A ROMAN LADDER FROM QUEEN STREET, CITY OF LONDON

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Despite being one of the few Roman ladders found in this country, the 1st century ladder from the Bank of London and South America site in Queen Street has never been fully published;[1] the following is an attempt to put it in its proper context. The ladder is at present on display in the Museum of London,[2] having also been displayed in the two previous homes of the former Guildhall Museum, the Royal Exchange and 55 Basinghall Street.

Brief reports of the site appeared in the annual summary of excavations in the *Journal of Roman Studies*[3] and in Ralph Merrifield's *The Roman City of London.*[4] The following report on the site has been written with the aid of the excavator's[5] site notebook, now in the Department of Urban Archaeology of the Museum of London.[6]

The site, No. 82 Queen Street, was excavated in 1953, during the preparation of foundations for the new Bank of London and South America building, which now occupies the site. During the course of excavation, fourteen Roman and eleven medieval and post-medieval wells were found.

The Roman wells were of two types; square in section, with a lining of oak timbers strengthened by diagonal braces and halved joints at the corners, or cylindrical, the timber lining being formed by re-used barrels.[7] The ladder was found in a square well near the northern edge of the site. On the surface of the well lay loose timbers from the uppermost courses of the well-lining and immediately below these, in a brown clay fill, were sherds of Roman pottery, including a bead-rimmed coarseware pot, dated to A.D. 70-90. 1.90m below the top of the well (which lay 5.65m beneath the modern road level) was a thin layer of organic material and in this lay a human skull, minus its lower jaw, partially crushed by an octagonal piece of timber:[8] 'the skull had obviously been pushed down through the already silted-up well . . . Directly beneath this skull (in a layer of grey clay) the first signs of the ladder were encountered'. A second, thicker organic layer was reached 2.54m below the top of the well; on it lay a number of loose barrel staves, a wooden spoon, a wooden spatula, a spindle, a large iron key, a Samian Drag. 29 bowl stamped OF CRESTIO and a pair of leather trunks.[9] The timber lining ceased 3.65m down, but both the well pit and the ladder continued. Unfortunately, due to the contractor's schedule, no additional time could be allowed for excavation beyond that point, so *c.* 2m of the ladder was salvaged and removed to the Guildhall Museum. It was however possible to resume the excavation at a later date though unfortunately Mr. Noël Hume was not on site when the contractors resumed digging and part of the mid section of the ladder was lost.[10] Only one further find was made, that of a wooden handled bowl, 'probably a water ladle', near the bottom of the well.[11]

The ladder was conserved with alum in the workshops of the Guildhall Museum and, after restoration (the two preserved sections having been joined together) the ladder now measures 5.59m long, though it is now impossible to gauge its original length (Figs. 1, 4 and Pl. 1).

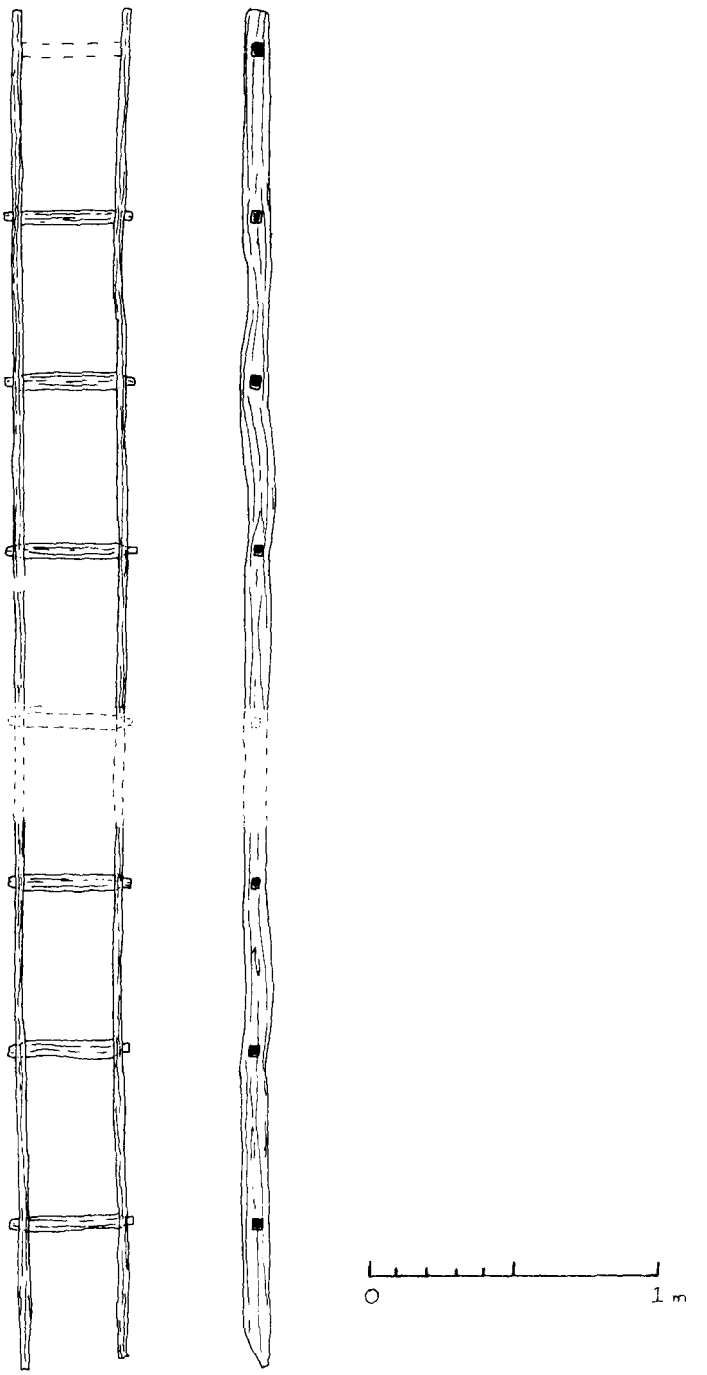

Fig. 1. Queen Street, London: the Roman ladder (dashed lines indicate reconstructed portions of the ladder).

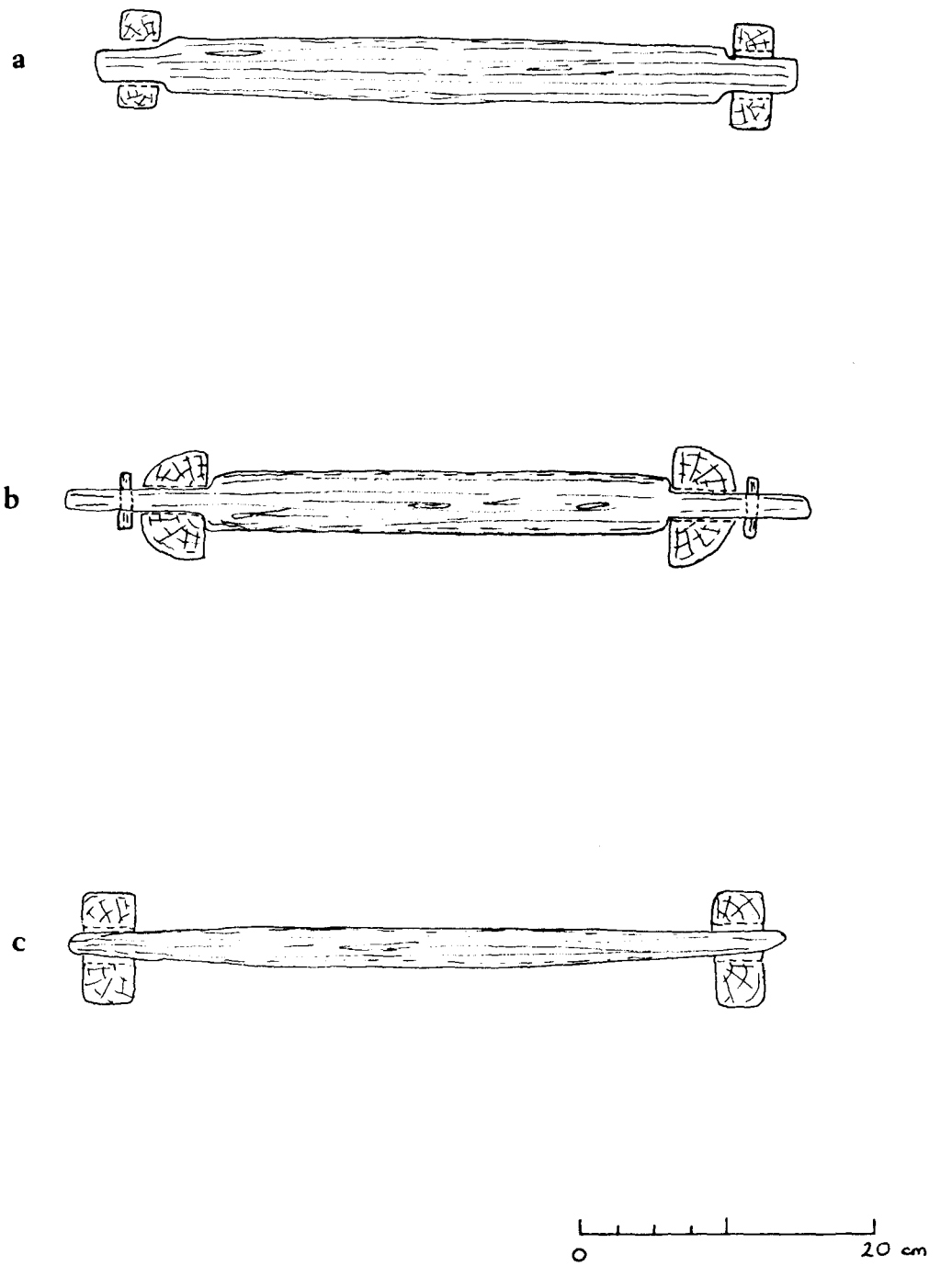

Fig. 2. Rung/pole joints in plan and section. (a) Queen Street, London; (b) Glastonbury, Somerset; (c) Silchester, Hants.

The wood used for the ladder was oak *(Quercus robur)*[12] for both the rungs and the poles.[13] The rungs of the ladder are spaced at 0.50m intervals,[14] each rung being cut flat on its upper face, though retaining the original curvature of the trunk on the underside. At either end , the rungs taper to fit into rectangular mortices cut in the poles (Fig. 2a). Though there are no wedges or other fastenings to keep the rungs in position, it is conceivable the rungs were originally held in place with wedges which have since become dislodged, as the rungs do not fit closely into the mortices. Ivor Noël Hume mentions that there were no wedges holding the rungs when the ladder was first found, but they then fitted fairly snugly. That they do not do so now is due to post-excavation shrinkage, no doubt accentuated by the use of alum for conservation.

The ladder poles are rectangular in cross-section and have been roughly dressed into shape with an adze. From the tree-rings visible in the cross-section of these two poles it can be seen that slightly more than half of one trunk was used for each pole. Traditionally, ladder poles are made from a single trunk cleft down the middle, but apparently this is not the case with the Queen Street ladder. Practically the whole diameter of the tree, including the sapwood, but excluding the bark, was used (Fig. 3). Fifteen rings of sapwood are visible, and, as the sapwood normally forms a band of 15-25 rings between the bark and the heartwood, the original diameter of the trunk can be estimated at *c.* 0.13m giving a circumference of *c.* 0.41m.[15] Each pole is made of one whole length of timber; one end of the ladder is broken

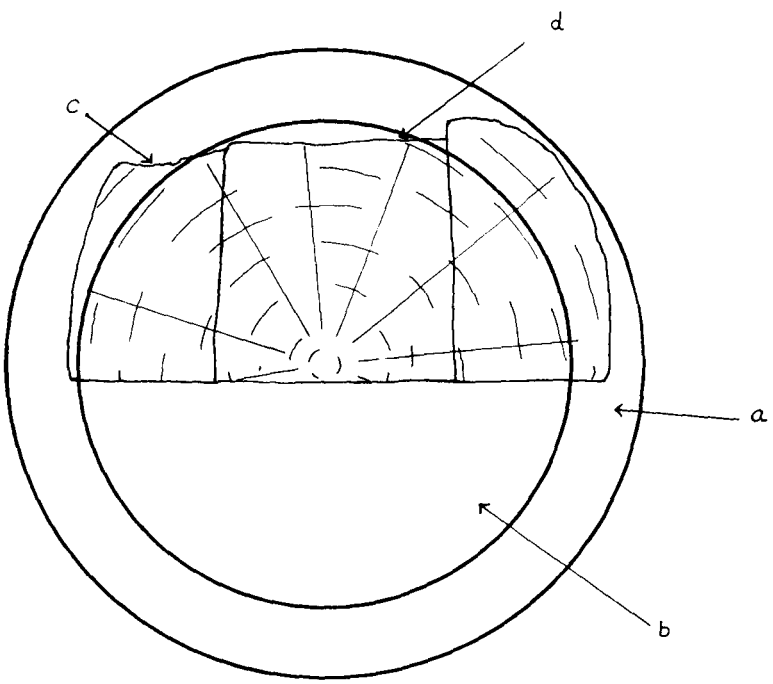

Fig. 3. Queen Street, London: sketch to show how ladder pole was cut from original trunk; a — sapwood; b — heartwood; c — broken edge of pole; d — cut face of mortice (not to scale).

off, but at the other end both poles are cut at an angle to seat the ladder more firmly on the ground. The straight length of these pieces suggests that the two trees came from a densely-wooded oak forest, where they had been forced to grow up straight in order to reach the sunlight.

Ladders dating to the prehistoric and Roman period have been found in various parts of Europe and fall into two different groups; the rung ladder and the less-sophisticated notched tree trunk ladder, the latter forming by far the largest group. Notched tree trunk ladders are found most frequently in mines such as those at Rio Tinto and Aljustrel, Spain, Villefranche and Roziers, France and Mitterberg, Austria.[16] The advantages of this type of ladder over the rung ladder are that it is quicker to assemble, less liable to collapse and more stable. Also, once in position, it takes up less room.

An intermediary type is represented by the ladder discovered in the Westbury Brook mine, Forest of Dean, 'at the junction of the ancient and modern workings'.[17] It was a 'rudely formed ladder 6ft. 6in. long, 8in. wide and 2in. thick. It was formed out of a massive plank of oak in which were cut six holes wide enough to receive the foot'. The author of the note, which appeared in the report of the Society's summer meeting at Gloucester, suggested that it was Roman in date. Certainly there is little evidence for prehistoric working in these mines. Edlin, however, mentions when writing of recent laddermaking, 'a very different kind of ladder . . . once favoured in the iron mines of the Forest of Dean, both rungs and uprights being carved from the single log of wood',[18] which suggests that either this type had a long ancestry or that the find reported to the Society of Antiquaries was comparatively modern in date.

Only two ladders dating to the Roman period have been adequately recorded providing sufficient evidence for comparison with the Queen Street ladder (Fig. 4). A rung/pole joint similar to that in the Queen Street ladder was used for the middle two rungs of a ladder found in the Iron Age lake village at Glastonbury.[19] The lowest rung was secured with wooden dowels which passed through holes drilled in the projecting tenons of the rung[20] (Fig. 2b). The uppermost rung was missing though the mortices remained and the gap had been repaired with a length of 'plaited withy'. The three wooden rungs were 'not quite straight, but followed the curves of the branch from which they were cut'. The reason for the different types of rung/pole joint is not immediately obvious, though presumably the lowest rung fitted its mortices very loosely and thus needed an additional fastening to keep it in position. The ladder poles were made of ash[21] and measured 2.10m long; they were plano-convex in cross-section with the curved surface of the trunk forming the outside of the pole. The report does not say whether the poles were made of split half-trunks or not, though it seems likely from the published diagram, but unfortunately the ladder has since been lost.[22]

An alternative method to dowelling the rungs was to wedge them and this solution was adopted in the 2nd century A.D. ladder from Silchester.[23] All but one of the five rungs were rectangular in cross-section, with tenons projecting 0.05m on either side of the poles 'kept in place by wooden wedges'[24] (Fig. 2c). The remaining rung, the second, was circular, 0.25m in diameter and had been lathe-turned; this may have been a repair. The rungs were set 0.35m apart (a similar distance to those in the Glastonbury ladder) and were made of oak; the poles were of fir[25] and, like the Queen Street ladder, were rectangular in cross-section. The whole ladder measured 1.94m long, though only the lower part survived as the pit in which it was found had obviously collapsed during the making. Fox and Hope suggest that the pit

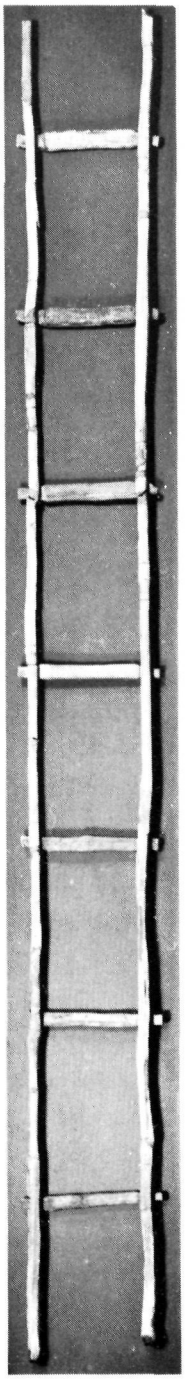

Plate 1. The Roman ladder from Queen Street, City of London (see text for measurements). *(Museum of London).*

was originally intended as a well and following the collapse, 'the workman managed to extricate the upper portion of his ladder'.[26]

LADDERMAKING

No written description of laddermaking in the Roman period has survived, but, using the evidence of the records of recent laddermakers and that of contemporary wall paintings, together with that provided by the ladder itself, it is possible to recreate the stages of making a ladder in antiquity. A wall painting in the House of the Vettii, Pompeii, showing Daedalus at work on the wooden cow which he built for Pasiphae, gives a clear picture of an ancient laddermaker at work for it is apparent from the form of the workpiece that Daedalus is in fact preparing a ladder pole (Fig. 5).[27] Additional comparative information can be obtained from modern ethnographic sources.[28]

A straight young tree, or two trees in the case of the Queen Street ladder, was chosen and split down the middle, to form the two poles; the resulting halves were either left plano-convex, as in the crudely-built Glastonbury ladder, or roughly trimmed with an adze or a saw to a rectangular shape. The face which was to form the inner face of the pole was evened up with a plane or a draw knife and the positions of the mortices marked. The pole was then fastened to a work bench; the Daedalus illustration shows a pole held in place by two bench stops, placed on alternate sides at either end of the bench. Daedalus is cutting mortices for the rungs with a morticing chisel[29] and a mallet or hammer. The bevel on the blade is clearly visible. The bow drill lying at Daedalus' feet need not imply that the rung/pole joint is to be the same as that in the Glastonbury ladder, since it would be necessary to drill the dowel holes through the tenons, and it would also have been used for the initial hollowing-out of the mortices.

The ladder rungs were split from a section of timber and trimmed to shape with a draw knife, though, once again, the rungs in the Glastonbury ladder seem to have been dressed more roughly than the other surviving examples. The rung tenons were trimmed into shape with a knife. Edlin notes that, prior to fitting the rungs into the poles, each rung was knocked

	QUEEN STREET, LONDON	*SILCHESTER, HANTS.*	*GLASTONBURY, SOMERSET*
Date	1st cent. A.D.	2nd cent. A.D.	1st cent. B.C.
Recorded length	5.59m	1.94	2.10
Width (+ poles)	0.45	0.55	0.41
Rung gap	0.50	0.35	0.30-0.43
No. of rungs	8	5	4
Rung dimensions (cross-section)	0.05 × 0.04	0.03 × 0.05	0.04 × 0.04
Pole dimensions (cross-section)	0.07 × 0.04	0.08 × 0.05	0.10 × 0.06
Rung/pole joint	mortice and tenon	wedged mortice and tenon	R2, R3 — mortice and tenon; R4 — dowelled mortice
Wood	Oak	Oak rungs Fir poles	Ash

Fig. 4. Iron Age and Roman ladders from Great Britain.

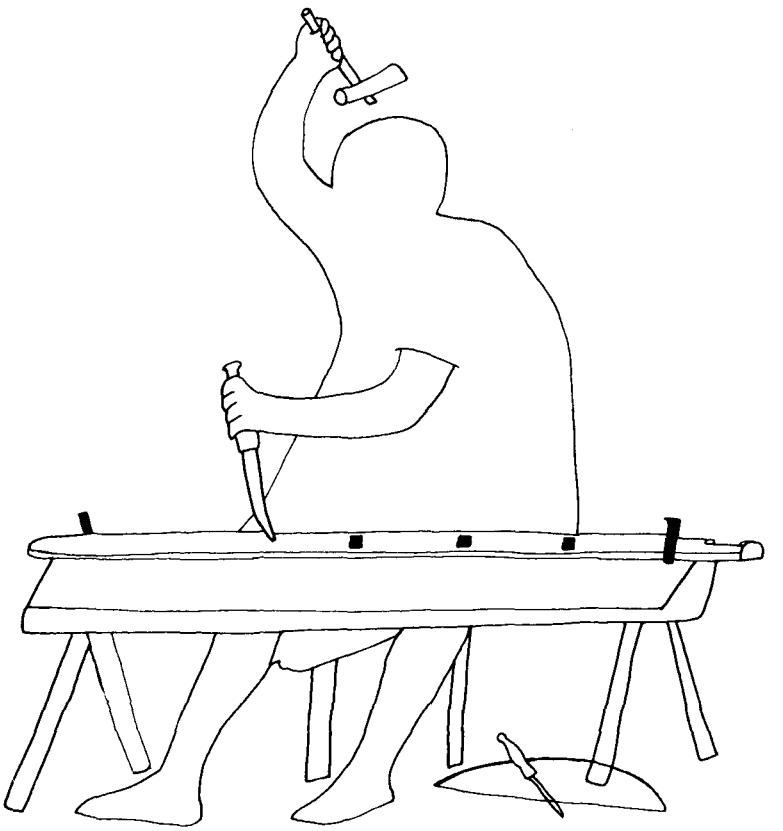

Fig. 5. House of the Vettii, Pompeii: wall painting showing Daedalus at work on a ladder (after J. Liversidge).

into a shallow gauge as a test for size.[30] This would not have been necessary when making the Glastonbury and Silchester ladders as the rungs are held in place by more than just a tight fit. Once the mortices had been finished the rungs were knocked into the holes in one pole, the other pole being then fitted over it and hammered into place.

As will be seen from this description, laddermaking does not require a specialised toolkit as the ordinary carpenter's tools — plane, chisel, adze, draw knife, bow drill — suffice. Furthermore, all these tools have been recognised in the Roman carpenter's toolkit, illustrated, for example, by the *1890* hoard of ironwork from Silchester.[31]

CONCLUSION

The appearance of a rung ladder in a pre-Roman context implies that this type of ladder was not a Roman introduction to Britain, though Roman technology served to improve the finished artifact. The use of ladders in the Roman world is well attested; soldiers are shown on Trajan's column using them to storm enemy fortifications.[32] Apart from military usage, they were also a necessity in a wide variety of activities, agriculture (especially viticulture and fruit-picking),[33] building,[34] mining, embarking and disembarking, and they even formed

part of actors' and jugglers' 'props'.[35] A Roman terracotta lamp in the British Museum shows an 'itinerant' surrounded by his troop of performing animals. On his right is a monkey, and on his left a cat or weasel climbing a ladder, and above his head are hoops for the animals to jump through.[36] Acrobats must also have used ladders and it is extremely tempting in view of the association of the ladder and the leather bikini trunks to imagine an acrobat using the Queen Street ladder in his or her act. This might offer an explanation for the unusually wide rung gap. Sadly, it is apparent from the different humus levels that the ladder had been placed in the well before the trunks were thrown in and 3.65m of silt had collected in between the two depositions. The ladder was most likely the property of a civilian workman and judging by its position and the broken upper ends of the ladder, it suffered a fate similar to that of the Silchester ladder.

NOTES

1. I would like to thank Hugh Chapman of the Museum of London for encouraging me to publish the ladder and for his advice during the writing of this paper. My thanks are also due to Dr. A. J. Parker for reading and criticising an earlier draft of this paper.
2. Museum of London Accession No. 21234.
3. R. P. Wright 'Roman Britain in 1954' *J. Roman Stud.* 45 (1955) 138-139.
4. R. Merrifield *The Roman City of London* (London 1965) 184, 215, Pl. 113.
5. The excavator, Ivor Noël Hume, was kind enough to correct a number of errors in the original draft of this paper and to send me copies of his notes and drawings not otherwise available.
6. ER (Excavation Register) 81; I am grateful to Peter Marsden of the Department of Urban Archaeology for giving me access to the excavator's notebook.
7. Merrifield *op. cit.* in note 4, Pls. 108, 112.
8. The piece of wood measured 0.70m long; it has been suggested that it might be a table leg, but the working of it is too crude for it to have been used for anything but the roughest furniture. The remarks in quotations are taken from Noël Hume's site notebook.
9. The purpose of the trunks remains enigmatic, but several pieces of evidence (Merrifield *op. cit.* in note 4, 215, Pls. 116, 117) suggest they may have been worn by an acrobat or athlete. A similar pair were found recently at Shadwell (for the site see A. Johnson 'A Roman signal tower at Shadwell.' *Trans. London Middlesex Archaeol. Soc.* 26 (1975) 278-280).
10. I am grateful to Mr. Noël Hume for pointing this out; the ladder is now so heavily restored that the break above the fifth rung is not immediately apparent.
11. Merrifield *op. cit.* in note 4, Pl. 115.
12. I am grateful to George Willcox for this identification.
13. Edlin uses this term to describe the side pieces of a ladder, see H. L. Edlin *Woodland Crafts in Britain* (Cambridge 1949) 148-149.
14. The most obvious explanation for the large rung gap is that a smaller number of rungs require less time to make and fit, while each extra mortice adds to the instability of the pole.
15. R. A. Morgan 'The selection and sampling of timber from archaeological sites for identification and tree-ring analysis' *J. Archaeol. Science* 2 (1975) 225.
16. For Rio Tinto and Aljustrel see O. Davies *Roman mines in Europe* (Oxford 1935); for Villefranche and Roziers, A. Heron de Villefosse 'Note de M.Ed. Cuq sur des objets ayant servi a l'exploitation des mines d'Aljustrel au temps des Romains' *Bull. Soc. Nat. Antiq. France* (1907) 358; for Mitterberg, J. Andree *Bergbau in der Vorzeit* (Leipzig 1922).
17. *Proc. Soc. Antiq. Lon.* 1 (1861) 369.
18. Edlin *op. cit.* in note 13, 149.
19. 'Found in the peat just outside the border-palisading, 26ft to the west of . . . mound XIV: it was lying lengthways in a NE and SW direction. The side piece situated towards the NW was raised 4in. above the level of the other and was buried 3ft. 8in. below the surface of the ground', see A. Bulleid and H. St. G. Gray *The Glastonbury Lake Village* 332, X55, Fig. 108, Pl. 51.
20. A similar rung/pole joint was used in a 12th century ladder found in a pit in the Saxon shore fort of Pevensey Castle, G. C. Dunning 'A Norman pit at Pevensey Castle and its contents' *Antiq. J.* 38 (1958) 205-217.
21. As presumably were the rungs, though Bulleid and Gray do not specify.
22. I am indebted to Martyn Brown of the Somerset Rural Life Museum, Glastonbury for allowing me to search for the ladder in the Tribunal, where the finds from Glastonbury are housed.
23. Pit XXVII, in the NE angle of Insula XXIII, see G. E. Fox and W. H. Hope 'Excavations on the site of the Roman city of Silchester' *Archaeologia* 57 (1901) 229-256.
24. Fox and Hope do not specify how the wedges were driven in but presumably they were hammered inwards from the outside face of the pole. Unfortunately, the wedges are no longer in position. The remains of the ladder (only two of the rungs survive) are stored in an outhouse of the Reading Museum. I am grateful to Susan Read, Assistant Archaeologist, for allowing me access to it and for unearthing a photograph of the ladder on display in the Museum.
25. Boon quotes Fox and Hope's report incorrectly, G. C. Boon *Silchester: The Roman Town of Calleva* (Newton Abbot 1957) 85.
26. Fox and Hope *op. cit.* in note 23, 244.
27. J. Liversidge 'Woodwork' in D. Strong and D. Brown eds. *Roman Crafts* (London 1976) Fig. 262.
28. Edlin *op. cit.* in note 13, 244.
29. The chisel must have a tanged handle as the junction between the blade and the wooden handle can be easily distinguished.
30. Edlin *op. cit.* in note 13, 148.

31. J. Evans 'On some iron tools and other articles formed of iron found at Silchester in the year 1890' *Archaeologia* 54 (1894) 139-160.
32. C. Cichorius *Die Reliefs der Traianssäule* (Berlin 1896, 1900).
33. K. D. White illustrates a fruit-picker using a ladder, an illustration taken from a Roman mosaic, see *Roman Farming* (London 1970) Fig. 63.
34. Liversidge has an illustration of Roman interior decorators at work, from a stone carving from Sens, Yonne, see J. Liversidge *Britain in the Roman Empire* (London 1968) Fig. 31. The price for 'an ordinary large ladder of 30 rungs' is fixed at 150 *denarii* in Diocletian's price edict, see Tenny Frank ed. *Economic Survey of Ancient Rome* 5 (Rome 1959) 360, XIV 6.
35. Pauly-Wissowa *Real Encyclopädie der classischen Altertumswissenschaft* (Stuttgart 1921).
36. H. B. Walters *Catalogue of the Greek and Roman lamps in the British Museum* (London 1914) Pl. 16, No. 679.