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Rounded Pebbles in Late Holocene Estuarine Silts, Oldbury-on-Severn: use as slingshot?

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Notes

ROUNDED PEBBLES IN LATE HOLOCENE ESTAURINE SILTS, OLDBURY-ON-SEVERN: USE AS SLINGSHOT?

> And the children of Benjamin were numbered at that time . . . twenty and six thousand men. . . . Among all this people there were seven hundred chosen men lefthanded; everyman could sling stones at an hair breadth, and not miss.
>
> Judges, 20.15–16

> And he [David] took his staff in his hand, and chose him five smooth stones out of the brook, and put them in a shepherd's bag . . . and his sling was in his hand. . . . And David put his hand in his bag, and took thence a stone, and slang it, and smote the Philistine [Goliath] in his forehead . . . and he fell upon his face to the earth.
>
> I Samuel 17. 40, 49

Coastal erosion in the Severn Estuary is continually refreshing exposures of archaeological sediments which record a long history of human activity, in Mesolithic to Bronze-Age times on the land surface beneath the Holocene estaurine alluvium (Bell and Neumann 1997; Allen 1998) and, chiefly from the Bronze Age to the post-medieval period, on the alluvium itself (Allen and Fulford 1987, 1992; Whittle *et al.* 1989; Fulford *et al.* 1992, 1994; Allen 1996, 1997; Allen and Rippon 1997, 1998; Bell and Neumann 1997; Nayling and Caseldine 1997; Nayling 1998). The artefacts mainly revealed are buildings and building materials, flint tools and debris, pottery, fuels, potboilers and bones and teeth, objects of metal, metallurgical materials and residues, items of personal use or adornment, trackways, and even wharfs and boats. Although some of these kinds of artefact are rare, all occur widely in Britain and, generally speaking, are in substantial measure understood.

On the shore near Oldbury-on-Severn, however, the estaurine sediments at Oldbury Flats yield objects, most likely of human introduction, that are much more enigmatic as no artefacts accompany them. This note aims to describe and interpret these items, which are rather uniform, well-rounded pebbles of stone in a distinctive context.

The estaurine sediments of interest consist of up to four peat beds interlayered with pale green silts (Wentlooge Formation) which drape over and bury an uneven, soil-covered land surface of periglaciated Triassic mudstones (Allen and Fulford 1992). Close to where the second and third peats wedge up against the buried land surface there is an earliest Neolithic site (Allen 1998). Charcoal from the occupation layer has a conventional radiocarbon age of $5{,}310 \pm 70$ years BP (Beta-84850). Wood from the nearby merged peats was dated to $4{,}630 \pm 70$ years (Beta-44057). The thin, uppermost peat some 2 m above—a silty deposit rich in reeds—has been radiocarbon-dated to the earliest years of the second millennium B.C. (Denise Druce pers. comm. 1999). No younger peats are known, in contrast to other parts of the Severn Estuary Levels (e.g. Bell and Neumann 1997). Above the uppermost peat at Oldbury Flats occur several more metres of silt, of which only the lowermost 1–2 m appear on the mud cliff at the shoreward edge of the active salt marsh.

It is from these silts that the pebbles have emerged over a number of years. Like the deposits on the modern salt marshes, the silts abound in root channels and vary from coarsely and irregularly laminated to almost structureless. Occasional evidence for the presence of small gullies on the marsh surface is seen toward the base of the sequence. The pebbles are found dispersed at various horizons in the lowermost 0.50–1.25 m of the silt over a cliff section more than 400 m long (O.S. Nat. Grid ST 603938 to 601933). They do not occur in laterally extensive, coarse-grained, sandy laminae, and are unaccompanied at the levels at which they are found by any other coarse debris, such as smaller pebbles of stone, mollusc shells, peat fragments, or even granules and lumps of essentially contemporaneous silt. Each pebble is immediately embedded in silt not detectably different from the general mass. None lay within artificial features, such as silted-up ditches, and there were no associated artefacts.

To summarize (Fig. 1; Table 1), the pebbles are of tough, compact, dense rock types, chiefly quartzites, and of a number of forms, especially ellipsoidal (spindle-shaped, discoidal), varying in mass over a relatively narrow, roughly three-fold range. Generally speaking, they are smooth and well rounded on the basis of Krumbein's (1941) visual comparison chart for estimating two-dimensional projection roundness. This roundness value (≤ 1) is the ratio of the average radius of curvature of the corners of the pebble when positioned most stably to the radius of the maximum inscribed circle.

A fifteenth pebble, in a similar context to those at Oldbury Flats, was recovered from the high Wentlooge Formation exposed on the marsh cliff at Rumney Great Wharf, at the south-western end of the Gwent Levels (Allen 1987) on the Welsh side of the Severn Estuary. It was found near the old breakwater (ST 242780), sealed in crudely laminated silt about 1 m above the top

Table 1. Properties of pebbles from Oldbury Flats and Rumney Great Wharf.

No.[1]	Lithology	Mass (gm)	Shape, roundness,[2] surface texture
		Oldbury Flats	
1	Vein-quartz	30.2	Spindle-shaped, 0.8, very smooth
2	Med. gr. quartzite	33.3	Tetrahedral, 0.7, slightly granular
3	Vein-quartz	34.3	Triangular-prismatic, 0.7, mostly smooth
4	Quartz mylonite	40.3	Irregular, 0.8, smooth to rough
5	Coarse gr. quartzite	42.2	Discoidal, 0.9, smooth
6	Vein-quartz	44.6	Discoidal, 0.7, very smooth
7	Metaquartzite	44.7	Tetrahedral, 0.6, smooth
8	Med. gr. quartzite	52.1	Discoidal, 0.9, smooth
9	Vein-quartz	52.2	Discoidal, 0.9, very smooth
10	Med. gr. quartzite	55.1	Discoidal, 0.9, smooth
11	Vein-quartz	57.0	Irregular, 0.7, smooth locally rough
12	med. gr. quartzite	70.3	Spindle-shaped, 0.8, smooth
13	Med. gr. quartzite	80.6	Tetrahedral, 0.7, smooth
14	Fine gr. quartzite	102.5	Spindle-shaped, 0.7, smooth
		Rumney Great Wharf	
15	V. coarse gr. feldspathic sandstone	48.0	Spheroidal, 0.7, rough and granular

[1]See also Fig. 1.
[2]Visual estimation chart (Krumbein 1941).

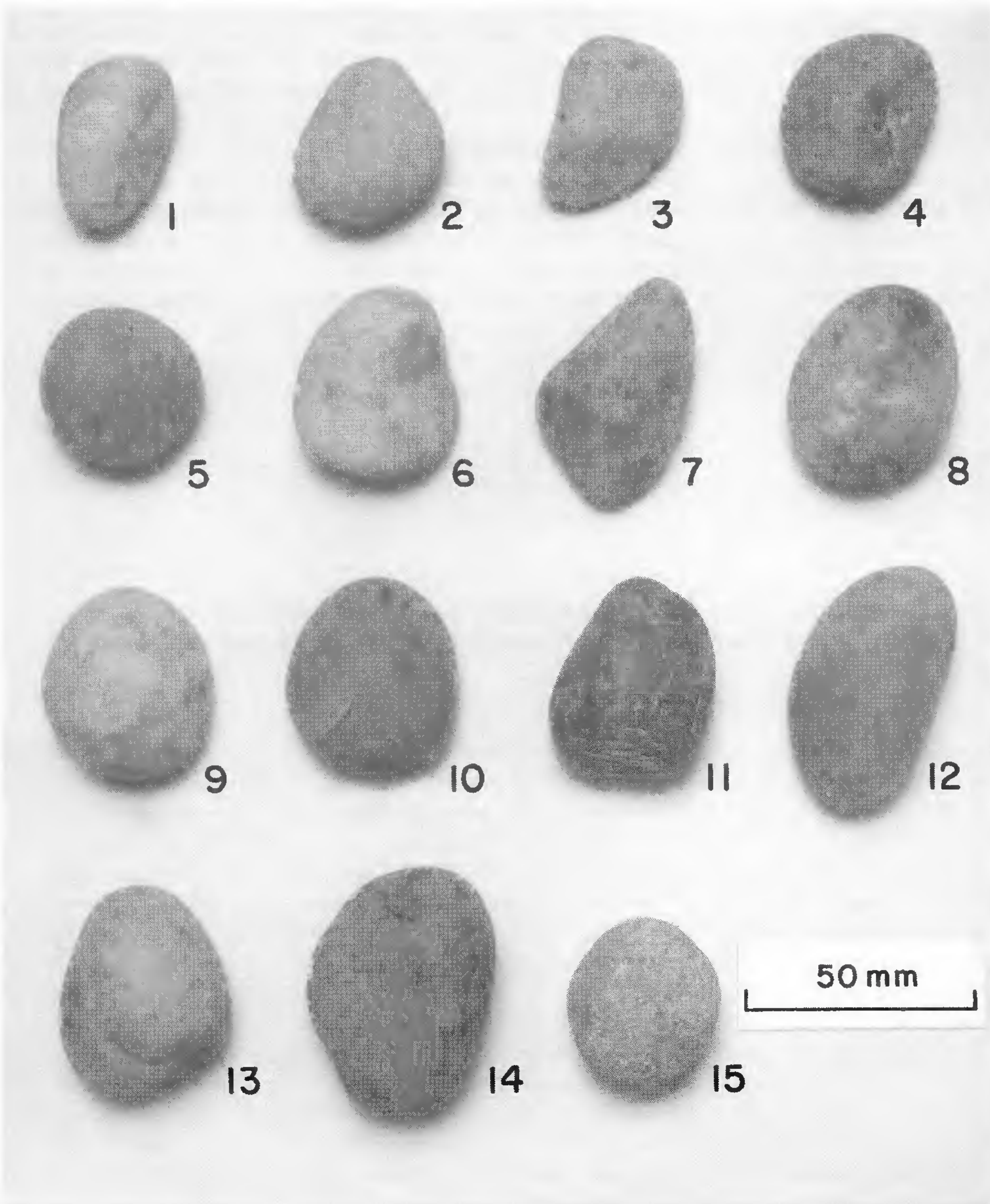

Fig. 1. Pebbles from (1–14) Oldbury Flats, South Gloucestershire, and (15) Rumney Great Wharf, Gwent.

of a peat bed. About 150 m further to the south-west, this peat supports a final Bronze-Age wooden roundhouse (Allen 1996, RGW3) with a conventional radiocarbon age of 3080 ± 50 years BP (Beta-46951). As at Oldbury Flats, the silts closely resemble those of the modern marshes. Like the Oldbury pebbles, that from Rumney Great Wharf was not associated with an artificial feature or with sandy or coarser debris. Falling within the same ranges of mass and roundness as the other pebbles, it is of feldpathic quartz sandstone with an incomplete silica cement.

At each locality the pebbles have an immediate origin which is local. Those from Oldbury Flats are readily matched in the Pleistocene fluvial terrace gravels of the area (Wills 1938). Similar pebbles, eroded from these outcrops, are being transported tidally in small numbers today, contributing to scattered gravel patches. The pebble from Rumney Great Wharf is of a lithology common in later prehistoric archaeological sites on the Gwent Levels (e.g. Fulford *et al.* 1994; Allen 1996) and could have come from local river terrace or valley gravels, such as those associated with the Rhymney River (Waters and Lawrence 1987).

There is no easy explanation for the pebbles which, from their contexts, are likely to have been emplaced in the Bronze Age or Iron Age. The chief possibilities are that they:

Natural origins

1) are the stomach/gizzard stones of sea mammals/birds;
2) were flung onto the marsh surface during storms;

Human origins

3) were thrown/slung during warfare or at wildfowl in order to stun and catch them;
4) record spillage from loads of potboilers being carried across the marsh from the estuary to an inland settlement; or
5) represent items used in a game of pitch.

Natural emplacement seems unlikely. Sea mammals such as seals take pebbles into the stomach and periodically expel them. These creatures have no fossil record in the late Holocene of the Severn Estuary Levels, and are seen in the area too infrequently to explain the dispersed pebbles at Oldbury Flats. Similarly, some birds ingest mineral matter (Welty and Baptista 1998), but not even ducks, geese, cranes or herons could have coped with the recorded stones. The pebbles were probably not emplaced by storms. Although storm waves affecting the edge of a salt marsh can scatter debris over a marsh for some tens of metres inland, experience of the estuary shows that such debris is normally abundant and extensive at any one horizon and is composed of assorted materials. Typically, it is dominated by fragments of silt ranging from granules a few millimetres in diameter to root-bound lumps some decimetres across. These are accompanied by shells, pebbles and other fragments of rock, and other trash. The pebbles from Oldbury Flats and Rumney Great Wharf are remarkable for the lack of associated coarse debris.

They also seem exceptional in other respects, suggesting deliberate selection for particular characteristics. Resembling a hen's egg in size and in many cases shape, the pebbles in comparison with their possible source deposits occur in a limited range of mass and are smooth of surface, or at least of no more than a granular roughness.

Such pebbles could have served in games of pitch, but there is little basis on which to judge this particular suggestion. It is inherently unlikely since, unless the marsh was being vigorously grazed, the tall, dense natural vegetation would inhibit such games.

That the pebbles are lost potboilers is also difficult to gauge, since they would never have been put to use. This interpretation is perhaps again unlikely, on the grounds that the thermally cracked potboilers from the Neolithic and Bronze-Age sites in the Severn Estuary (Allen 1996, 1998) are well-rounded pebbles and cobbles several to many times heavier than the pebbles recorded here (see also Bulleid and Gray 1917). They are also in the main of a different lithology (porous sandstone), presumably one that was more appropriate to the intended use. Pebbles of strong, dense quartzites and vein-quartz tend to crack violently when heated or chilled.

The possibility that the pebbles are slingshot deserves more serious consideration. They certainly match in shape and weight what are generally classified in this way from well-characterized archaeological sites. As Hawkins (1847) was early to show, and as biblical references further attest, slings and slingshot were long used in warfare in the Near and Middle East, the Mediterranean area, and in North-west Europe. Slingshot, probably used as a weapon, are recorded at Mohenjo-daro in the Indus Valley (Wheller 1968). They also served this purpose in modern times and even further afield (e.g. Bulleid and Gray 1917; Monckton 1921). Wheeler (1943) unearthed vast numbers of slingshot at the Iron-Age fortifications of Maiden Castle, Dorset. Closer at hand, Casey and Hoffmann (1999) recorded more than a thousand 'selected and rounded' pebbles interpreted as slingshot to the rear of the defences of the Iron-Age camp at Lydney Park, another of Wheeler's localities, overlooking the western shores of the Severn Estuary. These bullets are also recorded from other Iron-Age fortified sites, at Mount Caburn Camp, Sussex (Fox, 1881), and as a small hoard at Bredon Hill, Worcestershire (Hencken 1938). The lake villages of Glastonbury and Meare, Somerset, also yielded large numbers of what are interpreted as slingshot (Bulleid and Gray 1917; Gray and Cotton 1966; Coles and Minnett 1995). Smooth pebbles, shaped ceramic, and cast ellipsoids of lead have all been employed. At Maiden Castle they are chiefly smooth, egg-shaped pebbles, probably collected from a beach, weighing 14–57 gm. Some are moulded, ellipsoidal masses of ceramic, a few of which carry surface scorings, perhaps made by a thumb or finger nail. At Glastonbury, the slingshot, of stone and clay, range in weight from less than 25 gm to as much as 120 gm (Bulleid and Gray 1917). The ceramic slingshot recorded at Mohenjo-daro are, however, rather heavier, at about 170 gm (Wheeler 1968). A grooved, spheroidal ball of baked clay (19 gm) with a scored surface, possibly intended for use in a sling, was associated with a final Bronze-Age hearth at Rumney Great Wharf (Allen 1996). Hawkins (1847) cites a weight range of 42–98 gm for Greek leaden sling bullets, and his figured, almond-sized example probably attained about 85 gm. Greep (1987) extensively catalogues the distribution of slingshot in Roman Britain, almost certain as used by the military. For example, at Windridge Farm, St. Albans (Hertfordshire), the chiefly biconical forms vary from 28 to 78 gm in weight (Greep 1987), whereas near the Hawkesdown hillfort, Axmouth (Devon), the weight range is 33–47 gm (Holbrook 1989).

Coming from a number of horizons, albeit of limited stratigraphical range, the Oldbury pebbles are more likely to have been used in peace than war. Possibly they were fired using slings at birds required for food or perhaps ornament. Depending on their situation, the means most often recorded of procuring birds by peoples living wholly or partly off the country are by shooting with arrows (Clark 1966; Jenness 1977), snaring (Steel 1965; Marshall 1976; Jenness 1977; Lee 1979; Quine 1988), netting (Thesiger 1964; Jenness 1977), clubbing (Steel 1965; Clark 1966; Jenness 1977), or simply by seizing them (nestlings) with bare hands (Steel 1965; Clark 1966; Quine 1988). The bolas is also used, and not just on large, flightless birds (Sollas 1924). There is, however, one unmistakable record of birds being hunted with a sling. The lower border to one scene in the Bayeux Tapestry—that recording the arrival of Duke William's messengers at the castle of Guy de Ponthieu (Wilson 1985, pp. 11, 209)—shows a peasant firing a bullet from a sling at two birds flying up from the ground.

It is plausible archaeologically that on the Severn Estuary Levels in prehistoric times birds could have been caught for food using slings. At Brean Down, Somerset (Bell 1990), perched above tidal marshes, and again in the tidally influenced lower Nedern valley, Monmouthshire (Nayling and Caseldine 1997), mid and late Bronze-Age communities seem on the basis of bone assemblages to have eaten a wide range of wetland birds, particularly ducks, cranes and geese. Similar wetland birds were taken by the Iron-Age villagers at Glastonbury (Bulleid and Gray 1917; Coles and Minnett 1995) and Meare (Gray and Cotton 1966). Ducks and geese seem also to have figured in the Romano-British diet at Rumney Great Wharf (Fulford *et al.* 1994). So far as the finds in the marsh silts at Oldbury Flats are concerned, it is perhaps no coincidence that, on dry ground only 1.25 km away, there is an Iron-Age camp (Iles 1980) from which people may have forayed into the wetlands. Even nearer were Bronze-Age communities living on unburied parts of the pre-Holocene land surface (Allen 1998). The pebbles from Oldbury Flats and Rumney Great Wharf suggest how one of the natural wetland resources of the Severn Estuary Levels, exemplified by the meagre bone assemblages, may have been secured by later prehistoric peoples.

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Postscript

As the result of increasing erosion of the marsh cliff at Oldbury-on-Severn, further examples of possible slingshot have been recovered at much the same horizon and in a similar context to those described above. This additional material is composed of eight, smooth, rounded to well-rounded, discoidal to tetrahedral pebbles of a variety of tough, compact quartzites, weighing respectively 18.0, 30.0, 31.9, 50.1, 55.3, 56.6, 59.5 and 84.9 gm and one of vein quartz weighing 56.3 gm.

J.R.L. ALLEN

A MEDIEVAL WATER TANK IN THE CLOISTER GARTH OF GLOUCESTER CATHEDRAL

Introduction

In the north-west corner of the cloister garth of Gloucester Cathedral is a sunken stone tank (Fig. 1). It was discovered in 1887 (Welander 1991, 481) or 1889 (Hope 1897, 130), during the lowering of the ground level in the garth. The tank was restored in the late 19th century and left open thereafter, probably filling with debris, its stonework deteriorating.

In 1995 problems with drainage necessitated the re-excavation and repair of several Victorian drains. One of these led west from the tank; it was re-excavated and a manhole inserted. An archaeological watching brief (Heighway 1999, record no. 26) carried out during this process recorded details of the medieval culvert which originally also drained from the west end of the tank.

In 1996 a refurbishment of the cloister garth was carried out. The paths were relaid, a central foundation installed, and paving laid. A watching brief on this process provided evidence of mortar working floors and retrieved a collection of unstratified Roman and medieval pottery and finds (Heighway 1999, record no. 30: summary in *Trans. B.G.A.S.* **115**, 284). As part of the process of improvement, the decision was taken to infill and pave over the tank to preserve it from further frost damage and also to ensure the safety of visitors. Before infilling a full survey was commissioned from Gloucester Archaeology Unit; a series of photographs was taken by Alan Norton, clerk of works at the cathedral.

Description

The tank is built of local Painswick stone, with base slabs forming the foundations for the side walls which were built of well-jointed ashlars. The tank is rectangular except at the west end where it funnels into a narrow channel 0.35 m wide, at which point was a double sluice gate (Figs. 7–9). West of the sluice the water drained into a medieval stone culvert, which runs out under the west walk of the cloister (Fig. 2). At the junction between the sluice and the drain was a shaft, roughly semi-circular in plan (Fig. 7) and accessible from ground level. The surviving facing indicates that the shaft was 1.15 m deep from the surface to the drain base. This feature must have served as a manhole to give access to the sluice, which would otherwise have been inaccessible. The shaft was entirely refaced in Victorian concrete, but it is to be presumed that the restorers imitated a feature that already existed. The base of the tank slopes from east to west and the slope was continued down into the drain under the cloister walk; the level at the west end of the tank was 13.22 above O.D. and dropped to *c.* 13.16 m at the point where the culvert passed under the cloister wall.