

EXCAVATIONS AT NICHORIA IN MESSENIA: 1972–1973

(PLATES 17–32)

GENERAL INTRODUCTION

IN a previous issue of this journal¹ we made a preliminary report on the results of the first three campaigns of excavation (1969–1970–1971) by the Minnesota Messenia Expedition (MME) on the Nichoria ridge. The present article is intended as a sequel for the last three campaigns, viz. summer 1972, spring *and* summer 1973. Since 1973 was the final opportunity for large-scale excavation in a 5-year program,² we felt that an extraordinary spring season was needed to fulfill one of our main objectives, i.e. to investigate as fully as time allowed the over-all village layout in major occupation phases (Fig. 1).³

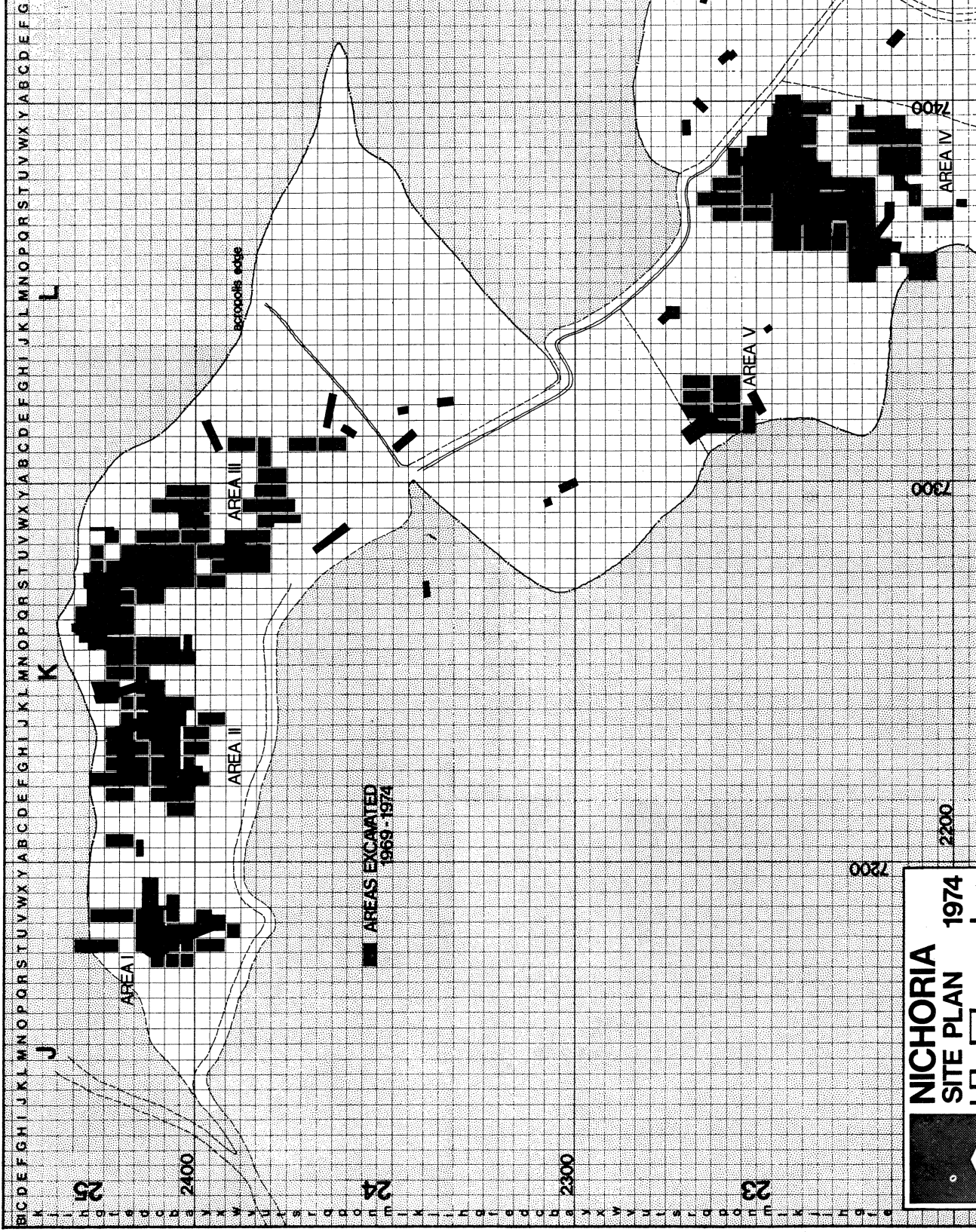
¹ W. A. McDonald, "Excavations at Nichoria in Messenia: 1969–71," *Hesperia*, XLI, 1972, pp. 218–273, pls. 38–52. The information there published on the discovery, topography and regional setting of the site need not be repeated. We owe a special debt to Mr. Bryan Carlson for his skilled and dedicated preparation of the maps and plans in that article and the present one.

² The excavation committee of the American School of Classical Studies at Athens, through which permits for most American excavations in Greece are channeled (subject, of course, to annual review by the Greek Archaeological Service), had made it clear to us from the beginning that we would be expected to yield the permit to another expedition at the end of five years. We take this opportunity to acknowledge the interest and counsel of the committee, most of whose members have visited our operation. In particular, we are deeply grateful to successive directors of the School, Henry S. Robinson and James R. McCredie, for their unwavering support of an enterprise that was in some ways a new departure in Greek archaeology. They and the staff at the School always provided sympathetic and efficient help without which we could not have satisfactorily carried out our own commitment.

We wish likewise to thank the Greek Archaeological Service for the opportunity afforded us to carry on research in a country that has become for many of us a second fatherland. The late Professor Spyridon Marinatos was Director-general of the Service throughout our five-year excavation. Dr. Nicholas Yalouris was ephor for western Peloponnese in 1958–1959 when the site was identified and first tested. In 1968 he and his successor, Mr. Georgios Papathanasopoulos, generously ceded their rights to excavate the inhabited area on the ridgetop. The excavation was carried out under the successive supervision of Mr. Papathanasopoulos, Mrs. Theodora Karageorga-Stathakopoulou, and Miss Styliana Parlama. To each of them and to their staff at Olympia we are deeply indebted for interest, advice, and time-consuming liaison duties.

We must not neglect this opportunity, furthermore, to express our gratitude to many individuals and institutions both in Greece and the United States (especially in Minnesota) for financial and moral support as well as for many favors and acts of good will. We intend to make detailed acknowledgments along these lines in the appropriate volumes of the final publication which is now in preparation.

³ We partially solved the problem of April showers by constructing shelters of plastic stretched tight over a metal frame, on the model of the *thermokipia* used by growers of early vegetables. The same frames covered with strong nylon cloth provide a welcome shade for excavators in mid-summer. But the most serious problem, at least in Messenia in recent years, is the critical shortage of labor in the spring. In fact, both the availability and cost of good local labor is now posing a serious problem for excavators at any season. If this factor forces excavators in Greece to utilize student labor, the problem could eventually work to our advantage in several ways.



The majority of staff and workmen are now veterans of several campaigns,⁴ and this may account in part for the undisputed fact that the later campaigns have

⁴ The general editor of the present article was director of all three campaigns. Professor George Rapp, Jr., MME associate director, was unable to participate in the 1972 season. Staff members are here listed, with their institutional affiliation and speciality in parentheses, followed by the campaign(s) in which each participated.

Stanley Aschenbrenner (University of Minnesota; gravity concentration, trenchmaster) 1972, 1973
 Sarah Bancroft (Princeton University; trenchmaster) 1972
 Duane Bingham (University of Minnesota; photography) 1972, 1973
 Robert Black (Grand Rapids, Michigan High School; photography) 1972, 1973
 Harriett Blitzer (Indiana University; small finds, trenchmaster) 1973
 Kay Caranicas (University of Minnesota; photography) 1972
 Jill Carington-Smith (British School of Archaeology; small finds) 1972
 Bryan Carlson (University of Minnesota; surveying, photogrammetry) 1972, 1973
 Marc Cooper (University of Minnesota; surveying, photogrammetry) 1973
 William Coulson (University of Minnesota; trenchmaster) 1972, 1973
 Oliver Dickinson (Birmingham University, England; pottery) 1972, 1973
 Tania Dickinson (Oxford University, England; trenchmaster) 1972
 Patricia Donovan (St. Paul Academy-Summit School, St. Paul, Minn.; house manager) 1972
 William Donovan (Macalester College, St. Paul, Minn.; trenchmaster) 1972
 Terry Sue Drayman (Institute of Archaeology, University of London, England; conservation) 1972, 1973
 Mary Ann Duncan (University of Washington, Seattle; animal bones) 1973
 Dorothy Fant (St. Paul, Minn.; records) 1973
 Jesse Fant (University of Minnesota; surveying, photogrammetry) 1973
 Lyle Folkestad (University of Minnesota; artist, photogrammetry) 1972
 Robert Gordon (University of Missouri; trenchmaster) 1973
 Steven Haase (Carleton College, Northfield, Minn.; gravity concentration) 1973
 Dietmar Hagel (Queens University, Canada; trenchmaster) 1972, 1973
 Eiler Henrikson (Carleton College, Northfield, Minn.; geologist) 1973
 Richard Hope Simpson (Queens University, Canada; trenchmaster) 1972, 1973
 Molly Howell (Gloucestershire, England; house manager) 1973
 Roger Howell (Birmingham University, England; trenchmaster) 1972, 1973
 Helen Hughes-Brock (Cambridge University, England; small finds) 1973
 Angeline Lieber (Los Angeles, Calif.; pottery) 1973
 Suzanne Martin (University of Minnesota; pottery) 1972, 1973
 Elizabeth McDonald (St. Paul, Minn.; records) 1972, 1973
 Axiope Mourelatou (Greek Archaeological Service; liaison with ephor) 1973
 Marc Norman (Institute of Archaeology, University of London, England; conservation) 1972, 1973
 Garry Peterson (Asst. Coroner, Ramsey County, St. Paul, Minn.; forensic pathologist) 1972
 John Rosser (Boston College, Boston, Mass.; trenchmaster) 1973
 Jennifer Shay (University of Manitoba, Canada; botanist) 1972, 1973
 Thomas Shay (University of Manitoba, Canada; trenchmaster) 1972, 1973
 Cynthia Shelmerdine (Harvard University; pottery) 1972, 1973
 Nicholas Theis (Queens University, Canada; geologist) 1972
 Kyriakos Trigonis (Institute of Archaeology, University of London, England; conservation) 1973
 William Wade (University of Manitoba, Canada; physical anthropology) 1973
 Eunice Whittlesey (New York, N.Y.; aerial photography) 1973
 Julian Whittlesey (Whittlesey Foundation, New York; aerial photography) 1973
 Nancy Wilkie (University of Minnesota; trenchmaster) 1972, 1973
 Donald Wolberg (University of Minnesota; animal bones) 1972

Workmen averaged 45 in summer 1972 and 1973, and 15 in spring 1973. The foreman throughout was Georgios Anastoulis of Miraka (near Olympia).

contributed more than their proportional share to our understanding of the history and importance of the Nichoria site. The latest campaigns, like earlier efforts, failed to uncover any evidence for occupation on the acropolis before Middle Bronze times. Bases of Early Helladic II sauceboats and small bowls, some of which were pierced and presumably used by the Middle Helladic inhabitants as spindle whorls, indicate that an Early Helladic site was then known in the vicinity. The results of MME's regional exploration⁵ suggest, however, that the local Early Helladic site may have been on lower ground and nearer the sea.

From the rather scarce pottery on the surface of the Nichoria ridge we had already inferred that it was occupied in Middle and Late Bronze times.⁶ Excavation and study of the finds is of course refining our understanding of the site's history, both in recognizing sub-periods and calculating demographic changes. For instance, charcoal from a pit belonging to the earliest Middle Helladic phase has yielded a C₁₄ date (uncalibrated) of 2315 B.C. Although a single such sample can of course be in error, this date is not greatly out of line with the direction in which the chronology of earlier Greek prehistoric horizons is moving. Our original belief that the Nichoria ridge might have been occupied continuously through the transition from Late Bronze to Early Iron Age was based almost entirely on the results of chance finds by the local farmers and of salvage operations beginning in 1959 by the Greek Archaeological Service in the cemeteries surrounding Nichoria, and especially to the north and north-west.⁷ We have now identified in Area IV North the focus of the Early Iron Age village, but there is a distinct possibility that habitation on the ridge was interrupted at the very end of the Bronze Age.

Likewise, although scattered medieval finds were known in the environs before 1969 and a few stubs of walls (probably late) could be seen above ground on the ridge itself, surface exploration had produced no guarantee of medieval habitation. Now we have substantial remains of five major buildings scattered over all areas of the ridge and dating from the 5th to the 13th centuries after Christ. Of the long intervening period during Archaic, Classical, Hellenistic and Roman times there is too little evidence on the ridge to justify any assumption of major habitation. Yet from the scattered finds in the excavated areas one could conclude that the ridge served some purpose even

⁵ See *Minnesota Messenia Expedition: Reconstructing a Bronze Age Regional Environment*, edd. William A. McDonald and George Rapp, Jr., University of Minnesota Press, 1973, pp. 131–133. Although this publication treats Nichoria with scarcely more special attention than scores of other prehistoric sites, the index will guide readers to a number of contexts where account is taken of results in the early years of the Nichoria dig.

⁶ Cf. especially McDonald and Rapp, *op. cit.*, pp. 280–281.

⁷ For an account of most of this material, see Angelos Choremis, “Μυκηναϊκοὶ καὶ πρωτογεωμετρικοὶ τάφοι εἰς Καρποφόραν Μεσσηνίας,” *Ἀρχ. Ἐφ.*, 1973, pp. 25–74, pls. A, 7–38. Dr. Choremis includes the very interesting results of his program of excavation in summer 1969 when he acted as liaison between MME and the Olympia ephorate.

then, and that one or more village or town sites existed close by. In the final publication we intend to document fully the evidence from the environs which supports this assumption.

By the time this second preliminary installment of our results appears the final publication should be well under way. Study seasons are planned in 1974 and 1975, and the first volume of a projected four-volume series should be completed in 1975. Our schedule calls for the remaining volumes to appear at approximately annual intervals. In the meantime, however, a summary of the major results in 1972-1973 seemed to be appropriate. Readers should realize that the account in this article is purely provisional. Further study may alter some of the tentative interpretations, and those responsible for various segments of the job need more time both to weigh carefully the conclusions to be drawn from the Nichoria evidence and to take into account relevant material from other sites.

W. A. McDONALD

THE LITTLE CIRCLE (Fig. 2)

In 1972 and 1973, the small circular stone pit or Little Circle adjacent to the tholos tomb (Pl. 17, a) yielded additional secondary burials and further information about the mass burial partially uncovered in 1971. Though the removal and study of the burials and other materials was not completed in 1973, it is clear that there were several burial episodes between the time the circle was constructed at the beginning of Late Helladic II and the building of the tholos tomb in Late Helladic IIIA2 times.

The preserved portion of the circle is 2 meters in diameter with vertical sides up to 1.2 meters high on the east and north. It is built of limestone blocks laid in two to three rows and 11 to 13 courses high. The structure was built into the steep western slope of the acropolis, but there is as yet no conclusive evidence concerning its original roof or entrance configuration. Both its south and west portions were disturbed by later construction. The western arc was dismantled, apparently during excavation for the adjacent tholos tomb whose eastern edge lies directly beneath. On the southern edge of the circle several stones had been removed to accommodate the burial of a young woman. No grave goods were found with this burial although it postdates both the circle and the tholos.

Fill inside the circle and over the burials consisted of a red sandy loam and a layer of limestone tumble. The matrix of the mass burial is a red sandy loam; that of the secondary burials a coarse-to-fine, yellow sand.

Three burial types are recognized. In the western half of the circle the uppermost burials represent at least seven men, women, and children laid carelessly on top of one another (Pl. 17, b). Subsequent compaction of the overlying fill and intermingling of the bones presented an initial impression that some of the individuals might have suffered violence or dismemberment before interment. Further study now shows that

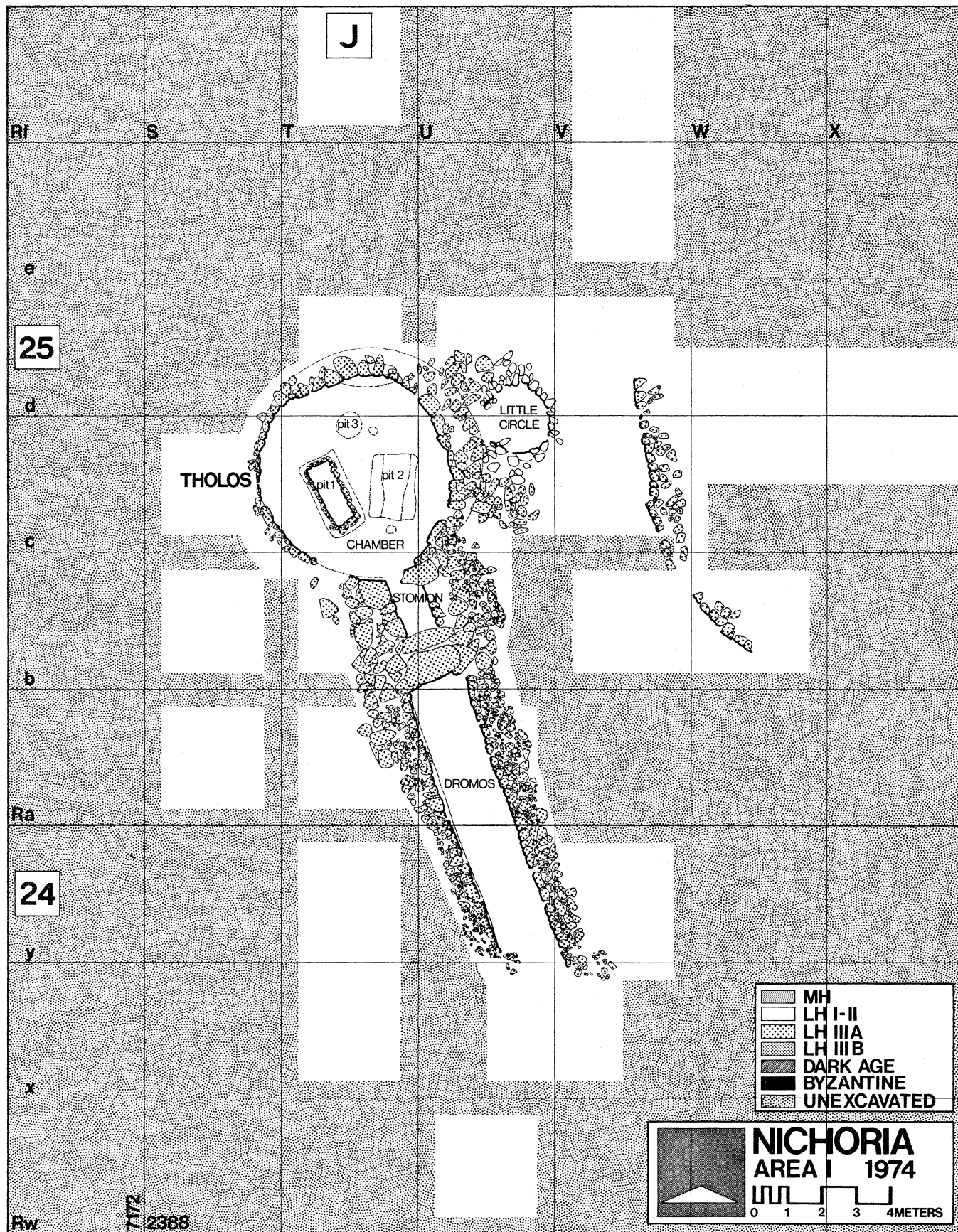


FIG. 2. Area I 1974

most if not all burials were complete when they were deposited. A careful examination of the skulls and other bones by Dr. Garry Peterson, pathologist, and Professor William Wade, physical anthropologist, yielded no evidence of pre-mortem traumata or fractures. Bones at the western edge had been removed during tholos construction.

Directly under the mass burial at the south side of the circle was an extended primary burial of an adult male. The skeleton was complete except for the skull which was presumably removed when the tholos was built. Below this burial in the southern and eastern portions of the circle there was a series of 17 or more secondary burials, mostly men and children, placed singly or in groups. Most had been arranged without discernible order, but in one case a skull had been laid against the lower south wall, with the long bones on either side of it, and the innominata and scapulae at either end. The lowest burials were in a deep pit or cist in the eastern half of the circle, which contained the remains of at least four individuals. At the end of the 1973 season the pit had not been completely excavated. It appeared to extend under the upper mass burials to the west.

The dating of these burials is hampered by the paucity of ceramic and other associations. Ceramics in the upper fill, and doubtless representing wash from higher up the slope, were mostly coarse wares dating from Middle Helladic to Late Helladic II. Associated with the lowest burials, however, there is a complete squat jug (Pls. 17, c; 29, d) and many fragments of a large Vapheio cup and of one or more conical cups, the latest dating to Late Helladic II A.

In summary the tentative sequence of events is as follows: (1) Construction of the circle and its first use as a burial structure can be fixed in early L.H.II times. The 17 or more secondary burials originally may have been primary burials interred in the circle or derived from another burial place. (2) An extended burial was laid over these secondary burials in the southern end of the circle. This may not have been long after the underlying secondary burials or much before the mass burial above. (3) A mass burial involving seven or more individuals was made in the western portion of the circle. At this time several of the underlying secondary burials were apparently disturbed since miscellaneous bones were included in the fill of these burials. (4) During construction of the adjacent tholos tomb in L.H.IIIA2 the extreme western arc of the circle and adjacent burials were removed. It is possible that this activity destroyed a western entrance and short dromos. (5) Several stones on the south side of the circle were removed to deposit an extended burial of a young woman. Further field and laboratory work promise to further clarify the events associated with the construction and use of this unusual burial structure.⁸

C. T. SHAY

⁸ Our Little Circle and its contents seem to have much in common with the interesting burial complex that is being investigated by Dr. Georgios Korres at Koukounara in western Messenia.

THE NICHORIA THOLOS (Fig. 2)

The excavation of the tholos tomb in Area I (Pl. 18, a) at Nichoria was undertaken jointly by the Greek Archaeological Service and the Minnesota Messenia Expedition. In 1972 the excavation of the burial chamber was supervised by Mrs. Theodora Karageorga-Stathakopoulou representing the Z Ephorate and by the writer, with the assistance of Dr. Stanley Aschenbrenner, representing MME.⁹ In 1973 the stomion was cleared by Miss Styliana Parlama of the Z Ephorate and the writer.

The dromos which had been partially cleared in 1971 was fully excavated to its original floor level in 1972, except for a section 1.40 m. long nearest the stomion, which was cleared along with the latter in 1973. The dromos is oriented to the southeast, facing down the Vathirema ravine toward the sea. Walls built of limestone blocks line both sides for its entire length of 8.90 m. The width of the opening between these walls averages 1.75 m. both at floor level and at the top of the walls (Pl. 18, c).

The dromos floor has an anomalous surface since in most places it was cut through the natural *pori* into the looser sand below. The two lining walls rest on ledges of the *pori* and the floor dips down between them. After the tomb was constructed a layer of red sand seems to have been strewn over the floor of the dromos in order to level it. This sand contained many small pieces of pottery, a few limestone chips, and occasional pieces of the lime plaster that evidently was used to prevent water from seeping through the walls. Directly in front of the entrance to the tomb numerous sherds were found both on the floor and in the fill immediately above it. Among them were a few large fragments of kylix stems and bases. The dromos fill consisted of an unstratified, reddish sandy loam which seems to represent an intentional filling after one of the burials. None of the sherds in this fill seem to be later than L.H.IIIA2, a date which is compatible with the material from the tomb itself.

The stomion, which is 3.37 m. deep at floor level, was roofed with huge limestone slabs. Two of these lintel blocks were found in place at the outer (southeast) end, while only a fragment of the innermost lintel block remained. Two additional blocks were probably required to complete the roofing. At the façade the stomion narrows from bottom to top, measuring 1.17 m. wide at the bottom and 1.07 m. wide under the lintel block. On the inside it measures 1.17 m. at the bottom and 1.02 m. at its maximum preserved height (1.33 m. above the floor). Here the upper portion of the west stomion wall had been removed, probably in recent times. On the other hand, the looting happened well before the Hellenistic period and possibly as early as the end of Mycenaean times.

A blocking wall was found at the outer end of the stomion (Pl. 18, d). It was built of double courses of unworked limestone blocks with an earth fill. In the fill were many

⁹ A summary of the work done in 1972 will appear in the *Χρονικά* for 1972 of the *Ἀρχαιολογικὸν Δελτίον*.

fragments of ivory and bronze along with a few sherds. At the widest point of its uppermost course this wall was 0.70 m. thick. Toward the bottom the wall became thicker and the stones in it were larger. An additional foundation course was laid beneath the inner side of the wall. The top of this foundation course was level with the floor of the dromos.

The tomb seems to have been re-entered for the purpose of making another burial at some time after the blocking wall was erected and the dromos filled. The upper meter of the blocking wall was removed at that time and its stones either pushed into the stomion or out directly in front of the entrance. In the tumble on the inside of the stomion was an intact pyxis lying on its side with its mouth against the lowest course of the west stomion wall. This pot can be dated to L.H.IIIB2 and probably belongs to the final burial in the tomb. When the upper part of the blocking wall was rebuilt after the final burial, worked limestone blocks replaced the unworked blocks used in the original wall.

In excavating the stomion, the burial of an adult female was encountered at a depth of about 0.70 m. below the lintel near its north end. She was lying on her back in an east-west direction with her head at the west side of the stomion, her knees up against the east stomion wall, and her lower legs bent back. The cranium and the long bones of the right leg were not in place but were found under the second lintel block. Since no objects were placed with the burial, its date is uncertain. A Roman context would be consistent with the stratigraphy in the stomion since the burial was made after the collapse of the tomb, which probably occurred at some time during or soon after the Hellenistic period.

During the 4th century B.C. and possibly into the later Hellenistic period the tomb was apparently used as a cult center (Pl. 19, a), a practice noted in many tholos and chamber tombs in Messenia during the same period. The Hellenistic level was readily distinguished by its concentrated ash and charcoal content, especially near the center of the tomb where fires seem to have been lit. A preliminary study of the charcoal indicates that oak, ash and possibly plane were represented. Among the animal bones from this level are those of various small mammals, along with teeth, tusks and limb fragments of pig.

Forming a sharp interface with the black Hellenistic level above it was a deposit of sterile, coarse, reddish sand which completely covered the floor. This deposit was thickest on the south side of the tomb where it seems to have washed in through the opening made by robbers in the blocking wall of the stomion.

Among the floor deposits, a concentration of bones of two or more individuals was located in the southwest quadrant of the tomb and directly over Pit 1. The grave goods probably to be associated with this burial included gold rosettes (Pl. 19, c), ivory rosettes (Pl. 20, a), and a pair of bronze tweezers (Pl. 19, b). Scattered over the rest of the floor and in the disturbed pit fill were the remains of a minimum of three other

individuals and some of the grave goods which must have accompanied them. Among these goods were the remains of a bone-handled mirror, another pair of tweezers (Pl. 19, b), fragments from what was no doubt a silver vessel, and a large assortment of bronze fragments, along with numerous bronze and gold-covered rivet heads (Pl. 19, d). There were also gold and blue-glass rosettes (Pl. 20, b), a few beads each of amber (Pl. 20, c), amethyst, carnelian (Pl. 21, a) and glass, dozens of tiny, colored faïence disc beads (Pl. 21, c), gold relief-beads (cockle, volute with bar) (Pl. 20, d), and a dozen unusual rock-crystal beads of ring and beetle shapes (Pl. 21, b). The pottery associated with the floor deposits included a complete kylix, the base of a globular flask, and a small, squat stirrup jar. These pots and the rest of the ceramic material from the floor should date at the end of L.H.IIIA2 and/or the beginning of L.H.IIIB1.

Cut into the natural indurated sand and siltstone which forms the floor of the tomb were four pits. Pit 1 is oriented in a northwest-southeast direction on the west side. Its dimensions are 2.50 m. by 1.18 m. by 1.70 m. deep. Its construction is similar to that of a shaft grave, with lining walls of small limestone blocks on all four sides to a height of 1.05 m. above the bottom of the pit. Resting on these walls, and roofing the lower part of the pit, were four large limestone slabs with many smaller stones covering the cracks between them. Since these slabs and the careful covering of the interstices seemed to be in their original position, and the 0.30 m. of fill at the bottom of the pit beneath them was completely sterile, it appears that the intended burial was never made. And it is surely significant that the robbers did not disturb the pit. The fill material in the upper part of the pit above the slabs contained at least six fragmentary, flat bronze arrowheads (Pl. 21, d; Buchholz' Type V)¹⁰, pieces of lead wire, a long bronze needle and fragments from two pairs of tweezers (Pl. 19, b), and an agate sealstone depicting a griffin.¹¹

On the east side of the tomb is another large cist (Pit 2), oriented in a north-south direction so that its south end approaches that of Pit 1 in front of the stomion. This second pit is 2 m. by 1.35 m. by 1.90 m. deep. Its lower 1.10 m. had once been roofed with limestone slabs, two of which were found in approximately their original positions. To support the covering slabs, ledges 0.30 m. wide had been cut from the natural *pori* on its two long sides. Lying on one of the covering slabs near the center of the pit was a large ox bone and the base of a globular flask which should probably be dated L.H.IIIB1. In the fill beneath the covering slabs a few human bone fragments were recovered along with numerous grave goods which include three seals, a few small, segmented faïence beads, beads of carnelian and glass, gold relief-beads in jug and lily shapes (Pl. 20, d), gold-leaf rosettes, an amber bead and fragments from six or more others, and two alabaster fragments, one of them certainly from the rim of a vase.

Between the north ends of Pits 1 and 2 a circular cutting (Pit 3) seems to have

¹⁰ Cf. *Jahrb.*, LXXVII, 1962, Abb. 11a. A bronze Type IX arrowhead was found in the stomion.

¹¹ This and the other seals from the tomb, twelve altogether, will be included by Herr Dr. Ingo Pini in *Corpus der Minoischen und Mykenischen Siegel*, V, Berlin.

escaped the notice of the robbers. It is 0.70 m. in diameter and was crammed with a large deposit of bronze objects (Pl. 18, b). Among these were seven bronze vessels: an amphora, a bowl which hangs from a small curved handle, a large spouted bowl, a jug with a strap handle, two bowls with ridges on their rims and circular depressions in their bases, and a shallow bowl with two heavy handles. Both the spouted bowl and the jug were decorated with a continuous band of linked pairs of spirals. The same spiral design runs down the midrib of a sword which had been bent at a 90-degree angle before it was placed in the pit. Six gold-covered rivets attached the sword to an ivory handle of which only faint traces remained. Likewise, two gold-covered rivets attached the handle to a pommel of *Lapis Lacedaemonius*. The remainder of the objects in the pit consisted of two daggers, two cleavers, a mirror with an ivory handle, and a curved band, also with the spiral design, which may have been attached to an object made of some perishable material such as leather or wood.

Another cutting in the floor of the chamber (Pit 4) is located on the north side and close to the tholos wall. Its dimensions are 1.80 m. by 0.70 m. and only 0.25 m. deep. The remains of four secondary burials, two at either end of the pit, were discovered here. Most of the grave goods were associated with the burials at the east end. Among these were two bronze knife blades, two large, heavy pieces of gold, two gold beads with granulated decoration (Pl. 20, d), a prismatic agate set in a gold mount (Pl. 20, e), and six sealstones. Four of the seals are of agate and are of similar size and workmanship, as though forming a set. Inside the perforation of the gold-mounted prism were remains of thread, apparently single-ply and single-spun, from a plant fiber which is to be analyzed. Also in Pit 4, but without certain associations, were found fragments of a very large, oblate amber bead, perhaps originally as much as 0.05 m. in diameter.

Investigation into the construction techniques revealed that the portion of the tomb below lintel height had been cut into the fine yellow sand that comprises the hill. Below ground level the walls of the tomb chamber are 0.70 m. wide and consist of two courses of stones laid side by side. Many of these blocks had faces worked to coincide both with the curvature of the circle and that of the vault. This is especially noticeable in the uppermost preserved courses and in stones from higher up that had fallen into the chamber. At ground level and above, a thick packing wall was constructed behind the tholos wall. Remains of it can be seen on the east or uphill side of the tomb where the wall attains its maximum preserved height of 3.40 m. Clay and lime plaster were used to waterproof both the walls of the tomb chamber and its packing wall.

The diameter of the tomb is 6.60 m. at floor level. Since its original height would have been almost as much, wooden scaffolding was probably necessary for the construction of the upper portions of the vault.¹ Two small circular holes cut into the floor, one near the stomion and the other in line with it on the north side of the tomb near Pit 3, seem to have been postholes which could have been employed in such scaffolding. Their respective diameters are 0.20 m. and 0.26 m.

AREA III (Fig. 3)

The work in 1969–1971 showed that the best preserved remains are in the northwest sector of Area III, on the upper slopes of the western acropolis, i.e. adjoining Area II. The 1972–1973 campaigns were concentrated in three sectors to the southeast and south of the 1969–1971 trenches (Pl. 22, a). Richard Hope Simpson was again in over-all charge, and Dietmar Hagel supervised digging in the grids eastward from K24 W and K25 W.

Sector 1

The line of the Mycenaean street was explored toward the southeast, in the hope of finding further structures adjoining it, especially on its lower southwest side. The street was found to continue for an additional 20 meters or so, from K25 Ue to Ya. On its northern side remains of a wall (N) are preserved as a foundation course, with a width of about 0.80 m. But the road surface is here poorly preserved, in contrast to that found in grids Sf and Te, and little debris was found overlying it. In K25 Vc a thin retaining wall only about 0.40 m. wide, with one face toward the southwest, was set against the substructure of the street on its lower side. In places two courses of the wall are preserved. It was not found further southeast of grid Vc.

In K25 WXa the badly eroded remains of an L-shaped structure (Unit III-4) set right up against the street were excavated (Pl. 22, c). The northeast limb of the structure (Wall L) is about 0.80 m. wide, and the southwest limb about 0.60 m. Up to four courses are preserved to a height of about 0.60 m. In Wall L two postholes were found, of which the western has a diameter of about 0.12 m. They were 1.30 m. apart. A further 1.30 m. to the northwest a gap in the wall line close to its corner could be caused by a third post, although this is hypothetical. Thus there seems to have been a timber-framed construction above the foundations. The floor belonging to the structure and the deposit overlying the floor are provisionally dated to the Late Helladic IIIB period. The deposit was sealed under compacted debris, consisting of stones and light-brown earth, which presumably came from the ruined walls. Signs of burning (reddened patches and dark gray ash) and about 70 fragments of bronze (including a complete needle and parts of other artifacts) suggest that this was a bronze-working establishment. Scraps and droplets of bronze waste were also found. A brass-like quality was detected in some of the bronze, but this hypothesis awaits laboratory analysis.

Sector 2 (Pl. 22, b)

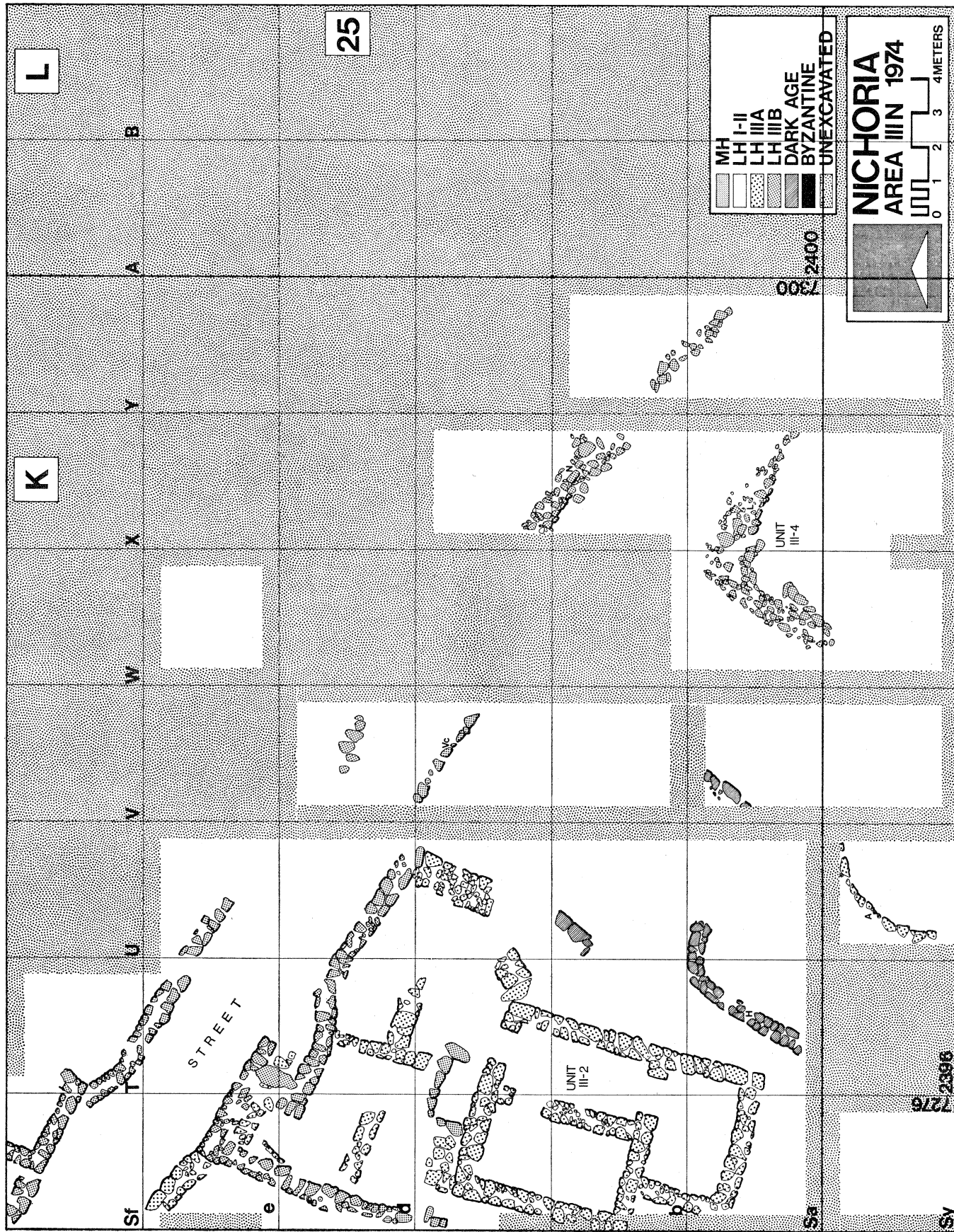
In 1972 a terrace wall was found in K24 Uy, oriented northeast to southwest. We traced it further to the southwest in grid Tw, in the hope of finding Mycenaean structures either retained by or abutting against it. None were found, and it was not until late in the season that we discovered the foundations of an apsidal building (Unit III-3), oriented northeast to southwest, about 6 meters outside the terrace wall and bearing no

relation to it. Only the northwest long wall (B) and the apsidal portion are preserved, together with the stump of a partition wall (D) and six postholes in line with Wall B, at some distance to the northwest of the central axis of the building. The southeast and northeast parts of the building had been entirely robbed out during the Dark Age, and most of the interior also.

The house had been built on top of Middle Helladic and Mycenaean debris, the lower part of which was a rubbish tip. On its northwest side it was terraced back into and onto L.H.IIIA2/B1 loose debris. In order to stabilize the northwest wall (B), it had been necessary to wedge it at the base of the inner side of the apse and buttress it on the outer side of the apse foundations. In the central part, the lower portion of the wall consists of stiff earth of a clay-like consistency. Both the wedges and the stiff earth were put in at the same time as the floor, with which they cohere, and laid straight onto the pre-existing debris. The stonework of Wall B is preserved to a maximum of 0.40 m. at the apse, where the wall is most solid and widest (about 0.65 m., excluding the buttressing). The average height of the preserved stonework elsewhere is 0.30 m., and the width 0.55 m. to 0.60 m. But the northern part of Wall B is at times 0.55 m. to 0.60 m. high, including the height (about 0.30 m.) of the stiff earth substructure. The partition wall D is bonded with Wall B. It is about 0.45 m. wide, but only 0.16 m. high. It is preserved for only a meter from the inner face of Wall B.

The postholes vary in diameter, two being about 0.08 m. (minimum) and the rest 0.03 m. to 0.04 m. They may, together with Wall D, mark a room or sleeping loft at this northwest side, against Wall B. Unfortunately, since they are not on the long axis, they give no evidence as to the manner of roofing (pitched?). The floor, well preserved only along the northwest part of the building, consisted of hard earth, with patches of small stones, pebbles, and small, worn sherds in its substructure. There were thin remains of the original trampled surface and of occupation material on the floor, and this softer and darker earth peeled neatly both from the floor and from the stiff earth which forms the base of the central part of the northwest wall. The top surface of the floor was level with the base of the lowest stone course of the wall or else with the base of the stiff earth. Both the floor and the occupation material on it appear to belong to a late phase of the L.H.IIIB period.

Little of the original debris of the house remains. Most of it, together with most of the walls, had been robbed out in the Dark Age (apparently during Phase IIa), and what was left had been trampled over. This trampled surface was similar to that observed above the debris overlying the Mycenaean street (*Hesperia*, XLI, 1972, p. 247), and consisted of the same soft, brown earth. It is surmised that some of the stones were needed for the contemporary terrace wall found to the southeast (see below). At the end of the Bronze Age and also in Dark Age Phase IIa, a leveling-up process took place, during which the ruins were back-filled with stones and rather sticky, dark brown earth, presumably in order to create fields against one or another of the terrace



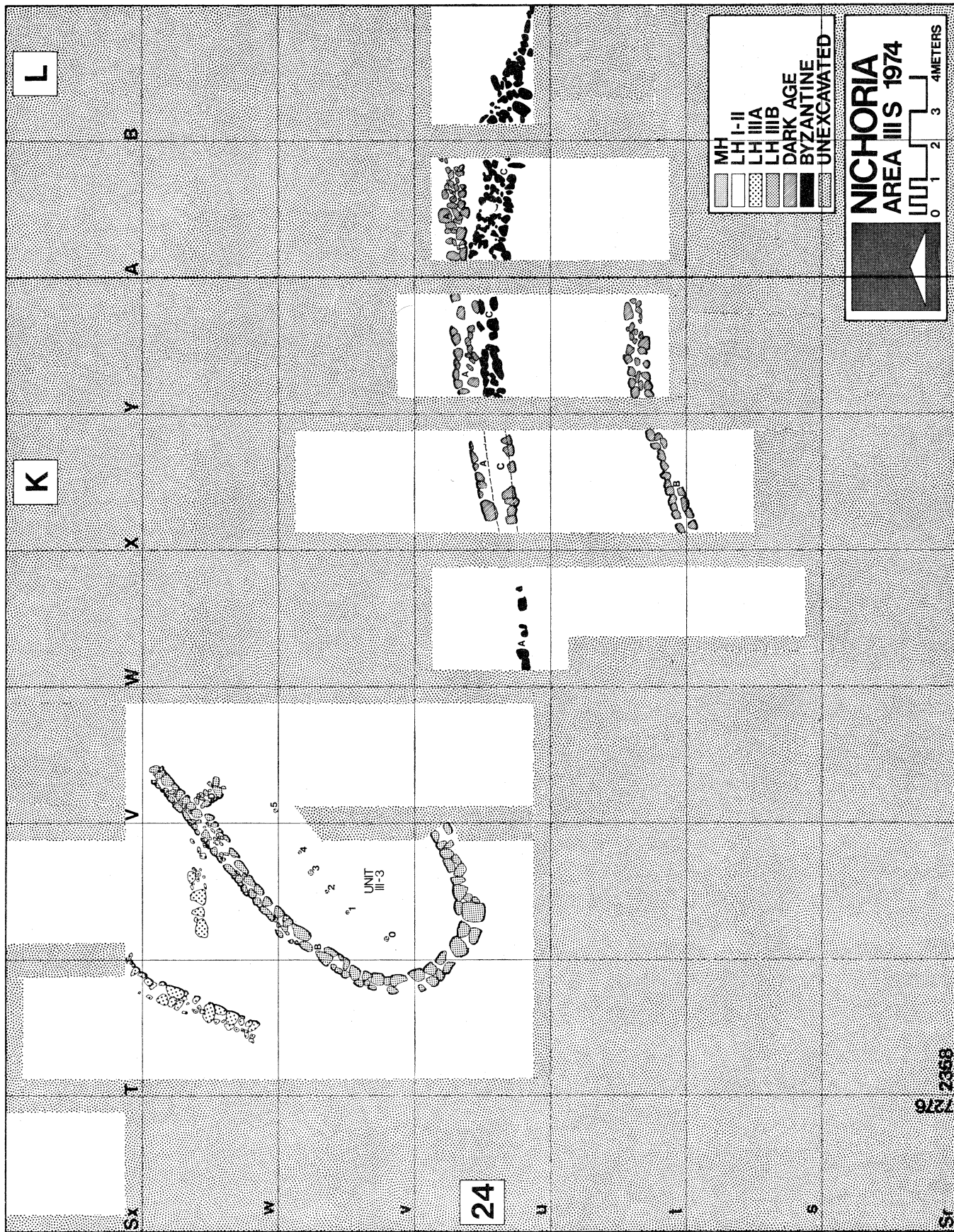


Fig. 3. Area III 1974

walls on the southeast. Finally, during the Byzantine period, a further leveling took place, in which the terraces assumed substantially their modern form.

Sector 3

In 1972–1973 the southern part of Area III was explored, starting with grid K24 Xu, where in 1971 a wide and substantial wall of undetermined date had emerged. Trenches to the east and west showed the continuation of the wall for at least 29 meters. A further wall was discovered to the south of it, running at a slight angle to the northern wall and preserved for at least 8 meters.

The northern wall incorporates two building phases, Wall A and Wall C. Wall C partially overlies Wall A at K24 Xu, arching from there southward in grid Yu, while Wall A continues in an approximately east-west direction. Wall C had been constructed over foundations laid in a basin-like hollow, i.e. a foundation trench. In it large limestone blocks were intermingled with pieces of caprock. Its width varies between 0.80 m. and 1.00 m. Wall C has only a southern face and only two courses are preserved. It was shown to be a Byzantine field wall.

Wall A suffered both from the Byzantine wall building above it and from erosion, especially on the east. Two courses only are preserved in most places. There is little regularity in the size and shape of its stones. The width varies from 0.80 m. to 0.90 m. To determine its date Wall A was entirely removed in grid Xu. The *terminus post quem* was established both by L.H.IIIA2 pottery below the wall and by a mixture of Mycenaean and Dark Age (apparently Phase IIa) pottery within it. In the absence of any floor connected with it, it must be presumed that it was a terrace retaining wall.

Wall B, to the south of Walls A and C, is of less heavy construction. The stones are well dressed and regularly arranged. Only one or two courses remain, each about 0.10 m. thick, laid in two rows. The wall has two faces and varies in thickness from 0.61 m. to 0.66 m. It is also provisionally dated by associated sherds to Dark Age Phase IIa. Although the manner of construction would indicate a house wall, no floor was found.

In 1972–1973 additional exploration was carried out around the Mycenaean house, Unit III-2, excavated in 1971. The courtyard was found to have run over an earlier wall (K25 Tb/Tc Wall C), 0.80 m. to 0.90 m. thick, with two courses, the upper of which is made of large wedge-like blocks, of a total height of 0.30 m. This wall was also overrun by the northeastern corner of Unit III-2. Two superimposed exterior surfaces were found in K25 Ta outside the southeast corner of Unit III-2, which are contemporary with the first (L.H.IIIA2) and second (L.H.IIIB1) floors of the house. A L.H.IIIA2 exterior surface was also found adjoining the terrace wall A in K24 Uy, with a L.H.IIIB surface above it, adjoining and partly covering the terrace wall, which is thus firmly dated to the L.H.IIIA2 period. Other L.H.IIIB exterior surfaces were found in K25 Uabc, K25 Va and K24 Vy, and these are also presumably contemporary

with the latest phase of habitation in Unit III-2 and with Unit III-4. But all indications are that both of these houses are prior to the construction of Unit III-3. The curved wall (H) in K25 Ta is apparently Dark Age. It is 0.50 m. to 0.55 m. wide, consisting of three courses to a maximum height of 0.35 m. Pottery of Dark Age Phase IIa was found in its vicinity.

Summary of Stratigraphy in Area III

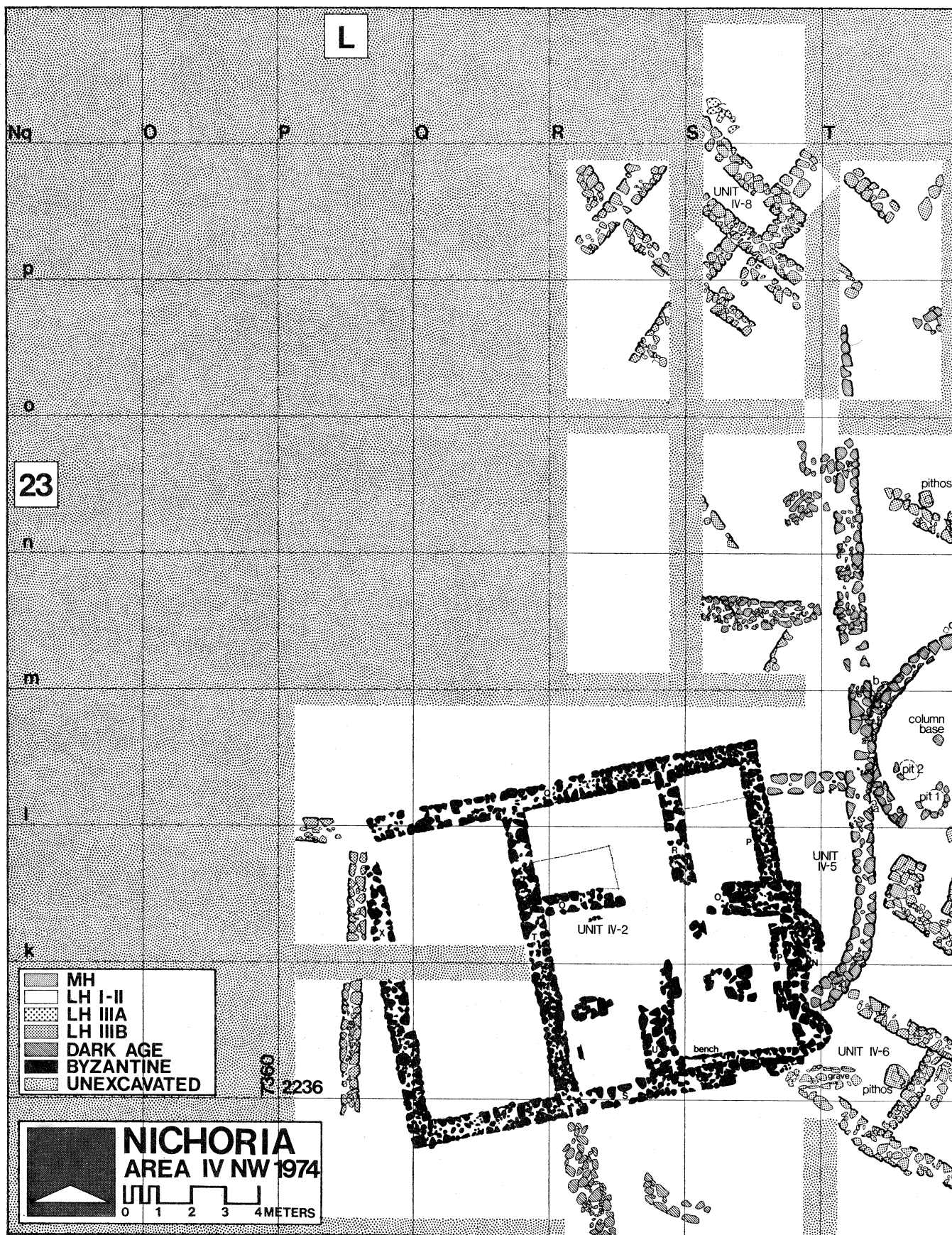
The great rubbish dump of late Middle Helladic to Late Helladic IIIA material, presumably thrown down from the western acropolis, was again explored down to the rock at 3.75 m. below surface in K24 Ux. The test further confirmed that the natural southeast slope of the acropolis had been largely smoothed out before the L.H.IIIA2 construction phase in this area. The Mycenaean street and adjoining buildings presumably continued further to the southeast originally, but in the center of the field they have suffered heavily both from erosion and from Dark Age stone robbers. In K24 Vy and in K25 Vab, for instance, the Mycenaean levels consist only of mixed loose stones and dark brown earth, with no clear trace of the continuation of the L.H.IIIA2 terrace wall (A) found in K24 Uy. It was clear, therefore, that excavation further south of the street would not be worthwhile. Trial trenches on the east side of the field in grids L24 Cpq, Crs, and Cvw everywhere encountered shallow depth and only a few finds of mixed date, since here the caprock rises up sharply toward the east and northeast.

The field seems to have been mainly used for agricultural purposes in the Dark Age, although the higher concentration of Dark Age finds in the northern trenches indicates that there were at least a few buildings then on the north and northwest edges of the ridge, in addition to the little apsidal Unit III-1 discovered in 1970. Indeed, the curved wall (H) in K25 Ta may be part of another Dark Age house, although no floor was found. The back-fill of the Dark Age robber pits was presumably intended to level up the field terraces. This level consists of soft brown earth and stones. Its top surface was in turn partly removed by the succeeding Byzantine cultivators. Levels of Byzantine fill were indeed recognized in most of the 1972 and 1973 trenches. These levels contained very little Byzantine material, however, the finds being mainly heavily worn Mycenaean and Dark Age, together with dark and somewhat sticky manganese-stained earth. The top "plow" level is relatively thin throughout Area III, showing that little change has taken place here since the Byzantine period.

R. HOPE SIMPSON

AREA IV NORTH (Fig. 4)

In Area IV North three buildings were excavated by the writer. Unit IV-1 is a large Dark Age apsidal building, and Units IV-3 and IV-7 are parts of Mycenaean houses.



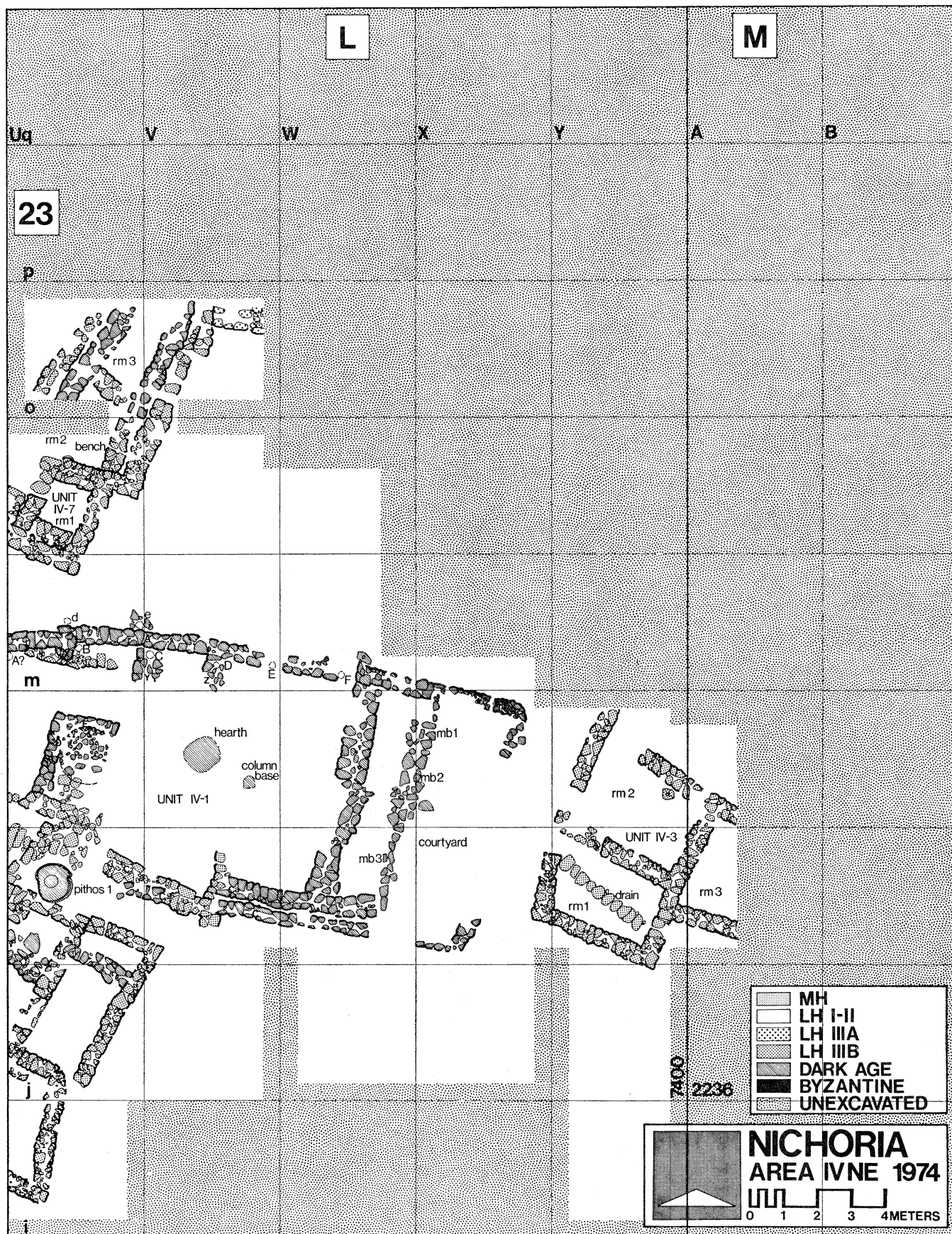


FIG. 4. Area IV N 1974

Unit IV-I (Pl. 23, a)

Unit IV-1 was discovered in 1971,¹² and during the 1972 and 1973 campaigns it was completely excavated and most of the baulks removed. The building itself is spread over five trenches. Running east to west, these trenches are:

L23 Xklm	9 m. NS × 4 m. EW
L23 Wklm	9 m. NS × 3.50 m. EW
L23 Vklm	12 m. NS × 4 m. EW
L23 Uklm	12 m. NS × 4 m. EW
L23 Tkml	12 m. NS × 4 m. EW

Trench Xklm

This trench was opened up to the east of Unit IV-1 to determine what structures, if any, lay in front of the major entrance to the building. Both the north and the south long walls of the apsidal building were found to continue in an easterly direction, forming the boundaries of a small open-air courtyard approximately 7.10 m. north-south by 2.30 m. east-west. The courtyard walls are very poorly built, consisting of quite small stones nowhere exceeding a depth of two courses. The foundations were not designed to bear much weight, perhaps one or two additional courses to delineate the courtyard. The north wall of the courtyard does not bond with Wall A (the north wall of Unit IV-1), and thus it appears that the courtyard was a later addition, perhaps belonging to the phase when the apsidal building was remodeled (see L23 Vklm).

Trench Wklm

In 1971 this area was found to contain the major entrance to the apsidal building. It is formed by a cross-wall (segments 1 and 2) laid at right angles to the major north (A) and south (C and Ca) walls of the building. In the center are the threshold blocks of the doorway itself, which has a total width of 1.36 m. (Pl. 23, e). To the east of this cross-wall there is a poorly constructed wall (X) of only one course of stones running across the entire width of the building. Wall X and the two segments of the cross-wall already described delimit a vestibule. Two large pieces of mud brick were found among the stones of the north section of Wall X, while portions of a third mud brick were found toward the south end. Mud brick 1 (to the N.) was removed and catalogued as N1835, and mud brick 2 was preserved *in situ*. Wall X itself may have served a dual purpose, not only to delineate the front of the building but also to serve as a protective row of stones against water flowing down the slight east-to-west slope.

The vestibule itself had a floor of tightly packed small stones, once no doubt

¹² McDonald, "Excavations at Nichoria," pp. 251–255.

covered with earth, and again designed to serve as a protection against water running down into the building from the east. This also explains to some degree the good preservation of mud bricks 1 and 2, since, as they occur among the stones of Wall X, they would originally have been below the floor level. The three mud bricks probably served some structural function, since they are placed equidistant from one another. For instance, mud bricks 2 and 3 are situated 0.58 m. from the entrance. They do not appear to be strong enough to serve as column bases but may belong to the base for a fence or railing across the front of the building.

In the northern part of the trench the north wall of the apsidal building contained what we presume was a side entrance only 0.68 m. wide. On its west side there is a hole, presumably for a wooden post (posthole E). A post here would have served a dual purpose, not only as a roof support but also as a door jamb for the side entrance.

Trench Vklm

Comprising the central section of Unit IV-1, this trench contained two good floor deposits belonging to successive phases of the south wall of the apsidal building. Wall Ca is the original south wall with which the earlier floor (floor 1) is associated. Most of its face has been robbed out. The level of floor 1 must have risen through time to about the preserved height of Wall Ca and then a second wall (C) was built to the south. Stones from the inner face of Wall Ca were then presumably used in the construction of Wall C. The later floor 2 belongs with Wall C and, indeed, indicates the remodeling of Unit IV-1. Floor 2 is not level and its surface is pock-marked with holes. It is backed up against Wall C and slopes downward to the extent of 0.13 m. toward the center of the building. Its surface consists of hard, dark soil. Bones taken from floor 2 represent an ox and a pig. To floor 2 belong a decorated Dark Age krater segment, an iron spike, a bronze rod, four spindle whorls, and a bronze ring.

Floor 1 also consists of a hard, dark soil but is slightly lighter in color. It also sloped toward the center of the building with a thickness varying from 0.08 m. to 0.20 m. The pottery represents a good Dark Age group, 60% coarse, 40% fine, with the latter containing many skyphos fragments. The finds from this earlier floor include two bronze rings, steatite and clay whorls, and a whetstone. The bones from the floor include goat, sheep, pig, *bovid*, with a fragment of *bovid* horn cone, *canid* and *cervid* fragments, and a high percentage of *astragalus* (used for gaming?). Some of the bones have knife and tooth marks on them. Near the center of the floor was found a pit hearth approximately 1.08 m. in diameter. It was filled with extremely soft, black soil mixed with numerous small carbonized fragments. The bottom slopes sharply to the west, and at its deepest point it is 0.29 m. below the floor.

Trench Vklm also provided evidence for the roofing of Unit IV-1. On the inside of the building at right angles to Wall A there are two buttresses (Y and Z) 1.80 m. apart. At the eastern corner formed by Walls A and Y was a large posthole (C)

approximately 0.35 m. in diameter and 0.18 m. deep. A similar posthole (D), also 0.18 m. deep, was uncovered at the corner of Walls A and Z. In trench Wklm, this line of interior postholes was found to continue with holes E and F, also located 1.80 m. apart. Opposite posthole C on the north side of Wall A was found an exterior posthole (e). The evidence, however, for an exterior row of postholes along the north side of the building is scant and rests solely on e. No postholes on the exterior were found corresponding to D, E, and F.

Unit IV-1 also seems to have had a series of roof supports along its long east-west axis. A little to the east of the pit hearth there is a fairly flat stone which was probably used as a base for a post or column. On the south side of the building potential evidence for roof supports has unfortunately been obliterated by later Dark Age intrusions. Yet directly under Wall C there are fragmentary foundations of a Late Helladic IIIB house, once oriented in the same northwest-southeast direction as Units IV-3, -5, and -7. These foundations could have served as buttresses both on the interior and on the exterior for postholes on the southern side of Unit IV-1.

Trench Ukln

Here the pits for two late Dark Age pithoi were responsible for robbing out a large portion of the western part of the southern wall of Unit IV-1. The larger of the two pithoi was placed right in the line of this wall. Its pit is circular in shape, 1.38 m. in diameter, and consisted of soft, yellow sandy fill. On the inside, the soil at the top was hard and black in color, mixed with stone tumble and pithos fragments. At the bottom, the soil changed to soft and yellow and contained many small mammal bones (see pp. 122-124) and a coarse mug. The second pithos, slightly smaller in size, was situated a little to the northwest of the first. Its pit also consisted of soft, yellow sandy fill, but its interior contained only stone tumble, and body and rim fragments from the pithos itself. Both pithoi appear to be contemporary with the Dark Age re-use of Unit IV-6 and with Unit IV-5.

The center of the trench contains the circular paved structure first uncovered in 1971 (Pl. 23, d). Twenty-one stones from the south side of this circle were removed during the 1973 season in an unsuccessful effort to gain further evidence by probing underneath. The probe, however, did uncover at a depth of 0.51 m. below the circle portions of a L.H.IIIA2/IIIB1 flagstone floor from a paved courtyard in front of the northern entrance to Unit IV-6. The pottery from the fill between the flagstones and the paved circle represents a transition between Late Helladic IIIA and the Dark Age. In the northern part of the trench on the interior of Wall A is a buttress (X) similar to those in trench Vklm and, again, situated at a distance of 1.80 m. from Wall Y. No evidence exists for a posthole in the angle formed by Walls A and X. It may not have been recognized during a trial sounding made to the south of Wall A in 1970. But it is probable that a posthole (B) should be restored here.

Trench Tkln

This trench contains the original floor of the apsidal west end of Unit IV-1 (Pl. 23, c). The floor itself consists of a very hard, yellowish clay. Resting on it we found a coarse terracotta lid and a skyphos. The small finds include fragments of an iron blade, a stone celt, lead weights,¹³ a bronze shield boss(?) (Pl. 22, d), an iron axe blade, and fragments of a clay cooking utensil. The bones include the usual goat, sheep, and *bovid* variety, but *cervid* and *canid* fragments were also found. A charred seed deposit (acorns?) was discovered in the northwest area of the room. We recovered a considerable amount of coarse pottery, including pithos fragments. An unusual piece was a ribbed kylix stem (once coated), which raises the question whether such stems may have continued in use into early Dark Age times. A large number of skyphos fragments were found, but cups seem rare in this floor deposit.

The apse of the building consists of two courses of fairly flat stones, and the floor is level with the lowest course. The floor itself slopes toward the center of the room. Again, some evidence for the roofing was found. A base for a column or post about 0.30 m. in diameter is in place in the center of the room. It is aligned along the main axis with the previously mentioned base in trench Vklm. Two postholes (a and b) were found just outside the wall of the apse at a distance of 1.80 m. north and south of the main axis. Posthole a to the south is the better preserved. It has a diameter of 0.20 m. and is ringed with fairly small packing stones. Posthole b to the north is partly obliterated by the east wall of a later Dark Age apsidal building (Unit IV-5). This structure, oriented north-south, was built directly over the tip of the apse of Unit IV-1 (oriented east-west), thereby indicating that very little time elapsed between the abandonment of one and the construction of the other. At the point where the apse springs on the north side of the building, there should have been at least one post. No interior posthole was found at this point (marked A? in Fig. 4), and the exterior one (c) is extremely uncertain.

A final feature of the floor is the presence of what probably can be identified as two storage pits in the southwest part of the room. The larger of the two (no. 1) has an average diameter of 0.70 m., a depth of 0.53 m., and a row of stones around the outside at the top. The smaller (no. 2) has an average diameter of 0.60 m., a depth of 0.46 m., and is lined with stones at the bottom. The stones originally lining the top of the pit have been robbed out with the exception of three on the west side.

Summary

The apsidal building (Unit IV-1), measuring 13.60 m. in length (excluding the courtyard) and 8 m. in width, is one of the largest of Greek Dark Age apsidal structures.

¹³ Such "conical whorls" may have been used as garment weights. See Sp. Iakovides, *Περατή*, II, Athens, 1969-1970, p. 452.

Its method of construction has already been briefly discussed.¹⁴ Dependable evidence that the building was roofed now comes from the recently discovered postholes and column bases. Six interior wooden supports (A–F) can be restored along the northern wall, and the same number should presumably be placed along the partially robbed-out south side. The holes are spaced 1.80 m. apart, and these vertical wooden columns or posts must have formed the frame for the side walls and outer roof structure. The interior column bases along the central axis must have supported columns designed to carry the weight of the ridge.¹⁵ If exterior supports were also used, as seems to be suggested, then there would be four on each side (indicated by postholes c-g on the north) and two outside the apse (postholes a, b). These would support an extension of the cross-beams outside the building. A wide overhang of the roof would serve to protect the outer walls from rain damage.¹⁶

The paved circle (approximately 1.60 m. in diameter) still remains elusive as far as its function is concerned. Several features, however, point to its importance and may indicate its use. It is located along the central axis of the building and rests on a low podium formed by Walls D and E. On top of the stones of the circle was found a thin layer of carbonized material, and on the floor of the building immediately to the west of Wall D there was a large quantity of animal bones. These features suggest that the circle may have been used as an altar.¹⁷ Yet, if it was an altar, this fact would by no means identify the building as a temple. Indeed, the domestic character of the small finds (e.g. spindle whorls, finger rings, and weapons), the seed deposit, and the large amount of coarse ware found within the building point to its use as a residential dwelling, perhaps a chieftain's house. In such an undoubtedly religious as well as political context, the addition of an altar in its interior might not be unexpected. Unit IV-1 may thus carry on an important Mycenaean tradition of combining sacred and domestic features in the "palace."

Unit IV-3 (Fig. 4, Pl. 23, f)

This structure, lying to the east of Unit IV-1, appears in the following trenches:

L23 Ykl 7.50 m. NS × 4 m. EW

M23 Akl 6.70 m. NS × 2 m. EW

¹⁴ McDonald, "Excavations at Nichoria," p. 254.

¹⁵ Similar construction is suggested for the ninth-century B.C. temple of Hera Akraia at Perachora. See H. Payne, *Perachora*, I, Oxford, 1940, pp. 42–51. Modern sheep huts in Attica and Boeotia are roofed in the same manner.

¹⁶ The Geometric shrine of Apollo Daphnephoros at Eretria has such exterior supports. See C. Bérard, "Architecture érétrienne et mythologie delphique: Le Daphnéphoréion," *Ant.K.*, XIV, 1971, pp. 60, 61; P. Aubersen, "Le reconstitution du Daphnéphoréion d'Erétrie," *Ant.K.*, XVII, 1974, pp. 60–68, pls. 14, 15.

¹⁷ A similar round structure at Miletos has been identified as an altar. See G. Kleiner, *Alt-Milet*, Wiesbaden, 1966, p. 14; Kleiner, *Die Ruinen von Milet*, Berlin, 1968, p. 40. Three round structures (unpublished), sacred in character, have also been found in the excavations on the Barbouna hill at Asine.

These two trenches revealed three rooms of a Mycenaean house oriented in a northwest-southeast direction with an entrance in its northwest side. The two rooms to the northwest have been completely cleared, but the one to the southeast runs into private property. The general stratigraphy of Unit IV-3 is as follows:

Level 1—soft, gray surface soil. Pottery: mixed modern to Byzantine

Level 2—hard, dark black soil. Pottery: Dark Age

Level 3—hard, red sandy soil. Pottery: mainly L.H.IIIB

Level 4—hard, reddish yellow sandy soil. Pottery: L.H.IIIA2–IIIB

Room 1 to the southwest had two distinguishable floors. The original floor (level 4) is level with the bottom course of the walls, thereby indicating that the walls were not trench built. It is L.H.IIIA2–B1 in date. A row of twelve large, flat cover slabs at about floor level and with almost the same orientation as the house presumably covered a drain. A second floor (level 3) is 0.24 m. higher than the original and belongs to a re-use of the house later in the Late Helladic IIIB period. Room 2 to the northeast has been cleared only to its L.H.IIIB floor. Resting on this floor in the northeast corner were found the base and lower portion of a pithos.

Unit IV-7 (Fig. 4, Pl. 23, b)

The excavation was begun in 1970 and continued in 1973. The building occupies parts of the following trenches:

L23 Tmn 7.50 m. NS × 4 m. EW

L23 Umn 7.50 m. NS × 4 m. EW

L23 UVo 3 m. NS × 7 m. EW

This unit comprises at least three rooms of a basement area that once belonged to a Mycenaean house oriented in the same northwest-southeast direction as Units IV-3 and IV-8. As with Unit IV-3, the entrance is located in the northwest side of the building. The two rooms at the southwest contain benches along their southwest and southeast sides respectively, suggesting that their function was mainly for storage. This building appears to be contemporary with the original phase of Unit IV-3, i.e. L.H.IIIA2–B1.

WILLIAM D. E. COULSON

AREA IV NORTHWEST (Fig. 4)

During the 1972 season Area IV was extended to the north and west where a test in 1969 had revealed foundations of the Mycenaean period.¹⁸ Excavation was begun in an area of 254 square meters (trenches L23 Pkl, Qkl, Rj, Rkl, Rop, Rmn, Sj, Skl, Smn, Sop, Sq, Top), extending Area IV into the northeast corner of the newly acquired

¹⁸ McDonald, "Excavations at Nichoria," p. 230, Trench L23–X.

Paraskevopoulos field. Here the modern surface is lower than the contiguous part of Area IV to the east. When excavation began, the two fields were separated not only by different levels but by a field wall made of stones which probably had been taken from ancient foundations. The ground level, when ancient habitation began, sloped even more steeply than at present toward the northeast where the ground dips into a deep ravine opening toward the Karia River valley.

The earliest remains from this area were found in the lowest level of trench Sop, close to the edge of the hill. Pottery of late Middle Helladic times was recovered, with no associated architectural remains. This M.H. deposit may be debris which accumulated at the edge of the settlement.

Of the early Mycenaean period no trace was found in this area. In a gully formed by the run-off of water during the winter rains some stones perhaps marked an attempt at the beginning of Late Helladic III to halt erosion. At any rate, the fill over this rudimentary foundation contained pottery of this period in the lowest level, together with fragments of two animal figurines, a bronze ring, and a small piece of painted wall plaster.

Above, the next stratum contained sherds of late L.H.IIIA1 and L.H.IIIA2 date. There were no architectural remains, and the deposit may be the result of an attempt to clear adjacent areas and to fill the gully at the beginning of Late Helladic IIIB. In addition to pottery, three whorls, parts of two female figurines, and bits of bronze were found.

Two groups of foundations of L.H.IIIB date mark the next period. The one, consisting of two foundations presumably for exterior walls of some structure west of the large Byzantine complex (IV-2), is tentatively dated to this period. The other, Unit IV-8, is a series of foundations further north which were constructed over the fill in the gully. All these constructions lie directly beneath the plow surface and, as a result, have been much disturbed. No complete plan of a building was recovered, but the lines of several walls are clear and, in the northern complex, one room was completely excavated. It measures 1.50 m. northeast-southwest by 2.50 m. For the most part only the lowest course of the foundations is preserved and only one small section of an original floor was found. An examination of these foundations suggests that there had been at least one period of rebuilding or repair during their use.

East of Unit IV-8 additional Late Helladic IIIB material was recovered in trench Top. Here there were no foundations, but tumbled stones and many sherds. It would appear that this deposit resulted from clearing and leveling by subsequent Dark Age inhabitants. Three terracotta whorls, three steatite whorls, a terracotta spool, a whetstone, and a grindstone were found here in addition to the pottery.

Still farther to east and south a large apsidal structure of the Dark Age (Unit IV-5) was partially cleared (see pp. 95-96). Immediately to northeast of Unit IV-5 tumbled stones mixed with sherds, animal bones, and carbonized wood form another dump.

This important deposit is to be dated late in the Dark Age, to judge from the pottery. Two skyphoi and a cup could be restored (Pl. 24, a). In addition to the pottery, two terracotta whorls, a steatite whorl, bits of bronze, two beads, an iron knife blade, a whetstone, a grinder, and a palette were found.

WILLIAM P. DONOVAN

UNIT IV-5 (Fig. 4)

Excavation was carried on in this area in 1973 to determine the nature and extent of a large structure located east of and beneath Unit IV-2. Wall A, a stone socle 0.65 m. wide, had been uncovered by W. Coulson in 1971 during the excavation of Unit IV-1. At that time it was posited that this socle, running north to south, might be a Dark Age terrace wall constructed directly over the apsidal foundations of Unit IV-1. Further excavation revealed that the southern part of Wall A curved into what may have originally been a full apse. Wall A and the area directly adjoining it to the west were then designated Unit IV-5.

In Room 3 of Unit IV-2 a test trench (Rkl) was sunk to determine if any remnants of a possible western wall for Unit IV-5 are extant. Below a mixed layer of Byzantine and Dark Age sherds there was a stratum of yellow soil which contained Dark Age IIA ceramics. No traces of a wall were found.

Another test trench (Sk1) in Room 1 of Unit IV-2 revealed that Wall Y, an east-west partition wall abutting Wall A (see Fig. 4), did not continue into Sk1, but terminated sharply at the east face of Wall P of Unit IV-2. A hard-packed surface of red soil in Sk1 lay over a deposit dated to the Dark Age IIA period. Below this deposit, the corner of a wall foundation was found to rest in soil containing mixed Dark Age I and Mycenaean IIIA2 (late) sherds.

In grids Tmn/Smn and Tl/Sl the uppermost deposits contained mixed Byzantine and Dark Age sherds in scrappy condition. Excavation to the north and south of Wall Y revealed that the hard-packed red surface uncovered in test trench Sk1 was also present throughout this entire area. The soil overlying the red surface contained numerous charcoal fragments and both fine and coarse sherds in great quantity. This presumed living surface was used in connection with Walls A and Y and varied in elevation from +87.810 to +87.740 m., running south to north. The ceramics, dated by Coulson, indicate that Unit IV-5 was in use during the Dark Age IIIa period.

There are many problems yet to be solved. The absence of evidence for a western long wall parallel to Wall A may perhaps indicate that during the construction of Unit IV-2 the area was cleared down to the level of the Dark Age II deposits. Remnants of a wall foundation appearing in Room 5 of Unit IV-2 could possibly be connected with Unit IV-5, but this is uncertain. The northern termination of this structure is equally unclear. In 1972 W. Donovan found a layer of rubble to the west of Wall A in grid Smn, but no wall has been preserved. It is evident, however, that Unit IV-5 was

erected over the foundations of Unit IV-1, and was in use during the Dark Age IIIa period.

HARRIET BLITZER

AREA IV-6 (Fig. 4)

The initial construction of Unit 6 can probably be assigned to the end of Late Helladic IIIA2 when the main room comprising the northwestern portion of the structure was erected (Pl. 24, c). At this time an elaborate entrance was set in its northern wall consisting of two square pillars flanking an opening 0.84 m. wide with postholes at either side. This doorway gave access toward the north to a stone-paved courtyard located in grids Uk and Vk which dates to the initial use of the house (see p. 90).

Somewhat later the original structure was enlarged by the addition of a long narrow room to the south. The eastern wall of this room was terraced back into the natural clay, so that at this end the room was 1.10 m. below ground level. Access may have been through its western wall which has not been exposed due to the later structures which lie above it. Alternatively, the room may have been a basement with access from an upper story, which seems to have been the case at a later time. In any event, no evidence exists for direct communication between this addition and the original structure.

Further alterations were carried out during the Late Helladic IIIB period when the southern room was divided into two. The cross-wall did not contain a doorway and thus isolated the southeastern basement room. A low bench or platform in the northwestern corner of this room has its upper course of stones at the same elevation as the lowest course in the new cross-wall, indicating a higher floor level during this phase of occupation. Additional evidence for the later floor level comes from the southwestern room where large fragments of a pithos rim lay on the upper floor. The body of the pithos was found in its original position, sunk into the floor beside the cross-wall.

The final addition to the structure, also of Late Helladic IIIB date, is represented by the small room which filled out the northeastern portion of the building. A doorway 1.10 m. wide with a paved threshold provided access from the original room to the west. In the latter room, the floor level associated with this L.H.IIB phase of occupation is about 0.20 m. higher than the earlier L.H.IIIA2 floor and at approximately the same level as the threshold blocks. Lying on the later floor in an area adjacent to the doorway and also on the threshold blocks themselves were numerous bronze fragments, including several possible rivet heads.

A rise in occupation level also occurred outside the structure at this time. During the Late Helladic IIIB period the paved courtyard to the north of the building was no longer in use since it has been covered over with a mixture of clay and sand which probably washed down from the slope to the east. Large portions of a L.H.IIB

spouted bowl were found at this later level directly beside the north wall of the structure.

The building seems to have been destroyed by fire during the Late Helladic IIIB period. A large burned area at the west end of the original structure yielded many fine painted sherds of this period including the major portion of a stirrup jar (Pl. 24, b). These appear to have fallen from an upper story since a large amount of stone tumble from the walls lay beneath the area of burning. From among the stone tumble various pieces of mudbrick were recovered, indicating that the upper portions of the walls may have been of this material.

Toward the end of the Geometric period, long after the large apsidal building (Unit 1) had gone out of use, two large pithoi were sunk into the ground (see p. 90). The pits dug for this purpose destroyed part of the southern wall of the apsidal building and also a portion of the northern wall of the earlier Mycenaean structure. At this time portions of the Mycenaean foundations were utilized in a partial rebuilding of the structure. The extent of the resulting Dark Age building is not known since no floor levels associated with this phase of occupation were found. It is certain, however, that the entire north wall of the Geometric structure was built anew at a slight angle to the original Mycenaean wall (see Fig. 4).

In the room at the northeast the new Dark Age wall abutted the re-used eastern wall of the Mycenaean structure. In the northwestern room the Dark Age wall had only a southern face, which was on the same line as the northern side of the doorway between the northeastern and northwestern rooms. The outer portion of this foundation was formed by a thick layer of tumble from the Mycenaean building. This tumble seems to have been leveled to provide a surface for approaching the pithoi in the courtyard to the north. The Dark Age walls are preserved to only a few courses, and it is not known whether they were continued in stone or mudbrick.

NANCY WILKIE

UNIT IV-2 (Fig. 4)

The outlines of all but the southwest corner of this large Byzantine building were established by W. P. Donovan in 1972, and considerable progress was made in clearing several of the rooms comprised in trenches Pkl, Qkl, Rj, Rkl, Sj, and Skl. In 1973 excavation was completed under the direction of John Rosser. Trenches Qij and Pij were opened in the unexplored area of the southwest corner. Further excavation throughout the building established that there had been two major building phases, the first perhaps secular, the second definitely ecclesiastical.

Building phase I-A (Pl. 25, b) was a structure roughly 10 × 10 m. defined on the exterior by Walls Q, R, S, and X. Wall T served as an interior partition, dividing the building into two almost identical rooms. No exterior or interior doorways have been discovered. The walls of carefully laid limestone blocks are uniformly about 0.70 m. wide and survive in one to three courses above the floor levels. The trench-built

foundations go down as much as three to five additional courses. The floors were constructed by leveling debris from the Dark Age phase of habitation.

The medieval remains were generally very close to the modern cultivated surface. There was undisturbed destruction debris only in the western room, where a layer of tiles was overlaid by stone tumble. The layer of tumble was mixed with very dark soil which, when chemically tested for humus, yielded a strong positive result. It thus seems probable that, after the collapse of the roof, vegetation flourished within the walls for a relatively long time before the walls disintegrated. Building phase I-A cannot yet be closely dated. The floor deposits yielded some meager small finds and pottery, in addition to the roof tiles. It is hoped that, when these finds are compared with floor deposits from the medieval buildings in Areas II and VI, the date of this original phase can be more closely determined.

Phase I-B comprised the addition of a room about 2.50×10 m. to the eastern side of phase I-A. Wall Q was extended, Wall P was built, and an entrance was constructed just east of Wall S in the southeast corner of the building. No interior doorway between the old and new parts has yet been discovered, but one may have existed in the southern part of Wall R which is now overlaid by the later chapel. On the floor of this phase I-B addition was found a coarse-ware amphora which had been crushed by the weight of the collapsing roof (Pl. 26, a). Dr. John Hayes of the Royal Ontario Museum dates this amphora to the late 5th-early 6th century (*ca.* A.D. 460-520).

In Phase II-A a double-apsed chapel, about 6.50×9 m., was constructed over the southeast area of the ruined building. The phase I-B entrance was blocked up, and the southern wall of the chapel was constructed upon Wall S. Wall O, considerably robbed, is the northern exterior wall of the chapel. It abuts on the earlier Wall T, which must have been used as at least the foundation for the western exterior wall of the chapel. Wall N, which connects the two apses, was partially constructed on Wall P. Wall U, also considerably robbed, served as a north-south partition wall, thus delimiting a narthex from the sanctuary proper. Inside the sanctuary a low bench about 0.35 m. wide was constructed along Walls O, N, and S. In the narthex, the remnants of a similar bench are visible along Walls O and T. The construction of these phase II-A walls is of much poorer quality than in the earlier building phases in which walls were constructed along straight lines with strong foundations below ground. Wall O, which was used in both phases II-A and II-B, has no foundations below ground. The roof over the sanctuary of the phase II-A chapel had an interior support in the form of either a wooden post on a rubble foundation or a rubble pier. The roof over the phase II-A narthex, however, was probably lower and slanting, without any such support.

At some time in the late 12th or early 13th century after Christ the narthex roof burned, apparently along with all or part of the sanctuary roof. The fragments of pottery and roof tiles as well as a considerable amount of ash from the sanctuary-roof destruction were dumped on top of similar debris in the narthex as a packing for the

new narthex floor. Fragments of several glazed sgraffito bowls, which had perhaps decorated the entrance to the phase II-A chapel, were carefully placed together in this packing for the new narthex floor. The new floor was now about 0.20 m. higher than the cleared floor of the sanctuary. A rubble foundation for a wooden post or perhaps a rubble pier was built over the debris from the fire to support the new narthex roof. This roof, along with that of the sanctuary, was probably gabled with the central ridge running east to west.

Within the sanctuary a similar rubble foundation or pilaster was built onto the bench along Wall U. The phase II-A rubble foundation or pier in the middle of the sanctuary was perhaps strengthened at this time and a rubble table was attached to its western side. No exterior or interior doorway has been found for either phase II-A or II-B. There is some indication, however, that there may have been an interior doorway in the presently robbed-out northern part of Wall U. A late 12th- or early 13th-century date for the phase II-A destruction is derived from the fragments of glazed pottery in the packing of the phase II-B narthex floor. It is not known when the original phase II-A chapel was constructed nor how long the phase II-B chapel was in use. The destruction debris of the phase II-B chapel, however, consisted basically of mixed tile fragments and stone tumble. This is strikingly dissimilar to the neat layers of tile fragments and stone tumble associated with the destruction of the phase I-A and I-B building.

Three burials, two infant and one adult female, were discovered in close proximity to the apses. The infant burials were just to the east of the apses and rather disturbed by the plow. The adult burial lay in a cist grave carefully built of limestone slabs. The cutting for this burial robbed out part of the southeast corner of the chapel, indicating that the burial was made when the chapel was in ruins. No burial goods were associated with the adult burial. Some small glass beads from a necklace were found in one of the infant burials.

J. ROSSER AND W. P. DONOVAN

AREA IV SOUTHEAST (UNIT IV-4) (Fig. 5)

The modern surface in this area slopes downward slightly from northeast to southwest. A trial trench (L23-XI) dug here in 1969 by W. P. Donovan yielded part of a sturdy Late Helladic II wall beneath 1.5 m. of wash fill. During the seasons of 1972 (supervised by Sarah Bancroft) and 1973 a large area was opened south and west of this trial sounding. It revealed an impressive complex of well-preserved wall foundations and rooms from the L.H.II-III A1 period.

Despite its proximity to Byzantine structures and deposits in Area IV Northwest, only a few medieval sherds were recovered, and these were always found in a predominantly Dark Age level. A pure Dark Age stratum occurred everywhere south of the

long line of walls running from northeast to southwest. The depth of the Dark Age deposit increased toward the southeast where it reached a thickness of 0.70 m. This characteristic dark grayish brown earth was rich in sherds, charcoal, and fragmentary animal bones. Although there was sufficient stratification to contribute to the establishment of the Dark Age chronology presented later in this report, the deposit lacked any secure association with structures. In the top-level grid of L23-Xd a single course of flat limestone slabs curved off southeast into the adjoining field. This may possibly represent a segment of a small apsidal building. With no real exception, the earth at the base of the Dark Age level changed to a dark yellow-brown color with more admixture of coarse sand and less charcoal and bone.

In some places the level with relatively pure Mycenaean deposits was simply a continuation of this same yellow-brown earth. But very often this cultural change was also marked by a layer of scattered small, usually rounded pieces of limestone intermixed with occasional larger stones. The high proportion of small stones suggests that this debris had been disturbed by the removal of many larger stones from the original deposit. Such robbing of stones probably occurred in later Mycenaean times. It appears that the construction of buildings ceased in this area after Late Helladic IIIA1, although later Mycenaean structures occur in Area IV North and possibly continued toward the east beyond the limit of our excavations.

The uppermost Mycenaean level is a mixed wash deposit, containing badly worn and eroded sherds from the L.H.II, L.H.IIIA1 and L.H.IIIA2 periods. Beneath this is an essentially pure Late Helladic IIIA1 stratum, associated with relatively well-preserved walls and floors. Deeper yet a third Mycenaean stratum is associated with what appear to be more fragmentary walls. This stratum is dated to the Late Helladic II period, although a few L.H.IIIA1 sherds were also present. Only the surface has been revealed; a deeper sounding, very small in area, yielded remains that date exclusively from the Late Helladic II period. Given the fairly uniform level of the tops of the L.H.II walls, it is possible that during the construction of the L.H.IIIA1 buildings the older remains were intentionally leveled. We have not established whether still earlier cultural deposits underlie those of Late Helladic II.

In 1973 the foundations of a L.H.IIIA1 megaron were uncovered. In addition to this well-preserved rectangular room, contemporary wall segments may comprise the remains of four adjoining rooms (Pl. 25, a). The megaron's interior dimensions are 6.80 by 4.70 m. In the approximate center is a hearth of reddish earth, rising 0.07 m. above floor level. It is roughly circular in shape with a diameter varying from 0.95 to 1.10 m. On either side of it are two rounded limestone column bases with an average diameter of 0.32 m. They are about flush with the preserved floor level, and they lie on the long axis of the room. No other assuredly permanent features were found, although a configuration of stones in the south corner may have formed part of a bench. In the center of the southwest wall a doorway 2.00 m. wide has a smooth threshold of small,

flat stone slabs. A paved area (perhaps a step) on the exterior of the doorway extends for approximately half of its width.

The floor of the megaron apparently consisted of earth only. The floor, threshold, and column bases were level with one another, and the floor itself was generously covered with sherds, all of them flat lying. Diagnostic pieces are dated exclusively to the Late Helladic IIIA1 period. The head and chest portion of a decorated terracotta figurine (Pl. 32, e, N1809) was found lying face down just west of the hearth. A sherd from a krater, decorated with large hook-stemmed spirals, was also found on the floor. Additional fragments of the krater appeared in the adjoining rooms to the southeast (Pl. 26, b).

The megaron wall foundations have an average thickness of 0.54 m., with four to six courses preserved. In all four corners are carefully formed bonds of overlapped large flat slabs, which suggests a single construction phase. There are no signs that these four walls were ever subsequently modified, but other walls were attached to the megaron by butt joints. These added walls serve to delineate, though incompletely, three additional rooms to the southwest, south and southeast. Further excavation is needed to understand more fully the entire complex. In the east room, where the walls are preserved in 11 courses to a height of 0.90 m., the deposit of purely L.H.IIIA1 materials was unusually deep. Over 0.40 m. of this deposit must have reached its present position rapidly, if not all at once, for throughout there were joining fragments of the spiral krater already mentioned.

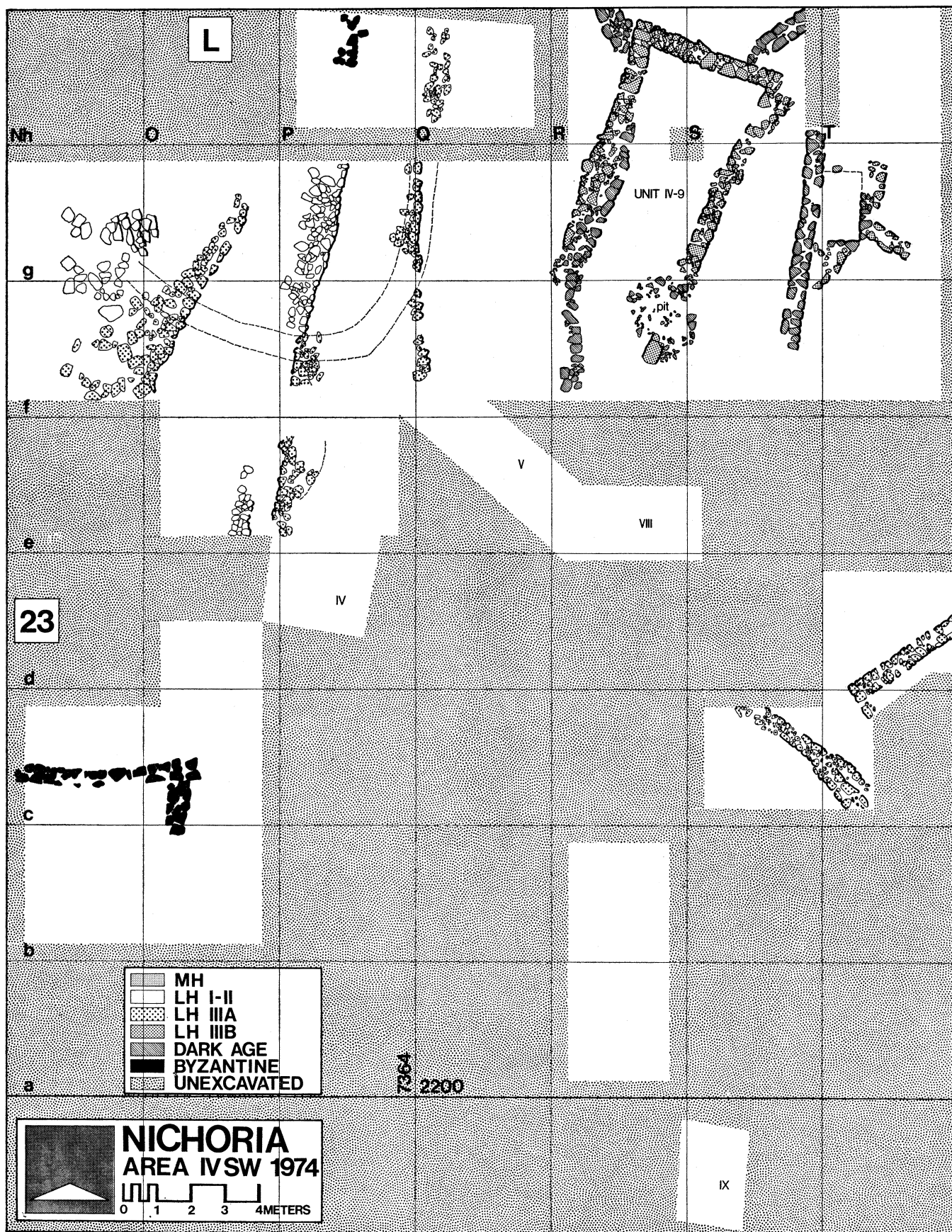
Although the floor plans and our understanding of the pre-megaron structures is far less complete, some preliminary information can be given. The wall that runs parallel to and close by the megaron northeast wall gives evidence of at least three earlier building phases before its southeast return was interrupted to make way for that great room. Even earlier activity is proved by the several segments and tops of deeper walls that seem to have been built in Late Helladic II and leveled off during Late Helladic IIIA1. Figure 5 shows how consistently the same northeast-southwest orientation was maintained.

No construction appeared northwest of the long line of L.H.II walls that can be traced all the way from the northeast corner of the excavated area. On the north side of this wall line culturally sterile earth was reached just under the topsoil. But to the south the deposit becomes increasingly deep and has nowhere been fully penetrated as yet. Furthermore, the complex clearly extends further to south and east into unexcavated land, some of which is privately owned.

STANLEY ASCHENBRENNER

AREA IV SOUTHWEST (Fig. 5)

In 1972 Tania Dickinson continued investigation in the area where in 1970 and 1971 we had located a large Late Helladic II terrace wall running from north to south



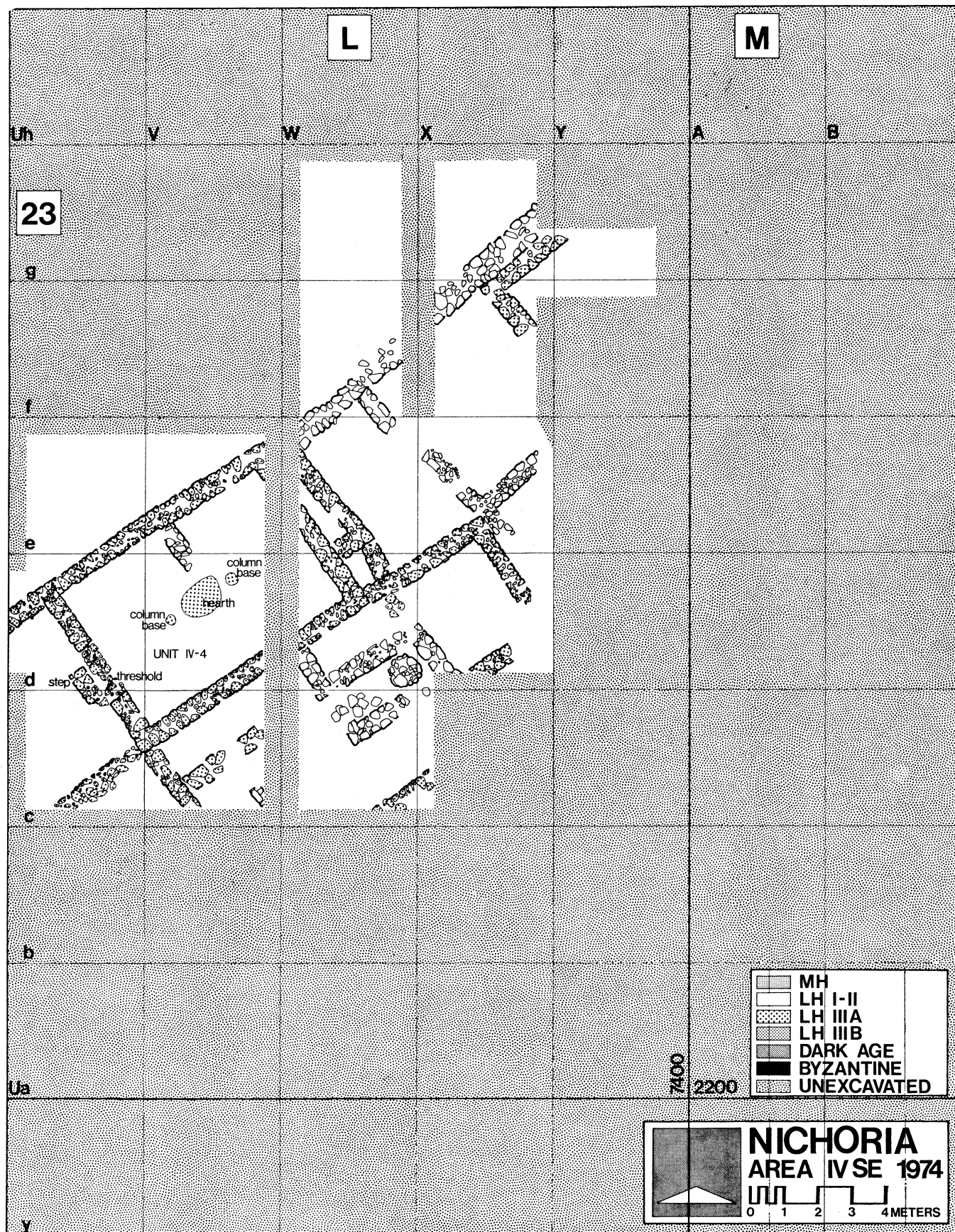


FIG. 5. Area IV S 1974

at the edge of a gully. She removed baulks between previously excavated trenches and opened a large rectantular area L23 NOPQfg, as well as two new trenches OPe and PQh. In 1973 the writer continued the work in NOPQfg and removed baulks in the area QRSTfghi. Also in 1973 Robert Gordon investigated an area NObcd at the point where a north-south gully began to drop steeply into the Vathirema ravine. The results of these investigations can be summarized as follows.

Trench NOPQfg

The curving terrace wall found in 1970 was fully cleared and removed in order to obtain more of the important underlying early Mycenaean deposits (Pl. 25, c). Bed-rock was reached in the area east of Pfg where it was found to slope up steeply on the eastern side of the gully and slightly down to the south toward the ravine. During Late Helladic I times the gully had begun to be filled in with gray ashy soil and some sand containing large quantities of small stones, rather small sherds, and animal bones. Above it a similar deposit contained even more stone and pottery belonging to the Late Helladic IIA period. This level also contained a fair amount of clay building material and many small scraps of bronze, mostly amorphous, though including some recognizable artifacts such as pins and needles. Charcoal flecks were found throughout the level, but especially toward the top which was darker gray in color. Near the top of the level and toward the north end of the trench three pieces of pumice corresponded to several other chunks found in the same level of trench Pfg in 1971.¹⁹ The sturdy terrace wall in Pfg seems to have been bedded into this deposit. The surface was scored by a water runnel indicating that this material may have been partly water deposited.

Above this level the nature of the deposit changes abruptly. Alternating lenses of more or less pure sand and silty clay must be entirely the result of water action. Practically no stones were found, and the scarce sherds seem to be mainly Late Helladic IIB in date. Above this again was a rather mixed layer containing thick bands of reddish clay and sandy lenses. The sherds included a high proportion of Middle Helladic as well as some early Mycenaean and occasionally some early Late Helladic III. There was a greater frequency of Middle Helladic sherds toward the southeast, and it seems that in the early L.H.IIIA period some disturbance—perhaps terracing—took place to the east, cutting into a Middle Helladic level. This could easily have happened, since an early Middle Helladic deposit was found in the 1969 trial trench L23–VIII only a few meters to the southeast.

Further alternating layers of sand and silt followed containing a few sherds of early L.H.IIIA date. Over this was a similar deposit with L.H.IIIA2 material. Two

¹⁹ Rapp, G. *et al.*, "Pumice from Thera (Santorini) identified from a Greek Mainland Archaeological Excavation," *Science*, CLXXIX (2 Feb. 1973), pp. 471–473.

lines of stones running from north to south were found in this level (Fig. 5). The westernmost seems to be a collapsed wall, possibly pushed over by the pressure of soil from the steep slope to the west. It was at least two to three courses high and is better preserved in trench OPe to the south. The second line, roughly parallel and about 3 m. to the east, may have been just a single line of stones and not a real wall. It extends further north and may be a bit later than the western line. At a slightly higher level the above-mentioned curved terrace wall was constructed (Fig. 5, Pl. 25, c). L.H.IIIA2 sherds were found on both sides of the wall as well as in its interstices. Near the top of the terrace wall and above the last of the sand and silt levels there was a mass of stone tumble. Part of the tumble probably came from the wall itself, and the remainder may be from another wall to the east. The material associated with the tumble is of Late Helladic IIIB date. Above were Dark Age levels, most of which had been excavated previously.

To the west of the large area NOPQfg bedrock was reached close to the surface. The whole area was rather disturbed by plowing and pits. A mixture of Middle and Late Helladic, Dark Age, Byzantine and modern sherds was found. A flight of five stone steps led up toward the west and may have been associated with the stub of a much disturbed wall.

A little to the east in the baulk between Ofg and Nfg, the line of another terrace wall found in 1970 in Ofg was further investigated. It seems to have been in use only for a short time at the beginning of the Late Helladic IIIA period. Perhaps it replaced at a point higher up the hill slope the heavy terrace wall of Late Helladic II date in trench Pfg. Its broader southern end lay underneath the western end of the L.H.IIIA2 curving terrace wall. Its northern end, which stops short of the north baulk of the trench, rests on the yellow clay revetment stretching down the hillside to the top of the Late Helladic II terrace wall. Here a fine bronze dress pin (Pl. 27, b) was found. Just over the clay revetment toward the south the remains of a hearth (?) occur, and nearby a piece of copper slag.

Trench OPe

To the south of NOPQfg, this trench was excavated in 1972 by Tania Dickinson. The baulk between OPe and OPf was removed in 1973 by the writer. As might be expected in an area close to the edge of the hill, these levels were generally rather mixed. A confused mass of stone tumble and rubble was found above the top of what may be the continuation of the heavy Late Helladic II terrace wall in Pfg. Here L.H.IIIA2 material was found (Pl. 26, d), together with some rather fine sherds of earlier date (Pl. 26, c). On the east an extension of the ruined L.H.IIIA2 wall of Pfg was found, with more L.H.IIIA2 material over it. To the west a depression filled with dark soil and sherds of L.H.IIIB date may be part of a filled-in water runnel. The stone tumble above seems to have fallen from the northeast, west and south. In the higher

levels Dark Age material occurred among the tumble. A number of scraps of bronze from these levels include a coiled bronze ring or earring (Pl. 27, c).

Trench NObcd

Further south again, on and over the edge of the hill, an irregularly shaped area was examined by Robert Gordon in the spring of 1973. The remains of an east-west wall with a return to the south at its east end may link up with the stub of another east-west wall found further south. These walls seem to be of Byzantine or later date. At the north end of the trench the top of another wall was found. It runs east-northeast-west-southwest and may be of Mycenaean date. We were unable to complete work here that was intended to check whether there are deeply buried remains of an entrance to the acropolis for a road leading up the gully.

Trench PQh

Tania Dickinson in 1972 dug this area down to the top of the stone tumble over the extension of the curved terrace wall of NOPQfg. Late Helladic III B, Dark Age and Byzantine material was found in the upper levels, and on the west the butt end of a north-south wall, possibly of Byzantine date. The remains of two charred beams lay under the wall.

Trench QRSTfghi

The 1973 investigation was limited mainly to the removing of the baulks Qfg/Rfg, Rfg/Rhi, Rhi/Shi, Sfg/Shi, and Rfg/Sfg. A small part of RSfg was also dug. The tops of several walls, some uncovered in previous seasons, were further investigated. They seem to delimit a building (Unit IV-9) of at least one room and possibly others (Fig. 5). The building is oriented along a northeast-southwest axis and stands higher at the north end. In fact, the walls on the south side have not yet been reached. So far only Dark Age levels have been removed, so that the date of the building is not yet clear. But it has the same orientation and general appearance as the L.H.IIIA2-IIIB houses found in Area IV North. Within the north end of the building a layer of rather flat-lying stones has been reached among which the upturned base of a pithos (?) can be seen. The level above this contained Dark Age material with occasional Mycenaean sherds. Toward the south end of the east wall a Dark Age pit had cut into the wall.

The western wall seems to have been built in the Dark Ages. The quality of this work is poor and the wall much disturbed. It resembles a field wall rather than that of a building, and its line is perhaps continued in a very crude, slightly curving wall found among a mass of stone tumble in Rhi (Fig. 5). In a cranny at its south end a fine bronze dress pin with a decorated head was found (Pl. 27, a). The wall may have been rebuilt in the late Classical period. Some large stones were found in a row directly above it, but they are so close to the surface that not much evidence remains (Pl. 25, d).

Among the stones were a few sherds of the Classical period, including the rim and neck of a neck-amphora of possibly fourth-century date (Pl. 26, e).

In the area of the baulks Sfg/Tfg and STfg/SThi a north-south Dark Age wall which had been uncovered in Sfg in 1971 was found to continue toward the north. For the most part only a single row of stones was preserved. Below this on the east, we cleared more of a very small Dark Age room which had been partially uncovered in Tfg. Its walls were of mudbrick laid over a single row of stones. It lies directly over the corner of the L.H.IIIA2-IIIB building discovered in 1971. Another wall of this building was found to extend in a southwest direction, set back slightly westward from the corner (Fig. 5). These walls are possibly to be connected with the tops of those noted above which lie further to the west in RSfgh.

R. J. HOWELL

AREA V (Fig. 6)

In 1972 and 1973 an area in the west corner of the Paraskevopoulos property (purchased in 1972) was investigated and designated Area V. Here four 1969 trial trenches overlooking the Vathirema ravine revealed mainly Middle Helladic deposits with a little Mycenaean admixture. In 1972 six trenches (L23 Dopq, Eop, FGop, Eqr, Fqr, and Gqr) were opened. In 1973 one new trench (DEn) was dug and Dopq was taken down deeper.

The area investigated seems to have been originally part of a natural hollow or gully on the western edge of the hill. After human settlement had been established, the gully had gradually filled with debris through natural wash or deliberate selection as a refuse dump. The excavations exposed bedrock on the southern and eastern edges of this hollow in trenches DEn, FGop and Gqr. It sloped down slightly from east to west in Gqr and FGop, but in DEn it dived steeply at the edge of the ravine. The earliest fill seems to have been a hard, red sandy soil in which were a few scraps of Middle Helladic I sherds. This deposit has so far been found only around the southern and eastern rim of the hollow in Gqr, FGop and DEn. Further north toward the center of the hollow it has not been reached. Above the hard, red soil a small area of softer, red sandy soil was excavated in FGop. Excavation stopped at a point where a patch of red and black burnt clay containing a large piece of copper/bronze slag began to appear. Numerous pieces of vitreous slag were retrieved just above this, and the associated sherds were still of Middle Helladic I date.

Still higher, alternating lenses of gray ashy soil and sand also contained Middle Helladic I sherds. A large pit or bothros had been cut partly through these fill levels and partly through the clay bedrock on the southern rim of the hollow in trench FGop. It is roughly kidney shaped in outline and measures 4.22 m. north-northeast-south-southwest and 2.75 m. west-northwest-east-southeast. Its depth on the southern side is about 1.40 m. The pit may originally have been cut to obtain clay for the floor

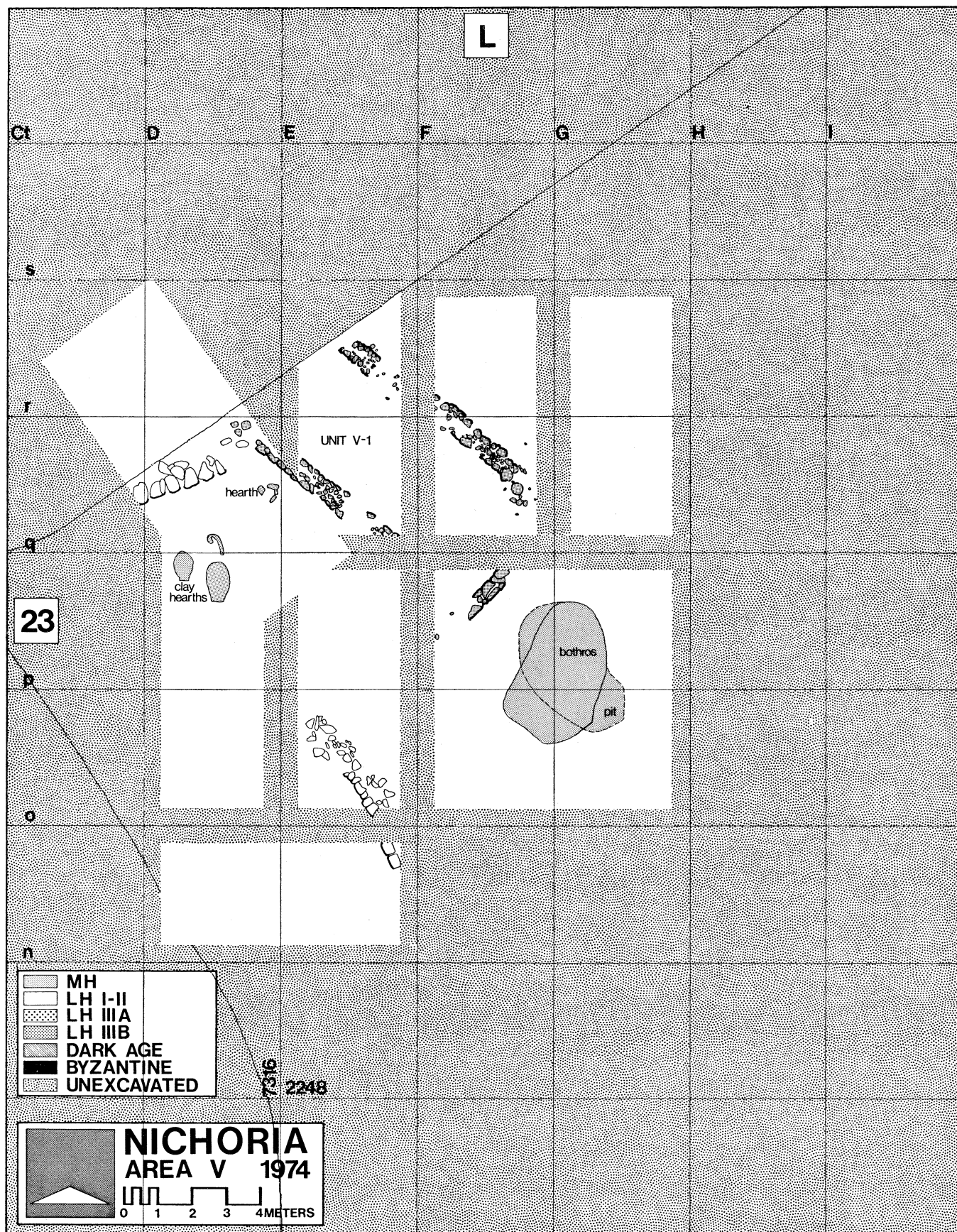


FIG. 6. Area V 1974

of the building just to the north (Unit V-1). The fill consisted of rather sandy soil with some fairly large sherds (Pl. 26, f) and animal bones. This suggests that the filling occurred rather quickly by natural means. Near the base of the pit a large piece of carbonized wood was found, which has yielded an uncalibrated date of 2315 ± 90 B.C. The upper part of the bothros was filled with alternating lenses of sand and gray ashy soil.

The long axis of the building mentioned above was aligned northwest by southeast, stretching across trenches Eqr, Fqr and FGop. Its northwest end could not be uncovered since it lies just outside the property purchased for excavation. The foundations were set in the rather soft gray ashy and sandy gully fill which sloped down to the west and are now only a little below the modern plow surface. In order to level the area, the southwest wall was constructed of five or six courses of stone, whereas the northeast wall has only two. Yellow clay with limestone nodules, perhaps excavated from the bothros pit to the south, served as fill between the walls and forms a somewhat irregular floor. The walls are 0.50-0.70 m. wide and were constructed in a fairly loose fashion of large and small rounded water-worn stones (perhaps from the Karya River bed at the eastern foot of the Nichoria ridge) plus chunks of crumbly sandstone that is similar to the bedrock at the northern end of the site.

The building was over 8.33 m. long and 3.30-3.40 m. wide. The only objects found inside the building were some sherds of Middle Helladic I date, a fragment of a bone pin (Pl. 27, e), a translucent chert arrowhead (Pl. 27, d), and some tiny fragments of copper or bronze together with a little slag. No evidence for the superstructure of the building was found. The south end of the northeast wall had been disturbed by a small pit containing a large coarse terracotta vessel which was found lying on its side. It had been partly destroyed by plowing and the cutting of a vine slot. There were some traces of burning in the immediate neighborhood.

To the southeast of the building a large ash-filled pit was partly cut into the top of the bothros. The gray ashy soil mixed with sand just to the northwest of this pit may have spilled out from it, since both contained numerous small fragments of copper or bronze slag (scoriae) and some small pieces of metal (Pl. 27, f). Pieces of crucible, some with slag still adhering (Pl. 27, g), and lumps of burnt clay or mud (Pl. 28, f) were also found. These finds surely indicate that the pit was connected with metal-working activities. It measures 4.16 m. north-northwest-south-southeast and 2.40 m. west-southwest-east-northeast. The sherds belong to the Middle Helladic I period.

Perhaps also connected with metallurgy are two small clay-lined horseshoe-shaped structures found toward the north end of trench Dopq to the west of the building and lower down the hillside from it (Pl. 28, g). They were built on ground sloping down slightly to the south. The eastern structure is in a fairly ruinous state and may have been the earlier. It seems to resemble closely the better preserved structure slightly further west. When a quadrant of the latter was removed, the section showed a bowl-

shaped profile with a red clay edge, partly lined inside with yellow clay. The fill contained layers of apparently banked ash containing burnt bone, sherds and some small pieces of slag. At the lower south side there seems to have been a narrow mouth. The structure measures 0.87 m. from north to south, and 0.59 m. from east to west. The clay lining is about 0.11 m. thick, and the preserved depth of the bowl in the center is 0.14 m.

So it appears that throughout the Middle Helladic I period this depression on the western edge of the Nichoria ridge was the scene of copper- or bronze-working activities. The large quantity of gray ashy soil and small pieces of burnt clay or mud found in the area add to this impression.

No ancient material later than Middle Helladic I was found east of trenches Eop and L23–XII. However, on the western brow of the hill and on the steep slopes above the ravine later periods were well represented in the rather mixed deposits of rubbish. There is thus reason to believe that these periods were also once represented further to the east in levels that have since been entirely eroded. Over the steep slopes of grid DEn we recovered Middle Helladic II sherds (Pl. 30, b) as well as early and later Mycenaean material. Part of a crude terrace wall was found in the northeast corner of DEn. It stretches into Eop and Dopq where it ends in a haphazard piling of stones. To the west of this line were found the rubbish deposits with later Middle Helladic and Mycenaean material. The terrace seems to have been constructed at the beginning of the Late Helladic III period. A little Mycenaean material was found to the east of this terrace, especially toward the more tumbled north end, in the direction of the heavy Late Helladic II north–south terrace wall found in 1969. Notable finds among the early Mycenaean rubbish include a fine bronze hair ornament (?) from DEn (Pl. 28, b), a fragment of a steatite mold for jewelry (Pl. 28, a), part of an unusual Late Helladic II female figurine (Pl. 28, c, d), and the head of an animal figurine (Pl. 28, e), all from trench Dopq. Small fragments of copper or bronze and slag were found in the Mycenaean levels, but since the slag might have come ultimately from the Middle Helladic deposits it would be rash to suggest on the present evidence that metal working continued in this same area into Mycenaean times.

R. J. HOWELL

THE MIDDLE HELLADIC POTTERY

Pending the final study, not much need be added to the account of the Middle Helladic pottery sequence outlined in the previous preliminary report.²⁰ Since 1971 Area V in the central part of the site has produced a substantial amount of material of the early phase, i.e. Middle Helladic I or Early Minyan (Pl. 26, f). We should have sufficient evidence to work out eventually the internal evolution of this period.

²⁰ McDonald, "Excavations at Nichoria," pp. 257–258.

Trench L23 DEN on the slopes of the ravine provided some large and fairly well preserved sherds of the Middle Helladic II or Classical Minyan phase and possibly of Middle Helladic III or Late Minyan, but the deposits were rather mixed (Pl. 30, b). In the lower levels a fair amount of early Middle Helladic material was present and in the higher levels early Mycenaean, so that it is difficult to observe the chronological evolution within the period. However, the impression of Minoan influence has been strengthened, in particular by the use of lustrous and semi-lustrous paint and decoration in matt purple and white.

We are now in a somewhat better position to make comparisons with the other main body of Middle Helladic material from Messenia, that from Malthi. It is clear that Valmin was misled by the primitive appearance of his coarse "Adriatic Ware." Having decided that it ought to have originated in the Neolithic period and that Neolithic was in fact represented at Malthi in the earliest levels, he was obliged to draw the conclusion that the same basic ceramic traditions persisted throughout the Neolithic, Early Helladic, Middle Helladic and even into the Mycenaean period. In looking for support for this hypothesis he seized upon the lustrous fabrics as providing the obvious local equivalent of Early Helladic urfirnis wares. The discovery in the 1960's, however, of typical Early Helladic II sherds at various sites in Messenia by the Minnesota Messenia Expedition and the excavation by Papathanasopoulos of habitation levels of that period at Kokla, less than a mile from Malthi itself, demonstrated clearly that Early Helladic II was not in fact represented at Malthi. We have learned at Nichoria that lustrous paint was fairly common in the later Middle Helladic phase and was probably a Minoan influence, perhaps introduced via the Minoan colony of Kythera.

In conclusion, it would now seem that the vast majority of the Malthi material belongs to the later phases of Middle Helladic, and that little if any can be attributed even to Middle Helladic I. We must admit that the Neolithic and Early Helladic I ceramic assemblages in Messenia remain virtually unknown. Enough Early Helladic II material has been found to suggest that the pottery of that period does not vary to any marked extent from that found in other parts of the Peloponnese. The Early Helladic III period is again a blank, although the discovery of typical E.H.III vessels at Olympia (now on display in the new museum there) makes it unlikely that anything radically different will be found in Messenia.

R. J. HOWELL

THE LATE HELLADIC POTTERY

A. *Tholos*

Material from surface accumulations in the dromos and from the collapsed dome is very mixed and can be safely discounted. The dromos fill was homogeneous, containing scraps with a M.H.-L.H.IIIA2 range, and similar material was found in the

make-up of its floor. Kylix fragments occur but are too scrappy to be likely remains of vessels used in funeral ceremonies. However, the greater part of a kylix bowl was constructed from pieces found in the make-up of the floor and in the stomion. The vase should date to L.H.IIIA2, perhaps early in the phase, and may give the best indication of the date of construction. The type is unusual but may be ancestral to FS 267 (Pl. 29, c).

Upper strata in the stomion and chamber contain much pottery that most probably dates to the first half of the 4th century B.C. Five black-glaze and red-coated vases have been made up and there are fragments of others, as well as many pieces of large coarse vessels (Pl. 19, a). The pottery from the Mycenaean stratum is very fragmentary and may include a fair number of strays, but at least 17 vases can be identified. Most were reconstructed from many widely scattered pieces and had probably been broken when the tomb was robbed, if not before. Joining fragments of some were found all over the chamber floor, in the stomion, and in Pits 1 and 2. Original groups can hardly be reconstructed, therefore, and the analysis must be stylistic.

Probably one of the earliest vases is a narrow-necked jug (FS 118) decorated with triple wavy stripes (cf. FM 67; *Ἀρχ. Ἐφ.*, 1973, pl. 22 is closely comparable), which is not likely to be later than L.H.IIIA2. A few scraps of L.H.IIIA-B are assumed to be strays. Many vases could belong either in late L.H.IIIA2 or in L.H.IIIB. These include two plain cups (cf. *Pylos*, I, fig. 354: shape 12), fragments of several plain kylikes, a large piriform jar (Pl. 29, b) decorated with a form of concentric arcs (FM 44), a small piriform jar, two flasks (Pl. 29, f), and six stirrup jars of varied type, two of which have a decorated body-band (Pl. 29, a). Two complete vases found in and near the stomion, a pyxis and an angular kylix, are likely to be the latest. The pyxis has good parallels at Pylos and locally (*Pylos*, I, fig. 386:410; *Hesperia*, XLI, 1972, pl. 50, e), which suggest that it is L.H.IIIB2. Four of the stirrup jars are decorated with the same variant of the flower pattern, also paralleled at Pylos (*Pylos*, I, fig. 391:411; closest to FM 18:129). They are likely, on the grounds of their quality, to be imports from the Argolid, as TP 9 may also be. The other vases were probably locally made, and several have individual features in their decoration.²¹

B. Settlement

The need to keep abreast of the great quantities of material excavated in the 1972-1973 campaigns limited the amount of time available for the detailed study of particular problems. Little can be added here to the framework outlined in the previous report,²² although the new material includes many useful deposits and has considerably amplified the representation of the local Late Helladic III sequence.

²¹ The author wishes to acknowledge useful advice from Mrs. E. French and from Mr. C. K. Williams, II.

²² McDonald, "Excavations at Nichoria," pp. 218-221.

Further Late Helladic I-II material came from the extension of the area excavated to bedrock in Area IV South and from large wash-deposits found in Area V (trenches L23 DEn and Dop). The latter are rather mixed and, though overlying Middle Helladic deposits, do not provide the hoped-for picture of the Middle-Late Helladic transition. Catalogued pieces include plain goblets (Pl. 29, e) and very fine "palatial" Late Helladic II A (Pl. 26, c). The fine squat jug from the Little Circle should also be mentioned (Pl. 29, d). Study of the earliest deposits has indicated that, together with the decorated ware, the tripod cooking-pot and "conical cup" were introduced at the beginning of the Mycenaean period. This provides a further indication of the fundamental change in the pottery industry at this time. Also common are plain goblets (with rather rudimentary feet in Late Helladic I), plain strap-handled bowls, and jars banded with matt or lustrous paint. A L.H.IIB deposit, isolated in material excavated in 1969, contains characteristic decorated pieces and plain ware of a quality foreshadowing Late Helladic III A.

Late Helladic III A1 is now well represented by the contents of Unit IV-4 and by two superimposed deposits from Area IV North (trench L23 Sq, levels 6-7). These deposits contain restorable decorated and plain vases which should contribute greatly to our knowledge of this phase. It is of interest that, while the earlier of the two deposits contains stipple-decorated pieces, it is only in the later that pieces decorated with the characteristic L.H.IIIA1 curve-stemmed spiral are found (FM 49; cf. Pl. 30, a). In the Argolid both motifs are found together. Such decorated sherds are in any case rare, the majority of the fine ware being plain or coated.

A long series of deposits in Area IV South (trenches L23 OPe, NOPQfg) extends from Late Helladic III A1 into Late Helladic III B. It should be possible to distinguish stages in the L.H.IIIA2 sequence, though decorated sherds are not common. Some fine sherds are decorated with the flower pattern (Pl. 26, d), but the bulk are plain or red-coated. Open vases, kylikes, large goblets, and strap-handled bowls are common. Decorated kylikes and plain angular kylikes seem to appear only at a late stage.

The L.H.IIIA2-B transition has been greatly clarified by the excavation of Unit IV-6 which contains successive strata of L.H.IIIA2, L.H.IIIB1, and L.H.IIIB2. Large pieces of decorated vases have been found in all strata (Pl. 24, b, d). It is of particular importance that we have here a L.H.IIIB1 phase, characterized by decorated kylikes, stemmed bowls, and deep bowls, but lacking coated deep bowls. L.H.IIIB2 is also better known as a result of the discovery of further deposits in the north and south of Area IV (Pl. 30, c). These, like the Area II deposit, are characterized by decorated deep (mostly Type A) and stemmed bowls, coated deep bowls, and plain angular kylikes and strap-handled bowls.

In Area IV South (trench L23 OPe) material stratified above the L.H.IIIB2 deposit seems to belong to L.H.IIIC, but there are still few satisfactory criteria for the definition of this phase. Types originally assigned to Late Helladic III C, such as

kylikes with swollen ribbed stems and deep bowls decorated with wavy lines, now seem more likely to belong to the early Dark Age (see below). Deep bowls with a reserved band inside the rim may prove characteristic of some part of L.H.IIC, and some likely decorated pieces have been found in one area. But this remains an elusive phase, and it may well be that Nichoria was then largely deserted. Otherwise, the picture presented by the pottery is one of uninterrupted, rather unexciting development, with little evidence of individuality but good technical quality.

O. T. P. K. DICKINSON

THE DARK AGE POTTERY

Evidence of the Dark Age occupation is spread quite widely over the site. The most significant deposits come from Area IV, with considerable material from Area III and very little from Area II. Study of the pottery is hampered by two factors: (a) the fragmentary nature of the material, i.e. the paucity of whole shapes; and (b) the fact that much of the surface decoration has been lost. Nevertheless, four major sequential divisions can be distinguished.

Dark Age I

The first phase is perhaps the least well represented and most elusive of the four. There are no major deposits but only scattered finds, notably in level 4 of trenches L23 Tkl and Vkl and in levels 2 and 3 of trench L23 Xklm. The most distinctive feature of this period appears to be the continuation of late Late Helladic III C shapes and characteristics such as ribbed kylix stems, pedestal bases, carinated skyphoi with high-swung, almost vertical handles and fairly straight rims (Pl. 31, g), rope handles and rope bands, and zoomorphic handles. The most common open shapes appear to be the skyphos with a small and rather shallow ringed foot (developed from the L.H.IIC deep bowl) and the pedestal krater. Of the closed shapes, the oinochoe and the low-bellied amphoriskos are common. Little coarse ware can be associated with this period. A complete statistical analysis of all the clay types has not yet been made, but preliminary figures show that in this first period 65% of the vases were made from a fine light clay fired to a creamy white color, 25% from a coarser clay which fired to a pinkish color, and 10% from a fine clay fired to a light gray color. Little decoration has been recovered, but what there is seems to consist of wavy bands in black paint. Toward the end of the period skyphoi with high conical feet begin to be introduced. This Dark Age I phase at Nichoria can be dated tentatively to about 1050–975 B.C.

Dark Age IIa

This seems to be a true Protogeometric phase and is to be associated largely with the original floor of Unit IV–1. The major deposits were found in level 3 of trenches

Tkl, Vkl, Rij, and Top. The most common shape is the deep skyphos with a high conical foot, everted rim, and S-shaped profile. The handles are becoming less up-swung and more horizontal. Other shapes include flat-based cups with S-shaped profile (Pl. 31, c), oinochoai, and amphorae. The ribbed kylix stem and the rope handle continue down into this period. The skyphos is most often coated on both interior and exterior with a fine monochrome black (?) or a streaky brown-black paint. Less frequently a reddish brown streaky paint is used. Reserved bands occur on the interior of the rim and on the foot. The field between the handles contains the decoration, which consists of both hand-drawn and compass-drawn circles and semicircles (more often on the oinochoai than on the skyphoi), crosshatched triangles (possibly a Laconian influence), multiple zigzags,²³ and wavy lines (Pl. 24, a). Sometimes these decorative motifs are placed in metopes alternating with three vertical lines forming the triglyphs. The oinochoe frequently has concentric semicircles on its shoulder with black bands beneath on the belly. Of this material 65% has been fired to a pinkish buff color, 25% to a grayish color, and 10% to a pinkish white color. The latter color appears to be a carry-over from Dark Age I. In contrast to Dark Age I, a great deal of coarse ware is now found. Many of the large open shapes seem to exist in coarse ware only.

Dark Age IIb

This phase belongs to the second floor and to the rebuilding of Unit IV-1. The shapes and characteristics of Dark Age IIa continue, but some additions are made. The flat-based skyphos may have been introduced at this time. The oinochoai are frequently coated and have horizontal grooves in pairs or in threes below the neck (Pl. 31, a). A class of miniature skyphoi also appears. These are made of a very thin and fine fabric, often coated in monochrome black. They sometimes have the decorative motifs common to Dark Age IIa.

Dark Age IIa and IIb is a long ceramic period and fairly widespread over the site. The shapes of the vases and their various decorative motifs are similar to the group from the Kokkevi Protogeometric tholos at Pylos, which is dated about 950 B.C.,²⁴ and to the group from the little Protogeometric tholos at Karpophora.²⁵ This would indicate a date in the 10th century B.C. for Dark Age II, although it may have extended as far down as the middle of the 9th century. It is not yet clear when phase IIa ends and IIb begins.

²³ A skyphos fragment with similar decoration of "jagged scribbles" comes from the Heroön at Sparta. See J. N. Coldstream, *Greek Geometric Pottery*, London, 1968, p. 213, pl. 46, c.

²⁴ W. D. Taylour in Blegen, Rawson, Taylour, and Donovan, *The Palace of Nestor at Pylos*, III, Princeton, 1973, pp. 241, 242.

²⁵ A. Choremis, *A.A.A.*, II, 1968, pp. 205-209; 'Αρχ. 'Εφ., 1973, pp. 62-69. I am indebted to Dr. Choremis for his kind permission to study these vases.

Dark Age IIIa

Phase IIIa is associated largely with level 2 in trenches L23 Tkl, Ukl, Vkl, and Wklm, i.e. the later floor of Unit IV-1. The "thin ware" of phase IIb continues and, indeed, is pervasive throughout this phase (Pl. 31, d). Skyphoi continue but now have small off-set rims, fairly horizontal handles, and almost flat or very shallow ringed feet. Flat-based cups are especially common. They have lost their S-shaped profile, however, and become quite straight. Grooving is frequently used, not only on the underside of the base of these cups but also on the neck and base of the oinochoai and the jugs with cutaway neck. Dark Age IIIa is characterized by an almost total absence of any decoration. The vases are simply covered in a rather metallic monochrome black paint. Some of the open shapes have no evidence of interior paint, although here it may well be that the paint has worn away. The fabric of 60% of the vases has been fired to a pinkish tan (sometimes an orange-pink) color, 30% to a gray color, and 10% to a deep red color. The latter fragments are quite thick and fairly coarse in texture and can be associated with the large open shapes. The red color begins in phase IIIa but is especially common in IIIb. Dark Age IIIa is also a long and widespread period and may last for as much as a century, about 850-750 B.C.

Dark Age IIIb

As far as present studies have determined, phase IIIb is confined to Area IV Southeast, specifically to the late Dark Age stratum above Unit IV-4, and seems to be a late coarse-ware stage of Dark Age IIIa. Period IIIb is a short phase, perhaps beginning around the middle of the 8th century B.C. but not going beyond the late 8th-century B.C. date for the Geometric vases of the pithos burial found in 1969.²⁶ Most of the IIIb material is very fragmentary, but seems to consist of large open shapes with heavy fabric. The clay, quite coarse in texture, has been fired to a red color. These vases may or may not have been coated; if so, the coating has disappeared.

Dark Age IV

This phase consists of the vases from the 1969 pithos burial (Pl. 31, b). These vases must be considered in a class by themselves, since their shape and decoration is quite different from the other Dark Age material from the site.

WILLIAM D. E. COULSON

THE BYZANTINE GLAZED POTTERY

The Byzantine glazed pottery found thus far is from two distinct chronological periods: late 10th or early 11th century and late 12th or early 13th century after

²⁶ McDonald, "Excavations at Nichoria," p. 228.

Christ. The former group comes from the immediate vicinity of two Byzantine buildings discovered in 1970 in Area II. This group of glazed sherds includes fragments of a polychrome cup, as well as the bottom of an undecorated white-ware jug, covered on the interior and exterior with a dark green glaze. Such pieces are typically late 10th or early 11th century at Corinth, a date which in the Area II buildings at Nichoria is confirmed by numismatic evidence and a Carbon-14 sample.²⁷ The Byzantine glazed pottery recovered during 1972-1973, however, is of the late 12th or early 13th century, and comes from the destruction deposit of the phase II-A chapel in Unit IV-2. The later material consists basically of sgraffito wares and painted wares, all in fragmentary form. The finest example of sgraffito ware is a bowl²⁸ with a slip and cream glaze uniformly covering the interior, but used more sparingly over the exterior rim (Pl. 32, c). The interior decoration consists of a central medallion with an interlace design on imbricated ground, and a band of decadent Kufic. The profile, with its high, nearly vertical rim and flaring foot, is typically late 12th, even 13th century at Corinth. The decoration of this bowl, however, which shows none of the deterioration often associated with these declining years of the sgraffito style, might be suitable in the middle or third quarter of the 12th century. The other sgraffito pieces from this group, however, show much more careless decorative work in the form of irregularly applied glaze and hastily scratched zigzags and bands of crosshatching. The painted-ware fragments show the same sloppiness of decoration, with streaky brown, green, and yellow paint applied over a slip on the interior, occasionally without a covering glaze. The profiles of the painted-ware fragments indicate a late 12th-, even 13th-century date. When taken as a whole, the glazed pottery from this deposit suggests a late 12th- or early 13th-century date for the destruction of the phase II-A chapel.

J. ROSSER

SMALL FINDS

The seasons of 1972 and 1973 were far more productive of small finds than the previous three. This is due largely to the numerous grave goods from the tholos tomb which are briefly enumerated above (see pp. 77-78). Of the rest of our considerable body of new material the following paragraphs may serve to give a general impression.

The discouraging condition of so much of our pottery is somewhat compensated for by the unusually fine preservation of some of the bronze. This has the additional advantage that it has allowed us to set aside for analysis a fair number of nondescript but well-stratified fragments from various periods, including some from the Mycenaean bronze-working area in Unit III-4 (cf. p. 80).

One exceptionally well-preserved object is the fine Dark Age pin N1789 with

²⁷ McDonald, *op. cit.*, p. 266.

²⁸ NP89. Height: 0.095 m.; est. diam.: 0.19 m.; est. diam. of foot: 0.12 m.

characteristic rings, swelling and small disc head (Pl. 27, a). Another Dark Age pin, unfortunately headless and in poor condition, has the swelling but apparently no rings. To Late Helladic II or perhaps III A belongs the roll-tip pin N1898 illustrated on Plate 27 (b) (cf. p. 105). A Dark Age one found in 1971 is published in our first preliminary report (McDonald, "Excavations at Nichoria," p. 262, pl. 51, g).

Several finger rings, spiral hair rings (?) and probable fibula fragments were found in various contexts of the Dark Age. From a L.H.IIIA deposit comes a small finger ring (Pl. 32, a) with splayed ends, each pierced with a tiny hole for the fitting of a bezel.²⁹ The earlier Mycenaean rubbish dump yielded the fine bronze object N1543 (Pl. 28, b) which may have served as a hair ornament, used perhaps with the bone pins of which we have a number of fragments from Middle and Late Helladic contexts (Pl. 27, e).

Among the most interesting of the finds from the floor of the Dark Age Unit IV-1 is the phalaron N1833 (Pl. 22, d) of the kind variously interpreted as shield bosses, horse brasses, cymbals or women's belt ornaments, and most recently discussed by Snodgrass in *Hamburger Beiträge zur Archäologie*, III:1, 1973. Our example, which measures 0.11 m. in diameter, has a small central hole and no interior ring. Dated Dark Age IIa, its closest parallel is an example from Grave 43 in the Kerameikos, also 10th century B.C.³⁰

The late Geometric bronze animal figurine N1723 (Pl. 31, e, f) lacks style, but the rounded base with grooves radiating from a central hole is worth noticing. The find-place was the Dark Age apsidal Unit IV-5.

Plate 32, g shows a selection of small bronze tools. The Mycenaean ones in the top three rows date to Late Helladic III A and III B, though N1718 and N1607 could be Late Helladic II. The large needle N1919, in beautiful condition, came from the Unit III-4 bronze-working area. N1004 is also a needle but with a minute eye. In the third row are small instruments with pointed or chisel ends. The bottom three rows are Dark Age IIa and include another such tool, N1907, and a bent needle, N1838, with the top rolled over to form a loop for the eye, as in Levantine examples. N1466 is probably an awl. N1904-6 was found in fragments—for once a happy circumstance, since the material made visible by the breaks aroused curiosity among the team's scientists. They hope analysis will clarify the apparently unusual composition of the alloy.

Of Dark Age iron tools the 1972 and 1973 seasons have produced about a dozen, including the fragmentary axe-head mentioned by Coulson among the finds from the floor of Unit IV-1 (above, p. 91). The knives too are mostly very fragmentary, but at least one is enough preserved to indicate that it has a straight edge and does not belong to the curved class with convex cutting edge.

The tantalizing sherd (Pl. 31, h) which seems to have been inscribed with a

²⁹ Cf. a later example in gold, Iakovides, *Περαρή*, A', p. 357; Γ', pl. 107γ.

³⁰ *Kerameikos*, IV, Berlin, 1943, pp. 4, 27, 42, pl. 37, inv. M13.

Linear B sign is mentioned below (p. 139) by McDonald. Though the bottom stroke is placed abnormally low, it appears to be the sign 08 with value "a." The sherd itself is Late Helladic III A, and the level it came from can be more closely dated to L.H.IIIA2.

Likewise tantalizing is the lower part of a Late Helladic II vessel, N1487, apparently some kind of open dish with splaying feet which suggest that its shape may have been zoomorphic (Pl. 32, d). Probably contemporary is a lead clamp, no doubt used to mend a terracotta vessel. Two Late Helladic sherds have been found with similar clamps still in position.

Among the most striking finds is the hideous figurine head N1264, whose deep hollow eyes, mere holes, give it a terrifying aspect (Pl. 32, b). The complete figure must have been quite large, perhaps 0.30 m. high or more, since the head fragment alone is 0.067 m. high. From the polos it wears one concludes that it is female, and she has accordingly been nicknamed "the Dame of Nichoria." The fabric is coarse and gritty, and there seem to be no traces of painted decoration, although admittedly much of the original surface appears to be worn away. Indeed, the lower part of the face is gone altogether, a regrettable loss, for one would give much to know whether the chin was round or of the long pointed sort like the Lord of Asine's. The date is probably Late Helladic III B, though the level from which the piece comes was not pure and contained some possibly L.H.IIIA2 sherds as well. Has this strange and repelling figure any relation to the idols from the Citadel House at Mycenae?³¹ Or could it conceivably, because of the polos, represent a sphinx?

Another unusually large figurine is N1528 which comes from the early Mycenaean rubbish dump (Pl. 28, c, d). Here it is the body that survives while the head is missing. Its early date lends this piece a certain importance. The style, consonant with the date, is relatively naturalistic, but the distended-looking shoulders and abdomen are curious. There are horizontal and vertical stripes on the back and traces of some pattern on the front in red-brown paint.

The selection of figurine fragments on Plate 32 (e) includes other naturalistic specimens. N1887 and N1852, which were found in the same part of the site, give an impression of being very much alike. Unfortunately, the former's context is not certain and the latter's (outdoor debris of Late Helladic III B and perhaps even later) disconcertingly late. In the second row the head N1809 was found lying on the floor of the megaron Unit IV-4 together with L.H.IIIA1 pottery (cf. p. 101). N1806, next to it, is contemporary and the tip of the left hand preserved between the breasts places it in E. French's Proto-Phi group,³² where an example from this part of Greece is to be welcomed. N1676, another kind of Proto-Phi figure, is from a mixed level ending with Late Helladic III A. The Phi figurine fragments N1253B (head with

³¹ Taylour, *Antiquity*, XLIII, 1969, pp. 91 ff. and XLIV, 1970, pp. 270 ff. See Mylonas' discussion, "The Cult Center of Mycenae," *Monographs of the Academy of Athens*, XXXIII, 1972, pp. 1-35.

³² *B.S.A.*, LXVI, 1971, pp. 112-116.

plait at the back) and N1253A in the top and bottom rows come from early L.H.IIIA levels, and the rather hollow stem N1771 (middle row, right) is not later than L.H.IIIA1. To L.H.IIIA2 levels belong N835 which has modeled breasts and N974 which has applied disc breasts. N1344 (top left), an extremely well modeled piece with hollow stem, can be no later than L.H.IIIA and may easily be earlier, the associated pottery going back to Late Helladic II. N1248, with plait behind but applied features missing from the front, was found with pottery dating to L.H.III B and later. N1720, our only Psi specimen, was associated with pottery of L.H.IIIA2-B. The remaining four pieces, N1054, N1211, N1673 and N1104, are not well stratified.

The animal figurine fragments, although fairly numerous, are mostly small and unexceptional. However, there is a large and very well modeled fragment of a pig (?), dated early Late Helladic III A, which must originally have stood some 0.10 m. high up to its neck, and taller with the head included. From the same L.H.IIIA2 level as the inscribed sherd mentioned above came a small horse's head not unlike the piece from Mycenae published recently by Miss Tamvaki.³³ The narrow neck, painted with parallel chevrons on one side and horizontal bands on the other, seems to bear no mark of reins or yoke.

The spinning and weaving material is to be the subject of a special study by Jill Carington-Smith in the final publication. Meanwhile, it may be noted that well over 200 spindle whorls were found, of various types and in all strata from Middle Helladic to the Dark Age. The Dark Age specimens are indeed particularly numerous and include two (N1286, N1692; Pl. 32, f) with the incised decoration not uncommon on Protogeometric whorls.³⁴ The pointillé bands around N1692, disposed not quite at random but at any rate carelessly, do not show up well in the photograph, since the clay is the crumbly fabric, fired very black, which characterizes many of our Dark Age whorls. Two loom-weights of Minoan discoid type came to light. One is from a L.H.IIIA context, the other is from a very mixed level but should probably be placed between Late Helladic II and III B. We now have a number of fragments of early Mycenaean spinning-bowls with interior handle like those known from Egypt and Palestine and now also from Myrtos in Crete.³⁵ Professor Marinatos found similar objects at Volimidia, and he has proposed for them the name "δμιτρέύς."³⁶

The stone tools will in the final report be treated separately by Harriett Blitzer. Those from 1972 and 1973 include a large number of chert and obsidian blades and flakes, several denticulate sickle blades (some with gloss showing), a fine knife of mustard-colored chert, and barbed arrowheads (Pl. 27, d) of Buchholz's Types III, IVa

³³ *B.S.A.*, LXVIII, 1973, p. 233, no. 93.

³⁴ E.g. *Kerameikos*, IV, Berlin, 1943, pl. 32; V, i, Berlin, 1954, pl. 157.

³⁵ T. Dothan, *Israel Exploration Journal*, XIII, 1963, pp. 97 ff.; Warren, *Myrtos: An Early Bronze Age Settlement in Crete*, *B.S.A.*, Suppl. VII, 1972, pot 701, pp. 78, 153, 209, fig. 91, pl. 68, b.

³⁶ *Πρακτικά*, 1964, pp. 87-88, fig. 90.

and IVb.³⁷ A bone arrowhead, N937, from a Middle Helladic I context deserves attention for its rarity. It belongs to the IIa class which according to Buchholz disappears after the early Middle Helladic period, and Buchholz's list contains no Middle Helladic examples of bone. Other stone items of interest are a so-called "arrow straightener" or "Pfeilstrecker"³⁸ to be added to an example found earlier, a pair of neatly fashioned dome-shaped pestles from the L.H.IIIA2 floors of Unit IV-6, two fragments which may after study prove to be legs of tripod mortars,³⁹ and a casting-mold which is probably Middle Helladic.

Finally there is the corner of a mold for relief ornaments, N1509, from the early Mycenaean dump excavated by Howell (Pl. 28, a). One matrix, barely half preserved, is for the interlocking ivy-leaf beads of gold and glass well known from a number of sites. It has the usual pair of runnels for the two string-holes.⁴⁰ The other, complete and without runnels, is for what appears to be some kind of bee or chrysalis ornament. Our mold is but the eighteenth such to come to light,⁴¹ and since the majority of the others are from the great centers of Knossos and Mycenae and none at all are known from the Southwest Peloponnese, its finding at Nichoria is worthy of remark.

HELEN HUGHES-BROCK

HUMAN SKELETAL BIOLOGY

Research activities in physical anthropology during the spring of 1973 were divided as follows:

1. Cleaning and reconstruction of skeletal material, principally from the Little Circle (J25 Ucd).
2. Participating in the excavation of additional burials in the Little Circle.
3. Analyzing human remains excavated in previous seasons.

A current estimate of the number of skeletons represented up to the end of the 1973 season is from 37 to 56. These include 32 assigned burial units from the Little Circle. Aside from the fact that an undetermined number of skeletons remained to be exposed in this area at the end of the 1973 season, there are probably not as many individual skeletons as there are burial units. There are between 10 and 17 burials from the tholos tomb. Seven additional burials come from various parts of the site, including the 25-30-year-old woman found alongside the Little Circle.

In other words, there is a respectable sample of human remains from Nichoria. The additional time involved in the completion of the study of these remains will be

³⁷ *Jahrb.*, LXXVII, 1962, pp. 1 ff.

³⁸ *Ibid.*

³⁹ Buchholz, *Jahrb.*, LXXVIII, 1963, pp. 1 ff.

⁴⁰ Higgins, *Greek and Roman Jewellery*, London, 1961, p. 81, no. 24; pl. 10A, fig. 14, j.

⁴¹ Vermeule, *Bull. Boston Mus. of Fine Arts*, LXV, 1967, no. 339, pp. 19 ff.; Hughes-Brock in Coldstream, *Knossos: The Sanctuary of Demeter*, London, 1973, p. 121.

adequately justified by the return of information relating to the biological characteristics of the people. The basic information can be broadly categorized as follows:

1. Demographic—age and sex
2. Metric features
3. Non-metric morphological attributes
4. Pathological observations

The interpretation of these data will provide a reasonably comprehensive pattern of genetic and environmental influences on the people, and perhaps some indication of their behavior as well.

General impressions should at this point be viewed with restraint. The people buried in the Little Circle include at least one infant, several juveniles and young adults of both sexes, with at least one individual of relatively advanced age. There are at least two adult males from the Little Circle and one from the tholos who were large and very robustly built. The majority of at least the Little Circle burials are remarkably free of the osteoarthritic afflictions that usually suggest heavy, arduous work or comparable physical stress. There is as yet little indication of the lesions of *hyperostosis spongiosa* that are thought to be evidence of a thalassemic response to a hyperendemic malarial environment. In the area of dental health, there appears to be a pattern in which decay, abscessing, and early tooth loss exceed the influence of attrition. Heavy gingival and interdental calculus deposits are very common on both anterior and posterior teeth, even in young children. The precise frequency of its occurrence is impossible to determine, but it was noted in well over half the dentitions examined. The occurrence of such heavy calculus deposits, especially in young children, would suggest that a major part of the diet consisted of soft rather than fibrous plant foods. This suggestion is supported by the high frequency of carious lesions in the deciduous and developing permanent teeth of children.

On the other hand, the rapid attrition evidenced in nearly all the adult and older sub-adult dentitions suggests a great deal of heavy chewing of tough, fibrous foods.

WILLIAM D. WADE

SMALL VERTEBRATE ASSEMBLAGE

During the 1972 season a concentration of small vertebrate remains was discovered in a large pithos located in grid L23 Uk. The pithos, with a somewhat smaller companion, had been set into the floor of a courtyard connected with a late Dark Age rebuilding of Unit IV-6.⁴² Most of the bones were concentrated in the lowest 0.1 m. of the pithos which had a maximum diameter of 1.2 m. More than 150 animals had fallen into the pithos and were unable to extricate themselves, an example of a classic sort of

⁴² McDonald, "Excavations at Nichoria," pp. 253-254.

	Minimum number of individuals
Amphibia	
Anura (frog and toads) <i>genus et species</i> indet.	16
Reptilia	
Lacertilia (lizards) <i>genus et species</i> indet.	18
Ophidia (snakes) <i>genus et species</i> indet.	1+
Mammalia	
Insectivora	
Soricidae (shrews)	
<i>Crociodura leucodon</i> (Hermann) Bicolored Shrew	18
Rodentia	
Gliridae (dormice)	10
<i>Glis glis</i> (Pallas) Edible Dormouse	
<i>Muscardinus avellanarius</i> (Linneus) Dormouse	
<i>Dryomys nitidula</i> (Pallas) Forest Dormouse	
? <i>Eliomys quercinus</i> (Linneus) Garden Dormouse	
Microtidae (voles)	6
<i>Microtus arvalis</i> (Pallas) Common Vole	
? <i>Microtus nivalis</i> (Martins) Snow Vole	
Muridae (mice)	
<i>Apodemus flavicollis</i> (Melchior) Yellow-necked Field Mouse	68
<i>Apodemus sylvaticus</i> (Linneus) Woodmouse	
<i>Apodemus mystacinus</i> (Donford and Alston) Broad-toothed	
Field Mouse	
<i>Mus musculus</i> (Linneus) House Mouse	11
Carnivora	
Mustelidae (weasels)	
<i>Mustela</i> sp.	1
	<hr/> 149

small vertebrate trap. The assemblage consists of several hundred skull and jaw fragments, several hundred isolated teeth, and several thousand isolated postcranial elements.⁴³

⁴³ It seems certain from other examples of this sort that about five percent of the animals in the pithos would have been preserved as articulated skeletons. The earth from the pithos was routinely passed through a vibrating gravity concentrator and all of the skulls were disarticulated in the process. Since hindsight shows that the lowest material in the pithos was mostly bone, the entire matrix containing bone should have been removed intact and dissected at leisure. Underwater screening techniques would have been a second choice for gentle removal of the bones from the matrix.

A preliminary faunal list, with minimum numbers of individuals, is given above. Both identifications and minimum number of individuals are subject to revision, the latter upward.⁴⁴

Of notable interest is the small number of house-mouse specimens compared to specimens of field mice and the total absence of both the genus *Rattus* and of rabbits. The frogs, toads, lizards and snakes await further study pending collections of recent osteological material. Discussion of the potential range changes of the mammals will be difficult in view of the paucity of information on the distribution of recent small mammals of Greece.

DONALD L. WOLBERG
FREDERICK V. GRADY
ROBERT E. SLOAN

BOTANY

There have been two aspects in the botanical work of the excavation. Firstly, the recovery, processing and identification of plant remains from the site and secondly, an examination of the present-day flora and vegetation as an aid to interpreting the past.

Charcoal and other plant materials were collected directly from the trenches and through the gravity concentration system. The majority of lots contain several pieces. All samples were carefully dried, labeled and a small proportion tentatively identified. Because of the seasonally wet and dry conditions of the soil, only charred remains are preserved.

At present more than 400 lots of material have been processed each containing from 1–50 fragments. Charcoal can most readily be identified as to species using anatomical features displayed in thin section. Various techniques for embedding have been tried so that thin sections or peels could be prepared. Some methods have been partially successful, but all proved time-consuming. Because of the large quantity of material to be studied, at present specimens are being examined with reflected light under a stereo-microscope. Later, small fragments and critical determinations will be confirmed by embedding and sectioning. Wood from more than 40 modern trees and shrubs has been sectioned and specimens charred to provide reference material.

To date, in charcoal from the site we have identified fig, olive, plane/maple, sweet chestnut, conifers and several species of oak. The latter occur most frequently, but this may be due to the ease of identifying the *Quercus* group. Charred acorns, olive pits and impressions of grasses have also been found.

Plants have been collected from the major vegetation types in the vicinity, includ-

⁴⁴ Wolberg and Grady sorted, curated and made preliminary identifications of the vertebrate material. Through the courtesy of Dr. Karl Koopman of the Department of Mammalogy of the American Museum of Natural History, New York, Wolberg was able to compare some of the *Nichoria* material with specimens in that institution.

ing the maquis, garigue, coastal and cultivated sites. Approximately 300 species have been identified and pressed, many with pollen or fruits. Members from three families—Leguminosae (pea), Compositae (daisy) and Graminae (grass)—account for 45% of the total recorded.

JENNIFER SHAY

GEOLOGY/LITHOLOGY

Some sections of the coastal area near Nichoria must have been utilized as a harbor or boat landing by ancient inhabitants of the ridge. We are interested in identifying potential harbor sites or landing areas. However, one cannot assume that existing coastal geomorphic elements extend back to the Bronze Age. Sandy coastal plains that are fed an ample supply of sediments by local river systems are loci of rapid geomorphic and geologic change.

In an effort to reconstruct the sequence of coastal environments and to draft paleogeographic maps of the Nichoria region three MME senior staff members, J. C. Kraft, S. E. Aschenbrenner, and G. Rapp, Jr., have undertaken an extensive program of core drilling to add the third dimension for a detailed geologic/geomorphic synthesis of local coastal evolution during the late Holocene (last 5,000 years). Eustatic sea level fluctuations, tectonic earth movements, and sediment infill have combined to alter the nature and location of shoreline features. Strong littoral drift processes continue to redistribute the sediments as they enter the Gulf of Messenia.

The present beaches are composed of coarse sand to cobble-sized sediments with many boulders. For a limited distance inland low-lying dunes of coarse sand fringe the coastline, thereby effecting a coastal damming.

The sandy coastal plain in the Nichoria region is a relatively recent accretionary feature. In pre-Roman times the sea was actively eroding the cliffs lying a few hundred meters inland from the present coast. We have studied in detail the lower portion of the local Karya and Tsana River valleys and the intervening coastal plain. The Karya flows by the eastern edge of Nichoria ridge. The Tsana lies less than 2 km. to the southwest of the mouth of the Karya. Using a soil auger another MME staff member, N. Yassoglou,⁴⁵ studied a former lagoonal embayment into the Karya River valley. Rapp⁴⁶ also projected a lagoon into the valley mouth in a preliminary paleogeographic reconstruction.

Establishing the location of a Bronze Age and Dark Age lagoon with a barrier beach at the mouth of the Karya River is of interest because such a feature would provide a storm shelter and minimal landing site for prehistoric ships. We have drilled

⁴⁵ N. Yassoglou and C. Nobeli, Chapter 10 (Soil Studies) in W. A. McDonald and G. R. Rapp, Jr. (edd.), *The Minnesota Messenia Expedition: Reconstructing a Bronze Age Regional Environment*, University of Minnesota Press, 1972, pp. 171-176.

⁴⁶ McDonald and Rapp, *op. cit.*, Chapter 16 (Perspectives), pp. 257-258.

nine core holes to 30 m. in depth to determine the Bronze Age paleogeography of this region. Figure 7 shows the location of the nine holes superimposed on a Roman-period reconstruction. The reason the reconstruction is for 0 B.C. rather than 1300 B.C. is that from our present drill-core and local water-well information we have C_{14} dates and Roman "African red-slip ware" that provide adequate chronological horizons for this period. Our drilling program is continuing in an effort to determine whether the lagoon existed during the period of major occupation at Nichoria.⁴⁷

From Figure 7 we can see that in Roman times the Gulf of Messenia occupied a position immediately adjacent to the sea cliffs with a sand-cobble strand line at their foot. Littoral drift systems built up a bar across the mouth of the Karya River forming a small coastal lagoon. Depths of present small lagoons in adjacent areas are up to 3 m. which would be sufficient to hold shallow-draft ships. Work in progress should define the geographic and chronological limits of this ancient lower Karya valley lagoon.

As stated in the first Nichoria excavation preliminary report,⁴⁸ several samples of volcanic pumice have been recovered from Late Helladic II A strata at Nichoria. To determine the geographic origin of the pumice we embarked on a program of chemical and optical index of refraction analyses of Nichoria finds and possible source material. The latter (optical) methods proved to be a reliable "fingerprinting" technique for Aegean pumice sources. The most obvious sources for an ample supply of pumice at Nichoria are: (1) pre-Minoan Thera pumice eroding from the island; (2) Thera pumice transported by floating on the sea to the Messenian Gulf at the time of the Minoan volcanic eruption; and (3) Melos, a relatively nearby island which has extensive pumice deposits and which supplied obsidian that was widely traded in prehistoric times.

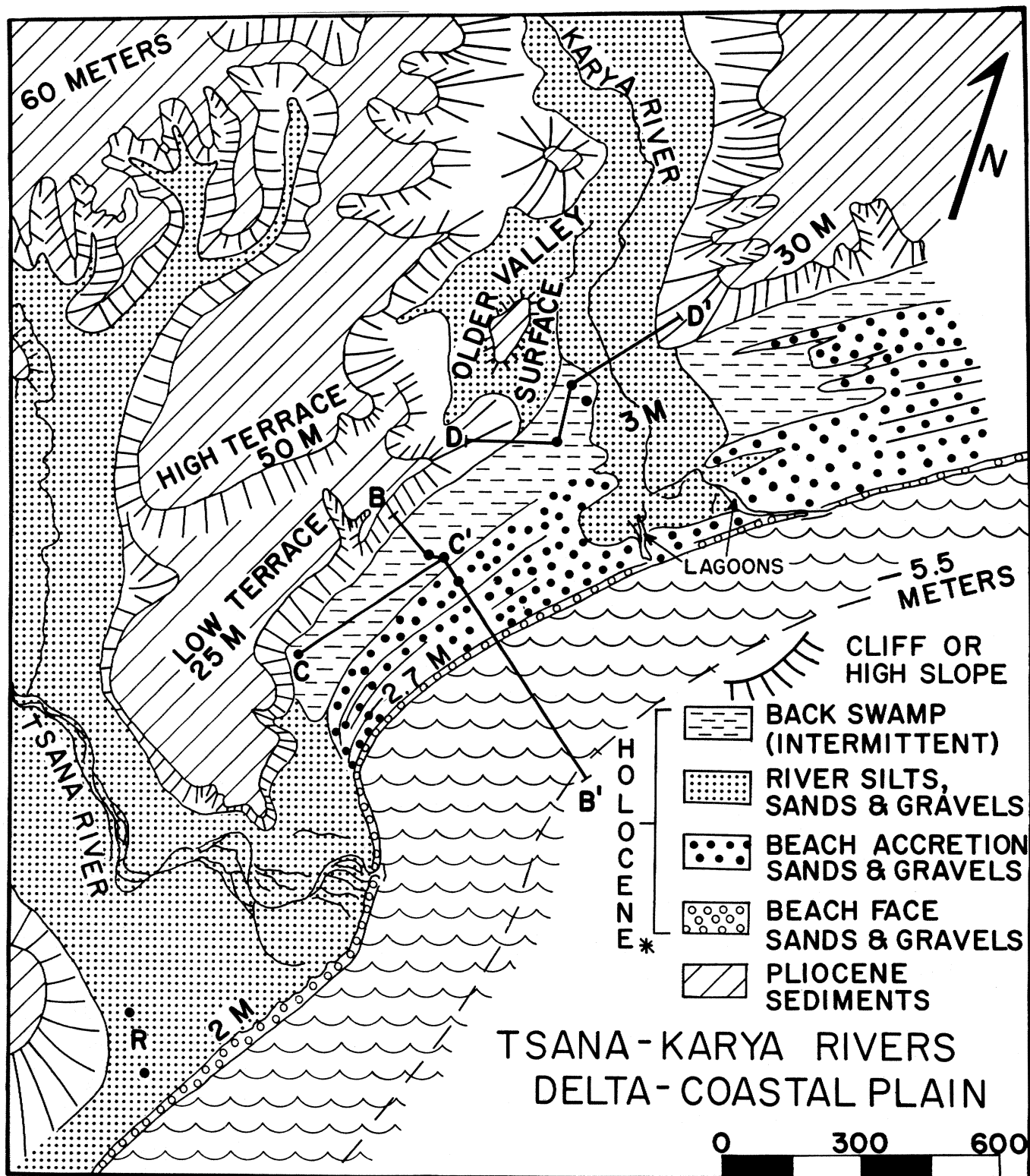
These sources were sampled aurally and stratigraphically and their optical indices of refraction (on the glass fraction) correlated with the Nichoria finds. As reported in detail elsewhere,⁴⁹ the Nichoria pumice can be shown to have come from the Minoan eruption of Thera. The pottery with which the pumice is associated stratigraphically belongs to the Late Helladic II A style (1500–1450 B.C.).

These data provide both a confirmatory *terminus ante quem* for the important Thera eruption and a potential additional stratigraphic marker for eastern Mediterranean prehistoric strata.

⁴⁷ This coastal-studies program has been broadened to include similar investigations of other important archaeological areas in the Pamisos valley, Lakonia, the Argolid, the Bay of Navarino, and Thermopylae. Space in this article does not permit detailed geological analyses or elaborate cross-sectional diagrams showing the sequence of coastal environments. More complete studies are being published elsewhere, and the full geomorphological history of the Nichoria coastal area will be published in Volume I of the final excavation volumes.

⁴⁸ McDonald, "Excavations at Nichoria," p. 267.

⁴⁹ G. R. Rapp, Jr., S. R. B. Cooke, and E. Henrickson, "Pumice from Thera (Santorini) Identified from a Greek Mainland Archaeological Excavation," *Science*, CLXXIX, pp. 471–473.



* UNDERLAIN & IN PART FLANKED W/ SIMILAR ENVIRONMENT PLEISTOCENE AGE DEPOSITS

R = ROMAN BATH-FLOOR 50 CENTIMETERS BENEATH FLOODPLAIN SURFACE

● = DRILL HOLES-THIS STUDY

FIG. 7. Coastal paleogeography in vicinity of Nichoria

Studies continued at Nichoria during 1972–1973 on the large number of samples of clay recovered during excavation. Preliminary results indicate that all such material normally identified by excavation methods has received some cohesiveness and resistance to breakdown in a hydrous environment by being “fired,” presumably accidentally in many or most cases. Sun-dried mudbrick, our experimental bricks, and local modern examples break down almost immediately during shaking with water in a small flask. Lithologically similar materials showing some evidence (texture and a pink or reddish color) of low-temperature firing are quite stable under the same water-test conditions. Preservation of mudbrick and related clay building materials to the point that they may be identified and recovered during excavation apparently requires the chance destruction of the building by fire.

The bedrock of part of Area IV consists of a silt and clay stratum locally called “aspropoulia.” This material makes a nearly water-tight packing “mortar,” although preliminary study of some of the clays from Area IV walls does not support the thesis that this material was so used. This clay/silt can also easily be molded into mud bricks or used as mud plaster for reed (*kalamia*) partition walls or ceilings. “Aspropoulia” is lithologically very similar to the material in many of the “low-fired” mud bricks or related building materials recovered at Nichoria, and it is tentatively assumed that this local material was used extensively as mud plaster or brick.

It is reasonable to assume that all or nearly all of the limestone blocks on Nichoria were transported there during the most extensive habitation period in the Bronze Age. None is native to the ridge. The limestone contained in modern field walls and in nondescript piles approximates 219 cubic meters (with an assumed rock packing density of about 70%). Approximately an equal amount has been removed by excavation. This total, plus the volume exposed in walls and foundations at the site plus an estimate of the rock still buried in unexcavated areas and eroded from the ridge, will at least suggest the minimum quantity of building stone utilized in the Late Bronze Age.

Calculation of the number of buildings and terrace walls that could be formed from this volume of rock is dependent on assumptions made concerning the number of courses of stone used in houses before changing from stone to mudbrick and/or houses built entirely of stone. Because mudbrick at or near ground level would erode rapidly during the rainy season, it can be assumed that at least one or two courses of stone above the foundations would be necessary.

Geologists often have to deal with unconsolidated sediments that are similar in composition and texture to the sedimentary matrix encountered in most archaeological sites. To aid in detailed studies of microstratigraphy and microstructures geologists have developed the technique of taking thin peels from the walls of slit trenches and from split sedimentary cores. The method consists of applying a glue material either directly to a prepared clean and planar surface or through a very porous material such as cheesecloth. The latter procedure is used when brushing or spraying the glue

material directly on the unconsolidated sediment would disrupt the delicate sedimentary structures. A wide variety of glues has been used successfully.

The glue should penetrate as evenly as possible and deeply enough to capture the textural relationships. After the glue has become somewhat firm, another coat is added and a backing material such as burlap is applied. Further glue is then added to give the whole unit some rigidity. The glue used at Nichoria was a white Greek water-based glue similar to Elmer's glue. Drying time was 24-48 hours. A properly applied peel is easily removed.

To aid the geological and archaeological interpretation of the stratigraphic record on Nichoria, particularly the specific environments during habitation periods, thirteen peels were made covering a variety of both "geological" and archaeological situations. An example is illustrated in Plate 30, d. This peel was taken from a pillar left standing when the tholos tomb was excavated. The detailed stratigraphy is readily apparent. The tomb floor is a coarse, yellow, somewhat indurated sand outcropping on the west end of the ridge. Above this a well-stratified coarse reddish sand entered through the dromos (level 7). Level 6 has abundant charcoal and ash, interpreted as remains of ritual fires during use as a cult center in the 4th century B.C. Later, the dome collapsed.

Colored photos of the peels exhibit even more detail. Geologists have also used soft X-rays on peels to study textures that are not evident in visible light. The peels serve as a permanent record of sections that are later removed or back-filled. They can easily be returned to laboratories for special studies and also make unique displays as part of an archaeological exhibit. A more detailed analysis of the use of peels at Nichoria will be published elsewhere.

In addition to the metal analyses reported on by S. R. B. Cooke, our laboratory has continued its studies of trace-element "fingerprinting" of potential source areas for Bronze Age copper and tin. We are now able to establish the provenience of native coppers for North America, even down to specific mines. Concomitant field work on copper and tin sources in Europe and Asia has continued. Associated smelting research to determine the partition of trace elements in metal and slag phases is also continuing and will be reported elsewhere.

GEORGE RAPP, JR.

ANALYSES OF COPPER/BRONZE SAMPLES

The analyses given in Table I were made on samples from a Middle Helladic I pit dug by R. Howell in 1972, all being from trench L23 FGop. Six of the samples were recovered from the gravity concentration (GC) operation, and consisted, when the corrosion products were removed by scraping under the microscope, of solid metal uncontaminated by oxide, carbonate or other material. The remaining two samples (Nos. 3215 and 3224), recovered directly by the trenchmaster, consisted of residual metallic grains bonded by the cuprous oxide corrosion product.

TABLE I

Emission Spectrographic Analyses

MME No.	%Sn	%Pb	Sb	As	Ni	Au	Ag
GC 3043 No. 1	0.11	~1.0	P	P	P	ND	P
GC 3160	0.07	0.5	P	P	P	ND	P
GC 3161 No. 1	0.15	0.5	P	P	P	P	P
GC 3164	0.02	> 1.0	P	P	P	ND	P
GC 3165	0.01	< 0.5	P	P	P	ND	P
GC 3180	2.40	~1.0	P	P	P	ND	P
3215	< 0.001	< 0.5	P	P	P	ND	P
3224	< 0.01	0.5	P	P	P	ND	P

P = present

ND = not detected

Notes

Analyses were made by the "total energy" method of Slavin (M. L. Slavin, *Industrial and Engineering Chemistry*, Analytical Edition, X, 1938, p. 407) using complete volatilization of accurately weighed samples and standards. At the time the analyses of Table I were made, standards containing known quantities of copper, tin, and lead only were available.

Except for sample GC 3180, it is unlikely that any fragment prepared for analysis came from an artifact. In fact, the shapes and surrounding materials suggested prills, drippings, or spatters normal to a melting and casting operation. GC 3180 was flatter than the others and was pierced by a hole.

Sample GC 3164 consisted of metal and its corrosion products attached to slag. None of the other samples was directly attached to slag, although several came from a total collection of pieces some of which were so identified.

Minor elements. Antimony and nickel occurred in all samples, the antimony in samples GC 3164 and GC 3180 being very low, probably little more than 0.004%. Arsenic was present in all samples, being very low in GC 3180 (probably not more than 0.05%), but in the remainder it was estimated to range from ~0.06 to 0.08%. Gold occurred only in GC 3161 No. 1 at about 1 oz. troy per short ton of metal. The very strong silver line at 3280.68 Å appeared in all eight samples at about equal intensity. Because it lies in the wing of the strong copper line at 3273.96 Å, no attempt was made to measure the line by photometer nor to estimate the silver content.

The tin analyses are correct to within $\pm 8\%$ of the amount reported. With the exception of sample GC 3180, the tin contents are quite low, ranging from about 0.001% (the detection limit) to 0.15%. Such small quantities of tin could have originated as a natural impurity occurring in the copper ores smelted for their copper content, particularly if ores derived from "gray" copper deposits were used. For example, Tylecote⁵⁰ gives tin analyses for "'Pure' Copper Artifacts from the (British)

⁵⁰ R. F. Tylecote, *Metallurgy in Archaeology*, Edward Arnold, 1962, Appendix A, p. 319.

Copper and Early Bronze Ages" as ranging from 0.04% to 0.31%. Tylecote employs the term "Pure" to mean coppers containing not more than 1% metal other than copper.

The tin content of GC 3180 is abnormally high to have originated in a copper ore. It may represent a deliberate addition of that metal in smelting or founding (melting), the adventitious addition of a piece of high-tin bronze in melting, or the importation of the alloy itself. A fourth possibility is discussed following Table II. Unquestionably, 2.4% tin would improve the physical properties of the metal, as compared with pure copper or the low-tin coppers given in Table I.

Table II shows the analyses of eleven other samples from the Nichoria excavation. For these samples fairly reliable standards containing known quantities of tin, lead, arsenic, antimony and bismuth were available. As in the case of the samples reported in Table I, the silver line at 3280 was uniformly strong in all the samples of Table II. The general remarks regarding lead, arsenic, nickel, gold and silver given above apply equally well to the analyses of Table II.

Samples 3424, SF 980, SF 1000 are low in tin, which could easily have been derived from the copper ore used in smelting. GC 3043 (Nos. 1 and 3) contain 1.3% Sn, and GC 3161 contains 1.2% Sn. These are higher than in the "Pure" copper artifacts of Tylecote, but cannot really be called tin-bronzes. It will be noted that these three samples contain by far the highest arsenic contents of any reported in Table II. They may represent a "trade-off" of arsenic for scarce tin to improve the physical properties of the alloys. The sums of Sn + As in the samples are respectively 3.64%, 2.59% and 3.45%, which should be fairly useful alloys.

TABLE II
Analyses of Eleven Copper/Bronze Samples From Nichoria

MME Number	%Sn	%Pb	%As	%Sb	%Bi	Fe	Ni	Au	Chronological Context
GC 3043 No. 3	1.3	0.55	1.29	0.09	0.050	—	P	P	MH
GC 3161 No. 2	1.2	0.60	2.25	0.12	0.020	—	P	P	MH
GC 3043 No. 2	1.3	0.62	2.34	0.12	0.020	—	P	Tr	MH
433	17.0	0.36	0.88	0.15	0.010	—	P	ND	MH-LHI
SF 1000	Tr	0.28	0.13	<0.04	0.010	—	P	Tr	LHIIA
SF 980	ND	0.94	0.19	<0.04	0.001	—	P	ND	LHIIA
3424	<0.1	0.91	0.13	<0.04	ND	5%+	P	ND	LHIIIA:2
SF 4656	9.3	1.08	0.48	0.16	0.014	—	P	P	LHIIIB-DA
GC 4084 No. 1	12.3	0.53	0.23	0.09	0.015	—	P	Tr	DA
SF 4842	25.0	0.76	0.14	0.15	0.001	—	P	ND	DA
4448	18.0	0.45	0.30	0.13	0.010	—	P	P	DAII

Symbols: Where percentages are not given, P > Tr > ND, in decreasing order of abundance, respectively.

P = Present. Nickel ranged from 0.05% to 0.15% (estimated), and gold ~0.003%.

Tr = Trace. The most sensitive line of the element was just detectable.

ND = Not Detected. Sn < 0.003%, Bi < 0.001%, Au < 0.001%.

Samples GC 4084, No. 1, and SF 4656 contain respectively 12.3% and 9.3% tin. These are true tin bronzes and fall within the limits imposed by skilled metallurgical craft. The high tin contents of samples 433, SF 4842, and 4448, respectively 17.0%, 25.0% and 18.0%, cause some disquiet. Tylecote⁵¹ reports tin analyses for (British) Bronze Age bronzes ranging up to 18.25% Sn for axes and palstaves, so that the two lower Nichoria analyses are perhaps not out of line. However, the 25% Sn of SF 4842 is very high.

A noteworthy characteristic of the Nichoria samples is the excessive oxidation to which they have been subjected. In the usual case there is an outer shell of malachite ($\text{CuCO}_3 \cdot \text{Cu(OH)}_2$) in which, very occasionally, there is minor replacement by azurite ($2\text{CuCO}_3 \cdot \text{Cu(OH)}_2$). Within the malachite, and in contact with any residual metal, is a shell of cuprite (Cu_2O). When corrosion has been extensive, individual grains of copper or bronze are separated by veinlets of cuprite.

During the corrosion of a piece of solid bronze, it is conceivable that the copper has leached out to form the cuprite and malachite, leaving the insoluble corrosion product of the tin, presumably the hydroxide or oxide, residual in the cuprite. Tin enters the lattice of malachite in only very minor quantities, so that unless the oxidation products of the tin occur as scattered but discrete particles in that mineral, it would be expected that the malachite would be very lean in tin.

Assuming topochemical corrosion of a sphere of bronze, eventual residence of the tin in only the cuprite and bronze, and the observed ratios of malachite-cuprite-bronze, it can be deduced that tin will be markedly enriched in cuprite and bronze relative to malachite.

Admittedly, this is speculative and experiments are now under way (1) to ascertain the tin distribution across the patina of a bronze oxidized by natural conditions, and (2) to develop a patina on a bronze sample of known composition subjected to the normal Eh, pH and carbon dioxide concentration conditions in a soil, followed by analysis of the patina for tin content.

Such a mechanism may account for unusually high tin contents of samples from which all corrosion products have not been removed prior to analysis.

Finally, if we look at the percentages of tin in these analyses in relation to chronology (assigned from pottery dates), the following points emerge. Three of eleven Middle Helladic specimens contain 1.2 or 1.3% tin and one contains 2.4% tin. We believe these represent deliberate additions of tin somewhere in the history of these materials. Because of the high tin content, sample 433 (17%), assigned a stratigraphic age of "M.H. to L.H.I," probably should be assigned to the Late Helladic.

The three samples from pure (unmixed pottery) Late Helladic lots are, interestingly enough, all "pure" coppers. Although additional analyses now in progress will no doubt change this, the evidence clearly indicates either (1) the continued use of

⁵¹ *Ibid.*, Table C, pp. 322-323.

unalloyed copper for implements during Late Helladic or (2) the use of copper for on-site alloying with tin in a local L.H. bronze-smithy. Concomitant study of Nichoria prehistoric slags seems to indicate that melting (or remelting) rather than smelting was employed there. This includes the possibility of on-site alloying of copper and tin.

All Dark Age samples are high-tin bronzes and undoubtedly represent the continuation of a sophisticated bronze metallurgy during development of an iron metallurgy in the southwestern Peloponnese.

The high iron content of No. 3424 (LHIIIA:2) requires some comment. In drilling a metallic specimen for analysis there is no discrimination between the copper or bronze on the one hand, and inclusions of slag or of other inhomogeneities on the other. Because the copper smelting slags contain much iron which subsequently crystallizes as fayalite, pyroxene, and frequently as abundant magnetite, and because very many of the Nichoria slags made in remelting are of the same nature, it is reasonable to assert that some of the iron reported in analyses originates in the slag inclusions.

However, sample No. 3424 is remarkably ferromagnetic—the whole specimen clings to a hand magnet—a property which would not be conferred by even massive quantities of magnetite within the metal.

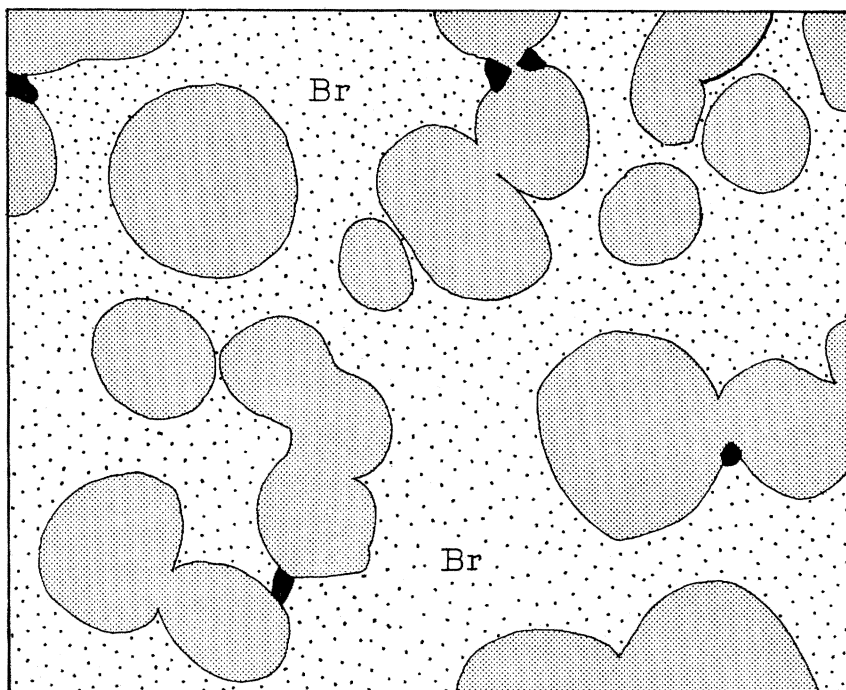


FIG. 8. $\times 2100$; unetched polished section of Nichoria No. 3424. Alpha-iron grains (shaded areas) in bronze (Br). The black phase is "primary" copper oxide (Cu_2O). The stippling of the bronze indicates finely divided exsolved iron. The original photographic print shows disseminated exsolved bronze in the alpha-iron.

The original specimen was roughly triangular, about 32 mm. along the base by about 25 mm. along the two sides. It was approximately plane-parallel, the thickness ranging from 7 to 9 mm. Whether it is a portion of an artifact or is a discarded piece of metal is indeterminate. The analysis reported was made from a single drilling extending about 5 mm. into one of the plane faces, and made after removal of surface oxidation products.

Samples for metallographic examination were secured by cutting with a diamond saw across the specimen, perpendicular to the parallel faces. These were mounted and polished by standard metallographic procedures.

They contained primary cuprite (Cu_2O), secondary cuprite originating from corrosion along the exposed edges and cracks in the metal, minor quantities of slag and small blowholes, and major quantities of bronze and metallic iron as alpha-iron (ferrite). Along one edge the ferrite occurred as spheroidal particles scattered at random through the bronze with some tendency to local concentration, and exhibiting some coalescence (Fig. 8). Toward the opposite edge the ferrite increased steadily in concentration until, macroscopically, it appeared as bands of ferrite parallel to that edge. Microscopically, these bands consisted of partly to wholly coalesced iron (Fig. 9).

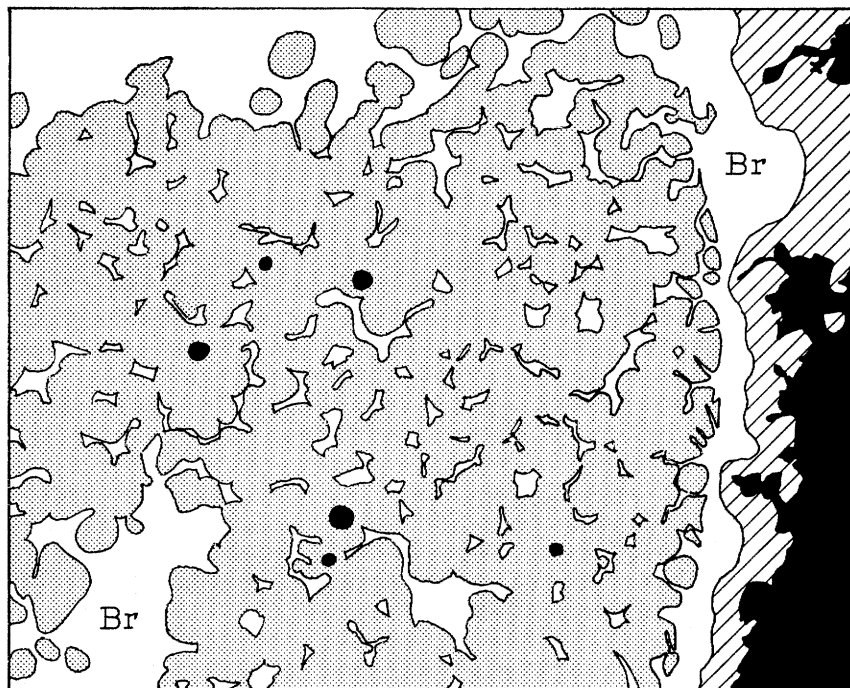


FIG. 9. $\times 135$; unetched polished section of Nichoria No. 3424. The irregular edge on the right is the corrosion edge, bounded by "secondary" copper oxide (lined). The shaded areas consist of partly coalesced grains of alpha-iron in the bronze (Br) matrix. The rounded black areas in the iron are blowholes formed by entrapment of gas during solidification.

Because of the very limited solubility of iron in either copper or bronze, and of copper or bronze in iron at temperatures below 600°C, the specimen is an excellent example of exsolution of the two metals, mutually soluble in the completely liquid state at much higher temperatures as governed by the relative amounts of the two metals. It also exemplifies gravity differentiation, the lighter iron segregating toward the upper surface in the denser bronze.

By chance, the sampling drill penetrated the specimen in a region of lower iron concentration. If it had penetrated from the upper surface, the iron analysis would have been much greater.

This example of copper/bronze containing metallic iron is not an isolated case, since of the 55 metallic samples from Nichoria so far examined, some 25% are strongly ferromagnetic. Samples from other parts of the Mediterranean show the same behavior, yet examination of analytical data available in the literature does not show high iron contents in coppers and bronzes, and to our knowledge the phenomenon described above has not been previously recorded.

S. R. B. COOKE

SUMMARY

After six strenuous campaigns amounting to over 40 weeks of full-scale excavation, only a fraction of the area of the hilltop showing evidence of habitation has been dug intensively. The total extent is in the neighborhood of 50,000 sq. m., whereas we have explored trenches totaling about 5,000 sq. m. Furthermore, relatively few of the productive trenches have been dug to undisturbed soil, either because we chose not to destroy important structures and other features or because we lacked the time to investigate earlier levels. Much additional information could be gained in various parts of the site, both in fields we purchased and in others still privately owned. Deep tests have proved that, particularly in Area IV and in the field immediately to the east owned by Panagiotes Athanasopoulos of Karpophora village, there are relatively well preserved Early Mycenaean levels under 2 meters and more of overburden.

Yet, in hindsight, we have few regrets about the areas we chose to investigate or the use of finite resources in the investigation. We have already learned a good deal about the natural and man-made changes in topography and site profile, about what parts of the hilltop were inhabited in what periods, about the changing local ecology, about village layout, construction methods, crafts, diet, health, agriculture, herding, regional and foreign contacts, burial customs, and so on. Little, if any, further "clean-up" excavation is contemplated, but thorough study of the various categories of material removed from the site is a daunting prospect. From 1972 and 1973 alone there are over 800 separate lots of pottery and almost 600 lots of animal bones. Catalogued small finds number over 2,000. Most of the vase mending remains to be done, and at

least 200 examples can be partially or wholly restored. Key samples of seeds, charcoals, metals, and clay building materials await systematic analysis.

In this situation, any attempt at a detailed synthesis of the present evidence would be incomplete and perhaps misleading. But some concluding remarks about our present impressions of the site's history may be appropriate. With the exception of Malthi, Nichoria is the only prehistoric settlement in southwestern Peloponnese that has been investigated "in depth." Howell's brief remarks above (p. 111) suggest that our results will serve to modify Valmin's claims about Malthi's early history. Indeed, these two local centers now seem to have played very similar roles through late Middle and Late Helladic times. On the other hand, Nichoria's Middle Helladic I settlement and particularly its Dark Age phases appear to have no parallel at Malthi. Nor did Valmin believe that the traces of medieval habitation at Malthi merited much comment.

It appears that throughout Middle Helladic times the inhabitants of the Nichoria hilltop formed a rather self-contained community.⁵² The earliest village seems to have been very small and centered on the narrow neck (Area V) between deep gullies cutting into the ridge from east and west. Only one M.H.I building and a few fragments of contemporary foundations have been discovered in this heavily eroded part of the site. There is also some important evidence here on the earliest metallurgy on the site.

In the latter part of the Middle Helladic phase there is evidence for Minoan influence on the pottery, and the inhabited area expanded considerably. The northwest acropolis (Area II) was then occupied, as is proved by pottery found in pockets in bedrock and spilled over the northwest slope (Area I), and particularly by over 4 meters of fill containing unmixed late M.H. debris washed into a deep ravine to the south in Area III. In Area IV South we also find fairly plentiful unstratified late M.H. pottery, perhaps wash from higher up. In Areas VI and VII at the southeast end of the ridge there was also settlement by the M.H./L.H.I transition. It is probable, however, that the ridge at that time still had a very modest number of families which were scattered rather widely. Although in the transition the increasing influence of Crete can be clearly documented in the pottery, we have seen no evidence that would suggest even economic, let alone political, domination from any outside source. No burials from M.H. times or the M.H./L.H.I transition have been found on the acropolis.⁵³

To judge from the quantity and distribution of pottery and other debris, the population increased considerably in Late Helladic I, and notably in the Late Helladic II period. There are fragments of L.H.II structures and terrace walls in Areas II and

⁵² McDonald and Rapp, *op. cit.* (note 45), pp. 133–136.

⁵³ Dr. Choremis (*op. cit.* [note 25], pp. 39–45) believes that the little "Nikitopoulou No. 4" tholos may have been constructed as early as the M.H./L.H.I transition. For the location of these tombs in relation to the Nichoria ridge, see Choremis' plate A.

VII, and particularly in Area IV. Indeed, the foundations of a major building complex seem to be preserved beneath a later Mycenaean complex in a level barely reached in Area IV Southeast. Also, we can now state that the earliest burials in the Little Circle in Area I belong to the end of L.H.I or the beginning of L.H.IIA. In addition, the recent publication by Dr. Choremis of the results of the earlier work of our Greek collaborators in the cemeteries surrounding Nichoria shows that the "Veve tholos" was constructed at about the same time. The small "Nikitopoulou No. 4" tholos, and probably "Nikitopoulou No. 5" as well, were in use in Late Helladic I.⁵⁴ Hence, it may be inferred with fair confidence that in Early Mycenaean times Nichoria was the center of an emerging political and social unit of considerable complexity.

The presence of one or more tholos tombs is normally considered as proof of the existence of a local "royal" dynasty. We do not know whether the Early Mycenaean "kings" of Nichoria would have controlled territory and even villages that lay much beyond the orbit of the M.H. village in its most prosperous phase. If the obvious wealth and associated power of the Nichoria rulers rested solely on control of the resources and labor available in this single community, we can probably infer that exploitation of land resources in the immediate environs was very intensive, that considerable trade by land and sea contributed to the economy, and that the population was larger than is indicated by the evidence we have uncovered on the acropolis itself.

Messenia is becoming well known for the early dates of some of its tholoi and for the ubiquity of these distinctive monuments in all Late Bronze phases. One begins to wonder if we are justified in believing that each tholos or cluster of tholoi built before L.H.IIIB is sufficient proof of a fully autonomous and self-sufficient political unit and that only "royalty" was buried in them. In the present state of our knowledge, however, the burden of proof would seem to rest with those who doubt this axiom. Such "petty kingdoms" might well be regarded as a natural historical link between the smaller and presumably autonomous M.H. villages and the well-known and relatively large L.H.IIIB kingdoms that are demonstrated in the Linear B tablets and presumably reflected in Homer's Catalogue of Ships.

The explanation is still far from clear and problems multiply. For instance, in the spring of 1973 while trying to recruit workmen in Daphni, a village about 2.5 km. to the north of Rizomilo, gossip about a local landowner removing large quantities of stone in a nearby field led to the identification of still another tholos tomb.⁵⁵ The site, although on the line of what was apparently the ancient road leading north from Nichoria, seems too distant to permit one to connect this tholos with those at Nichoria, and furthermore there are possible indications of a Mycenaean settlement near the Daphni tholos. Can we imagine the focus of a fully autonomous and separate

⁵⁴ Choremis, *op. cit.* (note 25), pp. 30-32, 39-45, 49-60.

⁵⁵ The discovery was immediately reported to Miss Styliana Parlama, ephor at Olympia, who investigated the tomb in the fall of 1973.

“kingdom” within 3 km. of Nichoria and with resources sufficient to provide the “king” with a “royal” tomb? Ought we, instead, to begin thinking of other possible explanations of the known data? For instance, a ruling family that had got control of a district of some extent may have designated “princes of the line” or favorite “courtiers” as resident supervisors in a number of villages or towns that were not fully independent politically, and the local representatives may have followed the royal burial practices of the “capital” as best they could.

The 14th century B.C. seems to have marked the acme of population and prosperity on Nichoria ridge. The gross bulk of L.H.IIIA pottery recovered in our trenches would tend to confirm such a hypothesis. So would the number of relatively well preserved house foundations in Areas II, III, IV and VII. Furthermore, the remarkable agreement of the Area IV buildings in orientation suggests some kind of over-all town planning, although we have recovered the definite line of only one major street.⁵⁶ The impressive Nichoria tholos tomb (Unit I-2), excavated jointly by MME and the Greek Service and briefly described above, was built in this period. It is of the conventional type excavated into a slope, whereas Choremis’ “Veve tholos,” 200 meters to the west, seems to have been built entirely above ground and much earlier, though it seems still to have been in use through L.H.IIIB.⁵⁷ Unit I-2 was apparently the most important local building project of the period, combining as it does architectural monumentality and commanding situation at the very entrance to the northwest acropolis.⁵⁸ Unless or until convincing evidence to the contrary emerges, this tholos can be considered as *the* burial place of *the* ruling family in the 14th and even into the 13th century. The quantity and quality of surviving gifts from these burials at least dimly reflects the apparent fact that local prosperity reached a peak in this period. As for the “palace” in L.H.IIIA times, there are some grounds for suggesting that the L.H.IIIA1 complex in Area IV Southeast (i.e. in the central saddle of the ridge) might have served this purpose—and perhaps also the L.H.II complex that underlies it. But it is very doubtful if we shall be able to do the additional excavation that might settle the identification one way or the other.

We have formed rather shifting opinions over the course of the excavation about the relative importance of our site in the 13th century B.C. In general it would appear that L.H.IIIB pottery and other datable material is smaller in bulk and less widely

⁵⁶ McDonald, “Excavations at Nichoria,” pp. 246–248. The apparently unbuilt-on space between the north outside wall of the complex in Area IV Southeast and the nearest contemporary structures discovered further north in Area IV may very well represent the line of another street. Its orientation conforms to that typical for L.H.IIIA buildings.

⁵⁷ Choremis, *op. cit.* (note 25), pp. 49–60.

⁵⁸ An explanation must be sought for the approximately contemporaneous date (L.H.IIIA1 into L.H.IIIB) attributed to his little “Nikitopoulou No. 3” tholos by Dr. Choremis (pp. 32–39). An attractive analogy now emerges with Dr. Korres’ excavations at Koukounara, where the numerous circular structures seem to be burial places of prosperous families.

spread over the hilltop than is the evidence for habitation in L.H.IIIA.⁵⁹ In Area II there is some evidence for rebuilding houses on or over L.H.IIIA foundations, but this area has suffered so much from erosion and probably from illicit digging that securely stratified proof of building activity in L.H.IIIB may be lacking. On the other hand, it is quite certain that several houses in Areas III and IV that were originally constructed in L.H.IIIA were used and sometimes modified in L.H.IIIB. No close absolute date can be assigned to the apsidal Unit III-3, but it seems to have been built some time in L.H.IIIB. The duration of its use is even less certain, but it was in ruins and a quarry for building stone in the Dark Age. Since the apsidal type of ground plan is well known in both Middle Helladic and Early Iron Age domestic construction, the lineage of our Unit III-3 is intriguing.

We can surely take it as given that the L.H.IIIB town belonged to the kingdom of Pylos and that its original name must be one of the more important place names recurring in the Pylos tablets. Before the excavation began, Dr. John Chadwick as well as others theorized that the location and size of the site on Nichoria ridge pointed to its identification as RE-U-KO-TO-RO, the subsidiary capital of the Further Province. Hence, there was some reason for hoping to find Linear B tablets in the ruins of the "palace" of the "sub-capital." As a matter of fact, we have located neither a "palace" nor inscribed clay tablets. A single sherd that seems to bear an incised Linear B symbol is the only indication that any of the inhabitants may have been literate.

The most likely location for the home of the rulers of Nichoria would be on one of the acropoleis which rise at either end of the ridge. That toward the southeast end (Area VI) proved to be totally innocent of Mycenaean ruins, though deep deposits of L.H.II-IIIB debris were swept down its slopes by man or by erosion. The acropolis at the northwest end of the ridge (Area II) has also suffered severely, yet it does still show substantial foundations of several late Mycenaean buildings. In their present condition they do not, however, seem to have belonged to one large complex such as we are conditioned to expect for a "palace" whose inhabitants were buried in tholos tombs. However, there is no reason, except for the analogy of the tholoi, to insist that the homes of local chiefs in Late Mycenaean times had to be imitations of the great palaces at Pylos, Tiryns and Mycenae.

There is very little evidence to suggest that the L.H.IIIB buildings suffered a general conflagration. Hence, in the rather unlikely case that a provincial town like ours did once have an archive, the sun-dried clay tablets would have returned to the

⁵⁹ Choremis publishes a small tholos ("Nikitopoulou No. 6," pp. 45-49) and a chamber tomb ("Rizomilou," pp. 60-62) that were built in L.H.IIIB. Both are said to have continued in use in L.H.IIIC. Another IIIB chamber tomb in the northwest outskirts of Rizomilo village is still unpublished. Our tholos tomb continued in use until late in IIIB and several small slab-built cists for child burials on the acropolis are probably to be placed in the same period.

earth from which they came. Furthermore, we should probably abandon the hypothesis that Nichoria is the site of the regional sub-capital. Cynthia Shelmerdine, one of our staff members, and Dr. Chadwick have recently come to the conclusion that the important site called TI-MI-TO-A-KE-E in the tablets was in the southwest quadrant of the Further Province, and that it rather than RE-U-KO-TO-RO is the name most probably to be equated with Nichoria.⁶⁰

A key issue in interpreting the history of the Nichoria settlement is the question of continuity of habitation and—even more important—the extent of cultural continuity in the transitional centuries from Late Bronze to Early Iron. Here, perhaps, our investigations can be expected to make their most important contribution to Greek prehistoric studies. The evidence from the cemeteries, derived from excavation and salvage efforts of several members of the Greek Archaeological Service, will also be crucial. There is no question about use of both acropolis and cemetery in Protogeometric times, after about mid-11th century B.C. But what was the situation in the previous century and a half, conventionally referred to as L.H.IIIC? Dr. Choremis seems to assume from the grave goods that at least a few families continued to live in the immediate vicinity throughout L.H.IIIC.⁶¹ And it is of course possible that, beginning in L.H.IIIB, there was a trend to desert the acropolis while using the same burial ground. Our most difficult problem is to decide whether the evidence we have will now support our earlier impression that the acropolis was not totally abandoned. Unfortunately, the scattered pottery that might be classed as L.H.IIIC is nowhere connected with structures or house floors. Both Dickinson and Coulson have emphasized above that, in the absence of a firm local and regional typology, at least some of the pottery with characteristics that we earlier assigned to L.H.IIIC may in fact be later.

To balance this uncertainty, however, our material for the Early Iron Age is fairly abundant and much of it is stratified. Coulson's new seriation represents a valuable break-through. The big apsidal Unit IV-1 seems to have been constructed in the 10th century B.C. It is an impressive and intriguing building, although its domestic vs. public function(s) is still debatable. It was succeeded a century or so later by the partially preserved Unit IV-5, apparently of similar plan and function but facing north instead of east. These were certainly not ordinary houses, and the massive timber frame proved for the earlier structure suggests that large trees existed in the neighborhood. The microfaunal remains in a pithos situated in the courtyard of a somewhat later Geometric house (rebuilt over mainly Late Helladic foundations)

⁶⁰ Shelmerdine, "The Pylos MA Tablets Reconsidered," *A. J. A.*, LXXVII, 1973, pp. 261-275; Chadwick, "The Geography of the Further Province of Pylos," *A. J. A.*, LXXVII, 1973, pp. 276-278.

⁶¹ He cites L.H.IIIC material in earlier tholoi and particularly the very interesting tomb (*op. cit.* [note 25], pp. 62-74) that has all characteristics of a tholos and at the same time presages the apsidal stone-lined cists of Protogeometric times.

provide another measure of the local micro-environment. The scanty Dark Age material from Area II, the considerable debris of this period in Area III, and the deeper contemporary strata in Area IV attest to the original existence on the ridge of a good-sized village. Probably most of the buildings were rather flimsy huts like the little apsidal Unit III-1.⁶²

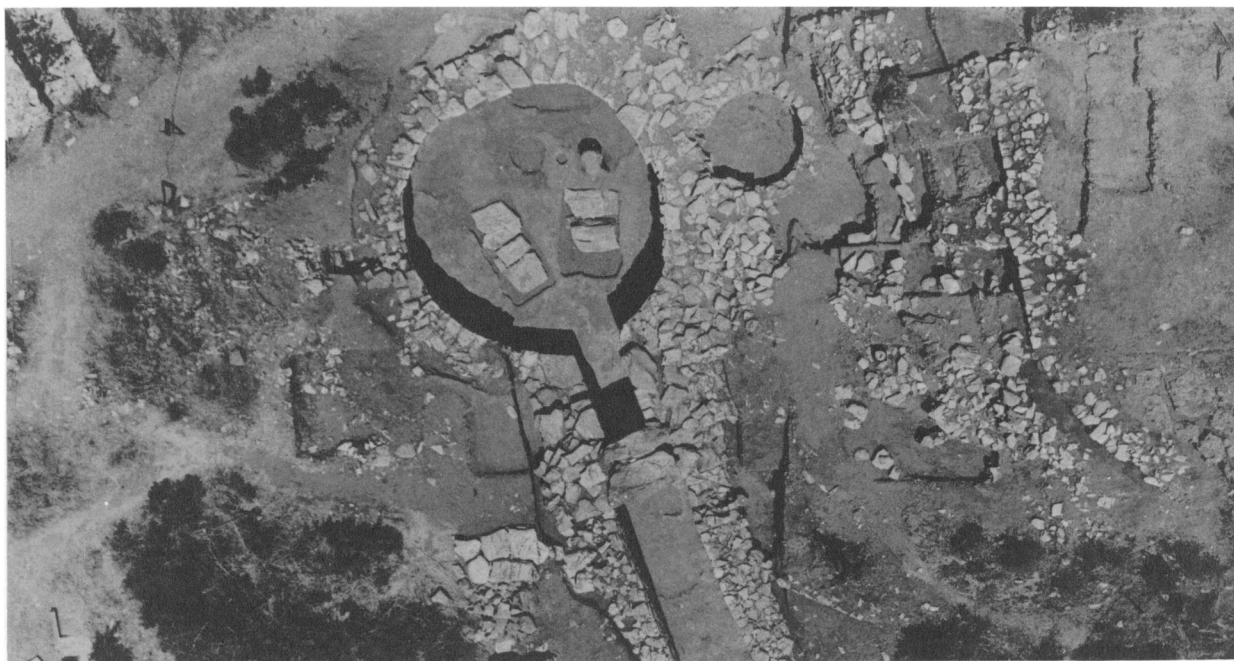
We have a good deal of evidence showing that the Early Iron Age population leveled off the tumbled remains of the heavier Late Mycenaean structures. Indeed, L.H.III walls may still have protruded above the surface. Some were certainly re-used for Dark Age structures. The "owners" of the hilltop in the later first millennium B.C. and in the first millennium after Christ would have found much of it an almost impossible surface to cultivate. It appears, in fact, that when medieval settlers once again built on it, they had in some places to carry out the same kind of leveling of Geometric debris that had been necessary 1500 years before, and they would not have had to look far for suitable building stone. Since Dr. Rosser, our Byzantine expert, joined us only in 1973, we refrain from attempting any generalizations about the medieval structures or their contents until his studies have progressed a good deal further.

One final note. It is most disturbing for those of us who have dug for six campaigns on a site where Middle Helladic, Late Helladic, Early Iron Age and Byzantine levels and structures can generally be quite clearly distinguished, to hear and read recurring remarks about the possibility that terracotta roof tiles were in use on the mainland in prehistoric times after the Early Bronze Age. Any excavator familiar with the masses of broken roof tiles in the collapsed ruins of a building with tiled roof (Classical or later) could never be misled by the occasional piece of pithos or water conduit that may be found in a Late Helladic, or possibly in a Middle Helladic or Early Iron Age building. For this one site in Messenia at least, we can state with absolute assurance that no excavated building before Byzantine times was roofed with terracotta tiles.

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⁶² McDonald, "Excavations at Nichoria," pp. 251, 264.



a. Tholos with Little Circle adjoining to right (east)



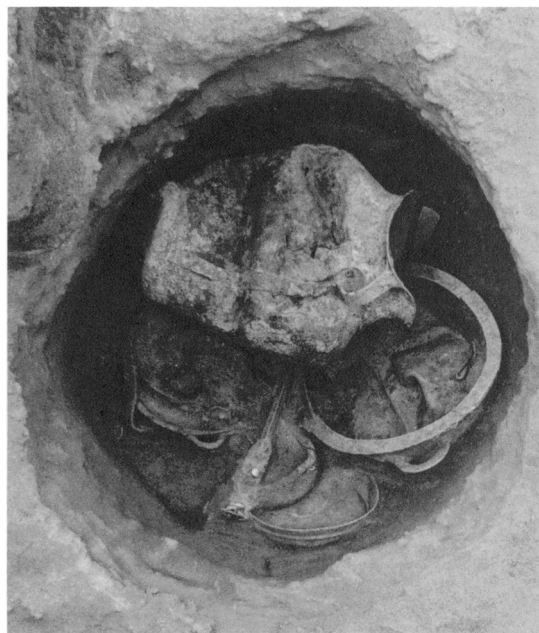
b. Upper burials in Little Circle



c. Squat jug associated with earliest burials in Little Circle



a. Tholos tomb, Unit I-2



b. Bronze hoard, Pit 3, tholos



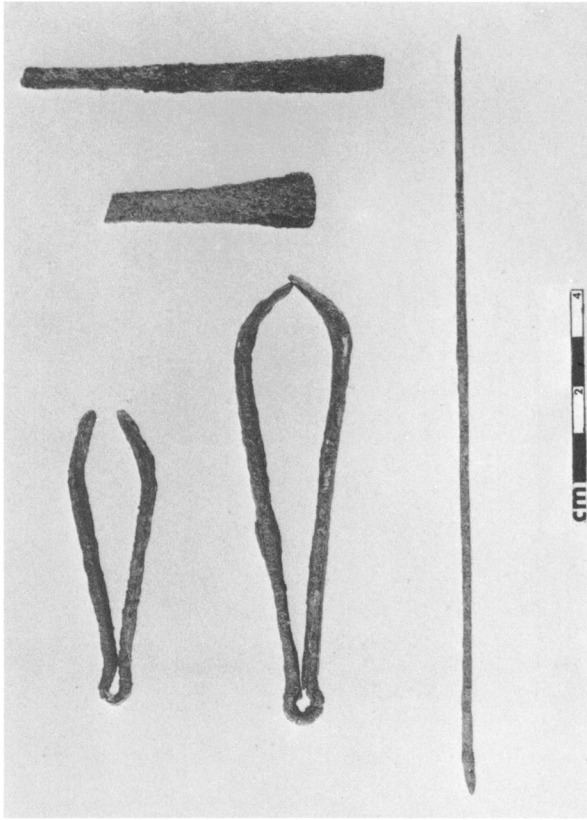
c. Dromos and stomion of tholos, looking northwest



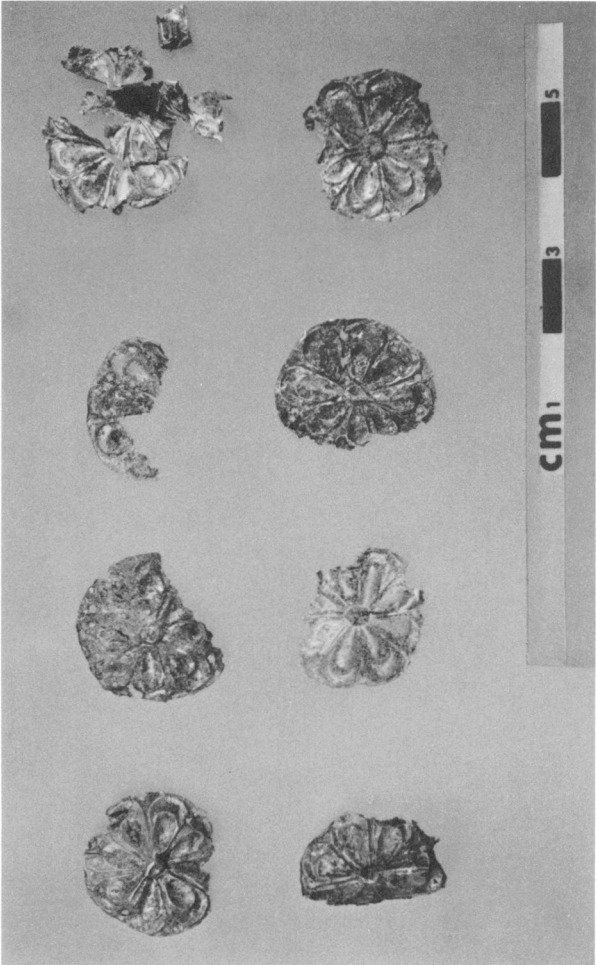
d. Blocking wall in doorway of tholos



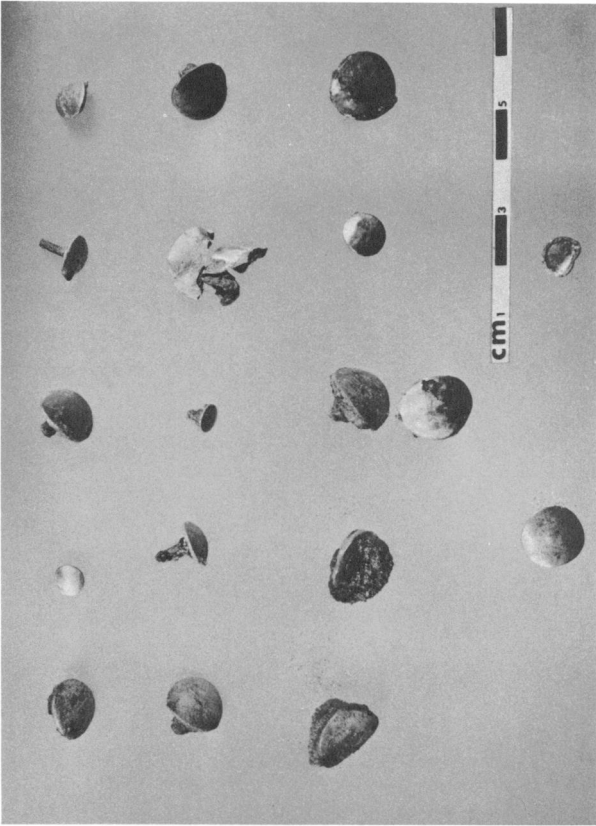
a. Black-glaze mug from tholos



b. Bronze tweezers from tholos chamber

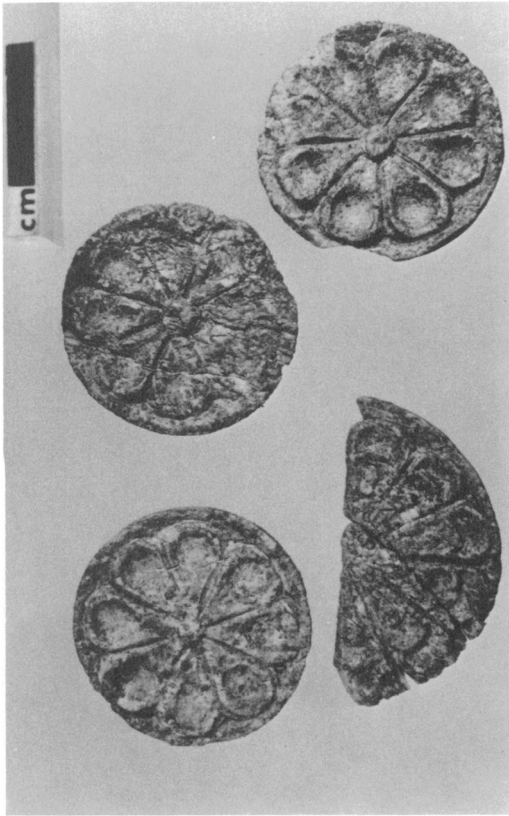


c. Gold rosettes from tholos chamber

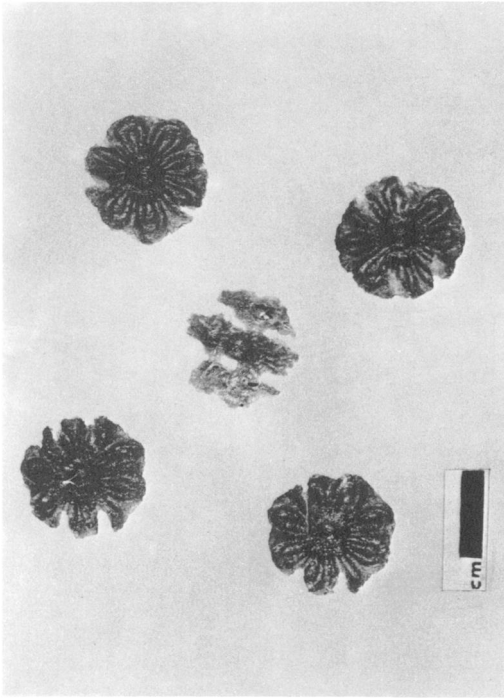


d. Rivet heads from tholos chamber

WILLIAM A. McDONALD: EXCAVATIONS AT NICHORIA IN MESSENIA: 1972-1973



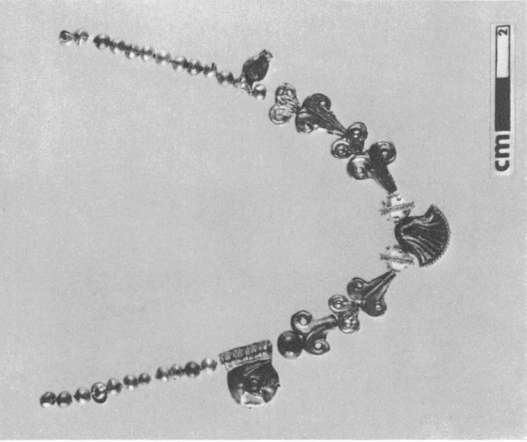
a. Ivory rosettes from tholos chamber



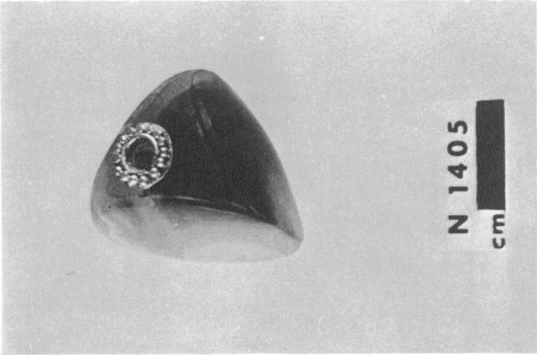
b. Blue-glass rosettes from tholos chamber



c. Amber beads from tholos chamber



d. Gold relief-beads from tholos chamber

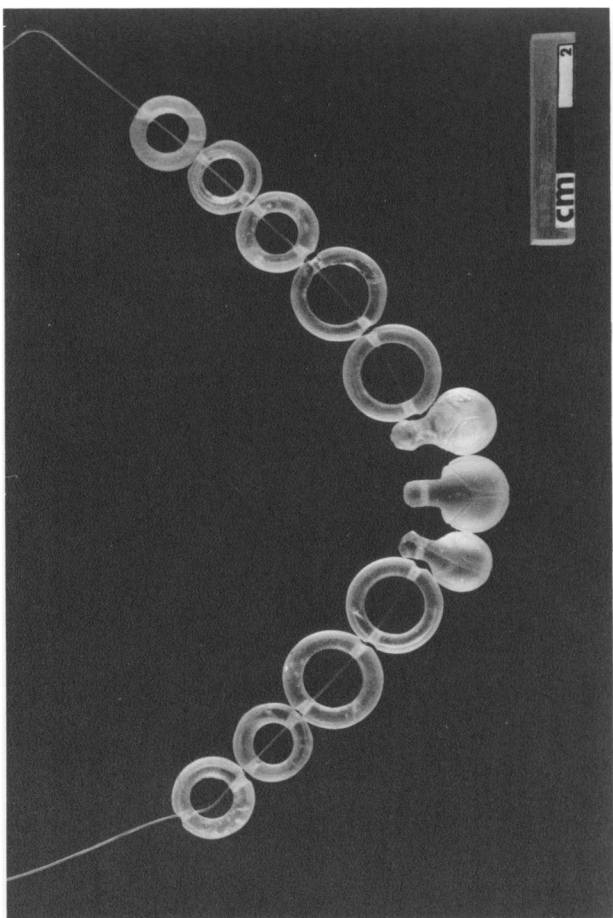


e. Prismatic agate with gold mount

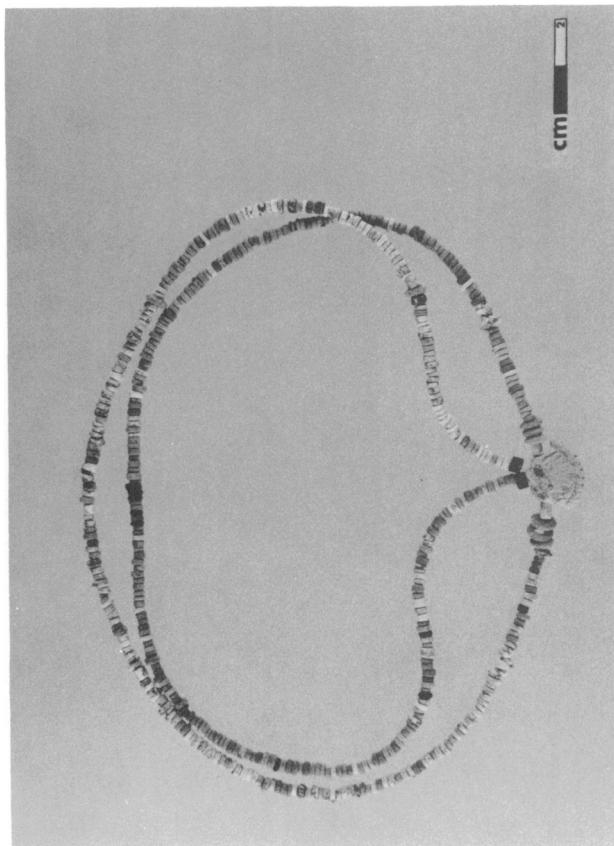
WILLIAM A. McDONALD: EXCAVATIONS AT NICHORIA IN MESSEIA: 1972-1973



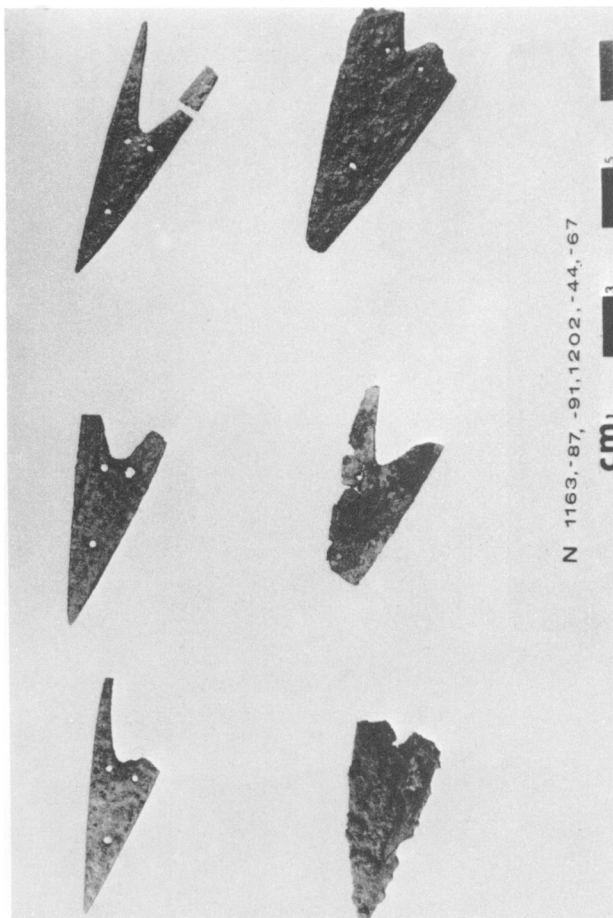
a. Carnelian and amethyst beads from tholos chamber



b. Rock-crystal beads from tholos chamber



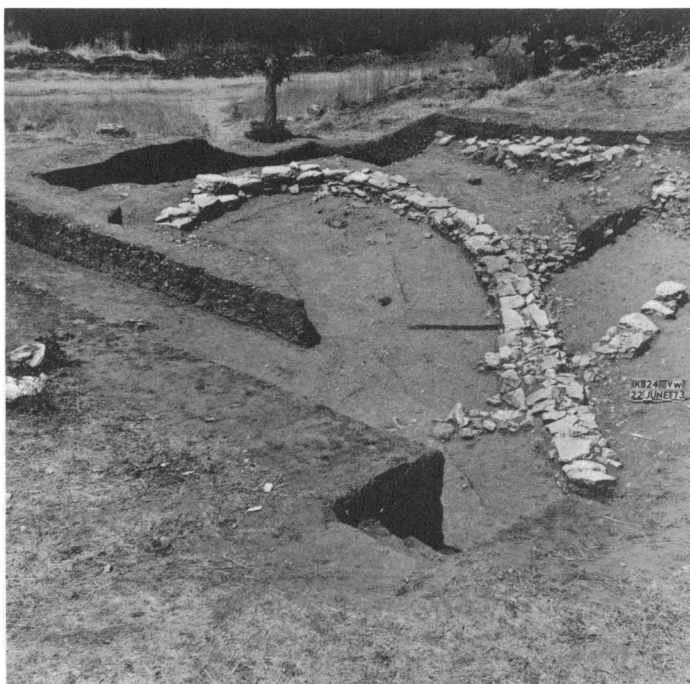
c. Faience disc beads from tholos chamber



d. Bronze arrowheads from tholos chamber



a. Area III from balloon



b. Unit III-3



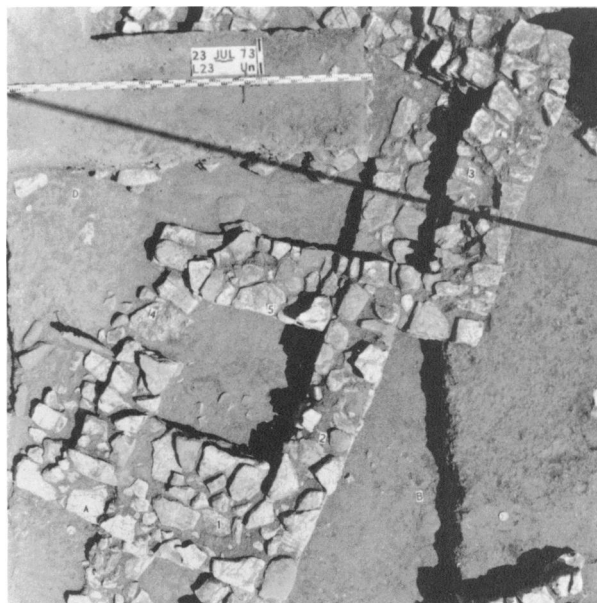
c. Unit III-4



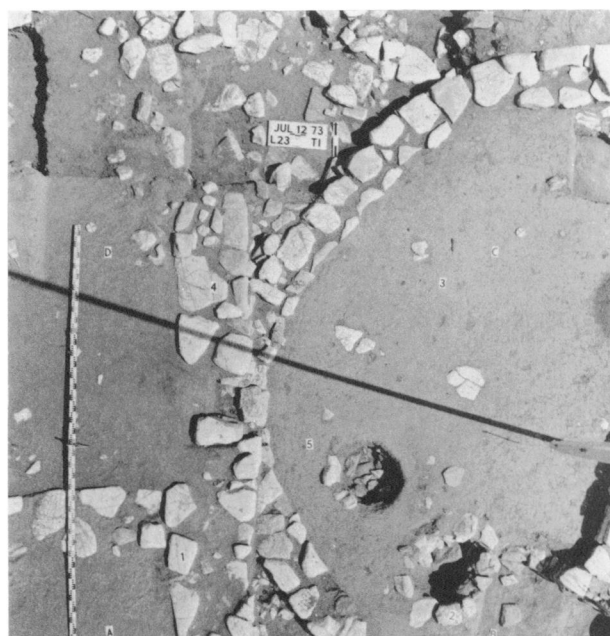
d. Bronze shield boss (?), Unit IV-1



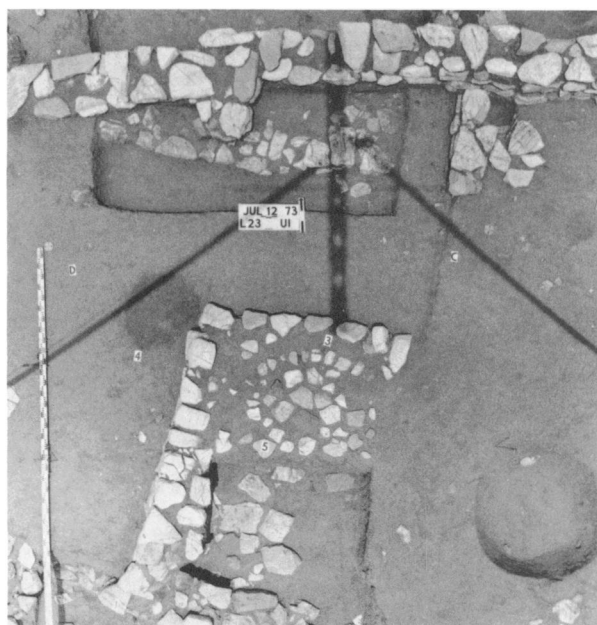
a. Unit IV-1



b. Unit IV-7, looking northeast



c. Apsidal end, Unit IV-1, slightly overlaid by Unit IV-5



d. Altar (?), Unit IV-1



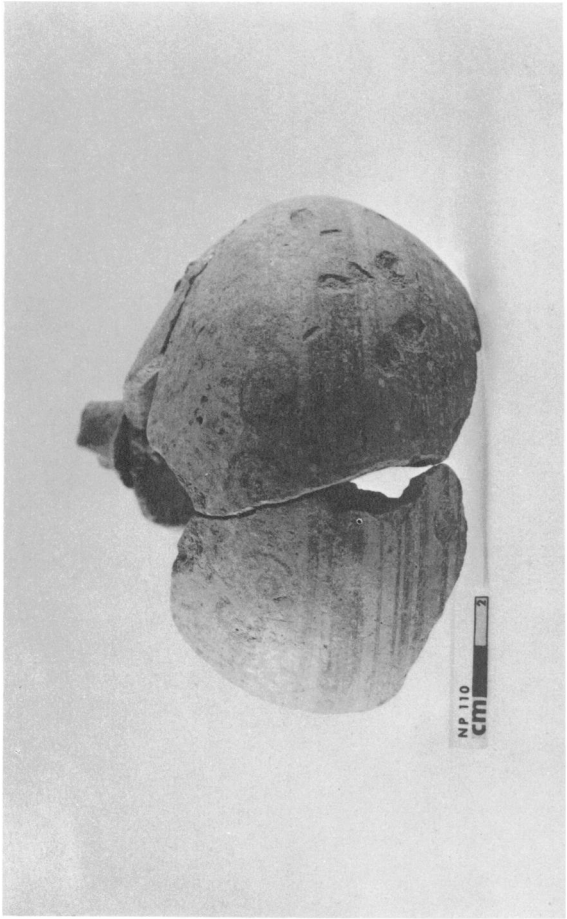
e. Courtyard and vestibule, Unit IV-1



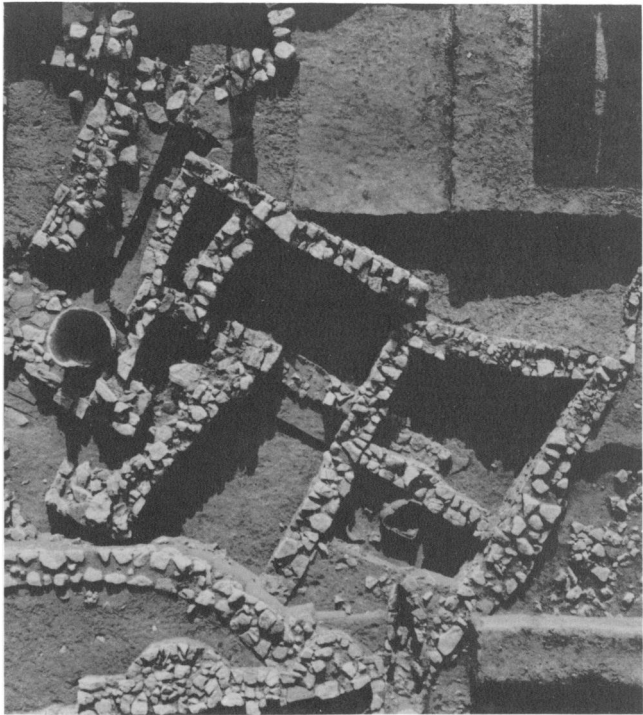
f. Unit IV-3, looking north



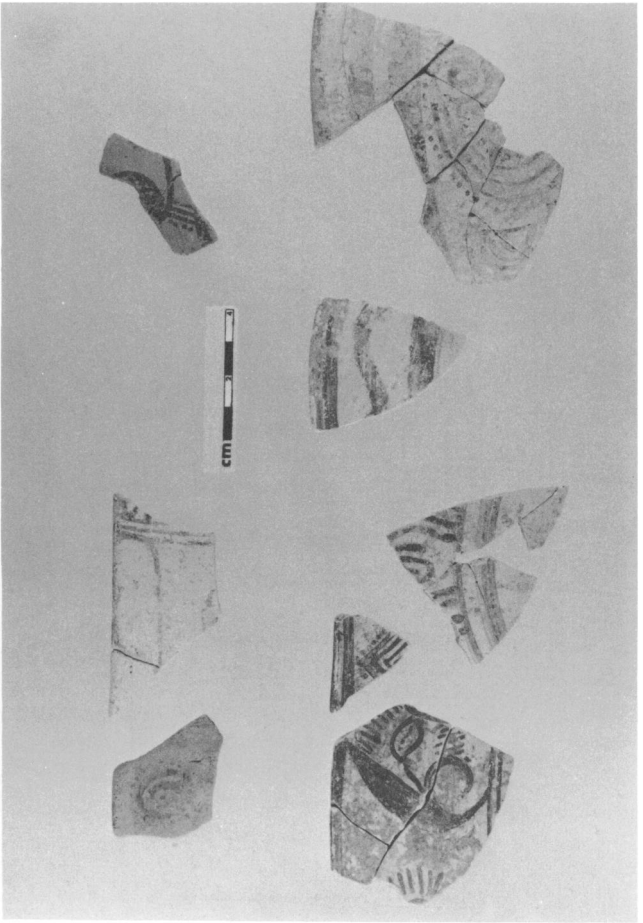
a. Dark Age skyphos, Area IV Northwest



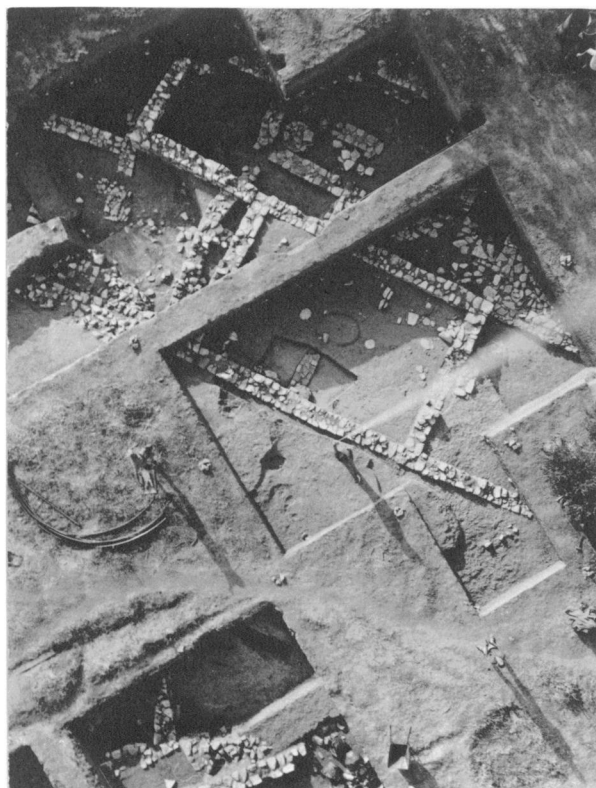
b. Stirrup jar, Unit IV-6



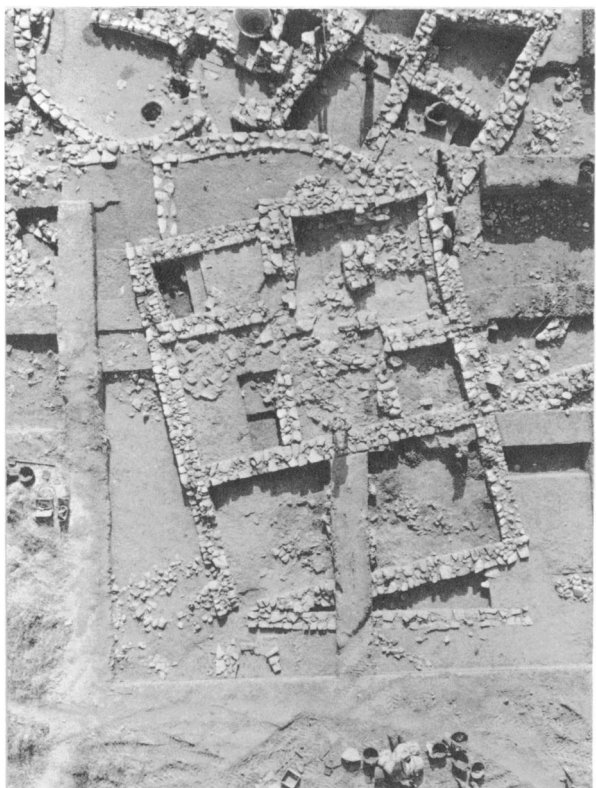
c. Unit IV-6



d. Sherds from Unit IV-6



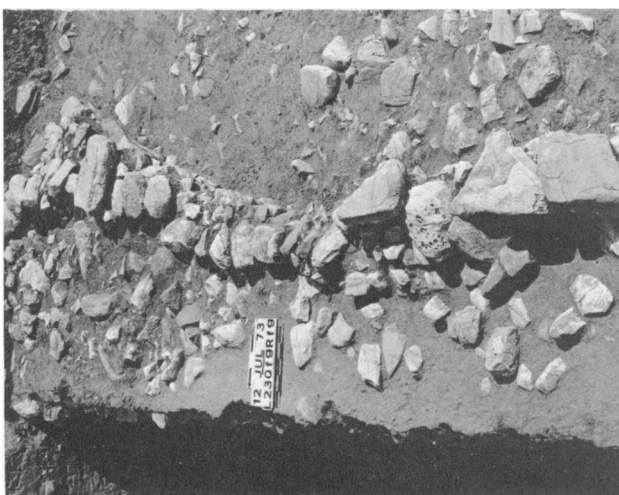
a. Unit IV-4 from balloon



b. Unit IV-2

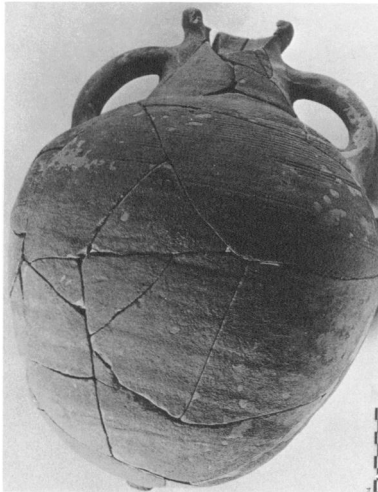


c. Curving terrace wall, Area IV Southwest

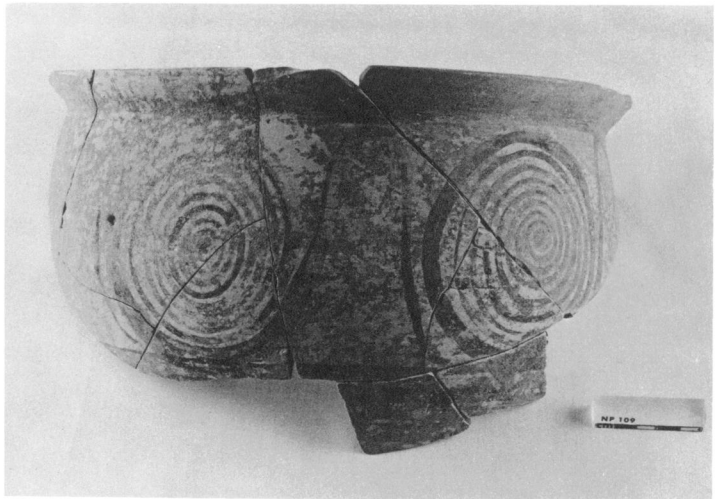


d. Classical wall (?), Area IV Southwest

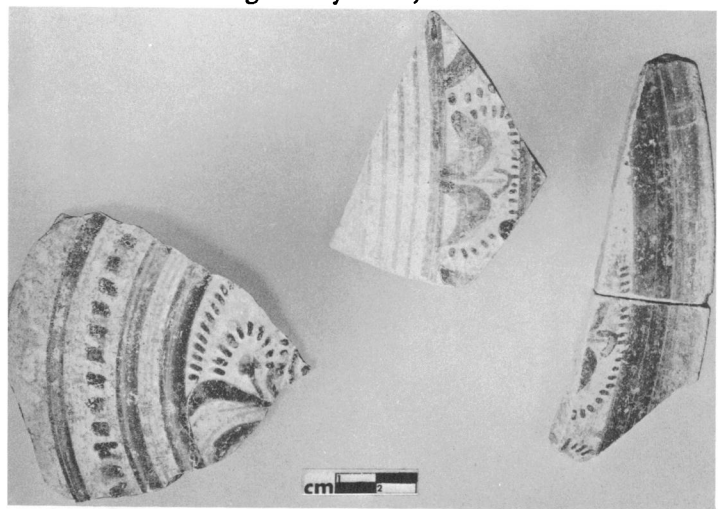
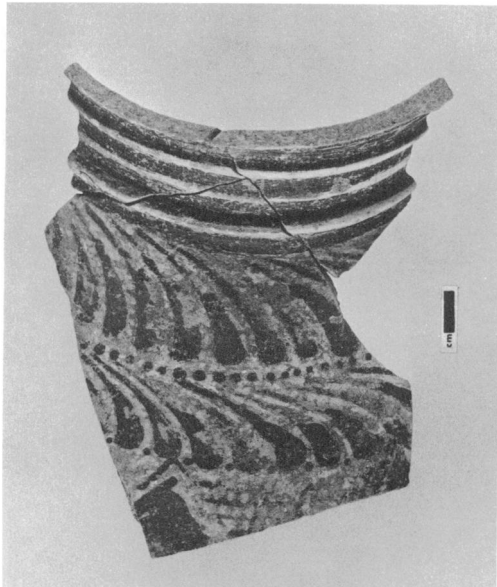
WILLIAM A. McDONALD: EXCAVATIONS AT NICHORIA IN MESSENIA: 1972-1973



a. Byzantine amphora, Unit IV-2



b. Fragmentary krater, Unit IV-4

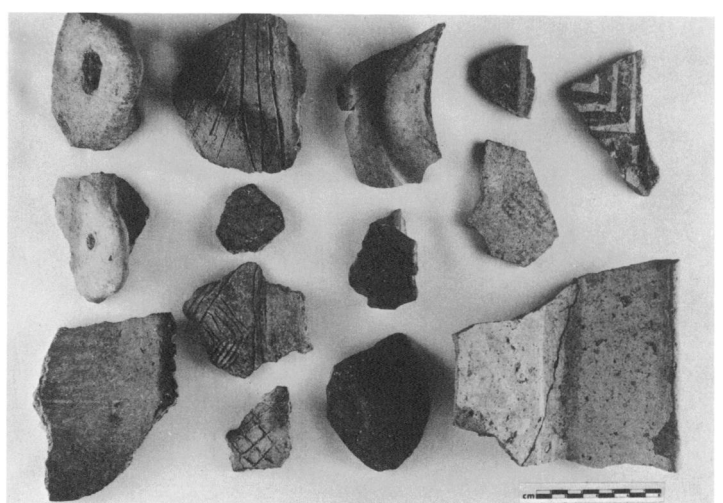


d. Sherds with flower pattern

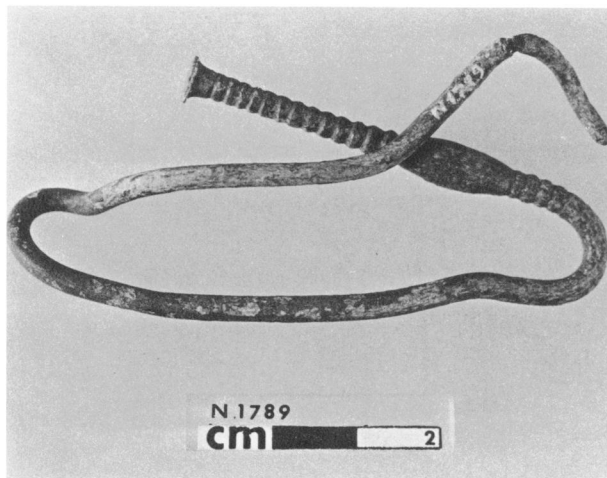
c. Fragment of "palatial" style



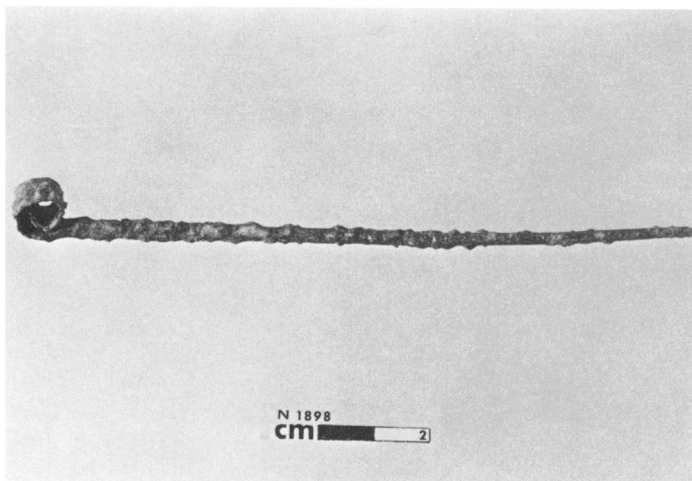
e. Fragments of Classical neck — amphora



f. Middle Helladic I sherds from bothros, Area V



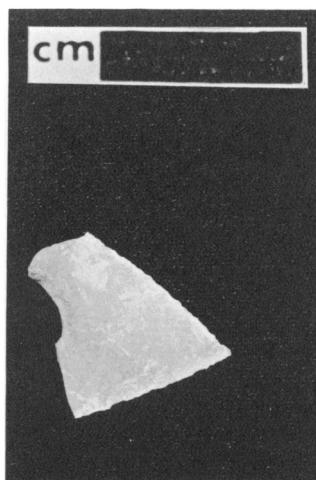
a. Bronze dress pin



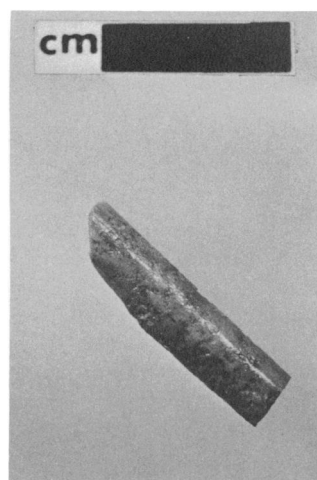
b. Bronze dress pin



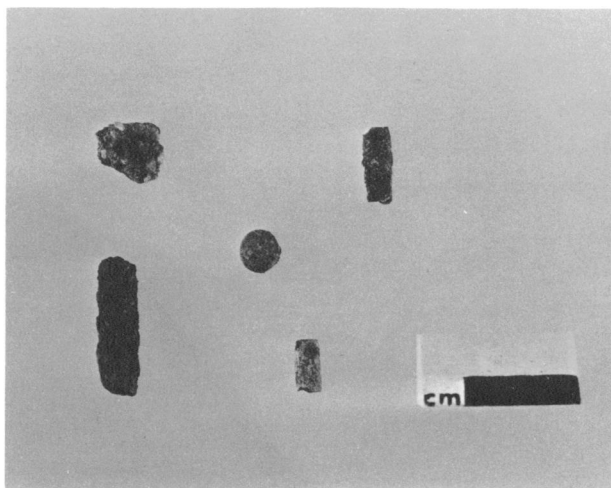
c. Coiled bronze ring or earring



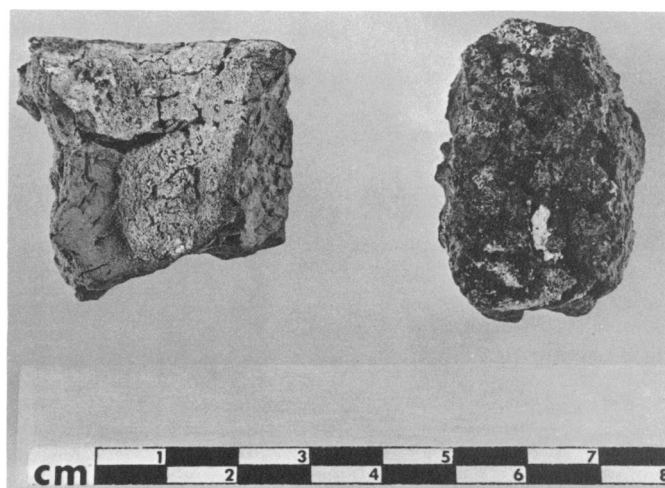
d. Chert arrowhead, Unit V-1



e. Bone pin, Unit V-1



f. Pieces of metal from pit, Area V



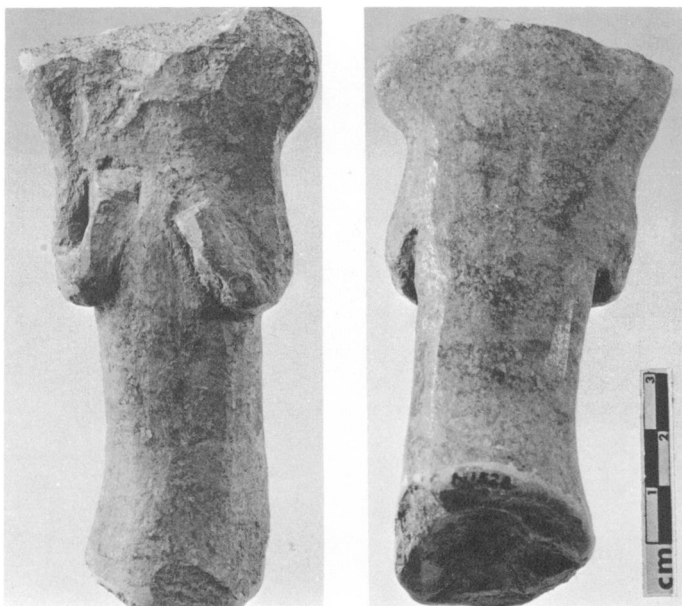
g. Fragments of crucibles, Area V



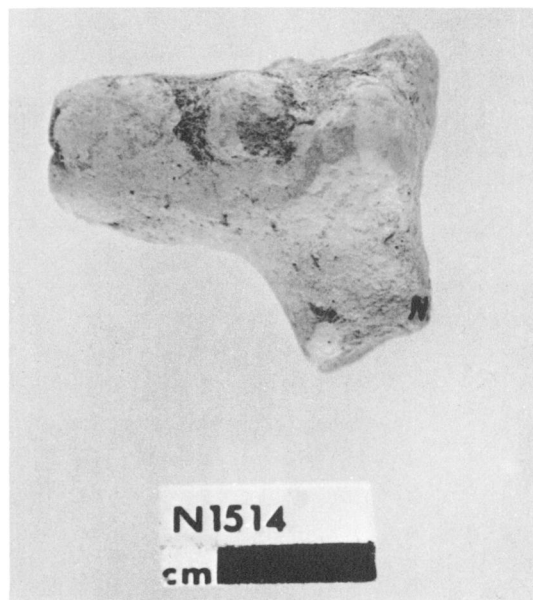
a. Steatite mold for jewelry



b. Bronze hair ornament (?)



Front Back
c,d. Late Helladic II terracotta figurine



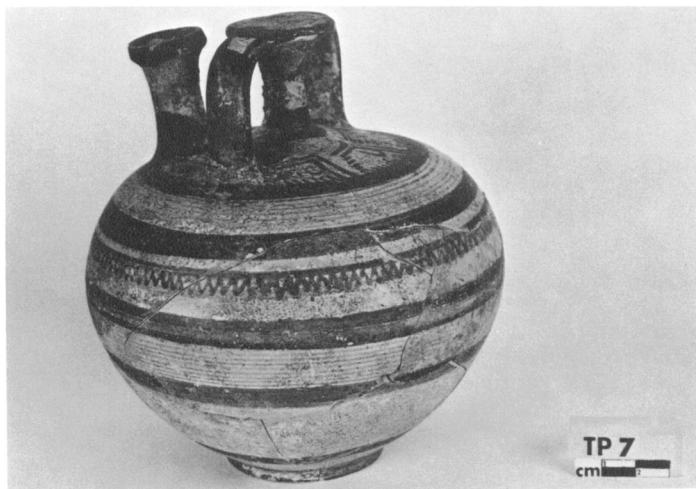
e. Head of terracotta animal figurine



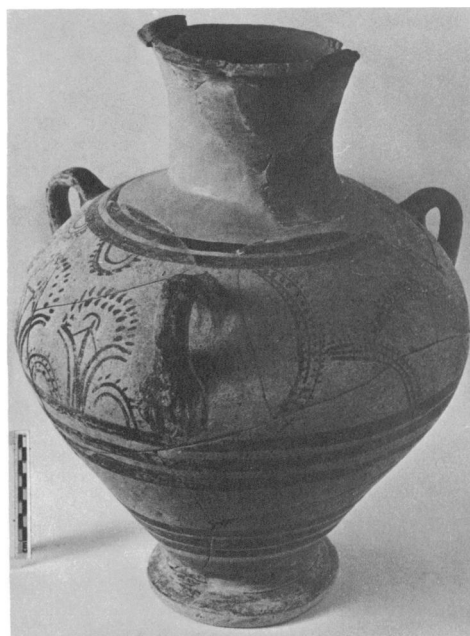
f. Lumps of burnt clay, Area V



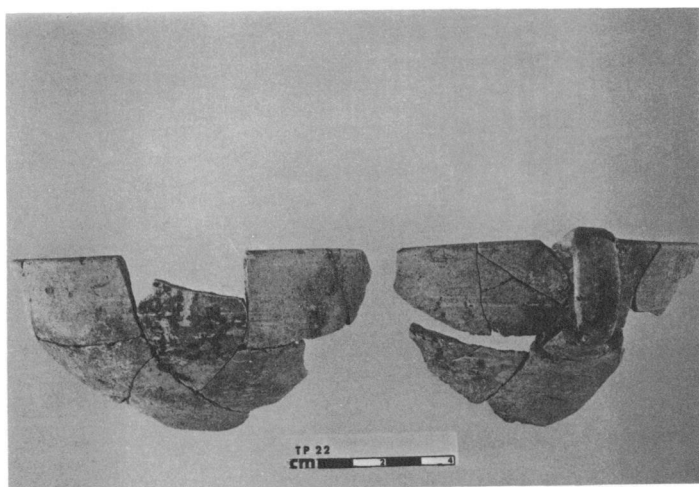
g. Horseshoe-shaped structures of clay, Area V



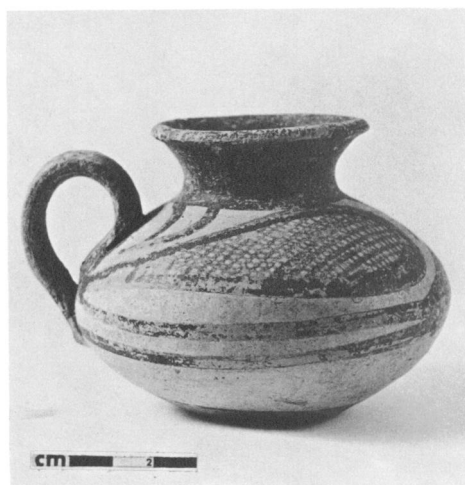
a. Stirrup jar from tholos



b. Piriform jar from tholos



c. Fragmentary kylix bowl from tholos



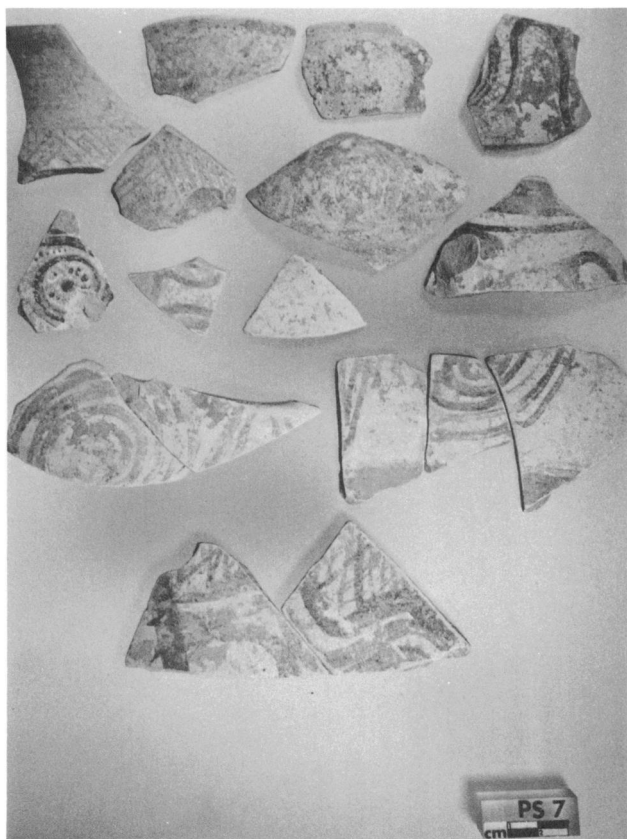
d. Squat jug from Little Circle



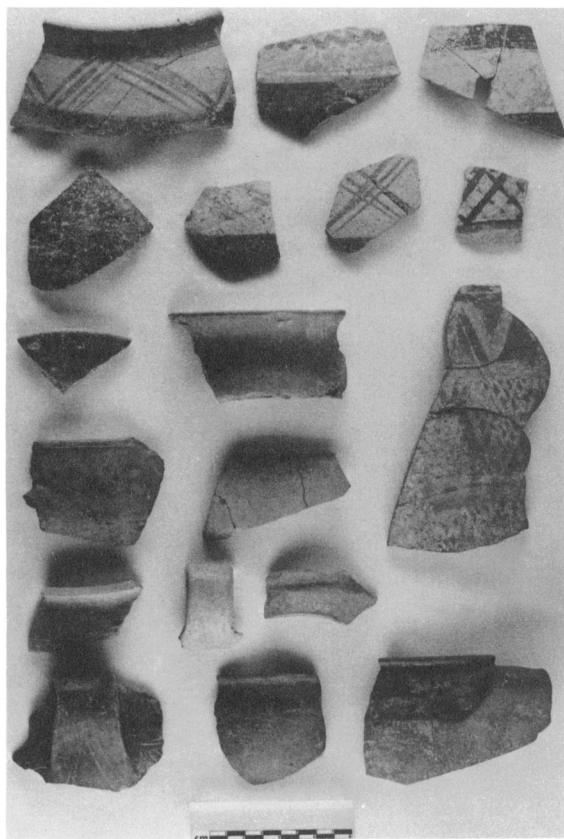
e. Undecorated goblet



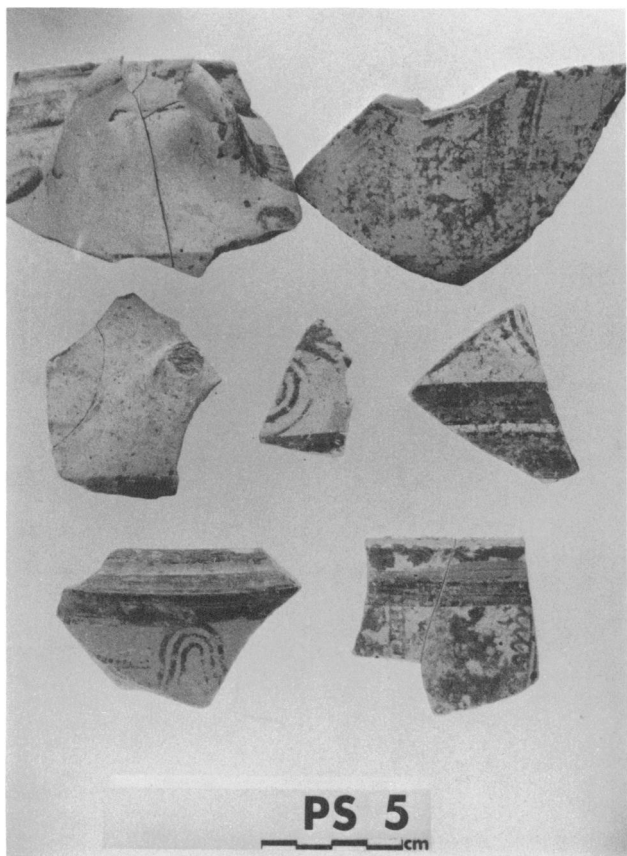
f. Flask from tholos



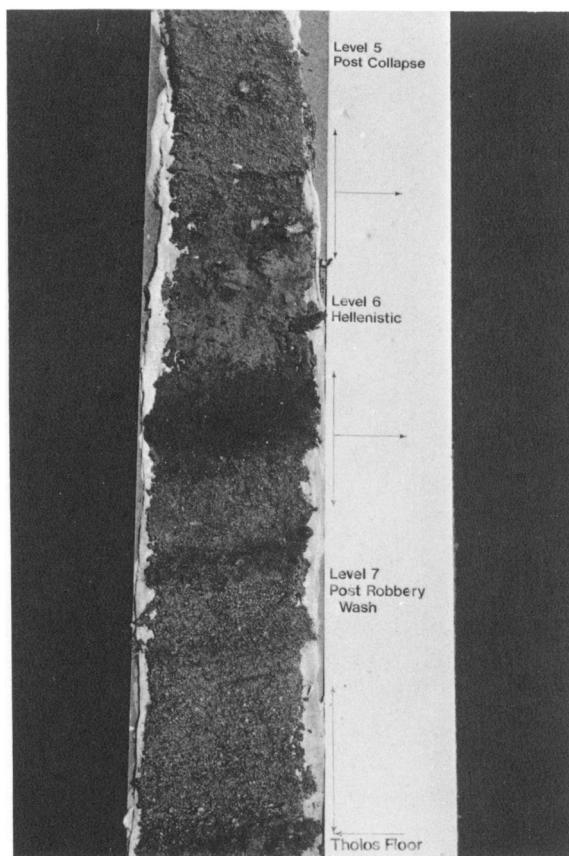
a. Sherds with curved-stem spirals



b. Middle Helladic II sherds, grid DEn



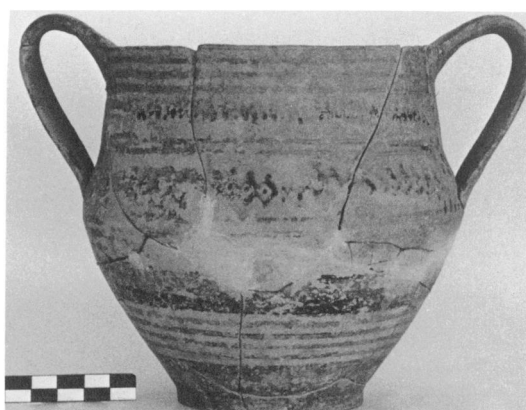
c. Sherds from Area IV



d. "Peel" showing stratification in tholos chamber



a. Oinochoe fragment



b. Late Geometric kantharos



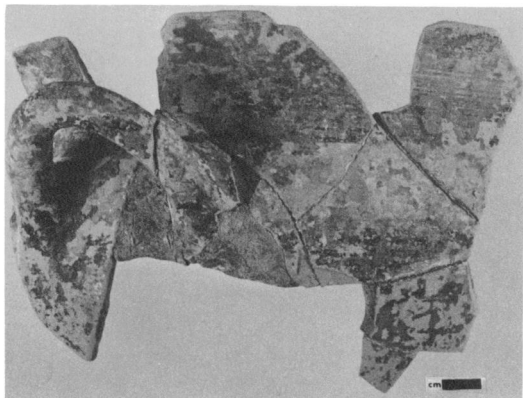
c. Dark Age IIA cup



d. Fragment of miniature skyphos



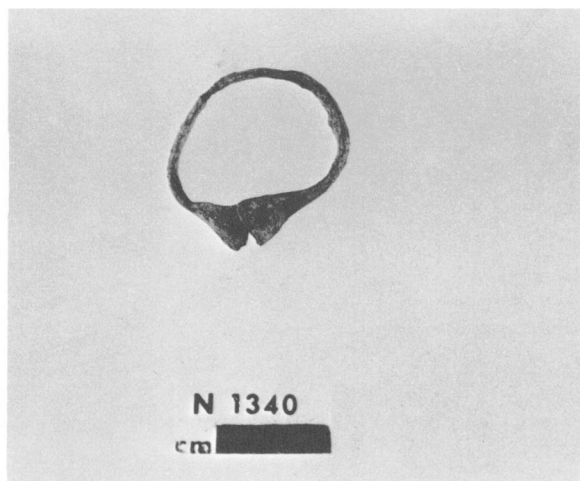
e,f. Bronze animal figurine



g. Early skyphos



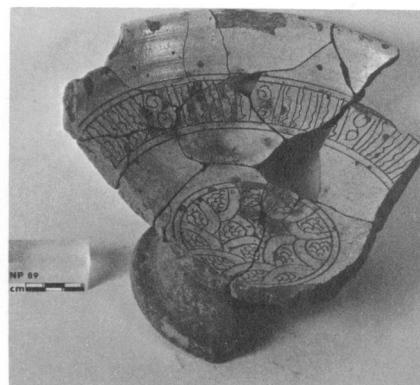
h. Inscribed sherd



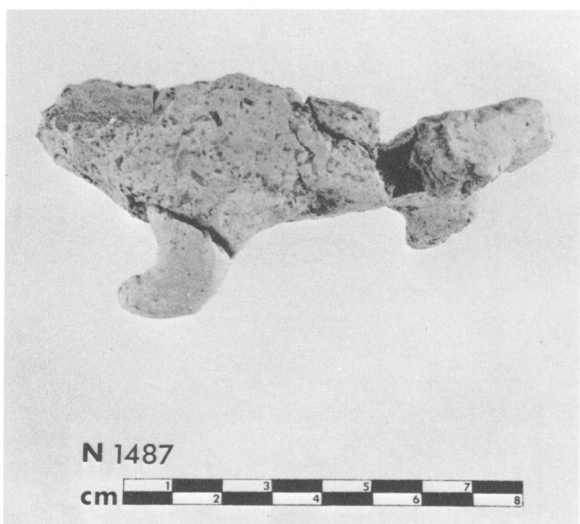
a. Bronze finger ring



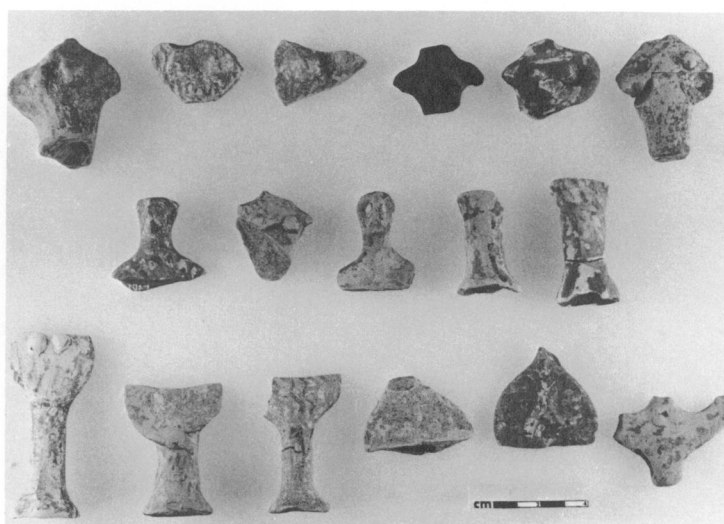
b. "Dame of Nichoria"



c. Fragment of sgraffito ware



d. Zoomorphic disc

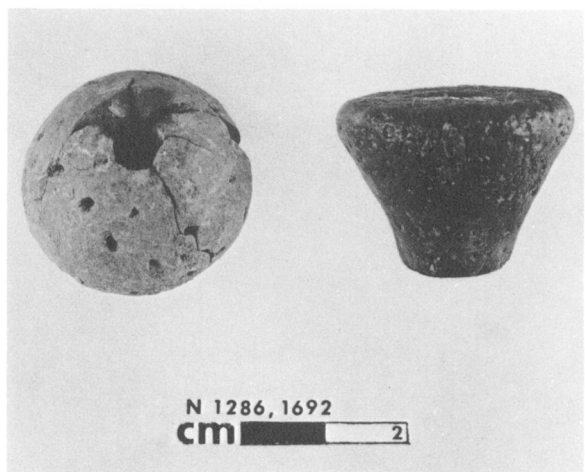


N1344 N835 N1253B N1887 N1852 N1054

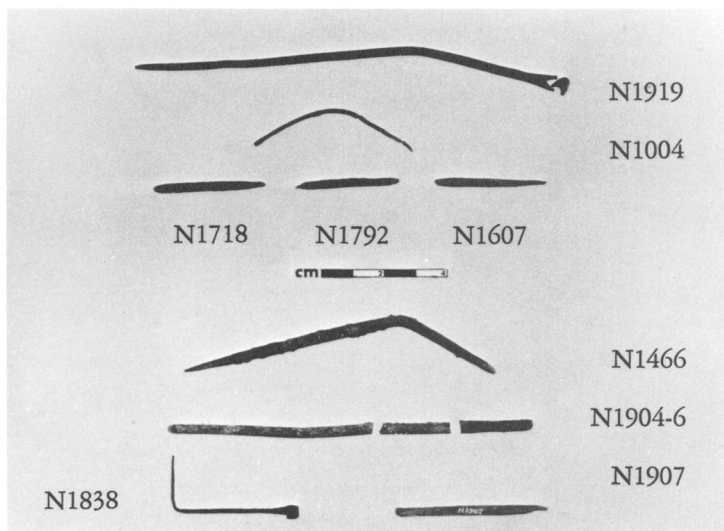
N1809 N1806 N1211 N1673 N1771

N974 N1676 N1253A N1104 N1248 N1720

e. Mycenaean figurines



f. Dark Age spindle whorls



N1919

N1004

N1718

N1792

N1607

N1466

N1904-6

N1907

N1838

Top rows: Mycenaean
Bottom rows: Dark Age

g. Bronze tools