The beginning of a new archaeological period in Greece usually means yet another influx of invaders into that rather poor but apparently most desirable little extremity of Europe. Only at the beginning of the Mycenaean Age does this not appear to have been the case. Rather, the Middle Helladic peoples, with their technical excellence in pottery and efficient weapons, but rather humble way of life, are supposed to have blossomed into the glorious Mycenaeeans, the contact with the rich culture of Crete playing a quickening role in the development of the new epoch. This interpretation makes excellent sense as far as spinning and weaving are concerned, for Mycenaean whorls are derived from Middle Helladic ones, and Mycenaean loomweights from Crete; although, taking a wider view, one feels much sympathy with the statement that "there is nothing in the Middle Helladic world to prepare us for the furious splendour of the Shaft Graves."

The Middle Helladic period is said to have stubbornly resists subdivision, but the Late Helladic period redresses the balance by being the most minutely subdivided era in Greek prehistory, and, whatever their ancestry, the hard-fighting, deep-drinking, cattle-raiding, boar-hunting, chariot-driving heroes, with their pride, generosity, hospitality, courage and petty quarrels, their splendid, well-organised and comfortable homes, their beautiful, faithful

and industrious, or treacherous wives, their children, servants, ships, flocks, herds, cauldrons, robes, gold, silver and all their forms of wealth - have been reduced by archaeology to L. M. I, L. M. II, L. M. IIIa:1 and 2, L. M. IIIb, 1 and L. M. IIIc:1 and 2. This terminology, representing changes in pottery styles rather than historical events, has endowed the era with a chronology more coherent and less anomalous than that of any other Greek pre-classical period, and although some of the textile tools to be considered are merely classified as 'Mycenaean' or 'Late Helladic', recent excavations have provided a sufficient body of more closely-dated material, which, when studied, emphasises yet again the conservative nature of tools as opposed to pottery.

a) spindle Whorls.

No new whorl type marks the advent of the Mycenaean Age. Many different kinds were being used, but all were already present in the Middle Helladic period, or, occasionally, earlier. Biconical types predominated, and conical whorls were also popular. Both were found in all parts of the country, often at the same sites, and even in the same contexts. Other species were rare in comparison with these two. While sizes were usually moderate, three centimetres being a common diameter measurement, there was considerable latitude in the matter, and both very large whorls (Figs. 65j, m, 67a; Pl. LIVc) and very small whorls (Figs. 65a, 66a, c, a, 1, 67f).

were also used. Decorated whorls were rare, and the major difference between the whorls of the Middle and Late Helladic periods is the absence of the scodelletta whorls from the latter - though they may have left their legacy in the form of the plain, biconical, hollow-topped whorls which are sometimes found in Mycenaean levels (Fig. 65p, Pl. LIVb). Certain minor trends which may be regarded as typically Mycenaean, are a predilection for an asymmetrical biconical whorl with a sharply truncated top (Fig. 65 1, o), and the occasional application of painted decoration to the whorls of the Peloponnese.

Within the two major categories of biconical and conical whorls there were many sub-species, and the variety in use at the very outset of the period is well illustrated by the collection of whorls found in, on and around Tomb Omikron at Mycenae, a grave which belonged to the fifth and latest

1. A sample of 162 whorls from Nichoria (those sufficiently unbroken to be measured) had an average diameter of 3.1 cms. Whorls with diameters as small as 2.0 - 2.5 cms., and as large as 4.5 - 5.2 cms. occurred, and whorls made from pot bases were occasionally as large as 6.0 - 8.0 cms.


The diameters of 75 whorls given in the Prosymna publication with a range of 1.3 - 3.5 cms. work out at an average of 2.24 cms., but it is doubtful whether some of the smaller ones could have been used as whorls - E. Blegen in C. W. Blegen "Prosymna", 1937, pp. 256, 313 ff.


chronological group of Grave Circle B (Pl. Lilia).

Nichoria in Messenia, a site where excavation has only just ceased, also demonstrates this variety, possessing an example or examples of virtually every type of whorl used anywhere in Mycenaean Greece; and it also provides a large corpus of closely-dated material, which is particularly valuable because the site was continuously occupied from early in the middle Helladic period until late in the Dark Ages (circa 1900 - 750 B.C.). This being the case, it seems reasonable to use the Nichoria collection as a standard for the whorls of the period - bellwether to the flock.

The types of whorl found at Nichoria are set out in diagrammatic form in Fig. 64, and are listed below:

**NICHORIA - WHORL TYPES.**

1. **Biconical.**
   1a. Plain symmetrical bicone.
   1b. Symmetrical bicone, truncated top.
   1c. Plain asymmetrical bicone.
   1d. Asymmetrical bicone, truncated top.

2. **Biconical, Hollow Top.** (Undecorated scodelletta form).

1. George L. Mylonas "Ο ΤΑΦΙΚΟΣ ΚΥΚΛΟΣ Β' ΤΩΝ ΜΥΚΗΝΩΝ", 1973, pp. 185, 207, 353; fig. 23 on p. 206; pls. 163a, 189a.
2. I should like to thank Prof. W. A. McDonald of the University of Minnesota, and leader of the Minnesota Messenia Expedition, for permission to make full use of all the material from his site which will appear throughout this section of the thesis. As the only available collection of Mycenaean textile tools which is both large and closely-dated, it has been of the greatest value. I should also like to thank Mrs. S. Brock, Dr. O. T. P. K. Dickinson, and Mr. R. J. Howell, members of the expedition's staff, for additional help and information.
3. **Spheroid.**
   
   3a. Tall, ovoid form.
   
   3b. Spherical.
   
   3c. Low spheroid (often rather formless).

4. **Flat.**

5. **Cylindrical.**

6. **Conical.**
   
   6a. Tall, truncated cone.
   
   6b. Medium truncated cone.
   
   6c. Non-truncated cone.
   
   6d. Very low cone.

7. **Hollow-topped Conical.**

8. **Tall, Convex-sided Conical.**

9. **Domed.**

10. **Concave-sided Conical.**

11. **Concave-sided Conical with Rounded Top.**

12. **Heel-shaped.**

13. **Whorls made from Sherds.**

   The divisions between categories are not always clear-cut: a rounded biconical whorl may approach the spher-
   ical (*Fig. 65d*); there is little difference between a cylin-
   drical whorl and a truncated cone with a slightly-tapered
   profile (*Fig. 66e, f*). The dividing line between straight-
   and concave-sided cones can be slender (*Figs. 66h, 67e*), and
   whorls have only been placed in the latter category when the
   concavity of outline is quite clear. Both convex- and
   concave-sided cones should perhaps have been included in the
   conical category, but as they have distinct characteristics,
   it seemed preferable to separate them.
At the time of writing, a sample of two hundred and forty one whorls was available; their division into the different categories is set out below, and, grouping hollow-topped whorls with the types they otherwise resemble, and uniting the two concave-sided types (as Type 11 is seldom found except at Nichoria), the percentage of the total provided by each major group is also given:

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Excluding undated whorls, and those from mixed mycenaean, Byzantine and modern levels, there remain one hundred and eighty seven whorls which can be dated with some degree of accuracy, as indicated under the headings of the following table:

1. February, 1975. Final total and percentages are unlikely to differ materially.
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The most notable aspect of this table is that almost every whorl type is represented in the middle Helladic period, in mixed M. H./early L. H. levels, or in the early Mycenaean period; and that although the body of L. H. IIIb - c material from the site is small, many of the same types were still in
use in the Dark Ages. The percentages of types in this smaller sample differ little from those in the larger one above. Finally, sixty seven whorls of the one hundred and eighty seven, which can be dated exactly, are set out in tabular form below:

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The value of the above table is limited because it contains no whorls from the later part of the Mycenaean period, and because some types are not represented; this has altered the balance of percentages, and those in the previous tables give a more valid picture of the general situation; but the continuity of the major whorl types is still apparent.

Within the framework provided by the Aegean whorls, those of the rest of the country may be considered.

1) Type 1 - Biconical Whorls. (Fig. 65, Pls. L., LIIa, b, LIVa, b). These were in use throughout the country, from Vardaroftha to Pylos, from Epirus to Kythera; indeed Eutresis appears to have been the only site in Late Bronze Age Greece where whorls were found but the biconical type was not. They spanned the whole Mycenaean period, from L. H. I Peristeria to L. H. III A Kefallinia.

There are many different kinds of biconical whorls - as with all hand-made objects, no two are absolutely alike, and the class could be sub-divided to a point where classification became meaningless. Statements which can be made about almost any biconical whorl, however, are whether it is a symmetrical or an asymmetrical bicone, and whether or not the top is truncated. This information is often given in archaeological reports, and on these factors the sub-classes adopted are based. Some idea of the variations possible within the sub-classes, the convex, straight and concave profiles, the differences in height and diameter, may be gained from

2. Ergon 1961, p. 167, Fig. 169. On display in Chora Museum.
3. S. Marinatos, A.S. 1932, p. 12, Fig. 15.
Some individual types and circumstances require comment.

Type la, the symmetrical bicone, appears to have been the type favoured in Macedonia. Most whorls from this area have straight sides and sharply carinated profiles (Fig. 65a, b). Some examples are slightly truncated (Type 1b - Fig. 65f, g).

A taller version of Types 1a and 1b, known from both middle Helladic (page 392 above, Fig. 61 e) and mycenaean levels at Nichoria, was also found at another Messenian site, Volimidia, in a shaft grave. There were others in a cist grave of mycenaean date at Mazarak i Zitsas in Epirus, on the island of Kefallinia, where they are probably to be dated to the end of the Mycenaean period, and in Macedonia (Fig. 65f). These whorls are not found in any numbers.

An unusual version of Types 1b and 1d has a convex or rounded lower half, and a concave-sided, truncated upper half. The example illustrated from Lerna (Fig. 65n), is

2. 2397 (? - fragmentary; L. H. IIIa: 2 - b); N317 (L. H. I - II).
3. From kephalovrysi Shaft Grave No. 1, on display in Chora museum; relevant site report - S. Marinatos, Praktika 1904, p. 87.
5. S. Marinatos, A.E. 1932, p. 12, Fig. 15.
6. W. A. Heurtley 1925 op. cit., p. 28, Pl. XIX, No. 7; W. A. Heurtley 1939 op. cit., Fig. 104f.
7. L5.323. I should like to thank Prof. J. L. Caskey, of the University of Cincinnati, for permission to include it in the thesis.
not dated, but two of this kind were among the collection of whorls from the vicinity of Tomb Omikron at Mycenae (pages 420 - 421 above, Pl. LIIa), and two were found in Mycenaean chamber tombs near Monemvasia in Laconia. One or two were among the whorls of Malthi, and among the very large collection of whorls recovered from the excavations at Aghia Irini on Aea. Tsountas illustrates one from Bronze Age Thessaly (Pl. XXIXb, No. 22).

Type 1d, the asymmetrical bicone with the truncated top (Fig. 65 1, o), though it may well have originated in the Middle Helladic period, is nonetheless perhaps the most typical Mycenaean whorl, especially in the Peloponnese. The truncation of the upper cone is usually severe, and when this is combined with marked inequality between the two halves, the whorl may approach the conical, as was the case with many of those from L. a. I - II burials at Prosymna. The sites at which this sub-species was found include Nastri on Atythera, and Monemvasia and Melathria in Laconia. Ano Englianos in

2. Seen in Kalamata museum. N. Valmin "The Swedish Messenia Expedition", 1936, Fig. 71O, fourth and fifth from left, are the closest illustrations in the publication (they should be viewed upside-down).
3. E.g. Al.44. I should like to thank Prof. J. L. Caskey, of the University of Cincinnati, for permission to mention it in the thesis.
4. С. Tsountas, Α.Ζ., 1908, p. 343. Pl. 44, No. 22.
5. E.g. Erik J. Holmberg "The Swedish Excavations at Asa in Arcadia", 1944, p. 119, Fig. 113, Nos. 18, 19.
10. Carl Blegen et al. "The Palace of Nestor" Vol. III, 1975, p. 50, Fig. 113; on display in Chora museum, Cat. Nos. 2507a, b.
messenia, Prosymna (Fig. 66b), mycenae and korakou in the Argolid and Corinthia, and chamber tombs near Patras and
Nato Goumenitsa in the north-west Peloponnese.

A large, elongated version of this type, which may
be said to have the appearance of a carinated pear, was pre-
valent in messenia, occurring at Michoria (Fig. 65w), and
Englianos and Volimidia. It was also found at korakou
and on nefallinia.

2) Type 2 - hollow-topped Bicones. These, the possible plain successors of the middle nelloadic scodelletta
whorls, are seldom numerous, and are found only at some sites.
There were two at Michoria, an asymmetrical bicone of normal
height and middle nelloadic date, which closely resembles
one from last year's excavations at the menelaion near
Sparta (Fig. 66b), which came from an L. H. IIIA:1
context; and a low symmetrical bicone (Pl. LIVb), which

2. A. J. B. Wace "Chamber Tombs at mycenae", 1932, p. 217,
   Pl. XXXV (Tomb 517).
3. C. Blegen "Korakou", 1921, p. 109; on display in corinth
   museum.
4. N. Kyparissis, Praktika 1936, p. 39, Fig. 5; Praktika
   1937, p. 93, Fig. 12.
5. N. Kyparissis, Deltion Vol. V, 1924-1925, p. 17, Fig. 3.
6. N645 (no date available), N1115 (L. H. I - IIIA:2).
   p. 50, Fig. 113. All on display in chorae museum, the
two referred to in Vol. I having museum cat. Nos. 2276,
2279.
8. From kepbalovrysi shaft grave No. 1 - on display in chorae
   museum - relevant site report, S. Marinatos, Praktika 1964,
   p. 87.
10. S. Marinatos, A.E. 1932, p. 12, Fig. 15.
12. Sm/74/108; I should like to thank Dr. H. W. Watling,
director of the excavations, for permission to include
this and the other whorls from the menelaion in the thesis.
was found with pottery that was mostly L. H. IIIa:1 - 2, but included some earlier material. This last is like the two whorls illustrated from malthi (Fig. 62D, Nos. 5 - 6), which may be of either middle or Late Helladic date. Prosymna's L. H. I - II "short cone" which was "represented by 31 examples, the majority of which have a slightly concave base, edged by a broad bevel" sound as though they may also have been of this type. The plain, hollow-topped whorls of rhylakopi have already been mentioned (page 396 above), and there are others from Kea, but no dates are available for either of these groups. The obtainable evidence suggests that these whorls were only used in the earlier half of the Mycenaean period; certainly whorls "slightly hollowed around the perforation" are twice mentioned in the Pylos report, but it is not certain that these belong to the category under discussion, or whether they merely have a slight dip round the hole, like those in Pl. LIIIb.

3) Type 3 - Spheroid Whorls. Spheroid whorls, the most indistinct of types, are often rather formless, and may be found in any period. The curious Type 3a, with a height that exceeds its diameter, is rarely found, and the few known

1. N3.
2. N. Valmin "The Swedish Messenia Expedition", 1938, pp. 355-356, Fig. 71D, second and third from right.
4. nl.416, K4.228, K4.85; two of a group K4.60 etc. I should like to thank Prof. J. L. Caskey of the University of Cincinnati, for permission to mention these in the thesis.
examples, are all from Messenia, from Malthi, Ithoria (Fig. 66a, b), and Peristeria. Type 3b, the true sphere, is more widespread, being known from Mythera, Ithoria, Pylos, the Menelaion (Fig. 66c), Asine, and Nefallinia, and Agios Mamas in the north. Small examples are indistinguishable from beads, and some larger ones may be poorly-formed substitutes for the biconical type, by which, at this period particularly, they are always outnumbered. The low spheroid Type 3c is seldom found in Mycenaean levels, but occurred at Mythera, Ithoria (Fig. 66d), and Pylos.

4) Type 4 - Flat Whorls. These are very rare in Mycenaean levels, and should probably not be regarded as a Mycenaean type. The single incomplete example found at Ithoria was of L. h. II date. One plain one, and three very unusual painted ones (see page 438 below) were found in a tomb at Koukounara near modern Pylos. One is mentioned

1. N. Valmin "The Swedish Messenia Expedition", 1936, pp. 355-356, Fig. 71B, two on left.
2. N13, N318, N1675, N1807.
3. On display in Chora museum in the group labelled "\(\text{NA} \pi\varepsilon\rho\rho\circ \chi\)" - relevant site report S. Marinatos, Praktika 1961, p. 171 ff.
4. J. N. Coldstream and G. L. Huxley "Mythera", 1972, p. 210, Fig. 60.
7. 37/74/73 (L. h. IIB/IIB:II)
9. S. Marinatos, A.E., 1932, p. 12, Fig. 15.
11. J. N. Coldstream and G. L. Huxley 1972 op. cit., p. 209, N165, Pl. 59, Fig. 59.
13. Carl Blegen 1966 op. cit., pp. 149, 247, Fig. 296, No. 2.
from Korakou, and two, one of which has a curious raised centre, from Vardaroftsa.

5) **Type 5 - Cylindrical Whorls.** Although tall, truncated conical whorls are comparatively common in the Mycenaean period, true cylindrical whorls are very seldom seen. Four of the six found at Nichoria were large ones broken in half lengthways (Fig. 66e); the other two were small. One found in the area to the north-east of the palace at Ano Englianos may be of early Mycenaean date.

6) **Type 6 - Conical Whorls.** The first three types of conical whorl, the tall truncated cone, the medium truncated cone, and the non-truncated cone, which is usually of medium height, are as widespread as the biconical whorls, although perhaps not quite as numerous. Many reports list whorls as merely conical, without elaboration, but the impression gained from those illustrated or on display, is that the truncated Types 6a and 6b are the more prevalent. They were found in Late Bronze Age levels at Kythera, the Mene-laion (Fig. 66i), Nichoria (Fig. 66h, j, k; Pl. LlVc),

2. W. A. Heurtley "Prehistoric Macedonia", 1939, Fig. 104a, b; W. A. Heurtley and R. W. Hutchinson, B.S.A. Vol. XXVII, 1925 - 1926, p. 34, Fig. 21, Nos. 10, 11.
3. No. 4, No. 47, N. 813, N. 1069, N. 1345, N. 1698.
6. Sm/74/72, Sm/74/56 (both L. H. IIIb/IIIa:1 ?).
and this list is merely a sample.

Type 6d, the very low, wide conical whorl, on the other hand, is rarely seen in Mycenaean times, although there was one among the Tomb Omikron whorls at Mycenae.

7) Type 7 - Hollow Cones. This type occurs only at a few sites, and in small numbers. It is known from both Mycenaean (Fig. 66 l) and Dark Age (Fig. 66m) levels at Mic- oria; from early Mycenaean contexts at Mycenae (Fig. 66m), and from Late Helladic Eutresis, where the example illustrated approaches the cylindrical - a similar one is illustrated from Malthi (Fig. 62D, No. 4). Some of the conical whorls from late Mycenaean Perati have slightly hollowed tops.

8) Type 8 - Tall, Convex-sided Cones. There are

3. N. Kyparissis, Praktika 1936, p. 99, Fig. 5; Praktika 1937, p. 93, Fig. 1.
4. S. E. Lakovidhes "ΠΕΡΑΤΙ" Vols. A', B', 1969, p. 40, 9, Pl. 10β; 8, 93, 14, Pl. 29β; p. 273, 3, Pl. 78δ; p. 435, 5, 95, Pl. 129δ; Vol. B', 1970, p. 358, Fig. 123, Types 4, 6.
5. H. Goldman "Excavations at Eutresis in Boeotia", 1931, p. 192, Fig. 265, Row 3, Nos. 1, 2, 4.
6. W. A. Heurtley "Prehistoric Macedonia", 1939, Fig. 104j - 1; W. A. Heurtley and R. W. Hutchinson, B.S.A. Vol. XXV1, 1925-1926, p. 34, Fig. 21, Nos. 15, 16, 19.
7. G. Monaco, Glara Rhodos Vol. X, 1941, p. 64, Fig. 14, Nos. 4, 5.
11. H. Goldman 1931 op. cit., p. 192, Fig. 265, Row 3, No. 6.
12. N. Valmin "The Swedish Messenia Expedition", 1938, pp. 355 - 356, Fig. 71D, fifth from left.
13. S. E. Lakovidhes 1969 op. cit., p. 40, 9, Pl. 10β; p. 95, 4, Pl. 29β; p. 461, 3, Pl. 138ε; 1970 op. cit., p. 383, Fig. 123, Type 6.
two of these from Nichoria, both from L. H. II contexts (Fig. 66a), and one from the shaft grave at Volimidia. The two tallest conical whorls from Eutresis have profiles which may be considered slightly convex - but basically this is not a Mycenaean shape.

9) Type 9 - Domed Whorls. This also is not a Late Helladic type, and was used only at Eutresis.

10) Type 10 - Concave-sided Cones. Although this type had its origin in the Middle Helladic period, it became, like Type 1d, very typical of the Mycenaean Age, and was used in that era at Aythira, Peristeria, Pylos (Amo Angelianos), Nichoria (Fig. 67b - e, h; Pl. LIVd), Mycenae, Korakou, Perati, and Eutresis. It does not appear to have been in favour in the non-Mycenaean north.

The degree of concavity varies from the slightly concave Eutresis example to the extreme form exhibited by a painted whorl from Mycenae (Fig. 671 - see below).

References:
1. N447, N630.
3. H. Goldman "Excavations at Eutresis in Boeotia", 1931, p. 192, Fig. 265, Row 3, Nos. 1, 2.
4. H. Goldman 1931 op. cit., p. 192, Fig. 265, Row 3, Nos. 3, 5.
6. J. N. Coldstream and G. L. Huxley "Aythira", 1972, p. 210, Fig. 65, Pl. 59, Fig. 60.
7. On display in the Chora museum in the group labelled Ν.Α. πηροκήφ; another in the group labelled ΗΡΟΣ 2; relevant report - S. Marinatos, Fraktika 1961, pp. 169, 171 ff.
10. A. J. B. Wace "Chamber Tombs at mycenae", 1932, p. 217, the conical whorls with "splayed bases".
12. S. E. Iakovidhes "PERATI", Vol. B', 1970, p. 386, Fig. 123, Type 8.
13. H. Goldman 1931 op. cit., p. 192, Fig. 265, Row 3, No. 7.
Nichoria is any guide, their popularity increased rather than decreased in the Dark Ages.

11) **Type 11 - Concave-sided Whorl with Rounded Top.**

This whorl, probably a variant of Type 10, has one representative at Peristerla, and is otherwise confined to Dark Age, or mixed Dark Age and Mycenaean levels at Nichoria (Fig. 57f, g). Malthi's flask-shaped whorls (page 399) may be related.

12) **Type 12 - Reel-shaped Whorls.** The one small example from Nichoria is at present undated; another of the concave-sided conical whorls from the same site approaches this shape (Fig. 67h). One was among the whorls from the vicinity of Tomb Omikron at Mycenae (Pl. LIIIa, bottom).

This, which is larger than the Nichoria specimen, is barely 3 cms. high, and so is too small to be a reel of the Middle Helladic type, which its shape might otherwise suggest. It, too, should perhaps be considered as a variant of Type 10.

13) **Type 13 - Sherd Whorls.** Despite the variety of made whorls available, these remained in use in this, as in all other periods. Kylix feet, as well as body sherds, were found useful at Nichoria.

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1. N533, N1050, N1051, N1342, N1534, N1553, N1614, N1656, N1667, N1766.
4. N482.
5. N987
7. See H. Goldman "Excavations at Butresia in Boeotia", 1931, p. 192; O. Frödin and A. Persson "Asine", 1938, p. 252, Fig. 171, bottom row, three on right; W. A. Haury and R. W. Hutchinson, B.S.A. Vol. XXVII, 1925 - 1926, p. 38, Fig. 22; etc.
14) **Incised Whorls.** Incised whorls of several different kinds make occasional appearances.

The simplest are biconical specimens in which either the upper half, or both halves, are decorated with incised dots. There is one of these among the Tomb Omikron 1 whorls (Pl. LIIIa), one from Pylos, possibly L. H. llib, but 2 from a disturbed context, and one from Nichoria in a mixed Mycenaean/Dark Age level. The parallels are from the earlier north, from Olynthus and Sesklo.

Another of the Tomb Omikron whorls, of the specialised type 1d kind with the convex lower part, and the concave, sharply truncated upper part, has an all-over design of strokes and circles or loops (Pl. LIIIa). A somewhat similar whorl was found at Minoan/Mycenaean Miletus in Asia minor, and the Late Bronze Age incised whorl from Vardino (page 214, Fig. 26m above) shows the continuity of what was an old custom in the north (pages 146 - 147, 213 - 215 above).

The Middle Helladic tradition of conical whorls with incised tops apparently continued into the Mycenaean Age at Asine, although there was only one from a purely Late Helladic context (page 394 above). A truncated conical whorl from a mixed Mycenaean/Early Dark Age level at Nichoria, 8 covered on both top and sides with incised dots, may be a

3. M1286.
4. George E. Mylonas "Excavations at Olynthus - Part 1 - The Neolithic Settlement", 1929, p. 80, Figs. 91a, b.
8. M1692.
relative or descendent of the similarly decorated Malthi
whorls (page 394 above, Fig. 62A (2 - 3)).

Three other incised whorls, apparently spherical,
and said to be Mycenaean, were found at Asine, but it is
difficult to reconcile the text with the illustration, and
the whorl on the right of the row of incised specimens looks
distinctly Protogeometric/ Geometric.

A large low conical whorl of rough grey clay from
the Mycenaean city at Phylakopi has a linked spiral pattern in-
cised round both top and base; the same decoration is to be
seen on a rounded biconical Early Bronze Age whorl from below
the Heraion on Samos.

Finally, three of the whorls from Kastri on Kythera
are decorated with an incised cross over the hole. Two of
the whorls are from an L. M. Ib context, one being of terra-
cotta, and one of marble, and one, of clay, is from an L. H.
IIIa:2 - b level, so that this appears to have been a pleas-
ant local fashion which continued irrespective of whether
Minoan or Mycenaean influence was predominant in the island.

15) Painted Whorls. Whorls with painted decorat-
ion are a rare phenomenon in prehistoric Greece, but are found
in a limited area in the Mycenaean period. Two of the Ky-
thera whorls, one from the site's 'Minoan' period, one from

1. O. Frödin and A. Persson "Asine", 1938, p. 252, Fig. 177,
Row 4, three whorls on right.
213, Pl. XL, No. 28 - on display in the National Archaeol-
ogical Museum, Athens, Case 64, bottom shelf, No. 5846 -
were it not that a context is given for it, I should have
said the whorl was Middle Bronze Age.
3. V. Milojčić "Samos Band I - Die Prähistorische Siedlung
73, Pl. 43, No. 9 - this is an incipient scodelletta whorl
with a very slight hollow.
766, Pl. 57, Fig. 60; 3163, Pl. 59, Fig. 59; p. 210,
42, Pl. 59, Fig. 60.
its 'Mycenaean', were covered with a reddish-brown wash.1
Three of the unusual flat whorls from the Koukounara tombs
were painted, one with an all-over black coat, one with a
wide, shallow incised ring round the hole in its upper surface,
which still bears traces of black paint, and one with a painted
stripe all the way round the side of its circumference.2 Some
of the whorls from Ano Englianos have coats of slip or paint,
and one of the Type 1d "carinated pears" has two solid circles
executed in black paint on its longer cone.3 Several of the
Peristeria whorls are likewise coated, and one has a wide
stripe painted round its middle.

A whorl from a chamber tomb at Mycenae far surpasses
all these. It is an extreme example of Type 10, the concave-
sided cone. It is decorated in lustrous red-brown paint on
a yellow ground; the "shank" is covered with thin concentric
rings enclosed between thicker borders, and the flat top is
adorned with three lilies (Fig. 67). It is large for a
whorl (diameter 8.5 cms., height 4 cms.), and, though it would
be quite possible to spin with it, it may have been intended
from the first as a grave offering. Both design and context
place it in the L. H. II period.

   165, Pl. 59; p. 210,7 39, Pl. 59, Fig. 60.
2. On display in the museum at modern Pylos; relevant site
   286, Fig. 280, No. 6. The whorl mentioned on p. 137, and
   several others on display in Chora museum from the site,
   show traces of red and yellow paint or slip.
4. Carl Blegen 1966 op. cit., p. 329. The whorl is on dis-
   play in the Chora museum, Cat. No. 2278.
5. Ergon 1961, p. 167, Fig. 169; on display in the Chora mu-
   seum in the group labelled N. A. Τεμάχη ; also the Type II
   whorl in the group labelled N. A. Τεμάχη - relevant site
6. The largest, central whorl of a group of five labelled
   Τεμάχη 2 on display in Chora museum; relevant site report
7. A. J. B. Wace "Chamber Tombs at Mycenae", 1932, p. 217,
   Tomb 515, No. 16, Pl. XXVIII.
Now, with the exception of this whorl from Mycenae, all the painted whorls are from sites in that part of Greece which faces towards Crete, and even the lilies on the Mycenaean whorl are reminiscent of Minoan pottery designs. Painted coating or decoration on whorls was certainly an Early Minoan habit (page 265 above), and, despite the chronological gap, it does not seem impossible that the painted whorls of the south might owe something to Minoan influence.

16) Ivory and Bone Whorls and Spindles. In the predominantly L. H. IIIc cemetery at Perati on the coast of Attica, two bone spindles with whorls of the same material still in place were found (Fig. 68), as well as two more incised ivory whorls, and other pieces of spindle shaft. The whorls are mounted at the top of the spindle, in the Egyptian fashion (cf. Fig. 4). The objects are very small and light, and may never have been intended for use. Their nearest parallels are from the east, from Late Bronze Age Megiddo in Israel, and Late Bronze/Early Iron Age Hama in Syria. Mycenaean contact with the east was at its height in the L. H. IIIb-c period; Mycenaean trade had reached areas east of Hama, and there were Mycenaean settlements on the Anatolian coast. It is not improbable that Mycenaeans, like modern Greeks, were fascinated by presents from abroad.

Objects which may be incised bone or ivory whorls, and pieces of a bone rod which may have been a spindle, are illustrated from chamber tombs on Kefallinia, and bone rods,

2. P. L. C. Guy "Megiddo Tombs", 1938, pp. 170 - 171, Fig. 175, No. 6, Pls. 84, Nos. 1, 2; 95, No. 50.
3. P. J. Riis "Hama - Fouilles et Recherches 1931-1938 - Vol. II (3) - Les Cimetières à Crémation", 1948, pp. 173 - 174, par. V, Fig. 217A - C.
5. S. Marinatos, A.E. 1933, p. 92, Fig. 40.
rather long to be pins, are known from Phylakopi and Kea, although, without whorls, there is no way of proving these to have been spindles. The possible spindle from Aghia Triadha (pages 272 - 273 above, Fig. 54a) should be recalled here, as it may well have belonged to the period of putative Mycenaean domination of Crete.

17) Gold-Plated Whorls and Spindles? In Schliemann's Shaft Grave III, the grave of three women, there were found ten long, thin tubes of gold leaf, which apparently had once covered wooden shafts. The ones illustrated taper at both ends, as spindles do, and have small gold leaf whorl-shaped objects mounted at one end. They are published as hair- or dress-pins, but could very well be spindles and whorls. They look rather too fine and fragile for use, but they are, after all, grave goods. Wace found a clay 'whorl' covered in gold-leaf in the same chamber tomb as the whorl with the painted lilies, which was also much too small for use in real life; he compares it with another found at Spata in Attica. When one calls to mind the golden distaff and little silver wool basket Helen had brought in during Telamachus' visit to Menelaus, gold-plated spindles and whorls do not seem out of place in a Mycenaean setting.

18) The Kea Whorls. In 1971, more than five hundred whorls, the great majority biconical, had already been un-
earthed at Aghia Irini on Kea, and even though the site was occupied throughout the Bronze Age, and the whorls can not yet be separated into its various periods, it is worth remarking that such numbers reinforce the impression of considerable textile production which is given by the hundreds of loom-weights found there (page 283 above).

19) steatite 'Whorls'. The small pierced objects of steatite usually called whorls or buttons are typical Mycenaean finds, although they originate earlier, and beyond the Greek mainland.

Crete possesses at least six deposits of steatite, which were being tapped as early as the Neolithic period, and came into full use in E. M. II; the stone continued to be used throughout the Minoan period. Steatite 'whorls' were standard funerary equipment in the Early Minoan period, and were used in both burials and settlements in the Late Minoan period (pages 271 - 272 above). Their first appearance on the mainland was in late Middle Helladic tombs at the port of Akrhna (page 400 above). Although the fact that steatite whorls were found only in L. H. III contexts at Prosyna and Mycenae seems to be true for the Argolid, this is not necessarily the case in other parts of the country, and a steatite whorl, unsupported by other evidence, is not a safe indication of L. H. III date. At Nichoria, which, in Mycenaean times, may have been right on the shores of the south-

1. I should like to thank Prof. J. L. Caskey, of the University of Cincinnati, for allowing me to see the whorls, and to mention them in the thesis.
2. P. M. Warren "Minoan Stone Vases", 1969, p. 141, Fig. 4.
4. P. M. I, pp. 90, 93.
5. P. M. Index Vol. - 'Steatite'.
ward-facing messenian gulf, three steatite whorls were found in \( m. H./L. H. I - II \) levels, and five in good Dark Age levels.

Steatite whorls are of several different kinds, and their typology as set out by Furumark is still valid, except that, in the light of the finds at K1rrha (page 400 above), his Type a:1 is not necessarily earlier than his Type a:2 on the mainland. The Early Minoan specimens, however, were nearly all conical types (pages 271 - 272 above).

It would be tedious to list all the places where steatite whorls have been found. No later Mycenaean burial seems to have been complete without them, and they were also used, though in smaller numbers, in settlements. They appear to belong strictly to Mycenaean as opposed to Late Bronze Age Greece, the northernmost coming from the area of the Gulf of Pagasae.

These objects have been called whorls for so long, that it would be pointless to try to change the name now, and indeed, in the general sense of the word, they have a right to the title - but I think it unlikely that they were spindle whorls. Some are large enough to have been used in such a way, but the majority are too small both in their diameters and in the sizes of their central holes. I fashioned a

1. N331, N332, N1554.
3. Arne Furumark "The Chronology of Mycenaean Pottery", 1941, p. 89, Fig. 2a, b. c. Other good illustrations of types - E. Blegen in C. W. Blegen "Prosymna", 1937, Fig. 602; S. E. Lakovidhnes "ΕΡΑΤΗ" Vol. H', 1970, Fig. 123.
4. A. J. B. Wace and W. S. Thompson "Prehistoric Thessaly", 1912, p. 203; N. M. Verdellis, Praktika 1952, p. 184, Fig. 22. Others from the Volos area are on display in that town's museum.
special spindle only 3 mm. thick to fit a steatite whorl which was just over 2 cms. in diameter, and tried to spin. It was singularly difficult. It was not easy to grasp such a thin spindle to give it an effective twirl, and it was in constant danger of snapping; and the small 'whorl' did little to aid or prolong its rotation. Of the four steatite whorls from Nichoria illustrated in Pl. LIVe, only the largest would have been of the slightest use as a whorl. The main reason why steatite whorls may be supposed to have any connection with clay spindle whorls, is that they appear to replace them in tombs in the L. H. III period; and certainly some of the clay whorls in the earlier tombs at Prosymna, with diameters of less than 2 cms., may not have been spindle whorls (page 420, note 1 above). It is the old problem: it is possible to state whether an object could have served as a spindle whorl or not, but it is not possible to say whether it was actually so used (pages 80 - 81 above). One negative argument may be advanced against the replacement of clay spindle whorls by steatite ones in the later Mycenaean period - it was not the case in the settlements, where clay spindle whorls outnumber steatite whorls throughout the period; and thread, like cloth, is produced in the dwellings of the living, not the tombs of the dead.

As long ago as 1897, Tsountas, faced with one hundred and sixty steatite whorls in one tomb (which admittedly contained several burials), was convinced that there could be no need for such a number of spindle whorls, and

1. I should like to thank the Director of the British School of Archaeology in Athens, Dr. H. W. Catling, for allowing me to experiment with a steatite whorl in the School's collection. (M 97, Dia. 2.2 cms., Ht. 1.6 cms., Wt. 10 grams).
suggested their use as buttons. Many have since adopted this theory, including Miss H. Lorimer, who suggested that they could have been fastened to garments by means of a piece of cord, or leather thong, knotted to prevent its slipping through the hole. Though not impossible, this method is a clumsy one. Two-hole buttons are infinitely more convenient, and it seems likely that, like spindle whorls, these were sometimes fashioned from disused sherds (Pl. XXIVc). Steatite whorls would not make comfortable buttons - they are not flat enough, and if worn down the back or down the front of a garment, would inconvenience the wearer every time he wished to sit back in a chair or lean over a wall. They could only have been applied to some odd place like a shoulder seam opening. The strongest argument against the button theory, however, is that no-one in Mycenaean frescoes is ever shown wearing any.

This is not to say that objects like steatite whorls do not appear in frescoes. The lady on the west wall of the Room of the Ladies recently discovered at Akrotiri on Thera wears a thin leather (?) thong passed girdle-wise several times around her waist, and on one of its hanging ends is to be seen an object of Furumark's Type c, which led Professor Marinatos to suggest that "we have, at last, the explanation of the numerous conical 'whorls' with a hollow base." This theory

3. Nεα νοσ. α.179, 44.161 - I should like to thank Prof. J. L. Caskey, of the University of Cincinnati, for permission to include them in the thesis. See also W. A. Neureit "prehistoric Macedonia", 1939, Fig. 104p, from Late Bronze Age Vardaroftha; R. Demangel "Fouilles de Delphes - Le Sanctuaire d'Athéna Pronaia (marmaria)", Vol. II (5), 1926, Fig. 11, nos. 9, 11.
is supported by the positions of steatite whorls found in burials in the Athenian Agora. Three were found at the waist of one skeleton, and one just above the right hip of another. Otherwise, however, the objects have never, to my knowledge, been found in such a position as to indicate their use, and numbers such as forty-four, and Tsountas' one hundred and sixty remain unexplained. Small conical objects were sometimes used to weight the corners of Doric chitons, as may be seen in occasional classical vase paintings, but there is no aspect of Mycenaean dress which suggests the need of such a weight. The decorative nets which were attached to the front of the dip-fronted L. M. Ib kilts were weighted by similar objects - but, again, these kilts were not seen on the mainland.

Mrs. Pendlebury, commenting on steatite whorls found at excavations in the Lasithi Plain, felt that "the single hole does not lend itself to attachment to a garment", and noted that "exactly similar objects were certainly used as beads in the contemporary Egyptian site of Tell el Amarna." As she worked at Tell el Amarna herself, her opinion commands respect. Steatite whorls found with burials in the Volos area are displayed in the town's museum in the form of two

4. P.M. II (2), pp. 725 ff., 751, Figs. 443, 452, 456, Coloured Pl. XII.
necklaces, and the effect is not displeasing; but one necklace contains twenty five whorls, and the other twenty nine, and if these numbers are multiplied by seven grams, which was the average weight of a sample of steatite whorls from Victoria, the resulting weights are between one hundred and seventy five and two hundred grams. It is by no means impossible that jewellery of such a weight might have been suffered for the sake of beauty, but steatite whorls are no more than pleasant in appearance - and if they were beads, why would only one be found in some tombs?

The purpose of these objects remains enigmatic. They were acceptable in settlements, almost essential in burials, useful either singly or in numbers, and, as far as may be ascertained, not confined to either sex. The charitable view that they "may have been employed for a variety of purposes - as spindle whorls, buttons or beads - according to need" is perhaps a good one to adopt on the basis of present evidence, but I think it more likely that they fulfilled some function quite unknown to us at present, and that we must wait until the circumstances of some special find reveal it to us.

b) Loomweights.

After the complexities of mycenaean spindle whorls,

1. The sample available when the calculation was made consisted of only 16 whorls. The weight range was 1 - 17 grams.
4. E.g. abacus-like counters, or an early form of money or token, or an idiosyncratic custom like today's fiddle- or worry-beads.
it is a relief to turn to Mycenaean loomweights. They are few in numbers, fewer in types, uncomplicated in genealogy.

1) Conical/Pyramidal Weights in the North. "The usual" conical/pyramidal weights, which, long ago at the end of the Late Neolithic period, had established themselves in the north (page 154 ff. above), and had remained in use there throughout the Early and Middle Bronze Ages (pages 225 ff., 400 ff. above), were still present in the Late Bronze Age. While some were virtually indistinguishable from the large, rough, earlier examples (Fig. 69r, Pl. XXXIVc, No. 2; cf. Figs. 35nn, 63t, Pls. XXXIVc, No. 12, XXXVa, b), others were assuming a much smaller and neater form (Fig. 69s, Pl. XXXIVd, No. 4).

2) Cylindrical Weights at Vardaroftsa. Cylindrical weights, very like those which had been used in the north in the Late Neolithic Age, and further south in the Early Bronze Age, and which had perhaps originated in the Balkans (pages 154, 218 - 225 above), were found in only one level, the 'burnt stratum', at Vardaroftsa, and Heurtley thought that they might be "peculiar to the Lausitz people" (Fig. 69q, Pl. XXXIVc, Nos. 3, 5, 6, 9, 10). This is probably an isolated occurrence, and the Late Bronze Age cylindrical weights found on Thera and in Miletus (page 292 above) are almost certainly part of the Cretan tradition (pages 286 - 291 above).

2. W. A. Heurtley 1939 op. cit., p. 87, Fig. 104r, s; W. A. Heurtley and R. W. Hutchinson, B.S.A. Vol. XXVII, 1925-1926, pp. 38 - 39, Fig. 24, Nos. 2, 4.
4. W. A. Heurtley 1939 loc. cit., Fig. 104q; W. A. Heurtley and R. W. Hutchinson 1926 op. cit., pp. 38 - 39, Fig. 24, Nos. 3, 5, 6, 9, 10.
The pierced cylinder/sphere is a simple and obvious type of loomweight, and may have been invented in different places at different times - but such an explanation is against the general nature of weaving tools, and is to be mistrusted. It is equally possible that in the cylindrical/spherical weights of Late Neolithic and Aeneolithic Europe and the Balkans, Early Helladic Greece, Middle Helladic Lianokladi, Minoan Crete, the Late Bronze Age Aegean, and the 'Lausitz' stratum at Vardaroftsa, we have an almost complete jigsaw puzzle for which, some day, the essential missing piece may be found.

3) Flat weights in the Peloponnese (Map 10). At a date approximately contemporary with the last days of the Mycenaean (?) dynasty at Knossos, or very shortly afterward, someone in the southward-facing, sea-accessible settlement of Nichoria in Messenia was weaving on a warp-weighted loom, equipped with weights which, while not Minoan discoid ones, looked very much like clumsy foreign copies of that type (Figs. 70a, b, 71a, b, 72a. Pls. LVa, LVIA, b).

Nine of these weights were found distributed through four successive levels of fill in two adjacent half-trenches, in such a way as to suggest that, once again, they had fallen from an upper storey. The earliest level which included a weight (N14 - Fig. 70a, Pl. LVIA), was dated by its pottery to L. H. IIa - b, chiefly the latter, and all the other levels which contained weights to L. H. II - IIIa:1 (+27); so that

1. N4, N5, N6, N7, N8, N9, N10, N14, N78.
2. M 22 I, Levels 5, 6 and 7; M 22 II, Levels 2 - 5.
3. M 22 I, Level 7. M 22 I, Level 6's pottery was "L. H. II - IIIa:1 - 2 (not past the middle of 2); and some M. H. - L. H. II". M 22 I, Level 5, and M 22 II, Levels 5 - 2, were all L. H. II - IIIa:1 (+27).
Despite their clumsy formation and variation in shape, there is little doubt that these nine weights were all from the same set. As well as the proximity in which they were found, they are all made of the same fine but friable poor quality orange clay with white inclusions, which sometimes retains traces of a paler slip, and, for the moment excepting the curious two-hole N8, and N6, of which only the upper half remains, the other seven weights have a weight range of 172 - 208 grams, an average of 190.3 grams, and a variation of only 36 grams, which, as sets of loomweights go, is a modest one (cf. pages 254, 281 note 2), and would have had no effect on the quality of the weave.

N8, the weight with the two holes set one under the other (Fig. 71a; Pls. LVa, right, Pl. LVlb), which is unique, weighs 284 grams, and may have been a Micchorian invention to counteract a technical problem. The selvedges or borders of woven cloth are inclined to be thin and weak (this failing can be seen on the left hand side of the cloth in Pl. VIIId), and this must be rectified by packing the warp threads more closely at each edge, as has been done in Pl. Xc. This weight may well have been made specially to hold the selvedge warps.

1. I should like to thank Prof. W. A. McDonald, leader of the University of Minnesota's Messenia Expedition, for permission to include the weights in the thesis, and for free and generous access to material, record cards and field notebooks, particularly the excellent one kept by Dr. W. P. Donovan, in whose trenches the majority of the weights were found. All responsibility for conclusions drawn from this concerning the weights however, naturally rests with me.

2. Twice the usual number of warps per centimetre that is to be used in the rest of the work is advisable. This feature is still to be seen on most of today's fabrics.
Three other weights were found at Nichoria, one very much like those in the set, but from some distance away, in a mixed L. H. II - IIIb level (Fig. 72b, Pl. LV1c); and two flat discoid weights of the Cretan type, one round in outline, the other oval, both from the same general area, but one from a mixed L. H. I - III context with a few Middle Helladic sherds, and the other from an L. H. IIIa:1 level which included a little L. H. II pottery.

Weights similar to the main group of Nichorian ones were also found at the Ano Englianos site, although only one was close to the Palace of Nestor itself. Another, found near the North-East Gateway, may be of L. H. I - II date (Pl. LVb, bottom right; c, top left); four were in the aqueduct, an area in which, although most of the sherds were of the same period as the palace, there was also Middle Helladic, L. H. II and L. H. IIIa material. More came from areas to the south east of the palace, and were also probably contemporary with it or slightly earlier. The weights in Pl. LVb, c, on display in Chora museum, are, with the exception already mentioned, from the two last-mentioned areas.

These weights, though better formed than the Nichorian ones, still have the appearance of mainland copies of Minoan weights, rather than Minoan weights themselves. This statement needs elaboration. The Mycenaean weights resemble

7. Carl Blegen et al. 1973 op. cit., pp. 15 - 16, Fig. 105, Nos. 1 - 3.
Minoan ones in their flatness and their frequently-grooved tops (Figs. 70a, 71a, b: Pls. LVc, LVla), but are inclined to have an elongated oval or rectangular outline rather than a roundish one. This is often combined with a flattened base (Figs. 70a, b, 71a, 72a; all weights except that on the left in Pl. LXa; five in Pl. LVb, c; Pl. LVla, b, c).

In a little room in the north-west angle of the palace at Mycenae, nicknamed, surely erroneously, 'the Guardroom', nineteen loomweights were found stratified below the latest floor there, in a deposit said to have been laid down "very soon after the beginning of L. H. III". Fourteen of the weights were of a flat oval type, with a single hole and grooved top, and the other five were a "rough, flat, rectangular shape". The dimensions given show them to have been a little larger and thicker than the Messenian weights, which otherwise they seem to have closely resembled.

Six flat clay weights were found at Lerna. Five, including one broken one, are round, medium or small in size, with single holes and grooved or flattened tops, and are indistinguishable from Minoan weights (Fig. 73b). The sixth (Fig. 73a), though it would arouse no comment if found in Crete, shows the typical Mycenaean elongation (cf. especially Nichoria No, Fig. 71b). No dates are available for these weights, but Lerna had some Late Helladic habitation, and it

2. The oval weights - 11 x 10 x 4 cms. to 9 x 8 x 3.5 cms.; the rectangular weights - 11-5 x 8 x 2.5 cms. to 10.5 x 6 x 2.5 cms. - A. J. B. Wace 1923 loc cit.
3. L3.42, L3.317, L5.398, L6.148, L6.149. I should like to thank Prof J. L. Caskey, of the University of Cincinnati, for permission to include these and the stone weights mentioned below in the thesis.
4. L4.37.
will be surprising if they do not prove to be, like the others, Mycenaean. Two stone examples, made from flat pebbles of the same shape, were also discovered (Fig. 74a, b).

Finally, one large, flat, oval, single hole weight was found in a pit in the settlement at Lefkandi on Euboea, and although it contained some L. H. IIIc material, the basic nature of the deposit was L. H. II - IIIa.

There is thus evidence that these flat weights were used in Mycenaean Greece from perhaps as early as L. H. I, and certainly from the end of L. H. II, until L. H. II Ib, the period of the Palace of Nestor. The fact that they do not appear to be outstandingly numerous or widespread is probably because comparatively few Mycenaean settlements, as opposed to cemeteries, have been excavated. They are the typical Mycenaean weight, and it is no accident that their earliest occurrences are in southern sites easily accessible from the sea. Whether they were adopted by Mycenaeans who had been in Crete, or whether they were brought to the mainland by Minoans who, for one reason or another, found it expedient to leave their island and settle elsewhere, it may be regarded as virtually certain that this type of weight was derived from the Minoan flat discoid one.

4) Bar Weights at Kythera and Pylos. The settlement of Kastri on Kythera, where the chief weight was the Minoan flat discoid type from M. M. IIIb to L. M. Ib (page 282

1. L5.202, L6.800. I have seen exactly similar stone weights excavated in a Late Geometric context at the settlement of Zagora on Andros.
2. LK/65/135. I should like to thank the directors of the Lefkandi excavations, Messrs. L. H. Sackett and M. R. Popham, for the information, and permission to include it in the thesis.
above), also produced seven examples of a curious type of bar weight - long, rectangular objects, usually with a perforation at each corner. (Pl. LVIIa, Nos. 43, 168, 169, 374a and b), although there are two examples with only one hole at each end (Pl. LVId, No. 167). The first of them appeared in L. M. 1b, and they continued in use in the L. H. IIIa:2 - b:1 period. They may be related to the Minoan cuboid weights (page 293 ff. above), but differ from these in their greater length, and the fact that the perforations are through one of the shorter axes, not through the length of the objects, as is the case with the Minoan ones. The holes show string wear (Pl. LVId, No. 374b, upper hole; No 374a, upper left hole; No. 167 lower hole; etc.). They were apparently well enough fired for their excavators to consider their use as fishing net weights. There is no record as to whether any were found as a group, but the consecutive catalogue numbers suggest that this may have been the case.

Seven similar objects were found scattered in the Wine Magazine of the Palace of Nestor (Pl. LVIIe). This was an outbuilding; there is no suggestion in the text that it might have had an upper storey which could have housed a loom, and although there is no accounting for tastes, it would seem rather odd to set one up in a wine cellar - unless the weights were merely being stored there. These clay bars, which, like

1. J. N. Coldstream and G. L. Huxley "Kythera", 1972, pp. 209, 210, 217, 3168, 3169, 3174, 3w374a and b; Pl. 61.
2. J. N. Coldstream and G. L. Huxley 1972 op. cit., p. 209, 3w67 (broken), 3167; Pl. 61.
5. 3167 - 169; 3w374a, b.
the minority of the Kythera ones, have only a single hole at
each end, were "apparently baked only in the fire that de-
troyed the palace", and are now in so fragile a condition
that it is difficult to imagine their ever having been put to
any strenuous use.

It is impossible to say whether these objects are
loomweights or not. Those from Kythera may well have been;
those from Pylos are a more doubtful case.

5) Clay Spools or Bobbins. The unpierced clay
spools or bobbins which were first seen in Early Neolithic
times (page 123 ff. above), and had never entirely disappeared
from the scene since then (pages 139, 158 - 159, 239 - 240,
299 - 300 above), showed a sudden increase in popularity at
the very end of the Late Bronze Age.

At Boubousti, a site in the far west of Macedonia,
which was inhabited at the end of the Bronze and the beginning
of the Iron Ages, "numerous reels, some blackened by fire"
were found. "Many enigmatic unbaked clay spools" were dis-
covered in an L. H. IIIc house at Lefkandi. Numbers occur-
red at Delphi in a context merely designated Mycenaean. Two
carefully made examples were placed in one of the tombs on

2. On display in the museum at Chora.
4. W. A. Heurtley 1927 op. cit., p. 174. Fig. 31, Nos. 1, 2;
   W. A. Heurtley "Prehistoric Macedonia", 1939, Fig. 104v, w.
5. L. H. Sackett and M. R. Popham "Excavations at Lefkandi in
   Euboea 1964 - 1966", 1968, p. 13, Fig. 16.
6. R. Demangel " Fouilles de Delphes - Le Sanctuaire d' Athéna
   Pronaia (Marmaria)" Vol. II (5), 1926. p. 10, Fig. 11. These
   are very much smaller than Schliemann's cylindrical weights
   from Troy, with which they are compared in the text.
Hesfallinia. Thirty-five were unearthed from the Granary at Mycenae. There was "an accumulation of thread reels of different sizes" in Room XLVI of House I at L. M. III Akhe, and a monochrome deep bowl from the same room looks as though it could well be L. M. IIIc. A group of three spools was found on the floor of a Dark Age building at southerly Kephoria (Pl. XVIIIb); and their presence at Late Minoan Knossos, L. M. IIIc Palaikastro and sub-Minoan Karphi in Crete has already been remarked upon (page 300 above).

The possible purpose of these objects has already been discussed above (page 123 ff.). That they are so often found in houses, and in groups, is in favour of their being loomweights, and such a use is certainly not precluded. Their simple form, the fact that they are often unfired, or appear to have been merely set near a hearth to dry out, could suggest that they were an emergency type resorted to when life became uncertain and primitive - but the pot- and kiln-support theories also command respect (page 125 above), and in our present state of knowledge, as loomweights they must still carry a 'not proven' label.

6) Clay Rings at Lefkandi. A group of objects of unbaked clay, of the size and shape of doughnuts, were found in a. L. H. III storeroom at Lefkandi. I know of no other examples from Greece, but such artifacts are the commonest.

1. S. Marinatos, A.E. 1933, p. 80, Fig. 38.
3. O. Frödin and A. Persson "Asine", 1939, p. 310, Fig. 515: 7.
4. O. Frödin and A. Persson 1936 op. cit., p. 302, No. 9, Fig. 209, No. 2.
5. N472, N493, N497; also N953, N1618. I should like to thank Prof. W. A. McDonald for permission to include them in the thesis.
type of loomweight in Iron Age Palestine. The shape was also used in the European Dark Ages. It cannot be proved that the Lefkandi finds were loomweights - it is merely a suggestion.

7) Pyramidal/Conical Weights at Lefkandi and Pylos.
Two very large pyramidal weights occurred in a context at Lefkandi which, while it did contain some earlier Mycenaean material, was basically L. H. IIIc. A more modest conical weight came from an L. H. IIIc/Proto-geometric context.

There can be no question about where such weights originated. They had been established in the far north of Greece since the end of the Late Neolithic period; both shapes and sizes similar to those of the Lefkandi ones were still in use there in the Late Bronze Age (page 447 above; cf. especially Figs. 35, 63t, 69r, a; Pls. XVIIb, XXXIVc, d, XXXVa, b).

The excavators of the Palace of Nestor thought that the small, neat, well-formed pyramidal weight which turned up in Court 92, just outside the Workshop area, might be Greek - but it may have been simply the writing on the wall.

1. E.g. W. F. Albright, A.A.S. O.R. Vols. XXI - XXII, 1943, p 56; and, very well illustrated, J. B. Fritchard, L.E.R. 28th March, 1964, p. 487, Fig. 1.
3. I have not had an opportunity to see the Lefkandi objects themselves.
5. LK/65/193, Ht. 9.5 cms., Base dia. circa 7 cms. I should like to thank the directors of the Lefkandi excavations, Messrs. L. H. Sackett and M. R. Popham, for the information, and permission to include it in the thesis.
Very little is known about Dark Age loomweights, but by the Geometric period, the pyramidal and conical types which had always been merely those of the far north in Greek prehistory, were the standard ones throughout the country, and were to remain so until within Roman times.

When the Dorians came from the north, they brought their loomweights with them.

c) Needles.

The fineness of Mycenaean sewing needles may be best gauged by the diameter of the tiny holes found in rosettes and other ornaments of gold leaf which were apparently designed to be sewn onto garments. This could only have been done with needles comparable with those of today, and naturally metal objects so slender have small chance of survival.

A bronze needle the size of a small modernarning needle, found in a child's grave of L. h. III date in the Athenian agora, is one of the smallest recovered. Others were found at Perati, possibly Pylos, Dendra, Malthi,

1. The only Dark Age mainizd loomweight I know of is the truncated pyramid from Tomb 7 at karmariani- W. A. neurtley and T. C. Skeat, B.S.A. Vol. XXXI, 1930-1931, p. 41. In Crete the pyramidal and conical weights from sub-minoan karphi may be recalled (pages 297-130 above); and a large pyramidal weight akin to the Lefkandi ones was found at Iron Age Kavousi - Harriet A. Botta. A.J.A. Vol. V, 1901, p. 141.
7. C. W. Blegen "Frosymna", 1937, p. 265 "fragments of wire pins".
8. Axel W. Persson "The Royal Tombs at Dendra near Midea", 1931, p. 91, Fig. 63; "New Tombs at Dendra near Midea", 1942, p. 9, Fig. 10, No. 2.
the Menelaion (Fig. 74c), and Nichoria. The lengths of the Dendra needles (16.5 cm; 11.8 cm.), and that of those from the Menelaion (circa 15 cm.), and Nichoria (14.2 cm.) preclude their use for fine sewing, and make it possible that they were used for pattern weaving, although, as will be seen, this was not a major Mycenaean accomplishment. It is worth noting that the Menelaion needle has its eye formed on the same principle as one of the Minoan ones from Gournia (cf. Fig. 74c with Fig. 54c, right).

Bone needles with eyes are not often found in Mycenaean levels, but there was one, very suitable for weaving purposes, in the burial at Mazaraki Zitas in Epirus which had the tall, biconical Type 1b whorls (page 427 above), and others, rather short for easy handling as weaving tools, at Prosymna, and Mycenae. One has been found at Nichoria in a mixed L. H. IIIa:2 - b/ D. A. 1 level.

d) Cloth Remains.

Although remains of actual cloth are always rare in Greece, there is an increase in the numbers of finds in the Mycenaean period. The pieces that have survived are

1. SM/74/50. I should like to thank Dr. H. W. Catling, director of the Menelaion excavations, for permission to include it in the thesis.

2. N1919; from a level that contained mainly L. H. IIIa:2 - b:2 pottery, but one or two D. A. sherds also; another needle, N1838, from a Dark Age context, has its eye crudely formed by flattening the top and rolling it over in a spiral manner. I should like to thank Prof. W. A. McDonald, of the University of Minnesota, for permission to include this information, and that concerning the bone needle referred to below, and Mrs. S. Brock for supplying it.


4. C. W. Blegen "Prosymna", 1937, p. 286, and note 3; Fig. 235, No. 18. Length circa 3.5 cms.

5. A. J. B. Wace, B.S.A. Vol. XXV, 1921-1923, p. 305, Fig. 67.

almost invariably small scraps in poor condition, showing plain tabby weave. If the material from which they were woven is designated at all, it is always called linen, and although there seems to be little firm evidence for this save the single microscopic examination made by Dr. Papademetriou (page 412 above), this is probably true, both because flax fibre is stronger and has a better chance of survival than wool, and because such samples as are illustrated, or on display in museums, or both, exhibit the comparatively even numbers of warps and wefts, and the smooth appearance of both thread and cloth surfaces, which are typical of the fibre. Additional evidence for the use of flax is supplied by the multi-stranded linen thread or cord used to join the bronze plates of a dagger sheath (?) found in a mycenaean chamber tomb near Thebes. The fibre was again identified by microscopic examination.

The late Professor Marinatos put forward the suggestion that the cloth found in both grave circles at Mycenae might have been made from the fibre obtainable from the stems of spartium junceum, the Spanish Broom (which, despite its common name, is probably indigenous to Greece - page 37 above). As he pointed out, the fibre is still in use in Greece today, but it is really more suitable for rope, canvas and coarse cloth, than for the comparatively fine mycenaean fabric.

All the cloth which has survived is from tombs, and therefore almost all of it is now stained green from the bronze grave goods it was used to wrap - and for such a mundane pur-

pose, undyed cloth would probably have been used; there are, however, two or three exciting instances where colours remain.

The largest and best-preserved pieces of cloth found at Mycenae, and indeed in prehistoric Greece, are those from Grave Circle B (pages 411 - 412 above, Pl. LIIIb, c), which belong to the end of the Middle Helladic period rather than the beginning of the Mycenaean Age, but other specimens were found in Schliemann's slightly later Grave Circle. He mentions "traces of well-woven linen, small particles of which were still attached to the sword blades", which led him to conclude that the swords had had linen sheaths. As weapons in Grave Circle B were clearly wrapped in cloth, however, and as linen is a rather flimsy substance for a scabbard, it is more likely that his linen scraps were also the remains of wrappings.

Additional information is given in Karo's detailed publication of the finds from Schliemann's Grave Circle. 2 Scraps of "fine linen" came from Grave II. Some small fragments from Grave V apparently did not merit detailed comment, but two larger pieces from the same tomb, Nos. 784 and 810, are respectively described as of "linen, not very finely woven", and "finely woven linen". If the illustrations show the actual size of the cloth (no scale is given), its fineness was similar to that of the Kephala cloth impressions, and little different from that of the Grave Circle B cloth.

Wace, in his later excavations, found a "small piece

2. G. Karo "Die Schachtgräber von Mykenai", 1930, p. 71, No. 228, Pl. LXXII.
of carbonised canvas" in the Granary at Mycenae, which led him to suggest that the grain found there might have been stored in cloth bags. As it is Wace who uses it, the term "canvas" is likely to be accurate; a canvas weave is one in which two or more warps and wefts are used together (Fig. 9b), but it is still a plain weave. In view of its provenance, this piece of cloth may well belong to the last years of the Mycenaean era.

A "large piece of Mycenaean cloth" was preserved inside a bronze lamp from a pit in the doorway of Chamber Tomb No. 2 at Dendra, which appears to have been of L. H. IIIa-b date; no further details about the cloth are given.

All the cloth remains mentioned so far have been plain in weave, and presumably also in colour, but there are at least a few exceptions to the latter.

A shallow wooden dish from Schliemann's Grave Circle bears, both inside and out, the faintest shadow of the cloth in which it was apparently wrapped, and the impression one receives is that the fabric was checked. The indication is so slight, that the conclusion may be erroneous, but, as will be seen, checked cloth was rather favoured by the Mycenaeans.

The actual weave of the cloth appears to have been plain.

2. He was Curator of Textiles at the Victoria and Albert Museum for many years.
3. Axel W. Persson "The Royal Tombs at Dendra near Midea", 1931; the cloth, p. 77; the lamp, p. 94, No. 12, Pl. XXXII(4), to the right of the illustration; the date, p. 75. One of the two bronze needles mentioned from this site (p. 457 ff. above) was found with a skeleton of a woman in the dromos of this same tomb.
A tholos tomb has recently been excavated at Nazarma in the Argolid. It was built at the beginning of the fifteenth century B.C., and continued to be used throughout the rest of the Mycenaean period. Inside it there were three cist graves with a skeleton in each, and in all three, abundant remains of carbonised organic matter were discovered, including "wood, purple leather and cloth." It is not clear from the text whether just the leather was purple, or both the leather and the cloth, but in view of the Homeric comparison given in the article, the latter assumption is the more reasonable.

A gold-plated bronze girdle, found by Tsountas in a chamber tomb at Mycenae "had once been stitched to cloth, apparently of a violet color."

It may have been in the early years of the fourteenth century B.C. that a tholos tomb at Routsi in Messenia was being re-opened to admit its final occupant; and when the work was done, the body was carried in, and laid down upon a cloak, blanket or mat, a deep blue one with red borders. When Marinatos opened the tomb twenty-three and a half centuries later, the faint bloom of its colours still remained beneath the skeleton.

5. S. Marinatos "Kladung-, Haar- und Barttracht", 1957, p. 16 and Note 68. This was in Tomb 11. He noted that the same blue colour had been observed in other tholos tombs, and recorded on colour film. Other reports on the site: S. Marinatos, I.L.N., 6th April, 1957, p. 543; S. Marinatos, Praktika 1956, pp. 202 - 206. (Routsi - p. 203, ff.)
Apart from remains of actual cloth, much can be learnt about mycenaean, like minoan, textiles from wall paintings; and there is a little additional information to be gained from figurines, and representations of human figures on pots and sarcophagi.

All the cloth is in the form of clothing, and again an understanding of the costumes of the period is necessary. Mycenaean ladies adopted minoan costume whole-heartedly. The short-sleeved, open-fronted jacket and long skirt (the latter usually in the form of flounced culottes, though flounced skirts and plain bell-shaped skirts are also shown) were worn from Pylos (Fig. 76b - d) to Thebes (Pl. LVIIa). Sometimes, however, the modest addition of an underblouse was made, and some of the very late mycenaean female mourners on larnakes from Tanagra near Thebes, though they still wear a recognisable version of minoan dress, have a short-cropped blouse, which, though it exposes the midriff, covers the breasts (Pl. LVIIb).

Another form of female costume, seen only once on the mainland, at mycenae, consists of a straight garment which

1. For detailed comment, see H. L. Lorimer "homer and the monuments", 1950, pp. 363 - 365.
passes under one arm, and is knotted above the opposite shoulder; under it appears a short-sleeved blouse or jacket.

This fresco was found in an area that was obviously a shrine, and as the Little Priestess of Akrotiri wears the same costume, it may well be one of hieratic significance.

At first glance it seems difficult to imagine what middle Helladic/mycenaean women wore before they came into contact with the minoans, but in fact indications of another type of female attire do exist. Psi and phi figurines give the impression of a long, simple robe with vertical stripes, or perhaps merely folds, girdled at the waist - but these little objects are schematic, and the value of their evidence, taken alone, would be slight. It is endorsed, however, by some of the more detailed figurines recently found at mycenae (Pl. 3 IVIlc, d), by some other mourning ladies on the Tanagra larnakes, and by the poor creature who is farewelling the soldiers on the Warrior Vase.

It has already been pointed out (page 329 ff. above) that the costumes on the aghia Triadha sarcophagus may well represent a mycenaean fashion; and the elaborate hem of just such a garment, complete with white feet which prove its wearer to have been female, is known from Pylos (Fig. 75p).

1. Lord William Taylour, Antiquity Vol. XLIII, 1969, pp. 91 - 97, Fig. 2, Pl. Xa; I.L.N. 4th Jan. 1969, p. 26, Fig. 2.
2. S. Marinatos "Excavations at Thera V", 1972, cover, and colour Pl. J; Ergon 1970, p. 195, Fig. 232.
3. Lord William Taylour, I.L.N. 4th Jan. 1969 op. cit., pp. 26 - 27 Fig. 1; Antiquity Vol. XLIII, 1969 op. cit., Pls. XII, XIII; Antiquity Vol. XLIV, 1970, Pl. XLIIb; see also George E. Mylonas "Mycenae and the Mycenaean Age", 1966, Fig. 128.
4. Ergon 1970, Figs. 17, 18, 19; Ergon 1971, Fig. 17.
This, like the 'gaberdine' hems in the procession fresco (page 330 above), and the Aghia Triada paintings, was probably part of a representation of a sacred procession - but the claims of these long gowns to exclusive religious status are somewhat weakened by the two skittish Ladies in the Chariot from Tiryns; the one in pink appears to be pointing out something amusing in the passing scene to the one in blue, who is driving. That their dresses, too, are ankle-length, is indicated by the fact that their knees do not show above the chariot rim, as is the case with a warrior from Pylos who is riding in one.

The sex of the Ladies in the Chariot may be determined only by the convention of their white skins, for their costumes do not differ in any way from the standard male Mycenaean dress. This, short-sleeved, well-fitted, and distinctively cut in only two pieces, with seams and edges usually bound in braid, has already been described (page 329 ff. above). For everyday wear on the mainland it was cropped short just above the knee (Figs. 75, 76a), but it was worn

1. G. Rodenwaldt "Tiryns Vol. II", 1912, Pl. XII; also particularly well illustrated in G. Rodenwaldt "Die kunst Der Antike", 1927, colour Pl. IV.

long on important occasions such as processions and funerals. Another type of long male garment is the one with the flourishes worn by the lyre player at Pylos and by people presumably seated at tables nearby, by one or two figures on seals, and by the youths in the Anosalian lamp stool fresco (pages 328-329 above); but, generally speaking, long male garments are reserved for special professions or occasions.

The 'active service' shorts worn by the captain of the Blacks (page 330 ff. above) appear again in several scenes at Pylos. Although these are usually referred to as kilts, I believe this interpretation to be mistaken, both because the garments are much too short to be kilts of the dip-fronted L. m. Ib type, and because they stay in place no matter how strenuous the activity of the wearers, whereas a kilt would fly out or up - and the Pylian artists were perfectly capable of painting the movement of clothes with the movement of the body when they wished. Similar shorts may be represented on a fragment from Orchomenos.

One other male outfit, seen only at Pylos, is the warriors' white skirt overlaid with black lappets of what one

2. It was still so worn (for mourning?) on the Tanagra larnakes - Ergon 1971, Figs. 13 - 16.
3. Mabel L. Lang 1969 op. cit., pp. 79 - 81, Pls. 27, 28, 125, 126, Colour Pl. A (45 H 6, 44s, b, H 6).
5. Mabel L. Lang 1969 op. cit., Pl. 123 (28 H 64 - bottom figure); Pl. 124 (24 H 64, two figures at bottom), Colour Pl. N (25 H 64 - the right-hand figure about to be scalped - note the front seam of his shorts, which is an original piece of the plaster, not part of the restoration).
hopes was something substantial like boiled leather. This was worn only with a boar's tusk helmet and a baldric. Otherwise the torso was left bare.

The old minoan codpiece and kilt outfit seems to have been reserved on the mainland for bull-leaping. The only exception to this rule is one of a group of five 'foreigners' at Pylos, whose garment has been (reasonably) restored as a version of this dress. He is a negro with a rather Egyptian type of head-covering - certainly no mycenaean.

The L. M. Ib dip-fronted kilt has not yet been certainly identified on any mainland fresco, and the elaborate pattern weaving that these required would not have been at all to mycenaean taste.

1) Plain cloth. By far the greater part of the cloth in the garments depicted in the mainland frescoes is plain, except for the braid which is often, but not invariably, used to decorate seams and edges. The common, short-sleeved, knee-length tunics are usually executed in a single colour, and the few simply-patterned ones which do occur are the exception rather than the rule. All the Pylian shorts except one pair are as plain on the mainland as they were at anossos. Long male robes are more likely to display some variety.
either bands of different colours, as is the case with the lyre-player and his possible audience, or the small, restrained, widely-spaced patterns discussed below - but even some of these long gowns are plain.

Female costumes are slightly more adventurous, but even in these, plain stuff often constitutes part of the costume. This is particularly true of the 'Minoan' jacket (Pl. LVIIa), and, when one is worn, its underblouse; both examples of the long robe knotted on one shoulder are plain, blue at Mycenae, yellow on Thera (page 464, notes 1, 2); and the dark, long-sleeved dresses worn by the very late Mycenaean ladies on some of the Tanagra larnakes and on the Warrior Vase (page 464 notes 4, 5), perhaps special mourning costumes, are completely plain. This does not mean that the results are unattractive. Plain cloth could be used to excellent effect, as is demonstrated by Professor Mylonas' double-chinned beauty from Mycenae. She wears plain yellow, but her garments are finished with a simple brown and white braid in a triple stripe, which is also used to bind her hair. Brown and yellow jewellery completes her tasteful ensemble.

White is the colour most often depicted; the mustard yellow worn by Mylonas' lady, and an attractive slate blue are also very common. The black, brown, russet and red of minoan frescoes are all present, and the range of shades in the last-mentioned colour seems to have extended to include clear pink and pinkish-mauve. It is to be seen

1. Mabel L. Lang "The Palace of Nestor" Vol. II, 1969, pp. 79 - 81, P1s. 27, 28, 125, 126, Colour Pl. A (43 H 6, 44a, b, H 6).
2. Mabel L. Lang 1969 op. cit., pp. 67-68, P1s. 10, 11, 119, (13 H 5, 14 H 5); Ergon 1971, Fig. 16.
particularly at Pylos, and also at Tiryns, where one of the
Ladies in the chariot wears it (page 485 above). It may
have been used at Thebes, but colour reproductions vary, and
it is difficult to be certain. One must also bear in mind
that the colours we now see may have been changed in varying
degrees by different intensities of heat during the various
final destructions of the sites concerned. It is neverthe-
less probably worth remarking that plum, scarlet and pinkish-
mauve are among the shades which can be achieved with differ-
et concentrations of the 'purple' murex dye. Green could
be mixed by the fresco artists for foliage, but, as in Crete,
was never shown on clothing. It does, however, appear on
faience 'tartan' sacral knots (see next page).

2) Patterned Cloth. Although the Mycenaeans
obviously admired the Minoans, and, in that imitation which
is said to be the sincerest form of flattery, copied their
loomweights, their fashions, their methods of adorning their
walls, and many other aspects of their civilisation which
are not the concern of this thesis, nothing more graphically
illustrates the basic difference of their character than
their cloth patterns. These, small, neat, simple, well-
spaced, not unattractive, but always, so to speak, in a
minor key, and usually executed in only two colours (Fig. 77),
are totally different in conception from the multicoloured,

63, 86 ff., Colour Pls. B (3 H 23), E (51j H nws; 51 H nws),
M (17, 19-20 H 43, 13 G 43). This range of pink-mauve is
also used for animals, dadoes etc.
2. The jacket of another lady from Tiryns may also be pink
-cf. S. Marinatos "Crete and Mycenae", 1960, Colour Pl. XL,
with G. Rodenwaldt "Tiryns Vol. II", 1912, Pl. VIII.
3. Helga Heusch "Die Zeichnerische Rekonstruktion des Frauen-
4. See Lillian M. Wilson "The Clothing of the ancient Romans",
1938, pp. 7 - 9 for variety of shades obtainable from murex,
and Pl. I for similar shades obtainable from other natural
sources.
flamboyant, imaginative, complex and technically demanding Minoan designs (cf. Figs. 56, 57, 77). The few patterns the Mycenaean did take over from the Minoans were either simple in themselves (Fig. 77h, i, j), or were simplified to suit the different tastes and capabilities of the mainlanders (cf. Fig. 77g with Fig. 56h; Fig. 77k with Fig. 57d).

One type of cloth which did appeal to Minoans and Mycenaens alike was check or tartan. As has been pointed out, checked cloth seems to have been in use from Early Minoan times onwards (pages 307, 312 above), and, although such a simple and attractive pattern is likely to occur independently in various places, Sir Arthur Evans is probably right in connecting the faience sacral knots found in Grave IV of Schliemann’s Grave Circle with his own M. M. III ivory one from Knossos, for the former may well have been made in Crete, and it is quite likely that the Mycenaeans adopted the idea of checks either woven (Pl. LVIIId), or, as is more likely, cut (Pl. LVIIIc), on the cross, from Crete.

The knots from Shaft Grave IV (Pl. LVIIIa, b), with their greenish-brown and dark green tones, and their double or quadruple lines, reminded Sir Arthur of the tartans of the Grahams or MacAlpines. Nor were these the only examples of tartan at Mycenae. One of the fragmentary frescoes found by Tsountas in the megaron there, shows some Mycenaean Lochinvar preparing to mount one of a pair of mettlesome steeds held by his groom; both of them are wearing tartan tunics cut on the cross, the check in that of the warrior being set

1. G. Karo "Die Schachtgräber von Mykenai", 1930, Pls. CLI, CLII.
2. P.M. I, pp. 429 - 430, Figs. 309a, b, c.
wider than that used for the groom's garment (Fig. 75). If, as is not impossible, this were an official military outfit at Mycenae, one may imagine that this is what many of Agamemnon's contingent wore to Troy - and it is a strange thought that, if so, on days when the Gods favoured the Trojans, the windy plains of Ilium may have had something in common with Culloden's grim moor. The cloth, however, was not reserved for warriors alone. A Pylian lady has her jacket cut from stuff which, like the Mycenaean sacred knots, has multiple stripes in the checks (Fig. 76b).

Today, checked fabrics are often, and tartans almost invariably woven in a twill, rather than a plain weave, which produces a cloth of a slightly more elastic nature, and is very suitable for garments cut on the cross, as Mycenaean checked ones appear to have been. It has been pointed out that twills which used an even number of openings or sheds in the warp could be produced on the warp-weighted loom, and indeed were produced on it in Late Bronze Age and Iron Age Europe (page 105 above). There is no evidence for or against their existence in prehistoric Greece, but the possibility is worth bearing in mind.

The Greek race has received many infusions of new blood since Mycenaean times, but obviously the Mycenaeans, among others, must have made their contribution to the Greek character - and checks and tartans appeal to today's Greeks too. The piece illustrated in Pl. LVIIIc, woven on the

1. A. J. B. Wace "Mycenae - an Archaeological History and Guide", 1949, Fig. 99b. Also well seen in G. Rodenwaldt "Die Kunst Der Antike", 1927, p. 144.
straight in a 2/2 twill, and cut on the cross, was purchased, not in Scotland, but in Ierapetra in southern Crete; and its price, its texture, and its quality all proclaimed its local manufacture.

Spotted cloth, like that worn by the Pylian stag-hunter in Fig. 76a, was another popular Mycenaean type (Fig. 77a). One of the long-gowned figures in the procession from Pylos has the same pattern executed in brown on a white ground. A huntsman from Tiryns dressed in blue and white sports this type of fabric, and it occurs yet again at Mycenae, where, as is the case with the Pylian huntsman, the dots are black on a white ground. Dots are to be seen on some of the long male robes on the Tanagra larnakes, and on the skirts of the soldiers on the Warrior Vase. The fact that this pattern does not appear to have been used on female garments is almost certainly owing to the chances of survival, as cloth patterns are usually shared by both sexes; perhaps the rows of dashes on the blouses of some of the female mourners from Tanagra (Pl. LVIIb) may represent this variety of cloth.

Only the Pylian illustrations are large enough to allow this pattern to be examined in any detail, and while making the mental reservation that these are artists' repre-

4. G. Rodenwaldt "Der Fries des Megarons von Mykenai", 1921, the colour plate entitled "Palast und Kampfszene. Fragment."
sentations, not weavers' pattern charts, it is worth observing that the dots appear, in both cases, to be rectangular rather than round, and that their length seems to slightly exceed their width. Those on the processional robe are in alignment both horizontally and vertically, but are arranged in the diamond formation that automatically results when every first group of patterns is the same as every third, and every second group the same as every fourth. This could have been accomplished by either of the methods of introducing patterns into the weft illustrated in Fig. 10 (page 108 ff. above). The dots on the deer-hunter's costume, however, lie only in vertical rows, and do not line up horizontally. This is probably owing only to the way the dots are painted, but it is just possible that it is because the pattern is in the warp. To achieve this effect, extra warps in the darker colour of the dots, preferably equipped with separate groups of loomweights, would have to be set up at intervals behind the warps of the basic colour, and brought forward when a dot was needed, either by hand, or by means of a small stick heddle (page 108 above). To be effective, this would have to be executed in a warp-faced weave (page 107 above, Fig. 9d), which is not advisable with woollen warps on a warp-weighted loom, for even when they are kept well-oiled (page 97 note 3, and pages 303, 304 note 1 above), they are inclined to stick together when very closely set. This objection would not apply to smooth linen warps, however.

The pattern illustrated in Fig. 77b, consisting of leaf-shaped outlines, is to be seen on the skirts of two ladies at Pylos (Fig. 76c, d), and possibly on the jacket.

sleeves of a life-size processional lady smelling a posy from 1
the same site. This is a textile pattern only in the sense
that it is a pattern depicted on textiles. It would be possi-
able to weave it on a warp-weighted loom (although the fact
that the motif consists of a hollow outline rather than a
solid shape would make the task more difficult), and on the
ladies' skirts (Fig. 76c, d) it does occur in more or less
regular rows - but what makes it suspect is the fact that it
is often used to indicate animals' hides. 2 It may be a con-
vention for indicating anything, whether cloth or hide, which
has a dappled appearance; and this obviously makes it impos-
sible to suggest what the exact nature of the cloth may have
been, or how it was woven.

A horseshoe pattern (Fig. 77c) is similar to the
leaf-markings except that it is open at one end. It is to
be seen on the skirts of the two life-size ladies with posies 4
from Pylos, and again on most of the skirts in the Frauen-
fries from Thebes (Pl. LVIIa); it also appears on some of
the figures on the Tanagra larnakes (Pl. LVIIb). This
pattern lacks the regularity which all cloth designs usually
display; the motifs face in all directions, and are scatter-
ed at random all over the area they are intended to cover.
Once again this appears to be a convention for some kind of
figured cloth, but there is no way of knowing exactly what it

   - 89, the figure referred to as X. Colour Pl. 0, her
left sleeve - the horseshoe pattern may be intended however.
   Colour Pl. F (21e G 46).
3. To avoid a proliferation of terrs, Miss Lang's nomenclat-
   ure is being followed - Mabel L. Lang 1969 op. cit., p. 34.
4. Mabel L. Lang 1969 op. cit., pp. 86 - 89, Pls. 34 - 37,
   Colour Pl. 0.
5. Helga Reusch "Die Zeichnerische Rekonstruktion des Frauen-
frieses im Boštischen Theben", 1956, Pls. 14, 15.
was like.

The psi design (Fig. 77d), is, by way of contrast, quite explicit, and both very easy and sufficiently interesting to weave. The cloth seen in Pls. Villa and Lila shows a double version of it, woven by the extra weft insertion method (page 109 above). This pattern, which is usually depicted in weft-aligned rows, is to be seen on the jacket of one of the pair of seated ladies (Fig. 76c), on one of the long male processional robes, and, curiously enough, on the putative codpiece and kilt outfit of the negro at Pylos; and on some of the skirts of the ladies on the Tanagra larakes.

For the lion's-manoe pattern (Fig. 77e) one cannot do better than quote Miss Lang. It "can be used either for lion's manes or for clothing which may be so marked to indicate texture and/or pattern or to show that it is animal hide." It is only preserved on the merest scraps of garments at Pylos. If it was an actual cloth pattern, it could certainly have been woven or embroidered, but it seems much more probable that, like the leaf and horseshoe markings, it was a convention.

The rippled lines (Fig. 77f), which are to be seen on some of the skirt flounces of the life-size ladies with the flowers at Pylos, and on one of their jackets, like the

5. Mabel L. Lang 1969 op. cit., p. 34.
straighter lines in the costumes of the campstool youths and La Parisienne at Anossos and Pylos' own lyre-player (pages 328-329 above), may merely indicate shadowed creases or folds in a soft material. Another possibility is that the ripple in the lines represents a seersucker type of weave, and this could probably be made very effectively on a warp-weighted loom by inserting groups of thicker warps at regular intervals among the standard ones, and weighting these very lightly, and the main body of the work very heavily. This would allow the thicker warp stripes (whether in the main or in a contrasting colour) to buckle or pucker, which would give the rippled effect. A third possibility returns to the suggestion that the skirt flounces were made from long lengths of narrow cloth (pages 304, 341 above), which of course would have been used sideways, and in that case a rippled pattern, woven horizontally, would appear vertical in the finished garment. This pattern, cut on the cross, may be represented on the skirts of some of the Tanagran mourners (Pl. LVIII), although there the wavy lines could also be interpreted as a crude representation of flounced culottes. It is a motif used in modern Greek weaving, and its simplicity may be seen in Pl. LVIII - only three weft rows are needed to complete it.

The remaining patterns (Fig. 77g - k) are those which are either minoan, or adapted from minoan designs. The plain diamond lattice, with what may well be beads at the intersections (Fig. 77i), seen on some of the flounces on the skirt of the right-hand life-size lady with the posy from Pylos, 1

is probably a plain version of the more ornate ones seen in Crete (page 313, Fig. 55k, 1 above). The barred version which formed part of the costumes of the Ladies in Blue at Knossos (Fig. 55k) has an almost exact replica at Pylos (Fig. 77j), but in a dado, not in cloth. The scale pattern that was so elaborately decorated on one of the L. M. 1b dip-fronted kilts in the Procession fresco at Knossos (page 314, Fig. 57d above), is used in a much simplified form (Fig. 77k) for some of the flounces on the skirt of a lady from Tiryns, and in a plain version in the Pylian dado already mentioned.

The particular barred pattern seen in Fig. 77h is copied from a fragmentary seated lady at Pylos, and is executed not in black and white, but in black and pink. A similar fragment, in black and yellow, is also preserved. This barred pattern, used only for skirt flounces, is, of course, Cretan, and has been noted on the skirts of the Snake Goddess's Votary (pages 311 - 312 above, Pl. XLVb), and the E. M. ill anthropomorphic vase from Mallia (page 308 above, Fig. 55f); the adjective 'Cretan', as opposed to 'minoan', has been used advisedly. It was Sir Arthur Evans who first pointed out that a certain incised pattern found on 'middle Neolithic' pottery at Anososos was "obviously of textile origin" (Fig. 23d), and, if he is right, as he so often is, this may well be the ancestor of the pattern under discussion.

6. P.M. I, p. 42, Fig. 8, Nos. 4, 5.
The man from the processional group at Pylos, shown in Fig. 79, is a symbolic figure. The gift he carried in his hands has not been preserved, and the basket shown is a reconstruction; but, Mycenaean that he is, he is the unconscious bearer of another offering - from the Minoan past to the Classical Greek future. This is the pattern on his robe, the dotted rosette (Fig. 77g), which played a subsidiary part in the design on the Knossian Cupbearer's kilt (page 315 above, Fig. 56h). It was elevated by the Mycenaeans to a major motif. It also appears on the garment of a second, less well-preserved figure from Pylos, probably from the same procession as the one above; and forms a component part of a braid shown in the "Frauenfries at Thebes" (Fig. 78n, Pl. LVIIIa, right). It is next seen on the piece of cloth, fresh from the loom, which is being folded in the scene on the New York lexythos (pages 95, 110 above, Pl. VIIc, top centre); it also decorates archaic headbands. It travelled westward with the Greeks, and is featured on the draperies of figures on South Italian vases from the end of the fifth century until the second half of the fourth century B.C.

"When a motif is depicted on cloth by three different, though connected civilisations, well-separated in years, there can be little doubt that it is a cloth pattern. Two methods of weaving it are shown in Fig. 10.

3. Helga Reusch "Die Zeichnerische Rekonstruktion des Frauenfrieses im Boötischen Theben", 1956, Pl. 15.
4. Ergon 1970, p. 165, Fig. 184.
5. I should like to thank Prof. A. D. Trendall for this information. See A. D. Trendall and T. E. L. Webster "Illustrations of Greek Drama", 1971, Pls. I, 19; I, 20; III, 1, 17; III, 3, 41; III, 5, 1; A. D. Trendall "The Red-Figured Vases of Lucania, Campania and Sicily", 1967, Pl. 28, 2.
Most of the strange idols recently found at Mycenae, both male and female, are coated with a plain, dark wash. It is difficult to know whether to treat them as people or as pots. Their position lies somewhere between the two. Their dark coatings may represent long, plain dark garments, or may merely be dark, plain washes. The same remarks apply to those few that are decorated. A male piriform figure has double spirals on his chest and shoulders, vertical rippled lines on his top, and horizontal bands on his lower half. A plaintive little female figure (Pl. LVIIId) has horizontal bands on her base and arms, and three doubly-outlined diamonds or lozenges on each side above the waist; in both these cases, all the motifs could be either textile or pottery patterns, the last-mentioned being later found on geometric skyphoi.

With the elegant and self-possessed creature in Pl. LVIIc, we may be on surer ground. She does seem to be wearing a long gown, decorated with a tall papyrus flower at the front and a shorter one at each side. These could have been either embroidered or woven. The effect of a scalloped decoration up the centre front of her garment, in her case the papyrus stalk, is echoed in the costumes of the figures who mourn a child on the larnax from Tomb 3 at Tanagra.

One other find from Mycenae is of quite exceptional interest. This is the group carved in ivory, composed of

5. Lord William Taylour, i.L.N. 4th Jan., 1969, p. 25, Fig. 1.
6. Ergon 1970, pp. 19 - 20, Fig. 17.
two women in minoan costume, with a child in a long, plain robe at their knees (Pl. LIXa). The skirt of the younger (headless) woman appears to exhibit the scalloped scale pattern used on the jackets of the Ladies in blue (Fig. 57c, Pl. XLIVd). That of the other woman has a three-dimensional quality - a suggestion of a thick, soft network of threads laid over a finer background. It is similar to, but more complex than the pattern on the jacket of the Little Priestess of Akrotiri (page 315 above) in appearance. Means other than weaving - embroidery, knotting, perhaps even a form of crochet - may have been resorted to; it is impossible to work out from the carving exactly how the cloth was made.

This, however, is not the case with the fabric of the shawl which envelops the two female figures (Pl. LIXa), for this is quite commonly used for cushion covers in Greece today (Pl. LIXb). It can be made as follows: you take a rectangular wooden frame of the size you wish the finished article to be, and you put nails or tacks at regular intervals all round all four sides. You pass a strong yarn round these tacks, first back and forth from top to bottom of the frame, and vice versa, then from side to side, so that you end up with a 'grid' of threads stretched on the frame. At each intersection you then fasten a short, thick bunch or tassel of threads, often using two colours. When every intersection is thus fastened, you cut the tassels short and fluff them out so that they form small, slightly square pompons. You add a fringe of tassels all round the edge (just as the

2. It bears a resemblance to today's Greek crochet pattern μαργαρίτες - the daisies - but I do not know of any find that could be classified as a prehistoric crochet hook.
3) Braids and Borders. The Mycenaeans did not display the same individuality in their braids as they did in their cloth patterns - almost every one of the examples illustrated in Fig. 78 is Minoan, or of Minoan derivation.

A partial exception, however, is the plain braid (Fig. 78a), so rare in Crete except in the latest Anoissian frescoes, so popular on the mainland. It was used at Pylos on all forms of male costume, shorts, knee-length tunics and long robes, both patterned and plain. Plain, or plain striped braid is also seen on female costume at Tiryns, on the gowns of the Ladies in the chariot (Page 465 above), and at Mycenae, on the jacket and blouse of Mylonas' lady (Page 466 above). The plain braid set diagonally on the long robes

1. The cushion in Pl. LIXb was made by Mrs. G. Kassellouris, of Foteino, Epirus, for her sister-in-law in Arta, at whose home I saw it. I am indebted to the latter for the explanation of how it was made, and for her kind hospitality. The pattern is not confined to Epirus, being popular for car cushions in Athens and elsewhere.

2. The cushion was photographed in April 1973, and made one or two years previously.

of some of the Tanagran mourners brings to mind the costumes of the Palanquin fresco at Knossos (Pl. XLVIIa).

The barred patterns (Fig. 76b - d), which go back to at least the M. M. III miniature frescoes at Knossos (page 317, Fig. 58m, n, o abcvo), were used at Pylos for bordering jackets (Fig. 76b, c, d), hems (Fig. 76p), and headbands (Fig. 78 1). At Tiryns, several different variants occurred on the jacket border and skirt flowes of the processional lady, and two (Fig. 78c, d), in a variety of colours, adorned the skirts or culottes of the ladies of Thebes (Pl. LVIIa). The barred braids used in the Theban and Tirynthian costumes are so deep, that they may be related to the barred skirt pattern discussed above (page 477) - and, if so, the pattern may well be much older than M. M. III. The 'brick' motif, which occurs only once, at Pylos (Fig. 78f), may be a Mycenaean variation on the theme, as may the half-barred pattern which forms a sort of thick, square meander (Fig. 78h) on the belt of the wearer of the pair of patterned shorts.

Rippled and zig-zag braids (Fig. 78i, j), well-known in Crete from at least E. M. III onwards (pages 308, 310 - 311 above, Figs. 55e, h, 58c, d), were another type very popular.

on the mainland, quite possibly because they are easy to weave (page 476 above, Pl. LXIIIa). The ladies with the posies from Pylos must have demanded about seventeen metres per head in this pattern, in different colours, and other, less complete figures from the same site used the same braid. One of the group of five 'foreigners' of whom the negro in the cod-piece and kilt outfit is one, wears a piece of this braid round his bare neck like a necklace or neckband. Several ladies in the Frauenfries from Thebes have similar types of braid on their jackets (Pl. LVIIia, two left-hand figures). The flame pattern or adder mark (Fig. 78k), a related type used extensively in Minoan Crete (page 311 above, Fig. 58e - g) is to be found on the flounced, divided skirt of the processional lady from Tiryns.

The spiral-decorated braid which forms the headband of the White Goddess at Pylos (Fig. 78 l) is straight from Crete, with obvious affinities with braids used by the Ladies in Blue at Knossos, and on the divided skirt at Aghia Triadha (page 310 above, Fig. 581, j). As she also has a distinctly Minoan type of nose (page 334 note 1 above), perhaps she

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1. Mabel L. Lang "The Palace of Nestor". Vol. II, 1969, pp. 96 - 89, Pls. 35 (51e H nws), 36 (51g, h, j H nws), 37 (51 H nws), 38 (51 H nws), Colour Pls. E (51f, j, n H nws), 0. The quantities were calculated by giving the ladies, as restored in Colour Pl. 0, the usual arbitrary height of 1.65 metres.
7. See also Mabel L. Lang 1969 op. cit., p. 144.
is an imported Minoan divinity.

The braid which displays ovals or circles with central dots (Fig. 79g) may be related to the dotted Minoan braids seen in Fig. 58k, 1, or it may signify a series of decorative, sequin-like discs, centrally fastened to a plain band. It is to be seen on the jacket borders of the opposed seated ladies from Pylos (Fig. 78c, d), on a short tunic worn by a warrior/hunter at Tiryns, and, in some illustrations, on the jacket of the processional lady from the same site.

Other versions show her with a braid of which the central portion is composed of a series of interlocking hearts or ivy-leaves (Fig. 78c), and perhaps this is a braid pattern that belonged to another figure. Ornaments of the illustrated shape, fashioned from gold leaf, are often found, and the central band could conceivably have consisted of a series of these sewn in place.

The same is true of the rosettes on the girdle of the left-hand lady with the posy from Pylos (Fig. 78m); rosettes just like these, as well as other ornaments, made from gold leaf, and provided with tiny holes to permit them to be sewn onto clothing, are comparatively common finds in Mycenaean tombs. Similar rosette-patterned braid, faintly preserved, was recorded on the side seam of one of the six

5. E.g. Ergon 1970, Fig. 202.
'gaberdines' in the Procession fresco at Knossos (page 316 above), so that it may have been a Mycenaean wearing it there as well.

One of the participants in the Frauenfries (Pl. LVIIa, right) displays an edging to her jacket that is both ornate, and, possibly, original - a series of dotted rosettes caught in the loops of a rounded meander (Fig. 78n - page 478 above). This could have been either woven or embroidered. If it was woven, it was one of the most complicated pieces of work undertaken by a Mycenaean weaver, in that it required three colours instead of the normal two.

This is also true of the braid - or braids - used on the hem and side-seam of the robe above the "Priestess' Feet" at Pylos (Fig. 78p). The horizontal part of the decoration may have been woven in one piece as a special border band, but as the braid which binds the side-seam is the same as one element of the border, it is more likely that the whole is composed of several different types of braid sewn alongside each other. Except for the fact that three colours were used at the one time, the patterns are very simple, the circles being the most challenging. This border, with its architectural overtones, is reminiscent of, but much simpler than the one which adorned the hem of the central figure in the Procession fresco at Knossos (page 316 above, Fig. 58b); but whereas that formed the bottom of a

flounced skirt, this belongs to a robe of the 'gaberdine' type.

The question of how these braids were woven can only be answered hypothetically. The barred and zig-zag types - the majority - could have been produced by tablet weaving (pages 186 - 187 above), but the only finds that appear even remotely suitable for this purpose are the bar weights of Kythera and Pylos (pages 452 - 454 above); their elongated shape seems awkward for such a purpose, though; and, as previously remarked, the Pylian specimens look as though they would crumble at a touch. One assumption that may be fairly made is that because, on any type of loom, setting up the warp is a far more tedious process than the weaving itself, it would have been more efficient to set up a few very long warps, and weave across the narrow width, rather than the reverse. As nearly all the braid is in only two colours, it is probable that the warps were set up in both, and the appropriate ones selected for each weft throw, so that the pattern was carried in a warp-faced weave.

However it was done, the quantities of braid needed for Mycenaean costume must have been very large. The 'minoan' female costume, requiring seventeen metres, would have been the most demanding (page 483 above); but a long 'gaberdine' would have needed seven metres, and a knee-length tunic, five. This calculation is based on a single width of braid binding the side-seams, neck and sleeve edges, and hem. It may well be

1. For Egyptian New Kingdom braids etc. made in this manner, see Grace M. Crowfoot "Textiles, Basketry and Mats" in S.H.B. Vol. 1, 1955, pp. 440 - 441, Fig. 278, Pls. 138, 148, 158; also Lillian M. Wilson "Ancient Textiles from the University of Michigan Collection", 1933.
that the supply was maintained by a body of specialist workers, perhaps the "headband-makers" of the Linear B tablets.

f) Linear B Tablets and a Mycenaean Textile Industry?

Linear B tablets have so far been found at four mainland sites, Thebes, Mycenae, Pylos and Tiryns; those that can be dated all appear to be of L. H. III B date, but differ very little in signs or subject matter from those found at Knossos, despite the fact that the latter may be approximately two centuries earlier.

The Tiryns 'tablet' is the merest scrap from a doubtful context; and little is yet known about the twenty tablets recently excavated at Thebes - except that every one of them is concerned with wool.

Leonard Palmer found that "one of the puzzling features of Wace's "House of the Oil Merchant" at Mycenae was that the Linear B texts found in it dealt largely with wool and personnel engaged in its processing". The structure cannot be entirely misnamed when thirty stirrup jars, impregnated with oil, and one tablet dealing with that commodity were found in it, but eighteen other tablets were concerned with textiles, mostly with the issuing of woollen cloaks to various employees. Those which are to be "well-boiled" are interesting, as this could represent either hot dyeing, or shrinking and thickening (fulling) processes. Room I, which

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2. T. G. Spyropoulos, A.A.A. Vol. III, 1970, p. 327, Fig. 4.
had pithoi set all around the walls in a clay bench, one of which had facilities for heating (page 68 above) should be recalled here. The architectural plan of this and neighbouring buildings are not like those of ordinary houses, and the whole complex may have been a workshop area, like that at Pylos, where a number of different industrial processes were carried out.

Only ten very fragmentary tablets recording actual textiles were found at Pylos, but many others were concerned with trades connected with their manufacture, and yet others with what may well have been quantities of linen.

Among trades mentioned are those of spinners, carders, weavers, flax-workers, fullers, tailors and tailorsesses, specialist workers, and headband-makers. It is interesting that all of this work, except fulling and some of the tailoring, was done by women.

Spinners and weavers would be needed for both wool

1. Well seen in G. E. Mylonas "Mycenae and the Mycenaean Age", 1966, Fig. 20, opposite p. 83.
13. As pointed out on page 338 above, all this is dependent on Linear B's being an early form of Greek, and on its translations being correct.
and flax; flax-workers are self-explanatory; carders are indispensable for the preparation of flax, useful but not essential for the preparation of wool (pages 23 - 24, 30 above); trained tailors and tailoresses are to be expected, as the cut of Mycenaean tunics and 'gaberdines' is very professional.

Fulling is a process similar to the washing or scouring usually undertaken before wool is spun (pages 29, 52 -53, 60 note 2 above), except that it takes place after the cloth has been woven. It may involve boiling the fabric in certain solutions, beating it or treading on it to thicken and shrink it, and treating it with fuller's earth, which absorbs grease and dirt, and gives a heaviness and lustre to the cloth. This type of processing is very appropriate to woollen cloth which is susceptible to being thickened and shrunk, whereas linen is not, but the term might be used to include the final bleaching and finishing of linen.

The specialist workers in textiles, all feminine, were a-pu-ko-wo-ko, e-ne-re-ja and o-nu-ke-ja. The a-pu-ko-wo-ko are translated as 'headband-makers' on the analogy of the ἀμυνά that fell from fainting Andromache's head when she saw dead Hector being dragged off by Achilles. Headbands were certainly worn both in Mycenaean Greece (page 483 note 6, Fig. 78 1 above), and were still in fashion after Homer's death (page 478 note 4 above). The e-ne-re-ja occur only on Knossian tablets; but the o-nu-ke-ja recorded at

Pylos are reasonably supposed to be those who prepared the o-nu-ke or o-nu-ka mentioned at knossos. It has already been suggested that this word may have been a nick-name for the barred braids so popular both in crete and on the mainland (pages 344 - 345 above). The a-pu-ko-wo-ko and o-nu-ke-ja may therefore represent the body of specialist braid-makers suggested above.

Two interesting theories have been propounded to explain the large numbers of female workers, including those concerned with textiles, at Pylos. One is that they were refugees flooding into the capital for protection from the unknown enemy who was shortly to destroy Pylos itself; and that they were being put to work to earn their keep and help prepare for the coming catastrophe. The other, which is supported by the fact that the ethnics of these women were from far-off places such as knidos, miletus, nythera, Lemnos (?), and chios (?), is that they were captives, which is very much in the homeric tradition.

Wool is not often mentioned in the Pylian tablets, but flocks of sheep which appear to have totalled over ten thousand head at the most modest estimate are recorded, so a woollen industry is very likely to have existed.

If the SA sign \(^{\dagger}\) is correctly identified as an ideogram for 'linen' (used loosely i.e. flax or linen thread or cloth, or anything made from these) then Pylos had a 'linen' industry organised very much along the lines of the woollen industry at Knossos. Numerous towns and villages (one of them the still-extant Kyparissia) had to produce a yearly levy of certain quantities of flax or linen. The figures varied between five and one hundred, averaging nineteen per village; the most frequent entries were ten and thirty. With one exception, the name of each village occurred only once in a series of forty-four tablets, so the network was wide, the industry extensive. On one tablet, a village is assessed at forty-five SA, and the total is itemised by being divided among the inhabitants. The 'mayor' is to give over half the total; and the fact that cowherds, shepherds and the smith are also to provide small quantities suggests that much of the crop was produced as an agricultural sideline by peasant villagers, as is the case at Paniperi today (pages 21, 24 above). Other tablets record deficits, quantities to be retained and used at local centres, concessions and remissions, and free allowances to certain people; the one to the planters is understandable, but those to huntsmen and smiths seem odd, unless their womenfolk were expected to spin and weave a free allowance of flax for them.

The units in which this SA was measured seem to indicate quantity rather than weight, as at Knossos. It is

unlikely that the unit would have been a length or bolt of cloth, because if so, the cloth ideogram could have been used. As single units are thought worth recording, they cannot have been anything too small, like hanks or skeins of spun thread. The numbers must therefore represent some unit like bales, bundles or donkey-loads.

The little flax that is still grown in Messenia today is pulled in May/June, and drying, rippling, retting, drying, beating, carding and spinning follow in quick succession, because the thread is wanted to weave into sacks in which olives will be crushed in November/December.

This brings up a curious discrepancy. The Pylian flax levies were apparently being collected early in the European spring, for the agricultural year was not far advanced when Pylos fell. Tablets were annual records, which probably began at the winter solstice, and there was no mention of harvest or shearing in those found in the ruins of the palace, so they would only represent the first three or four months of our year.

There is an analogy for such a delay in flax processing. At Courtrai in Belgium at the turn of the century, the flax was dried in the field, then, instead of being rippled and retted immediately, was "housed or stacked in the winter succeeding its growth, and in the spring of the following year ......retted." The Courtrai flax was renowned

1. I am indebted to Dr. Chadwick for this suggestion, and for much general information on the linen industry at Pylos, including the fact that flax levies seem to have been collected in the early spring.
2. I am indebted to Mrs. Eleni Kotsaki and other inhabitants of Paniperi for this information.
for its excellence. If a similar system were being followed at Pylos, it would account for the spring levy.

Other factors which add weight to this theory are that the first stage in the preparation of flax that requires expertise is the retting (page 22 above), that there were textile experts who were quite specifically 'flax-workers', and that these were based on several different centres in the kingdom, perhaps special flax-working establishments.

At Pylos, then, there was a degree of organisation in the manufacture of textiles sufficient to suggest that there may have been something approaching a palace monopoly. This was probably designed not only to supply local needs, but to provide a surplus of linen cloth for export, at least beyond the borders of the kingdom of Pylos, and perhaps beyond the shores of Greece. This surplus no doubt made a material contribution to the wealth of a kingdom which was traditionally second only to Mycenae itself in importance in the Mycenaean world.

The Mycenaean Age is, so to speak, enclosed within flaxen parentheses, for at its very beginning stand the many scraps of fine linen used to wrap offerings in the two Grave Circles at Mycenae, and, right up to the moment of its final destruction, the flax levies were being recorded at the palace at Pylos.

If the Linear B tablets had not so conveniently recorded a linen industry at Pylos, it would have been necessary to postulate one there. Both the pieces of cloth found in burials, and the predominance of white in the male clothing shown in frescoes would have indicated the likelihood of large quantities of linen being needed by the Mycenaeans, and it would obviously have been uneconomical to have imported it all from Egypt or elsewhere. Small quantities of flax, suitable for household consumption, could have been, and no doubt were grown in fertile pockets of soil in other areas of Greece, but the only part of the Mycenaean world which had the conditions necessary for large-scale production, was Messenia (pages 18 - 19 above); and it is sad to think that, as this is being written, fewer crops are being sown there with each passing year, as ready-spun, man-made yarns become cheaper and more readily available, and a link with the Mycenaean past is dying.

Linen, however, was probably only half the story at Pylos. Those flocks totalling over ten thousand head are unlikely to have been kept merely for mutton and cheese - particularly as many of them, as at Knossos, were rams. The only reason that we do not have Linear B records of a woollen industry also, may be because the palace was burnt down just too early in the year.

If Pylos is likely to have had a large textile industry, Mycenae, traditionally, should have had an even better one, possibly based, as the few tablets found so far

1. The reason for its survival in Paniperi is probably that the village is approached only by a very rough road, well off main highways, and in 1972 had only two buses per week to Kalamata.
seem to suggest, on wool; and if Theban officials were at the pains of making records of wool, perhaps there was a third industry there. It may well be that tablets still in the earth at sites as yet unexcavated will eventually prove that every Mycenaean kingdom had its own industry, spread throughout its territory, but controlled from a palatial administrative centre.

g) Homer on a Mycenaean (?) Textile Industry.

It is unlikely that there will ever be agreement on the extent to which Homer's works reflect the Mycenaean Age, but it is possible to state that in the realm of textiles he is so accurate that it is hard to believe he was always blind. That his descriptions of spinning and weaving (pages 96 - 97 above) should be correct is not surprising, for the same methods were in use both in Mycenaean times and in his own day, but his confirmation of the tablets' account of textile staff is noteworthy. Textile manufacture was women's work, and they were often enslaved captives, who were either valued because they were already trained in the craft, or else had to be taught some aspect of it by faithful old retainers like Eurycleia. Large numbers (fifty may or may not be a mere poetic total) were based on 'palaces' like those of Alcinous and Odysseus.

As Homer coincides with the tablets in so much, other information which he provides may also reflect the Mycenaean situation - and it is the type of information that is unavailable from any other source. Textiles were not only women's work, but the most important and valuable work women

1. Odyssey I, 357; Iliad VI, 491.
2. Odyssey XXII, 422; Iliad I, 31; VI, 450.
3. Iliad IX, 270.
4. Odyssey XXII, 422.
5. Odyssey VII, 104; XXII, 422.
could be engaged in, the major household task to which all others were subservient. Everyone from queens, princesses and heroes' wives to servants and slaves appears to spin or card or weave nearly every waking minute. Even Helen has to make a show of it, and Aphrodite, wishing to visit her in disguise, pretends to be her old carding-woman.

The busy workers had to provide sheets, coverlets and purple rugs, chair covers, ships' sails, and of course shrouds, as well as fresh clothes for guests and bridegrooms' retinues. The products of the loom were so esteemed that they were among the treasures presented as guest-gifts, and used to ransom bodies from sulky heroes. They were even thought to be a worthy offering for the gods, although necuba's effort met with no success. The final accolade is surely provided when a female captive, skilled in the fine crafts, is part of the first prize for the chariot race at Patroclus' funeral games.

Neither the situation described by Homer, nor that recorded in the tablets, could possibly have been imagined if it had been necessary to rely on the evidence of Mycenaean weaving tools alone. The spindle whorls found in cemeteries

1. Iliad III, 125; XXII, 448; Odyssey II, 94; VI, 52 - 53; VI, 305 - 306; XIX, 137 etc.
2. Iliad I, 31; VI, 450; Odyssey VII, 104 ff.; XXII, 422.
3. Odyssey IV, 130 - 135.
4. Iliad III, 386.
5. Odyssey IV, 296 - 299; VII, 334 - 338.
8. Iliad XXIII, 254; XXIV, 796; Odyssey II, 94 etc.
12. Iliad XXIV, 228 - 231.
13. Iliad VI, 286 - 311.
are only typologically informative; and the one Mycenaean settlement to produce them in rather impressive numbers is Nichoria, which may have been part of the Pylian kingdom in the further province beyond Mount Aigaleon. The fact that no tablets have been discovered there makes it unlikely that it was itself an administrative centre. Twenty-six whorls were found in or very near to the palace at Mycenae, and, to judge by those on display in Chora museum, a further fifteen to twenty in areas just beyond it. The numbers are respectable, but not startling. So many people have dug at Mycenae that there is no way of knowing how many whorls may have been found in the settlement areas there over the years, but there is no mention in any report of their being unduly numerous.

Mainland loomweights make an even poorer showing. Pylos, Nichoria and Mycenae each have just about enough weights to equip one loom per site. Lerna (where their date is unconfirmed) could not even do that.

Textiles were being woven, however, and in no mean quantities. One possible explanation is that if there was a Middle Helladic type of loom without weights, its use may have continued into the Mycenaean era. Another is that the two-beam, vertical loom introduced into Egypt in the sixteenth century B.C. (page 89 above) was adopted. The third, and I believe the correct solution, is that it was the warp-weighted loom with its adapted Minoan weights which was typical of Mycenaean Greece, but that most Mycenaean loomweights are still

in the ground. Because the excavation of Mycenaean tombs is usually more rewarding in terms of finds than the investigation of settlements, we know much more about how Mycenaean were equipped for death than for life - and even where settlements have been dug, it is often only in the area of the 'royal' residence, not the surrounding town, where most of the looms may well have been housed.

A quality to be admired in the Mycenaeans is their ability to learn from others more advanced than they, without losing their own identity. Their whorls, which were those of their Middle Helladic ancestors, or developed therefrom, were retained; their loomweights, and probably their loom they adopted from the Minoans, very likely because the machine was superior to the one they had been using previously - but the patterns they wove on it were their own, with the addition of only those Minoan ones which pleased them; and, like the loomweights, these were often slightly altered to suit Mycenaean tastes. They learnt to decorate their walls with frescoes, but the majority of the people in them were Mycenaean engaged upon Mycenaean pursuits. The gorgeous Minoan dress was taken up by the ladies, but when engaged in informal activities like riding out to view a hunt, they reverted to a simpler costume - and this was sometimes worn by them even on ceremonial occasions, as by the 'Priestess' of the 'White Goddess' at Pylos. The men never really abandoned their well-cut tunics and 'gaberdines'. Illiterate, they adapted the writing system of another language to fit their own, in order to be able to keep bureaucratic records in the Minoan fashion - and nothing is more likely than that once they had learnt
the rudiments of the system, they improved the methods of organisation - the impression given by both Anossian and mainland Linear B tablets relating to textiles is one of quite admirable efficiency, coupled with flexibility - an unusual combination in bureaucracy.

Although the Mycenaean benefited so much from contact with the Minoans, it was also, in a way, a misfortune, for, as their successors as the leading power in the Aegean, they are naturally compared with them - and usually to their disadvantage. This is natural. The Minoan civilisation was one of the most brilliant to flower upon the face of the earth at any time, in any place, and almost any other pales somewhat in comparison - but the Mycenaean is the one most closely overshadowed by it. For this reason, the Mycenaeans do not always receive as much recognition for their own achievements as they should, nor sufficient credit for adaptability, originality, keen intelligence, and a great capacity for learning - qualities which may well have been their legacy to the much-admired classical Greeks, and are not lacking in the race today.

If, as the Middle Helladic invaders of Greece, they destroyed a better way of life than the one they brought with them, they in turn, as the Mycenaeans, made amends for this by developing a civilisation far greater either than any which had previously existed on the Greek mainland, or anything that was to be seen there for half a millennium after its ending. Those pyramidal/conical loomweight users who destroyed it, did Greece no service.