Kommos (Crete). Excavations of the University of Toronto and the Royal Ontario Museum, under the auspices of the American School of Classical Studies at Athens.

Trench Reports
Riche 1 1978

Trenches 27A, 27A1 (L.F. Nixon)
Trench Reports (27A, 27A1) 13
Catalogued Objects 2
Drawings 2
Pottery Summary 17

Archaeological Survey of the Kommos Area, Southern Crete.
Report on the 1978 Season 11
Interim Report on the 1979 Season (R.H. Simpson) 7
 Provisional Report on the Survey of the Present day Land Use in the Kommos Area (M.E. Parsons) 28
Geology of the Komnos Archaeological Survey Area (J.A. Gifford) 6
Trench 27A: Final Report

1. General Description of the Area

Excavation in Trench 27A (grid co-ordinates for SE corner 988.51X, 1222.88Y) was conducted from June 27 to July 12, 1979 (see Notebook 27, pp. 7-63; hereafter, references to Notebook 27 will be cited by page number only). The trench was laid out to the E of Trenches 21B and 19R2 excavated last year. To the N of it lie Trenches 30A and 30A2, excavated this year by M.C. Shaw. Trench 27A measures 6m25 N-S x 4m15 E-W (minus last year's triangular nibble along Wall 56). For the position of Trench 27A and other nearby trenches on the hilltop at Kamos (North Hill), see the notebook plan on p. 6. The nearest benchmark is PL40 at 20.01 above sea level.

There was little to clear from the surface of the trench before excavation began, because of the large-scale sand-clearing done in 1977. The surface of the already exposed fill sloped down from NW to SE.

2. Excavation of the Trench as Conducted

The purpose of digging this trench was two-fold: first, to determine the plan of the so-called "Crocked Building", part of which was excavated last year in Trench 23B (see the final report for that trench); and second, to see if the road running roughly north-south along the E side of the North House continued this far S (see the final report for Trench 24, excavated last year, and this year’s reports on Trenches 30A etc.).

Until this year only the western side of the Crocked Building, or "Batiment-Oblique", was known. Wall 54, plus the run-out southern stretch of Wall 55 (partially obscured by Wall 41 which is built above it), defines the western limit of the structure. Wall 56 to the E is parallel to 54-55. These two NW-SE walls are connected by Wall 55. Where 55 and 56 meet there is a blocked doorway; a large threshold is visible under the blocking stones. To the N, Wall 63 might have represented an addition to the house.

The rooms enclosed by these walls were JJ, with a blocked doorway on the N and the enigmatic lighthouse in its NW corner (LM IIIB at 19.49); and KK to the S (LM IIIB level at 19.45; this room is not completely excavated).

The process of excavation in Trench 27A was fairly simple: we had only to follow the walls mentioned above, and watch for a floor at the level indicated by the threshold in Wall 56's blocked doorway. We began by clearing the remaining 5cm or so of surface sand (+Level 1); next we removed the first layer of fill (+Level 2), again from the entire trench.
At this point, we divided the trench and excavated only the western four metres. We soon found that Wall 55 does not continue E past the blocked doorway; it goes, however, corner S. After clearing the E face of Wall 56 we discovered to our great satisfaction that it does corner E.

This new wall—No. 77—following the same system of numbering used since 1976 in this area—we assumed to be the N boundary of the house; it lines up with the short E-W stretch of Wall 54 to the W.

Level 3 begins officially at the level of the tops of the walls. The triangular area N of Wall 77 was at most 1.25 wide; so we removed enough fill with Paill 3 to exterior face of Wall 77, and then left this area at 19.47 to be dug with the bank separating Trenches 30A and 27A (eventually dug as Trench 304). The top of Wall 63 was still not showing. The area was given the convenience label of Space W.

S of Wall 77 in what came to be known as Room NW, we began to find an interesting series of corners features: slabs, on whose E edge were a number of sherds; two smaller slabs set like seats against the E face of Wall 77; a quarter circle of small stones separating the first large slab from a rather halting line of stone which included a good-sized lump of beachrock. We knew that the large slab was probably an indicator of the floor level, because of the threshold under the blocking in Wall 56 (large slab at 19.52; threshold at 19.30). Nonetheless we decided to go deeper only near the corners, and in a narrow strip along the E face of Wall 56. We had discovered by this time that Wall 77 pattered out after ca. 2m75; we thought that it might corner E but could not be certain. The drawing on p. 18 shows the lightly area in which digging continued.

Soon a pattern emerged which we held true for the rest of the room. We removed large numbers of stones and started looking fairly systematically for a floor level. While we could find the beginnings of a hard, pale layer toward the SW corner of the trench, and later on at the N end, the area near the S corner remained obstinately full of stones and brown fill. When we had cleared off a patch of hard yellowish flooring near slabs etc. between Walls 77 and 56 (with Paill 6, down to 19.22), we decided to open the E of the trench.

We were hoping to locate the E boundary of Room NW, if not of the house, in this area, so we were pleased when the first wall-like structure emerged. Unfortunately, this turned out to be a chicken wall running roughly E-W. Its discovery was distinguished further by the curious number of land snails collected along its E face, and by the presence of a 2nd century A.D. rim fragment of a glass jug or flask (MS). Next we came upon a rubble wall with one face (roughly E-W), extending at most 1m50 from the E scarp.

Initially we thought that this might corner with the chicken wall (see plan on p. 32); when we found that it did not, we cleaned off its uneven upper surface and left it as a 19.52 (the bottom of Paill 8) to be dug with Trench 304, the bulk.

As we uncovered more and more of the chicken wall, we could see that it curved around to the SE before it disappeared into, the S scarp of the trench, where it seemed to widen and to bifurcate for no apparent reason. We could locate only an E face for the chicken wall. We had reached its foot when we finally found Wall 78, which turned out to be the N wall of Room WW, and the E limit of the Crooked Building (see again the plan on p. 32, and the Polaroid on p. 38). Like Wall 77, Wall 78 pattered out rather inconclusively to the N, and we were forced to assume that it had been partially destroyed, or robbed out. It was likely, though, that it had originally cornered with Wall 77. To the E of Wall 78 we encountered a hard white surface which we thought was indication that we were not far from bedrock. This suspicion was partially confirmed when we discovered that Wall 78 was only one course deep.

In the meantime the N section of the chicken wall was removed so that we could dig more of Room NW as a unit, and concentrate on finding a floor for Room WW. Part of the chicken wall was left in because the next trench to be dug on the hilltop was to be set to the SE, and we wanted to be able to pick up any continuation of the chicken wall in order to determine the reason for its construction.

We resumed with Paill 6 in the western part of the trench by cutting another E-S strip starting from Wall 77. We found a hard surface in which a number of beach pebbles are embedded here as elsewhere in the floor of this room there was very little pottery. 01499 kylix feet and 8171 a broken wheelstone were found at this point. Once more it was difficult to trace the floor surface in the E part of the trench. In the eastern part of the room, we used two pails to get to the floors, 14 and 15, to check on the H IIBB date, which was confirmed. The pebbled surface continued under the chicken wall all the way over to Wall 78, at 15.135. We investigated the area E of Wall 77 (i.e. where it should have continued) with Paill 14, and found no continuation of the floor surface. The notebook drawing on p. 54 shows the location of these pails and the extent of the pebbles in the E part of the trench. Although the lack of any true floor deposit was disappointing, we had managed to trace a good surface and date it. Room WW was thus complete, except for a quick look at the features in the corner formed by Walls 77 and 56. We dug down in the quarter circle of stones separating the large slab from the little wall incorporating the lump of beachrock, but found only fill.
containing a LN IIIA2 goblet (GI947). We had noticed, too, that the E end of Wall 77 where extended beyond the corner features seemed to be sitting on earth, above the pebbled surface. This section of the wall looked as though it were off the line of the western section, as we wondered if there had been some rebuilding. It was not possible to check on Wall 77's full construction history, of course, until the bulk was dug.

(Later when the bulk was excavated the nature of the corner features became clear. Wall 63 is not a wall but a drain, and the corner was intended as a washing area, either for people or for clothes. See p. 22 for a photograph of the corner at the exterior drain after their excavation in Trench 30A2. Wall 77 still looks bent, but its original continuation to the E is confirmed by a row of horizontal slabs set against its E face and a little further along its assumed line.)

We finished excavation in Trench 27A by returning to the area of the NW and the Crooked Building, known as Space XX. We determined first that the hard white surface mentioned earlier was not bedrock, but rather a hard-packed surface which might have contained powdered kongouras. Then we discovered Wall 79, an unimpressive stretch of wall not quite parallel to Wall 78, projecting from the E scarp of the trench. There were too many other stones in the S end of this small space to see whether or not 79 continued S. Only the top of this wall was visible, at the level reached in Trench 27A, 19.065, which we took to represent a road or passage surface. The scanty pottery from this surface was dated to LN IIIA2/IIIIB. We then dug a small (50cm square) test for bedrock at the N end of Wall 79 where it was obscured by the rubble wall; we found bedrock at 18.65. This little sounding also revealed that Wall 79 has another, lower course. Thus excavation ended in Trench 27A.

(When the bulk was removed, Trenches 27A and 36A was dug as Trench 30A2, the rubble wall was removed, and Wall 79 was found to continue N, albeit haltingly.)

3. Structures Discovered (including a general discussion of the Crooked Hldg)

4. Pottery and Small Finds

These two sections will be found after the preliminary sections of the report on Trench 27A, as Trenches 27A and 27A1 are closely related and need to be discussed in conjunction with one another.

Trench 27A1: Final Report

1. General Description of the Area

Excavation in Trench 27A (grid co-ordinates of NE corner 982.282, 1216.627) was conducted from July 11 to July 27, 1979 (see Notebook 27, pp. 59-103; hereafter references to Notebook 27 will be cited by page number only). Trench 27A1 completes the circle of excavation around the Excavation Tree on the hilltop at Kommos (North Hill). It lies between Trench 27A and NB of Trenches 21A2 and 4A-414; see the notebook plan on p. 58 for the layout of these trenches.

Trench 27A1 consists of two rectangles. The larger measures 6.20 x 5.00m N-S x 5m00 E-W; the smaller, known as "the addition", is located on to the N corner of the main trench, and measures 1.675 x 3.50 E-W. There was little sand to clear from the surface of the main trench before excavation began, because of the large-scale sand-cleared done with the spade in 1977. The surface of the addition, however, is unusually high as part of the original sand layer was still preserved above the fill. Generally the surface of the trench slopes down from NW to NE.

2. Excavation of the trench as Conducted

The purpose of the trench was to find the S boundary of the Crooked Building (see above, p. 1 for a preliminary discussion of this structure) if possible, but more specifically to find the continuation of Wall 78 and the road surface. In the addition we wanted to see if Wall 4 continued N of its threshold with Wall 42, and to investigate Wall 42 E of the threshold. We also hoped to be able to remove the last fragments of C108 jar with octopus decoration which had had to be left in the N scarp of Trench 4A1 three years ago.

We began as always with the clearing of the last remnants of the sand cover, and started in on the removal of fill. We found the top of a chicken wall almost immediately, but were not certain at first if it was the chicken wall, discovered earlier in Trench 27A. Because the new chicken wall ran along the N scarp of the trench (more or less), it provided a welcome means of separating the addition from the main trench. We soon determined that Wall 4 does not continue N of the threshold with Wall 42; the latter's continuation remained uncertain.

Next we found that the two chicken walls, in 27A and 27A1, were indeed one and the same. In Trench 27A it was more obvious that the chicken wall was built as a curved retaining wall; the Excavation Tree obscures the ruins that it was meant to retain, no doubt. In quick succession we came upon...
Wall 80, a “crooked” wall grafted onto Wall 42, and the hoped-for continuation of Wall 78, which at a certain point underlies a section of the chicken wall. See the notebook plan on p. 72 for the location of these walls. The drawing shows how everything of interest was confined to the W side of the trench at this point. When this section of Wall 78 first emerged we noticed an irregularity in its W face (indicated as Threshold on the plan). We were looking very hard not only for an entrance to the Crooked Building on its N side, but also for the S wall of Room NW. Room NW had already proved to be very wide for a room with no internal supports, and was proving to be very long as well.

When we began to suspect that Wall 78 might continue with Wall 80 toward the S end of the trench, we speeded up our investigation of the chicken wall which obscured this possible wall intersection. First we removed the superficial fill in the NW corner of the trench so as to join the two chicken wall sections in Trench 27A and 27AI. Next we determined that the wall had no W face, but that its S face was fairly respectable even where it diverges from that of Wall 78. In Trench 27AI it is quite clear that the chicken wall was built right over the ruins of Wall 78 and may even incorporate some of the latter’s stones. The section of the chicken wall overlying Wall 80 was removed; see p. 76 for a “before” photograph. By this time we knew that Walls 78 and 80 did not continue, and, moreover, that Wall 78 was an addition to it continues all the way to the S scarf of the trench. We also suspected the existence of a more or less E-W crosswall built onto Wall 78, about 1 m W of Wall 78’s corner with 80.

After our investigation of the chicken wall, we decided to concentrate on the more conspicuous wall portion of the trench, where the bottle fragment (1974) had been found in the upper fill, and where quite a lot of pottery was turning up. As we dug down the fill became rather gray, and eventually at 19.35 we came upon a little floor deposit including both pots and stone tools (Trench 29). The space “in Room 28” is too small to say much about the nature of the surface on which these objects were sitting. Their date is presently thought to be LM IIIA2. We did not dig deeper here, not only because of the limited space, but also because at its N end, the height of Wall 80 drops to 19.35, which is more or less the level of the surface reached in 28. For plans and photographs of the deposit, see pp. 60, 82.

We returned to the road or passage N of the Crooked Building, and dug down through a layer of soft brown fill packed with pottery (Trench 25) to the approximate level of the road surface found in Trench 27A. Earlier in the 1979 season a somewhat similar packing had been found over the road surface in Trench 30A (19.35-19.32/18). Here, however, we had reached the foot of Wall 78 without finding a hard white surface to go with it, and so were forced to assume that the exterior surface used after the construction of the Crooked Building was not the hard white road surface (which we later found below at 19.00-18.90). Trench 25, dated to LM IIIB, contained a large quantity of pottery, including 2140 fragments of a Mycenaean deep bowl and 2914 Mycenaean White Slip Ware sherds, and a number of stone tools, plus 52 beach pebbles all more or less the same size, 10 of them burnt, found near the E end of the trench.

By this time we had been able to trace the crosswall mentioned above, Wall 81, which runs N from Wall 78, so that our excavation of the road surface was confined to the area N of this wall. When we reached the foot of Wall 81, we changed to Trench 30 and continued until we found a whitish surface at a level slightly lower than that of the surface found to the N in Trench 27AI. The step from one surface to the other was marked by two stones at the trench boundary, which may or may have been placed. When a whitish patch showed up near Wall 78 we realized that we might be close to bedrock again. We scraped off our possible lower road surface and decided to ignore the fallen stones still poking up through the fill in the E side of the trench.

Of Wall 81, the fill was beginning to look okay. In short order we excavated two more walls, 82 (at right angles to 81) and 83 (parallel to 81). Walls 82 and 83 did not meet so we assumed that the doorway to Room TT lay between them; see the notebook plan on p. 96 for the location of these walls. We had been worrying about the quality of the S addition to Wall 78—could it have been part of the original Crooked Building, for example? so little of it is visible that it is not even possible to say for certain whether or not it bonds with 78. In any case, Wall 83 is built onto this extension of Wall 78. Room TT is therefore later still.

Room TT seemed to be full of ash, so we were anxious to find both the floor and the source of all the burning. The floor (Trench 33, dated surprisingly to early LM IIIA2) was a disappointment as it lay over a limey outcrop of bedrock in the NW corner. Part of it was the rock itself, part of it consisted of small stone chips and earth, and part of the floor was hard and whitish. Once again there was no floor deposit as such; several fragments of a cooking tray lay near a possible oven in the NW corner; other finds included four stone tools, some olive pits, shells, bone, and pins.

When we had finished with Room TT, we had only to remove the small strip of earth S of Wall 80, at the E end of Room P excavated in 1976 as part of Trench 441. Here we found two or three sherds of CI08 oinochoe jar (and no fragments of M17 ryhthos, despite careful sieving). Trench 27AI was then considered complete.
Wall 77 B-W
Total L 4m 40cm; W 1m 30cm; H 50cm; N. of courses 4; max. 8. Sections B and H (see below) look very similar in the 50-60cm range, with most other stones 30cm. Lower course near drain projects 8cm; sloppily or krepolimally; S face very krepolimally, again esp. toward the E where the wall seems to float some 30cm above the pebbled floor. 77 built with drain, which is keyhole shaped. Width of drain varies from 5-10cm. Interior face on 10cm. Original continuation of 77 to S confirmed by line of slabs (dug as part of Trench 3042), which continues beyond the preserved section of the wall.

Wall 78 B-W
Original L 3m 40cm; W 60cm; H 40cm. N. of courses 4. At the E this wall petered out; at the S it may have continued further, but no such construction is noted in Trench 44L. Incorporates all sizes of stones, some horizontal and some not. In Trench 27A it sits right on 78. In Trench 27A the rubble floor of Trench 77 was beneath it. Built as a retaining wall, and used by us for the same purpose, in our case to protect the Ericcson Tree.

Wall 79 B-W
L 2m 30cm; W up to 1m 20cm; H 20-30cm. These stones were definitely placed, but for what purpose it is difficult to imagine.

Wall 80 B-W
L 3m 40cm; W 50cm; H 55cm. N. of courses 4. Exterior face on a presentable. Stones up to 45cm long; some slabs. Seems to bond with 78; may have been thrown out onto Wall 42.

Wall 81 B-W
L 2m 40cm; W 50cm; H 30cm. N. of courses 3. Runs into wall 78 at W end; bonds freely with Wall 82. Some effort made to have a decent face on both sides. Size of stones varies from 20-55 cm. Casual construction.

Wall 82 B-S
L 2m 40cm varies from 40-50cm (NW-SW) H 37cm. N. of courses 2. Not too bad, until the E end where the construction is very indistinct; exterior face plays out. Slabs set against N face. Bonds with N. Peters out before it meets 83 where in any case there may be a doorway.

Wall 83 B-W
L 2m 50cm W 5cm (partly obscured by the S scarp of the trench); H 22cm. Runs into the S continuation of wall 78. Stops to allow for doorway between 14 and Wall 82.

Wall 84 B-W
First discovered in 1977 in Trench 214; most of length background revealed in 1978 in Trench 214. Ends at threshold with Wall 4 in a very nice corner construction. Two squared blocks sitting on a third which projects 8cm. Wall 80 is built onto Wall 42.

Wall 85 B-S
Now known to end at threshold with Wall 42. Originally dug in 1976 as part of Trench 44L.

Space IV
The space N of Wall 77 in Trench 27A; named only for convenience. Consists of the drain ("Wall" 63) and the slabs set against Wall 77.

Room 61
Enclosed by (starting from the E) 77/78/79 or some other B-W conosed by the Ericcson Tree/56. 57/60 B-W X 47/57 B-S from Wall 77 to the S scarp of Trench 27A. No interior supports discovered here, so presumably this is an unroofed space. Floor at roughly 19.20 is neatly a pebbled surface; problems at E where stones still poke up. Laid by plan 6, 14, 15 to an IIIB. Major floor features: bathroom in NW corner with slab; circle of stones, and low wall with lumps of beachrock perhaps as foundation for a screen (49). The floor is dated to AB IIIB by the pottery in Plan 6, 14, and 15 (only 3 catalogued items: 01922 thistle jar base; 01941 kylex fragment with whorl decoration; 01949 kylex base). Stone tools include one definite and one possible whetstone (S117; S190); a broken stamnatis (S18) several cobbles (2188, 2635, 2637) and a flake (S168). 267 strips of bronze plus bone and shells were also found here. From the available evidence it is hard to be specific about the use and purpose of this large room or courtyard.
Wall 55 may corner S, in the line of Wall 56, which would give the B wall of KK. We can probably assume an E-W crosswall somewhere between 77 and 80, to provide NW with a S wall.

The S limit of the building is a problem. It is not possible to say how far S Wall 55 originally went, as it has been partially destroyed by Walls 40 and 41. It may have cornered S before it reached Wall 55. The relationship of Walls 42 and 80 is particularly troubled. Wall 42 runs N from Wall 1, with which it does not bond, and ends in well built corner where Wall 4's threshold is set to the S. In contrast the E end of Wall 80 is rather ragged. It seems unlikely that Wall 42 was built after Wall 80. Nor is there any basis for saying that Wall 80 originally cornered N at just this point. We seem to be stuck with the union of Walls 42 and 80 as the S wall of the Crooked Building. (If the building as reconstructed had been set 3m 20 to the E there ought have been enough room for an appropriate S wall.)

There are no indications that the building was not a house when first constructed; as often happens on the hilltop, later periods of re-use (as implied by the blocked doorways) may obscure the original function of individual rooms. We are no closer to understanding the "lighthouse" in the NW corner of Room 7 than we were last year when it was dug. Both JJ and WW, the latter because of its lack of internal supports and its hard pebbled surface, seem to be exterior spaces. KE has not been excavated to sufficient depth for us to pronounce on its first use, and ZZ is revealed to be too small. YY was certainly used for cooking, but it was entered from outside the Crooked Building, and should probably be associated with another set of rooms.

The NW-SE orientation of the Crooked Building sets it apart from the North House and the House of the Fallen Slabs, both built on the hilltop in LN 1. Every floor or level reached in the Crooked Building has been dated to LN III. Furthermore when we dug below the foot of Wall 78 in the road to the S, we found only LN III pottery. All the structures to the W of the GB are also LN III (see the Final Report for Trenches 21B, 21L, 25A, p. 14 for more detailed information). It seems possible, then, that the Crooked Building was built during this period. If this is so, we can no longer say the major construction on the hilltop was confined to the LN I period. Up to now, we had thought that building activity in LN III in this area consisted chiefly of the remodelling and re-use of existing structures, on a relatively humble scale. The Crooked Building may force us to think again, not least about the use of the area between the North House and the House of the Fallen Slabs before it was built.
One of the most interesting things about the building is its potential evidence for phases within LH IIIA. Room XX was excavated as tiny but its pottery was dated to LH IIIA2 (rail 25). Room YY, built after the main construction phase of the building, seems to be early LH IIIB (rail 33). The pottery-filled layer over the road surface XX may be late LH IIIB (Pail 25).

Excavation to the S of the Crooked Building where Wall 78 may have been extended might help with construction sequences in this area, although the fill here seems very shallow. (We should not forget Trench 21A, excavated last year, where an LH IIIB level was discovered at 16.34, however.) It would definitely be useful to know what the E boundary of Room F was.

To sum up:


LH IIIA. Crooked Building built, including drain through Wall 77. S wall grafted on to wall 21B.

LH IIIB. Crooked Building partitioned; doorway punched through Walls 77, 78; doorway between JJ and MM blocked for separate use of these rooms? doorway to XX blocked and XX out of use; S section of Wall 55 destroyed for construction of Wall 40, 41. Rubble piled up for rubble walls.

Wall 78 partially ruined; chicken wall built to retain remains of Crooked Building; late LH IIIB pottery dumped W of chicken wall to raise level?

47. Pottery and Small Finds

As mentioned above, Pails 25, 29 and 33 would repay further study.

Samples taken for water-sieving are awaiting analysis.
<table>
<thead>
<tr>
<th>Catalogued Objects from Trench 27A1</th>
</tr>
</thead>
<tbody>
<tr>
<td>E74 shaft (square insection)</td>
</tr>
<tr>
<td>C1254 bell figurine</td>
</tr>
<tr>
<td>321</td>
</tr>
<tr>
<td>C2012 rayon lr</td>
</tr>
<tr>
<td>322</td>
</tr>
<tr>
<td>C2022 handle with potter's mark</td>
</tr>
<tr>
<td>324</td>
</tr>
<tr>
<td>C2032 klyx</td>
</tr>
<tr>
<td>323</td>
</tr>
<tr>
<td>C2033 deep bowl</td>
</tr>
<tr>
<td>323</td>
</tr>
<tr>
<td>C2034 bowl fr</td>
</tr>
<tr>
<td>323</td>
</tr>
<tr>
<td>C2106 shallow bowl fr</td>
</tr>
<tr>
<td>328</td>
</tr>
<tr>
<td>C2112 leadweight</td>
</tr>
<tr>
<td>329</td>
</tr>
<tr>
<td>C2113 jar</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2114 ladle</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2115 conical cup</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2116 shallow cup</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2117 goblet</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2118 cup/bowl fr</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2137 cooking ware handle</td>
</tr>
<tr>
<td>325</td>
</tr>
<tr>
<td>C2138 ?spouted jar</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2139 ?jug fr</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2140 deep bowl</td>
</tr>
<tr>
<td>325, 30</td>
</tr>
<tr>
<td>C2141 Cypriot White Slip II milk bowl fr</td>
</tr>
<tr>
<td>325</td>
</tr>
<tr>
<td>C2142 sherd with plastic ram's head</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2143 closed vessel with pierced base</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2144 ?juglet</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2145 small bowl or cup</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2146 small bowl or cup</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2147 deep bowl fr</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2148 cup/bowl fr</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2149 deep bowl fr</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2156 bowl base</td>
</tr>
<tr>
<td>330</td>
</tr>
<tr>
<td>C2157 cu p/bowl fr</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2164 cooking pot rim</td>
</tr>
<tr>
<td>331</td>
</tr>
<tr>
<td>C2165 ?brasier handle</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2166 bowl</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2167 goblet base</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2168 bridge-spouted jar fr</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2169 deep bowl</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>C2189 dark burnished sherd</td>
</tr>
<tr>
<td>333</td>
</tr>
<tr>
<td>C2292 goblet</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S226 cobble fr with ochre at end</td>
</tr>
<tr>
<td>324</td>
</tr>
<tr>
<td>S227 cobble with ground end</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S284 red-brown chert drill</td>
</tr>
<tr>
<td>325</td>
</tr>
<tr>
<td>S285 green sandstone slab</td>
</tr>
<tr>
<td>329</td>
</tr>
<tr>
<td>S286 grey cobble with pecked margins</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S287 grey rounded cobble with indentations on both faces</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S288 grey hardstone with rounded ends</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S289 limestone slab with rounded face</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S290 sandstone with ground ends</td>
</tr>
<tr>
<td>325</td>
</tr>
<tr>
<td>S291 calcarious sandstone cobble with pecked ends</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S292 green sandstone cobble with battered end</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S 324 calcarious sandstone perforated cobble fr</td>
</tr>
<tr>
<td>326</td>
</tr>
<tr>
<td>S531 grey igneous cobble with central depression</td>
</tr>
<tr>
<td>333</td>
</tr>
<tr>
<td>S532 black igneous cobble with pecking</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S533 grey sandstone cobble with pecking</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>S538 obsidian percussion struck flake</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
For section lines, see the drawing in Nethercumbe, 23, pp. 18 and 46.
<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pottery Description</th>
</tr>
</thead>
</table>
| 12/19/79  | K99A/274/1  | 1 Total 590 grams  
Est. 28 sherds - surface level  
mixed quality: poor & fine painted  
½ coarse Red - ½ med. crse. - ½ fine buff  
Mostly Minyan; 2 (possibly 3) L.M. III A or B sherds |
| 4/7/79  | K99A/274/2  | 2 Total 2690 grams  
Est. 75 sherds  
½ coarse red, ½ medium coarse, rest medium, fine, poor preservation, mixed deposit: LM III A, B, E, LM III A + B, LM III A rim;  
MM III = LM III A mixed unit (with or without) |
| 4/7/79  | K99A/274/3  | 3 1750 grams total  
Est. 60 sherds  
Because red, 4 polished, spread, medium to coarse, remains, fine buff  
Fine preservation, some worn, some concorded  
mixed deposit: MM III handle, I Ph. 3, LM III B cup base; LM III A rims + LM III B (gray)  
Adobe  
L.M. III A |
| 14/7/79  | K99A/271A  | 4 Total 5940 grams  
Est. 360 sherds  
S-G coarse red, MM III A/B medium coarse, remains, fine buff  
 Mostly MM III B - more fine quality, better preservation  
Mixed deposit  
mostly fine, medium and coarse sherds - not too many, damaged & broken  
MM III = LM III A, very mixed group |
| 14/7/79  | K99A/271A  | 5 Total 8970 grams  
Est. 130 sherds  
Some medium, some fine, some very fine  
Mixed deposit  
Some medium, some fine, some very fine  
Mixed deposit  
L.M. III A + B, with bit of I Ph. (gray)  
Central sherds larger, more fine, some concorded |
| 14/7/79  | K99A/271A  | 6 Total 5700 grams  
Est. 250 sherds  
Some medium, 40 polished, 100 concorded  
Some medium, mixed |
<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level, feature</th>
<th>Pail</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-7-79</td>
<td>KA1/11H 3</td>
<td>7</td>
<td>2160 total grams</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Est. 10 coarse red</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ed. 20 medium coarse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30 fine buff shards</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>poor preservation, worn surfaces</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 black matrix: LM II A; nothing certainly later</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Latest datable sherds: LM III A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level, feature</th>
<th>Pail</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-7-79</td>
<td>V7/7H 3</td>
<td>8</td>
<td>2280 grams total</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Est. 15 coarse red sherds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18 medium coarse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15 fine buff</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>poor preservation; worn surfaces; little paint</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. LM III A:2-B shards + = M.M. sherd mixed w.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Latest datable material: LM III A:2-B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level, feature</th>
<th>Pail</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-7-79</td>
<td>V7/7H 3</td>
<td>9</td>
<td>3020 grams total</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Est. 15 coarse red</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25 medium coarse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 fine buff</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>poor preservation; worn surfaces;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mixed material. MM I-II, &quot;Barrel&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MM III, LM III A:1, LM III A:2-B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Latest datable: LM III A:2-B</td>
</tr>
</tbody>
</table>

MiB glass
<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pottery Description</th>
</tr>
</thead>
</table>
| 7/7/79 | K9/A/3 | 1030 grams total  
10 coarse red  
8 medium coarse  
20 fine buff  
poorly preserved, some MMIII with LMIII A2-B  
latest dateable pottery: LMIII A2-B. |
| 11/7/79 | K9/A/3 | 430 grams total  
4 coarse red shards (2 Fr. rim cooking tray)  
16 medium coarse  
20 fine buff  
very scappy/jointy; some MMIII canical cups  
1 bded rim; latest dateable material is LMIII A1. |
| 12/7/79 | K9/A/3 | 4300 grams total  
est. 30 coarse; cooking pots dishes  
15 medium coarse: pithos  
12 fine buff: conical cups, bases/cylindrical  
late large, very few preserved coarse ware, cooking, pot sherds, some lid sherds too  
Thessalian MMIII material so well as LMIII A1, but not latest dateable  
pottery is LMIII B: the good base  
LMIII B for date and disposition (or later coarse)  
The sherds are very fragmentary, few joins. |
| 17/7/79 | K9/A/3 | 1580 grams total  
5 coarse; 10 medium coarse  
35 - pithos fragments  
fine buff: 5%  
scappy/jointy; MMIII, LMIII A LMIII B  
latest dateable material: LMIII A |

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pottery Description</th>
</tr>
</thead>
</table>
| 16/7/79 | K9/A/3 | 1070 grams total  
8 coarse red  
12 medium coarse  
20 fine buff  
small jar, scappy sherds, few dateable; some MMIII  
LMIII 6 sherds; latest L MIII |
| 23/7/79 | K9/A/3 | 110 grams total  
coarse: 3 Fr. rim cooking dish  
medium coarse: 8  
fine buff: 42  
some conical cup fragments; some MMIII, few LMIII sherds;  
poorly preserved, worn surface;  
latest: LMIII, possibly LMIII A1. |
| 27/7/79 | K9/A/3 | 4110 grams total  
coarse: 50 st st st st st  
medium coarse: 35 st st st  
fine buff: 1600 st st st  
again, scappy/poorly preserved; very small and no noticeable joins; some MMIII, LMIII A1; LMIII A/118 sherds; runs of a Spout base  
latest: LMIII A2/118. |
| 1/8/79 | K9/A/3 | 1640 grams total  
coarse: 15 st st st st  
medium coarse: 28  
fine buff: 86  
small parts, no joins; neither; a few yellow MMIII, LMIII A sherds  
latest: clearly dateable is LMIII A1. |
### Kommos Excavations

**Brief Daily Pottery Summary**

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pottery Description</th>
</tr>
</thead>
</table>
| 3/7/39 | W10 | 790 grams total  
--- coarse red: 12 sherds, marm. potsh.  
--- medium coarse: 15 sherds  
--- fine buff: 55 sherds  
--- some MM IIIA conical straight-sided rhyta, LMM IIIA 1 cup/bowl  
--- mostly LMM IIIA, though still a small unit. Some mortars have been identified as LMM IIIB, LMM IIIA 2 is typical. Early 1, categorized as LMM IIIA 2, significant since IIIA 2 is difficult to associate. |

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pottery Description</th>
</tr>
</thead>
</table>
| 4/14/39 | W11 | 343.5 grams total  
--- 30 coarse  
--- 20 medium  
--- 20 fine. Buff. MM IIIA conical, MM III cup/bowl/handle, LM IIIA 1: spouted bowl, kylikes, cup/bowl  
--- LM IIIA 1: LM IIIA 1 cup/bowl  
--- 500 grams total  
--- coarse red: 2 sherds  
--- medium coarse: 12 sherds  
--- fine buff: 45 sherds  
--- very poor quality, mostly MM IIIA cups, beaker pot frag.  
--- latest datable IIIA 2. The best example is a LM IIIA 2, but it is difficult to associate. |

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pottery Description</th>
</tr>
</thead>
</table>
| 6/7/39 | W11 | 250 grams total  
--- coarse red: 2 sherds  
--- medium coarse: 24 sherds  
--- fine buff: 4 sherds  
--- very poor quality, mostly MM IIIA cups, beaker pot frag.  
--- latest datable IIIA 2. The best example is a LM IIIA 2, but it is difficult to associate. |

--- The level IIIA 2 is very limited, indicating that IIIA 2 is a very minor component. Surface 398 was not identified.
<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level, feature</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/7/74</td>
<td>2B1</td>
<td>2680 gr. total.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>coarse red. 13 - cats. in pit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>medium coarse 19 - Lithos, 68.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fine buff. 40.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>very schepquit, small, worn shards.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>difficult to date. Latest recognizable is L M I.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level, feature</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/7/74</td>
<td>2B1</td>
<td>2980 gr. total.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>coarse red. 20 - cats. in pit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>medium coarse 15 - Lithos, 68.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fine buff. 40.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>very schepquit, small, worn shards.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>difficult to date. Latest recognizable is L M I.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level, feature</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/7/74</td>
<td>2B2</td>
<td>1012 gr. total.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>101 sheets of coarse red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54 medium coarse.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>84 fine buff.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sherds are rather worn edges. Some MM III survival. Pottery sherds are concave at edges. However, the latest sherds are certainly MM II B.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a bulb with vertical marks (2032), a bulb horizontal (2033), and are diagnostic for MM II B.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note the quantity of coarse red cooking wares, loose sherds in association of the two rooms.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L M I I B.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level, feature</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/7/74</td>
<td>2B3</td>
<td>6090 gr. total.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>coarse red. 70.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>medium coarse. 64.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fine buff. 250.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sherds are very worn - many are concave. This unit has few painted sherds. However, a bulb fragment, high stems, goldet bowls, and handles from a ladle incline me to date this unit to L M I I B. There are some painted cups on few MM III survivals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>latest date: L M I I B.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level, feature</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/7/74</td>
<td>2B4</td>
<td>700 gr. total.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>coarse red. 70.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>medium coarse. 64.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fine buff. 250.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sherds are very worn - many are concave. This unit has few painted sherds. However, a bulb fragment, high stems, goldet bowls, and handles from a ladle incline me to date this unit to L M I I B. There are some painted cups on few MM III survivals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>latest date: L M I I B.</td>
</tr>
<tr>
<td>Date (d-m-y)</td>
<td>Area, trench, level, feature</td>
<td>Pail 1</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>30</td>
<td>19A/188 30</td>
<td></td>
</tr>
</tbody>
</table>

**Pottery Description**

- Course of 165°. Some loose & from 19A. Some coarse, hard clay reddish brown, red. 
  - Mid. 5 pieces of 188 small & complete.
- Firebrick.
- 630 small: bowls, cups, ladles, site has many small. \(\text{Straw} \text{grayish tint.}
- Many small breakable, steaks, few points, some short.

---

<table>
<thead>
<tr>
<th>Date (d-m-y)</th>
<th>Area, trench, level, feature</th>
<th>Pail 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>27/1/19</td>
<td>19A/27A1/3 52</td>
<td></td>
</tr>
</tbody>
</table>

**Pottery Description**

- Course of 170°.
- 30 conserved.
- 35 medium conserv.
- 175 fired.

- Mostly small, broken up. Most of the pottery are completely diagnostic. For anything below the TLUM 118, generally a very poor unit. The TLUM 118 has three sorts of dark burnished sherds, one is possibly a similar but not quite so dark, with a few red, and a third sort of TLUM 118 which is a very good. TLUM 118 is suggested.

---

<table>
<thead>
<tr>
<th>Date (d-m-y)</th>
<th>Area, trench, level, feature</th>
<th>Pail 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4/19</td>
<td>19A/21A/3 38</td>
<td></td>
</tr>
</tbody>
</table>

**Pottery Description**

- Course of 168°.
- 80 fish pit.
- Large, close porosity, coarse grained.
- Medium conserved.
- 500 conserved.

- From the sherds TLUM 120 was [unclear] piece put in the ground. Some from TLUM 120, probably from TLUM 120.
- Some material TLUM 120 far more complete. The TLUM 120 is a very poor unit, being mostly sherd.

- Some material TLUM 120 is a very poor.
- TLUM 120 to be burned in this. It is a TLUM 120, the TLUM 120.

- TLUM 120 is a very poor.
- TLUM 120 is a very poor.

- Much burnt pottery.

---

<table>
<thead>
<tr>
<th>Date (d-m-y)</th>
<th>Area, trench, level, feature</th>
<th>Pail 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4/19</td>
<td>19A/21A/3 38</td>
<td></td>
</tr>
</tbody>
</table>

**Pottery Description**

- Course of 168°.
- 80 fish pit.
- Large, close porosity, coarse grained.
- Medium conserved.
- 500 conserved.

- From the sherds TLUM 120 was [unclear] piece put in the ground. Some from TLUM 120, probably from TLUM 120.
- Some material TLUM 120 far more complete. The TLUM 120 is a very poor unit, being mostly sherd.

- Some material TLUM 120 is a very poor.
- TLUM 120 to be burned in this. It is a TLUM 120, the TLUM 120.

- TLUM 120 is a very poor.
- TLUM 120 is a very poor.

- Much burnt pottery.
<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level</th>
<th>P</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>25/3/19</td>
<td>36/50 q.t.</td>
<td></td>
<td>Cardboard: 7 sheets</td>
</tr>
<tr>
<td></td>
<td>240 q.t. total</td>
<td></td>
<td>Consec: 273 sheets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Indian (cord): 391 sheets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fine (cord): 405 sheets</td>
</tr>
</tbody>
</table>

**Kommos Excavations**

Brief Daily Pottery Summary

- 240 q.t. total
- Consec: 273 sheets
- Indian (cord): 391 sheets
- Fine (cord): 405 sheets

**Pottery Description**

- Cardboard: 7 sheets
- Consec: 273 sheets
- Indian (cord): 391 sheets
- Fine (cord): 405 sheets

- Consec is followed by a description of the pottery recovery, including notes on the cardboards and cords used.

- The table format is consistent throughout the document.
<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pail</th>
<th>Pottery Description</th>
</tr>
</thead>
</table>
| 24/1/34 | 374A/374/26     | 26   | 6,970 in total  
50 covered  
60 medium coarse - pithos style?  
80 fine buff |
|       |                |      | Many small, unworked sherds, mostly undecorated, some of same as LM II III, LM IIIA-I. Latest material is LM IIIB, identified via 2 fragments from two bowls. One is rather large, with either rounded or conical sides around handle zone; the other preserves only the upper handle. LM IIIB - baked reddish material. |

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pail</th>
<th>Pottery Description</th>
</tr>
</thead>
</table>
| 31/1/34 | 374A/374/26     | 27   | 892 in total     
28 coarse red  
12 medium coarse  
46 fine buff |
|       |                |      | Again, the presence of a many-parted cooking pot fits in LM II 23, also, there is some MM III scroop, vis a vis conical cups, a LM IIIB goblet & frags from the kylix, C 2032, found in Pail 23, give this unit a date of LM IIIB kylix (q.p. 23). |

<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pail</th>
<th>Pottery Description</th>
</tr>
</thead>
</table>
| 33/1/34 | 374A/374/26     | 28   | 3690 in total  
50 as covered - large pieces from cooking pot  
30 medium coarse  
80 fine buff  
Some MM III conical cups, mostly unpainted kylix & goblet fragments. These of the frags from a deep bowl close as the latest material, to LM IIIB. |
|       |                |      | Note: Deep bowl fr. of straw  
Goblet  
Kylix  
C 2106 - cup, bowl fr. of horizontal stripes |
<table>
<thead>
<tr>
<th>Date</th>
<th>Area, trench, level feature</th>
<th>Pottery Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>24/7/79</td>
<td>K76A/27A1/31</td>
<td>Floor Deposit</td>
</tr>
</tbody>
</table>

Weights: in grams

"floor" - coarse red: 260 g, 35 shades
medium orange: 260 g, 14 shades
fini buff: 630 g, 30 shades

"the very floor" - coarse red: 100 g, 1 shade
medium orange: 660 g, 1 shade
pinkish: 180 g, 10 shades

1. loom weight: 120 g
2. base sherd: 30 g
3. coarse red jar: 1740 g
4. ladle body sherd: 900 g
5. conical cup + saucer: 320 g
6. ladle handle: 280 g

Cataloged objects:
1. loom weight
2. coarse red jar
3. ladle body
4. conical cup + saucer
5. other catalogued objects

Comments: This unit is distinguished by the number of unpainted fire wave shapes, goblets, cups, saucers, and lades. Only the cup, C2118, is remained. Outside shape + a base from a by(lar). There are a few sherds of MMIIA-LMII, but most is consistent with a date of LMIIIA. The material looks necessary. MMIIIB + the goblet profile is clear, LMIIIA + the conical cup is rare. Any the plain laced lared. Date for deposit is: LMIIIA-2.
Although this project was not formally recognized as a survey until 1976, it began with the travels of J. W. Shaw in 1969 and later years, in 1975 and 1976 in the company of L. V. Watrous among others. In 1976 and 1977 important contributions were also made by various members of the Komos Excavations staff, and by others. In addition to Shaw and Watrous, J. Hayes, P. P. Betancourt, H. Blitzer, L. Nixon, J. Griford, and J. McEnroe participated in the search for sites; and the result of their combined efforts was the discovery of about 30 sites of all periods within the Matala Pitsidhia area, besides extensive travel in the surrounding areas, especially in the neighbourhood of Kamili to the north and Siva to the east.

After a brief reconnaissance in summer 1977, I undertook the task of consolidating and synthesizing the work of the team, while restricting the coverage of this "intensive" work roughly to the area covered by the numbered sites on the provisional sketch map area. In summer 1978, together with J. McEnroe and, for a shorter period, with L. Nixon, I began the systematic "intensive" campaign of fieldwork. In a period of 5 weeks (May 29 to July 1) of active search on foot, we visited again all the sites previously found (with the exception of two "on the border"), and discovered over 30 "new" sites (of all periods ranging from Early Minoan to medieval). The results were thus already remarkable for such a relatively small area (about 20 square kilometres). In addition to Komos, and to the excavated sites in the Kamili area, some 24 Minoan sites are now known, one or more of the Archaic period (i.e. Vigles, No. 66, to south of the Komos site), at least 29 of the Classical and/or Hellenistic periods, 22 of the Roman period, and 6 or more of Byzantine or later medieval date. It has not been possible to complete the desired full pattern of intensive search in this one season; and some gaps still remain in our coverage. But the main hills and valleys have been thoroughly investigated, sometimes repeatedly, and all the more likely areas have been walked over in the manner of "ploughing".

Despite certain published remarks to the contrary, it is obvious to us that surface surveys of this type can not be relied upon to produce anything like a complete picture of the patterns of habitation in the various periods of the past. For instance, no Neolithic site has yet been found in the area, although we are very much in quest of one. And in the Matala district in particular, the Classical and later occupation has been so heavy that it has obviously obscured the surface traces of Minoan habitation in many places.

The Minoan sites actually found in the Matala district are mainly on the higher hills or hill slopes; but there are indications (i.e. at sites 18 and 37) that the lower hills were also occupied at this time. Most of the Minoan sites found are those revealed by erosion, which is by nature random and partial, so that the exact original size of the settlements can seldom be gauged. But it may be significant that they most frequently occur in "clusters" marked by relatively limited spreads of surface potsherds, on groups of contiguous or nearby hillsides. Komos itself, together with the adjoining hillocks to north (site 75) and the higher hill of Vigles to the south (sites 6 and 70) forms one such nucleus; although Komos appears to have been far more important than any of the other "clusters" in the area. Other main "clusters" are in the coastal valley of Kalamaki (sites 35, 20, 62, 64, 63, and 25); between Kalamaki and Pitsidhia on the north side of the Kalamaki stream (sites 45, 33, and 57); between Pitsidhia and Kamili (sites 47, 53; Beli, 54, 55, 49, and 32); immediately south-west of Pitsidhia (sites 2, 79, 77, and 16); and in the centre of the Matala valley sites 31, 51, 50, and 40), on the Arolithia
ridge. The remaining few Minoan sites found in the area may have been more isolated, peripheral, and perhaps smaller.

No particular pattern or concentration is as yet observable for the Classical sites, but their number is perhaps surprising (up to about 20). The Hellenistic (up to about 25) and Roman sites found are mainly in the Natale area, which would appear (from the apparent indications supplied by the well-disciplined, but now disused terraces, even in the higher plateaus) to have been fully and extensively farmed at this time, if not before. A thorough survey of the immediate vicinity of Natale has been deliberately deferred, especially since the Greek Archaeological Service is at present conducting excavations there. Medieval sites known are few, but an attempt will be made to add to their number in particular, although the area may have been a "backwater" at this time.

Up to 1978 the biggest problem encountered in the survey work was not that of discovery of sites, but of pinning down their locations. Now, due in large part to Mr. and Mrs. Alan Walton, of Keele University, we have been able to acquire air photographs (from World War II operational sorties in 1944 by the R.A.F.) of all of the area. With the aid of these, and of a 1:50,000 map of the area of the same vintage, it has been possible to make up a provisional sketch map (here appended), showing more or less accurately the position of the sites and their inter-relationships, and relations to the natural terrain and to modern villages and roads. An attempt is being made, under the supervision of Dr. G. T. McGeath (Department of Geography, Queen's University) to produce an improved map of the area by means of the photographs, which themselves for the present constitute our best "map" for the area.

Surface pottery has been collected at most of the sites; and P. F. Betancourt, L. V. Watrous, and J. Wright have identified the diagnostic sherds, so far as is at present possible. The most easy to identify have been the Minoan. The local varieties of Classical, Hellenistic, and Roman pottery are somewhat harder to define; and the Kommos excavation Classical and Hellenistic material has not yet been fully studied, and indeed is still being excavated; so that identification of some potentially diagnostic sherds from the survey would be premature. But the data are being collected, and some of the surface sherds are of surprisingly good quality. Since we intend to gather more material at the sites already located, and since the data collected can not always be fully diagnosed, I have made no attempt to distinguish the presence (or supposed absence) of the various sub-periods, so far as the provisional map is concerned. But a list of sites and periods already distinguished is appended below.

An attempt has also been made this year to study the natural environment of the sites, and to gauge the agricultural potential of their neighbourhoods (cf. the long version of the Survey Form used). But the main work on Land Use remains to be completed next year. Professor John Gifford (University of Minnesota, Duluth) made a preliminary geological study of the area and also examined material from the Kommos Excavations. Unfortunately, his visit took place after I had left the area. But I left a series of questions of a very specific nature for him to investigate in the field, particularly the question of the sand cover (wind-blown) on much of the area. This sand was obviously not present, or at least not in quantity, in the ancient periods concerned. Since Gifford's report to me has satisfactorily answered many of my questions, I reproduce it in full here, although some of the conclusions are admittedly speculative; and considerable further time is needed in the field.
There are several "gaps" in the survey coverage, especially on the east and south east fringes of the area. Several promising sites will be re-visited in 1979 in the hope of finding further diagnostic sherd material and further architectural remains. For instance, a small conical knoll (site 51) high up on a ridge, seemed at first sight a promising candidate for a "Peak Sanctuary". But, in default of substantial architectural remains, and because of the lack of any surface finds that might be considered as "votives", we are inclined to suggest a more humble use of the site, perhaps for a shepherd's hut and sheepfold. It is indeed often extremely difficult to diagnose the nature of most of the structures whose foundations are intermittently visible on the surface or poorly preserved, or both. But we have followed traces of aqueducts (presumably Roman) on both sides of the southern Katsa valley, various foundations of quite large buildings, including a possible tower at a site in the Kalampari valley (No. 62). The so-called "Minoan Road" at Vigles seems in fact to be part of a circuit wall round a portion of the "acropolis"-type hill. These and similar traces have been recorded, and appropriate sketch plans made (often with the aid of the air photos themselves). Sketch plans have been made, and forms filled out, of the more significant sites (about 20 in number), and about 120 photographs have been taken in the field in black and white, as well as many in colour. It must, however, be realised that some of the "sites" are represented only by sherd "scatters" which may or may not indicate the presence of actual settlements at the exact locations.

My own work this year during the season consisted of five weeks of active survey in the field, and ten days of subsequent study and recording. From my own experience, I would judge that the survey has already been extremely successful, as regards archaeological discovery and recording. I am particularly grateful to John McElroy, who assisted in the field for the first four weeks, and made many important discoveries and observations; and I am also grateful to Lucia Nixon, who gave similar valuable assistance during the fourth week. Both colleagues then transferred their attentions to the needs of the excavation itself. The excavation director, Joseph Shaw, was able to accompany us on some field trips just before the excavation began, and he helped us to pin-point some of the previous discoveries (i.e. up to 1977), at sites we had only partially re-located (often because of this year's unusually abundant flora). The work of Philip Betancourt and Vance Watrous in identifying the sherd material was, of course, invaluable. To all these colleagues, as well as to the remainder of the Kommos team, I am very grateful.
KOMMOS AREA SURVEY. LIST OF SITES (up to July 1978)

(omitting sites outside the survey area)

(EM = Early Minoan, MM = Middle Minoan, LM = Late Minoan, LG = Late Geometric, A = Archaic, C = Classical, H = Hellenistic, ER = Early Roman, LR = Late Roman, Byz. = Byzantine, Med. = Medieval)

4. Miraso North (Petro's House) MM, ER.
5. Evangelimmos (Kalamaki). LR
6. Vigles (East of Ayios Pandeleimon) EM II, MM
8. Orthes Petres. C
10. Vigles (Site on crest). A
15. Voulakas Shipwreck. ER
16. Vreoniakos. MM, LM
17. To Fapourl tis Kassojanninas. EM II, MM/LM
18. Charaki. EM I-II, C or H, ER, LR.
21. Asphendias. EM I-II, C or H.
22. Pitsidhia River Valley. LM? H or R
32. North of Pitsidhia. MM, LM III
33. Peristeria. EM I-II, MM I-II, C, ER.
34. Matala North Valley. LM
35. Sphakoryako. MM III, LM
36. Asphendias (west). LM
37. Matala Dump. LM III, C, H.
38. Ayios Stephanos (Hill to W.) H?, ER, LR.
39. Matala Valley. C or H, ER.
40. Arolithia (South). MM III, LM I, LM III, H.
41. (North of Charaki). Byz.?
42. Matala South Valley. H, R.
43. Arolithia SW foot. ER, LR.
45. Peristeria (west). MM, LM?
46. Karapanas (SE). C, H?
47. Karapanas (Kamiali old rd.). MM I-II, LM?
48. Pitsidhia (North). MM, H or R.
49. Pitsidhia (North). Minoan, C, H?, ER.
50. Arolithia (South). EM I, EM III/MM IA, MM I, C.
52. Traganatha. LR.
53. Karapanas. MM, LM?
54. Karapanas. MM IIB/III
55. Pitsidhia (North). MM, C or H.
56. Langos. H, ER?
58. Asphendias SW Slope. LM I
59. Asphendias (W. of Gates). H
60. Arolithia West Foot. ER, LR.
61. Arolithia West Foot. H, LR.
62. Kalamaki (North). MM I, C or H.
KOMMOS AREA SURVEY. ADDITIONAL BIBLIOGRAPHY

(including Land Use in Greece)


ARCHAEOLOGICAL REPORT ON THE KOMOS AREA (SOUTH CRETE):

INTERIM REPORT ON THE 1978 SEASON

(USSRC Grant No. 410-78-0398)

By R. Hope Simpson

The work, and this report on it, are a sequel to the 1978 campaign. The 1979 campaign was again a team project, carried out in conjunction with the Kommos Excavations and directly or indirectly, all members of the excavation team, as well as others.

WALK DONE

The season began with the arrival of Hope Simpson, John McEnroe, Lucia Niiran, and Michael Parsons "en suite" on May 22. Parsons made a full study with the modern land use pattern and the soil types, both with a view to investigating the present environment and in order to provide a basis for hypotheses concerning the ancient environment. The others continued the archaeological survey, complementing the 1978 work, until June 20, when McEnroe and Simpson resumed their duties on the Kommos excavations. Hope Simpson and Parsons completed the remaining fieldwork, recording of data, and editing of provisional reports until their departure on July 12. From June 20 to July 7, and again for a few days in late July, John Gifford continued the geological fieldwork, both for the survey and for the excavations. The results obtained by Gifford and Parsons are here given separately. It should, however, be emphasized that his year there was considerable interaction in the field and discussion between the archaeologists and geographers, and, one approach has been as inter-disciplinary as possible. It is naturally too early to attempt any synthesis from the present data, since many problems remain, and the analyses (of soil samples etc.) are not yet completed. We have had little time for reflection, since the process of data collection and daily recording has taken up most of the field time available, and members of the team have all dispersed to other activities (for the most part to University terms).

SUMMARY OF THE RESULTS

At the end of the 1978 campaign we had listed, and plotted on the provisional map, some 24 Minos "sites" or "scatter", two of the Archaic period, at least 29 of the Classical and/or Hellenistic periods, 22 of the Roman period, and 6 or more of Byzantine or later medieval date (R.B. the use of the terms "site" and "scatter" in this context is explained below). At the end of the 1979 campaign we now have some 50 Minos "sites" or "scatters", at least two sites (Kommos and Vigles) of the Late Geometric and Archaic periods, at least 50 of the Classical and/or Hellenistic periods, 34 of the Roman period(s), and about 11 of Byzantine or medieval date. For the identification of the Artifacts; found (mainly ceramic) we are indebted to the following members of the team and/or visiting experts: Philip Betancourt and Robert Cole (Minos), Vanoss Wittern (Late Minos and Classical to Hellenistic), John Hayes (Geometric to Byzantine and later), Peter Callaghan (Classical and Hellenistic), and Jim White (Classical to Roman). Objects selected for cataloguing (and possibly for illustration in the publication) have been photographed by Robert K. Vincent, and drawings of profiles etc. to be done by David Neil Lews. It has not, however, always been possible to identify the surface sherds, which are normally
found in very worn condition. In many cases sherds appeared to be out of their original location, on eroded slopes etc., and we have mainly confined our collection of artifacts to locations where the original position of the "site" indicated seemed more or less clear. Relatively few "scatterers" are represented in the collection.

This year we have been able to determine and record the location of finds with much greater precision. A full set of copies of the World War II R.A.F. cover of our area has been acquired from Keele University, with the aid of a special grant from the Council, and with the generous cooperation of Drs. and Mrs. Alan Walton, of the Department of Geography, Keele University. With the aid of these photos and because of his unusual topographical skill, Michael Parsons has now provided us with a much improved (and fully checked in the field) sketch map of the area, showing with much greater accuracy the positions of the sites and their inter-relationships, and their relations with the natural terrain and the modern villages, roads, etc. The air photos themselves, will provide the most accurate "map" of our area available, but the new "base map" is sufficiently accurate as to enable us to superimpose onto it completed overlays or trace maps upon it. Michael Parsons has already completed two such overlays, one of the modern land use and the other of the soils. The overlay and the "potential" will be completed by his later, when the soil samples have been analysed by the Department of Geography, Queen's University. John Gittard has completed his soil map of the Surficial Geology of the area. Hope Simpson will supervise the provision of the overlays for the periods of ancient settlement (a or stages trace maps). The base map and the overlays will form the main topographical illustrations for the survey publication. Other figure illustrations will include several detailed area maps (already prepared by Hope Simpson) and an overall map of the area with the walls of ancient buildings and features on it prepared by McVehil, and Nixons. These archaeological maps, plans, and sketches will be prepared by Mr. Ron Hough and others of the Cartographic unit of the Department of Geography, Queen's University, supervised by Hope Simpson. The photographic record 1978 (photos taken in the field by Hope Simpson) will be compiled by Mr. John Hames (of the same department), who will make the necessary prints. All this supplementary work is being financed by the SSHRC grant.

We return now to the archaeological fieldwork and study. Hope Simpson, McVehil, and Nixon have prepared a first draft of the full report on the sites and "scatterers" found, and Betancourt will coordinate the reports on the artifacts, especially those chosen for illustration. It is not possible to present this first draft as a report, since much further study is needed. But a copy has been left at Pittsida, another in at Toronto, and a third copy here at Queen's.

An explanation of the nature of our survey is necessary here, together with some warning as to the limitations inherent in all archaeological surface surveys. Most surface finds consists of small fragments of broken pottery, i.e. sherds, which are in very worn condition. Even when sherds are reasonably well preserved and near remains (usually also poorly preserved) of ancient buildings, they seldom provide any guarantee of the date of such structures, especially when there is an admixture of sherds of different periods in the vicinity.

THE NATURE OF THE SURVEY AND ITS OBJECTIVES

Much discussion has taken place recently (e.g. The Cambridge colloquium on Mediterranean Geography 1977) as to the merits of so-called "intensive" (i.e. field by field or even more thorough) surface surveys. In practice, however, it is impossible for us to observe the whole of, or even most of, the ground surface selected for examination. Typical obstacles to observation include:

- A modern houses, roads, threshing floors, gardens and other enclosed private property, land under intensive cultivation or deliberately cleared (e.g. most vineyards) or conversely.
- Land covered by garigue vegetation, such as gorse, scrub, thorns, thick grasses etc.
- Also, because of often extreme variations in erosion and/or deposition, sherds and other surface materials have often either been moved from their original position or obscured by later "fill" or other disturbance, either natural or man-made.

It seems reasonable that these factors combined tend to call in question all theories concerning the feasibility of extrapolation from surface finds alone in any one area in order to provide reliable estimates for "retrojection" in other (unsampled) areas (cf. Bintliff, 1977 contra). It is thus debatable as to whether the results of so-called "intensive" surveys are more reliable than those of so-called "extensive" (i.e. less thorough) surveys in this respect.

Our purpose has been to find out as much as possible about our area in the limited time available. We are basically interested in it for its own sake, rather than as a "sample" of any kind. The area has been deliberately chosen, i.e. it comprises the immediate vicinity of the important ancient sites of Zamos and Katalia (ancient Metaleum). In practice the 1978 and 1979 seasons have been reasonably "intensive". On the other hand we do not claim to have searched the accessible ground beneath every bush or tree, even to have traversed the whole of every terrace. The time spent on the surface survey has been limited by the availability of the qualified personnel involved (all of whom are skilled observers, such as are necessary even for "intensive" surveys), and by the funds, which could reasonably be expected. The funding by SSHRC has been very generous, considering the relative importance of stratigraphic excavation vs. a-wing surface examination. Rightly or wrongly, the decision was made to mount only two major systematic campaigns, in 1978 and 1979. But it should also be remembered that considerable previous fieldwork (of "extensive" nature), and excavation have already taken place in the area previously (as recounted in my 1978 report), especially the reported "scatterers" of 1977 to 1979, and more widely since 1975. Thus, the end of the two major periods had been found in the area.

In each of the two major campaigns (1978 and 1979) 4-5 weeks were spent in the field, followed by 2-3 weeks "on site" study and field checking. In one or two cases, the areas chosen for detailed examination were reasonably coherent geographically, but not political, unit, consisting of the Metaleia and Pittisida coastal valleys and the surrounding hills. The exact borders of the survey area are more or less well defined by natural features. It did not seem feasible to us to attempt to cover only part of this area "intensively" in the fuller sense (i.e. to make sure that we leave the rest to subsequent examination, since there are great variations in the terrain even within this small district. We therefore rejected any kind of "sampling" procedure, (whose validity would in any case be difficult to justify for the reasons given above). Our objective has been simply to locate and record as many as many of the "sites" and "scatterers" as possible in the time available, while giving surface coverage throughout the area. We estimate that at least 30% of the total land has been searched, and that the rest of this area is not be expected either man-made constructions or obstacles by natural vegetation or subsequent
deposition (including the phenomenal amount of blown sand in the coastal area, for which see Johnson’s 1976 report). It is questionable whether a fully intensive surface search would have yielded substantially greater returns than our "reasonably intensive" search. We did examine every feature, both on the hills and hill slopes and in the valley bottoms, using the same general approach and method, regardless of whether we were traversing along hills, terraces and valleys, and also across them. Many of the surface finds, especially in the 1979-80 season, were in the form of small "scatters" of pottery, which we have defined as "very light" and "insignificant". But surface pottery, even in large quantities, ever almost all the area, especially in the Matala valleys. It would indeed be very difficult to chart the position of every sherid and the results of any such attempt would probably be utterly meaningless, given the extent of ancient and modern cultivation and other disturbances.

We have tried to confine the term "site" to places where the evidence is, in our opinion, firm enough to warrant the conclusion that a habitation, tomb, or other type of ancient site actually existed at, or very near the precise location of the surface finds. The identifications are, of course, more secure in cases where foundations or other traces of actual structural remains have been found, especially when these can be more or less securely dated. We do not, of course, claim to have found every "site" or "scatter" which may now exist in the survey area. And even if such a feat were possible, there is no way that the finds would accurately reflect the actual ancient patterns of settlement in the periods concerned. For instance, around Matala the heavy overgrowth of Hellenistic and Roman remains may have obliterated or obscured most former traces of Minoan habitation; so that the pattern of Minoan occupation so far reconstructed is only a part of the Matala valley, and even of that part.

Intensive cultivation both here and in the immediate vicinity of Pitsidia has rendered most surface sherds unrecognizable. In general, constant erosion on the hillsides and terraces has taken a heavy toll of the ancient remains, even though the same erosion has often been of considerable aid in our search. It is therefore extremely difficult to estimate what percentage of the ancient sites which originally existed in our area have actually been preserved. Accordingly we strongly urge that future work train from undue speculation and extrapolation (particular computer "simulations"), and to take full note of the qualifications and caveats outlined above, when assessing our results. Here, as elsewhere in Crete, we are already much in the stage of collection of the "raw data", and most "reconstruction" is premature.

For convenience, we have adopted certain arbitrary guidelines in our classification of the relative size of the "sites" or "scatters" actually observed. Except for Kommos (with Vigles) and ancient Metelli, there are no habitation sites so far discovered in the area which can be classified as "large" (i.e. 10,000 m. or greater). Most are "medium" (i.e. 1000 m. to 10,000 m.2). The message of the fact that the approximate spread of the possessions observed, and need not, of course, represent the actual size of the settlement where indistinct. "Scatters" are of small size (here termed "very light" or "light"), and "scatters" that are so widespread and thin that they have no discernable nucleus will either be mentioned in passing or omitted. As was said above, potsherds of extremely thin-walled and recognizable type can be found almost anywhere in our area; but we confine our reports to those whose periods can be more or less securely assigned, and which appear to have some significance in the case of most "sites", habitations in the areas where building remains and/or other artifacts have been found, either because of erosion or deposition and/or because of disturbance by man.

**SUMMARY OF PERIODS OF HABITATION**

Although the qualifications outlined above must always be taken into account, it would be fair to say that the number of "sites" and "scatterings" located is considerable, considering the relatively small surface area (about 20 km.²) of land surface, allowing for the shapes which has now been systematically surveyed.

Any Neolithic or earlier sites which may have existed have so far eluded us. Despite our great desire to locate them, but in addition to the sites of Kommos and Vigles, some 19 Minoan "sites" are now known and about 20 "scatterings". Of all these, the Early Minoan period is represented at 19, the Middle Minoan at 29 at least, and the Late Minoan at about 16 (including at least 5 in the LM III). Late Cretaceous and Archaic are present at Kommos and Vigles, and a significant, if small, Archaic settlement is here indicated. At least 20 Classical and at least 24 Hellenistic "sites" or "scatterings" are indicated (including in Kommos and Metelli, Kommos and Vigles, etc. centred at A.D.A.). This has been set out at 22 locations at least, and Early Roman at about 10. The Byzantine and later periods are not so well represented, but there are indications of habitation at about 11 locations.

**THE PATTERNS OF ANCIENT SETTLEMENTS**

Despite certain published theories (e.g. Billot’s 1977 paper), it should be obvious that surface surveys alone, even when of "intensive" type, can not be relied upon to produce anything like a complete picture of the patterns of ancient settlement in the various periods of the past. For instance, the fact that no Neolithic sites have yet been located does not mean that there were none. High likelihood that the abundance of late settlements, and of later disappearances of all kinds, will have obliterated remains of such antiquity in this particular area. The problem in the Matala area has already been shown in the Matala area, where we may have already found remains of the highest hills or hill slopes. There is certainly a significant "cluster" of Minoan sites on the Arolithi ridge, between the Matala and northwestern coasts of the Matala valley (i.e. 51, 52, 54, 50, 49, 40, and 29). Another significant settlement area (i.e. at Malignes, at 51, 79, 129, and 130) that the lower hills, and at least part of the valley bottom, were also settled at this time, beginning in the Middle Minoan period. MB II is well represented in the entire area, with a much eroded site (503) in the Arolithi Group, and will be represented in this group in general. LM III is known only at 521 (one sherd) at 590 in the Matala Valleys. Apart from Kommos and Vigles (Kommos, 529, 67, 70, and 66), the other major "clusters" of Minoan habitation and those at Pitsidia (53, 57, 58), 59, 39, 42, 93, 95, 96, and 297), and north of Pitsidia (54, 55, 56, 129, 202, 32, 77, and 6811), Minoan habitation began early at the Eastern Group (533 and 57) and at Kommos (521, 57) and the Middle Minoan sites are known. There are no sites in these groups. LM I is sparsely represented (at 564, 25, and 32). The Minoan sites were mainly on the higher hillsides and slopes, usually facing south, but Minoan sherds have been found in lower ground (at the foot of 532, for instance), and the Minoan was transported at the base of the sand quarry at Kalamaki (530) demonstrate that at least one settlement extended to the valley bottom here. The absence of LM I is perhaps surprising, and might possibly be the result of a kind of "suppression", i.e. a concentration at larger sites, such as Kommos. Throughout the area, much of the Minoan sites and those "scatterings" have been revealed by recent work, which has been severe, in many places
or anticipate the results of analyses (of soils etc.) still to be carried out. But we have already advanced a long way towards a better understanding of the present environment, and have a few clues as to the reconstruction of that of the past. The raw material upon which the archaeological report will be based is now in good shape (due mainly to the work of Betancourt, McNees, and Nixon, and others mentioned above). The records have been assembled and duplicated. Many maps and plans are already in the semi-final stage, and the illustrations of the finds have been chosen. The main responsibility for the final coordination of the survey will be divided between Betancourt, Gifford, Hope Simpson, McNees, Nixon, and Parsons. Our present plan is to incorporate the survey report in Volume I of the Kommos Excavations Report, due to go to Press in 1982, under the general editorship of Shaw.

The excellent assistance received from others has been acknowledged above, and we repent that all members of the Kommos team (among others) have been neither directly nor indirectly involved.

ACKNOWLEDGMENTS

Once again it must be emphasized that the results have been obtained by the combined work of members of the Kommos team in general. I will not here either duplicate the conclusions in the reports presented by Gifford and Parsons,
2) NOTES ON THE APPROACH TO SOIL MAPPING IN THE KOMOS AREA SURVEY

Several approaches to soil mapping are possible, the choice of which one depends on the objective of the study.

Archaeological based soil surveys may have several objectives which overlap in perspective. The most common of these are firstly soil studies related to the nature of the ancient terrain (paleopedological), and hence to an attempt at remodelling the model environment pertaining to particular sites of interest. Secondly, soil mapping may be carried out to examine the stability of the present landscape (soil geomorphology) and hence the long term effects on the development of a soil and its' evolution in the landscape. Finally, soil mapping may be used in conjunction with a land-use survey to provide information on land-use potential of the present day.

Ideally the surveyor should examine the soil cover with all three approaches in mind, but this is both time consuming and rarely accurate on a field-based survey. Detection of polygenetic soils requires considerable laboratory analysis of a large number of samples collected on a three-dimensional basis.

A land-use based survey, however, may be based on less detailed field observations of the soil profile, together with a limited series of field soil fertility tests and laboratory determination of cation-exchange-capacity. Analysis of land-use potential requires data on soil fertility, soil stability, and soil depth, combined with some climatic data, such as rainfall and temperature. A knowledge of the relationships between soil and landscape evolution is important to the production of a land-use potential map. Extrapolation of land-use potential to any period in the past for the purpose of reconstructing the pertinent agricultural conditions requires considerable knowledge of the changes in the pattern of the soil cover through time, and of changes in other factors, such as climatic conditions and vegetation cover.

Mapping units of soil groups are also constructed by different procedures according to the basis of the study. Typically, soil units are grouped by genetic criteria of a well defined system of soil taxonomy. Such systems incorporate information on most aspects of soil genesis, and several features of soil fertility, but require, once again, a considerable amount of laboratory analysis, and a well-trained soil surveyor. Such an approach was used by Yarnaglou and Nohell (1972) in Greece.

Modifications of the detailed soil genesis map exclude some of the characteristics of a soil body considered necessary for a structured taxonomy, but will still provide considerable insight into the evolution of the soil body. Bintliff (1975) used a limited number of soil properties, such as slope, soil depth, soil stability, and soil parent material to produce a soil map of the Glykofarango valley in south central Crete.

Another option is to divide the soil continuum into areas of equal soil fertility, based on a number of assumptions regarding climate. This is useful for a study in which soil fertility, and hence land-use potential are the prime objective, but gives very little indication as to the evolution of these soils, and the effects this will have had in the farming through time.

It seems that under conditions of restricted survey the Bintliff approach would probably give the most adequate result. Certainly the Komos area survey is limited in its approach to fine detail in evaluating the soil cover, as digging and augering are not possible, except where soil sections already exist, as in road cuttings, rock-steps, gullies, stream beds, and collapsed terrace walls. Large areas of soil cover need to be interpolated between the occasional exposed pedons. Often interpolation is made difficult by the nature of the land-use. Pastures and fodder crops do not enable differentiation of soil types, and can make soil depth difficult to estimate. In ploughed areas, especially on the shallow soils of the ridges and plateaus, much of the O horizon has been turned over, and large stones of partly weathered parent material lie at the surface.

There is also a second difficulty in delimiting particular soil groups, notably that of the extensive terracing, both ancient and modern, which has considerably modified the soils.

Where active slope transport is limited to terraced-areas, the associated soils typically show an increase in depth from the back to the front edge of the terrace. Horizonation becomes more distinct toward the front of the terrace, making soils more readily classified by a system of soil taxonomy. These terraces may range in width from 1-2m. to as much as 25m. on gentle valley bottom slopes.
and the difference between soils at the retaining and rear edges may be considerable. The scale of the mapping unit does not allow for sub-division of the individual terraces, and one is forced to consider the model profile as representative of the whole. In soil survey we continually encounter this problem of transition between mapping units at the intra-unit level. For the sake of convenience in the survey, soil mapping units are used here that are representative of the soil type that covers at least 60% of the unit area.

Where well maintained, such terraced soils are among the most stable in the Kommos area survey. More often the terraces are either poorly maintained, or completely abandoned, though well maintained units may be irregularly dispersed amongst the poorly maintained group, and give some indication as to the former quality of the soil, and its potential for land-use.

Poorly maintained and abandoned terraces fall roughly into two groups: eroded, and overgrown. On overgrown terraces the terrace wall is often intact, and little erosion has taken place. Soil stability is similar to that of a well maintained terrace, though its fertility may differ considerably. A typical area of overgrown terrace may be seen on the hillslope to the SW of site 57.

Eroded soil is not confined to poorly maintained terraces. Indeed it is more severe in areas of non-terraced slope, though the number of such slopes in the Kommos area is limited. The south-east slope of Kiso facing the lower Matala valley is such an example. Here, in various sections of the road cutting the unstable slope deposits can be noted with a very shallow soil cover. Such erosion is considered to be on the massive or catastrophic scale, and at higher elevations little or none of the original soil remains. It is therefore not possible to evaluate the slope with respect to past land-use, as probably such erosion is on the geologic rather than historic, time scale.

On the eroded terrace soils the soil profile is considered to be truncated, i.e. part of the upper subsoil has been removed downslope, and only the lower horizons remain. Generally at least all the A horizon is lost, and apparently part of the B horizon, though occasionally only altered parent material remains. Horizon may be unequal across a single terrace. Although incipience of such erosion of terraced slopes is probably natural after the terraces fell into disuse, it is possible that in certain areas, such as the SW Arolithi ridge, and the SE Matala uplands, destruction of the terrace walls has been aided by heavy grazing by sheep. This has a cumulative effect on the instability of affected areas.

In the area to the east of Pitsidia, and in the upper Pitsidia and upper Kamilaroi valleys soil erosion is not a pressing problem, and these areas are notably areas of sediment accumulation. The soils are fairly deep, and moderately well developed, and at present form the most heavily cultivated group in the survey area.

Many of the valleys bordering the sea are heavily overlain with an aeolian sand. The soils here are very poorly developed and show little sign of horizonation. Differentiation into a single mapping unit is simple, but the presence of the overburden limits the investigation of the truly colluvial soils. There is some evidence in the upper parts of small river valleys that there have been several phases in the evolution of the present landscape, but as yet the presence of paleosols is not proven. It appears that at least one of these sedimentary units may be given a terminus post quem that indicates it to be at most Minoan in age.

This brings us to the naming of the soil mapping units. Obviously it is not possible to recognize and define particular soil series from the limited sample data available. Nor is it possible to classify these soils to any further extent than sub-order level (USDA 1975). The choice of the USDA System of Soil Taxonomy (1960 & ff.) is proposed as it is the most widely accepted soil classification at present. It has already been mentioned that for a field based survey both the USDA and the FAO/UNESCO systems are clumsy and inappropriate below the sub-order level. In the Kommos area there is some difficulty in separating several soil orders from one another due to the very high levels of CaCO₃ present in the soil that mask true and distinguishing soil colours.

To use the USDA (1975) system effectively under restricted field observation, a process of elimination is convenient, if neither desirable, nor rigorous in its destruction. This method is severely limiting when dealing with the truncated soils found in the Kommos area. Definitions of soil orders are dependent on the presence of a diagnostic epipedon; a soil horizon that forms at the surface. Truncated soils have lost at least part of that epipedon, and often a sub-surface horizon lies at the surface.

Yet it is possible to eliminate certain soil orders on the basis of climatic criteria which strongly influence the development of certain diagnostic epipedons. The Mollic (L, molis, soft) epipedon therefore would not be found in Crete, as it is typically the product of a steppe climate, as is the Anthropic epipedon which is a horizon modified by man during land use. Similarly
the Umbric epipedon which contains a higher percentage of organic matter than down the Mollic type is not present in Crete, nor in the Albic epipedon, typical of humid to perhumid climates.

Of the two remaining epipedons, both the Plaggen (a man-made horizon produced by long continued manuring) and the Ochric epipedon (one that is too high in value or in chroma, is too dry, has too little organic matter, or is too thin to suit the definitions of the other epipedons) are possible, but the latter is most commonly observed in the Kommos area. The Plaggen epipedon is not typical of this area as manuring is only an occasional practice.

That the Ochric epipedon should prove to be the most likely of all the epipedons in the Kommos area is not surprising, as most of the soils contain a high CaCO₃ content, are dry for 8 months of the year, have a fine crumbly structure, and possess a low organic matter content.

Soil orders that are defined by the presence of an Ochric epipedon are: Aridisols, Entisols, Alfisols, and Inceptisols.

Alfisols are mineral soils that are defined by not having a fragipan, but having an argillic or mottic horizon, or have a fragipan below an argillic horizon, or have clay skins greater than 1mm. thick in some part of the fragipan. Alfisols have an epipedon that is both massive and hard when dry, or have an argillic, ustic, or xeric moisture regime, but do not have a mollic epipedon, unless the base saturation in the argillic horizons is greater than 50%. In soils with a high carbonate content it is unlikely that a strong argillic horizon will develop under either ustic or xeric moisture regimes; this would be especially true in shallow soils. Fragipans do not develop in Crete as they are thought to be strongly connected with glacial or Pleistocene events. Soils at Valley bottoms are likely to contain sufficient moisture to limit capillary action with carbonates, and likewise promote downward translocation of clay minerals. In the Kommos area it is thought that many of the deeper soils in the valley soils around Pitaihia, but south of the hills to the NE of the village are Ustalfs; that is, soils that have an ustic soil moisture regime, or are an epipedon that is both massive and hard when dry, or within 1.5m. of the surface, or within a depth of 50cm. of the base of the argillic horizon, there is a calcic horizon, and a moisture regime that is ustic but marginal to ustic. This latter definition may be the most typical of the Ustalfs in the Kommos area.

The Central concept behind that of Entisols is that of soils that have little or no evidence of development of podogenic horizons. Entisols do not have a diagnostic horizon unless it is a horizons, other than an Ochric epipedon, and a calcic horizon above it. In depth. Several pedons fit this definition in the Kommos area, and it is possible to sub-divide into Peatments and Orthents on the basis of dominant particle size. Peatments are typical of the areas of alluvial sands, whilst Orthents are found on the ridges and plateaus of most of the hill and where steep slopes are not terraced.

The presence of an Entisol may be due to complete loss of the former podolic horizons and subsequent new pedogenesis, but should not be recognized where truncation of the profile is evident.

The definition of Inceptisols is of necessity long, as this group of soils are thought to be common to all climates, to many geomorphic positions, and to a wide range of vegetation. These soils have altered horizons that have lost some bases or iron and aluminum but retain some weatherable minerals; they do not have an illuvial horizon of silicate clay, but other accumulation horizons are often present. Certainly many of the profiles examined fit the definition required for Inceptisols, and commonly Inceptisols grade into Alfisols in warm climates. Cambic horizons, which are often associated with Ochric epipedons in Inceptisols, were not observed in the Inceptisols of the Kommos area. The location of the typical Inceptisol in the area is mainly on the well preserved terraces, much is on Arealith, or as transition soils at the top of basal concretion. They many, or may not be indurated, and occasionally contain a poorly developed Calsic horizon. Because of their location on the strongly terraced slopes, the depth of these Inceptisols varies considerably across the terraced unit (USDA 1975) and may also be in considerably different stages of erosion. As many of these soils are derived from man-made accumulations of weathered material, it is difficult to place them in any other order.

(It appears that the soils accumulated on terraces may be derived by one of two methods. The first in a simple retention of slope-washed material behind a contouring wall. Unless the rate of slope-wash was very high, the process of accumulation would be very slow. In a climate where long periods of drought are followed by seasonal rainfall, the rate of accumulation may have been increased by simply stripping the hillslope of vegetation, and the terrace would then act as a sediment barrier. A "natural" process would
function most efficiently on moderate to steep slopes i.e. 25°-40°. Over a long period of time this action would tend to lessen the natural angle of the unterraced slope, and produce a wider valley bottom. The second method would involve the use of striping the hillslope of its soil behind the terrace wall, using the hand of man, to a sufficient distance upslope to produce a reasonable soil depth across the terrace, and then placing a higher terrace wall behind the "new" soil on top of the striped area. This method would not lead to modification of the valley side-slope angle, and would increase the overall amount of soil per unit area. However the importance of the terrace is to produce a soil that has moisture and nutrient retaining capacity and will have sufficient depth for a good root system. In this respect the production of terraces by the manual stripping method is as useful as that by natural stripping, and far less time consuming.

The fourth soil order mentioned as likely to occur with an Ochric epipedon is the Aridisol. It is considered that the soils of the Komos area are not Aridisols as they do not have a sufficiently arid soil moisture regime to satisfy the criteria of Aridisols, and that the drier soils of the area show too great a development of an eluvial horizon to warrant an Aridisol classification.

The recognised soil sub-orders in the Komos area are: Oxisols, Planosols, Orthents, and Ochrepts. Apart from the Planosols, which are derived from Miocene sands, two major lithologic groups may be recognised; soils on calcic parent materials, and those on non-calcic materials. Non-calcic materials include sandstone, and schistose and other metamorphic rocks. The occurrence of large outcrops of sandstone at the surface in the Komos area is limited and often outcrops are smaller than mapping scales allows and thus are not included in the soil units recognised.

Soils may also be stable or unstable (subject to rapid removal) or under conditions of surface wash, and sub-surface through flow. The latter is less important as the surfaces of these soils have a low infiltration capacity due to splash and impact compaction, and a low humus content.) Orthents are commonly found complexed with rockland, and occasionally with Ochrepts.

The following soil polyhedrons are recognised:

1. Duric Planosols
Soils that consist nearly entirely of sand and that show very little pedogenic development and limited structure and texture. Organic matter content low, translocation of material restricted to carbonates, which are combining with silca to produce the duric horizon.

2. Xeric Planosols
Most of the lower valleys near the coast, and some of the areas above the Natal valley and below the Pitsuluia massif. Very little organic matter and poor sandy structure almost granular. No texture and no obvious development of a B horizon.

3. Lithic Orthents
Found on convex slopes near the divide on most of the calcic massifs. Varies in depth from 15-60 cm, and may be complexed with rockland and/or paralithic Orthents. High carbonate content, and a loamy texture, but only a crumbly structure. No evidence of the development of a B horizon. Low fertility based on a deficiency of nitrogen and low phosphorus content.

4. Paralithic Orthents
An for 3., except that the contact with the parent material is not abrupt and there is a transition horizon. Fertility low, carbonate content high. Grasses and small shrubs.

5. Ochric Ochrepts
Inceptisols that show a deep Ochric epipedon up to 80 cm, but have very little in the way of other horizon development. A calcic horizon may be incipient but organic matter content in low as in the nitrogen content. Phosphorus and Potassium values are of medium value, and the potential for retaining water is moderate, that is higher than the aforementioned soils. Structure ranges from crumbly to sub-angular blocky or prismatic.

6. Inceptic Ochrepts
As for 5., but to the rear edge of the terrace, or on steeper slopes near the valley head or just below the convexity. Grasses, wild flowers, and shrubs.

7. Rhodic Ochrepts
These are probably degraded Mollisols but they lack the characteristic humic horizon of the Mollis epipedon. They are found on the higher slopes of the crystalline limestone area to the SE of Natala. The intensity of the red colour varies with the amount of non-crystalline material present in the parent material. These are very shallow soils never more than 15 cm deep, have a medium carbonate content, a loamy texture, and a crumbly structure. The pH is lower than in the other calcic soils, around 6.7-7.0, and the fertility is low, though this may in part be due to the truncated nature of these soils. The terrains in which many of these soils are found are in a poor condition and there is little surface vegetation, though on the more gentle slopes remnants of a sod cover are visible.
9. **Calcic Ustals**

Found in the wider valleys around Pitsidhia, between Asendilian and the Kaniari ridge. Deep soils with at least an incipient argilllic horizon, and this may overlie a calcic horizon. Soil fertility is low to medium, again limited by the low nitrogen content and the poor distribution of humic materials. The soil structure ranges from crumbly through to prismatic and the texture from a sandy loam to a loam. The possibility of water retention in the dry season is higher than many of the other soils in the area, and is facilitated by these Ustals being in an area of flow convergence. The typical vegetation is grassy with some more exotic shrubs that are not found in drier sites.

8. **Non-calcic**

10. **Lithic Orthents**

Found around the metamorphic intrusions in the Matad valley they are very shallow soils, and have a relatively low carbonate content. In general these soils are very infertile, and have a very poor soil development. Some shrubs, **Buxus** and **Calluna**, and various members of the **Leguminosae** family.

11. **Ptychic Ustals**

Soils found on the steeper slopes to the north of the olive covered valley between Pitsidhia and Sivas. Of medium depth, these soils have slight horization but more organic matter content than those in type 9. Low base saturation is suggested though it is thought that translocation is in the chemical form alone, and hence there is no development of an argilllic horizon. A medium low fertility is found, but the potassium content may range from medium to high. A richer type of grassland is expected to flourish on these soils, with a wide range of wild flowers.

12. **Non-soil**

A. **Rockland**. Areas in which the overburden of weathered material does not fit the definition of a mineral soil (USDA 1975 pp. 13-14) and is large enough to be recognised as a single mapping unit.

By far the greatest area of a single soil mapping unit in the Komos area is the Paralithic Orthents, which occupies approximately 25% of the survey area. Next highest is the Xeric Psamment at 28-29%. The Ustals constitute about 15% of the area, and the Inceptisols between 20% and 25%. Other soils form between 5% and 10% and may be considered minor contributors to the soil cover.

2) **A SHORT NOTE ON THE DETECTION OF AN ANOMALOUS SOIL OR POSSIBLE MINOAN OR EARLIER AGE**

Three sites have been found in which a thin red surficial stratum is present that is not seen in any of the surrounding soils, and resembles to a certain extent, the Rhodic Orthents of the Matad uplands.

The three sites are: a) In the river bed under a thin sand cover at the base of a meander cliff is the sand on the eastern side of the same structural unit as the Komos site, on the Pitsidhia river; b) in a small gully halfway between the Komos site and exposure s), covered in part by sand but exposed at the surface by slope wash erosion of the overlying sand; and c) under 1m. of sand in the Viglos quarry. The latter site is found to be sitting on a coarse alluvial material age, and could be contemporaneous with the older fill of Vita-Final (C, Vita-Final, 1969, “The Mediterranean Valleys”), and therefore be of Pleistocene rather than Holocene age. The first two sites are found to be sitting directly on partially weathered bedrock.

At the Quarry site there have been found sherd of a possible Minoan age at the surface of the red strata. At the other two sites there have been Minoan sherds found on the surface of the exposed red material. These could not have come from the sand, as the sand layers are known to have been deposited at a later period. No sherds of other periods have been found.

Field identification of the two strata shown them to be far more than slope wash sediments; there is a considerable structure to the material that would not have developed except under the conditions of soil formation. This structure is of the blocky sub-angular type, and has led to the development of clearly defined ped.
Clay skins are visible along the surface of these peds, and there is some further evidence for the in situ translocation of clay-sized particles, in that channels appear to be lined with a deposit of fine material. Secondly, the red colour is anomalous with any of the present day colours found in the surrounding soils. It is suggested that for a soil to develop such a structure, and such a colour, at least one of the soil forming factors was different from that of the present day. To think of this as the entire soil profile would be inaccurate; the chances of an unstable soil surviving in its present geomorphic context after at least two million years would be very few. However, it is well documented that the argillie horizon of a soil is far less susceptible to slope wash erosion than is the rest of the epipedon. The nature of the material suggests that this is indeed a relict B horizon from a now-degraded soil that was Alfisol in nature. Therefore it is tentatively suggested that there changed soil forming factors was climate, tending toward an increase in precipitation, and hence an increase in the vegetative cover which would ensure a more stable soil, and an increase in the rate of weathering processes that would form high proportions of clay minerals. The very presence of a strong argillie means that the water retention capacity of the soil was larger than most of the soils of the survey area.

The probable order of events was: 1) gradual formation of the soil during the Pleistocene/early Holocene under the conditions of increased precipitation; development of a strong argillie horizon; 2) Irrational use by Neolithic and Minam farmers which gradually lead to the erosion of the top soil by the time the settlement pattern had changed; 3) burial by sand and silt overburden by the concentrating action of the local hydrological forces (and); 4) Gradual infestation with carbonate from the parent material while under strong capillary forces created by the new hydrological regime. The soil ped is weakly filled with a secondary carbonate deposit that is now confined to the planes and channels and has not migrated to the main body of the ped. Carbonates seem to play an effective role in stopping the movement of clay and hence the observation that the infestation of these soils was post-burial.

Because the formation of an argillie-horizon is relatively slow, its presence indicates that the surface has been relatively stable and that the period of stability has been long enough to develop an equilibrium between the formation and decomposition of organic matter.

Several criticisms are possible. Firstly, the identification of an argillie horizon is relatively slow, its presence indicates that the surface has been relatively stable and that the period of stability has been long enough to develop an equilibrium between the formation and decomposition of organic matter.

Several criticisms are possible. Firstly, the identification of an argillie horizon is not simple without an overlaying eluvial horizon in the field. It is thought that the presence of such well-defined clay skins can be sufficient field evidence. Secondly, the occurrences of this soil are confined to areas that are at present located in actively eroding zones, and that all that is being recorded in a slope wash material of some sort. It is certain that slope wash materials do not develop such a well-defined structure as observed here. Thirdly, to what extent to the horizon observed at present resembles the present soils on the Matale uplands that are both unstable and fairly infertile? The resemblance is close, but field evidence alone cannot distinguish between them. However it is suggested that the argillie horizon in the exhumed soils is similar to those soils in the Matale uplands. There is evidence therefore for the contemporetinity of the development of these two sets of soils, and that the burial of the argillie horizon is the only factor that prevented the degradation of this soil past its present state to a state that is as badly degraded as the soils of the Matale uplands. This does not suggest that the latter soils were ever as well developed as it is suggested the exhumed soils were before erosion took place. Finally if these soils were present in some former landscape that was present in the Minam era; what evidence is there that these were not just isolated occurrences? This of course is hard to disprove and one must rely heavily upon the conca view concept of Minam, which in one of its modes of interpretation enables one to assume that such soils on a uniform parent material will, under conditions of similar climate, tend toward the same profile type. This would suggest that much of the Nilgiri valley was mantled with such soils, though extrapolate the evidence of this valley to other areas within the study area is too presumptuous. It is not clear why such argillie soils have not developed on the first area on the low plateaus of the Kamlari ridge, or of Arundillar. It is possible that the period of erosion was enough to remove completely the soil cover on most of the hills, and that preservation was burst in the valley bottoms. Yet such an argument is not strong enough. Certainly it is not envisaged that such soils were found on the surrounding hill slopes. It is unfortunate that other buried or exhumed soils have not been found in the survey area. Evidence of large accumulations of sediment since the construction of the "dam" at site Bil (Sand指导es) favours the complete removal theory of the pre-Minam soil landscape.
Several factors contribute to the nature of the present land-use pattern which have to be discussed before an interpretation of that pattern may be made. These include: climatic and hydrological, soil and geomorphology, and ethics and economics.

The local climate is of the Southern Mediterranean type with hot dry summers (mean temperature 25°C, rainfall 50-100mm.) that produce a large water deficit and strong capillary movement of soil moisture, which rapidly dries out the soils. Strong winds in the early to mid-afternoon aid in giving a high evapotranspiration. Rainfall during the winter months of November to early March totaln 250-300mm, but temperatures reach 15°-20°C, but not falling below freezing. Climate data from Heraklion is not representative of the Kommos area climate. Storms which build upon epi-cyclones are often ineffective as regards the Matafa area, or are directed out to sea before they reach Kommos. My March the winter rainfall has brought a considerable moisture capacity back to field potential, but there is already an excess of potential evapotranspiration over rainfall. (Note: the calculation of potential evapotranspiration is based on empirical data that only partly represents the conditions prevailing at the surface. One of the assumptions is that there is a uniformly thick layer of a single plant species, grass, and that it covers an infinite area. For this assumption, throughout the period of calculation the water supply must be adequate.)

However, the assumption of obtaining field capacity over the winter does not allow for the interaction of other hydrological factors, the most decisive of which is run-off, and may lead to an over-estimation of the available soil moisture. (see discussion on soil conditions following).

Stream flow in the area is limited to that which follows a few major storms in the winter, and does not last for very long. A depth of 30-40cm. was considered possible after observation of stream lines in the Greater Matafa valley. The other rivers in the area, the Pitsidia stream and the stream at Kalamos showed signs of intermittent flow only, and may rarely exhibit continuous flow after an exceptionally large series of storms.

Ground-water was formerly the main source of water in the area with a total of four springs and ten wells. Of the former one at Ayios Stephanos is too far away from the present centres of population and agriculture, (it has a flow rate of about 1 litre per minute) to be of much value. The water is currently wasted, and the flow does not reach the main valley of the lesser Matafa river. The Spring at Pitsidia has a higher flow rate (about 5 litres per minute), and the water is much cleaner, but is now only used for animals. The other two springs are at Kamillari, and although the flow rate is similar to that of the one at Pitsidia, at least one still supplies domestic water. The use of these springs for irrigation purposes is not recommended, because of the higher salt content, and because there is insufficient supply to irrigate more than a very small area (0.10 ha., based on calculations of field capacity and of the types of crop worth irrigating under climatic conditions already described).

The supply of artesian water from the wells is not quantified. Some farmers do use the wells for irrigation of small areas, such as in the valley of the Kalamaki river below Peristeria. Generally the water appears of good quality and the salt content is slightly lower than that of the springs.

The present day water supply for Matafa and Pitsidia comes from the Matafa water supply project which utilizes deep ground water that may be of geologic age, but still contains a high percentage of dissolved salts. This supply is currently being used to irrigate about 5-10 hectares of the lower Matafa valley, mostly for watermelons, but also some other cash crops such as tomatoes and onions, and some vines for raisin crops are also irrigated. These are high capital projects, and require a large labour input.

If the climate and water supply may be considered restrictive, then also may the soils and geomorphology. The soils of the Kommos area are not very well developed, with at least 70% being poorly developed Entisols and thin Inceptisols. These soils are unable to retain large amounts of water for use in the dry summer as they have large pores through which the water may drain, and a very low clay and organic matter content-two soil-constituents which are able to combine physically with water. Only the Alfisols are sufficiently deep, and possess enough clay (but still only contain a low organic matter content) to retain water through the summer for limited plant growth.

As regards soil fertility the Entisols are by far the least fertile, especially the Xeric Fauvitozems, with very low nitrogen and low potassium and phosphorus contents. The pH of these soils is 7.8-8.2, and there is a fairly high carbonate content, which limits the types of crop that may be grown. Vines will struggle in these soils, and fodder crops will produce a low yield, but
wheat and olive will not grow well. Figs will survive with a limited yield. Also these soils are irregularly receiving fresh inputs of windblown sand that destroy the surface soil that has developed, and bury the lower parts of the plant. A lot of metabolic energy is used in ensuring sufficient shoot growth to prevent burial.

The very thin Estisols and Inceptisols also limit the type of crop as they do not provide sufficient rooting depth for the olive or for the fig, and insufficient moisture retention for cereal crops. Very often the use of the plough has drawn large blocks of weathering parent material to the surface and ruined any previous structure the soil might have created. On the Calcic parent material these soils have a very high pH value around 8.0-8.4, which is very restrictive to most plants.

The calcic Alfisols (Calcic Ustalfs) that are present around the Pitsidia infield, and along the Kalami river valley, have a much better crop potential than do the other soils of the area, and a slightly higher fertility. Nitrogen, although still low, is the highest of the unfertilized soils, and is complexed in a greater amount of soil organic matter. Phosphorus is of medium to medium high values and therefore is not restrictive under current cropping patterns, whilst potassium ranges from medium to medium high, and is generally the least restrictive of the essential macro-nutrients. However the pH is still fairly high, between 8.7 and 8.2, and does limit the flow of other minor nutrients into the plant.

The Non-calcic Ustalfs tend to be more fertile than the Calcic group, with high values of phosphorus and potassium, and low to medium low values for nitrogen, and the pH tends to be near the neutral point, which is the most suitable for grain crops, and does not limit the flow of micronutrients. The soil structure tends to favour the development of very dense rooting systems, and hence most crops are possible on these soils. The problem is that out of the whole survey area these soils occupy only 5-10% of the surface.

Slopes in the Komnos area vary from gentle (10-30°) in the river valleys and close to the sea, to 40°-45° in some of the uplands and on the slopes of the larger masifs such as Arolithia and Asfendillo. The flattest lands are in the lower Matala valley, and it is here that much of the irrigated and intensively cultivated land is found. In many areas where the slopes are too steep for soil stability under some of cultivation, terraces have been constructed. These are both ancient and modern, though the modern terrace unit generally does not create an gentle on an in terrace slope as the ancient terraces did. In the modern system more land is available for cultivation (that is there are less terrace walls per unit area), but the possibility of erosion is far greater.

Different sides of a single valley may show contrasting amounts of erosion, even though they have at some time in the past been equally terraced. There is no apparent reason for this at the geomorphological level. Erosion is either local, as it is on parts of the Kamliari ridge, or may spread across the whole slope, as in some of the hills of the Matala uplands. In severe cases of erosion, most of the top soil has been lost, and the slope is littered with weathered fragments of rock. This may occur on any slope, but is most apparent on the soft Pliocene marls where the slope is greater than 20°.

The non-marine deposits to the east of Pitsidia give lower slope angles, and a much broader convexity, compared to the marine rocks. On the metamorphic rocks, slopes tend to be much steeper, and there is an increase in the length of the rectilinear section at the expense of the convexity, and a lowering of the angle in the concavity. These long rectilinear slopes are not terraced, and are relatively stable compared to the rectilinear slopes on the other rock types, but only produce a shallow soil.

The following land categories based on the geomorphology are recognized in the Kommos region:

1. Upland Plateau
   Found on the hills to the south and east of Matala. This unit is only slightly eroded, and falls away by a steep slope into deep valleys.

2. Dissected Plateau
   Typified by the Kamliari ridge, this unit is small in extent, and may possess several slopes and aspects. Units are connected by soils.

3. Col
   Between two plateau units, these have slopes that vary in angle from 15°-15°, depending on the nature of the valley below them.

4. Ridge
   As on the southern side of the lesser Matala valley, formed between two closely parallel valleys.

5. Spur
   Lower than the main plateau and the main axis, and at least 30° from the trend of the main plateau, as seen at Peristeria.
6. Convexity
That section of slope below the plateau, and above the rectilinear slope. May vary in size and steepness.

7. Rectilinear
The straight segment of the slope that shows the greatest angle, and may vary in length according to the angle and the height of the hill.

8. Basal concavity
At the base of the rectilinear slope, the reverse of the convexity.

9. Valley bottom
Local flat areas near the stream, and which may or may not be continuous along the stream course.

10. Lowland plain
Gentle undulating slopes that have no one slope aspect, as in the lower Pitsidia valley.

The rectilinear slope occupies the greatest ground area, but considerable portions of the landscape are of the two plateau types. Together these landscape units are about 55% of the total survey area, and offer the most restrictive farming conditions. The ridges, spurs and convexities constitute a further 10%, and are equally as difficult to farm. The most intensive agriculture takes place on units 8, 9 and 10, and an attempt is made to cultivate most of the soil, but the soil conditions are often against intensive cropping.

Therefore, if one combines the soil and geomorphological conditions it appears that only 10-15% of the Komoa area is suitable for quality agriculture, and that the rest of the area ranges from mediocre through to poor and very poor.

The construction of a land-use potential map must be based on the results of the interaction between soil, geomorphology, climate, and hydrology. It must also take into account the available crops of the region, and must not be influenced by the approach taken by other surveys which are based on different climatic conditions, as are those in northern Europe. Grade A land should not be considered environmentally synonymous in both Crete and Britain, but the description should be understood as expressing the characteristics of the best land available, relative to all other types of land quality. On this basis, very little of the area would be thought of as prime quality, whilst large tracts would be considered of the lowest quality. The presence of this approach increases the amount of lower-middle potential land than would otherwise be predicted without the interference of man. (see the section on the construction of a land-use potential map). This topic will be pursued further when the actual cropping pattern has been reviewed, and the influence of economic and ethnic attitudes on agricultural practice considered. Only under ideal economic and social conditions would the interpretation of a land-use potential map be maximized.

There has been in Crete, since the withdrawal of the Turkish presence in 1899, an increasing change in the basis of the rural economy, and this, as with the rest of the world, has been most marked since WW II, and has taken a new direction in the past 15 years with the advent of large scale tourism. There was probably a revival after WW II in the intensity of agricultural practice, especially in the cereal crop production. After WW II an increase in the area under Olives took place, as the demand for oil increased. Many areas that had formerly been under fodder or pasture or grain were planted as olive groves, and the limit of the tree moved further up the valleys. Similarly, the age-old practice of each landowner having his own threshing floor, (often more than one if his fields were widely separated) which commonly revived. Some farmers at the present still have to travel distances of 5-10 km. between their fields, and these may be located at the extreme ends of the survey area, or in the Messara proper, and even in the Kyfalida valley. There is now a system of group renting of threshing machinery, and the use of a single, central, field. There are at least three such groups in Pitsidia, and a large number of independent, who carry out threshing within the area of their buildings. Yet some individuals still carry out threshing by hand. Grain crops are for local consumption, whilst Olives are also for export from the area, and therefore provide one of the few means of providing a cash inflow into a society that is becoming increasingly dependent on the purchase of goods and services from outside. Similarly, although the watermelon project in the Natura valley was Government-induced as a method of increasing the agricultural export potential of Crete, this also provides a source of external income to those people not involved in the tourist industry. The vine crop is mainly for internal consumption, as the quality is not high enough to reach export standards.

The Land Tenure Act of 19 , in association with the Five Year Plan of 19 , served to change the approach to farming in much of Crete, and to limit the sub-division of land parcels by dower and inheritance. A minimum size was put on the size of field that was permissible to be owned by an individual, or a co-operative, and this was set at one stremata, and was subsequently to be raised in stages to 5 stremata by Further Acts. The response to this in the Komoa area has been slow, legs so in areas that have recently been subject to planting as olive groves. Much of the reluctance to the change lies in the Cretan mentality which is opposed to division of their way of life from outside,
Many of the trees in the area have not been well tended in recent years, and have been allowed to grow to sizes that are both too large to be easily harvested, and are inefficient as far as the production of the fruit is concerned. Many of the trees are of pre-WW II age, and in the air photographs of that period many of the trees are seen to be in a matured age. As a long period is required to bring a young tree to fruition (7 years), it is obvious that no consistent renewal schemes to replace old trees has been in operation. It is said locally that many of the trees were planted soon after Crete's independence in 1894.

Approximately, 50 ha. of Olives are planted with a new species that essentially is a dwarf variety, and needs a thorough pruning after each productive year without which the level of production falls to levels comparable to the more common larger variety. This is an important advance for Olive production, as it means that fields may be planted in a manner that optimizes the use of the available moisture, yet at the same time does not hasten soil degeneration. The one restriction is that double cropping then is not feasible. Many of these "new" Olives are planted on soils that are of marginal quality near the crest of ridges, and on the dissected plateaus of the Kamari ridge. The field size is typically much larger than with the older trees.

The yield of oil from Olives ranges from 2-12 kg/ha, with a mean value of 3.0 kg/ha. On this basis about 20-30 thousand kilograms of oil are produced in the area, every two years.

2. Cereals

The area of cereals grown is far less than that of Olives, being about 20% of the total. Wheat is not as common as barley and is restricted to the Pitsidia infield, and some of the low hills to the east of that village. Barley is found in most areas, where the soil is deep enough for rooting structures to develop, and in some areas where it is not. Many of the lowland soils are used for cereal crops, whilst the valleys on either side are in pasture or olives. The quality of the crop is not high as the soil is often too alkaline for a high yield, and seedlings may suffer from a number of nutrient deficiencies induced by the high pH. Similarly, cereal seedlings have a low tolerance to soil moisture deficiency, and will not prosper on the shallow soils of the ridges and cols. Planting in late February or in early March is just late enough to ensure a fast maturation and to avoid loss by flattening during rainstorms, while early enough to ensure a sufficient moisture base for seedling growth. On the non-calcic
soils of the area, cereal crops compete with olives for the best land, and the yield is higher than elsewhere in the area. Yields above 1700 kg/ha. In the area seem unlikely, and a typical value would be nearer to 110 kg/ha., giving a production of 1650 tons. This at current consumption rates would be sufficient to support about 2000 people, or nearly twice the current population of the valley. This figure is subject to inaccuracies stemming from the estimation of the yield, and the total amount of land used for cereal production.

3. Fallow
Theoretically the amount of fallow land should be proportional to the amount of land under cereal production, the proportion being related to the type of rotation scheme in operation. However, there is a pattern of fallow land that is used to provide a poor quality fodder crop for animal consumption. This is then included in the land-use map under the pasture/fodder category.

Pasture/fodder
There is about 500 ha. of this land in the area. The type of plant grown varies considerably within the area, and is related to the soil potential. On soils of low potential, the typical fodder crop is a natural field weed growth, consisting of grasses, wild flowers of the Composite family, and some other common wild flowers. Very often such mixtures consist almost entirely of the wild flowers, and can be highly nutritious when harvested correctly. Unfortunately, many of these secondary crops are harvested too late for maximum nutrient value, and have been burnt to a state that is not of sufficient quality to replace an improved grass/fodder crop. Such natural fodder crops are found on Askaslas, the Kallatis ridge, and the hills behind Pyritagia.

The use of improved grasses to provide a fodder crop in this area is not common. There are some areas where grasses have grown alone, but they are short and appear to be of low food value. Improved grass/fodder crops require a fair amount of time to produce, and therefore may be not possible with current techniques. It is difficult to estimate the amount of fodder and pasture production or the carrying capacity it creates, but it appears more than sufficient to support the local animal population, as much of the straw from the cereal crop is exported from the area. (See section on animals)

4. Rough grazing
This is a euphemistic term to cover any of the land tracts that are insufficiently defined by other categories, or areas that are definitely used for that purpose alone because the land potential is much less than in other areas. Many of the abandoned terraces on Arolithia are counted as rough grazing simply because they have been abandoned to natural vegetation and receive little or no attention from the landowner.

The type of plant species found on these areas of rough grazing varies considerably, but is generally far less suitable for animal digestion than in those areas designated as pasture. Typical associations consist of many of the species of the Leguminosae family, particularly the gorse species, and several evergreen shrubs, such as Rosmarus and Erica arborea. (Box and tree heather).

Grasses are not common, though this may be because they have been grazed out in some areas, though in areas that do not appear to be regularly grazed grasses are often not present. Some wild flowers are found, though these too are rare. In areas of high gorse concentration, and are mainly of the Cruciferae (mustard) and Ranunculaceae families, and many irregular groups of Ursinae maritima (sea squill). A considerable portion of the land surface is not under vegetative cover and the soil in such places is either very thin or eroded away by the underlying rock.

Rough grazing may be found on steep hillslopes, on thin, poor soils, on the upland plateaus of the Malta area, on abandoned terraces, and on the very infertile soils of the sand deposits near the coast.

The current animal population of this land use unit is approximately two herds of sheep comprising nearly four hundred animals. Part of their grazing range lies outside the area of the survey, but even then it is thought that this is a considerable excess demand on the plants and soil of the area. Indeed many areas show considerable effects of overgrazing, and a very poor plant and soil recovery rate. Seeding with grass species, and a lower demand might radically improve the ability of this area to support animals, but certainly management practices would have to be drastically altered towards a concern for conservation before it could be thought that a stable exploitation ecosystem existed.

5. Vineyard
Vines require a far more restrictive soil and moisture regime than any of the other crops discussed so far; i.e. rapid drainage, but with a fair ability of the soil to supply moisture during the heat of the day in order to prevent burning of the leaves. Also the soil must have a good available supply of bases, particularly Calcium and Magnesium, and a pH range around 7.2-7.4.

Soil depth, as a medium for the support for the roots is not of great importance, and vines may grow satisfactorily on moderately thin soils. It is noticeable
that most of the soils on the calcic materials are of a pH range that is too alkaline for good quality grapes, whilst those of the non-calcic continental rocks are too acid. The xeric Psammets are probably a little too freely drained for optimum growth, but they do have a suitable pH range, and, through the action of capillary forces, a sufficient supply of bases.

There are approximately 300 ha. of vines in the area, but the quality of particular fields varies considerably. Large doses of insecticide are applied, but very little else, and the grapes appear to be small, and the size of the bunches diminished. Many of the fields are not weeded and the wild flowers are dominating the vines and hence at an advantage for trapping late moisture supplies. Typically the vines are not trained and are left to provide their own support, and hence many of the grapes may attract mildew during periods of late rains, and are susceptible to considerable ground insect attack. Pruning, as with the olives, is very rarely practised, and therefore the potential yield, even allowing for the poor soil conditions, is not at a maximum for the area. Under conditions of proper plant maintenance an expect yield of 3-4000 kg/ha. may occur, but probably the yield here is only around 50% of this, and the quality low.

Most of the grapes are used to produce the local wine, and table grapes are grown only in the courtyard of the residence of storehouse. Where the grapes are of a sufficiently good quality to be sold outside, one can notice immediately the difference in the appearance of the field.

7. Figs

There are approximately 90 fig trees in the survey area, most of which are found in the Pitsida river valley on the Zoros Psammets, and interspersed amongst the sand and vines. It has been suggested that they are originally planted as some sort of wind break, and indeed there is evidence in the form of planting lines that could be used to support this. Figs are moderately fast growing trees, and provide a considerable area to act as a wind break; but here it is thought that such a pattern was not the intention.

The trees are individually owned in many cases, and most families do have more than one tree. There is little need of any additional work apart from harvesting, and the yields are fair to moderate.

8. Watermelons

This crop is a recent addition to the traditional cultivation pattern of the area, and is providing a lot of extra income from outside the region. There are considerable overheads involved, especially in the construction, and maintenance, of the irrigation system, which needs to be adequate to meet the demands of the crop. The demand for moisture by far exceeds any available soil moisture, and puts considerable stress on the local water supply.

Any five hectares are involved in the lower Pitsida valley, but the type of land used shows what can be done to an area of relatively poor soils given enough capital investment, in the form of irrigation and annual base fertiliser to increase the available nitrogen. Watermelons have a high nutritional demand for nitrogen and phosphorus, both of which are not readily available in the unattended soils. Yields necessarily are high in order to ensure an adequate return.

By using a soil-fertiliser regime it is then possible to at least double crop the fields without reducing the yield of the second crop (which occurs in the other fields, such as in the cereal fodder multiple cropping). Tomatoes are a common second crop, and they are less demanding on the water supply when kept in a hothouse. There are a couple of small enterprises using hothouse systems to raise tomatoes, but much of the local consumption is supplied from the kitchen gardens.

9. Other Crops

There are very few other crops in the survey area, and this is mainly a reflection on the physical limitations of the area, not on the economic association. Carobs are found occasionally, but are not confined to any one particular area. Again each tree has a specific owner, but because of the high alkalinity of the soil the yield is fairly low. The trees in most cases are beyond their fruit-producing prime.

Other fruits, such as limes and lemons, are not grown in the field, but rather are found in many of the gardens. The local supply is not sufficient to meet demand.

Some vegetables are grown in gardens but the production is limited, and many common vegetables are not to be found in the local shops.

10. Animals

A large number of animals are to be found in the area, with sheep being the largest group. The two flocks are maintained under different ownership status. One flock consists of sheep owned by the shepherdes, whilst the other is an agglomeration of all the sheep from Pitsida and several other villages that are not supported on the fodder crops. The demands made by such a large number of sheep on the available plant resources is leading to, or has in the past contributed to, a degeneration of the ecosystem.

As considerable distances are traversed each day in search of food, the quality of both the wool and the meat is low, and there is a heavy reliance on the sheep reared in the Pitsida infiend as the major source of quality meat.
There may be up to 50 sheep at any one time grazing in the immediate vicinity of Pittidhia.

Goats also form a large part of the local animal population. As with sheep, they are used for both wool and meat, and considerable use is made of the milk. Sheep's milk is also used for making cheese, but both the yield and the quality are lower than that from goats. Pasture areas which would be considered of a very low quality are turned into a good yield product by goats, and therefore very little upkeep of the fields is needed. It takes a goat at least five weeks to eat through all the plants in a 1/3 hectare field. This is half the regeneration time of a similar field in the early summer. On this basis it is possible to calculate a theoretical goat carrying capacity of approximately 350-400

There are also a considerable number of horses and mules, though the exact number is not known, and their demands on the land uncertain.

A small herd of six black cattle are kept at Pittidhia.

11. Other aspects of land use

The other types of land use that occur in the survey area are limited, but there is one particular activity that does not take place elsewhere in Crete, and that is the quarrying of sand from the surficial deposits in the three valleys. It is estimated that the removal rate is close to 100 m³ per week, and that the average life of the three quarries is less than a year at present demand levels. Indeed, the quarry below Viges is already worked out, and over half the volume has been removed from the one in the Matallia valley.

Tourism has only really affected the land use pattern at Katala, where the settlement has increased in size two or three times since WW II. There was, until recently, only one permanent resident at Katala. The expansion of the settlement has not affected the agricultural use of the land, as the village sits on what was previously bare sand.

Similarly, various archaeological excavations in the area are not typical useful productive land.

It would seem that there is a considerable emphasis on olives in the area, and that they take up much of the best quality land. The restraints on the production of a wide variety of crops are reflected in this limited use, and in the quality of the produce. In order to make considerable improvements in the land use, there is not only a need for higher capital investment, but also a change in the social order.

Observations on the practice of dry land farming in the area show that there is a considerable degree of inconsistency in the manner in which it is carried out. Firstly the procedure of shallow ploughing to remove weeds and to provide an irregular soil surface to aid infiltration and to lessen the evapotranspiration is inconsistent. Often the plough lines are orthogonal to the lie of the contour in many fields, which of course facilitates run-off, and hence erosion of the soil. If ploughing is carried out, it is often with the deep plough which on the shallow leptic Orthox tends to bring the sub-soil to the surface, and to lessen the growth potential. Thirdly some soils are ploughed too soon after cropping, and the conservation ability of the stubble is lost. Finally the soil should not be subject to tilling until very shortly before planting, as the destruction of the larger clods, which does aid infiltration, at the same time enhances compaction and the erosion of small particles by wash, and this is currently considered to be of greater negative effect than positive.

4) NOTES ON THE CONSTRUCTION AND APPLICATION OF A LAND USE POTENTIAL MAP

Land use potential maps can only reflect the conditions as they are observed at the present time. Even with knowledge of the former land surface (a rare occurrence indeed), the ability to transpose current concepts on land use potential to some point in antiquity is severely limited by our current understanding of the present processes of land use.

In order to construct a representative land use potential map that will have a high certainty of accurate prediction, several specific observations must be made. These are: 1) soil type; 2) soil fertility; 3) soil stability or slope angle; 4) climate; and, 5) the type of other natural hazards (e.g. bush fires etc.). The construction of the map based on these observations makes several economic assumptions that are not consistently practised. They should be made since they form a weighting which ensures equality of interpretation, but they may limit the application. It is assumed that these will be consistent intensive exploitation that is not subject to any sort of market forces that may bias the amount of effort applied to any one area of the land surface in favour of another.

Most land use potential maps employ a limited number of categories, generally five, and then have a series of qualifiers which may be added to the middle three groups.
Class V land is found on many of the slopes of Arolithia that face the Mataala valley, and on a considerable area of Blous. The entire coastline of the survey area would be considered class V.

That there is so much class IV land exemplifies the reasons for a limited agricultural base, and shows why so much of the area is under dry land farming for olives, and in grazing of one type or another. It does not account for the very high acreage of olives on the class III and to a certain extent on the class II land, and the reasons for this are both economic and social. Much larger areas could be given over to cereal crops, and less of the class III land used for pasture. The small, intensively cultivated area in the lower Mataala valley is probably at optimum use.

It is suggested that at present the land is not being used in the best possible manner, and that a far greater number of crops could be grown. Cereals are often being cultivated on land that is essentially transitional from class III to class IV, and olives are being grown on land that would suit the more highly demanding cereal crop. That so many olives are being grown on the wrong land type is not hard to understand when it is known that the organisation of the bi-annual crop is very poor, as is the quality of the trees. However, although there is considerable inappropriate agricultural practice, it is not thought that the land could support any larger population at current standards. At subsistence levels, the population supported would probably reach about 2500 if there was maximisation of the land potential.

It is important in the practice of dry land farming techniques to ensure that the proper precautions are taken to ensure the greatest benefit from the land. By careful use of a well-constructed land use potential map, it is comparatively easy to decide upon the correct conservation practices. By using this map it is possible to tell that although some techniques are carried out, there is still considerable scope for improvement in the quality of the farming. One of the aims of the land use potential map should be to facilitate the conveyance of readily translated information to the land user.
Geology of the Komos Archaeological Survey Area

During the second half of June 1979 the writer continued geological investigations in the area surveyed by R. Hope Simpson, L. Nixon, and J. McCann in November 1977. It is hoped that the geological study will reconstruct the area's past physical environment so that more accurate estimates of its resource potential can form the background for evaluations of site distributions during any one time period.

The survey area comprises approximately 182,000 square yards of low hillocks on the southern edge of the Mesara Plain, along the shore of the Gulf of Mesara. Marine sedimentary rocks of Upper Miocene (Messinian)-Lower Pliocene (Zanclean) stages form the bedrock over most of the survey area. The narrow, sandy shoreline of the Mesara Plain extends seaward to about the mid-point of the survey area, where it abuts against a rock cliff coastline that continues along and beydond the southern boundary of the area. The cliffs they possess no channel storage capacity, and thus are subject to short duration, high-intensity rainfalls as well as poor farming practices. The Komos and Matala streams, with headwaters several kilometers east of the survey area, exhibit a winter flow for periods of at least one month's duration (i.e., as intermittent streams), but the Pitsidia must be a typical ephemeral stream that flows only in direct and brief response to rainfall in its immediate drainage basin.

Evidences of recent geological change:

Four classes of field evidence were studied: stream deposits, ancient cultivation practices, buried soils, and aeolian sand deposits.

1. Stream Deposits.

The two larger streams, in channel banks, a basic sequence of alluvial-sediment that has been transported downstream by running water and then deposited, overland by colluvial-sediment washed downslope from stream valley sides into the channel with no subsequent downstream transport.

All three streams' present channels are incised 3-5m into their valley walls. The streams exhibit an erosional regime. In the Komalaki stream valley this erosional phase began some time between two thousand years ago and the present, since archaeological remains dated to Hellenistic/Roman times are exposed in the channel base at Site 56 (grid loc. 729/027). The alluvial sediments forming the present channel bed of alluvium ranging from fine sand to cobbles and small boulders: the Komalaki and Matala streams a clear correlation exists between the location of modern alluvial deposits and exposures of coarse alluvium fill, so the present winter stream discharge is only eroding material from pre-existing alluvium rather than transporting coarse alluvium from upstream sources.

A basal colluvial deposit is exposed along the Komalaki stream channel from the vicinity of Site 56 downstream for about 200m. It is a coarse lag deposit that grades upward into an alluvial fill deposit containing mostly fine sediments. At approximately 787/029 in the Komalaki channel, one Late Minoan sherd was discovered embedded in a coarse gravel lens of the alluvium. Along a 50m reach of the Matala stream channel (centered on 802/993) an alluvial lag deposit is exposed in the eroding banks of the stream. A large lens of the geological study and related deposits (apparently from the same vessel) were observed to be intermingled with the alluvial cobbles. No sherds later than Minoan were ever noted in the backwatering of the Komalaki stream channels, which suggests that both streams were capable of carrying a greater maximum sediment load during Minoan times. This coarser alluvium may have been derived from the erosion of Late Prehistoric fills formerly present upstream in these valleys, and which represented the products of more intense weathering during the Wurm glaciation (cf. Vita-Valzani's Older Fill). One further time constraint on the period of alluviation in the Komalaki stream comes from midden-like Minoan wall stones at Site 20 exposed immediately at Site 20 (786/032) - they were constructed directly on a muddy alluvial fill of the Komalaki stream.

Overlying alluvial deposits in the Komalaki and Matala stream valleys are thinner streambed deposits (colluvium), representing a period of increased surficial erosion of the valley slopes' unconsolidated sediment cover (including any soil present there). At Site 56 along the Komalaki stream, this light greyish-brown, gravelly, muddy colluvium contains small rounded fragments of Late Minoan pottery. At Site 131 on the Komalaki stream (759/937) a 2.5m-high scarp of colluvium yielded a large fragment of a Hellenistic/Roman bowl in the middle of the deposit. A colluvial scarp exposed the Pitsidiana stream, north of Komalaki, and at grid location 727/016 (Site 23) showed near its base a horizon of subangular bedrock pebbles and cobbles, within which were several badly worn but probably Minoan sherds. Finally, the lower of two colluvial deposits was exposed immediately downstream from a check dam (no. 4) on a first-order tributary of the Komalaki stream (at 802/031) was found to contain small sherd; four of them were identified as Minoan.

Since the Komalaki stream system, therefore, there is evidence of a colluvial deposition beginning in the Late Minoan period or some time thereafter; some evidence exists in the Matala valley for colluvial deposition during or after the Hellenistic/Roman period. The major colluvial episode must have ended in Hellenistic/Roman times in the Komalaki valley, since a structure of this date was built into the colluvium (Site 56) and after abandonment covered by a sand deposit. The distinct from colluvium. Also, isolated sherd of Hellenistic/Roman date were occasionally found in small colluvial deposits along the slope bases of the Matala valley.


Evidence of past cultivation practices in the Komos region is to be found in terrace systems and one check dam irrigation system.

Groups of abandoned terraces are located on the north slope of the Aerohitia Ridge in the Matala Valley and along the west slope of a first-order tributary that flows into the valley that joins Komalaki stream at Site 46. The former terrace group is not associated with any visible irrigation system and appears to simply represent an effort to increase cultivable land area while relying solely on surface water for irrigation. The terrace group on the Komalaki stream tributary, however,
is sited to receive any ephemeral stream flow in the tributary valley by means of check dams. Four such dams, of which only a small one is built, from the local marl bedrock, have been exposed by recent stream incision along the valley. The dam furthest upstream (identified as no. 4) was sited in some detail last June. Its lower section consists of an upper gravelly and an upper truncated ("truncated") soil covering the sand-covered areas north and south of Kommos. One exposure of this buried soil, already mentioned in a previous report, and studied by L. V. Vavrouss in an earlier phase of the archaeological survey, at Site 75, about 200 m north of Kommos. The writer studied this exposure as well as a second one to the northeast that was exposed by the erosion of the Pitsekhli channel. A third exposure was found under the surface of the Pitsekhli stream valley that was exposed by the commercial sand excavations.

Mr. Parsons has tentatively (pending further laboratory studies) identified the soil of these three exposures as representing the "Alfi profile," a large part of the sand-covered Pitsekhli stream valley to the northeast, east, and southeast of Kommos. In all, this soil is characterized by the presence of sand, gravel, and pebbles. In the Vavrouss sandpit, several sherdsof Early Minoan or Minoan (or Millers) date were recovered from the soil horizon, and at Site 75 numerous sherds contemporaneous with Kommos are embedded in the soil sediments. No sherds were found in the Pitsekhli stream valley. Further, the stream bed of the Pitsekhli was exposed in a large area of the Pitsekhli stream valley. The evidence that the soil was exposed (and cultivated) during the Late Minoan period came from the scattered patches of soil sediments excavated in past seasons of Kommos.

4. Aeolian SAND Deposits.

About 18% of the 18m area is covered by a blanket of wind-blown sand ranging in thickness from 1cm at its edges to over 1m in deep pockets on the lee side of topographic barriers to the west and northwest. Kommos was buried beneath this sand, which seems to have accumulated primarily after the last occupational phase of the Greek cemetery (1st. century B.C.).

At the time of this report, the two commercial sand pits were located southeast and northeast of Kommos. A correlational differential sequence is evident—an initial, and major, period of sand accumulation, followed by a two-three smaller episodes of sand accumulation, and a major accumulation upon which a single depositional episode is exposed by the present erosion. The deposits are composed of slight sand deposits, that project out from the uncongested deposits, that weathering, processes attack the walls of the sandpits.

This result is on the top of the top of the sandpits, that by Late Minoan times a large fraction of the sand blanket had already been deposited. No sherds were found in the sand. The finds from one of the late depositional episodes produced it. A separate line of evidence pointing toward sand deposition in Late Minoan times is the observation by H. Blitzer that these deposits on the monuments of the Minoan and Neopalatial periods. Possibly this inferred Minoan sand cover was never too thick in the settlement areas, that were eroded away before the construction of the Greek cemetery complex. In contrast, sand accumulation in the pockets of sand accumulation, which is now being eventually accumulated, was sufficient enough to cause little post-depositional erosion and therefore appear more complete sand stratigraphy.

Summary

Geological observations made in the Kommos survey area indicate that the changes of significant but as yet uncertain magnitude occurred in the physical environment of the area. Figure 1 presents a summary interpretation of the four fines of evidence as a tentative time chart showing physical changes around Kommos during the past 5500 years. These interpretations are presented for the characteristic evidence of these data with any universal causal mechanisms such as climatic changes or human degradation of the environment. In particular, the study of the stream flow in the Kommos Area, with their included historic and prehistoric sherds, reflect the "accelerated soil erosion" phenomenon discussed by Butzer (1974).

Second, the presence of major terraces and groups of at least one artificial terrace on the hilltops of the area implies the existence of enough cultivable land in the three stream valleys. The population was forced to build these terraces. This general observation was made by many others, but the authors believe that terraces on the Mediterranean were not practiced until after the Hellenistic-Minoan times. As construction of the terraces and check dams would have required much labor relative to the return in increased agricultural productivity, their construction may be related to the period of greatest post-Minoan settlement density in the area, at least as a first approximation for dating purposes.

The origin of the thick and widespread sand deposit covering a large part of the survey area may be linked to some very localized geological event, possibly tectonic sea level oscillations. While a local phenomenon, this sand deposit is of certain significance to any environmen-
tal reconstruction of catchment areas of Kommos and surrounding sites. The presence of this sand is a clear caveat that local factors may partly or totally overshadow the effects of any hypothetical climatic changes in the recent past adduced for the Mediterranean region but applied uncritically to specific locales.

REFERENCES


Jenness, D., The Economics of Cyprus (Toronto, 1956).

Fig. 1. Environmental Changes Around Kommos

Stream Deposits -
Kalamaki
Alluviation
Colluviation
Pitsidia
Alluviation
Colluviation
Matala
Alluviation
Colluviation

Irrigation System -
(Period of Use?)

Buried Soils -
(Period of Erosion)

Sand Deposition -

[Note: Time axis → w/o any scale!]

Late Minoan
Heli/rom

Present

? — erosion
? — erosion
? — erosion
? — erosion

[No visible record]