

NOTE TECNICHE

- A New Early Iron Age Kiln at Kavousi, Crete
(L. PRESTON DAY, W. D. E. COULSON, G. C.
GESELL)

A NEW EARLY IRON AGE KILN AT KAVOUSI, CRETE

In the summer of 1987 excavations were resumed at the Early Iron Age site at Vronda in the Siteia mountains above the modern village of Kavousi in East Crete (Figure 1).¹ Previous excavation of the Kavousi area had been carried out in 1900 by Harriet Boyd,² who uncovered a building and cemetery of the Sub-Minoan period on the ridge of Vronda and a settlement of the Late Geometric-Early Orientalizing Period above Vronda on the precipitous peak of the Kastro, with its nearby cemetery.

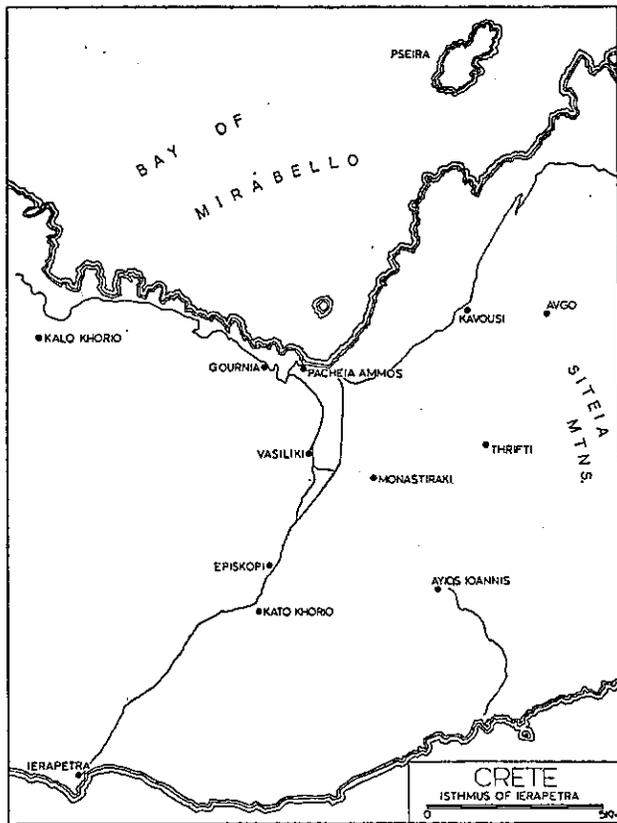


Fig. 1. - Map of Isthmus of Ierapetra, showing location of Kavousi.

Cleaning by the authors in 1981, 1983, and 1984³ indicated more extensive habitation on the summit of the Vronda ridge, beginning in the Late Minoan IIIC Period (Figure 2). Parts of this settlement, par-

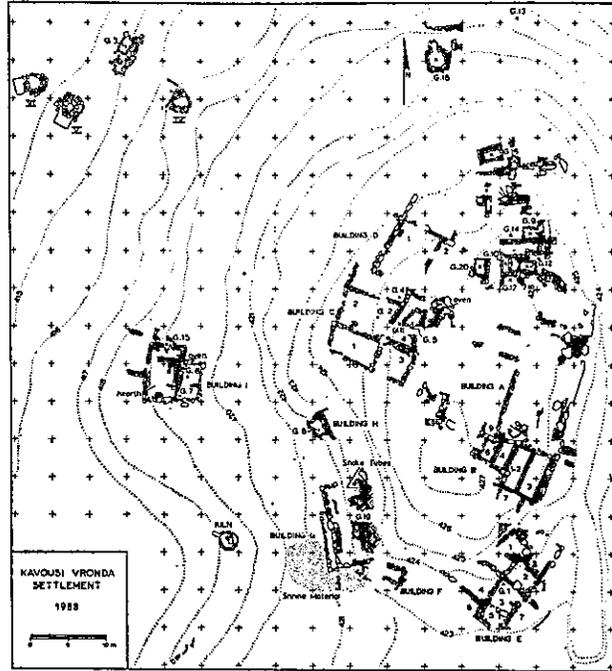


Fig. 2. - Plan of Vronda Settlement, 1988.

ticularly below the summit to the southeast, continued into Early Protogeometric, after which the area was abandoned for habitation. The cemetery of small tholos tombs on the north and west edges of the ridge was used extensively from the Subminoan through the Mature Geometric Periods, and the collapsing buildings of the settlement were later utilized for Late Geometric cremation burials.

Prior to the renewal of excavation at Vronda, a geophysical survey was carried out in 1986 in a large field to the southwest of the settlement to test for underlying structures.⁴ This survey showed a strong anomaly both in the magnetometer and electrical resistivity readings, and suggested that there was a major structure of backed clay in the area. Accordingly, four trenches were opened in the area when excavations began in 1987, and revealed that this structure was a pottery kiln (Figure 3), with the stoking channel, the firechamber, and about one quarter of the firing floor preserved.⁵ Nothing remains of the actual kiln chamber.

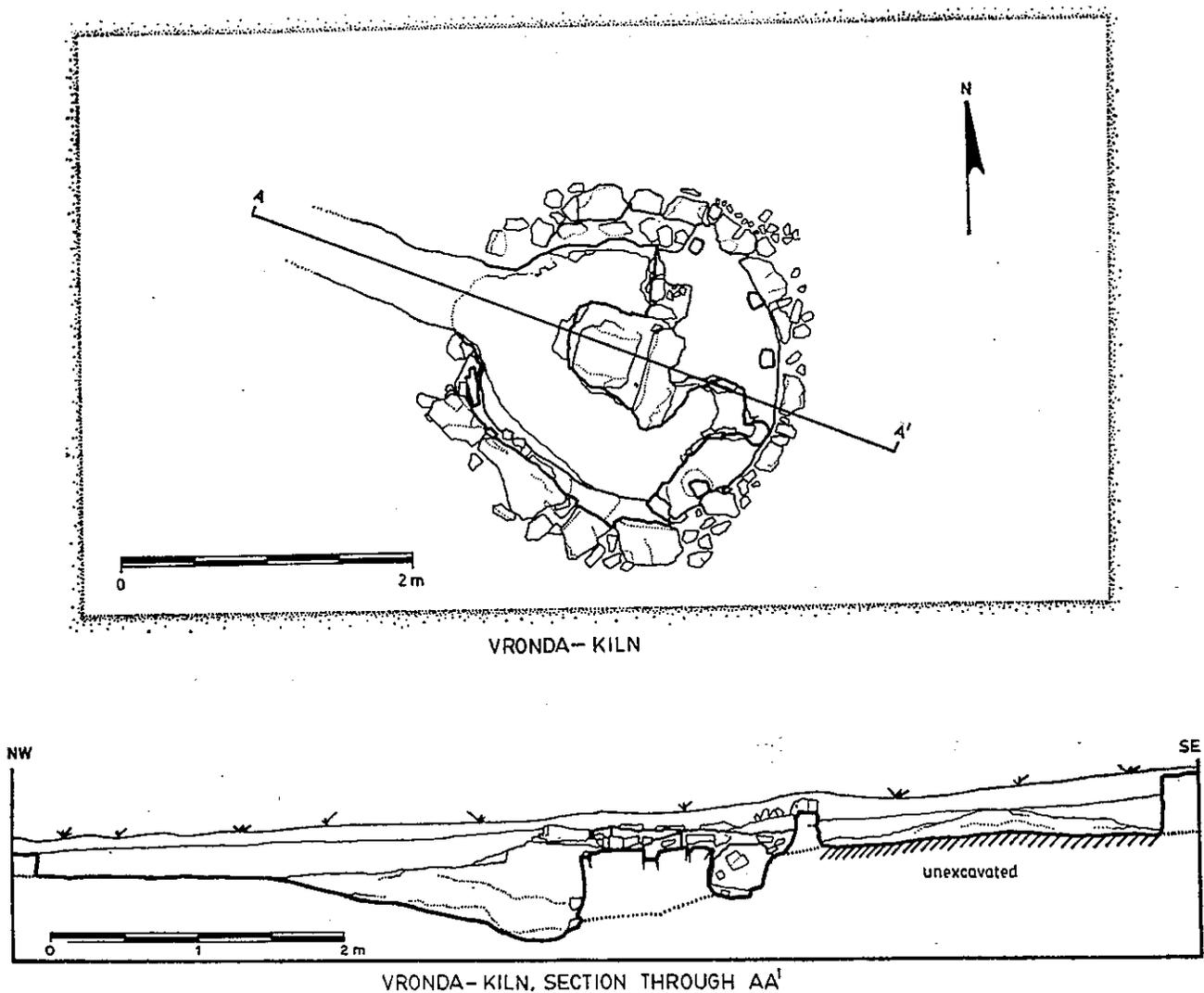


Fig. 3. - Plan and section of Vronda kiln.

The kiln is roughly circular, measuring 2.13 meters E-W and 1.88 meters N-S (Plates 1-2). The firechamber has been cut into the bedrock, while its upper sides are built up of clay and stones and lined with mud,⁶ which has fired into terracotta during the kiln's use. A small (ca. 0.50 m. wide) shelf or ledge of flat stones and clay runs around the interior of the kiln, 0.75 m. above the floor of the firechamber. A rectangular pillar stands in the center of the firechamber. Like the walls of the firechamber itself, the lower part of the pillar is cut out of the bedrock, while the upper courses are built of large, flat stones and clay. The top of the pillar is at the same level as the ledge or shelf around the interior, and together they supported the firechamber above. The firing floor itself rested on an arch of clay which sprang between ledge and

pillar. The spring of the arch is preserved and clearly visible.

Part of the firing floor is still preserved. It is approximately 0.20 m thick and is made of clay and small, flat stones. Large rectangular vent holes (0.12 m x 0.10 m) through the floor allowed the heat to rise into the kiln chamber. Five of these holes are preserved near the wall, and there is room for at least five more around the walls. A second row of holes between the outer row and the central pillar probably existed,⁷ but there is no certain evidence for them. Nothing of the upper structure of the kiln is preserved, but it must have been domed with a central hole at the top, like other updraft kilns (Figure 4). Possibly the dome was removed after each firing.⁸ No evidence for a doorway into the kiln chamber is preserved.⁹

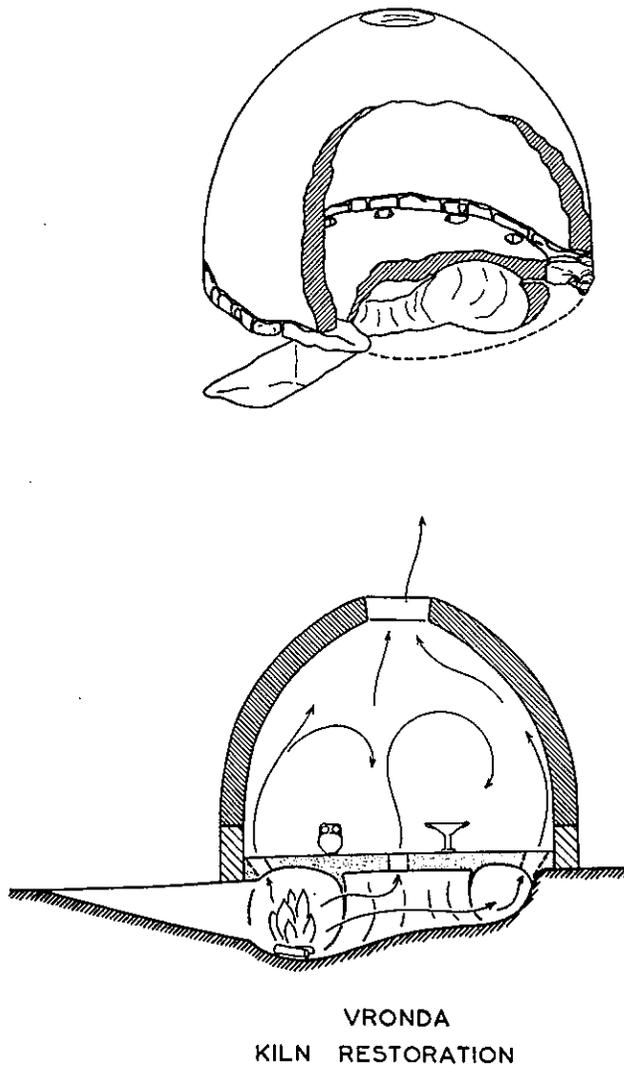


Fig. 4. - Reconstruction of Vronda kiln.

On the west side of the kiln was the entrance to the firechamber or the stoking channel.¹⁰ This was a long (1.30 m.) channel cut into the breccia bedrock and sloping down from west to east into the firechamber. The channel apparently was used only for stoking the fire within the firechamber and never contained the fire itself. The clay lining within the chamber was burned rock hard and where the clay was missing, the limestone bedrock was calcined from the heat of the fire. Traces of burning appeared just inside the entrance, but not in the channel. Thus burning appears to have been confined only to the firechamber itself.

The firechamber was filled with stones and fired clay from the collapsed firing floor and possibly from

the walls of the dome. There was some broken pottery in the debris, most of it coarse and much of it burned gray or warped. There was little fine ware, but some identifiable LM IIIC sherds help to date of the use of the kiln. No rejects or trial pieces of pottery were found in the area outside the kiln. It is clear that the kiln was used for the firing of pottery and was not involved in metallurgy; no traces of metal or slag were found in the vicinity, and the design suggest pottery manufacture.

Excavation and further magnetometer and electrical resistivity surveys in 1988 indicate that the kiln lies outside the settlement or on the extreme southwest edge of it. No other architectural features were found in the adjoining trenches. There is no evidence for another kiln in the area, and nothing identifiable as a potter's workshop has so far come to light. The kiln is positioned quite close to the building which was identified in 1988 as the shrine (Building G) (Figure 2), and which has produced a large number of fragments of terracotta ritual objects, including statues of goddesses with upraised hands, snake tubes, kalathoi, and plaques. It is possible that the kiln's location was determined because of its use in the making of ritual objects. None of the wasters found in the kiln, however, came from a goddess or ritual vessel, but rather represent simple domestic coarse ware. Building I, a domestic establishment, lies almost as close to the kiln on the north.

Recent publication of Cretan kilns¹¹ makes it possible to place the Kavousi kiln in context. The Vronda kiln is an example of Davaras' Type B, a larger and more sophisticated kiln type with a central pillar to help support the firing floor.¹² Earlier Cretan kilns were smaller and either had no support for the firing floor, as at Achladia and Zou,¹³ or had parallel walls for support, as at Phaistos, Knossos, Zakro, and Stylos.¹⁴ Although perhaps used earlier on the Mainland, the type of kiln with a supporting central pillar does not appear on Crete until late. Prior to the excavation of the Kavousi kiln, the earliest example with the central pillar is the Archaic kiln at Lato.¹⁵ The Vronda kiln represents the earliest example of this type of kiln found to date on Crete.

LESLIE PRESTON DAY

Department of Classics, Wabash College

WILLIAM D.E. COULSON

American School of Classical Studies at Athens

GERALDINE C. GESELL

Department of Classics, University of Tennessee

¹ The excavations at Kavousi are being carried out by the Universities of Tennessee and Minnesota and Wabash College under the auspices of the American School of Classical Studies at Athens, and with the support and assistance of the Greek Archaeological Service. Financial support has been provided by the Institute for Aegean Prehistory, the Lucille and David Packard Foundation, the National Endowment for the Humanities, the National Geographic Society, the sponsoring institutions, and private donors. For a complete report of the work at Kavousi in 1987, see G. GESELL, L.P. DAY, and W.D.E. COULSON, «Excavations at Kavousi, Crete, 1987,» *Hesperia* 57 (1988) pp. 279-301.

² HARRIET A. BOYD, «Excavations at Kavousi, Crete, in 1900,» *AJA*, series 2, 5 (1901) pp. 125-157.

³ G. GESELL, L.P. DAY, and W.D.E. COULSON, «Excavations and Survey at Kavousi, 1978-1981,» *Hesperia* 52 (1983), pp. 389-420; L.P. DAY, W.D.E. COULSON, and G. GESELL, «Kavousi 1983-1984: The Settlement at Vronda,» *Hesperia* 55 (1986) pp. 355-387; G. GESELL, L.P. DAY, and W.D.E. COULSON, «Excavation at Kavousi, Crete, 1987,» *Hesperia* 57 (1988) pp. 279-301.

⁴ The survey was conducted by Professor Stavros Papamirinoupolous of the University of Patras and Professor Grigori Tsokas, then of the University of Thessaloniki. Total intensity geomagnetic measurements were carried out with a proton magnetometer (ELSEC 770). Electrical-resistance mapping was conducted with a Geoscan RM 4. For further information see G. GESELL, L.P. DAY, W.D.E. COULSON, «Excavations at Kavousi, Crete, 1987,» *Hesperia* 57 (1988) pp. 290-293.

⁵ The terminology for the various parts of the kiln is that established by K. DAVARAS, «A Minoan Pottery Kiln at Palaikastro,» *BSA* 75, 1980, [pp. 115-126] p. 125. The lower portion of the kiln which housed the fire will be called the firechamber. The chamber in which the pottery rested during firing will be referred to as the kiln chamber, and the surface in which the pots rested is the firing floor, perforated by vent holes. The channel leading into the firechamber will be called the stoking channel.

⁶ DAVARAS (footnote 5) p. 117, suggests that the builders cut into the bedrock to obtain the highest possible degree of heat during firing.

⁷ The vent holes in kilns such as this one tend to be in two or more rings around the outer margins of the kiln floor, according to Harriet Blitzer (personal communication). The Vronda kiln should have had a second ring to prevent irregular firing.

⁸ Since little has survived of the domes of ancient kilns,

it has been concluded that they were temporary, built for each firing, as is the case with many modern potter's kilns; so P. BETANCOURT, *The History of Minoan Pottery* (Princeton, 1985) p. 119; also DAVARAS (footnote 5 above) pp. 123-124. Like the firing floor, the superstructure of the kiln may have been built of stones and mudbrick; some of the rubble and stone fill found within the fire chamber may represent collapse from the upper part of the kiln. On the other hand, the Achladia kiln had a corbelled stone superstructure. (DAVARAS, footnote 5 above, p. 121), in building technique resembling the tholos tombs.

Certainly the technology of corbelled tombs was known to the inhabitants of Vronda, who were burying their dead in such structures. There is, however, no real evidence for the superstructure at Vronda.

⁹ The entrance to the stoking chamber usually lies opposite the entrance to the kiln chamber in this type of kiln, or at least at a 90 degree angle. So Harriet Blitzer (personal communication).

¹⁰ The opening of the channel on the west is not directed toward the prevailing north winds, and in fact the area in which the kiln is located to the southwest of the settlement is the most protected from the winds. Thus for the Kavousi kiln, as for the kiln at Palaikastro (K. DAVARAS, footnote 5 above, p. 115) the suggestion [PAUL FAURE, *La vie quotidienne en Crete au temps de Minos* (1973) p. 217] that kilns were invariably oriented toward the prevailing winds is not true.

¹¹ K. DAVARAS, *Κεραμεική κάμινος εις Ίστρωνα Ἀνατολικῆς Κρήτης*, *ArchDelt* 28 (1973), pp.110-115; K. DAVARAS, *Μινωικὴ κεραμεικὴ κάμινος εις Στύλον Χανίων*, *ArchEph* 1973, pp. 75-80; DAVARAS, footnote 5 above.

¹² DAVARAS, footnote 5 above, pp. 125-126.

¹³ Achladia: N. PLATON, *PAE* 1952, p. 646, fig. 25; DAVARAS, *ArchEph* 1973, p. 79 A1; DAVARAS, footnote 5 above, pp. 120-121. Zou: N. PLATON, *PAE* 1956 p. 238, fig. 1; DAVARAS, *ArchEph* 1973 p. 79 A2; DAVARAS, footnote 5 above, p. 120.

¹⁴ Phaistos: D. LEVI, *Festòs e la civiltà minoica (Incunabula Graeca* lx, 1976) pp. 318, 327 f., 509; DAVARAS, footnote 5 above, pp. 120-121; D. LEVI and C. LAVIOSA, «Il forno minoico da vasaio di Haghia Triada,» *ASAtene* LVII N.S., XLI (1979) pp. 7-47. Zakro: N. PLATON, *Ergon* 1973, pp. 106f., fig. 100; 1975, pp. 180-81, figs. 179-1809; *PAE* 1973, pp. 150-152; 1975, pp. 345-50, fig. 11, pls. 269-70, suppl. pl. 1b; DAVARAS, footnote 5 above, p. 120. Knossos: HOOD, *JHSArchRepts* for 1957, p. 24; *BCH* lxxxii, 1958, p. 783, fig. 12; DAVARAS, *ArchEph* 1973, p. 79 A4. Stylos: DAVARAS, *ArchEph* 1973, pp. 75-80.

¹⁵ DAVARAS, footnote 5 above, pp. 122, 125.



Plate 1. Vronda. Kiln from northwest.



Plate 2. Vronda Kiln from north.