SIMILARITIES AND DIFFERENCES IN THE ARCHITECTURAL STRUCTURES OF THE PALACES IN CRETE AND UGARIT *

by ENRICA FIANDRA

In recollection of the years passed in Crete, I would like to dedicate this work to Rachel and Sinclair Hood.

In a previous study[1] I explored the topic of the social units formed by palace and city in Crete and the significance of the Cretan palaces in this context. This subject was expertly taken up by Peter M. Warren[2]. I will, therefore, give a brief summary here of what has been said regarding the functional elements making up the Cretan palaces – elements which link them to the Oriental palace complexes from which they are derived.

The Cretan palaces constitute the multi-functional fulcrum of the communities dwelling in the cities or in the surrounding villages. As in the case of the Oriental examples, the palaces are municipal-administrative centres provided with internal and external areas which suggest they were destined for use of a public nature. The internal areas, as their planimetry shows, were agglomerations of architectonic quarters or sectors with various functions. In the main they are offices, warehouses and archives for the administration of goods; but there are also shrines, places of worship, craftsmen's workshops, etc. The external areas consisted of unencumbered spaces – courtyards and open areas – which were necessary for the intense traffic involved in the operations of loading and unloading in the warehouses and for the amassing of goods and their redistribution; in part they were used also for religious and secular spectacles: games, processions and assemblies and for the administration of justice.

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* The collection of material and data used in this study was begun at the time of the excavation by C. A. Schaeffer whom I wish to recall here with gratitude.

The english translation is by Diane Bland.

[1] E. Fiandra, Cultura e scambi commerciali nella civiltà minoica, *Le Scienze* 176 (1983) 30-43.

[2] P. Warren, Minoan Palaces, *Scientific American* (1985) 74-81.

Thus the palaces responded in a totally functional way to the complex demands imposed by centralised systems of government. However it is necessary to underline that it is predominantly those demands concerned with administration, accounting and archiving that are answered in the composition of both the Cretan and the Oriental palaces, but that the results, in terms of planimetry, do not produce an identical layout. The nature of the land where the palaces are situated is a decisive factor in the choice of their planimetric composition: centralised, more compact solutions are adopted in adherence to the morphology of hilly ground, as at Phaistos and Knossos; whereas at Mallia and Ugarit the proximity of the sea and open plains favour the distribution of the functional units, which at Phaistos and Knossos are combined, in distinctly separate bodies.

The same system of distribution of space according to its utilisation and its territorial situation is found in both the Oriental and in the Cretan palaces; this underlines their common Oriental origins.

But it is not only the characteristics of planimetry and function which the Oriental and Cretan palaces have in common; passing from a general examination of the city and palace civilisations to a more detailed one of architectonic structures and systems of construction, one finds technical components which are common to the palace buildings of both Crete and the Orient.

This is the subject dealt with in this study. I will also try to show how, although the Cretan palaces undoubtedly derive from the much more ancient Oriental ones, there is also a return influence exerted by the Cretan constructors on the work carried out in the Oriental centres in commercial and cultural contact with Crete[3]. Since the connections between Crete and Ugarit are well documented and we know that non-sporadic relations of a commercial kind existed between the two sites, the case of Ugarit will be an example. In fact, the palace of Ugarit (fig. 1) presents architectonic characteristics which are very interesting for their close resemblance to those of analogous palace structures in Crete, in particular both Palace I and Palace II in Phaistos[4].

A. Lucas[5] notes that: "The nature of the building materials employed in any country depends upon many factors, the principal of which are the climate, the degree of civilization of the people and the kind of materials available". In fact, the materials used for the Minoan palaces in Crete and for the

[3] This article is not concerned with the chronology of the various sites. For a general chronological framework see Fiandra 1983, *cit.* 32-33.

[4] D. Levi, *Festòs e la civiltà minoica*, I (Incunabula Graeca, LX) Roma 1976; II,1 (Incunabula Graeca LXXVII) Roma 1981.

[5] A. Lucas, *Ancient Egyptian Materials and Industries* (2° ed.), London 1959 , 61.

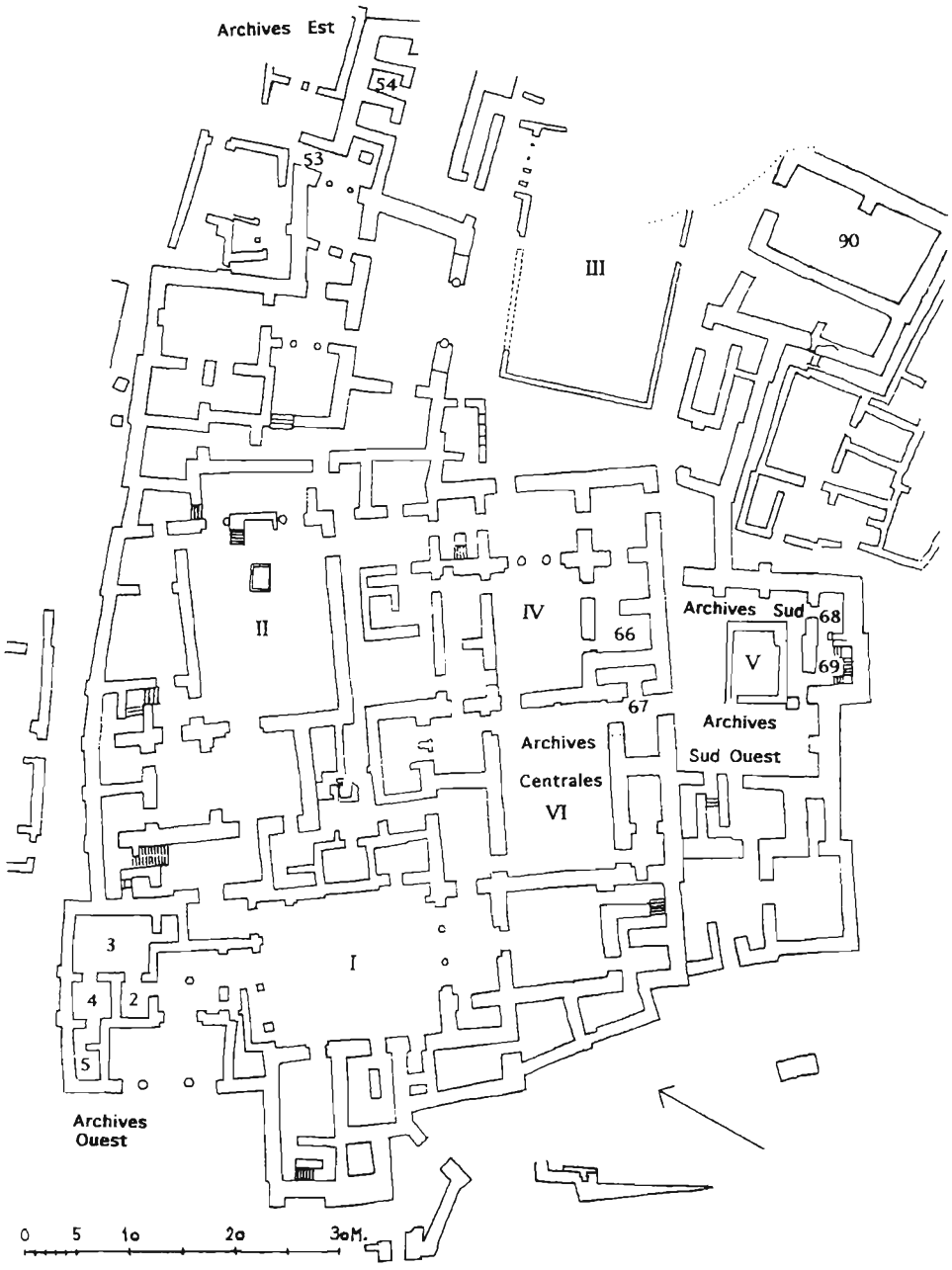

Fig. 1 – Ugarit. The Palace Archives at Ugarit.

palaces of Ugarit were easily obtainable near the palace itself and were in keeping with the importance of the buildings and with the climate.

The following are among the main characteristics:

1) The main walls are made up of carefully squared blocks of limestone finished, on the outside, in such a way as to represent ashlars and true orthostates. On the inside the blocks were left rough and have a very uneven appearance. The inner part of the wall and the empty spaces formed by the uneveness of the blocks were completed with smaller stones of varying sizes held together with mortar or other binding materials which varied in composition according to the period (figs. 2, 3).

Thus, the wall presented an isodomic appearance on the outside, with carefully squared blocks resting on a series of slabs which widened the supporting base of the wall and acted as a foundation. On the other hand, the inside of the wall reveals its economical character, as a combination of small stones were used which were then carefully plastered over on the inner face of the wall.

In Palace I in Phaistos the internal walls, despite their considerable thickness, were built exclusively using calcareous stones of reduced dimensions bound together with mortar and plastered on both sides.

In Ugarit, on the other hand, the internal walls of the Royal Palace are built using carefully worked blocks and are very similar to those, nearer to them in age, of Palace II in Phaistos which are equally well worked on all surfaces.

The method of building external walls described above is also found in Ebla where there are walls of pseudo-orthostates made of basalt[6].

The finishing of the external surface of the limestone blocks is carried out so as to leave a rough surface; it is not smoothed down, in fact, but rather prepared to take a thin layer of plaster. Mason's hammers, hatchets and pick points were used to level off the blocks both in Ugarit and in Phaistos (figs. 4, 5, 6). In Phaistos the white plaster is still visible in some points. In each building period the thin layer of white or coloured plaster which finished off the wall was obtained by rubbing it with flat pebbles used as plaster floats. These pebbles retain the colour of the plaster around their centre (fig. 7)[7].

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[6] P. Matthiae, *Ebla, un impero ritrovato*, Torino 1977, 125, fig. 24; Id., *Ebla, alle origini della civiltà urbana*, Roma 1995, 167, 169.

[7] It is useful to remember that these pebbles, being so practical, were used in different ages and in localities far apart from each other. Pebbles of this type with remains of coloured plaster on them have been found in the Roman villa of the second century A. D. in Silin (Tripolitania).

Fig. 2 – Ugarit. Wall with external stones in imitation of orthostatic blocks, completed internally with unhewn stones of small and medium dimensions.

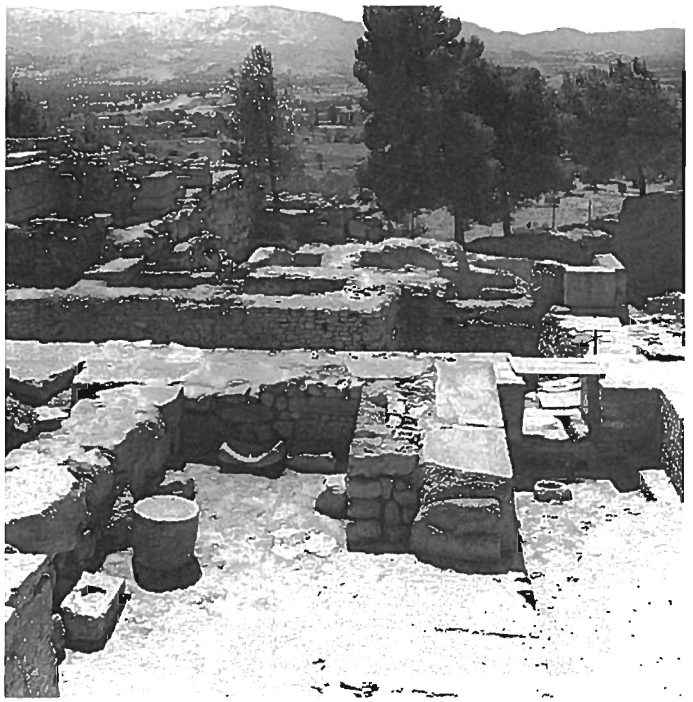


Fig. 3 – Phaistos. Wall of Palace II with similar characteristics to the wall in fig. 2.

Fig. 4 – Ugarit. Wall end containing blocks worked with a toothed implement.

Fig. 5 – Phaistos. Orthostatic block worked with a narrow or flat chisel.

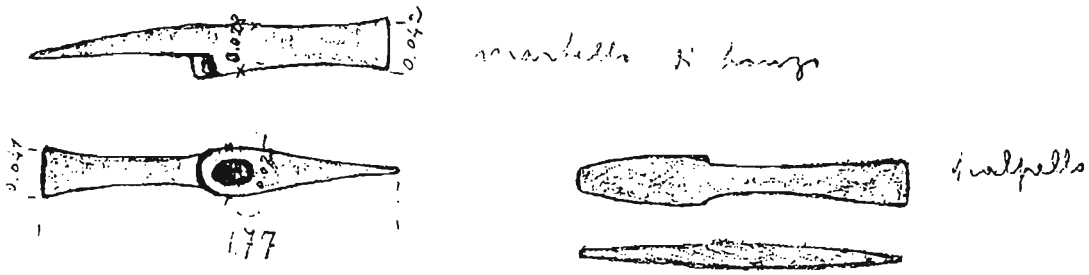


Fig. 6 – Tools from Phaistos and Ayia Triadha (drawing by Luigi Pernier).

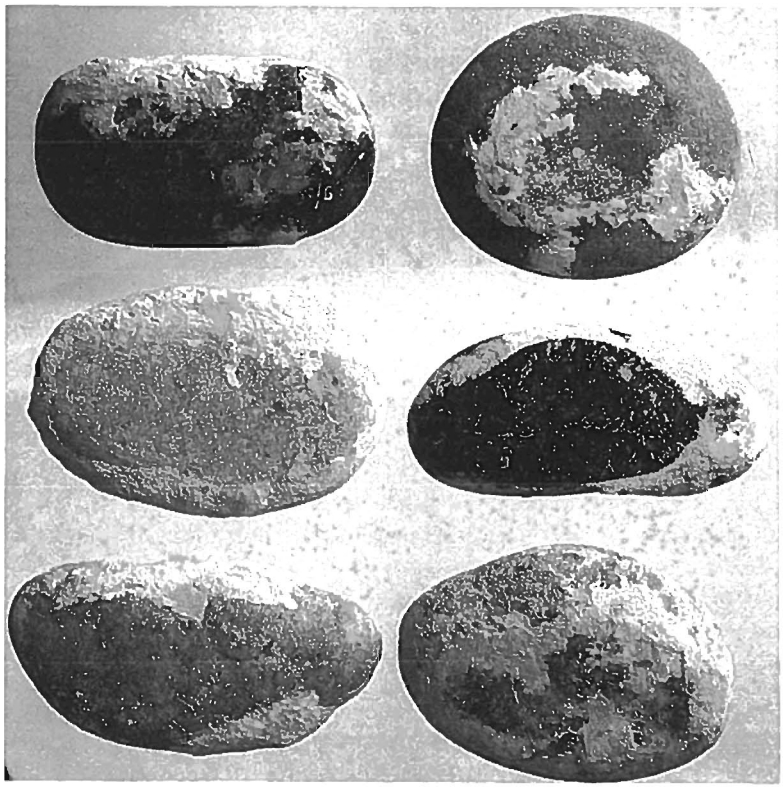


Fig. 7 – Phaistos. Pebbles used as plaster floats.

In Palace I at Phaistos, the principal external surface of the orthostates is worked in a particular way which does not seem to be present in Ugarit, and which anticipates the constant use of this technique in the classical period: a band along the edges around a slightly protruding central part (figs. 8, 9). This system of preparing the faces of the orthostatic blocks facilitated their correct positioning. The horizontal band served to line the blocks up and the two vertical bands served to get the faces in plumb[8]. There are also examples with this characteristic in Ayia Triadha[9].

2) At the ends of the walls, the terminal blocks are true orthostates and have square holes in the upper surface which serve to connect the blocks vertically to the overlying part of the wall (fig. 10). The holes are generally 4x4 or 4x3.5 cms in size and are between 6 and 7 cms deep. The position of the holes in the terminal wall-block in Ugarit (fig. 11) is very interesting and elaborate. The blocks positioned along the wall also have a row of holes in the upper surface (figs. 2, 3, 12, 13, 14).

This system of holes in the upper surface of the orthostates is not characteristic of Crete, Thera and Ugarit alone, but, in the period between 2000 and 1400 B.C., is widespread in the whole of the Middle East in both square and circular forms, particularly in Syria and Anatolia. In Maşat Höyük[10] there are orthostates with square or rectangular holes of various dimensions; unfortunately they have been re-used in more recent walls so that their original position is not known (fig. 15).

The holes can also be circular, as at Ebla in the orthostates of the city gate S-W (fig. 16), and in Arslantepe in a block found to the east of the *tepe* during the building of a modern road (fig. 17). It is most probably a block from a Hittite wall. At both Mallia and Phaistos there are circular holes, not on the orthostates but on the door-sills, at the side of the doorways and on column bases[11].

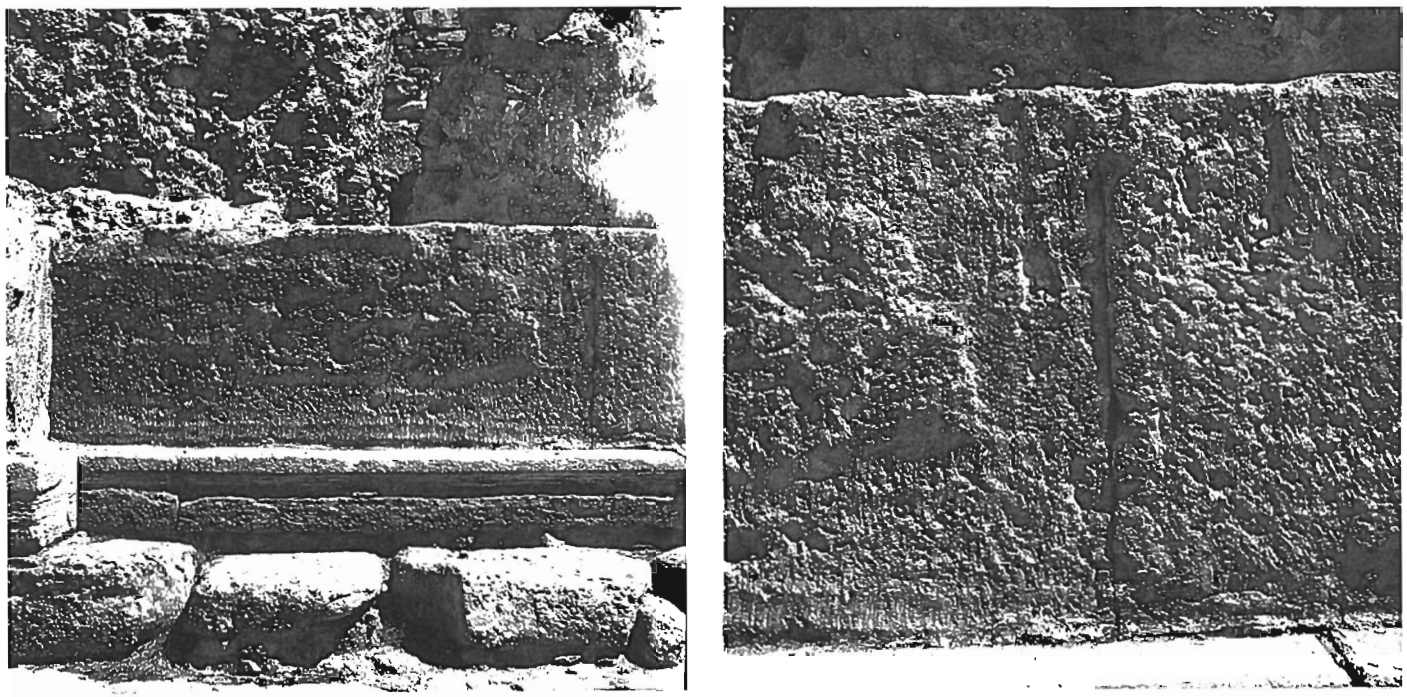
The finish given to the surface where the holes are positioned is also very similar in the different locations, only the size of the orthostates changes: they are of a gigantic height in Ebla (m. 1.80), smaller in Phaistos and of medium height in Ugarit. This difference can be attributed to the period, to the purpose for which the walls were intended (city or palace walls), or to the thickness of the blocks that could be extracted from the quarries.

[8] These drafted edges (german *Randschlag*), are similar to *anathyrosis* and are very painstakingly worked with chisels.

[9] This information was given to me by Prof. Sinclair Hood in a letter dated 8th June 1994: "There are one or two examples at Ayia Triadha".

[10] T. Özgüc, *Excavation at Maşat Höyük and investigations in its vicinity*, Ankara 1978, 31, 32, 33; Id., *Maşat Höyük* II, Ankara 1982, Pl. 20, figs. 5, 6, 7.

[11] J. Show, Minoan Architecture, *Annuario della Scuola Archeologica di Atene*, XLIX (1971) figs. 61, 62, 145, 192.



Figs. 8-9 – Phaistos. External face of orthostatic blocks with band along the edges.

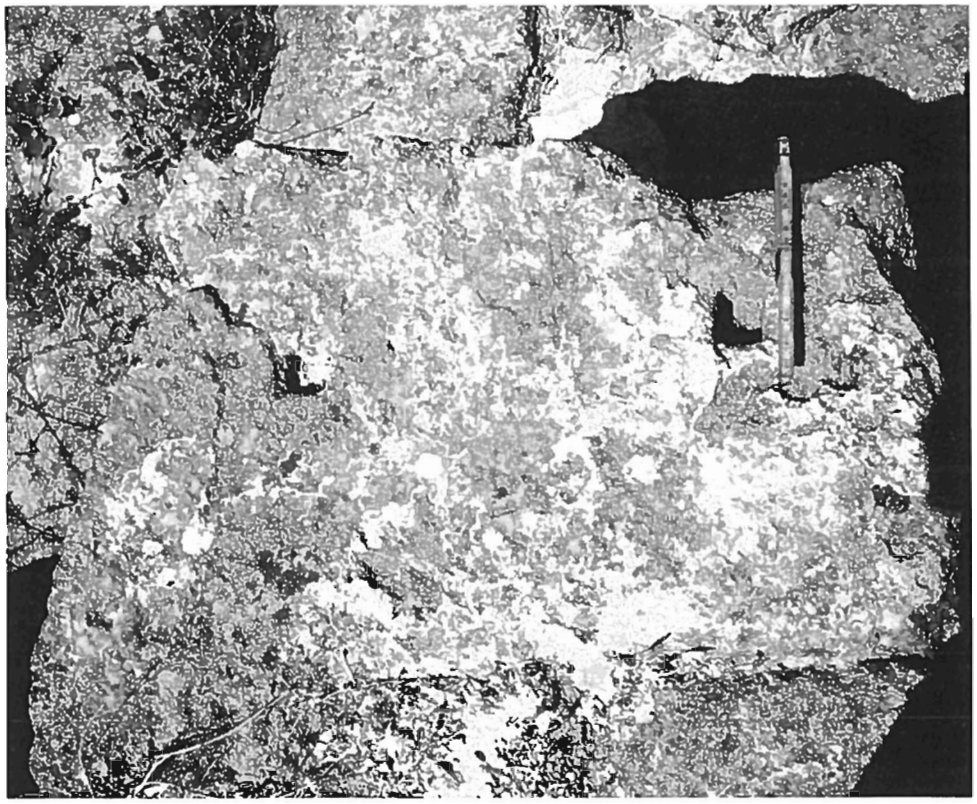


Fig. 10 – Ugarit. Upper surface of orthostatic blocks with square holes.

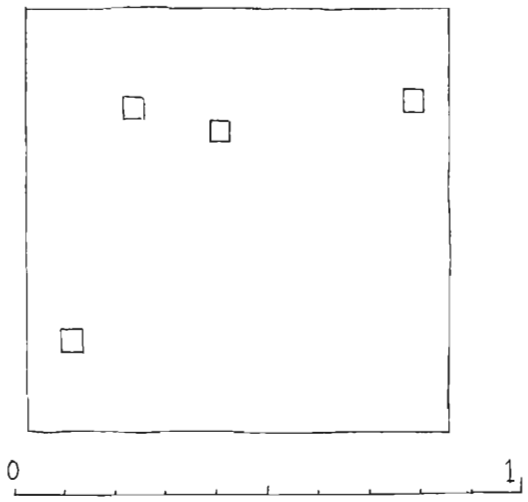


Fig. 11 – Ugarit. Drawing of an orthostatic block cornerstone.

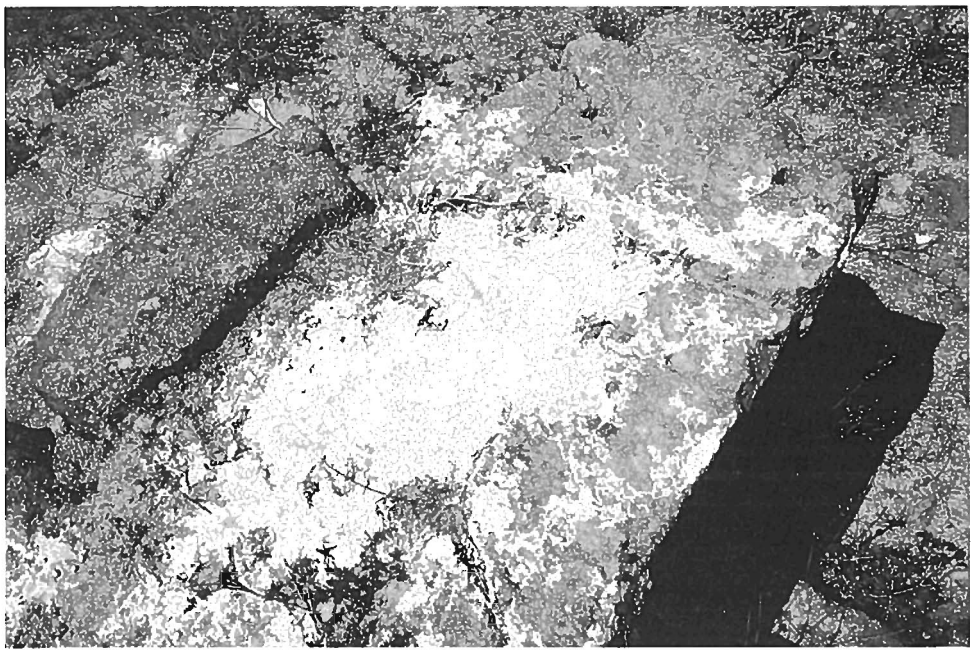


Fig. 12 Ugarit. Square holes in the upper surface of the orthostatic blocks placed along the wall and the edges.

Fig. 13 – Phaistos. Square holes in the upper face of the orthostatic blocks placed along the wall (room LXI).

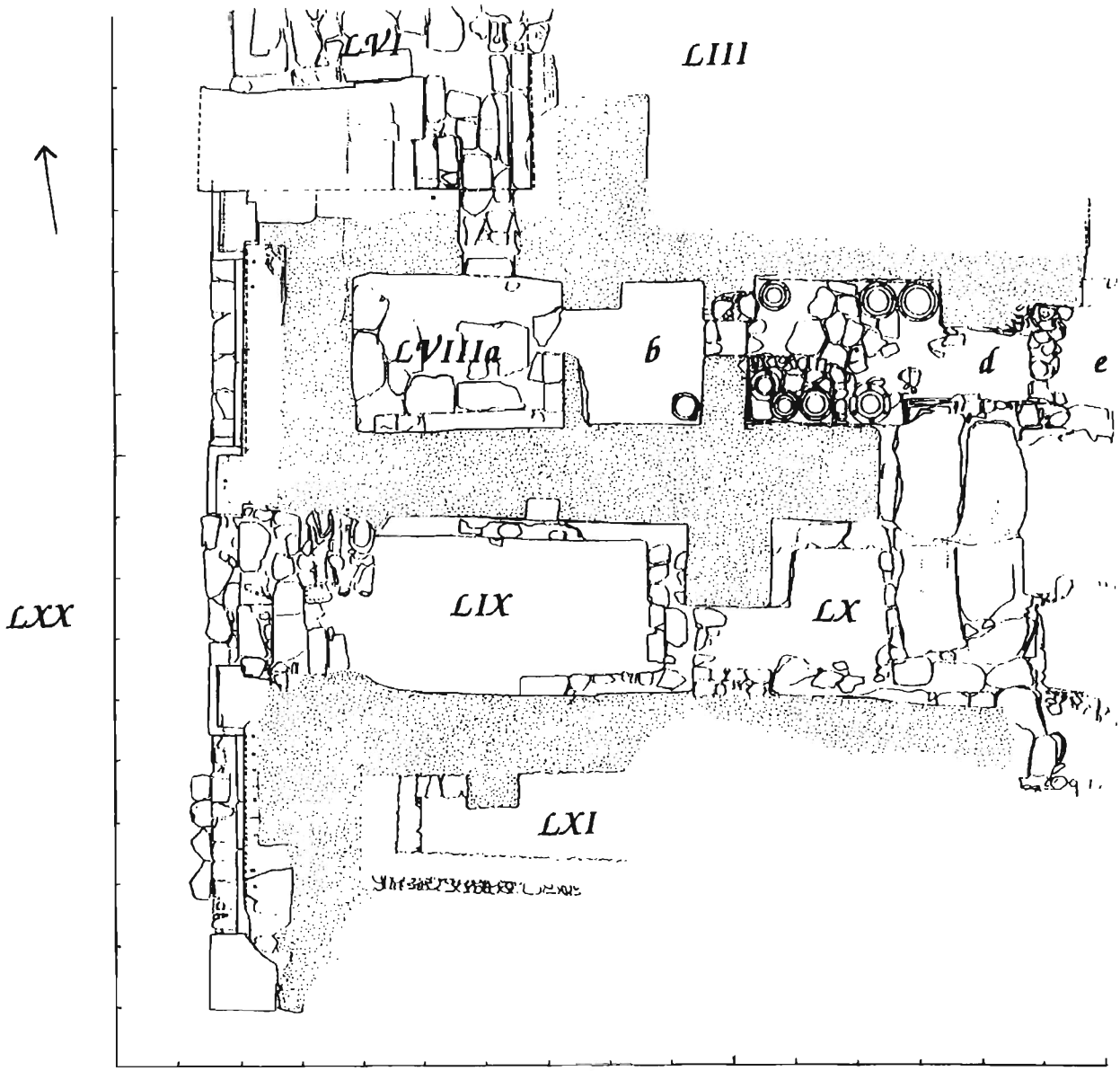


Fig. 14 – Phaistos. Plan of the southern section of Palace I with wall of orthostates in correspondence to room LXI, LIX, LVIIIa and LIII (drawing by Enrica Fiandra).

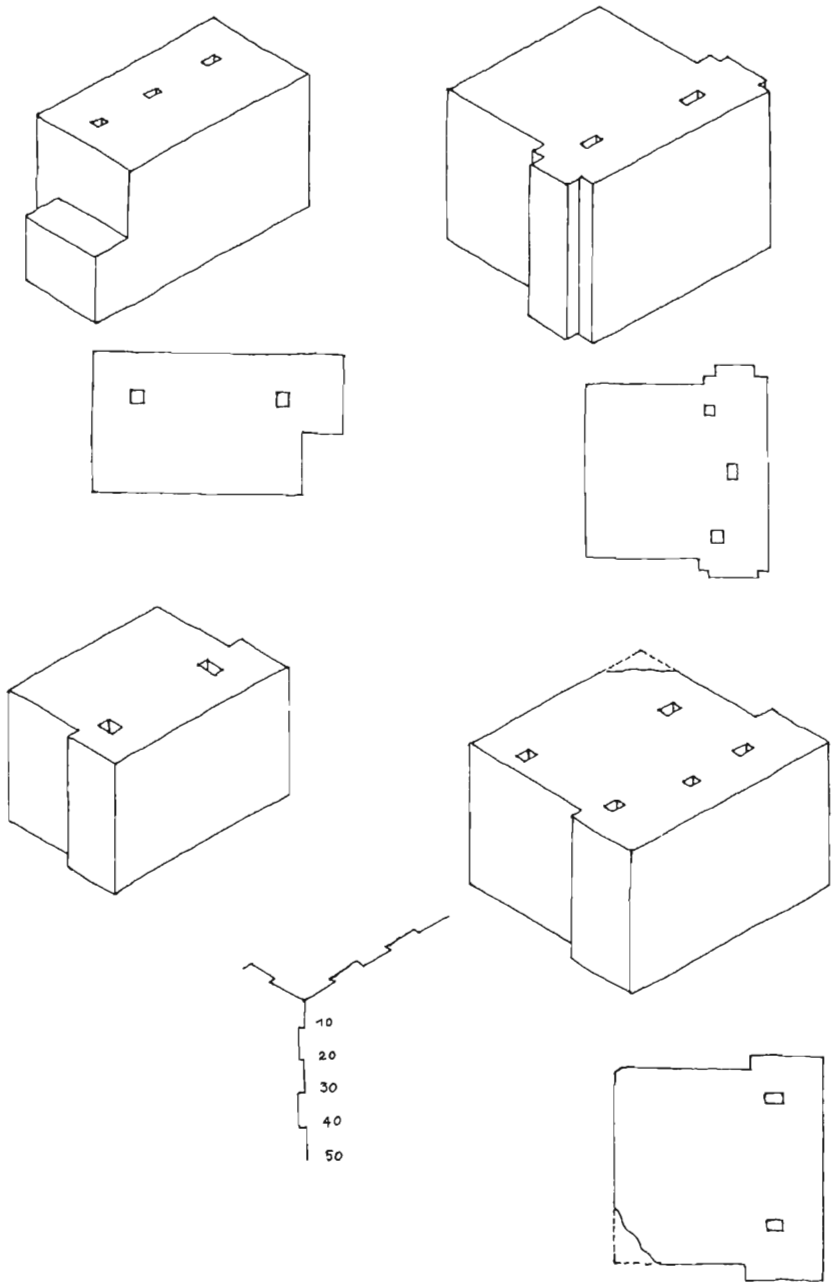


Fig. 15 – Maşat Höyük. Drawings of quadrangular blocks with square holes (after T. Özgüç, Maşat Höyük II, Ankara 1982).

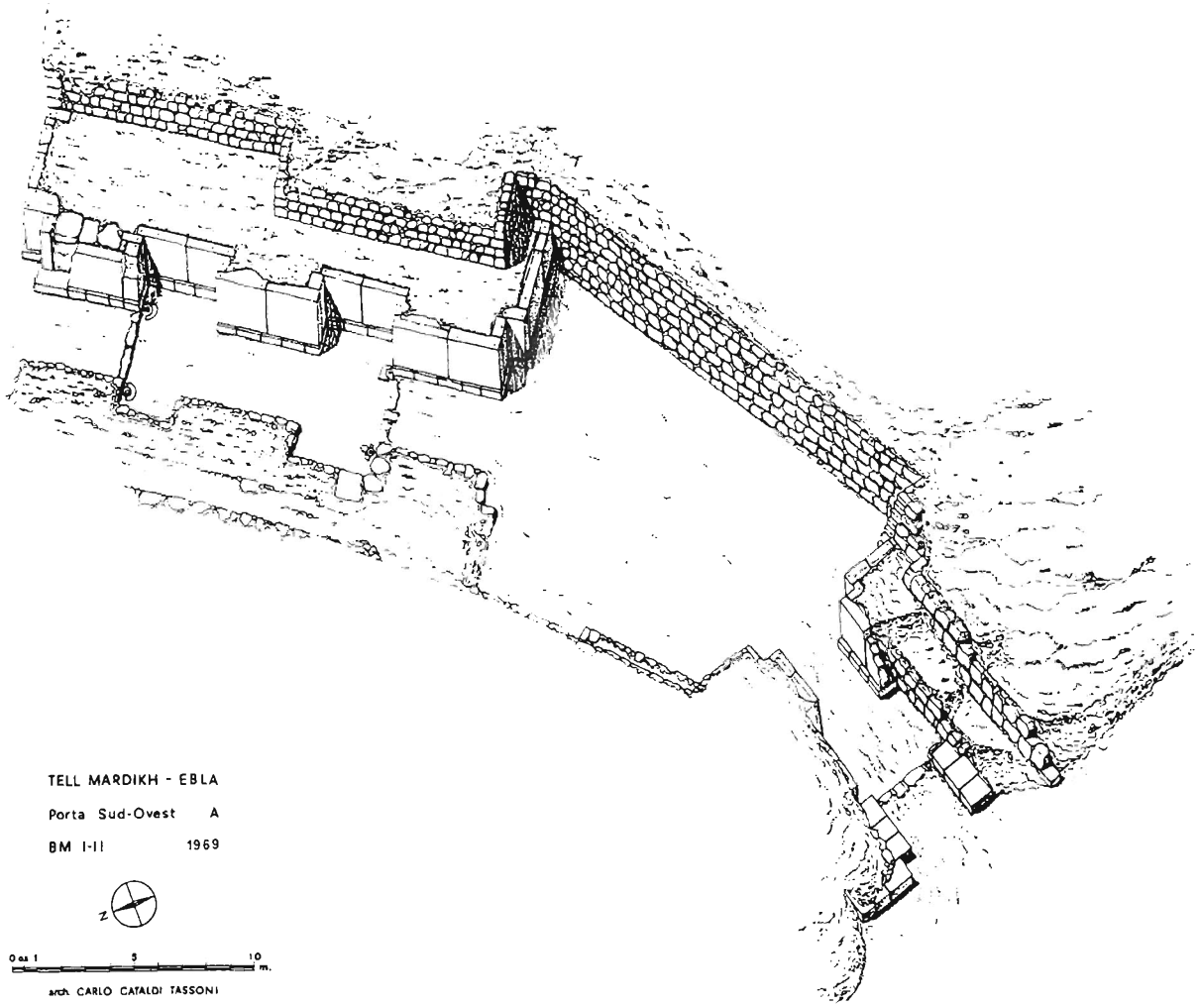


Fig. 16 – Ebla. Walls round holes in the blocks of the S-W city gate.

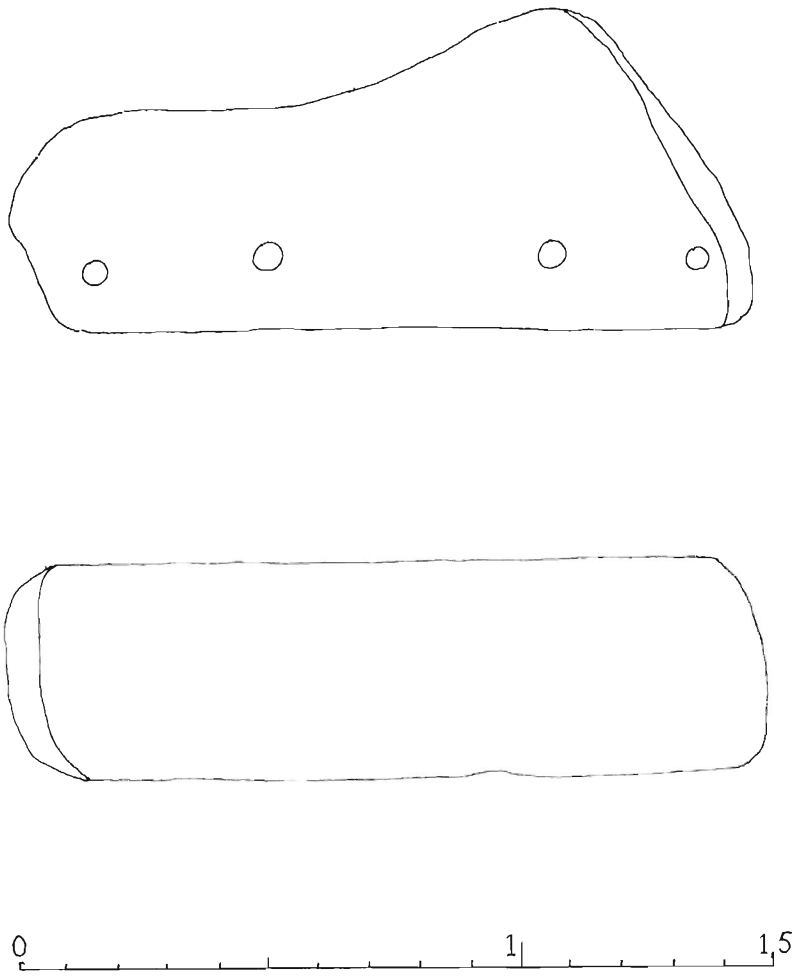


Fig. 17 – Arslantepe. Drawing of a Hittite block.

These structural characteristics, which are present in Phaistos and Ugarit but also in many eastern centres, not only associate the Cretan techniques with those of Ugarit, but also underline the Oriental origins of the Cretan palaces. As has been shown, these eastern origins can be seen in marginal technical elements, for example the holes in the orthostates, as well as in the planimetry and in the functional sectors of the palaces.

In relation to this, it should be remembered that there is a particular technique, consisting in holes passing through two joining faces, most pro-

bably connected with systems for closing or locking doors, which is present in Ugarit (fig. 18) and is also found in the palace of Knossos, but of which there is no trace in Phaistos.

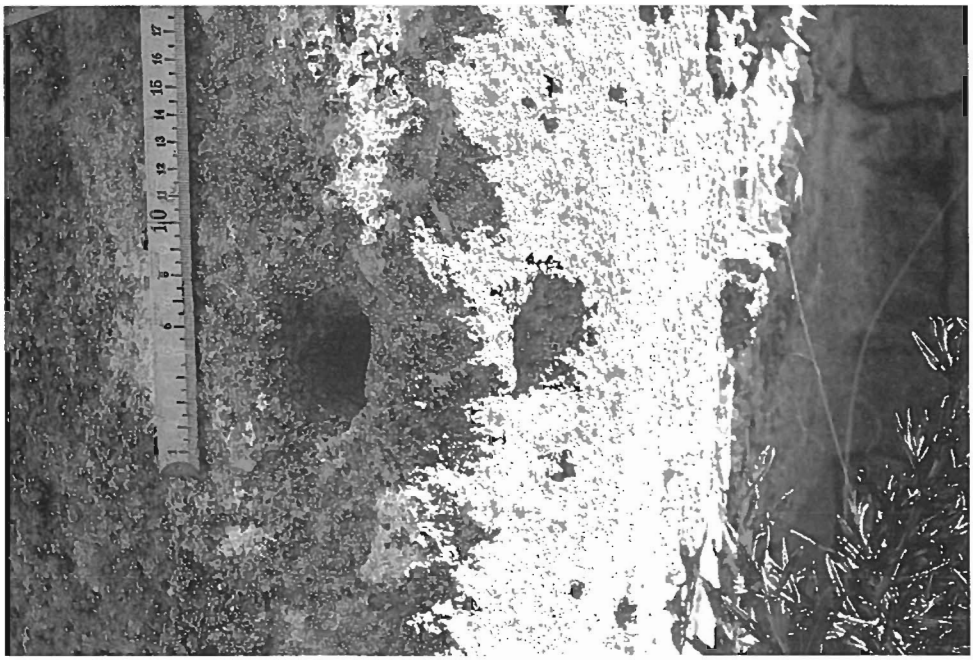


Fig. 18 – Ugarit. Blocks with holes passing through intersecting edges.

3) Another important characteristic common to both Ugarit and Phaistos is the use of timber inside the walls. From the cast of the imprint that the wood left in the lime, it has been possible to obtain information about the type of wood used for building. The timber used inside the walls in Phaistos was seasoned olive stripped of its bark, the surface of which had been attacked by *Phoeotribus scarabeoides*. In Ugarit the timber was probably Aleppo pine. The cast of the imprint left by the trunk in the lime in which it was immersed inside the wall gives us the picture of its external surface; thus it is possible to affirm that the trunk, in this case, still bore the bark[12] (figs. 19, 20). The use of unfinished timber inserted in the walls is totally analogous to

[12] Dr. Mario Palenzona, Director of the Istituto per le piante da legno e l'ambiente, Torino, has been able to make a fairly reliable identification of the type of tree from the photographs of the casts.

Fig. 19 – Ugarit. Cavity with the impression left by the wood placed inside the wall.

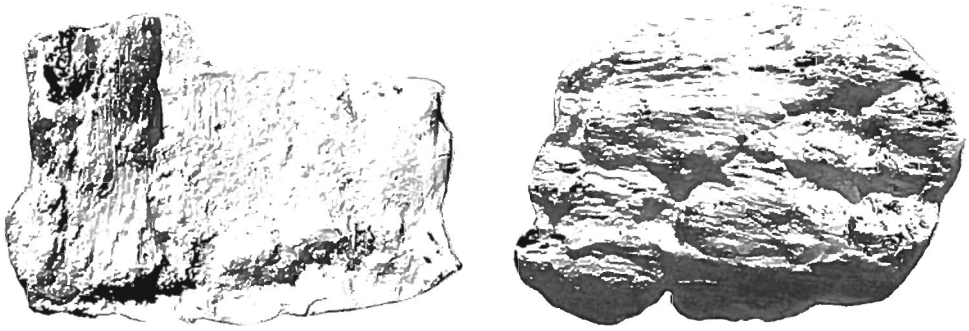


Fig. 20 – Ugarit. Casts of impressions left in the lime by the wood placed inside the wall.

the Cretan system, dating from the period in which the structures in Vasiliki were built.

4) The floors of the entrance halls (figs. 21, 22) and the courtyards in Ugarit, both inside and out (fig. 23), are paved with blocks of limestone of different sizes, and are similar to the Cretan floors called *kalderim* (fig. 24). The columns are of wood with stone bases.

5) Finally, a technically complex building system was adopted in the palace structures in Ugarit (fig. 25), as well as in Crete, especially at Phaistos

Fig. 21 – Ugarit. Paved entrance of the palace with stone bases for wooden columns.

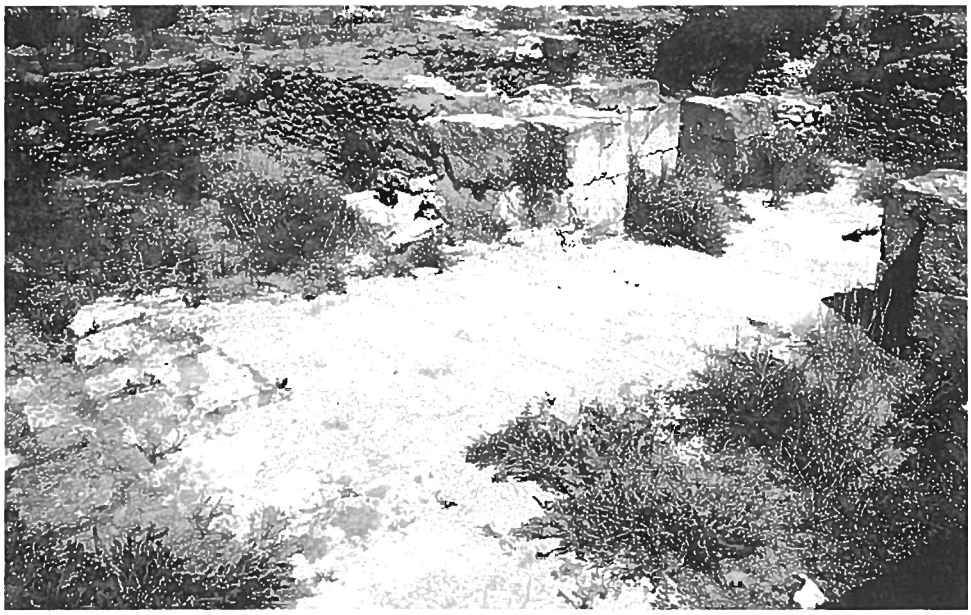


Fig. 22 – Ugarit. Palace entrance. (The tablet with the alphabet was found next to the doorpost on the right of the illustration).

Fig. 23 Ugarit. Paved courtyard with concrete stratum between the original wall and the reconstruction.

Fig. 24 – Phaistos. Paved courtyard LXX and stratum of solid concrete over the rubble of the 3rd structural period.

Fig. 25 – Ugarit. Palace courtyard with concrete stratum between the original construction and the rebuilding of the palace.

during the 4th period of Palace I and between the structures of Palace I – which had been destroyed and levelled out – and those of Palace II.

In Phaistos, this building technique consisted in the use of a very compact, resistant concrete made of lime, stones and ground terra-cotta which makes the mixture not only resistant but also waterproof[13].

The concrete in the palace of Ugarit is, in fact, concrete used as a method of construction, exactly as occurred in Phaistos. The most obvious evidence is the fact that the floor, made of concrete precisely, was smooth and horizontal; the wooden beams were laid out parallel to the length of the walls and placed in the mass of concrete leaving the impression of the wood inside it. Furthermore, the concrete was predominantly made up of lime, and this composition, due to its homogeneity, could certainly not have been caused by fire or by chance. Finally the concrete was also laid over the blocks of the surviving walls and the new wall rested on this, rebuilt along the same alignment with blocks recuperated from the walls which had collapsed (figs. 23, 25).

The concrete was laid over the previous structures which had been destroyed in various ways, e.g. earthquakes or fires, so as to create a solid base on which to begin the new building. In these cases, both in Phaistos and Ugarit, the rubble was considered too bulky to be cleared away and was, instead, roughly levelled out and covered with a thick layer of concrete.

Naturally the under part of this layer was very irregular because it was resting on the underlying rubble and penetrated into the more yielding part. The upper part, however, was perfectly flat and smooth because it had to serve as the floor of the new building and, generally, the pre-existing walls were kept and raised.

Furthermore, in many rooms the concrete had sunk and in some cases had even collapsed towards the centre of the floor, perhaps also as a consequence of the violent earthquake which hit Ugarit. This also occurred in Phaistos, where the concrete had been laid over a mass of loose material used to fill rooms which were no longer usable at their original height, and had then been disturbed by earthquakes. In Phaistos we have an example in room LI where clay sealings were, in fact, found both above and inside the depression formed in the damaged floor[14].

[13] The analyses of the samples from Ugarit and Phaistos were carried out by Prof. Aurelio Burdese, Department of Material Science and Chemical Engineering – S.M.I.C. Turin Polytechnic. See Appendix, at the end.

[14] There were 7 clay sealings found in room LI, namely: C1487, C1488, C1489, C1490, C677, C675, C679. C1530, which was attributed to Room LI by G. Pugliese Carratelli, Nuove epigrafi minoiche in Festo, *Annuario della Scuola Archeologica di Atene*, XXXV-XXXVI (1958) 376, was, in fact, found in Room 25.

It must also be borne in mind that the condition in which the remains are found is rarely the same as that immediately following the events which caused the building's collapse (fires, earthquakes, destruction etc.). Rather, the remains were rummaged through and overturned by the inhabitants themselves in their search for survivors, victims and goods that they hoped to salvage from under the ruins. For this reason archeological material and, particularly in Ugarit, written tablets have often been found scattered everywhere in a state of great disorder not only on the same storey of the building but also at different depths and broken into fragments.

As has been mentioned above, this type of construction using concrete has antecedents in Vasiliki where it was adopted for building both walls and floors[15]. A preliminary investigation indicates, therefore, that the building system described, which was also used in reconstructions, is, in its most ancient use, of Cretan origin.

In Ugarit, as has been seen, it seems to be an actual system of construction; that is, the floors, made of solid concrete laid over the rubble of the previous buildings[16], are perfectly flat and smooth. We find a very similar but more recent situaton to that found in the 4th structural period in Phaistos. It is a question of identifying if the system used in Ugarit is derived from that of Phaistos or if it is the continuation of an Oriental usage.

Woolley had already confirmed the close analogies between the architecture of Alalakh and that of Minoan Crete, in its materials, its systems of construction and its planimetries, and he had made just such observations to Arthur Evans many years previously. In particular, concrete was used in Level VII for the foundations of the Temple of Alalakh and also for the floors which, like those in Crete and particularly in Phaistos, were then covered with plaster made of lime. Woolley holds that the use of concrete was then abandoned in more recent times, however in Ugarit this system was taken up in the construction of the Royal Palace. Thus we see confirmed, in all its manifestations, the architectonic homogeneity in Crete, in Anatolia, in Syria and in Northern Mesopotamia.

In this study, the system in use in Ugarit – concrete as a means of construction rather than simply as a filling material – is examined from an exclusively technological point of view for its analogies with the system used in Crete; however, it merits a deeper and more careful examination for the repercussions it could have on archaeological stratigraphy. In fact, by examining its presence in the different areas of the palace, it would be possible to

[15] A. Zois, *Vasiliki*, I, Athens 1976, 88-89.

[16] Cf. A. Schaeffer, *Annales Archéologiques de Syrie*, 2 (1952) 5; Id., *Syria*, 31 (1954) 19.

determine which rooms had been covered over with concrete, and which had been re-used without the need to cover them with this material, as would seem to be the case with the palace courtyard in Ugarit. The benefit that could be gained from this in the chronological-stratigraphic field is evident, with particular relevance for the dating of the different archives found above and below the concrete. The fact that documents, which seemingly belong to the same period, have been found in apparently different layers according to whether rooms had or had not been covered with concrete has always presented a problem.

Up until now, attempts to determine to which level and relative archive the tablets belong, have been made starting from the depth and from the levels in which they were found[17]. In my opinion, these elements are insufficient to determine, from a stratigraphic point of view, which groups of tablets were contemporaneous and formed homogeneous archives lasting a definite span of time. The levels at which the tablets were found are not decisive in establishing the chronology of the archive, precisely because of the events undergone by the layers in which they are situated. As has already been said, the concrete could have been laid at different levels according to the necessities dictated by the underlying rubble and by the consequent distribution of new rooms. Furthermore, it is presumable that the concrete was only laid on top of buildings and not, for example, in the courtyard where, for reasons of economy, it would have been sufficient to stamp down the layer of earth sealing the rubble underneath. The levels could differ from one room to another; in evidence of this, in fact, a small, adapted staircase was found in Room 53 of the Royal Palace.

In any case, the rebuilding using concrete took place immediately after the destruction, both in Phaistos and in Ugarit. The blocks from the ruined walls were recuperated and the walls themselves were continued above the layer of concrete in perfect alignment with the surviving wall below. To accomplish this, it was necessary to have arranged and shifted the remains of the collapsed building and, therefore, also to have mixed up the objects found among the ruins, moving them from their original position.

It is, therefore, very important to follow the concrete in the different levels in order to be able to ascribe the tablets and the archives to the period of reconstruction or the period preceding it. For example, in all the archives most of the tablets were situated in the filling above a concrete floor covering rubble of over one metre in depth. In the Eastern archives of the pal-

[17] W. H. Van Soldt, The Palace Archives at Ugarit, *Cuneiform Archives and Libraries*, K. R. Veenhof ed., Leiden 1986, 196-204; M. Liverani, Il primo piano degli archivi di Ugarit, *Cananea Selecta*, 5 (1988) 121, 142.

ace, the tablets found above the second floor certainly post-date those found on the original floor. It should be underlined, however, that the second floor was not found everywhere *in situ*.

In the Central archives the tablets are in two layers, but there does not seem to be a concrete floor between them. In this case the tablets may be contemporaneous and belong to two archives situated on two different storeys of the building.

If some tablets were to be found under an undamaged concrete floor, it would certainly be necessary to assert that they belong to a previous phase. This assertion stems from the fact that a concrete floor which is both thick and irregular in depth cannot be suspended above an empty space. This type of floor, in fact, cannot belong to a second storey, as its technical characteristic is that of being laid over a continuous support, even an irregular one such as that formed by rubble. Consequently, the concrete seals in whatever is underneath at the moment of laying. However, it cannot be excluded that, at the moment of excavation, the floor is found in a completely different state because of changes which occurred in ancient times, during or after the last destruction, and which may have damaged the floor, causing movements, sinking or cracks. This also explains the presence of tablets scattered outside the collecting places and archives.

A more thorough interpretation of the excavation in relation to the existence or otherwise of a layer of concrete would be decidedly useful, not only for the dating of the tablets[18], but also for an understanding of the different phases of building or re-building of the Palace of Ugarit, just as it was for the Palace of Phaistos.

Certainly the structural characteristics described, of a very similar type, which were in use on the two sites of Ugarit and Phaistos would seem to indicate not only an intensity of contacts, but also common origins with clear reciprocal influences.

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[18] Such a reconstruction is now considerably facilitated by the very useful data published in P. Bordreuil, D. Pardee, *Ras Shamra-Ougarit*, V, Paris 1989.

APPENDIX

Analyses of mortar from Ugarit and from Phaistos carried out by Prof. Aurelio Burdese, Department of Material Science and Chemical Engineering – S.M.I.C. Turin Polytechnic.

	Ugarit	Phaistos
Insoluble residue in HCL	2.49	19.7
SiO2 (silica) soluble	0.7	1.0
Fe_2O_3	0.65	1.02
Al_2O_3	1.5	7.38
CaO	52.0	39.1
MgO	0.9	1.2
loss at 900°	40.3	30.0
CO_2	39.8 (corresponding to 50.6 of CaO)	9.8 (corresponding to 37.9 and approx.to 68% of $CaCO_3$)

H_20 combined approx. 0.5 (corresponding to 1.5 of CaO).

The sample from Ugarit consists of very compact, completely carbonated lime mortar adhering to a pebble (not calcareous), the size of a walnut. There is no fine aggregate (neither sand nor ground aggregate). A visual observation, even only approximative, of a more consistant sample could show if, at the moment of laying, the mortar was mixed with gravel or crushed stones.

The sample from Phaistos consists of very compact, dry, completely carbonated lime mortar, mixed with fine aggregate of ground terra-cotta which is not separable by mechanical means; the absence of combined water means that the presence of unbaked clay in the aggregate can be excluded; the soluble residue is almost entirely silica.