

A NEW PUMICE ANALYSIS FROM KNOSSOS AND THE END OF LATE MINOAN I A

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The volcanoes of the Aegean Hellenic Arc made pumice available for human use at all times. In Crete, for example, at Neolithic Knossos, in the words of the excavator J.D.Evans, “many small pieces were found throughout all the strata”.¹ Two pieces were used in the Early Bronze Age settlement at Myrtos, Room 57,² c. 2200 BC, and a piece was found in the Early Minoan Tomb II at Lebena.³ An analyzed sample from a Middle Minoan II level at Knossos probably came from the Cape Riva eruption of Thera c. 21,000 BP.⁴ When pieces of pumice or volcanic ash occur in Late Minoan I in contexts in Crete, c. 1580–1425 BC, the finds are of particular interest because they have the potential to correlate the Minoan levels with the great LB I eruption of Thera, which put an end to the brilliant settlement at Akrotiri. The town was destroyed in Late Cycladic I, with hundreds of ceramic vessels exported from or locally made but based on Late Minoan IA Cretan workshops. As far as Crete itself is concerned definitive proof that the eruption occurred in Late Minoan IA, well before the major destruction of Minoan civilization in Late Minoan IB c. 1440/1430 BC, came in 1989 with the discovery of Thera eruption ash in the settlement at Mochlos, accompanied by LM IA vases and stratified below the LM IB destruction level.⁵ This crucial discovery was supported by the evidence of pieces of pumice from LM IA contexts at nearby Pseira⁶ and from LM IB Knossos,⁷ samples at the latter site showing that the eruption has already occurred by the time of the Minoan destruction. The evidence from all three sites was presented at the Thera and the Aegean World III conference in 1989, published in 1990.⁸

There remained the question: at what point in LM IA in Crete did the eruption occur? The event is usually taken to mark the end of LM IA, but there has

remained room for precision on this matter. Was there, for example, any period of LM IA time after the eruption but before the LM IB ceramic period?

In 1997 excavation on the Stratigraphical Museum site at Knossos, directed by the writer for the British School at Athens, revealed a quite substantial deposit of about 140 vases datable to LM IA. This material was presented in 1999 in *Meletemata*, the volume (actually three large volumes) in honour of Malcolm Wiener.⁹ A brief summary is all that is needed here, but incorporating and synthesizing new information. The deposit was found in a very small room or walled space; it formed a layer 0.50 m thick from the paved floor upwards. Together with vase SEX/97/P2423 in the deposit was a piece of pumice. Given the context it was hoped that analysis would show the piece to be a product of the Theran Minoan eruption. It turns out, however, to be probably from the Theran Lower Pumice Series (Unterer Bimsstein), c. 200,000 BP and so somewhat less than helpful for our present chronological purposes.¹⁰ It is simply one of those pre-Minoan eruption pumice pieces picked up and used in Crete, like the Neolithic and Early Minoan pieces referred to above.

Above the 0.50 m thick LM IA vase deposit came a fill or accumulated soil 0.63 m thick, with nine more catalogued vases, again LM IA. At the top of this level was a probable floor marked by two stone slabs, with more LM IA vases. Among these were fragments, identified in 2001, of a Vapheio cup with small running spirals (Fig. 1A, Pl. 1A). This is a very distinctive composition; other examples are known at Knossos, including at least one from another LM IA context (Gypsadhes Well) and all probably products of a single Knossian workshop or even painter.¹¹ A related Vapheio cup, with a single band of relatively

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¹ EVANS 1968, 271

² WARREN 1972, 52, 240

³ ALEXIOU and WARREN 2004, 138, 140.

⁴ WARREN and PUCHELT 1990, 78–79 (sample C). BICHLER, HUBER and WARREN 2006.

⁵ SOLES and DAVARAS 1990.

⁶ BETANCOURT, GOLDBERG, HOPE SIMPSON and VITALIANO 1990.

⁷ WARREN and PUCHELT 1990, especially 79–80 (sample J).

⁸ HARDY and RENFREW (eds.) 1990.

⁹ WARREN 1999.

¹⁰ BICHLER, HUBER and WARREN 2007.

¹¹ WARREN 1999, 899–900 and notes 61–63 for a list.

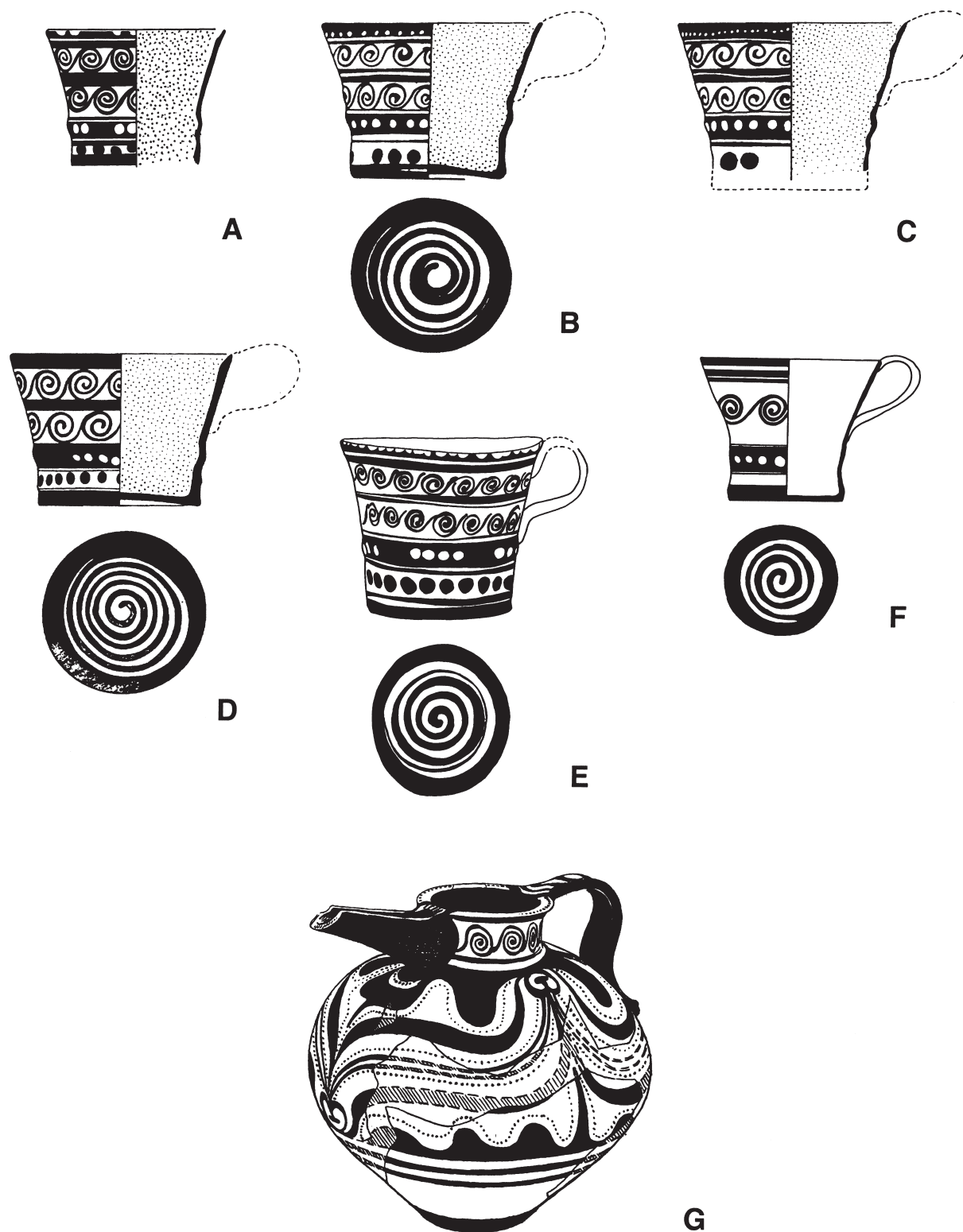


Fig. 1 Late Minoan I A Knossos Small Spirals Workshop Vapheio cups (A–F). A–D: Knossos Stratigraphical Museum Site P2579, P442, P442a, P443. E: Akrotiri West House, Thera Museum 3191 (drawing after photo MARTHARI 1993 pl. 40). F: Ayia Irini; Paleokastro (Cyprus) QUILICI Tomb vase no. 228 (drawing derived from combination of QUILICI 1990, figs. 220–221, 316a no. 228, not checked against original vase). G: Late Helladic II A bridge-spouted jug, Palaikastro (Crete) Block B Room 10 lower level (LM I A) (after BOSANQUET 1902–1903, 285 fig. 5), all scale 1:3



Pl. 1 A Late Minoan I A Knossos Small Spirals Workshop Vapheio cup. Knossos Stratigraphical Museum Site P2579.
 B: Late Helladic I/II A border bridge-spouted jug, Akrotiri West House, Thera Museum 5115 (after MARTHARI 1990, fig. 8)

small spirals, can be classed as Minoan and probably from the same Knossian workshop; it comes from the tomb excavated by L. Quilici at Ayia Irini: Paleokastro, stratum V (the second earliest, including also Proto White Slip and White Slip I) (Fig. 1F).¹²

At exactly the same level as the slabs which probably indicate a floor level, only four metres away to the south-east, was a very clear plaster floor, over which were again fragmentary LM IA vases. In addition to a plant style bowl and a bowl with ripple decoration there were three more Vapheio cups from the Small Spirals Workshop, an excellent link to the piece near the slabs at the same level (Fig. 1B–D).¹³

In terms of the Minoan sequence we thus have here a mature LM IA vase deposit, followed by later LM IA material, followed by even later LM IA vases with the slabs and the plaster floor. What is of special interest is that another Vapheio cup from the Small Spirals Workshop comes from Akrotiri, from the destruction debris of the West House, published by Marisa Marthari (Fig. 1E).¹⁴ On the basis of the Knossian evidence just outlined it is reasonable to conclude (a) that the Small Spirals Workshop producing Vapheio cups is a distinct feature of very late LM IA, (b) that the Akrotiri destruction, which briefly preceded the eruption (as new work at Akrotiri is making clear), can be closely correlated with this very late LM IA in Crete, confirming the views of Betancourt and Soles.¹⁵ It may in turn be speculated that the Stratigraphical Museum deposit and other deposits with Small Spirals Vapheio cups were the result of the same earthquake as that which destroyed Akrotiri shortly before the eruption.

I say very late LM IA because Greek Mainland evidence suggests there might have been a final phase

of LM IA after the eruption. This evidence is the combination of two factors, (a) the presence of a Mainland bridge-spouted jug in the Thera destruction, again from the West House, datable to late LH I or the LH I/LH IIA border (Pl. 1B),¹⁶ and (b) the presence of an LH II A import in an LM IA context at Palaikastro in Crete (Fig. 1G).¹⁷ With the Thera destruction, in Mainland terms, no later than the LH I/LH IIA border, the clearly LH IIA jug at LM IA Palaikastro suggests a little more time for that period, at least in east Crete.

This paper attempts to link more precisely the relative chronology of Minoan Crete to the Thera eruption. For this the new pumice evidence is neutral, the ceramic evidence positive. As for absolute dates, we can state that the LH I/IIA border, and so too the Thera eruption, very late LM IA and Late Cypriote IA:2 (the White Slip I bowl from Akrotiri¹⁸ and the association at Ayia Irini:Paleokastro Quilici tomb stratum V – see above), date to after 1540 BC; this is because there is an Egyptian XVIIIth Dynasty (began 1540 BC) stone vase from Mycenae Shaft Grave IV, LH I (contemporary with Late Cycladic I Thera and largely contemporary with LM IA), and another from Akrotiri itself.¹⁹ The date of the LH I/IIA border, the eruption etc may be set at 1530 BC or very soon afterwards (about the middle of the reign of Ahmose). For the slightly later point of earliest LH IIA and final LM IA (see above) the date is set at about 1520/1510 BC.²⁰ LM IB thus begins at this point. In full sequential accord with this absolute dating is the fact that both LM IB and LH IIA have links with the early XVIIIth Dynasty, down through the first half of the reign of Tuthmosis III (LH IIA) and through most of the reign (LM IB).²¹

¹² QUILICI 1990, 86–87 no. 228, figs. 220–221, 316a no. 228. ERIKSSON 2003, 425–426. I am grateful to KATHRYN ERIKSSON for discussion of this vase and for photocopies from QUILICI'S volume.

¹³ WARREN 1999, 899–900 and pl. CCVII P442, P442a, P443.

¹⁴ MARTHARI 1990, 62 and fig. 4b. MARTHARI 1993, pl. 40 no. 3191. I thank Dr Mariza Marthari for her kind permission to make a drawing, inked by Susan Grice, from her photograph (*ibid.*) and to copy her photograph for Pl. 1B.

¹⁵ BETANCOURT 1985, 133. SOLES, TAYLOR and VITALIANO 1995, 391.

¹⁶ MARTHARI 1990, 64 and fig. 8 (Thera Museum 5115). WARREN 1999, 894. The short spout occurs on LH I and LH IIA bridge-spouted jugs (MOUNTJOY 1999, 82 and fig. 10 Argolid 11 (LH I), 90 and fig. 13 Argolid 38 and 40 (LH IIA)),

suggesting that the canonical longer spout of LH II A bridge-spouted jars may not yet have evolved. The particular form of dotted cross motif on the Thera jug is paralleled in LH I (MOUNTJOY 1999, 893 and fig. 363 Melos 1).

¹⁷ BOSANQUET 1902–3, 284–287 and fig. 5 (House B Room 10, lower (LM I A) level). Close parallels BLEGEN 1937, 401–402 and pl. V no. 375 (Prosymna Tomb XXV); MOUNTJOY 1999, 872–873 and fig. 350 Kea 25 (Kea VIIb). Compare also KERAMOPOULLOS 1910, 209 and pl. 9, 2 and MOUNTJOY 1999, 651 and fig. 247 Boeotia 13.

¹⁸ MERRILLEES 2001. WIENER 2001.

¹⁹ WARREN 2006, 303–319.

²⁰ See n. 19.

²¹ See n. 19.

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