

A ROW OF CEDAR BEAMS¹

By H. C. THOMSON

“Three rows of hewn stone, and a row of cedar beams”; this cryptic statement occurs in the description of Solomon’s Temple in 1 Kings vi, 36, referring to the inner court, and also in vii, 12, referring to the great court of the Forest of Lebanon House, “and the porch of the house”. The phrase is found again in Ezra vi, 4, in Cyrus’ edict regarding the rebuilding of the Temple; in this context it is not specified whether this refers to a part of the work or the whole of it (*cf.* Ezra v, 8).

The phrase has always been puzzling to commentators;² whether it is taken as meaning a wall consisting of three courses of stone topped with a kind of coping of cedar, whose purpose is hard to see; or as meaning three courses horizontally with an inner lining of cedar,³ which is linguistically possible but has no structural sense. I should like to support the suggestion that the reference is to a form of building technique which is fairly well attested in the Ancient Near East, in which timber is actually built into the structure of the wall itself.

The use of timber as a building material is well known and needs no explanation here. Roofs, columns, doors and frames, perhaps window-frames and staircases, and decorative work such as panelling, are uses of timber which are known. The use of timber set in the actual structure, which is our concern, can be demonstrated by a mass of evidence which it would take too long to detail here. However, a summary of the more striking examples can be given.

It must be borne in mind that as wood itself is much more perishable than stone, direct evidence is not easy to get. Timbers were probably taken away when a building fell into disuse, and reused; damp in the course of time rots the substance away; ants and other creatures may eat it, and fire in many cases is the cause of its destruction. But even so, traces are sometimes left; holes appear in masonry which are too regular for chance, charcoal may testify to the fact of wood having been used, and occasionally by good fortune pieces of the actual wood itself may remain. With this in mind we turn to the evidence.

In the reports of excavation in the various fields, examples are found of wooden beams evidently laid *horizontally* on top of a stone foundation. Their

¹ A paper read to the Society for Old Testament Study in January, 1959. “an unintelligible method of building.”

² Batten (I.C.C., *Ezra*, p. 142) called it it as “panelling” (Joüon, Siegfried).

³ So Rudolph, van Gelderen; others take

dimensions are difficult to determine when the wood has perished or is carbonized; they vary from quite narrow poles to substantial timbers (40 cm. in Knossos for instance). At Alishar Hüyük von der Osten records "wooden beams let in horizontally along both the outer and inner faces of the wall" (0.25–0.30 m. thick).¹ At Troy in the Middle Bronze Age (VI f) "there is a slot for a wooden beam about 0.12 m. high in the inner face of the wall some 0.80 m. above the floor. This probably ran the full width of the room."² Sometimes these are associated with orthostats, as at Tell Halaf³ and Carchemish.⁴ "The lowest course of bricks is set back behind the rest, backing a beam which lay along the top of the orthostats . . . when found, the ashes of the lowest beam . . . lay undisturbed upon the stone-work, a solid mass of charcoal still preserving the form of the old wood."⁵

More common is the use of horizontal beams along with shorter *crosspieces* or transverse battens let into the thickness of the wall. This is found in the main wall of Early Bronze Jericho. "At intervals in the mud-bricks are transverse and longitudinal timbers, presumably intended to bind the wall together and prevent the collapse of the face which we have found to have occurred so often. But with the great heat of the blazing brushwood against the face of the wall, the timbers caught fire, for they can be traced as lines of charcoal, and they would have helped the fire to penetrate right into the core of the wall."⁶ In Troy again (House VI f.) "At several places in the rugged stone masonry of this building, as in others, we found horizontal slots which presumably once held wooden beams. One opening of this kind . . . is 0.13 m. high, and where we could measure it by inserting a meter stick, about 0.80 m. deep."⁷ In Alalakh (Room 21) "on the stone foundations a longitudinal beam, on this two courses of mudbrick interrupted by transverse beams at 1.0 m. intervals, then a second longitudinal beam and the two brick-courses as before; this is the extreme of half-timber work."⁸ And in Room 32: "The walls . . . gave the best illustration of half-timber construction. A longitudinal beam rested on the stone foundations; on that was built brickwork alternating with transverse beams, the holes left by which are 0.30 m. high and 0.18 m. wide and run back into the wall for about 0.60 m. Immediately above there came the second longitudinal beam, the impression of the rounded back of which can be clearly seen in the mud-mortar behind it; then more transverse beams directly above those in the lower course, another longitudinal beam 0.30 m. wide, and a third row of

¹ *O.I.P.*, 29 (1937), p. 292.

² *Troy*, vol. III (1953), p. 288.

³ M. von Oppenheim, *Tell Halaf* (Eng. translation), p. 275.

⁴ Woolley, *Carchemish II*, p. 148.

⁵ See also Yadin, *Israel Exploration Journal* 8 (1958), pp. 12, 14, on Hazor.

⁶ K. Kenyon, *Digging up Jericho* (1957), p. 177.

⁷ *Op. cit.*, p. 287.

⁸ Woolley, *Alalakh* (1955), p. 123.

transverse beams; the description holds good of all the walls except the north wall which had no timbering.”¹

A further elaboration is found in cases where *vertical* timbers are also employed, often as door-jambes, the result being a framework of timbers, horizontal, transverse and vertical, which is filled with walling of mud-brick (a curious anticipation of 20th century A.D. building techniques where structural steel replaces the timber). An outstanding example is at Beycesultan in Anatolia, about 15th century B.C. in which the timber is half-way up the stone substructure of the wall. “The substructure of stone ‘rubble’ usually stood to a height of about one metre and was itself reinforced at about half its height with a framework of longitudinal wooden beams and cross-ties. Above this the unbaked brickwork was divided into panels about 70 cms. wide by groups of vertical posts, further multiplied at the intersection of the walls.”² In Knossos “in the covered part of the Hall the practice, already known in Early Minoan times, of dividing the stonework of the interior walls into sections by the interposition of upright posts tied together by horizontal and transverse beams emerges once more into prominence.”³

At Vasiliki in Crete (Early Minoan II) Seager reported: “The houses were rectangular, possibly two or three stories high. Above a stone base the walls were constructed of sundried bricks tied together vertically and horizontally with wooden beams.”⁴ This is characteristic of the Helladic civilisation. In Mycenæ “all the houses illustrate the structural system of the Mycenæans: a wall construction of rubble masonry and wooden framework; timbers set horizontally and vertically so as to form quadrangular panels, by means of which a superstructure of mud-brick was supported and tied to the rubble part of the wall. This system of timber-framing was used even in the construction of the palaces and in parts where ashlar masonry was employed.”⁵

It is noteworthy that this technique is characteristic of both Helladic and Hittite cultures. Conteneau says of Zendjirli, “on remarque, dans la construction, une particularité qui consiste à placer sur les fondations de pierre et dans le mur de briques crues une armature de bois adjour’hui brûlée . . .”⁶ while Wace sums up with reference to Mycenæ: “The usual method of building was of crude brick on a stone foundation set with clay . . . and in their upper part was anchored a wooden framework which, projecting above the stonework, ran right up through the crude brick superstructure and held it together.”⁷ It seems likely that this is not merely coincidence. Lloyd and Mellaart thus compare the areas: “The general practice of

¹ *Ibid.*, p. 126.

² Lloyd and Mellaart, *Anatolian Studies*, 5 (1955), p. 50.

³ Evans, *The Palace of Minos*, vol. I, p. 347.

⁴ Quoted in J. Pendlebury, *Handbook*, p. 27.

⁵ G. Mylonas, *Ancient Mycenæ* (1957), pp. 68-9.

⁶ *La civilisation des Hittites* (1948), p. 172.

⁷ *Mycenæ*, p. 105.

building mud-brick walls on stone foundations and reinforcing both with timber is so widespread in Syria and the Ægean as well as in all parts of Anatolia that it can hardly be used as a criterion of particular comparison. But some details of such a construction as used at Beycesultan are so exactly reflected at Mallia that the possibility of coincidence is almost excluded."¹

Examples of the technique, however, are found in other civilisations also, for instance at Ur,² Babylon,³ and El-Amarna,⁴ while to bring the matter nearer to the area with which we are chiefly concerned, there is an example from Megiddo so clear that the excavators compare it with the verse in 1 Kings vi, 36. It comes from Stratum IV (Early Iron): "The superstructure of building 338, apparently composed of mud brick and timber, was erected on a raised platform or, to use the term loosely, a podium composed of stone walls with earth filling. None of the superstructure remains, but wherever the flat top of the stone walls of the podium was preserved it was strewn with fragments of burnt mud brick. A quantity of wood charcoal was found on the pavement of the courtyard along the west wall of the podium." Also "on the floor of courtyard 313 . . . there was found a large piece of wood charcoal . . . which, when analysed, proved to be that of cedar."⁵

These examples from the detailed reports of individual excavations have shown that there is fairly clear evidence of this structural use of timber in the ancient Near East from Neolithic times (Jericho) down to the Iron Age, and that it is found all round the Fertile Crescent. This general position is accepted in several of the books dealing with the subject of Biblical and Near Eastern archaeology as a whole. Barrois for instance writes in his *Manuel d'archéologie biblique*: "Les architectes ont fréquemment consolidé les murs de briques en employant des chaînages de bois: des poutres ou des madriers horizontaux étaient noyés dans la maçonnerie."⁶ Frankfort in discussing the Hittite Empire wrote: "The upper portions of the walls were built of sun-dried bricks strengthened with wooden beams." And referring to Syria in the second millennium B.C.: "Wood was extensively employed to strengthen the mud-brick upper portions of the walls."⁷

The existence of this peculiar building technique having thus been demonstrated, the question then arises: What was its purpose? Several possible explanations come to mind, which we may consider briefly.

(1) *Economy* could be one answer. In well-wooded lands timber is readily available, and might be used to supplement other materials such as

¹ *Anatolian Studies*, 6 (1956), p. 122.

⁵ Lamon & Shipton, *O.I.P.*, 42 (1939),

² Woolley, *Excavations at Ur* (1954), pp. 76, 155.

p. 59.

³ Koldewey, *Das wiedererstehende Babylon* (1913), pp. 57, 62, etc.

⁶ Vol. I, pp. 103-4.

⁴ Pendlebury, *Tell el Amarna* (1935), p. 88.

⁷ *Art and Architecture of the Ancient Orient* (1954), pp. 139, 145.

stone. This may possibly be the answer in some instances, but it does not cover all. This technique is found not only in countries such as Anatolia, but appears also in sites such as Babylon in the Mesopotamian plain, where timber of this sort is not found and would have to be transported considerable distances.

(2) *Aesthetic* considerations may have played a part. We know that in several cases kings have left on record that they brought cedar particularly for the decoration of their palaces and important buildings; and indeed most of our evidence comes from such buildings, although there are also instances of the use of timber in houses. The fact, however, that in a number of cases the timber was actually set into the walling and sometimes plastered over, suggests that its use cannot have been always decorative, or it would hardly be hidden from sight.

(3) We must always bear in mind that *ritual* considerations might have entered into the matter. But here again this explanation does not carry us all the way. The use of horizontal timbers, particularly when carrying some of the weight of the structure, seems to point in a different direction. At the same time, it is possible that a practice which originally leaned heavily on ritual may have been continued long after the ideas behind it had fallen into disuse, or other reasons had become important as well.

(4) While it is possible that one or more of these considerations may have played their part, it seems most probable that *structural* reasons lie at the root of this practice. It occurs so widely, and retains its essential similarity in different times and places; and the significant fact that the wood is sometimes plastered over, suggests that this technique was designed to lend structural strength to buildings of different kinds. What sort of strength would it offer? A solid wall of stone seems at first sight a much stronger structure, especially in case of fire.

The most probable explanation is that protection against shock, and particularly earthquake shock, lies at the heart of this problem. Earthquakes are quite common in this part of the Near East, and a number of famous ones have been recorded. (We should perhaps bear in mind that the cause of these was not known in those days, and so places which to us are out of the seismic zone might well seem to their ancient inhabitants as liable to this strange visitation as any other.) In such a disturbance, stone or brick walls are apt to give way, where a long timber will cushion the shock to some extent and hold the bonding together; and transverse timbers, though shorter, will tend to prevent a wall from falling outward or inward. Pendlebury writing of El Amarna in 1935, said: "Now there is one danger with mud brick, and that is its habit of drying unevenly, shrinking, and so causing the wall to warp . . . In the case of pylon towers or very big walls, therefore, barks of timber were substituted which not only served to tie the bricks but also had a certain amount of elasticity which minimized the

dangers of warping. A similar practice, though for a different reason, is found in Minoan Crete, where a noticeable feature of the buildings is the amount of timbering. Here the reason was the desire to minimize the effects of the earthquakes to which Crete is particularly liable."¹ This point (which so far as I know Pendlebury was the first to make) is taken up by Lloyd and Mellaart in their 1955 report on Beycesultan: "In fact, the system is dictated by climatic conditions and the character of available building materials. When the three primary elements, stone, clay, and timber are easily obtainable and long experience of earthquakes has shown that some structural elasticity is desirable, experiments in widely separated localities arrive independently at the same results. Stone recommends itself for the foundations, crude brick for the upper structure and the walls are reinforced internally with a framework of timber beams, which also assure the stability of the roof."²

If this practice were adopted in regions liable to earthquakes, it would not be surprising if it spread to other places where it was less necessary, and became an accepted architectural feature. Established as it certainly was in the Helladic and Hittite areas, and through them into north Syria, its influence was to be found in the region from which David and Solomon imported builders,³ who would probably be familiar with this technique which had been in use for a long time. Does this mean that they deliberately employed it as a protection against earthquake shock when the Temple and the Palace were built? Not necessarily; more probably they simply used the accepted methods of their day in which they had been trained, following the fashion which prevailed in such large and grandiose buildings.

If this is so, what exactly was the method of construction used? There seem to be two main possibilities.

(1) They may have laid a stone foundation of three courses and then added one course of cedar wood (with or without short transverse beams), and then repeated the process up the wall. This would be an unusual method, to judge from the archaeological evidence, but it would provide a possible explanation of the various hints in the text. The side-chambers were each five cubits high, and they increased one cubit in width from the lowest to the highest, and they rested on the wall of the building with beams of cedar, so as to avoid being bonded into the actual structure.⁴ If the main wall were built of three courses of large stones with a beam above, this would approximately equal the five cubits, and the beam would then provide a ledge on which the side-chambers could rest; and if the wall were then set back a cubit and continued in the same way, this would account at one and the same time for the unequal width of the siderooms, for the

¹ *Op cit.*, pp. 67, 68.

² *Anatolian Studies*, 5 (1955), p. 43.

³ 2 Sam. v. 11; 1 Kings v, *passim*.

⁴ 1 Kings vi, 5-10.

מַנְרְעוֹת and for the row of timber (which might of course serve other purposes as well).

(2) The other explanation keeps closer to the text of Kings, and is more in accord with the archaeological evidence. They may have laid a foundation of three courses of stone, interposed a bedding of cedar (with or without transverse pieces) and continued the wall in brick. Three points might be cited in support of this. Mud brick was used in pretentious structures as at Babylon,¹ Khorsabad,² and Medinet Habu³ where it is noteworthy that while the sacred parts of the complex were of stone, the more secular parts were of brick; and in the text of Kings it suggests that this technique was used for courts and porch. Secondly, this method of building usually in other places supports a heavy wall of mud brick; and thirdly, the Hebrew text of 1 Kings, v. 32, emphasizes that stones were cut and prepared "to make the foundation לִיסָד" which is odd if it means that all the building was of stone. (It is not impossible that ashlar masonry was used for the founds, and rubble for the rest; but this would be a highly unusual method, as far as the archaeological evidence goes.)

The possibility of mud brick having been used for parts at least of the Temple complex seems worth further investigation. It is again not inconceivable that both the above explanations might be true, applying to different parts of the building. I do not claim to have provided finally conclusive answers to these difficult problems; merely to have opened up some questions in this particular field of Old Testament study which seem to call for fresh examination in the light of the evidence provided by archaeology; and to have put forward some suggestions which may lead towards a solution.

¹ Koldewey, *op cit.*

² Loud., *O.I.P.*, 38 (1936).

³ Cf. Hölscher, *O.I.P.*, 41 (1939), p. 75; *O.I.P.*, 21 (1934), foreword.