-scale (Odell, 1977; Semenov, 1964; Tringham et al., 1974). A Motic SMZ-168 stereo-microscope was used with a magnifying power of 20x–50x in order to observe edge-removals and abrasions. The

second is the 'High Power Technique' (HPT), which is used to observe wear-traces on the micro-scale (Keeley, 1976; 1980; Van Gijn, 1989). An Olympus BX60 metallographic microscope with a magnifying power of 100x–400x was used to define microscopic polished surfaces and features, such as striations, pits, micro-abrasions and micro-edge rounding.

The interpretation of the traces on the archaeological pieces was based on a comparison with the traces produced in experiments. The reference collection available at the Laboratory of Use-Wear Analysis in the Zinman Institute of Archaeology, University of Haifa, Israel was used in this research for interpreting some of the traces, specifically those related to plant material processing. Another set of experiments was designed especially for the analysis of the Canaanian blades. The experimental program included tasks that were performed using replicated tools, and the tasks were carefully planned in order to examine the various aspects of wear-formation and tool efficiency.

A sample of 25 pieces of the Canaanian blades found at the 1996 excavations was selected for use-wear analysis including unmodified and retouched blades, some of which bore traces observable to the naked eye, and some were plain, with no traces observable to the naked eye.

RESULTS

Almost all the Canaanian blades exhibited diagnostic use-wear, except for three items. Twelve blades were related to plant processing, and will be discussed briefly here. The other ten blades were related to clay processing, and were the focus of this research.

Plant processing activities

The Canaanian blades related to plant processing showed traces produced by contact with plants; however, they were

interpreted as related to three different functions. These blades were divided into three major categories, including sickle blades, threshing knives and *tribulum* inserts, each exhibiting unique traces, which are usually related to the unique morphology of the blades. For example, the first category includes six blades, mostly medial segments of Canaanian blades, with wear-traces related to cereal harvesting with a sickle (Fig 3).

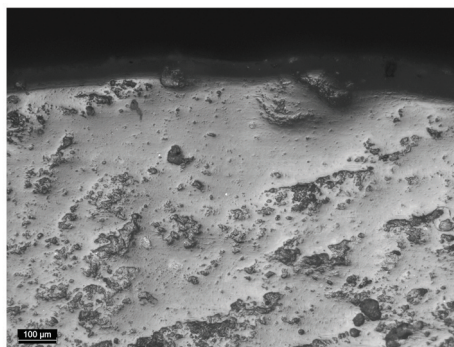


Figure 3. Use-wear polish observed on archaeological blade, related to cereal-harvesting using a sickle (original magnification 100x).

The second category includes five reaping knives, mostly longer blades, with traces related to cutting soft plants. (Fig. 4).

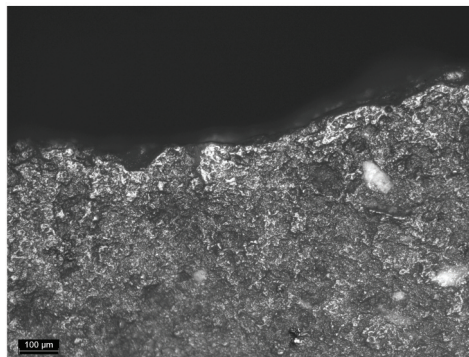


Figure 4. Use-wear polish observed on archaeological blade, related to cutting soft plants using a threshing knife (original magnification 100x).

The reaping knives are of notably different sizes, probably because a long cutting edge was the required property for

this type of tool. Some of the reaping knives had traces produced by the contact with a haft on the ventral face near the proximal edge. This supports the functional reconstruction, indicating that they were hafted at one end (Fig. 5).

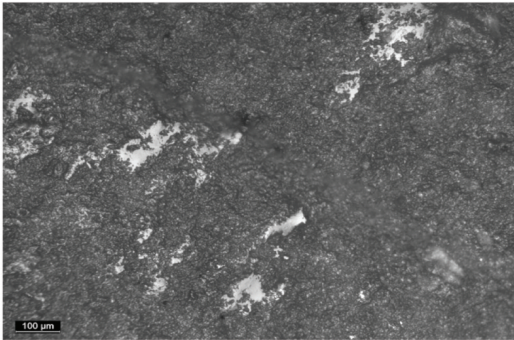


Figure 5. Use-wear patches of polish observed on archaeological blade, produced by contact with a haft (original magnification 100x).

The last category includes a unique item that was interpreted as a threshing sledge (*tribulum*) insert (Fig. 6). Traces were indicative for this unique purpose, and were compared to examples published by others (see references below)

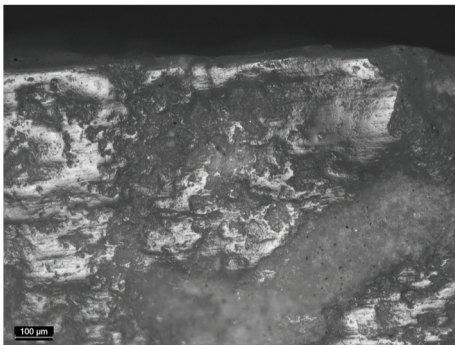


Figure 6. Use-wear polish observed on archaeological blade, related to the use of threshing sledge (*tribulum*) (original magnification 100x).

The use of the *tribulum* during the Early Bronze Age was compared to ethnographic examples, and recognized in various sites in the northern Levant (Anderson, 1999; Anderson *et al.*, 2003; Chabot and Eid, 2007).

In Israel, Canaanite blade-segments found near ancient threshing floors were identified as threshing inserts at sites in the Uvda Valley, southern Negev Desert (Avner *et al.*, 2003), and probably also at Megiddo (Gersht, 2006). This unique find is one of the few examples that indicate that this type of processing technique prevailed in the southern Levant.

Use-wear related to pottery processing

Ten Canaanite blades exhibited unique traces. These blades have a distinctive polish, usually not fully developed, and entirely different from the polish associated with plant processing. The polish (defined according to the Van Gijn 1989 method) is of bright reflection and coarse texture. It is developed on protruding areas of the micro-topography of the flint, on the edge, away from the edge, and on the dorsal ridges of the blade. In some cases it is distributed as scintillation, with a delicate granular topography. This polish is occasionally associated with short and deep striations that appear parallel or perpendicular to the working edge. Delicate rounding of the surface of the flint was also observed, creating round pits, especially in coarse flint, with an uneven micro-topography (Fig. 7a-b).

At this stage these traces were

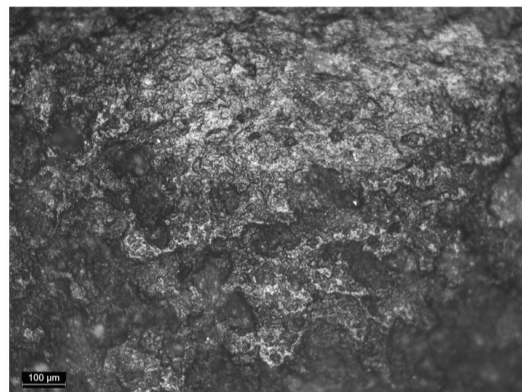


Figure 7. Use-wear polish observed on archaeological blade, related to pottery processing (original magnification 100x).

interpreted as indicating transverse and longitudinal motions against a relatively abrasive but soft material. The traces indicate that the tool could penetrate deeply into the matrix of the worked material; or it is possible that a considerable portion of the surface of the flint was in contact with the worked material during action, because the polish spread considerably. Furthermore, this material did not level or truncate the micro-topography of the flint, but rather caused delicate rounding of the surface and edges. Some of the blades were heavily damaged, but this was related to a secondary action, because microflaking cut the polish.

These traces differ from traces produced by plants, hard stone, soft tissue, hide and bone. It was hypothesized that they are related to soil material, probably clay, which is used for pottery production, especially while the paste is still wet.

The experimental program

To examine the hypothesized function of the Canaanian blades, four experiments were planned. The purpose of the experiments was to create traces similar to those observed on the archaeological pieces, and to reconstruct the activity that was inferred. The experiments included tasks of processing clay in several modes to produce several types of use-wear. Different aspects of motion and abrasiveness were emphasized in the experiments to enable a thorough understanding of how clay-processing use-wear is created.

In the experiments two types of a WBB Fuchs Keramische Massen clay were worked:

- fine-tempered clay containing 3% grog (0–0.2 mm), and
- coarse-tempered clay containing 40% grog (0–0.2 mm).

The texture of the coarse-tempered clay resembles the typical clay of EB pottery industries (Goren and Halperin, 2001;

Greenberg and Porat, 1996; Greenberg and Iserlis, forthcoming; Iserlis, 2009; Mazar *et al.*, 2000). Petrographic analyses of EB pots from northern Israel indicate that EB potters used tempered clays containing up to 35% temper (Iserlis, 2009). Therefore, we focused in the experiments on creating the traces produced by coarse-tempered clay, and the processing of fine-tempered clay was used as a test to emphasize the uniqueness of each type of wear.

In the experiments coarse-tempered and fine-tempered clays of different moisture contents were worked in order to create different types of traces, which were correlated with the different stages in pottery production:

- moist clay, as in the first stages of forming and shaping, and
- almost leather-dry clay, as in the final stages of processing the surface of the pottery.

The flint blades used in the experiments were plain blades similar in raw material and morphology to the archaeological Canaanian blades. Experimental Canaanian blades were not available for our experiments. The experimental blades were produced from Eocene brown flint, which was collected from the southern foothills of the Sartaba ridge in the Lower Jordan Valley. They were knapped in a direct percussion technique, using a hard hammer, to create long (about 12 cm) and wide (about 2.5 cm) blades, with straight laterals and a straight profile.

Two of the experiments were conducted in the potter's studio in Tel Aviv. Some of the tasks were performed by the potter and some were performed by us under her guidance and supervision. The advantage in working with a professional potter was that we could observe her actions when she chose a tool, or how she decided to work with it. We were able to witness her intuitive behavior and apply it to the alternatives that were available to the ancient potters of Qiryat Ata. In the first two

tasks we performed several actions with fine-tempered and coarse-tempered clay, using a potter's wheel to create the traces that are produced by contact with a slow-rotating device. We focused in these experiments on creating traces that were supposedly produced using an EB *tournette*. The *tournettes* were used during the EB II–III in the same way as modern potter's wheels, but much slower, for wheel-coiling and wheel-molding fashioning techniques (Iserlis, 2007; Iserlis and Greenberg, forthcoming; Roux and Miroschedji, 2009). *Tournettes* were used as slow rotary instruments, not as fast rotary instruments that can be used for pot-throwing, which is not typical for EB pottery (Roux and Miroschedji, 2009). The main difference between the two types of rotary instruments is the speed: the minimum speed of a fast potter's wheel is 150 rpm; the maximum speed of a slow *tournette* is 80–100 rpm (Roux and Corbetta, 1989; Roux and Miroschedji, 2009). In our experiments we used the fast rotary instrument to throw pots, and as a *tournette*, at up to 80 rpm, for smoothing and scraping tasks.

We observed that in the task of shaping a pot on a potter's wheel the potter started working with the flint blades only after she had centered the lump of clay on the wheel. She did not use the flint blades to throw the pot. To perform other shaping tasks, the potter used a reduced speed, similar to the speed of a *tournette*. The blade was used to



Figure 8. Smoothing and thinning of the wall of a pot made of coarse-tempered clay on a potter's wheel at reduced speed.

create the shape of the pot by pressing the edge of the blade to the wall of the pot, and it was used to shape and reduce paste at the rim or the base of the pot (Fig. 8).

Each of these tasks was performed for several seconds using a small section of the actual edge of the blade or one of the faces, except for the thinning of the wall, where she used the maximum length of the blade. In order to create use-wear typical of intensive and durable use, as in a potter's workshop, we also performed controlled-action tasks. These included the smoothing of lumps of coarse-tempered and fine-tempered clay on the potter's wheel until most of the paste was removed and the base of the wheel was reached. In these tasks the blades were held perpendicular to the rotating clay, as in a transverse smoothing motion (Fig. 9).



Figure 9. A controlled task of smoothing coarse-tempered clay on a potter's wheel at a reduced speed.

The two other experiments were performed outdoors, and included controlled tasks performed by hand on moist and almost leather-dry coarse-tempered clay. These tasks included unidirectional and bidirectional smoothing and cutting with the lateral edges and dorsal ridges of the experimental blades. The flint blades were effective for accurate cutting and smoothing due to their sharp edges. We used them for cutting the clay chunks and for cutting the clay surfaces that

we made. One of the tasks was to smooth a clay surface built of patches (Fig. 10).



Figure 10. A controlled task of multidirectional smoothing of a moist coarse-tempered clay surface built of patches.

Using the sharp edges, we were able to smooth the surface, compress it in the area of the joints, and reduce its thickness to a homogeneous surface. The large size of the blade allowed a comfortable prehension, and the long edges were useful for working on the wide clay surface. For smoothing and compressing almost leather-dry surfaces, the dorsal ridges of the blades were also effective.

Experimental results and comparison with the archaeological Canaanean blades

Eight blades were used in the experiments, involving more than two hours of work. Only five experimental tools exhibited diagnostic use-wear. The rest did not produce a polish, due to the short duration of use in the experiment: this was especially so in the case of the tools used for cutting the clay.

The characteristics of use-wear produced by the contact with clay using a potter's wheel are summarized in Table 1. Use-wear produced using a potter's wheel was unique in its distribution. The polish appeared as a thin band that spread away from the working edge, indicating a transverse motion. This distinct directionality was the result of the constant unidirectional motion

of the clay against the flint blade. The polish was most developed at the actual edge, where the flint was almost totally smooth and the band of polish was very thin (less than 1 mm). The polish faded away gradually as the distance from the edge increased, indicating that the area which was in contact with the material was small and the material in contact was soft (Fig. 11).

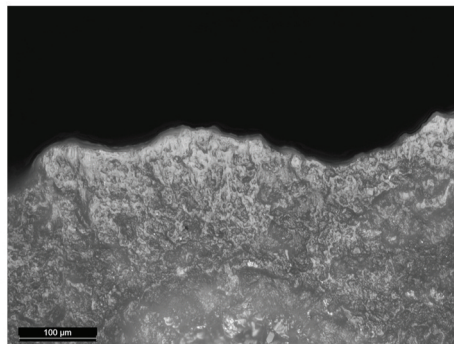


Figure 11. Use-wear polish observed on experimental tool, produced by contact with the rotating clay on a potter's wheel (original magnification 200x).

The distribution of the polish was thus indicative of the motion, and was similar for both types of clays (coarse and fine-tempered). However, the polish texture produced by fine-tempered clay differed from that produced by the coarse-tempered clay. The first had a bright reflection and smooth texture, the second was dull with a rough texture (Table 1).

The difference in polish texture is the first evidence for distinguishing between the types of clays. The dull rough polish is similar in its texture to the polish observed on the archaeological tools, but not in its distribution. Therefore, it was concluded at this stage that the polish on the archaeological tools was produced by contact with coarse-tempered clay, but not by the action of the potter's wheel, because the polish on the archaeological tools did not exhibit directionality. The rough texture and dull reflection of the polish was the result of contact with the paste that contained a high

Table 1: Characterization of use-wear polish observed on experimental tools, produced by contact with coarse and fine-tempered clay rotating on a potter's wheel.

		Coarse-tempered clay	Fine-tempered clay
Potter's wheel experiments	Edge-rounding	Developed	Developed
	Polish distribution	Thin band spreading away from the edge	Thin band spreading away from the edge
	Polish texture	Rough	Smooth
	Polish topography	Domed and pitted	Domed and pitted
	Polish brightness	Dull	Bright

content of temper that created the coarse texture of the clay.

The characteristics of use-wear produced by contact with coarse-grained clay in controlled actions performed by hand are summarized in Table 2. Tasks by hand on coarse-grained clay produced smooth edge-rounding on the macro-scale, and microflakings did not develop. On the micro-scale, it was evident that the moisture content of the clay did not affect the texture of the polish: a matt rough polish was produced by contact with both moist and almost leather-dry clay. The distribution and the visibility of the polish were distinctive. Almost leather-dry clay polish exhibited clear directionality after a few minutes of bidirectional smoothing, and it was visible to the naked eye after less than 10 minutes of continuous work (Fig 12).

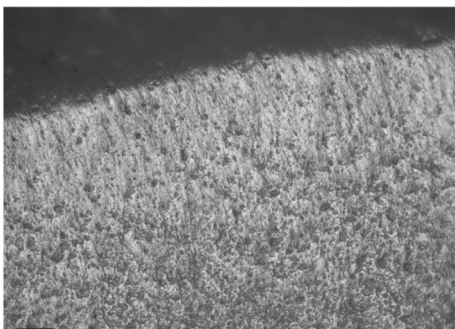


Figure 12. Use-wear polish observed on experimental tool, produced by bidirectional smoothing on almost leather-dry coarse-tempered clay (original magnification 100x).

This type of polish was not observed on the archaeological tools from Qiryat Ata, and none of them exhibited use-wear polish observable to the naked eye. On the other hand, polish produced by contact with moist coarse-tempered clay spread over wide areas of the flint surface (Fig 13).

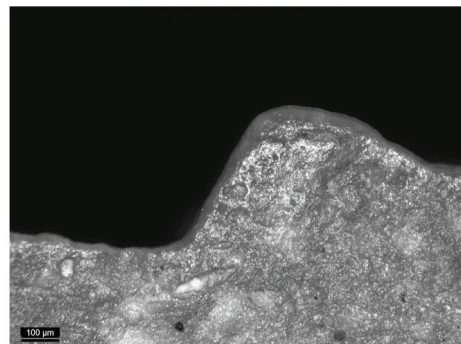


Figure 13. Use-wear polish observed on experimental tool, produced by bidirectional smoothing of moist coarse-tempered clay (original magnification 100x).

Directionality was not evident, although tools were used in a constant back and forth bi-directional motion, and the polish was delicate, developing slowly on protruding areas of the micro-topography of the flint.

The polish produced by the contact with moist coarse-tempered clay was similar to the polish observed on the Canaanite blades (Fig. 17: a–b) in its rough texture and dull reflection, in the distribution on protruding points, and in not being visible to the naked eye. Thus the experiments

Table 2: Characterization of polish produced by contact with moist and almost leather-dry coarse-tempered clay observed on experimental tools used in controlled tasks conducted by hand.

		Moist coarse-tempered clay	Almost leather-dry coarse-tempered clay
Controlled action experiments	Edge rounding	Developed	Developed
	Polish distribution	Spread and on protruding points	Spread and distinctive directionality
	Polish texture	Rough	Rough
	Polish topography	Scintillation and granular	Granular

indicated that the archaeological blades functioned as tools used to scrape or to smooth moist coarse-tempered clay.

SUMMARY AND DISCUSSION

The use of Canaanite blades as potter's tools is emphasized in this article because these unique blades are usually associated by researchers to agricultural activity (Rosen, 1997). Past research of glossy Canaanite blades indeed supports this functional aspect (Anderson et al., 2004). This research, however, introduces a new functional interpretation of the use of some of the non-glossy Canaanite blades which sometimes bear traces not visible to the naked eye. Therefore, the use of Canaanite blades for the processing of moist clay was studied in this research, providing new data concerning the use of Canaanite blades, and some insights into the production of ceramic tools during the Early Bronze Age. Furthermore, the results provided new information that enabled the reconstruction of an activity barely represented at the site – the local production of pottery – which is one of the advantages of use-wear analysis. A potter's workshop was not found at Qiryat Ata, but the blades that were the subject of this research are an important indication of the activity of potters in this early city. An indication of local pottery production is the basalt and limestone

tournettes that were found in Area A of Golani's excavations, less than 100 m southwest of the excavated area (Golani, 2003: 15; Rowan, 2003: 191–192). These were dated to the EB I–EB II, but they were not found in a well-defined context (which is also the case for the blades discussed here). The Canaanite blades that were the subject of this research were used for processing moist clay by hand. They were not used for clay processing on a potter's wheel. However, it is possible that both techniques were employed, even in the same potter's workshop.

The experimental program produced detailed information concerning use-wear formation and characteristics in the function related to pottery processing. The microscopic analysis showed that the motion, the action, the type of clay, and the moisture content of the paste might be distinguishable and represent indicative traces. The work with a professional potter showed that the blades were especially effective for shaping but not for throwing pots. The experiments in tasks conducted by hand indicated that the blades were easy to hold due to their large size, and they had functional advantages for accurate cutting, smoothing, compressing and shaping.

Flint tools are not mentioned in ethnographical or technological studies related to pottery production techniques.

Other materials, such as bone, wood, cane, gourds, metal, hard plastic, flaked stone, sherds, pebbles and shells, are often mentioned as potter's tools used for different tasks in pottery manufacture (Hill, 1937; Lothrop, 1927; Rice, 1987; Rogers, 1936; Shepard, 1985). On the other hand, archaeological reports and suggestions more often point to the use of flint tools for pottery processing. The closest indication known in Israel was identified at the site of Bet Yerah (northern Israel). A group of polished Canaanean blades was found in a potter's workshop dated to the EB II (Iserlis, 2007; Shimelmitz and Rosen, forthcoming). These blades were not the subject of a thorough use-wear analysis: however, preliminary observations indicate that these blades bear clay use-wear produced by a potter's wheel (Iserlis, 2007; Shimelmitz and Lemorini, 2009 personal communication).

The possible use of flint tools for decorating vessels was proposed for the coarsely-denticulated Neolithic sickle blades (Khalaily and Kaminsky, 2002). It was suggested that the denticulated edge was used to create the imprints that are the typical decoration of the Wadi Raba pottery from Tel Dover, northern Israel. Use-wear analysis was not performed for these items, but the imprints seem to be similar.

Other rare examples from different parts of the world also indicate the use of flints for pottery processing; and some items are similar in their morphology to the Canaanean blades (for example, Anderson *et al.*, 1989; Gassin, 1993; Méry *et al.*, 2007; Van Gijn, 1989). Working clay by hand is rarely discussed; however, clay processing using a potter's wheel or scraping (smoothing) almost leather-dry clay is commonly in evidence. The traces found on the Canaanean blades of Qiryat Ata are another rare indication of the use of flint by potters. Furthermore, this functional interpretation indicates that Early Bronze Age I-II potters used flints before the technology of the potter's wheel became

widespread. It is possible that other blanks, such as flakes, were also used for processing clay, and it is likely that these will be found near or inside a potter's workshop where ceramic tools were produced (Fig. 14).



Figure 14. The Canaanean blades from the 1996 excavation at Qiryta Ata interpreted as pottery processing tools.

It is proposed here that in discussing the distribution networks of Canaanean blades another route should now be taken into account. This is the route that leads to potter's workshops. Potters needed the goods of the Canaanean knapper, as did the agriculturalists. Based on the experiments, it is obvious that blades used for pottery processing are barely worn, as opposed to blades used for cereal harvesting, especially those inserted in a threshing sledge (Anderson *et al.*, 2004). The potters probably consumed smaller quantities of blades than the agriculturalists, and the potters' blades were kept intact and were useful for a long time. The extent of this phenomenon is still unknown because more Canaanean blades need to be analyzed and additional activities could then also be detected.

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