The Riddle of the Sands:
Pudding Pan Roman shipwreck

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This paper presents the results of investigations into the history and nature of a Roman shipwreck site known as Pudding Pan. The study included investigations of the nature and range of artefacts recovered, the locations and possible sources from which artefacts have been recovered, and the possible destination of the main consignment. What might the recovered assemblage tell us about samian manufacturing processes? This paper will conclude with a summary of the on-site investigations that have been undertaken in search of the main wreck.

In 1778, Thomas Pownall, an antiquarian from London who was visiting the fishing village of Whitstable on the north Kent coast reported "…a very peculiar kind of red earthenware found amidst the cottage furniture of the fishermen of the Kentish coast…".[1] Pownall claimed that in a sea area known as 'Pan Speck' his brother recovered, through trawling, half a hundredweight of brickwork cemented together, some small pieces of broken pans and then three entire pans.[2]

Significant quantities of complete and near-complete samian or terra sigillata wares are now known to have been recovered in the vicinity of an area of the Kentish Flats known as Pudding Pan. This area is situated in the outer Thames Estuary approximately 6 km due north of Herne Bay off the north Kent coast. Although the pottery has been recovered in the oyster dredges and fishing nets of the commercial fishermen of Whitstable for more than 300 years[3], the site from which they have been recovered has never been found.

The bulk of the recovered samian assemblage, which now numbers more than 520 complete vessels, largely dates from 180 to 200 AD and had come from the production sites at Lezoux in central Gaul[4]. This statistically significant sample is the second largest assemblage of samian ware recovered from a maritime context anywhere in the Roman Empire. The British Museum holds one of the largest collections of samian from the site; the Pudding Pan Rock assemblage was used as the basis for an early classification of samian ware[5] which was never adopted.

Over the years, since the antiquity of the pottery had first been realised, various theories have been proposed to explain the presence of these Roman table wares off the north Kent coast. Many are based on the mistaken assumption that the deposition site was once dry land which, subsequently, has become inundated by the sea. These

[1] T. POWNALL, 1779: 282.
[2] T. POWNALL, 1779: 282-4.
[3] G. KEATE, 1782: 126.
[4] R.A. SMITH, 1909.
[5] R.A. SMITH, 1907.

theories range from anchorage detritus, to the remains of a *pharos* or navigation mark[6] or more fancifully, a completely submerged Roman town.[7] Pownall claimed to have seen only pottery stamped by *Atillianus* (*sic*) and suggested that this was the remains of his submerged pottery manufactory.[8] This claim was somewhat undermined by the journal editor's footnote which stated that he had seen several potters represented. More recently other theories suggestive of a deliberate deposition have been investigated including the possibility that it represents a votive deposit, or that the pottery was laid down by the Romans as a "cultch", a substrate on which oysters could grow.[9] Having considered all the theories and the associated evidence it is now clear that the vessels represent a jettisoned cargo or the remains of a shipwreck.

The pottery has been very popular with local collectors who bought the artefacts from the fishermen who recovered them. Wallace Harvey was chairman of the local historical society, had a considerable collection in the late 1950s. Recent investigations have identified more collectors, including an elderly gentleman who was the last surviving member of the Whitstable shipbuilding firm, Anderson, Rigden and Perkins, who had fourteen vessels in his possession. This tendency for private collection has, unfortunately, resulted in the dispersal of the recovered assemblage to collectors and public institutions all over Britain and further afield, including North America, making it very difficult to establish precisely how many vessels have been recovered.

The last published study of the site, or more accurately the assemblage that has been recovered from it, was written more than a century ago[10] so a new assessment, taking advantage of the tremendous progress in the study of samian production, distribution and use,[11] seemed timely. The site had been largely ignored in that time as it had been claimed that, over the last 300 years, the site has been completely "fished" out,[12] so nothing survived on the seabed. This study, however, has more than doubled the known assemblage,[13] which has enabled analyses of variations in the nature of the recovered vessels over time. Comparison of the range of potter's stamps recovered from the site a century ago compared with stamps recovered more recently displays considerable consistency with the same names represented at both times; forty seven different named potters are represented by the stamps.[14]

The dating of the potter's stamps confirms that the bulk of the assemblage dates from the later second century AD, or more precisely to 180 to 200. Some stamps are considerably earlier, dating from the third quarter of the first century, 65 to 85 AD. The variation in date between these two groups is too great to explain as ship's equipment, personal possessions of crew members, or residual cargo so it must point either to casual losses from an earlier ship or to a second source of material buried somewhere else on the Kentish Flats. The latter hypothesis is supported by the recovery of other artefacts from the area that reflect these two discrete dates. Two Roman lamps recovered from the area amply illustrate this point. One dates from the last quarter of the first century while the other matches the dates of the second century artefacts.[15]

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[6] R.A. SMITH, 1907; 1909.
[7] F.C.J. SPURRELL, 1885, p. 281.
[8] T. POWNALL, 1779, p. 290.
[9] M. WALSH, 2006.
[10] R.A. SMITH, 1909.
[11] E.g. S. WILLIS, 2005; 2011.
[12] A.K.B. EVANS, 1981, p. 527.
[13] M. WALSH, 2006.
[14] M. WALSH, 2017.
[15] M. WALSH, 2017.

Some artefacts cannot be dated quite so accurately. The date of a complete Gauloise 12 amphora from northern France ranges from 1 to 299 AD so it could feasibly have come from either source. It was, however, recovered fairly recently by oyster dredge, which confirms that it belongs to the second century AD assemblage as the later dated vessels have all been recovered by oyster dredge, whereas the earlier vessels have all been recovered in fishing nets.[16]

Numerous central Gaulish black-slipped vessels are reported to have been recovered from Pudding Pan but only one example, with missing sides, has been recorded by the current study. These vessels seem thinner-walled than their red-slipped counterparts and are therefore less likely to have survived intact which probably explains their rarity as the fishermen favoured complete vessels. The date and provenance of these vessels is not dissimilar to the samian ware so they could well have comprised part of the same consignment.[17]

When a complete London 555 amphora, dating from the second half of the first, or the early second century, was recovered with its stopper still in place it was found to contain c. 6,200 olive pits or stones. The recovery location was given suspiciously accurately and placed it to the north of Pan Sand.[18] Numerous mortaria are reported to have been recovered from the Kentish Flats, although only a few have been seen during this study. Some are stamped Q.VAL (Q. VALERIVS SE--) while others are stamped CAVARIVS. Both potters belong to the two main first century AD groups identified by K.F. Hartley, dating to 55-85 AD.[19]

Fig. 1. The late/early second century AD London 555 amphora recovered from the north of Pudding Pan, which still contained 6,296 olive pits or stones (Photograph by kind permission of the National Maritime Museum and Gustav Milne)

This has resolved a long-standing confusion over the area from which artefacts have been recovered. Reports state that artefacts have been recovered from both Pudding Pan and Pan Sand, as if they are the same location when in fact they are several kilometres apart. Moreover the fishing techniques used at each site are very different; dredging for oysters is only conducted over Pudding Pan as the seabed is too soft at Pan San for the cultivation of oysters; conversely trawling for fish is only conducted at Pan Sand. Analysis and dating of the finds has shown that the later second century material has primarily been recovered

[16] M. WALSH, 2006.
[17] M. WALSH, 2006.
[18] P.R. SEALEY, P.A. TYERS, 1989.
[19] K.F. HARTLEY, 1977.

by oyster dredge and therefore comes from the vicinity of Pudding Pan while the first century material has been recovered by trawlermen and therefore comes from north of Pan Sand.[20]

More recently, some third century material, including African red-slipped bowls, has come to light.[21] There are, however, too few artefacts of this date to suggest a discrete deposit, or indeed to indicate where that deposit might be located. Obviously these finds could just represent casual losses from passing ships.

A single-hole stone anchor was also recovered by fishermen from the Kentish Flats but cannot be unequivocally associated with the Roman material as the use of stone anchors spans many centuries. It is, however, made of quartz arenite which does not occur naturally in the area so the stone has been imported to the area.[22]

A number of Roman roof tiles (*tegulae* and *imbrices*) have also been recovered from the area, most of which have been recorded as unused, which suggests that they comprised part of the cargo rather than representing a roofed galley area as suggested for the tiles recovered from the St Peter Port wreck.[23]

Most of the samian appears to have been lying on the seabed in an inverted position so the red slip has been worn away on the exposed undersides of the vessels. Some of the small (Drag. form 33) cups, however, display wear consistent with the cups lying on their sides. It is interesting to note that the footrings of the cups lying on their sides are intact whereas the footrings of the inverted cups have been completely removed. These wear and damage patterns are consistently observed on most of the 500+ recovered samian vessels. It appears that the footrings have been destroyed on the inverted vessels by the oyster dredge during the recovery process.[24]

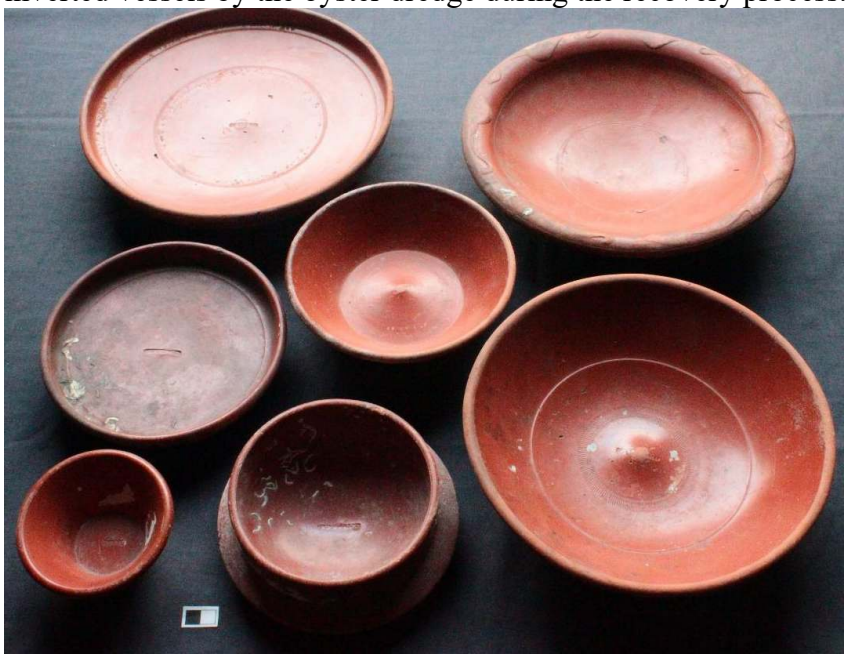

Fig. 2. Some of the complete samian ware vessels recovered by oyster dredge from Pudding Pan for which the site is famous (Photograph : the author, courtesy of Whitstable Museum)

[20] M. WALSH, 2006.
[21] M. WALSH, 2006.
[22] M. WALSH, 2006.
[23] M. RULE, J. MONAGHAN, 1993.
[24] M. WALSH, 1998.

Other damage that has been identified on the recovered samian ware includes pre-firing damage such as grit embedded on the surface of one vessel from another vessel stacked on top while they dried to leather-hardness before going into the kiln. Post-firing damage is also apparent on some vessels in the form of a circle of slip worn away by the footring of the next vessel in the stack. Circular wear patterns on the sides of some bowls appear to have been caused by the scour around oysters that had once been attached to the bowls.[25]

Plenty of sea areas around the world are named after shipwrecks but Pan Sand and Pudding Pan seem to be the only sea areas named after archaeological artefacts. For example, an area in the vicinity of Pudding Pan called "Albion Knowl" is named after an English East Indiaman called the Albion which sank in the area in 1765. Pan Sand is marked and named on the earliest known chart of this area that was produced in c. 1533, so it is possible that Roman pottery has been recovered from this area since the Tudor period. The area known as Pudding Pan only appears on a much later chart that was surveyed in 1844. It seems to be called Pudding Pan because when antiquarians first noticed the bowls they were being used by the families of fishermen to cook a Kentish pudding.

The orientation of the Pan Sand sandbank on charts over the last 150 years has rotated clockwise through 45 degrees from its current position. This appears to lend credence to the suggestion that the wreck is uncovered and recovered by the shifting sands of the outer Thames Estuary every 40 or 50 years.[26] When, however, the dates at which the pots first became known, are plotted against the dates when studies of the assemblage were first published it becomes clear that any perceived cyclical recovery is more likely a reflection of waxing and waning interest by succeeding generations of antiquarians and archaeologists than any natural phenomenon. Any explanation regarding the rate at which pots have been recovered over 300 years is further complicated by variations in the techniques and the changing fortunes of the oyster fishing industry.[27]

The likely position of the wrecking incident, approximately 10.5 km north-north-west of the site of the later Roman shore fort of Reculver, which marked the northern end of the Wantsum Channel, would suggest that the ship had passed through this channel as most ships at that time would have done to avoid the treacherous waters of the North Foreland. From here, the intended route of the ship could have been either westwards into the River Thames to London or northwards along the east coast to the northern frontier.[28]

If we compare the samian assemblage recovered from Pudding Pan with the aggregate from terrestrial sites around Britain there is one very notable difference. Approximately 25 per cent of terrestrial assemblages comprise large decorated samian bowls,[29] which are completely absent from the recovered Pudding Pan assemblage. It could be argued that the levels of the ship that contain the decorated bowls have not yet been reached or that the plain bowls were jettisoned to save the ship which then sailed on with the decorated wares still on board. The Pudding Pan assemblage, however, comprises a significantly higher proportion of large plain bowls than are found on terrestrial sites, which suggests that, in this case, large decorated bowls have been

[25] M. WALSH, 1998.
[26] M. DEAN, 1984.
[27] M. WALSH, 2006.
[28] M. WALSH, 2006.
[29] S. WILLIS, 2005.

substituted by large plain bowls. Perhaps the shipment was for a specific and as yet unidentified purpose?

If we then compare the samian assemblage recovered from Pudding Pan with different terrestrial site types, including military, extra-mural, major civil, minor civil, and rural sites[30] we find that the previously observed variation is consistent between the Pudding Pan assemblage and all other site types.[31]

The only other significant samian assemblage recovered from a shipwreck anywhere in the Empire comes from the site of Cala Culip (IV) in the Mediterranean off the north east coast of Spain.[32] Interestingly, when the characteristics of this assemblage are compared to those of the assemblage from Pudding Pan, which is approximately 100 years later in date, the same variation is observed. So the Culip IV assemblage more closely matches the characteristics of British terrestrial assemblages than those of Pudding Pan, with a similar proportion of large decorated bowls and an absence of large plain bowls. This is surprising, even given the 100 years difference, and serves to emphasise the unusual character of the Pudding Pan assemblage.[33]

If we compare the range of potter's stamps recovered from Pudding Pan with those found on terrestrial sites an interesting detail emerges. It is important to note that the probability of two contemporaneous assemblages producing a stamp of the same die, or even the same potter is low.[34] Thus the fact that a considerable proportion of the dies found at Pudding Pan were also found on terrestrial sites, including 14 per cent at Corbridge (180 AD), 20 per cent at Wroxeter (165-175 AD), and 57 per cent at New Fresh Wharf (170-180 AD), is both significant and remarkable. New Fresh Wharf is one of the Roman quays of the port of London;[35] the high percentage overlap with Pudding Pan must suggest that a similar consignment to that carried by the Pudding Pan ship must have got to London, which must point to London as the intended destination of the Pudding Pan assemblage.[36]

Pudding Pan has been the focus of attention since at least the eighteenth century when the great antiquity of the artefacts was first recognised.[37] The search for the site continues and from academic research, discussions with local fishermen, and records of finds, two areas were originally identified for further investigation. Originally an area to the south of Pan Sand was identified. As the research progressed the search area moved further south to an area centred on Pudding Pan which is now believed to be the area in which the wreck lies. These investigations have included marine geophysical surveys, followed by ground-truthing diver surveys, and even controlled dredging using Whitstable oyster dredgermen.[38]

The divers that undertook the ground-truthing made some interesting discoveries including a mound-like anomaly that seemed reminiscent of the amphora mounds found in the Mediterranean. When ground-truthed, however, a site containing barrels that bore the characteristics of a nineteenth century shipwreck was found. Two parachute mines containing 1,000 kg of high explosive, dropped by the Luftwaffe in the Second World War were also found.

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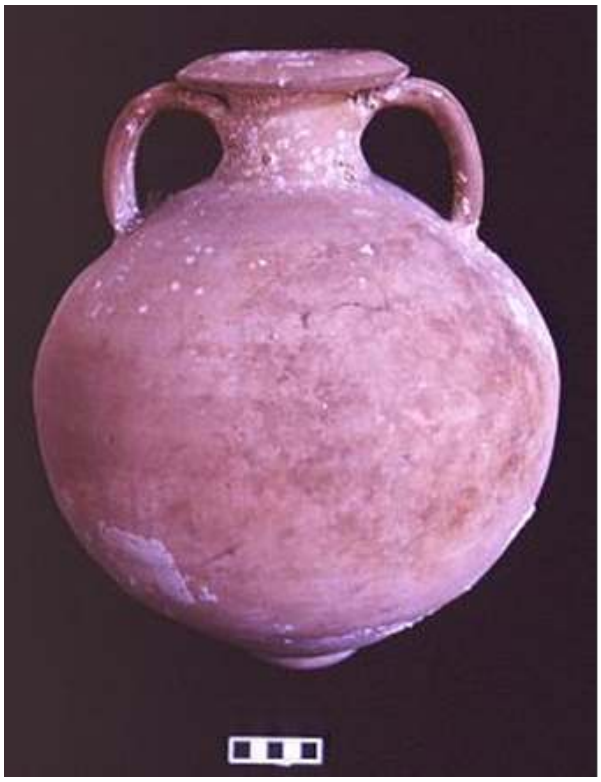
[30] S. WILLIS, 2005.
[31] M. WALSH, 2006.
[32] J. NIETO PRIETO *et al*., 1989.
[33] M. WALSH, 2006.
[34] M. MILLETT, 1987, p. 96.
[35] T. DYSON, 1986.
[36] M. WALSH, 2006.
[37] G. KEATE, 1782.
[38] M. WALSH, 2006.



Detailed locational information is rare as the fishermen only realise they have picked up a Roman artefact when they recover the dredge, after perhaps 8 km of dredging, and empty the catch on deck. This research included some controlled dredging using a Whitstable oyster dredger. The dredgermen dredged over a much shorter distance, up to 2 km, and the positions were tracked using GPS. Four Roman artefacts were recovered over two days including one complete samian vessel (a Dragendorff form 80 dish) as well as a number of fragments and a possible Roman roof tile (imbrex). This helped to narrow the area in which to conduct the search for the site.[39]

Fig. 3. A Gauloise amphora from southern Gaul, recovered intact from Pudding Pan (Photograph courtesy of Phil Edwards)

More recently, the Kentish Flats windfarm has been built in the vicinity. The results of this research were used to ensure that the windfarm avoided the probable location of the Roman wreck. The benefits of this and other similar offshore developments, like the London Array windfarm which was built further out in the estuary but whose export cable runs to the south of Pudding Pan, are considerable. The benefits to this project are that a considerable number of marine geophysical surveys has been conducted in the area. These data were recently made available for this research as were other survey datasets including those of the Port of London Authority (PLA), and the Maritime and Coastguard Agency (MCA).[40]

The problem with these datasets is that they have been collected for different purposes, are of variable resolution and quality, and are therefore of varied use in the search for the Roman wreck site. One of the benefits has been the acquisition of sub-bottom seismic surveys associated with offshore windfarm developments which have identified the distribution and thickness, of seabed deposits overlying geology. In the vicinity of Pudding Pan, only thin Holocene deposits are present (beyond sand / mud banks) with thicker deposits found to the north-west around the Kentish Flats offshore wind farm.[41]

Having reviewed the datasets collected for other purposes, it became clear that the area in which it is believed the Roman shipwreck lies had been avoided. Consequently, in 2014 Historic England funded a research project to use the latest marine geophysical survey techniques over this area. The surveys were conducted in 2015 and 2016 and enabled an assessment of the distribution of anomalies from the Pudding Pan study area, and their relationship to local interpolated bathymetry. This

[39] M. WALSH, 2006.
[40] M. GRANT *et al.*, 2016.
[41] M. GRANT *et al.*, 2016.

revealed a notable depression in the centre of the study area which coincides with known Roman find spots.[42]

An area with the highest potential for containing the Roman remains has now been identified for a number of reasons. It is the area from which a cluster of known samian ware finds, from both fishermen and controlled dredging, have been reported. There are bathymetric features that are possibly indicative of exposed eroding faces that might be yielding the constant stream of archaeological finds.[43]

The discovery of this site would be significant not only because so few Roman shipwrecks have been discovered in British waters, but also because it would be the first Roman shipwreck ever discovered in northern Europe through pro-active research rather than serendipitous discovery. In addition, the assemblage recovered to date is unusual not only because it appears to comprise an assemblage of plain samian wares, which would be highly unusual from a terrestrial site, but also because it currently appears to comprise a major component of the consignment. Although several *amphorae* have been recovered, there is very little uniformity of type so they are difficult to interpret as elements of an amphora-borne cargo and seem more likely to have carried ship's provisions. The discovery of this wreck would lend new impetus to research into Roman maritime activities which could have a significant impact on our current understanding of cross-Channel trade in the Roman era.

[42] M. GRANT *et al.*, 2016.
[43] M. GRANT *et al.,* 2016.

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