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## Incised Marks (Post-Firing) on Aegean Wares

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## INCISED MARKS (POST-FIRING) ON AEGEAN WARES

The practice of incising potmarks into LH and LM III vessels after firing is not only distinctive but also a peculiar and limited Cypriot phenomenon. A close examination of the types of vessels marked in this way and their distribution should provide some clues to patterns of trade between the Aegean and eastern Mediterranean. The work I present here is still very much in progress, and I welcome suggestions and criticisms.<sup>1</sup>

In the MBA and early LBA Aegean, the need to mark pottery was widespread. At this conference, C. Zerner has discussed the elaborate system of potters' marks which existed at MH-LH I Lerna.<sup>2</sup> In the extended Minoan world, people were familiar enough with the Linear A script that Linear A signs or marks modelled on Linear A signs appear, usually incised and in a few cases painted, on a considerable variety of vessels, both in formal inscriptions and as isolated signs.<sup>3</sup>

The Mycenaean period, however, stands in sharp contrast to the preceding periods, for the practice of marking pottery is severely curtailed. The types of marks which appear on LB III Aegean pottery may be classified into three categories, none common:

1) *Painted Linear B Inscriptions*, most often found on coarse-ware stirrup jars and almost always painted before firing. The precise function of these inscriptions is debated, but it seems clear that their limited appearance is connected with a very specific aspect of LB IIIB trade between Crete and the Mainland.<sup>4</sup>

2) *Painted Single Marks*. These are a very different phenomenon from the Linear B inscriptions; they appear on a wide variety of open and closed shapes throughout the Aegean, Crete, Cyprus, and the Near East; and they seem to be applied both before and after firing. The meaning of these marks and any connection they might have with other marking systems has not been fully studied.<sup>5</sup>

3) The final category, and the one to which I will devote the rest of this talk, is that of *Incised Marks*. Like the painted marks, some of these were applied before firing and some after firing. This is a fundamental difference, for pre-firing marks are directly related to the manufacturing process so that, whatever the significance of such marks, we at least know that they were intentionally placed on the vessels as part of the production of the vase, whereas marks incised after firing may have been placed on the vessels during processes of trade, exchange, use or reuse. In either case, however, the signs may be associated with a wide range of meanings: identification of contents, origin, destination, owner or distributor, for example.

Although painted inscriptions and signs are conscientiously published, both post- and pre-firing incised marks are rarely mentioned. There is no general corpus of such marks, though we are fortunate that special studies have been or are about to be published for Tiryns,<sup>6</sup> Kommos,<sup>7</sup> and the few LH III sherds at Kea.<sup>8</sup> Thus a researcher is faced with the difficulty of not knowing to what extent the lack of published references reflects an absence of such marks on pottery from LH/LM III sites.

Although the published material does not provide much information with which to work, we can make some observations. First, if the published marks constitute a representative sample, the practice of marking pottery with simple signs incised before firing (which I shall refer to as specifically potters' marks) is rare during the LH III period.<sup>9</sup>

Second, LH/LM III pottery is distinctive in the limited appearance of post-firing signs. I would like to emphasize that the appearance of marks incised after firing is a very restricted

phenomenon in the Aegean. Of all the published LH/LM III pottery in the Aegean, I have been able to find only 33 vessels marked after firing: 29 from the Argolid<sup>10</sup> (mostly from Tiryns) and four found on Crete.<sup>11</sup> The marks occur on a limited range of shapes, all large closed transport or storage vessels. The four marked vessels on Crete are coarse-ware stirrup jars, while those in the Argolid consist of large (including fine-ware) stirrup jars and a few piriform jars. Almost all of these vases can be dated to LH/LM IIIB by context or by ware. The signs are placed in prominent positions (on the handles) unlike the pre-firing potters' marks, which are generally hidden (often under or near the base). Most of the marks incised after firing are simple in form, and it is possible and perhaps tempting to identify them with simple characters of the Linear B script. However, these simple marks can just as easily be equated with signs of the Cypro-Minoan (CM) script or, for that matter, be assumed to be abstract marks like many of the MM and MH-LH I marks, and therefore unrelated to any formal script. Yet one complex mark which appears on two separate vases is certainly CM no. 87,<sup>12</sup> and another seems likely to represent CM no. 104.<sup>13</sup> There is one possible Linear B sign, inscribed on a coarse stirrup jar found at Kommos, but its form is not sufficiently diagnostic to make this identification certain without further parallels.<sup>14</sup> There is no obvious relation between the incised marks and painted signs or inscriptions except that they occur in the same period and all these categories appear on coarse stirrup jars.

In summary, in the Aegean, vases bearing marks incised after firing are relatively few in number, consist of a limited range of shapes, and are primarily a LH/LM IIIB phenomenon. To what extent they provide evidence for a common marking system is unclear. There is limited but clear evidence for the use of formal CM signs, but also one dubious Linear B sign. Consequently, within the context of the LBA Aegean, in which the practice of marking pottery in general seems very limited, the incised signs found on pottery from the Argolid and Crete stand out as exceptions.

However, if we shift our focus eastwards – towards Cyprus and the Near East – the practice of marking pottery with incised signs no longer appears exceptional. In fact, it is commonplace, especially on Cyprus, and contrasts sharply with the situation in the Aegean. Of the vases and sherds of local Cypriot pottery from LBA contexts on Cyprus, at least 500 are incised. Incised marks occur on all sorts of wares, but especially on the local (Plain White Wheelmade) jugs and jars. Signs are inscribed both before and after firing, though marks incised after firing are far more common. CM inscriptions (i.e., actual sequences of two or more CM signs) are not uncommon on these domestic vessels, and single marks often reflect CM characters. The signs on local wares are generally placed where they are clearly visible – on handles or shoulders as on the Plain White Wheelmade jug from Katydhata.<sup>15</sup>

The practice of incising marks on pottery extended also to imported wares. Canaanite jar handles found on Cyprus, for example, are often incised with signs that are clearly CM. It is hardly surprising, then, to find Aegean wares with incised signs at every major site in Cyprus. They are found also at Ras Shamra/Minet el Beidha and several other Near Eastern sites (Alalakh, Byblos, Beth Shan, Tell Abu Hawam, Deir el Balah) where finds of Cypriot pottery indicate trade relations of some sort with the island.<sup>16</sup>

Like the pottery from the Argolid and Crete, the marked Aegean vases on Cyprus can almost always be dated to Late Cypriot IIC, which corresponds to the Aegean LH IIIB period, by either ware or context. And also like the Aegean examples, large stirrup jars – both coarse and fine – and piriform jars are the primary shapes upon which such marks appear.

There are, however, some significant differences between the marked Aegean pottery found in the Aegean and that found on Cyprus. First, Aegean wares with incised marks occur far more frequently in Cyprus: in contrast to the 33 incised vases found in the Argolid and on Crete, sites throughout the island of Cyprus have produced 127 incised vases, almost four times as many

examples. If one includes the incised Aegean wares found in the Near East (41), then the proportions increase to over five times as many vessels with incised marks found in the eastern Mediterranean as in the Aegean. Second, post-firing marks appear on a wider range of shapes in Cyprus, notably on jugs and Pictorial Style craters as well as the shapes for which marking is attested in the Aegean.<sup>17</sup>

Thus far, three facts about the incised marks point to a connection with Cyprus:

- 1) The Cypriot tradition of incising marks on pottery, which contrasts with Aegean practice.
- 2) The large numbers of incised Aegean wares found on Cyprus, in contrast with the limited numbers found in the Aegean itself.
- 3) The wider range of Aegean shapes carrying incised marks found on Cyprus.

These impressions of a close connection with Cyprus are confirmed by an examination of the marks themselves. The complete corpus of marks incised on Aegean wares consists of 85 different signs appearing on 202 different vases. The signs are mostly simple in form, and consequently may be interpreted as Cypro-Minoan, Linear B, or simply abstract marks. However, among the more complex marks, at least 14 can be identified as specifically CM (Fig. 1). I should mention here that the CM script is barely known; there exist comparatively few formal texts which include only some 2450 signs in total (or less than a page and a half of running text).<sup>18</sup> The entire repertoire of signs has not been identified and the significance of variations in the forms of many signs is not understood.<sup>19</sup> These factors make it difficult to identify any but the most obvious parallels as certain CM signs, and thus the total of 14 different CM signs attested within the corpus of incised marks is a conservative number.<sup>20</sup> In fact, the complex signs which cannot be equated with characters in the formal CM repertoire are often paralleled by signs incised on local Cypriot pottery, and they may well represent CM signs so far unattested in the formal inscriptions.<sup>21</sup> All of this suggests to me that incised signs appearing on Aegean vessels are evidence of a marking system based upon the CM script.<sup>22</sup>

This final observation supports the hypothesis that marking Aegean pottery with signs incised after firing is a specifically Cypriot practice. This, in turn, implies that vessels with these signs on them have either been routed via Cyprus at some stage, or that they have been handled by people familiar with the Cypriot marking system. Thus, there are several possible explanations for the presence of CM-inscribed pottery in the Aegean. The Mycenaean vessels found on the Ulu Burun shipwreck provide examples of fine and coarse Aegean wares which survived one or several trips to the Near East and were being shipped back towards the Aegean; similarly, the incised closed transport and storage vessels found on Crete and in the Argolid may be more examples of such "returnables." Less likely is the possibility that some Mycenaean wares were made and marked in Cyprus; the FS 36 piriform jars and some of the Pictorial vases may be examples of such a case,<sup>23</sup> a few having been shipped to the Argolid as imports along with other cargo. Finally, there is the chance that the marks were incised outside of Cyprus by people knowledgeable in the Cypriot marking system. In this case, we might imagine a Cypriot or Mycenaean individual in the Argolid, specifically concerned with exports to Cyprus, incising the appropriate marks on outgoing vessels. Since the marks are incised after firing, it cannot be determined at what point they were inscribed on the vessels, and thus all these explanations are possible.

If the marks themselves are evidence of Cypriot handling, then the distribution of such marked vessels should reflect areas of contact with Cyprus. Thus, for example, it is not surprising to find such marked vessels at Near Eastern sites, where Cypriot vessels in much greater quantities suggest significant trade with the island. The concentration of vessels with incised signs in the Argolid, especially at Tiryns, fits in with other evidence of close relations with Cyprus. The four incised coarse stirrup jars from Crete may have arrived via the Argolid or by way of Kommos.<sup>24</sup> What is surprising is the lack of these marked vessels anywhere else in the Aegean. In some areas,

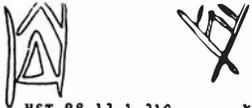
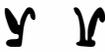
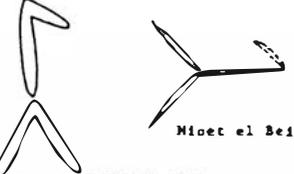
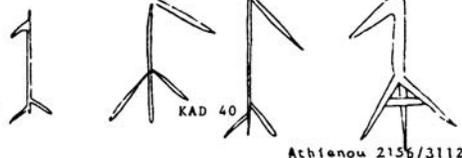
 CM no.108	 HST 98 12-1 310 Kitico-Bamboula KEF-322	 CM no.99	 Pyla KK 27
 CM no.87	 Tiryns LXI 43/9 XV Tiryns 27.430	 CM no.41	 Kouklia KC 402
	 HST C434 Alalakh Enkomi 5791/1	 CM no.38	 Ras Shamra topo.4574
 CM no.107	 Tiryns 639 Enkomi Br.T.68 Enkomi Sw.T.18/57	 CM no.65	 Byblos K.11/T.3
	 Erlangen I 335 Enkomi T.3/272 Tiryns LXII 40/36 II	 CM no.102	 Kourion B1129 Kourion B438
 CM no.104	 HST 1971 3-25 Tiryns LXII 44/13 II HST 51.330 Dhenia 1937/IV-13/1	 CM no.66	 Tell Abu Hawam 34-717
 CM no.106	 Enkomi T.3	 CM no.13	 Dhenia 1937/IV-13/1 Mizec el Beidha T.v
 CM no.31	 Enkomi 3595/1 KAD 40 Athenou 2156/3112	 CM no.26	 Akantou-Mouloa Kitico T.9/51

FIG. 1. Cypro-Minoan signs on vases

lack of excavation or publication is certainly a factor, but it is strange that no examples have been noticed in the Dodecanese, particularly Rhodes, presumably way-stations between Cyprus and the Argolid and Crete. Perhaps this is an indication of specifically directed trade contacts, with certain wares discharged only to certain markets and not subject to peripheral trading *en route*.<sup>25</sup>

One final point needs to be made. It is important for any general interpretation to determine whether these CM-related signs on Aegean wares were indeed incised after firing. Generally, these signs have been published as post-firing marks. However, a few recent articles have challenged this assumption, both with regard to the signs incised on coarse ware stirrup jars and those incised on fine ware vessels.<sup>26</sup> We must consider these well-reasoned proposals carefully because of their important ramifications. Time does not permit me to discuss here in detail the particular observations which can be used to distinguish between pre- and post-firing marks, peculiarities such as the manner in which the strokes are cut, the disposition of the temper, and even the color of the clay within the incised groove. In the last year and a half, I have examined about 500 marks incised into pottery of many different types, including 1/4 of the marks incised into fine and coarse Aegean vessels. On all the Mycenaean and Minoan examples which I have studied, I believe that the CM marks were incised after firing.<sup>27</sup>

In conclusion, the marks incised after firing on Aegean wares are a specific and limited phenomenon. They occur mainly on large storage vessels. They are almost exclusively associated with the LH/LM IIIB period, and are found only in certain areas: one in Egypt, a few on Crete, 29 in the Argolid, but 127 on Cyprus and a further 41 at Near Eastern sites closely associated with Cyprus. Their distribution suggests that they are specifically related to Cyprus. In fact, I believe the marks to be directly associated with Cypriot marking systems. First, this makes sense in the context of the frequent Cypriot practice of marking local wares, often with CM signs. Second, the complex marks on the Aegean wares are often demonstrably CM, while only one can be even tentatively identified with a Linear B sign. The presence of vessels with incised signs only in the Argolid and Crete in the Aegean and not, for example in Rhodes, may be an indication of direct trade routes between those areas and Cyprus.

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#### NOTES

<sup>1</sup> I thank Drs. Karageorghis and Papageorghiou for permission to undertake a study of pot-marks occurring on LBA wares found on Cyprus. I also thank the members of the Cyprus Antiquities Service for their patient help at all stages of my work. I am grateful to the excavators on Cyprus for their willingness to share their unpublished material, their expertise and their time with me: P. Åström, G. Cadogan, J.-C. Courtois, S. Hadjisavvas, V. Karageorghis, F. Maier, I. Nicolaou, A. South Todd, and M. Yon. I benefited greatly from the facilities of the Cyprus American Archaeological Research Institute (CAARI), and am especially thankful to its director, S. Swiny, for his kind and energetic help in matters both scholarly and logistical. The AIA Olivia James Traveling Fellowship and a grant from the Mellon 1984 Foundation made my fieldwork possible. This research project was originally suggested to me by T.G. Palaima, and he has voluntarily continued to supervise its course; I am grateful for his persistent interest and support.

<sup>2</sup> See Zerner, this volume. Also at Tiryns (Döhl, 1978, pp. 115-120), Kea (*Keos IV*, 1984), and Phylakopi (C.C. Edgar and A.J. Evans, "The Pottery Marks," in Atkinson *et al.*, 1904, pp. 177-185) numerous finds attest to well-developed marking systems consisting of combinations of short slashes and punches. Most are incised before firing and presumably are associated with some aspect of the organization of manufacture. These widespread systems, however, disappear (or are severely limited) after LH I. J. Rutter has suggested that these impressed/incised potmarks continue through LH/LM II (based on finds from Tsoungiza) and their decline may reasonably be connected with the collapse of the Aeginetan export industry (and perhaps the early LM IIIA2 destruction of Knossos, as well?) (personal communication, 26 Feb. 1990).

<sup>3</sup> See, for example, Godart and Olivier, 1982, pp. 63-127; see also Palaima, 1982.

<sup>4</sup> E. Hallager, 1987; Catling, Cherry, Jones and Killen, 1980.

<sup>5</sup> Though see Raison, 1968, and Stubbings, 1951a, for some discussion of these painted single marks.

<sup>6</sup> Döhl, 1979; Olivier, 1988.

<sup>7</sup> Bennet, forthcoming.

<sup>8</sup> *Keos IV*, 1984, pp. 26-43.

<sup>9</sup> At Tiryns, for example, 79 pieces of MH III-LH I/II pottery were incised with simple pot marks before firing, but only three have been recorded from the LH III levels (MH III-LH I/II marks: Döhl, 1978, nos. 1-77; Olivier, 1988, nos. 2-3; LH III incised marks: Olivier, 1988, nos. 4-6).

Incised pottery at Kommos consists of only a few pieces. Close study reveals that few of the incised marks from the LM levels occur on local pottery.

The LH III pottery of Kea is too small a sample from which to draw conclusions (*Keos IV*, 1984, p. 40).

In general, the published pre-firing incised marks from LBA sites are very simple, are often scratched on the base of pots, and are probably specifically potters' marks. The only exceptions are three or possibly four coarse stirrup jars from Crete (**Khania**: KH X 16 in E. Hallager and Vlasakis, 1976, pp. 215-219; **Knossos**: Popham, 1970, p. 74, pl. 28:g and possibly 28:e) which carry signs incised on their false-spout discs. One sign is certainly the Linear B *wa* (KH Z 16); the others are simple crosses which may stand for Linear B *ro* (though the equal lengths of all arms argues against this identification). These examples are clearly different in form and possibly in function from the other LH/LM III pre-firing marks. The fact that one sign is certainly a Linear B character, the marks' prominent positions on the disc, and the fact that they were marked before firing place them close to the tradition of painted Linear B inscriptions or painted single signs.

<sup>10</sup> **Mycenae**: Chadwick, 1963. **Tiryns**: Åkerström, 1974; Döhl, 1979, nos. 81-93; Olivier, 1988, nos. 10, 12, 15-26. **Asine**: Frizell, 1977. **Dendra (Midea)**: *ArchDelt* 19, 1964, B, p. 134, pl. 135:c.

Subsequent to the presentation of this paper, E. French kindly informed me that a number of inscribed LH III sherds were found during excavations at Mycenae, but as yet remain unpublished. Although, by her estimate, the unpublished examples from Mycenae would double the sample size known from the Aegean, even this substantial increase does not lessen the great predominance of inscribed Aegean vases found in Cyprus and the Near East relative to the Aegean.

<sup>11</sup> **Amnisos**: Herakleion 18213, *ArchDelt* 23, 1968, B, pp. 402-403, pl. 363:b. **Tripiti**: Herakleion 9246, Raison, 1968, p. 20, no. 108c, pl. V.21; also Kanta, 1980, p. 249, fig. 9:5. **Kommos**: Shaw, 1978, pp. 128-129, pl. 36:f; also Bennet, forthcoming. **Knossos**: Hood and de Jong, 1951, p. 193, no. 35, fig. 8, pl. 47:c. I thank S. Hood for bringing this piece to my attention.

<sup>12</sup> Tiryns LXI 43/9 XV and Tiryns 27.430.

<sup>13</sup> Tiryns LXII 44/13 II.

<sup>14</sup> Kommos, note 9 above. It is possible, also, that the stirrup jar from Amnisos is incised with

Linear B characters, but I have been unable to find a picture or check this reference.

<sup>15</sup> Most recently published in: Åström, 1989, pp. 15-16, T.11/17 (A1493), T.11/11 (A1496).

<sup>16</sup> **Alalakh:** Woolley, 1955, p. 371, pl. CXXIX. **Minet el Beidha:** *Ugaritica* I, 1939, p. 77, fig. 68; *Ugaritica* II, 1949, p. 144:15, fig. 54:15, p. 152:15, fig. 58:15, p. 154:1a-l, fig. 59:1a-l, p. 156:16, 20, fig. 60:16, 20, p. 160:4, fig. 62:4, p. 190:9, fig. 77:9, pp. 228-229:13, 19, 25-27, fig. 96:13, 19, 25-27, fig. 125:6, fig. 128:2, pl. XXVII; *Ugaritica* VII, 1978, p. 306:5, 7, fig. 36:5, 7, p. 318:3, fig. 41:3, p. 336:2, fig. 48:2. **Byblos:** Salles, 1980, p. 34, pl.13:6, pl. XII:4. **Beth Shan:** Hankey, 1967, p. 127, fig. 4, pl. 28:c1. **Tell Abu Hawam:** Balensi, 1980, 46, 56, 133, 135, 162, 178, 211, 429, 436, 460, 461, 501, 55, 556; catalogue pp. 70, 77, 86, 108, 226; pls. 32:2,4,7,10,12, 37:33, 75, 131:18, 137:7, 143:50, 147:24, 153/4:4, 154:10; also Hamilton, 1934, p. 46, no. 282, p. 50, no. 306w, p. 53, no. 310A:a-d,f, pl. XIX:306w. **Deir el Balah:** Dothan, 1979a, p. 12, p. 14, fig. 15, p. 15, figs. 19-20.

<sup>17</sup> It is important to note, however, that the range of shapes with incised signs found in Cyprus/Near East is still restricted in comparison to the complete range of Mycenaean/Minoan wares found there.

<sup>18</sup> Palaima, 1989.

<sup>19</sup> A word of caution must be interjected here. The comparison of signs scratched into hard clay with signs inscribed into the soft clay tablets of formal inscriptions is not always straightforward. The differences in the Linear B sign-forms found on the inscribed stirrup jars as compared to tablets provide a good example of the way in which ductus can alter a sign form (see Sacconi, 1974). The corpus of Linear B inscriptions is large enough that the vital features of each sign have been distinguished, and variants due to ductus or individual hand can be fairly securely identified. The Cypro-Minoan script, however, is barely known: there exist comparatively few formal texts, the entire repertoire of signs has not been identified, and the significance of variations in the form of many signs is not understood. These factors make it difficult to identify any but the most obvious parallels as certain CM signs. On the other hand, they provide a great deal of leeway in identifying possible CM signs.

<sup>20</sup> According to comparisons with the standard CM signary published in Masson, 1974, pp. 13-15.

<sup>21</sup> For example, the  sign, which occurs several times as an isolated sign on Cypriot as well as Aegean wares, is found also in one instance as part of an "inscription" consisting of two signs incised on a Canaanite handle (Catling, 1989a, p. 326:14 fig. 1:14, pl. XLIV:14). The appearance of this complex sign on different wares from widely-separated contexts suggests that it reflects a commonly known sign/symbol. Its appearance in an "inscription" suggests that it is, indeed, a CM character which has heretofore not been attested in the limited formal CM repertoire. The brevity of the inscription and the simple nature of the second sign prevent a certain identification of these signs as specifically CM, but, given the frequent appearance of similar short CM inscriptions on Cypriot wares, the probability that this, too, is CM is very high. At the very least, the complex signs which appear on both Aegean and local Cypriot wares but not in the formal CM repertoire attest the use of the signs by Cypriots and thus support the hypothesis that these marks are to be considered a Cypriot practice, even though they do not point specifically to the use of the CM script.

<sup>22</sup> I do not mean to imply that all the marks are specifically CM characters, but the proportion of signs which must be or can be CM is great enough to suggest that the formal script was the inspiration for the incised marks.

<sup>23</sup> The issue of production centers of "Levanto-Helladic" and Pictorial wares is much too complex to be addressed within the context of this paper. But the possibility of Cypriot origin must be considered.

<sup>24</sup> Because of various hints that marking vessels with incised signs was not entirely unknown in

Crete – the *je* incised after firing on the Kommos stirrup jar, and the pre-firing *wa* and possible *ro*'s at Knossos and Khania (see note 9 above) and maybe a Linear B inscription on the Amnisos stirrup jar (not yet seen by me) – I am not adamant that the marks on coarse stirrup jars must all be CM or viewed as an exclusively Cypriot practice. Still, enough of the marks on large coarse stirrup jars, including one on a stirrup jar certainly of Cretan fabric (Kourion-Bamboula B1129) are demonstrably CM to make this a fair assumption for most marked large stirrup jars.

<sup>25</sup> This difference in trade practices between the mainland/Rhodes and mainland/Cyprus is demonstrated also by the very different assemblages of imported Mycenaean pottery found in each area.

Although (with the exception of the el Amarna deposit) relatively small quantities of Mycenaean wares have been found in Egypt, perhaps it is significant that only one Mycenaean sherd with an incised sign has been found: V. Hankey was kind enough to bring to my attention a handle from a piriform jar (FS 35 or 36) found at Hawara, marked with a typical incised sign.

T.G. Palaima reminded me of an interesting parallel: painted inscribed Linear B stirrup jars are found only in markets where Linear B was readable. The distribution of CM-marked pottery may similarly reflect the use of marking systems appropriate to specific markets.

<sup>26</sup> Yon and Caubet, 1985, pp. 175-187; Palaima, Betancourt and Myer, 1984.

<sup>27</sup> I have not yet been able to examine closely the coarse stirrup jar which was the central piece of the article published by Palaima, Betancourt and Myer, 1984. I have, however, looked at all the pieces published by M. Yon. Signs incised into wet clay are easy to identify, but it is not so easy to differentiate between signs incised into clay at the leather-hard stage and those cut into fired clay. In his early study of CM signs, J.F. Daniel suggested some criteria: "Inscriptions made after firing often have many successive strokes of the knife within the incision. Inscriptions cut while leather hard are cleaner, and the surface coloration of the vase often continues into the incision" (Daniel, 1941, p. 273, no. 56). From my own work, I believe that it is possible to differentiate between marks incised before and after firing. In addition to Daniel's expressed criteria, I would add the following characteristics:

(1) In coarse wares, the inclusions provide clues. If a mark is made before firing, even at the leather hard stage, the grits will be disturbed by the incising tool. The inclusions are either dragged along the line of incision or pushed into the clay, and no longer project into the plane of the incised groove. After firing, on the other hand, the grits resist the incising; often they show cut or scratch marks, and sometimes they have been "popped" out of place, leaving empty holes.

(2) On fine wares, and often on coarse wares, when a line is made in clay before firing, a very characteristic ridge is raised on either side of the incised groove, a result of clay being pushed aside by the incising tool. Clay which has been hardened by firing does not, of course, yield and the result is a line without any sort of a ridge whatsoever. Further indications that the clean, sharp incisions on fine wares were made after firing are paint which has been flaked away at the edges of an incised groove by the pressure of the incising tool, the appearance of scratch marks alongside the primary groove, where the hardness of the clay has forced the inscriber to make several starts or has slipped off-track before achieving a satisfactory line, and finally an example from Kalavassos-Ayios Dhimitrios where the incised mark clearly penetrates into fabric which has not been exposed to firing. Finally, experiments with hard-fired Mycenaean sherds indicate that it was not a particularly difficult task to inscribe even intricate marks using simply-shaped flakes of flint from Cyprus.