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ÉDITÉS PAR

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LATE MINOAN HEARTHs
AND OVENS AT KOMMOS,
CRETE*

The following is a study of fixed installations used with fire for heating, cooking and other purposes at the Minoan site of Kommos. The site divides into two distinct sectors according to function: a town (plans, figs. 1 and 2), spreading on a small hill on the west coast of the Messara plain overlooking the Libyan sea, and an administrative or civic centre directly to its south, at the bottom of the hill (plan, fig. 3). The majority of these installations functioning as hearths have a pi-shaped plan, defined by three upright sides within which the fire was kindled. The evidence from Kommos and from other Minoan sites suggests that this type of hearth, which will concern us most, does not appear in Crete before LM IB-LM II. This raises questions about the possible implications of its introduction, use and specialized location in certain rooms.1

Archaeological publications frequently use vague and multiple terms to refer to heating and cooking installations. Here the term “hearth” will imply only constructed floor fixtures used with fire, whether: round, square or apsidal in shape; raised above or sunk within a floor; made of flat stones serving as a border (figs. 5, 6) or laid out as bedding (fig. 7); made of mud bricks, clay or stone slabs set on edge and forming a bin-like enclosure with three or four sides (fig. 12). “Oven” will refer to a partially, or almost completely, closable space heated with the use of embers rather than flames (as perhaps that in fig. 8). Poor preservation, unfortunately, makes it often difficult to distinguish hearth from oven.2 Finally, one has to be aware that not all pi-shaped

(*) I would like to thank here two people, my husband, Joseph W. Shaw, and Eric Gsap, for their useful comments and the generous time spent in helping to edit this article.


(2) By the above definition, evidence for an open fire kindled on the ground or some other surface will generally not be considered in this paper. The difficulties arising from recognizing pyrotechnic structures with certainty, and the resulting ambiguity in descriptive terms used in archaeological reporting have been a topic of a recent seminar: A. Lehou-Gourian, Les structures d’habitats: témoins de combustion (1973). I am grateful to Professor R. Treuil for providing me with a copy of the proceedings.
Fig. 1. — Distribution of hearths and enclosures in the houses on the hilltop, Kommos, indicated by bold Arabic numerals.
fixtures were used as hearths and one needs a statement about the evidence of fire, whether present or lacking, which is crucial information not always specified in publications. Examples at Kommos with no evidence of fire will be referred to as "enclosures." Such enclosures often occur in the same rooms with hearths at Kommos and warrant some consideration as they obviously have related functions.

In order to give an idea of the distribution of such fixtures at Kommos, the particular locations of both hearths and enclosures will be briefly listed, proceeding from north to south. All such fixtures have been numbered in heavily printed Arabic numerals in three plans representing the northmost excavated area of the town or "hilltop" (fig. 1), the central part of the town (fig. 2) and the southern, civic area (fig. 3). More detailed illustrations of some representative examples are provided in a drawing which also gives an idea of their relative scales and orientation (fig. 4), and in photographs (figs. 5-14).

On the hilltop (fig. 1), hearths and enclosures appear in the North House (1-7), in the House of the Press (14-15), and the Cliffside House (13). They also occur in a number of rooms which are attached to, or built between houses (9-11 and 12). As will be specified below, only 7, 15 and probably 13 were built after MM and before LM III. The rest were used, and probably mostly built, in LM III. On the central hillside (fig. 2), two locations are involved: in the so-called House with the Snake Tube (16-22) and in Room 30 (23) in a house to the east, all of LM III date. Finally, in the southern area (fig. 3), they appear in rooms and other spaces of the important LM I Building J/T in a period of re-use in LM IB-LM II or early LM III (24-30), but not later.

DISCUSSION OF HEARTH AND ENCLOSURES IN THE TOWN AT KOMMOS (figs. 1-2)

No MM hearths have been found at Kommos, although levels of this date have been excavated extensively. The earliest type of hearth is represented by two LM I examples found in two houses on the hilltop (fig. 1): the North House and the House of the Press (7 and 15; figs. 5, 6, respectively). Each hearth is centrally located in the largest room of the ground floor of the respective house and is roughly square (c. 1.00-1.20 m. wide), bordered by small, flat stones which rise only slightly above the floor. In the House of the Press the hearth was found next to a round stone base of a column set in the centre of the large room, the roof of which it helped support. The hearth was set just off centre and lined up with some of the interior doorways, as if to make it visible from within more remote spaces. At a later stage, possibly in LM III, the room was apparently converted into a court and roofed only along the west side. Structure 14 in the northeast corner of this court bears no evidence of fire and is best labelled an enclosure. Due to erosion in the eastern half of the court, it is not absolutely certain that the hearth continued to be used in LM IIIA. It was not in use in LM IIIB. In the North House the hearth was

(3) So-called on account of a large, spouted circular slab set on a stone platform found in one of its rooms. identified as an oil press by II. Blitzer. See also: J. W. Shaw, Hesperia 47 (1978), p. 116, fig. 3 and pls. 35, a-b.
covered over in LM III A1 by a new floor. In general, it appears that this type of hearth ceased to be built after LM IA-LM IB, though it probably continued to be used until somewhat later.\footnote{\textsuperscript{4}}

\footnote{The date of the construction of these two hearths will be discussed in more detail in the final publication of the site of Kommos, in Vol. 1. In the case of the North House, the floor with the hearth overlay an LM IA stratum, although other, possibly contemporary, floors had some LM IB sherds. A sounding in the court of the House of the Press yielded sherds no later than LM IA. The hearth in the North House was missing its north side. As preserved, it is 90 cm. E.-W. by 70 cm. N.-S. That in the other house was 1.20 m. E.-W. by 1.00 m. N.-S.}
A third hearth (13, figs. 1 and 7) in Room 6, also on the hilltop, is somewhat similar to the hearths just described, but its construction date is unknown. It is also flat, but made of a pavement, rather than just a frame of small slabs (covering an area c. 88 cm. × 71 cm.), and is placed against a wall, rather than centrally. Sherds found in the small exposed area of the floor around it show it to have been used during, or to have gone out of use in LM III A.5

Central hearths of the kind represented in the North House and the House of the oil Press can be compared with possibly related, though not identical types known elsewhere in MM and LM I times. In these there is usually a central, square or rectangular, terracotta slab used as a hearth, though, it should be noted, not always bearing traces of fire. Most examples are from houses at Mallia, where they often appear in the vicinity of a column, like the hearth in the House of the Press at Kommos.6 Comparable to the Kommos examples in terms of centrality and overall shape, but not of construction, is a hearth, described as a built platform “coated with tamped clay,” found recently at Kastelli at Khania in House I, room M (destroyed in LM I B).7 Also central, but circular rather than square, are three superposed hearths of LM III date found in a large building, again at Khania. Both their location and shape have naturally prompted comparison with hearths of this type, commonly found in Mycenaean palaces, with an inherent possibility of Mycenaean influence, or even presence at Khania in the LM III period.8

While remnants of animal bones and occasionally of carbonized food suggest that hearths of LM I date discussed above were used for cooking, their central placement suggests that an even distribution of heat and perhaps of light was a prime concern, for cooking is best conducted against a wall or in a corner. Important is the available evidence that much domestic activity went on in rooms thus equipped. At Khania, for example, the discovery of loomweights in the LM I room with the oblong central hearth led the excavator to believe that weaving took place alongside cooking.9 Rooms of this type then can be thought of as “foyers” in the true sense of the word—a focal location (Latin focus = hearth), the very heart of the house, where residents congregate to talk, cook, dine, possibly sleep, and carry out household chores.10

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(5) This hearth was found in a cleaning operation in 1987 immediately under the floor of the room which seems to have been used as a kitchen into LM III A-B. Though no hearth was found on the upper floor there was extensive burning in exactly the same location.


(9) In an adjacent room carbonized food remains were found, stored in a jar. The room with the hearth itself was equipped with querns, grinding stones and cooking pots: Y. Tzedakis-E. Hallager, ArchAnAth 17 (1984), p. 5.

(10) Rooms of the kind described above at Mallia and obviously related to Room M at Khania, that is with varying combinations of central hearth and central column, have been discussed in a number of studies: J. Deshayes, Maisons II (ÉtCret XI), p. 12-13; O. Pelon, BCH 90 (1966), p. 552-585 and in particular p. 567; I. Begg, Mycenaean Storerooms in the Late Bronze Age, University of Toronto dissertation (1975), Appendix I; A. Michalidou, in Festschrift E. Andronikos (1986), p. 509-526 and 509, in particular.
Fig. 3. — Distribution of hearths and enclosures in the southern area, Kommos, indicated in bold Arabic numerals.
Fig. 4. — Drawings of representative hearths and enclosures (a-j) and of cooking vessels (k-n) from Kommos. Shaded areas represent walls. Arrows point North.
Though the above type of hearth is scantily represented at Kommos, possibly because of the limited exposure of LM I floors in excavation, pi-shaped hearths, characteristic of the later and last phases of Minoan habitation, are quite numerous. Unless otherwise specified, these are constructed of flat stone slabs set on edge, usually against a wall and often in a corner.

The pi-shaped hearths of the North House on the hilltop are on floors which were laid during or just after LM III A1. One (55 x 32 cm. wide in the interior and c. 40 cm. tall) is in the very room which earlier contained the central hearth discussed above (5 in Room N17; figs. 1, 4, c and 5). A few lumps of baked clay found in the northern area of this room may have once lined this structure, which, depending on whether the lining continued up to form a dome, may have even been an oven. In the east area of the same room was an enclosure built against a wall (6, fig. 5). Fragments of a cooking pot were found within the enclosure and not in the hearth. From additional evidence at the site, one gets the impression that such enclosures were used for temporary storage, possibly of pots with cooked food ready to be used or while more food was being cooked in the hearths. This may explain why hearths and enclosures are often identical in size and shape. They enclosed the same kinds of pots.

Still in the North House, we found what comes closest to being identified as an oven (2 in Room N16, figs. 4, a and 8). Here a thick lining of clay coated the interior and rose slightly above the three upright slabs, beginning to curve upwards and forward at the point where it was broken. It may have once formed a domed top. The floor was also of burnt clay sloping down towards the back. The small interior space, especially if once closed at the top, makes it unlikely that a cooking pot of average size could have been placed within it. Fig. 4, k-n shows the average sizes of Kommmian tripod pots and a lid representing the usually covered cooking dishes and trays. Though details are not certain due to poor preservation, the oven could resemble small, domed baking ovens particularly common in the Near East both in ancient and modern times.

Still in Room N16, an enclosure was set between the jambs of a door leading east, but blocked in LM III by a curving wall (4 in space 17b: fig. 4, b and 9). One unusual feature was that its third (east) side was not closed by the usual upright slab. Instead, a small stack of flat stones formed a rough platform. On evidence from pi-shaped enclosures in the stoa of Building J/T, and by analogy to what I believe may be a comparable fixture in the House with the Snake Tube (18, figs. 1, 13), this enclosure may have served as a platform for a quern used to grind food stuffs. Remnants of food,
shells and bones, some burnt, are clear indications that cooking took place both in this and the adjacent room of the North House. Ash was particularly extensive in the west room where it clearly emanated from the hearth/oven and was brushed away towards the southwest corner of the room. It is of interest that the duplication of floor fixtures in the two adjacent rooms, together with the lack of direct communication between them, indicate that the house was split into at least two residences in its final phase.15

Equally rich in hearths and enclosures is the LM I House with the Snake Tube, during its LM III re-use (fig. 2).16 In the west half of the house is an open hearth consisting of a very burnt slab set horizontally on the floor (17). Of the enclosures in the house, that in Room 4 (16) contained a brazier and had a removable fourth stone to close it, when necessary, on the south side.17 A second enclosure was set between this room and that to the north (18, Room 3b; figs. 4, g and j, and 13). Like enclosure 4 on the hilltop, to which it has already been compared, it too had a third side of stacked slabs, rather than the standard upright slab.18

More extensive evidence for the use of fire in this house comes from the northeastern Room 5. Here were two pi-shaped structures close to each other near the centre of the room (20 and 21, figs. 4, h, and 12). Traces of burning and ash, food remains, and extensive fragments of cooking pots were found around them. An almost complete cooking pot was found in situ in a somewhat unusually shaped enclosure made of a combination of upright slabs and a curving rubble wall, set against the room’s north wall (19).19 Just south of this room was a partially curving fixture 22, made of slabs and small stones, probably also a hearth, outside of which was found a flat round stone with one side somewhat hollowed out, which had probably served as a stand for a pot.

The remaining examples of pi-shaped hearths and enclosures are found in makeshift rooms created in LM III when major construction was no longer taking place. On the hilltop, such rooms are 019 with a pi-shaped hearth, 12, built against its north wall,20 and Room 012. The latter was long used as a kitchen to judge from three enclosures found in it, all used in LM III B. Two of these were on a lower floor, one a now much destroyed hearth (9), the other a slab enclosure (10), set in the northwest and the

(15) There are two more enclosures, 1 and 3, in Rooms N3 and N16 in this house (fig. 1), the first found empty, the second containing the base of a coarse pot.

(16) This house will be published by J. McEnroe in Kommos, vol. 1. Though his understanding of these important remains has been helpful to me, he is in no way responsible for any error in judgement or information I provide here. The evidence on hearths from this house has already been presented in preliminary excavation reports (J. W. Shaw, Hesperia 46 [1977], p. 227-231; 47 [1978], p. 126; 48 [1979], p. 155-158).


(18) A saddle quern found in this area may have been set on the superposed slabs, to elevate it above the floor which, interestingly, stepped down in level on the south side. A receptacle could then have been placed under it to receive the ground matter. The quern was found to fit snugly between the two upright slabs of the enclosure, though we cannot be certain it belonged here. If so used, this or another quern would have been held in place during use, thus freeing the hands of the person doing the grinding.

(19) The enclosure and the pot (C 1179) are illustrated in: J. W. Shaw, Hesperia 48 (1979), pl. 54, c.

(20) This hearth (c. 30-35 cm. wide in the interior) was made peculiarly: of its walls, both preserved only as stubs, one was of clay and somewhat curving on the interior, the other an upright slab, of which only the lower part was preserved.
Fig. 5. — Room N17a from southeast, hilltop, Kommos (photo by J. W. Shaw).

Fig. 6. — Detail of central hearth in Room 2 from northeast, hilltop, Kommos (photo by J. W. Shaw).
Fig. 7. — Hearth in Room 6 from northwest, hilltop, Kommos (photo by J. W. Shaw).

Fig. 8. — Hearth/oven in Room N16 from south, hilltop, Kommos (photo by J. W. Shaw).
northeast corners respectively (figs. 1, 4, e, and 11 show the enclosure). Another hearth (11), on a slightly higher/later floor in the southwest corner of the same room, had two phases of use. Larger at first (c. 68 cm. wide and 60 cm. long) and with upright slabs, it was then narrowed (to c. 35-43 cm. width) by replacing the south slab with a curving wall of small stones (figs. 4, f and 10).

Two more pi-shaped fixtures are from incompletely excavated architectural contexts. One was set up in a court (8 in 013, fig. 1) on the hilltop and contained sherds of a cooking pot, but its slabs appeared to be unburnt. Near it was found an accumulation of limpels, remnants of a meal. The other, on the central hillside, was in a small room which could have been part of an extensive house (23 in Room 30, figs. 2, 4, i). This, a definite hearth, was found on an LM IIIA2 floor overlying an earlier floor of the same date. It was set against a wall, from which some small, thin slabs projected horizontally like a ledge, making it difficult for one to imagine how a cooking pot would have fit here. Judging from evidence for metal working in this room, this hearth may have been used as a melting furnace, but cooking must have also taken place judging from food remains. The metallurgical activity at Kommos is under study by H. Blitzer.

HEARTHS AND ENCLOSURES IN THE SOUTHERN, CIVIC SECTOR AT KOMMOS (plan, fig. 3)

Pi-shaped hearths found in this area are particularly interesting because of their more narrowly datable contexts. Here they appear first in the late LM IB period or in LM II, generally a time of impoverishment at Kommos and, in the southern area, of a hiatus between the destruction of the magnificent and monumental LM I Building J/T and the construction in LM IIIA of another monumental edifice, P, with successive, wide and long parallel rooms or galleries. The ephemeral existence of pi-shaped hearths and related enclosures in this area, in contrast with their persistence into late LM III in the town, can be explained by the fact that domestic activity was temporary and limited to that intermediary period in the southern area.

The clearest sequence is attested in the easternmost part of the stoa recently excavated. Here, four contiguous, pi-shaped slab enclosures (26, fig. 3) had been built in a N.-S. line on a dirt floor rising some 15 cm. above the fine original slab pavement of the room, once one of the best appointed spaces in Building J/T. A four-sided bin (27),

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(21) The interior of the hearth, which consisted of three upright slabs, is 44 cm. wide and 27 cm. high, its third dimension being very poorly preserved. The enclosure in the northeast corner is 58 x 30 cm. in the interior. Its height, quite uneven, is 25 cm. where better preserved.

(22) It consists of two upright slabs 38 cm. apart and about 35 cm. long.

(23) Evidence for such activity, identified by H. Blitzer, is in the form of crucibles, moulds and scraps of metal. Pieces of copper ingots from Kommos have also been identified by Drs. T. Stech, J. Muhly and R. Maddin during their visit in Crete in the summer of 1983.


Fig. 9. — Slab enclosure in Room 17b from west, hilltop, Kommos (photo by J. W. Shaw).

Fig. 10. — Hearth in Room 012 from west, hilltop, Kommos (photo by J. W. Shaw).
also made of upright slabs, was inserted into the floor right against a blocked doorway which once had led to the eastern storerooms. Except for the bin, which was somewhat smaller (40 cm. deep), the enclosures were uniformly an average of 48 x 35 cm. wide internally and 30 cm. high. Each was equipped with a quern, found either in or next to it. The largest quern provided a clue as to the function of these enclosures, since its underside was cut so as to allow it to stand on the ground in a steeply slanted fashion so that whatever was being ground on it would fall right onto the floor of each enclosure. The floors were paved with sheets of plaster, once part of the wall revetment of the stoa, to judge by the fine fabric and the presence of painted polychrome patterns. The associated fill was LM I B, which also seems to be the approximate date of the installation in the nearby corridor (space 22) of at least two large hearths built each with two upright slabs against the south wall (29, fig. 14, and 30). The eastern one could have been an oven, to judge from the clay lining preserved against the wall and curving in the interior, but it may never have risen higher to form a clay dome, as is more likely in the case of the “oven” in the North House. The two fixtures in the corridor were used during LM II, possibly a little later. One is tempted to conclude that they were connected with the enclosures in the stoa which were probably used for food processing. On the other hand this area at Kommos had a high concentration of items related to metal working in which the hearths in the corridor may have played a role.

The enclosures in the stoa went out of use when a curving wall was built over them in the northeastern corner of the room in LM III (not shown in the plan, fig. 3, which represents the preceding phase). Within the small space thus formed, and set in its northwest corner was a very small and badly preserved clay fixture, possibly an oven, since a cooking pot would probably not have fit within it (28, fig. 3: marked “later hearth”). This was in use in LM II and possibly in early LM III. Shortly afterwards the structures were covered over along with this end of the stoa and the eastern rooms of

(26) The foreman, George Beladakis, suggested that the querns were set on top of the enclosures. Though this idea does not quite work, since some of the querns are too small, the suggestion alerted me to the possibility of the interpretation noted in the text. The bin against the east wall may have been a stand for a vessel used as the container for the substances ground in the enclosures. Samples of soil which may contain organic remains from within and around the enclosures have been collected, but not yet thoroughly examined.

(27) Of the two fixtures, the western one was made of two upright slabs and a curving line of small stones which enclosed an irregularly shaped interior space, 60-80 x 75 cm. wide. The eastern one, of which the clay sides had disintegrated almost entirely, was smaller, c. 45 cm. wide where the sides projected just slightly from the back wall.

The complete set of fixtures in the stoa and the corridor recalls a group of structures at the mansion of Vathypetro. Two rooms are involved there, one with three slab enclosures, the other, described as a kitchen, with a number of hearths/ovens which from the illustrations seem to be pi-shaped, and which the excavator suggests to have also served as bread ovens (S. Marinatos, Prakt. Arch. I 1952, p. 592-610 and especially p. 605-607 and fig. 18). The date of these structures is not clear to me. Vathypetro seems to have been used in LM I B after incurring major damage in LM I A after which it was repaired (see S. Marinatos and M. Hirmer, Crete and Mycenae [1959], p. 68, where the presence of LM I B sherds is noted). See also S. Hood, The Minoans (1971), p. 55, for the idea that the building was used also in LM I B.

(28) The structure of the hearth/oven was difficult to clarify because of the compactness of the fill around it. It was made of clay walls curving at the back and also appearing to curve forward. The interior was tiny and all it contained was a small, fragmentary jug that was very burnt.
Building J/T in a major levelling operation at the time of the construction of Building P in LM III.

Also in transitional use in LM II, possibly early LM III, was a small, pi-shaped hearth built against the north wall of Space 7 in the westernmost sector of Building J/T, which was remodelled and re-used in LM III (24, fig. 3). The use of fire seems to have continued here in this last phase as can be seen from the intense burning on top of a large block set there flush with the later floor. 29

**PI-SHAPED HEARTH/OVENS IN CRETE AND ABROAD**

Before turning to examples of pi-shaped hearths outside Kommos, it is important to clarify how these differ from other similar looking structures with which they might otherwise become confused. I am referring to quadrangular enclosures unconnected with fire, but similarly defined by short, upright walls, these usually of mud brick and often set contiguously as a group on floors. These bins occur in a number of Minoan sites as in the Treasury of the Palace of Zakros, in houses at Phaistos, and recently in some LC I houses at Thera. 30 If closed on all four sides, like the bin in the stoa at Kommos, their contents would have obviously been handled from the top, and this may have been the case with those with one side open, when placed with that side too close to a wall. Unlike pi-shaped hearths, such bins and clusters of three-sided enclosures are already known before LM I B-II. 31

(29) Compare with the burnt slab, 17, serving as hearth in room 3b (fig. 2), discussed above. The use of fire on a type of platform, apart from the surface of the floor itself, is encountered in one more case at Kommos, in the little Room 4 built in LM III, during the remodelling and the re-use of the northwest section of Building J/T (25, fig. 3). This consisted of sherds set flat on the dirt floor and covering a small round area (c. 42 cm. in diameter) which was extensively burnt. Sherd hearths are known from many areas both in Greece and in the Near East. A parallel from Greece is in a LH III (13th c. B.C.) house at Tylissos, excavated in the 1920's and uncovered in recent cleaning operations. See P. Genke-G. Hiesel, *Tiryns V* (1971), p. 1-19 and pl. 20, 2f.


(31) For a discussion of hearths in Minoan houses, see interesting discussions in J. McEnroe's Ph. D. Dissertation for the University of Toronto, *Minoan House and Town Arrangement* (1979), and for the LM III examples in particular Hayden, *op. cit. (n. 11), passim*. It should be noted here that Hayden (p. 124) quotes antecedents for such pi-shaped hearths at three sites, as evidence that they were already in use in LM I: Prasa, Zou and Mallia. There are ambiguities, however, relating to both the identification of enclosures there as hearths and to their date. Thus at Prasa, Room A, a kitchen in House B, had a slab enclosure that was *not* the hearth noted by the excavator. From his description, the hearth was apparently an open one set in another corner of the room, where traces of burning appeared on the floor, next to a blackened vent in the wall (N. Platon, *PraeArchEj* 1951, p. 246-257 and 256-256 and fig. 5, p. 252, in particular). At Zou, the hearth mentioned is actually not said to be of the slab type in the published report, though slab enclosures (not specified as hearths) were encountered in another room, apparently in association with a quern and a rubbing stone (N. Platon, *PraeArchEj* 1955, p. 288-305 and 291, in particular). These enclosures may have been used in connection with grinding, as suggested above for the ones in the stoa at Kommos. As to the pi-shaped fixtures in House E at Mallia, they are more likely to belong to the LM II and LM III periods, as is argued below in my text. Finally, two slab enclosures at Thera have been more recently labelled *"hearth"* by the excavator, although he himself admits that there was no evidence for fire associated with them (*Thera I*, p. 27, 28, and *Thera VII*, p. 30).
Fig. 11. — Slab enclosure in Room 012 from east, hilltop, Kommos (photo by J. W. Shaw).

Fig. 12. — Two hearths in Room 5 from east, central hillside, Kommos (photo by J. W. Shaw).
Fig. 13. — Slab enclosure in Room 4 from south, central hillside, Kommos (photo J. W. Shaw).
As for the pi-shaped hearths, one of the earliest examples outside Kommos is in the southeast section of House E at Mallia, which was re-occupied in LM III. Here Room IIII.2 contained a rectangular hearth, found full of ash and made of three upright, unbaked bricks and a fragmentary, probably removable, fourth one closing the fourth side. Nearby was a slab enclosure (fig. 15, at U and T, respectively). Animal bones, shells and carbonized grains found on the floor show that this was a kitchen. O. Pelon, the excavator of this sector of the house, believes that the hearth and some other remodellings in Room IIII.2 belong to Mallia phase III.B (equivalent to LM I B-II). He also compares the hearth to one of a somewhat later period (LB III B) found in a house in Troy VIIa, which he connects with a much older tradition of such open hearths in the Near East. To the same period he also attributes a conjectural hearth from the same house at Mallia in the southwest corner of Room IIII.1 to the north, where remnants of bricks and ashes were found (fig. 15).\(^{(32)}\) A fourth fixture, used in LM III, was found in the same house in Room IV.2 (figs. 15, at L, and fig. 16). This, however, may simply have been an enclosure rather than a hearth, since there was no evidence of fire. It was built of a combination of stone slabs and mud bricks set on edge.\(^{(33)}\)

Another example of a hearth/oven (described as both "foyer" and "fournier") from Mallia comes from a small LM III B room, attached to the maison aux Vases à étier and made of local sandstone. The drawing provided in the publication does not clarify its exact shape, though it looks like a roundish enclosure, rising above the floor and open at the top (rather than on one side), and set against a wall in which a vertical opening seems to have acted as a vent for the smoke.\(^{(34)}\)

Pi-shaped hearths of either LM II or LM III date also appear at Khondros Viannou, Khania, Palaikastro and Knossos. There may be a related fixture in the later use of the palace at Phaistos.

At Khondros Viannou, among the several slab enclosures that occur in various rooms throughout the site, one can be definitely identified as a hearth because of the mention in the published report of ash and burning.\(^{(35)}\)

At Khania a pi-shaped structure made of hard red and yellow clays and rubble walls was found in a room of LM III A/B date, associated with the earliest of its three (all burnt) floors. This could be a hearth, or an oven, though excavation in that location is incomplete.\(^{(36)}\) At Kastelli, also at Khania, a double installation of hearth and oven was found in a partially excavated room in a LM III C context. The oven had three walls of small stones coated with clay on the inside; the hearth was made up of a bedding of sherds, and with slabs coated with clay and stucco.\(^{(37)}\)

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\(^{(32)}\) O. Pelon, *Maisons III (ÉtGrel XVI)*, especially p. 73-77. Hearth U was 50 x 32 cm. wide on the interior. The Near Eastern comparanda for this type of hearth are discussed on p. 77 and note 3. For Pelon's dating of the later phases of House E at Mallia see also: O. Pelon, *BCH* 91 (1967), p. 494-512 and especially p. 499-500 and 508-511.

\(^{(33)}\) O. Pelon, *Maisons III (ÉtGrel XVI)*, p. 116; also plans I and II, pl. XXXIII, 2. The fixture seems to be ca. 35-40 x 25-30 cm. wide.


\(^{(36)}\) I. Tzedakis, *PraktArchEl* 1977, p. 455-458. Archaeologist Maria Vlazaki, the excavator of the particular trench, suspects that the structure may prove to be a kiln, an idea she conveyed to me during the present conference.

At Palaikastro, an oven has just been discovered in LM III re-occupation levels. It was apparently made of clay and set on a low, semi-oval platform.  

At Knossos the recent excavation of the Unexplored Mansion has yielded information. Two pi-shaped clay hearths were installed, one in LM II in Pillar Hall H in a corner created when partition walls were built between some of the pillars, the other in a little room, D, apparently used until the abandonment of the building in LM III. The lack of finds on the floor of the Pillar Hall makes it impossible to fix the exact function, but Catling, who studied the metal finds, considers it a possible furnace for the production of metal objects. The LM II period gives ample evidence of metallurgy in this building. The existence of two other pi-shaped hearths/ovens at Knossos seems to be implied by Evans' description of a "rough stone erection...[which] may have had a culinary purpose", one specimen having been found in the "Megaron" of the Little Palace, the other in an unlabelled structure southwest of the House of the Frescoes, and in both cases in re-occupation levels. There is no mention of associated finds.

In the Palace of Phaistos, a fragmentary structure made of burnt clay-coated walls set in the centre of a court has been restored as horse-shoe shaped and is thought to have been a melting furnace, probably of LM III date.

DISCUSSION

The evidence from the houses at Kommos and other sites in Crete suggests that some of the pi-shaped hearths may have been used partially, and in some cases possibly primarily, for melting metal (as perhaps in the stoa area at Kommos)—a specialized function to which one is also alerted by Catling's interpretation of the evidence at the Unexplored Mansion. Generally, however, their function seems to have been mainly culinary, as indicated not only by the organic remains in their vicinity, but also by accessory equipment such as potstands, querns for grinding, and pounding tools, as well


(39) Unexplored Mansion, p. 10-12, 21, 204-207, 262-264, 266, note 26 and pls. 3, 254 and 294. The scale in the illustrations shows the hearths to be comparable to the average hearth at Kommos, i.e. some 35-40 cm. wide in the interior.

(40) PM II, p. 20, note 1.

(41) The fixture which is c. 2.80 x 2.00 m., as preserved, was built over a layer of earth accumulated over the initial pavement of Court 90; Pernier-Banti, Festos II, p. 215-216, figs. 134, 135 and plan, fig. 285, opp. p. 484. T41. The possible LM III date is suggested by evidence from the nearby magazines on the west side of the court; S. Alexiou, Μυκηναϊκή πολιτισμός (1964), p. 216.

(42) The possibility that hearths at Kommos may be connected with metalworking has been mentioned to me by H. Bitter, whose study of the pertinent items and of their distribution should provide a closer estimate of such a possible function. My impression at the moment is that such items only rarely occur in the same rooms and in the same levels with the hearths.
Fig. 14. — Hearth in Corridor 22 from north, southern area, Kommos (photo by J. W. Shaw).

Fig. 15. — Plan of southeast section of House E, Mallia (Maisons III [EtCrèt XVI], plan II).

Fig. 16. — Enclosure in Room IV2, House E, Mallia (Maisons III [EtCrèt XVI], pl. XXXIII, 2).
as slab enclosures that one tends to associate with food processing. Some of these rooms well deserve the name of "kitchen."

Evans noted that fixed hearths largely disappeared from Crete after the pre-palatial period, when Anatolian were supplanted by Egyptian connections and hearths had been replaced by movable braziers. Though this picture has been modified recently, especially with evidence from LM I houses at Mallia, the evidence for fixed cooking installations in LM III at Kommos and elsewhere in Crete stands in striking contrast to the paucity of such information for the MM-LM I period. It is not only the pi-shaped type of hearth which strikes one by the novelty of its shape and location, but the fact that people now prefer to do their cooking indoors in a space which, though used for other functions as well, is primarily devoted to the preparation of food.

Is the emergence of the kitchen a sign of luxury and sophistication? Paradoxically, it may reflect the opposite. Indeed, the fixtures under consideration appear mainly at sites undergoing a period of drastic change, sometimes of decline, or in relative isolation from other sites.

Thus at Mallia House E and the maison aux Vases à étier present rare cases of re-use during LM II and LM III of part of the once thriving MM and LM I town. A period of decline and disrespect for once graceful architectural settings is also symbolized by the installation of a pi-shaped hearth in the Pillar Hall of the Unexplored Mansion at Knossos, where the metal working activity in LM II might have been at the service of Mycenaean overlords, a circumstance indicating a diminished position for the local population, despite the continued production of luxury items. The whole settlement of Khondros Viannou, founded after LM I, gives the impression of a haphazardly organized town and one rather isolated from other LM III sites. One would also like to know the extent and character of the LM III settlement at Chania. There the presence of both pi-shaped hearths/ovens and round, central hearths of Mycenaean type may well imply a more mixed population, as others suggest. It may be significant that the Mycenaean type of hearth appears in the more substantial building there.

Something more specific can be said about the vicissitudes of the site of Kommos. There, terms like "decline" and "impoverishment" are surely applicable to the LM II period in the southern area. The conversion of the east end of the stoa into a simple room, and the installation there of the various enclosures, the failure to replace the destroyed mural decoration which adorned it before, all speak of this state. Recovery comes with the launching of the new major construction, that of Building P in LM III A1. Prosperity is also seen in the impetus of foreign trade and contact, reflected by the pottery imported from the Levantine coast, Cyprus, and Egypt. The southern area now loses the temporary domestic character which marks the earlier LM I-II transitional period.

(43) Room III 2 at Mallia is a good candidate for the term "kitchen". Here reference should be made to another kitchen at Kommos of LM III date, which, however, lacks a built hearth (Room 6, fig. 1). It is the one discussed earlier in connection with an earlier hearth made of a pavement of slabs underlying its upper floor. For a good idea of equipment used in LM III kitchens, see: S. Hood - P. De Jong, BSA 58-59 (1958-59), p. 182-193.

(44) PM II, p. 20.

(45) P. Metaxa-Mufly, loc. cit. (n. 6).


Shifting focus back to the Minoan town at Kommos, one senses that its history may not have run on parallel lines with that of the southern civic area. In the town all major construction was limited to the MM and LM I periods. The hearths/ovens of pi-shape, whatever the exact date of their introduction there, had come to stay till the very last days of habitation, in contrast with the situation in the southern area. Did the local people profit from the recovery of the southern area?

One can only guess what caused the introduction of this type of hearth with its specialized location within certain rooms. Had such fixtures simply been placed on upper floors or roofs in earlier times, one might expect to find at least a few examples on ground floors, where there is occasional evidence of cooking and of the use of fire. If, on the other hand, I am right in supposing a context of decline and impoverishment, the changes would have been to some extent dictated by this condition. If, for instance, cooking was done outdoors and by servants in earlier times and often with the use of portable metal braziers, now possibly rare, then the practical shift in location indoors, and the substitution of braziers by crudely built hearths would make sense. It is also possible that certain services offered earlier by the community, or handled by nearby sites, now broke down, forcing the inhabitants to resort to home-made devices. "Shops" of agricultural and industrial types have been recognized in Minoan sites, including at least one connected with the production of oil at Kommos.\(^{49}\) One type of service once offered in a "shop" might have been the baking of bread and the parching of grain (apparently necessary to facilitate separation from the husks), both requiring an oven, and likely to have been executed on a large scale for the community as a whole, rather than individually.\(^{50}\)

There is an interesting ethnographic parallel for the hypothetical disruption of such a service in the case of the modern village of Pitsidia, near Kommos. There, during and immediately after World War II, the scarcity of grain led to the closing of the village bakery and to the resumption of bread baking at home. A few little ovens still exist today in old, deserted houses, often constructed within a pre-existing fireplace and with a capacity for baking only some 6-10 loaves of bread. The one illustrated here (fig. 17) is c. 60-70 cm. in diameter, and c. 75 cm. tall to where the round vent is, at the top of the conical dome. Next to it can be seen a small pi-shaped hearth (c. 20 cm. wide and 20 cm. tall) with a metal rack for resting cooking pots on top.\(^{51}\)

The problem, however, in applying this interpretation to LM III Kommos and other Minoan sites, is that the public ovens, as far as I know, are yet to be found. Still, they may have existed. In contemporary Egypt there is much information in models and painted representations about the preparation of bread, leavened and unleavened, fried

\(^{49}\) See note 3 above. That this was no ordinary house will be argued in the projected publication. For workshops in Late Minoan settlements, see K. Bragan, in P.J. Ucko (ed.), Man, Settlement and Urbanism (1972), p. 751-759.

\(^{50}\) For the use of the earliest ovens in the world for parching grain, see C. Renfrew, The Emergence of Civilisation (1972), p. 209-210. For the Near East see Aubench, p. 249-250. For a discussion of the milling and baking of bread in Antiquity, see A. Neuburger, The Technical Arts and Sciences of the Ancients (1930), p. 89-100.

\(^{51}\) I would like to thank the following people in Pitsidia for providing this information and showing me some of these ovens: G. Beladakis, our excavation foreman, Sifis Phasoulakis, long time excavation workman, and Mrs. Ph. Spinthakis, whose grandmother's oven is the one seen in the picture.
and baked, and the presence of special shops, sometimes combining granary and bakery.\footnote{See Neurhuger, op. cit., p. 96, fig. 158.} There is also an elaborate miller's shop in the LC IA settlement of Akrotiri at Thera, though no bakery seems to have been located.\footnote{For the Miller's house at Thera: Thera III, p. 13-15.} One other, final possibility for the introduction of pi-shaped hearths in Crete must be considered, namely that it may be an imported custom, or one introduced to the older population by newcomers.

Here one must recognize inherent limitations in the evidence. Hearths display variable shapes and materials even within a single site, with the result that they often look related to similar examples from other sites, even when there are no indications of contact or any other form of interaction between the people who use them.

Particularly strange, for instance, is the resemblance of the pi-shaped hearths to hearths of the same type and to little ovens with conical domes in Neolithic and Chalcolithic levels in the Eastern Mediterranean and even later, as at Late Cypriot Enkomi, where bigger versions of such fixtures were used chiefly for copper smelting.\footnote{A thorough account of hearths/ovens in the Near East up to the middle of the 4th millennium is given in: Aurenche, vol. I, p. 241-256. For Enkomi see P. Dikaios, Enkomi, I-11b (1969 and 1971), passim.} Comparable in scale and perhaps in function in Crete is the possible furnace in Court 90 in the Palace at Phaistos, not far from a series of magazines which seem to have been re-used in LM III.\footnote{Pernier-Banti, Festos 11, p. 215-216, figs. 134, 135 and plan, fig. 285, opp. p. 484.} Pi-shaped hearths and ovens of a similar shape are also known in Greece from Neolithic to Middle Helladic times, like the ovens at Sitagroi, at Myrtos in Crete, at Eutresis and elsewhere.\footnote{Treul, p. 330-335; C. Renfrew, Antiquity 44 (1970), p. 131-134; P. Warren, Mytlos (1972), especially p. 34 and 84; Eutresis, figs. 46 and 47. See also examples at Krise: J. Jannoray and H. van Effenterre, BCH 61 (1937), p. 299-326 and 319-320 in particular.}

Hearths and ovens typically placed indoors are not features encountered on the Greek Mainland in the Late Helladic period, and thus their introduction to Kommos could not be attributed to Mycenaeans from that area.\footnote{More likely would it be a derivation from the East. But despite the long tradition for rectangular hearths, open at the top and often accompanied by ovens there, it is difficult to find examples which could be interpreted as direct antecedents to the Minoan ones.} Two sites provide potentially important information. One is Ugarit/Ras Shamra with its harbour at Minet el-Beida. This harbour town, the excavator believed, developed in the 15th and 14th centuries B.C. upon the arrival of Cypriot and Mycenaean immigrants.\footnote{For Mycenaean hearths see: I. Shear, Mycenaean Domestic Architecture (1968), Bryn Mawr dissertation, passim, and p. 446-447 in particular. She refers to one hearth with upright slabs in the West House at Mycenae, but, in fact, it seems to me that there was some confusion in the description of this item in the publication (N. Verdelis, in J. Chadwick, The Mycenaean Tablets III [1963], p. 13-29 and ff.), for it is unconnected with the real hearth, of a different type, which was the only one with evidence of fire. I have not been able to obtain P. Darcque's dissertation on Mycenaean houses, but he confirmed my impression that there are no Mycenaean pi-shaped hearths, through personal communication.} A house of that period, discovered relatively recently at Ugarit, was full of hearths and ovens, and later houses often had a well and an oven in the court from which the house was normally entered. In one case, remnants of moulds and gold scraps suggested that a goldsmith may have lived there, using the oven also for melting.\footnote{C. F. A. Schaeffer, Syria 16 (1935), p. 141-176 and especially p. 168.}

\footnote{Ibid., p. 169, 109. For the so-called "Maison aux fours" at Ugarit, see J.-C. Courtois, Syria 54 (1974), p. 23-28 and fig. 5.}
Fig. 17. — Modern oven and hearth in Pitsidia, Crete (photo by J. W. Shaw).

Fig. 18. — Hearth/oven and enclosure, Marsa Matruh (courtesy of Dr. D. White).
The other Near Eastern site is a small island at Marsa Matruh on the African coast, between present Libya and Egypt, where the University of Pennsylvania has recently been excavating. D. White, the director, envisions Eastern Mediterranean traders using it as a port of call in the summer months and even settling there seasonally and exchanging products with the local Libyans. Among other items, they could have offered metal objects, some of which were possibly produced locally, as suggested by the discovery of crucibles and metalworking debris. A floor fixture of two adjoining structures, an oven (60 cm. x 70 cm. wide) built of upright flat stones, coated in the interior with clay and suggested to have once had a clay dome, like a "tabun" (here fig. 18), may have been connected with such an activity. The room is also thought to have served as a kitchen, the floor and the compartment next to the "oven" being full of ash. Fragments of metal were found in the vicinity. The pottery that these foreigners brought with them was mainly Cypriot of the 14th-13th centuries B.C., with some Mycenaean, LM III, and two Minoan sherds. The small scale and impromptu production of metal objects bring to mind G. Bass' "tinker"/"merchant" in the ship wrecked off Cape Gelidonya.

Returning to the pi-shaped hearths and possible ovens from Kommos, trademarks of the latest Minoan periods: unless they are indigenous inventions—and they could well be, being rather simple structures—they, and perhaps others like them in Crete, may have been introduced through contact with people coming from the East, from Cyprus and the Syrian coast, not Mainland Mycenaean, but their probable associates involved in the eastern branch of maritime trade in the Mediterranean. Evidence for connections with that area, as well as with Egypt, is by now well attested at Kommos. That the hearths/ovens were put primarily to culinary use is also clear. How much they were also used for industrial purposes and metal working—perhaps the primary use of the hypothetical foreign models—is a question that will have to await a more detailed analysis of the metallurgical evidence at Kommos.

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(60) I would like to express my thanks here for information I received through a number of letters from Drs. D. White, M. McClellan and for being provided with the photograph, here fig. 18. For reports on the excavation see: D. White, *ARCE Newsletter* n. 131 (1985), p. 3-17, and D. White, "1986 Excavations on Bates's Island, Marsah Matruh", *Journal of the American Research Center in Egypt* 23 (1986), p. 51-84, and 26 (1989), p. 87-114.