



A Dice Tower from Richborough

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ABSTRACT

The dice tower, or pyrgus, an ancient device for rolling dice, was an everyday object in the Roman world, but up to now only two towers, from Germany and Egypt, have been found. In re-examining a group of bone box-casings from Richborough Roman fort, however, the author has found that some of these casings must have belonged to such a tower. This article shows how this dice tower may have been constructed. The author also summarises the literary and artistic evidence for dice towers, and shows how the rosette decoration on this tower links it to the Roman game of Duodecim Scripta.

INTRODUCTION

From the earliest of times, people have tried to outdo each other in acts of skill and feats of bravery, using means both fair and unfair. In time came the appearance of board games and knucklebones, and later dice, and in Roman times there also came about the invention of the dice tower, or *pyrgus*, probably designed to try and ensure that the throw of the dice was fair. These ingenious devices were little towers containing sloping boards for rolling dice: dropped into the open top, the dice would drop down onto a succession of sloping boards and emerge at the opening at the bottom (FIG. 2b).

During excavations at Richborough Roman fort in Kent between 1928 and 1931, several pieces of bone plating (FIGS 1 and 4 (Nos 1–33)) were found fairly close together, near the bottom of the inner ditch just outside the walls of the late third-century A.D. stone fort, on the west side. Initially, all these pieces of bone were considered to be bone casings of a wooden box,¹ but more recently some of these pieces have been recognised as parts of a dice tower, from the distinctive perpendicular cuts in one of the large pieces of bone plating (FIG. 1, A). By comparison with two towers which have survived from antiquity, from Vettweiß-Froitzheim in Germany and from Qustul in Egypt (FIG. 6, and below under ‘Surviving Towers’), it has been possible to work out something of what the object looked like.

RECONSTRUCTION

The Richborough dice tower consisted of a wooden structure which was covered with bone plating nailed on with bone pins. The wood has all rotted away, but some of the plating remains,

¹ Bushe-Fox 1949, 152, pl. LVII; Greep 1983, I, 217; II, 653, nos 256–93; IV, fig. 188. Bushe-Fox describes these pieces as part of a single item, ‘bone casings of a wooden box or casket’, so one must presume that they were found close enough together for them to have been so considered. Later, though, Greep notes (1983, I, 217): ‘It is uncertain whether all of the finds are derived from a single object, since varieties of mount involved suggest more than one.’

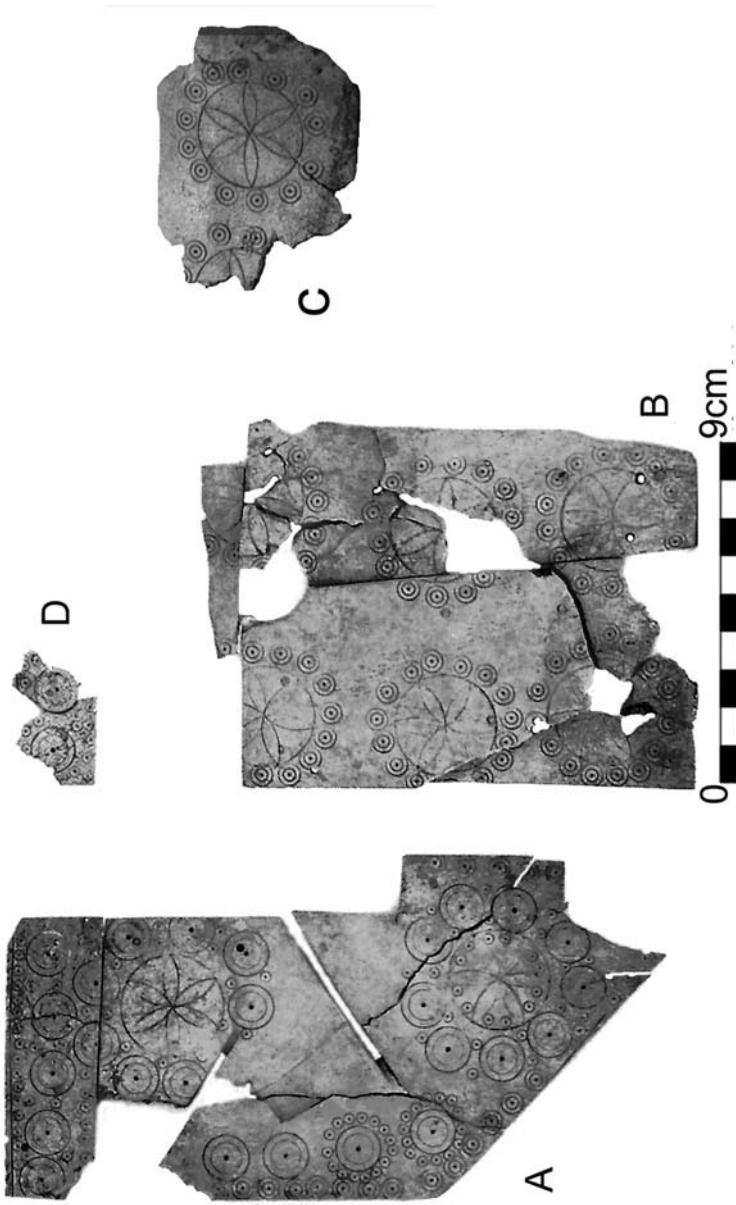


FIG. 1. Bone plating from the dice tower.
(Photos: A, B and D by Samantha Harris and C by the author)

which can be seen in FIG. 1. These plates clearly belong together: Plates A–C share the same patterns — large circles with six-leaved rosettes or hexafoils inside, as well as small concentric circles (or bulls-eyes) — and are fairly unique amongst decorative bone remains found in Britain;² the little plate, D, must also belong in this group, having the same pattern as the top part of Plate A — they both have the larger concentric circles surrounded by circle-and-dot decoration, and also a horizontal line on the top edge, traces of which survive in fragmentary form on Plate D (this line is a bit more visible in FIG. 3, C).

RIGHT-HAND PANEL

To start with the right-hand side of the tower, in FIG. 2 a comparison between the Richborough tower and a diagram of the inner workings of the tower from Qustul can be seen. On the Richborough Plate A, the cut-out slots for the top two sloping boards are clearly visible, and, with the addition of a triangular piece at the bottom, the position of all three boards can be seen (FIG. 2a). The diagram of the Qustul dice tower (FIG. 2b) shows the position of the sloping boards to be virtually identical to the Richborough example, and clearly shows that the Richborough panel is part of a dice tower.

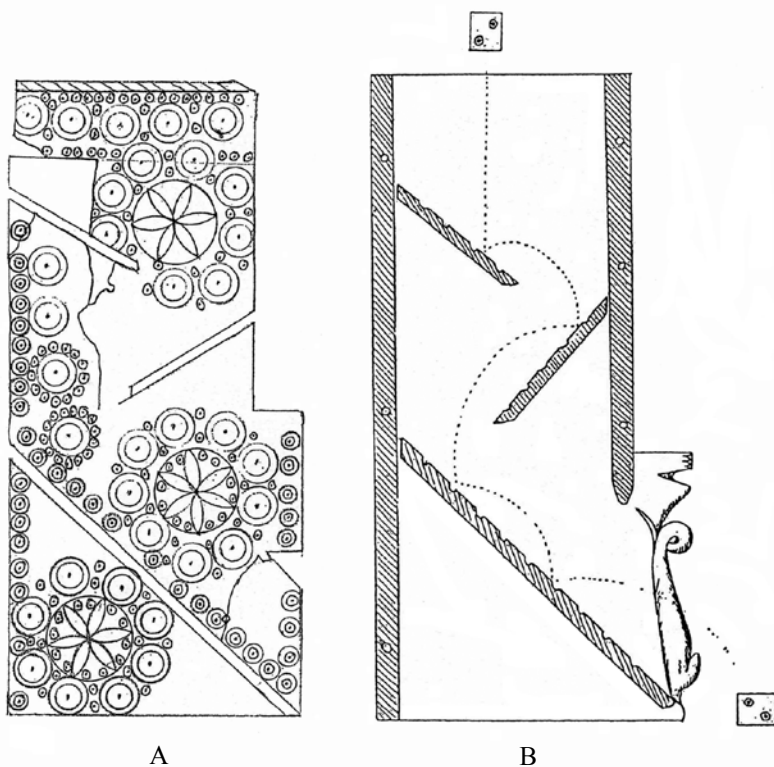


FIG. 2. (a) Richborough Plate A, restored. (*Drawn by the author*)
 (b) Qustul dice tower section. (*After Emery and Kirwan 1938, fig. 111*)

² Greep 1983, I, 217: 'The large floral-decorated plates are the only representatives of their type.'

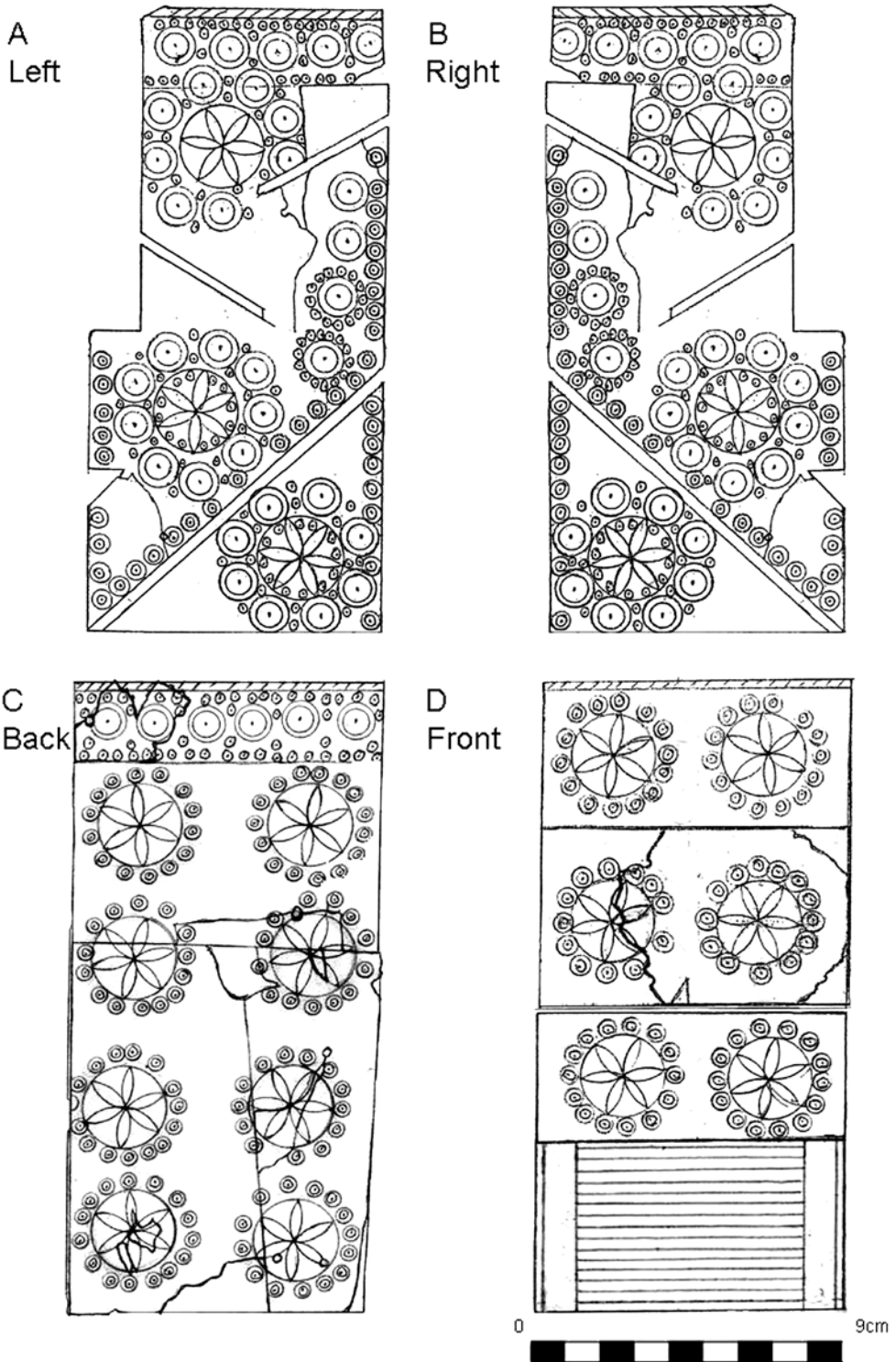


FIG. 3. Restored sides of Richborough dice tower. (Drawn by the author)

Plate A is narrower in the top half. The upper right-hand part seems to have been deliberately cut out in an L-shape: there is no reason to think that there should be a strip of bone missing there.³ Lower down it is wider, where it projects out to the right; and, following the shape of the towers from Qustul and Vettweiß-Froitzheim (FIG. 6), it can reasonably be assumed that the missing part of the base also extended to the right to the same extent (FIG. 2a). Also, on the lower side of the part of the panel that projects to the right, there can be found the remains of a small sawn piece of bone sticking out, barely discernible, but angled at 50–55 degrees down to the right, perhaps indicating a perpendicular line there.

The triangular piece at the bottom may also have been decorated with a rosette, surrounded by concentric circles — this seems suitably to fill the space; and the line of bulls-eyes running down the left side of the panel may have continued down to the bottom.

FRONT AND BACK PANELS

The front and the back panels can be taken together (FIG. 3, C and D). On the front side, there must have been three pieces of plating (see FIG. 5): a large upper vertical panel, a smaller lower vertical panel set on the part that projects out — in effect, a lintel above the doorway at the bottom where the dice emerge — and a narrow horizontal piece set in between the two. The large Plate B must have come from the back side of the tower (FIG. 3, C): it cannot have come from anywhere else, and it is in any case too long to have come from the front upper panel.

There also seems to have been a band of circles running around the top of the panels on at least three sides, similar to the row of circles at the top of Plate A. The little piece, D, together with the strip on Plate A, must have been part of this band. As there is clearly no room for Plate D on the left side of the tower (see FIG. 3, A: it would have to be located at the top of the left panel, starting in the left-hand corner, but there it would run into the concentric circles surrounding the upper rosette), rather it must belong either on the front or the back. Following the Vettweiß-Froitzheim tower, which has a band of lettering running around the top of the left, back and right panels, and possibly also the Qustul tower, which has a decorative band running along the top of its left-hand panel (FIG. 6a and b), Plate D may also have been located on the back; it can be seen in place in the top left corner of FIG. 3, C.

Plate C, then, must have come from the front upper panel (FIG. 3, D): there is no room on the back for it, and the front upper panel is the only place left where there is space for it. So, similar to the back, the decoration on the front (both upper and lower plates) may have consisted of rosettes surrounded by bulls-eyes, which seems adequately to fill the space.⁴

THE SLOPING BOARDS

The sloping boards inside the tower were almost certainly bone plating: the width of the slots on the right-hand side panel is 2 mm, the same as the thickness of all the bone plating. Following the length of the slots and the width of the back panel, the two upper boards must have been about 40 by 90 mm, and the lower board perhaps 110 by 90 mm. These grooved boards can be partly seen on the Qustul and Vettweiß-Froitzheim towers (FIG. 6). While no bits of sloping board were found in the Richborough group of bone pieces, there are two unprovenanced pieces of bone plating found at the Richborough site with evenly-spaced parallel lines (FIG. 4, Nos 34 and 35)

³ Also, the slots for the two upper sloping boards are equal in length, as are the two upper sloping boards from the existing towers (for Qustul boards, see FIG. 2b (= Emery and Kirwan 1938, fig. 111); for Vettweiß-Froitzheim, see Horn 1989, 147, n. 8). So there would be no need for a further piece of plating here.

⁴ Alternatively, the top band could have been on the front upper panel, but this would only leave room for two rosettes, and no obvious pattern to fill the extra space.

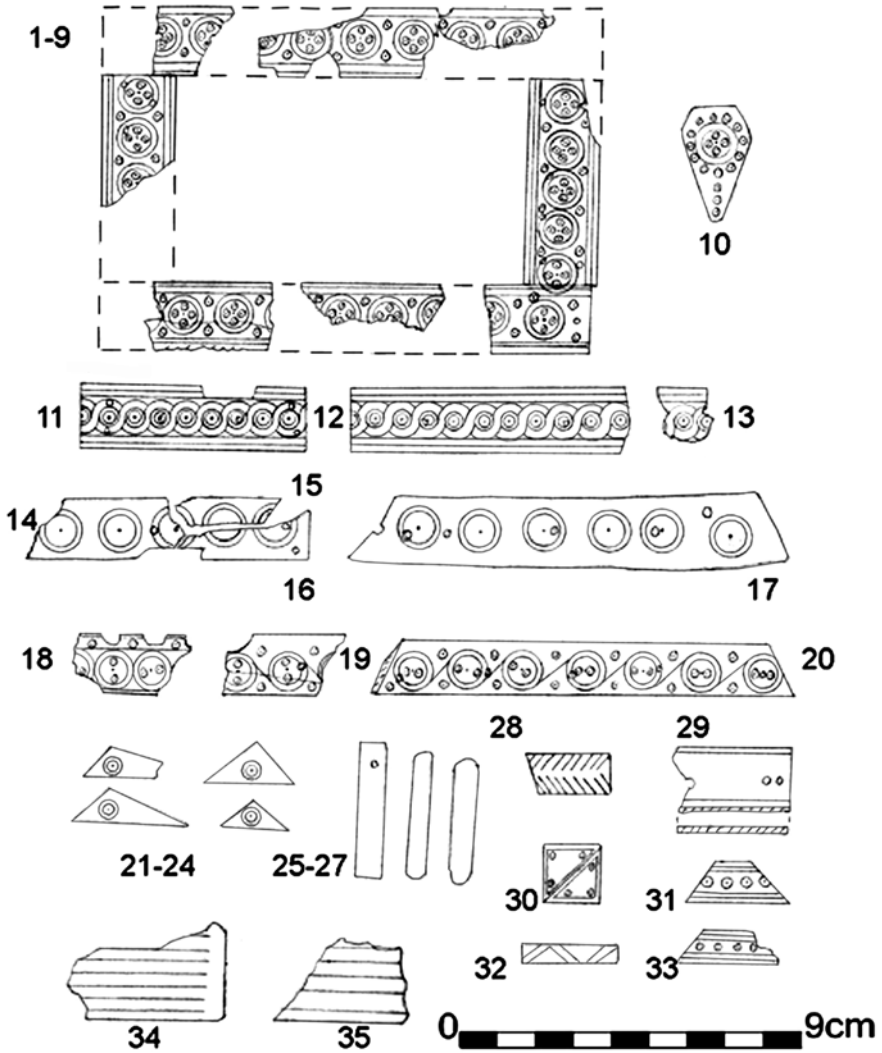


FIG. 4. Other Richborough bone pieces: Nos 1–33 from inner ditch, Nos 34–35 unprovenanced. (Drawn by the author)

which may have been part of these sloping boards: one of the pieces has been filed down on one edge (on the right-hand side) in order to fit into a slot, perhaps on a dice tower. While they may not be boards for this tower, perhaps they give an idea of what these boards were like.⁵

The estimated height of the tower, then, was around 190–195 mm; and it was 90 mm wide and

⁵ See Greep 1983, IV, fig. 197, for these and three other surviving grooved plates.

85 mm deep. This compares with the Qustul tower, 160 mm high, 80 mm wide and 70 mm deep, and the Vettweiß-Froitzheim tower, 225 mm high, 95 mm wide and 95 mm deep.

METHOD OF CONSTRUCTION

The bone plating was attached to the wooden frame with bone pins around 8 mm long — many of them still lodged in the holes drilled for them in the bone plating. It seems that generally the bone plating was first attached to the wooden frame, and then the decoration was scored on with a compass, since the scoring-marks of the compass patterns and circles run over several of the bone pin-heads. But some bone pins look as if they were added afterwards, whether at the time of manufacture or later for repair, because some bone pins with no score marks on them interrupt the scored circles.

Many of the bone plates are very wide, and they can only have come from the broad scapula bone (FIG. 1: Plates A, excluding the top horizontal strip; B, made up of three plates; and C). A box from Heilbronn, Germany, dated to the early sixth century A.D., is also largely covered in scapula bone plates. However, the narrow band that runs around the three sides was made up of the more usual antler strips which were often used for box edging (FIG. 1: Plate D and the top strip of A).⁶

OTHER PIECES

There are other pieces of bone, mentioned earlier, which were found with the pieces in FIG. 1 belonging to the dice tower; these can be seen in FIG. 4 (Nos 1–33).⁷ Many of these pieces, however, probably came from a box: a group of these pieces with the same decoration — rows of concentric circles each containing four dot-and-circles (Nos 1–9) — seems to be part of a rectangle which could have been set on a box-lid, possibly measuring 130–140 mm by 100 mm. An ornamental piece with the same pattern, and surrounded by a ring (No. 10), probably belonged to this group and may have been placed within the rectangle.

Other strips of bone include: pieces with a ‘guilloche’ pattern (Nos 11–13), some with concentric circles (Nos 14–17), and some with circle-and-dot decoration (Nos 18–20), one of which has a castellated edge (No. 18) and the other two with wave patterns (Nos 19–20); there are also two strips of rhombus shape (Nos 31 and 33); several triangular pieces (Nos 21–24 and 30, made up of two triangular pieces); and several plain pieces (Nos 25–27). Most of these designs are found on box decoration; and several of the triangular and plain pieces (Nos 21–27) are stained green, as though they had been in contact with bronze, perhaps evidence that there was a lock or handle on the box.⁸ Also, some pieces, such as the triangular and plain ones, differ from the tower pieces in having no pin-holes for attachment, while other pieces seem too long or there is no obvious place to put them on the dice tower.

Two other pieces from this group, however, could possibly have belonged to the tower. No. 29 could have been part of the horizontal piece on the front. No. 28 could have been part of a roof, set on top of the wooden frame of the tower: the hatched strokes of the herringbone pattern almost match the hatched lines at the top of Plate A (FIG. 5); also, the piece is 11 mm wide, which could perhaps have been the thickness of the wooden frame of the tower. Admittedly, No. 28 could also have been part of a box — this herringbone pattern has been found on the rim of the lid of a box from Weilbach — but, as the Richborough tower, like the Heilbronn box, appears to

⁶ For use of scapula bones, see MacGregor 1984, 9, 199. For Heilbronn box, see Goessler 1932 and Grainger and Henig 1983.

⁷ See note 1.

⁸ Bushe-Fox 1949. See Cunliffe 1968, 106, pls LXI–LXII, for remains of another fourth-century A.D. box from Richborough; also Schoppa 1953, for a reconstructed box from Weilbach (of Frankish date) with similar casings; and Greep 1983, for a large catalogue and illustrations of box plating.

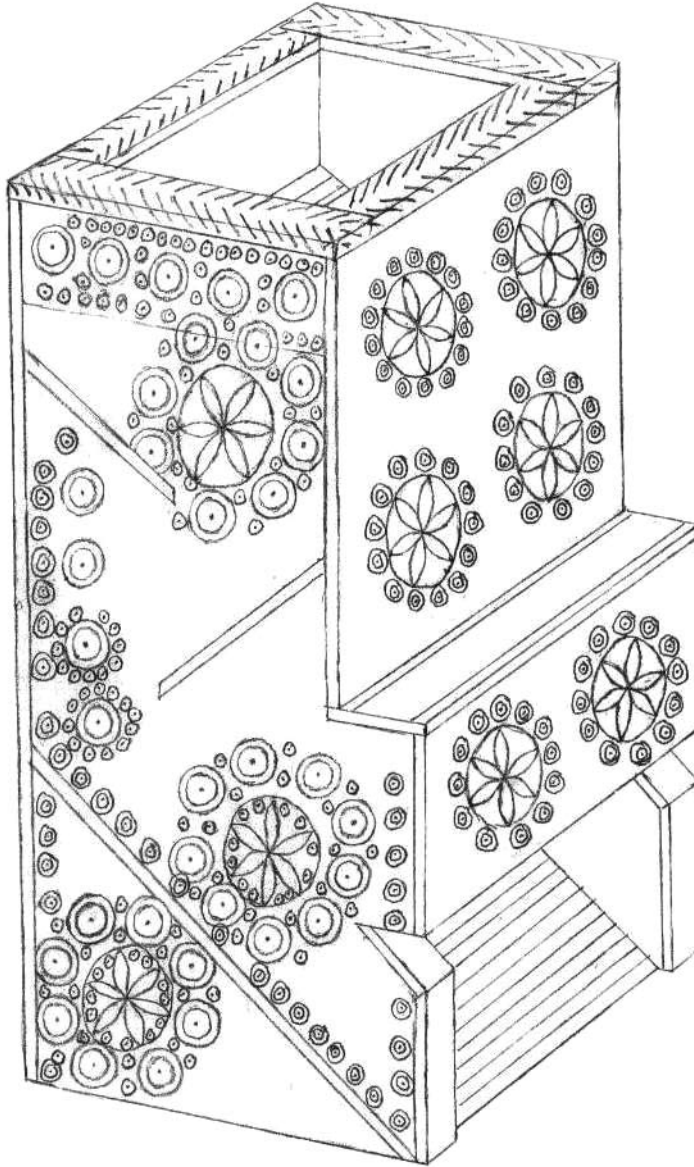


FIG. 5. Reconstruction of the dice tower. (*Drawn by the author*)

attempt to cover all wood surfaces with bone plating, perhaps it would be reasonable for the roof and the 'door posts' at the bottom exit to be covered as well.⁹

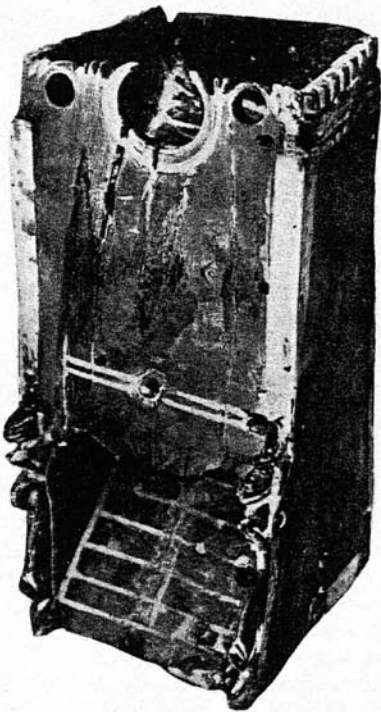
Finally, it may be noted that several of the geometric designs in FIG. 4 are even identical (in

⁹ For Weilbach box, see Schoppa 1953, pl. 8.1; for Heilbronn box, see note 6.

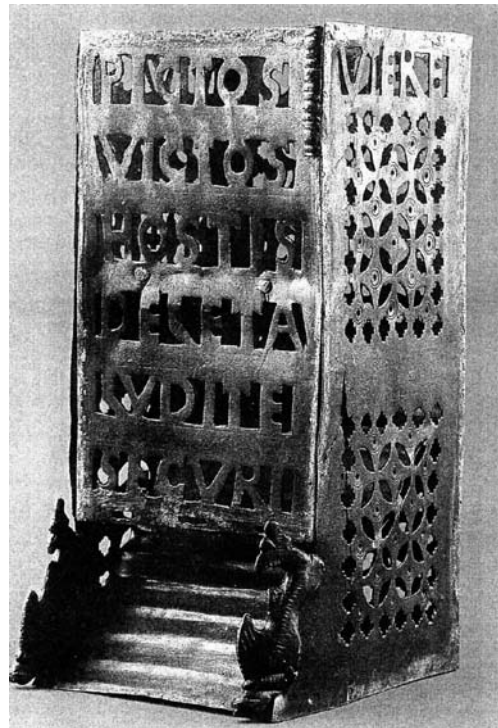
diameter) to those on the dice tower plates, for example, some of the concentric circles (Nos 1–10 and 18–20) and bulls-eyes (Nos 21–24). While it is entirely possible that further pieces of this bone casing belong to the dice tower, perhaps it is more likely that these pieces were incised for different objects in the same workshop, using the same or similar incising tools for marking out the same-sized circles.¹⁰

THE COMPLETED TOWER

The completed dice tower can be seen in FIG. 5, with boards on all four sides, the decoration on the front matching that on the back of the tower, the band of circles round the top rim of the left, back and right-hand sides, and the right-hand side similarly matching the unseen left-hand side. Roof panels give a nice finish to the top of the tower. The sloping bone plating inside can be seen leading down to the exit for the dice at the front. And perhaps there was some bone plating on the wooden columns on either side of the doorway, though maybe not carved dolphins, as can be seen on the Vettweiß-Froitzheim or Qustul towers (FIG. 6).¹¹



A



B

FIG. 6. (a) The Qustul dice tower. (Photo: after Emery and Kirwan 1938, pl. 87b)

(b) The Vettweiß-Froitzheim dice tower.

(Photo: Landschaftsverband Rheinland, Rheinisches Landesmuseum Bonn: after Hartley et al. 2006, pl. 69)

¹⁰ MacGregor 1984, 60 even suggests that ‘tools with fixed-radius scribing points’ were used rather than ‘variable compasses’.

¹¹ See also Horn 1989, 147, fig. 13.

LITERARY REFERENCES

Dice towers are mentioned in Classical times from Martial in the first century A.D. up to Bishop Isidore in the seventh century. The name usually used was *pyrgus*, a Greek word meaning a tower, though Martial (*Epigrams*) uses the word *turricula*, little tower. It was a way to prevent cheating while throwing the dice; pretending that he is a dice tower, he says: ‘... if the cheating hand that knows how to cast prearranged dice throws them through me, all it can do is pray’, i.e. while one can cheat with a throw out of one’s hand, one cannot possibly cheat with a dice tower.¹²

The dice tower could be used for gambling with dice or for playing the boardgame *Duodecim Scripta* (or The Twelve Line Game), a predecessor of backgammon. Isidore (*Origines*) calls this game *Alea*: ‘... *Alea*, that is, the board-game (*tabula*) ... is played with a dice tower (*pyrgo*), counters and dice.’ The tower (*Latin Anthology*, fourth/fifth century A.D.) would be set up somewhere on the board: ‘In one area of the board stands the dice tower (*pyrgus*), just like an urn, which spews out the dice from its internal staircase (*vomit internis tesserulas gradibus*): as a result of the throw, a battling counter leaves [the board].’ Three dice are cast into a ‘wooden dice tower, with its staircase concealed’ (*Palatine Anthology*) in the game of *Tablé* (= *Alea*) played by Emperor Zeno of Constantinople (A.D. 474–491), and described by Agathias, writing in the sixth century. And the fifth-century writer Sidonius Apollinaris (*Letters*), enticing a friend of his to come and visit, says that there awaits him a gaming board set out with counters of two colours, ‘and many dice ready to rebound from the ivory steps of dice towers (*tessera frequens eboratis resultatura pyrgorum gradibus*)’.¹³

DEPICTIONS

There are also several depictions of dice towers. There is an illustration for a Roman calendar for the year A.D. 354, originally drawn by the Roman artist Philocalus, for which a mediaeval copy survives (FIG. 7b). The illustration for December has a man holding a flaming torch in one hand and playing dice with a dice tower with the other. The Roman festival of Saturnalia took place in December, when slaves could play games with their masters. The dice tower also features in two mosaics, one from Carthage (from the second half of the third century A.D.) and one from Antioch (dated to around A.D. 450). In the Antioch one, the dice tower is set on the side of the board, while two people play a game of counters (FIG. 7a).¹⁴

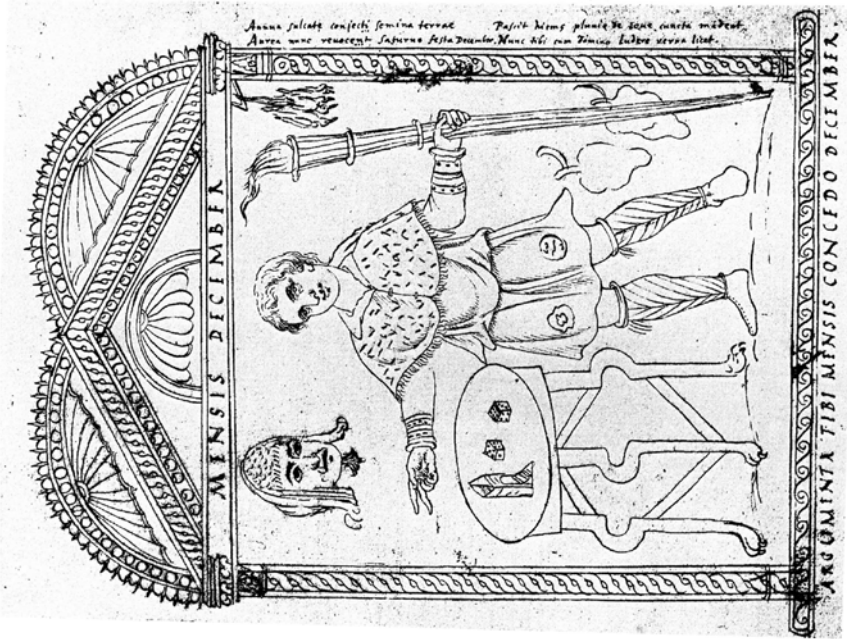
SURVIVING TOWERS

In addition, the two complete towers mentioned above survive from antiquity. There is the fourth-century A.D. bronze dice tower (FIG. 6b) from Vettweiß-Froitzheim, Kr. Düren, Germany, measuring 225 mm high, 95 mm wide and 95 mm deep, complete with a hexagram inscription that links it to the *Duodecim Scripta* boardgame: ‘PICTOS VICTOS HOSTIS DELETA LUDITE SECURI’, ‘The Picts are conquered, the enemy destroyed — play in safety’; and a band round the left, right and back sides: ‘UTERI FELIX VIVAS’, ‘Use happily; may you live’. There is also the fourth-century A.D. wooden tower, decorated with ivory inlay and silver fittings, from Qustul

¹² Martial, *Epigrams* 14.16.

¹³ Literary references: Isidore, *Origines* 18.60; *Latin Anthology* 193.1–3; Agathias, *Palatine Anthology* 9.482.23–4; and Sidonius Apollinaris, *Letters* 8.12.5. For *Duodecim Scripta* and *Alea*, see Murray 1952, 30–3; Parlett 1999, 70–2; also, Schädler 1995.

¹⁴ For the Philocalus Calendar: Strzygowski 1888, 80, pl. 32; Salzman, 1990, 74–6, fig. 23; Horn 1989, 148, fig. 15. For the Antioch (Antakya) mosaic: Levi 1947, pl. 79d; Horn 1989, 148, fig. 14, n. 16. For the Carthage mosaic: Salomonson 1965, 76, pl. 58:1.



(b) The Philocalus Calendar, illustration of the month of December, Romanus 1 ms., Barb. lat. 2154, fol. 23. (after Strzygowski 1888, pl. 32 and Horn 1989, fig. 15)

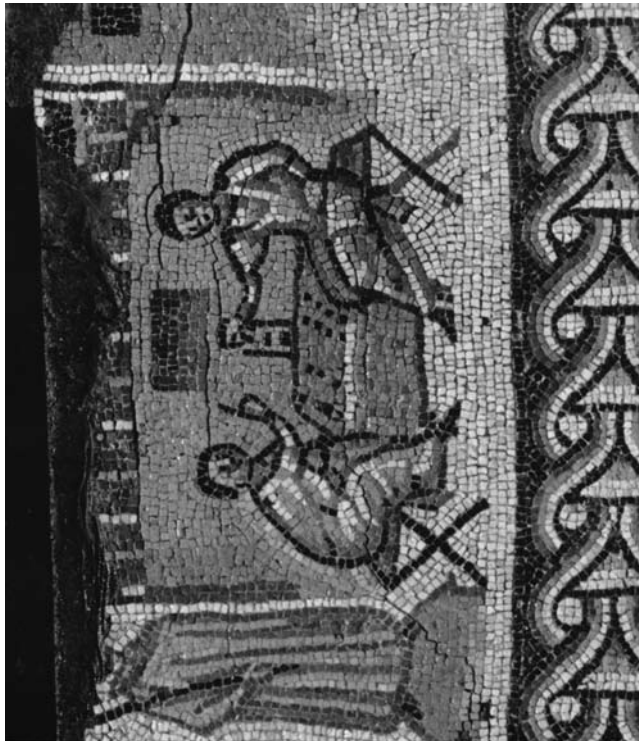


FIG. 7. (a) Mosaic from Antioch, c. A.D. 450. Antioch Expedition Archives. (Photo: Department of Art and Archaeology, Princeton University; after Levi 1947, pl. 79b and Horn 1989, fig. 14)

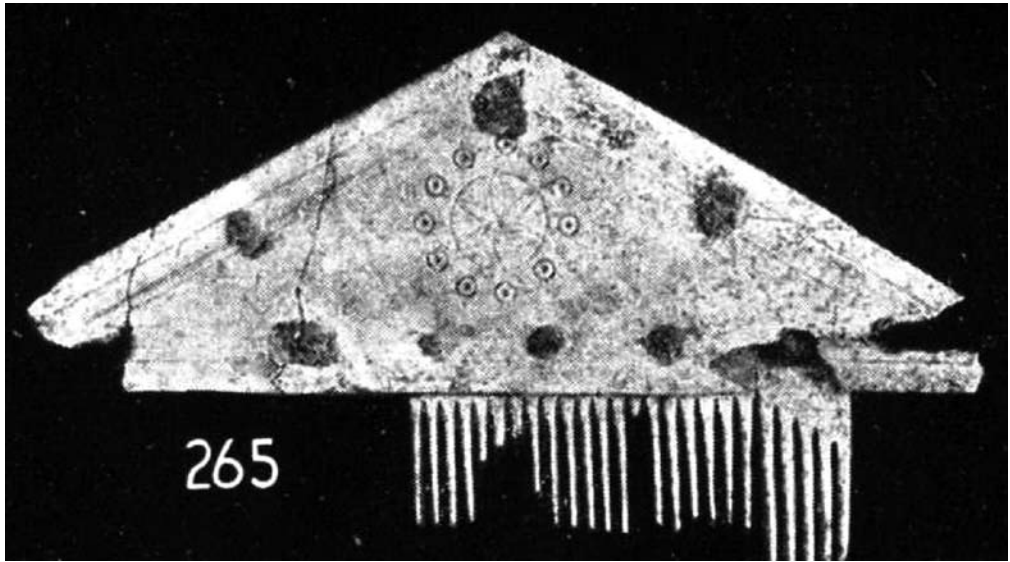


FIG. 8. (a) Comb from Richborough, Kent.
(Photo: *The Society of Antiquaries of London: Bushe-Fox 1949, pl. 56, no. 265*)

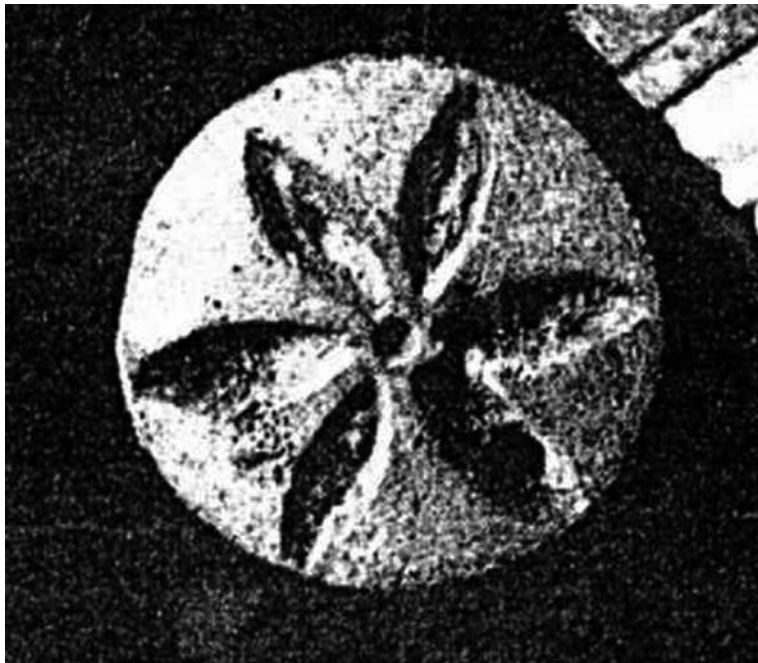


FIG. 8. (b) Pendant from Lydney Park, Gloucestershire.
(Photo: *The Society of Antiquaries of London: Wheeler and Wheeler 1932, pl. 31, no. 151*)

in the ancient kingdom of Nubia in southern Egypt (FIG. 6a), measuring 160 mm high, 80 mm wide, and 70 mm deep; it was found with a complete games set, including a *Duodecim Scripta* board, 15 ebony and 15 ivory counters, and 5 dice.¹⁵

It seems, then, that dice towers could be made of bronze, or wood, and then inlaid with ivory and adorned with silver fittings; and the sloping boards or steps could also be made of ivory, as the writer Sidonius describes above. In Britain, however, though the odd item has been found inlaid with ivory, bone and antler were the materials normally used.¹⁶ Finely-worked items in bone would have been no less desirable: a considerable amount of skilled work has obviously gone into this dice tower in the workshop where it was made, and it must have been of some considerable value. The tower must certainly have belonged to someone of means and no doubt importance, perhaps even someone of high rank from the Roman fort at Richborough.

STYLE

Stylistically, the dice tower can be dated to the fourth century A.D., as many of the geometric patterns on the tower — ring-and-dot, ‘bulls eyes’, and concentric circles etc. — are commonly found on pieces of box plating which date from the late Roman period onwards.¹⁷ The rosettes on the Richborough plates are also found on other bone objects, including a comb from Richborough dating from the fourth to fifth century A.D. (FIG. 8a) and a pendant of Roman date from Lydney Park (FIG. 8b); later on, in Merovingian times, this design is commonly found on the Continent on spindle whorls and amulets.¹⁸

These rosettes are also found in gaming contexts, on *Duodecim Scripta* boards: for example on the second-century A.D. buffware board from the camp of Legion XX at Holt, Denbighshire (FIG. 9a), and the stone board from Porta Portese, Rome (undated, but possibly second-century A.D., FIG. 9b). These two boards have, as playing points in the game, three rows of twelve symbols (hearts and scrolls) or three rows of twelve letters, here formed of six words each with six letters (similar to the six words on the front of the Vettweiß-Froitzheim dice tower), and a rosette in the middle of the central row and half a rosette in the middle of the two outer rows.¹⁹

These rosettes were clearly associated with gaming boards, and their use on games accessories like dice towers seems natural. A similar link with gaming boards can be found for the Vettweiß-Froitzheim dice tower. The tower is decorated on its left, back and right sides with cross-in-circle patterns (FIG. 6b), and this same pattern can be found on a marble *Duodecim Scripta* board from Trier (from the late third to early fourth century A.D.); it is similar to the Porta Portese board, with three rows of letters, and with the cross-in-circle patterns in the middle of each row.²⁰

¹⁵ For the Vettweiß-Froitzheim dice tower, now in the Rheinisches Landesmuseum in Bonn: Horn 1989, May 1991, 186, fig. 180; Zehnder 1999, 72–3; Hartley *et al.* 2006, 135, fig. 69. For the Qustul dice tower, now in the Egyptian Museum, Cairo, see Emery and Kirwan 1938, 345, fig. 111, pl. 87b; Emery 1948, 46, pl. 32b; Török 1988, 102, figs 97–8; Horn 1989.

¹⁶ MacGregor 1984, 199.

¹⁷ MacGregor 1984, 197; Myres and Green 1973, 86–7. Bushe Fox 1949, 152 also suggests that the Richborough plates are of late imperial date.

¹⁸ Richborough comb: Bushe-Fox 1949, 150, pl. LVI; Greep 1983, IV, fig. 240.43. Pendant from Lydney Park: Wheeler and Wheeler 1932, pl. XXXIA.151. See also Roes 1963, 71, pls 57.1 and 3 for amulets and 29, pl. 34.1 for spindlewhorls.

¹⁹ Austin 1938, 250–3, fig. 1, for the Holt board, now in the Museum of Wales in Cardiff, and 251–2, figs 2 and 3, for the Porta Portese board, now in the British Museum. For *Duodecim Scripta* boards, see note 13.

²⁰ Horn 1989, 154, fig. 19, n. 23. There may also be a link between these rosettes and the eight-leaved rosettes from the Royal Game of Ur and Game of Twenty Squares from the older games of Egypt and Ur from which *Duodecim Scripta* may have derived (n.b. Plato, *Phaedrus* 274d, assigns an Egyptian origin to the Greek games *Petteia* and *Kubeia* (probably = the Roman games *Latrunculi* and *Duodecim Scripta*)): see Murray 1952, 16–34, figs 8 and 11; Parlett 1999, 63–72. See also Finkel 1995 for the rosettes in the Royal Game of Ur.

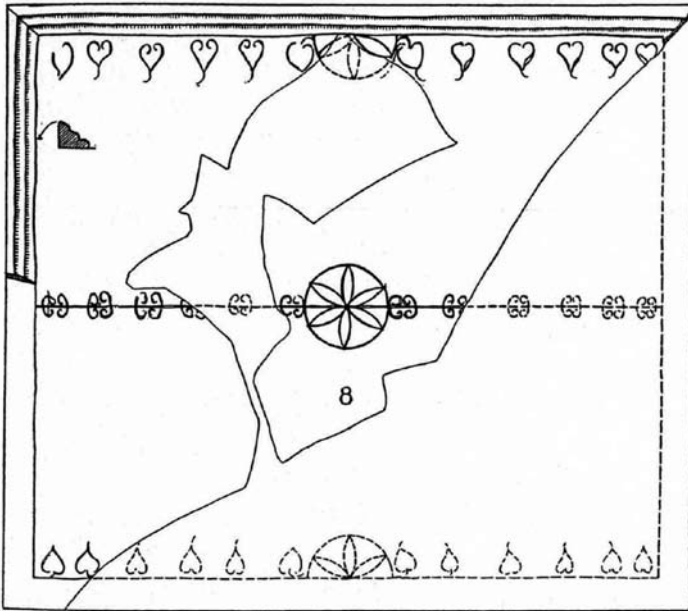
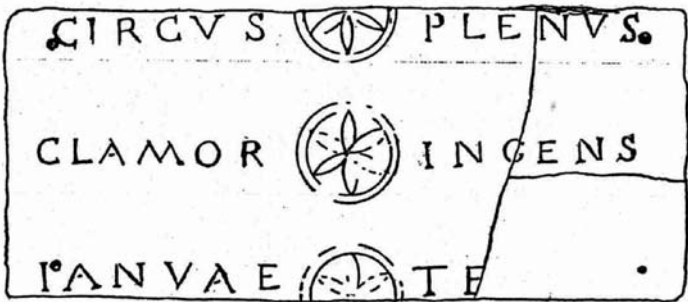


FIG. 9. (a) Gaming board from Holt, Denbighshire. (After Austin 1938, 251, fig. 1)



(b) Stone board from Porta Portese, Rome. (After Austin 1938, 252, fig. 3)

DATE

The tower was found at Richborough in a ditch dug sometime late in the third century A.D., when the earlier earth fort and ditches, as well as the monumental arch in the centre of the town, were all levelled: a new stone fort was built, and two ditches were dug to surround it, including the inner ditch nearest to the fort in which the dice tower was found (FIG. 10).²¹ The stone or ‘Saxon Shore’ fort was probably largely built in the reign of the emperor Probus (A.D. 276–282) following coastal raids by Saxons and incursions into Gaul by Germanic tribes, and before Carausius was appointed by the emperor Diocletian in A.D. 286 to put a stop to the Saxon raids.²²

The date for the dice tower ending up in the ditch is more uncertain, however. It was found near

²¹ The ‘middle’ ditch in fig. 10, between the inner and outer ditches south of the west gate and which was initially dug for the fort, was soon filled in and replaced with the two ditches: Bushe-Fox 1949, 68.

²² Johnson 1970; 1979. For the view that the fort was built under Carausius, see Bushe-Fox 1949, 65–6.

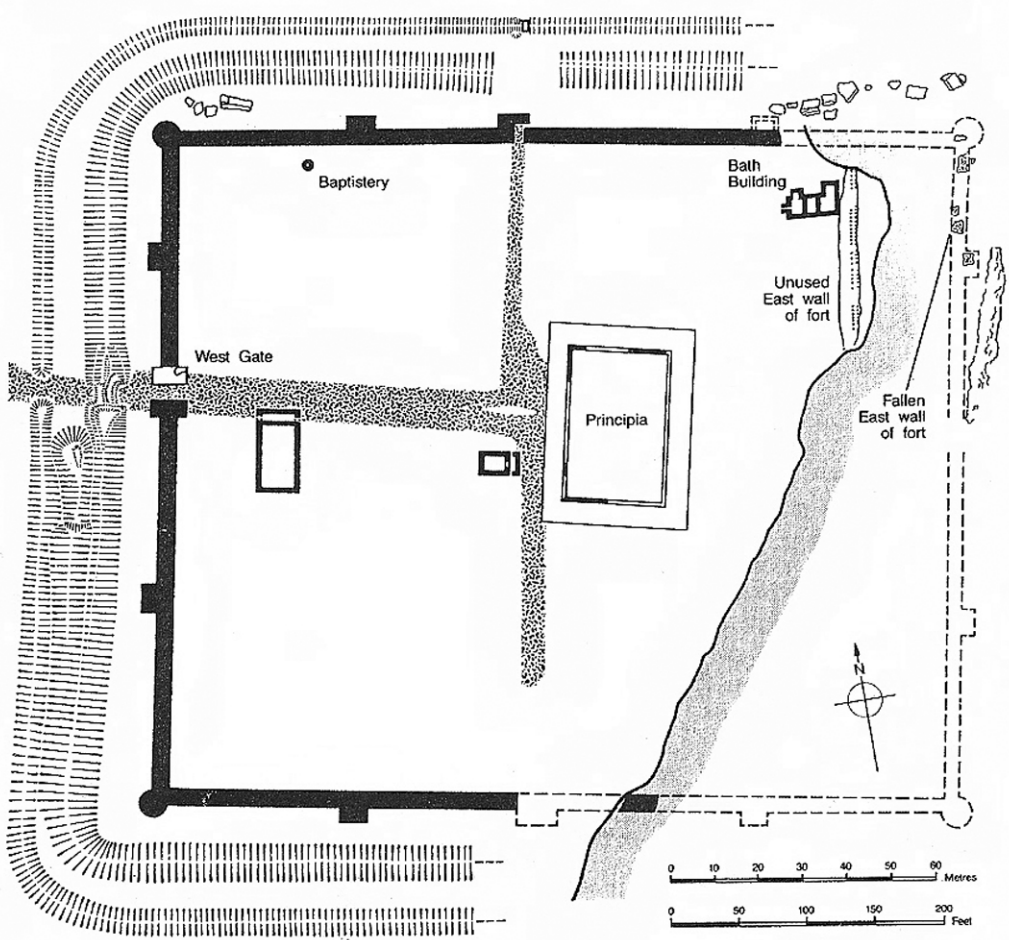


FIG. 10. Plan of Richborough Saxon Shore fort.
 (Drawing: © English Heritage: after Maxfield 1989, fig. 48)

the bottom of the ditch in a fourth-century context;²³ here, in the bottom layer on the west side, the pottery appeared mainly to date from before A.D. 350, though items from post-A.D. 350 were also 'well represented'. However, the excavator states that generally the material in the ditches (though all Roman, with the exception of some medieval items in the higher levels) showed no stratification or definite layers of debris, and there appeared to be little or no difference between the material in all the layers. Also, the presence of many coins from the House of Theodosius (86 in number, late fourth/fifth century) in the lower layers of the ditches suggests that the ditches were still reasonably clear in the later part of the fourth century. This led the excavator to conclude that most of the material ended up in the ditches sometime after the abandonment of the

²³ Myres and Green 1973, 86.

fort, through silting or ploughing.²⁴ It is possible, then, that the dice tower ended up in the ditch at an earlier date in the fourth century as it was found near the bottom; however, the excavator does note that there was post-A.D. 350 material in the lower fill, so the tower could have ended up there any time up to the end of the fourth century or even sometime in the early fifth century.

CONCLUSION

So, despite the difficulties of reconstructing this Roman object from so few surviving bone pieces (and there are obvious problems with the other pieces found in the group as to which belong to the tower and which to another object), nevertheless a reconstruction does seem possible. The large right-hand-side plate matches the diagram of the inner workings of the Qustul tower almost perfectly and shows that it can only have come from a dice tower (FIG. 2); and, with the help of the two existing towers, the physical dimensions of the Richborough tower can be roughly worked out. As regards the decoration of the tower, the left, right and back sides seem reasonably certain. The front may be more problematic, but similar decoration on the front and back seems a reasonably satisfactory solution.

Furthermore, as well as the two existing towers, it seems that there is ample support for dice towers from references in literature, depictions in mosaics and a calendar illustration; and the fact that these range from Egypt, Antioch and Constantinople in the East, to Rome, the Germanic border, and Britain in the West, as well as Carthage on the North African coast, indicates that these towers were familiar objects right across the Roman world. They could be made using materials available locally, whether bone in the West or ivory in the East, as well as bronze, and be decorated using patterning familiar on other locally-made objects, such as boxes, combs, and gaming boards. And finally, they also attest to the popularity of the game of *Duodecim Scripta* and gambling in the late Roman period.

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²⁴ Bushe-Fox 1949, 70–1 and 74.

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