



A Contextual Analysis of the Late Roman Pewsey and Wilcot Vessel Hoards, Wiltshire

By RICHARD HENRY, DAVID ROBERTS, MICHAEL J. GRANT,
RUTH PELLING and PETER MARSHALL

ABSTRACT

In late summer, sometime between cal A.D. 340–405, a hoard of tightly packed, stacked copper-alloy vessels was deposited in the Vale of Pewsey, Wiltshire. The corrosion of the vessels allowed for the preservation of delicate plant macrofossils and pollen. Analysis of this material has provided insights into the date, season and context of this act of structured deposition. A second hoard of similar vessels was deposited in the fourth or fifth century only a few miles away at Wilcot. The hoards and their deposition relate to Romano-British lifeways, at a time when the region was on the cusp of a dramatic period of change. The distribution of late Roman coins and belt fittings offers further insights into the social and economic character of Wiltshire at their times of deposition.

Keywords: archaeobotany; hoards; Irchester bowl; Pewsey; pollen analysis; post-Roman transition; Roman Wiltshire; seasonality; Wilcot

INTRODUCTION

In October 2014 metal-detectorists discovered a Roman vessel hoard near Pewsey which was recorded on the Portable Antiquities Scheme (PAS) database (WILT-0F898C). The hoard consists of a large copper-alloy cauldron with an iron band, within which two bowls, a straight-sided vessel with feet, and four scale pans had been carefully placed. The micro-environment created by the metal corrosion products within the stacked group led to the remarkable preservation of organic packing material. The hoard was removed by the detectorists contrary to best practice, but crucially the vessels were neither separated nor cleaned, allowing analysis of material within them. The combination of exceptional preservation and detailed artefactual and environmental analysis provides a unique window on the deposition of vessel hoards in the late Roman period. A second late Roman vessel hoard, without such good organic preservation, was found nearby at Wilcot in 2017 and is also reported here (WILT-047110). This hoard was also removed by the detectorist contrary to best

practice and three of the vessels are in a fragmentary condition. As with the Pewsey hoard, crucially the vessels were not cleaned, allowing analysis of the material within them.

THE PEWSEY HOARD: DISCOVERY AND CONTENT

The findspot of the Pewsey hoard lies on a natural Upper Greensand Formation terrace, overlain by freely draining loamy soils, above the now canalised upper section of the Salisbury Avon; the precise findspot is not given here to protect the location. The finders reported that the hoard was discovered at a depth of *c.* 0.3–0.4 m below the topsoil, within a pit cut into the natural Greensand. Excavation of a 4 m² trench around the findspot in January 2015 confirmed the hoard's location in a pit cut into natural (FIG. 1).¹ The entirety of the small amount of pit fill that remained *in situ* was retrieved for flotation. Excavation also uncovered two ephemeral linear stone spreads either side of the pit and showed that the subsoil contained Roman material: a small number of sherds of British and imported ceramics and ceramic building material, all Roman in date and of apparent domestic character.² It is possible that the finds derive from Roman manuring, or from an undiscovered Roman settlement in the vicinity. Geophysical survey was also conducted around the findspot with inconclusive results, probably due to geological interference.³ Overall it appears that the hoard was deposited in a pit dug for that purpose and with no immediately adjacent structures or ditches, albeit within an actively used landscape.



FIG. 1. South-facing excavation photo of the hoard findspot. A small amount of *in-situ* pit fill remained in the south-east side of the pit following its excavation by metal-detectorists, but the remainder of the pit fill and cut had been removed.

¹ Roberts and McQueen 2015; Henry *et al.* 2017.

² Venn 2015; Henry *et al.* 2017.

³ Roberts and McQueen 2015.

The vessels were placed within the cauldron (FIG. 2.1) as shown in FIG. 3, with the inverted Irchester bowl (vessel C, FIG. 3.5) covering a copper-alloy bowl (vessel A, FIG. 2.2), within which was placed a copper-alloy vessel (vessel B, FIG. 2.3), within which were four scale pans (FIG. 3.4). The feet of vessel B had become detached, and were included in a minerogenic deposit that lay beneath the Irchester bowl and around the outside of vessel B. This deposit also contained some fragments of copper alloy. The scale pans within vessel B were surrounded by, and contained, organic remains preserved by copper-alloy corrosion product mineralisation, which had taken place within the microenvironment between vessel B and the inverted bowl (vessel C).

A description of each of the vessels within the hoard is provided below. The alloy composition of each vessel was established non-destructively using portable X-ray Fluorescence Spectrometry (pXRF). No cleaning of the vessels was undertaken after excavation, meaning that the sediments and organic material within, and adhering to, each vessel were retained *in situ*. This has allowed sampling and analysis of material from the various vessels to understand their use, the material used to pack them, the local environment at the time of deposition and the date of deposition.

1. Copper-alloy cauldron with iron band (FIG. 2.1)

The cauldron is *c.* 310 mm in diameter, 0.3 mm thick and constructed from bronze with a high tin content with a reinforced iron band at the rim.⁴ The one-piece lathe-turned cauldron is carinated with a concave body. The cauldron is similar to examples from the Wotton hoard, which have reinforced iron bands, and in form to those from Burwell.⁵

The cauldron was heavily damaged during its removal from the ground and survives in two main sections (the body and the base) and many smaller fragments. The examples from Burwell were heavily patched and repaired, but no repairs were noted from this example.

The Irchester bowl (vessel C) was inverted and placed within the cauldron, leaving an impression of the rim of vessel C on the internal face of the cauldron base. The base of vessel A is also visible as an impression on the base of the cauldron. Black sooting is visible externally on the cauldron.

2. Copper-alloy bowl (vessel A; FIG. 2.2)

Vessel A is made from a leaded bronze with a high tin content.⁶ It has been defined as a 'bowl' as it is an open-rimmed basin with height less than the radius at its rim.⁷

The rim of the vessel is uneven, but is generally *c.* 8 mm wide and *c.* 2.5 mm thick. The sides of the vessel narrow from the rim, where it is 246 mm in diameter, to the concave base, which is 210 mm in diameter. The vessel is 38 mm in depth at the wall of the bowl. Soot is visible on the exterior base.

Two parallels for this vessel are recorded from Sutton Courtney.⁸ Miles⁹ notes that these bowls are likely to be from a cemetery dating to the second to third centuries, although the findspot was not specifically recorded. It is therefore possible that vessel A was an antique when it was deposited. A further broadly similar parallel is known from Trier.¹⁰

⁴ 3.5% Fe, 73.9% Cu, 0.1% Zn, 0.2% As, 18.5% Sn, 3.2% Pb (plus trace elements).

⁵ Smith 1916; Gregory 1977.

⁶ 2.7% Fe, 53.4% Cu, 0.3% Zn, 0.09% As, 39.9% Sn, 3.3% Pb (plus trace elements).

⁷ Lundock 2015, 14.

⁸ Miles 1976.

⁹ Miles 1976, 75.

¹⁰ Bienert 2007, Form 62 no. 200.

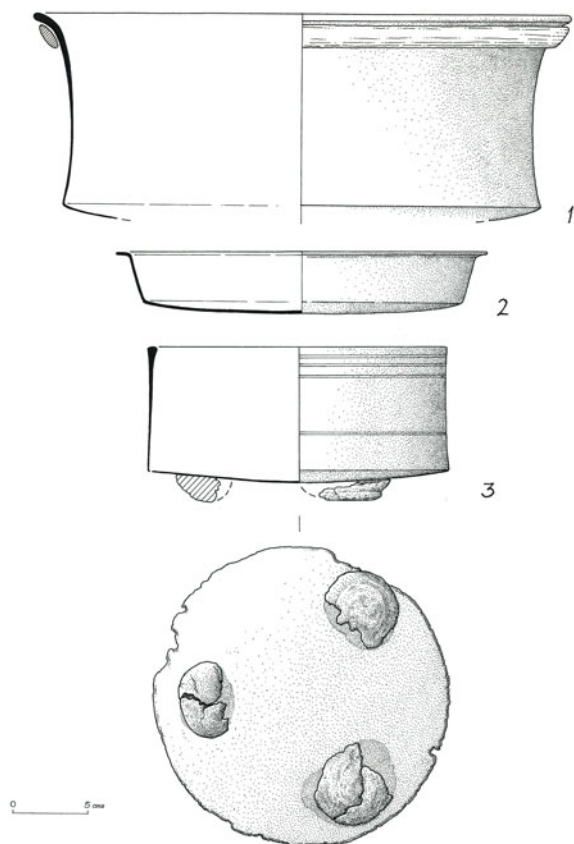


FIG. 2. (1) Copper-alloy cauldron with iron band; (2) Copper-alloy bowl (vessel A); (3) Copper-alloy vessel (vessel B).

3. Copper-alloy vessel (vessel B; FIG. 2.3)

Vessel B is made from a leaded bronze.¹¹ The walls of the vessel are vertical and straight (85 mm in height) with a thicker rim that expands internally and very slightly outwards (6.25 mm thick); the rim expands from 9.7 mm below the flattened top. The external walls show evidence of tinning, and are decorated with three sets of double parallel incised circumferential grooves towards the top of the vessel, with another two sets towards the base.

The base of the vessel is concave and has become detached. The breaks occurred post-deposition but are patinated, so are unlikely to be recent. The vessel has three fragmentary feet (approximately 55 mm wide, 36 mm long and 13.35 mm thick). The feet are made of lead internally and are covered with a sheet of bronze externally. They are 'D'-shaped or shell-shaped and appear to taper in towards the base of the foot.

¹¹ 1.9% Fe, 71.3% Cu, 7.3% Zn, 0.9% As, 12.4% Sn, 5.7% Pb (plus trace elements).

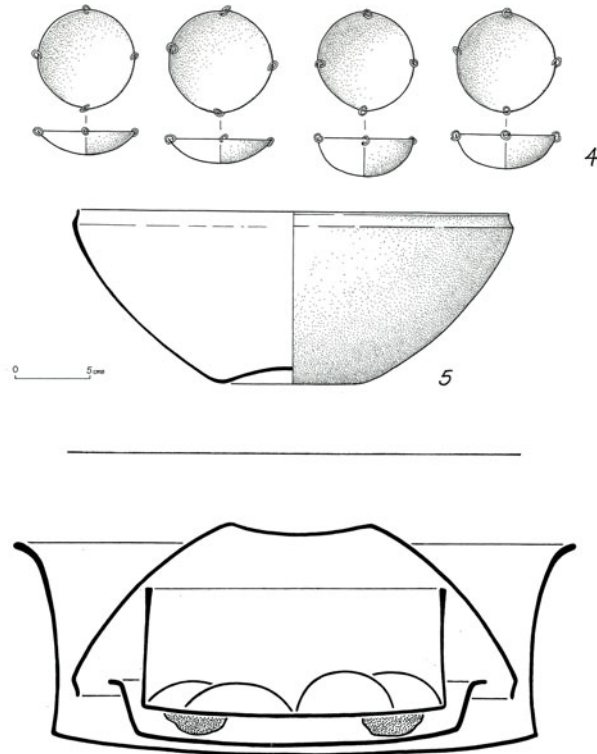


FIG. 3. (4) Four copper-alloy scale pans; (5) Copper-alloy Irchester bowl (vessel C). The configuration of the Pewsey vessel hoard.

4–7. Four copper-alloy scale pans (FIG. 3.4)

The scale pans are of a broadly similar form and appear to be two pairs, distinguished mainly by height and weight (pans A and B, and C and D).

Scale pan A measures 65.4 mm in diameter, 15.3 mm in height and weighs 28.6 g. Scale pan B is slightly wider and deeper, measuring 68.6 mm in diameter, 15.6 mm in height and weighs 27.7 g. Both pans are undecorated; around the rim are four small rings placed at regular intervals set within circular drilled perforations. The rings are *c.* 7.5 mm in diameter and 1.5 mm wide. Both pans were constructed from a leaded bronze and their similarity suggests that they may be a pair.¹²

Scale pan C measures 66.5 mm in diameter, 24.7 mm in height and weighs 19.1 g. Scale pan D measures 67.3 mm in diameter, 24.5 mm in height and weighs 18.5 g. Both pans are undecorated and around the rim are four small rings placed at regular intervals and set within circular drilled perforations. The rings are *c.* 7.4 mm in diameter and 1.65 mm wide. Both pans were constructed from a leaded bronze and their similarity suggests that they may be a pair.¹³

¹² Scale pan A 0.2% Fe, 62.0% Cu, 0.1% Zn, 2.7% As, 14.3% Sn, 20.1% Pb (plus trace elements); Scale pan B 1.2% Fe, 57.3% Cu, 3.8% Zn, 2.3% As, 15.4% Sn, 18.9% Pb (plus trace elements).

¹³ Scale pan C 4.7% Fe, 38.1% Cu, 2.8% Zn, 3.6% As, 1.5% Sn, 39.6% Pb (plus trace elements); Scale pan D 5.7% Fe, 37.8% Cu, 1.5% Zn, 3.2% As, 9.7% Sn, 41.3% Pb (plus trace elements).

8. A copper-alloy Irchester bowl (vessel C; FIG. 3.5)

This high tin bronze Irchester bowl is 296 mm in diameter at the rim and 110 mm in height.¹⁴ The rim is in-turned (3.65 mm thick) and the bowl tapers from its widest point (below the rim) to the base.

The Irchester bowl has incurving sides, an omphalos base and an in-turned rim. Irchester bowls are basins manufactured in the fourth or fifth centuries in Britain, although they remained in circulation into the early Anglo-Saxon period.¹⁵ The uniformity of the design suggests that the vessel was a product of one or more centralised or associated workshops, and that they were used as part of a dinner service or perhaps for hand washing.¹⁶ Examples from elsewhere in the south of Britain include Amersham, Bucks.,¹⁷ Drapers' Garden, London,¹⁸ Wotton, Surrey¹⁹ and Bishops Canning, Wilts.²⁰ Recently further examples from Wiltshire have been reported to the PAS from Lacock (WILT-029D2B) and Wilcot, catalogued here as part of the Wilcot vessel hoard.

THE WILCOT HOARD: DISCOVERY AND CONTENT

The Wilcot findspot was not excavated but lies in a similar position on an Upper Greensand Formation terrace above a tributary stream of the Avon, close to the site of the fifth-century Stanchester hoard and Stanchester villa.²¹ Geophysical survey was also conducted around the findspot, with no archaeological features recorded.²²

The Wilcot hoard consists of a symmetrical flanged bowl strainer, a basin with an out-turned rim (Bassin Uni), a carinated basin with a foot-ring and an Irchester bowl. The vessels nestled within one another and all were contained within the Irchester bowl. The vessels are fragmentary and fragile: the carinated basin and Irchester bowl are in multiple pieces and the bases of the Irchester bowl, cauldron and Bassin Uni have become detached.

1. The symmetrical flanged bowl strainer (FIG. 4.1)

The strainer is circular (260 mm in diameter, 61 mm in height) with a flat out-turned and expanded rim (45.55 mm in width and 4 mm thick at the end). The exterior margin of the flange is upturned. The interior band is raised with a convex curving form rolling downwards into the body, which then widens outwards to undercut the internal rim top. The strainer is hemispherical and 100 mm in width at the rim before expanding to 150 mm. The strainer was originally a single piece of copper alloy, but was repaired in antiquity with an additional piece of copper alloy. The original basin of the strainer was decorated with two rows of circumferential perforations (28.8 mm below the rim), below which are further perforations, but due to the original break this decoration is now indiscernible. At this point a piece of curved copper-alloy sheet has been riveted to the body of the strainer as a repair. The sheet has a circumferential band of circular perforations (95 mm wide) surrounding four scrolls (85 mm wide), themselves surrounding a circular band of perforations (40 mm wide) and a central pellet. The perforations on the repair begin 41.9 mm below the rim. The

¹⁴ 1.1% Fe, 72.0% Cu, 1.9% Zn, 1.4% As, 11.7% Sn, 11.1% Pb (plus trace elements).

¹⁵ Kendrick 1932; Kennett 1971; Farley *et al.* 1988.

¹⁶ Farley *et al.* 1988; Lundock 2015.

¹⁷ Farley *et al.* 1988.

¹⁸ Gerrard 2009.

¹⁹ Smith 1916.

²⁰ Guest 1997b; 2014.

²¹ Abdy 2009.

²² McQueen 2018.

perforations on the original vessel are circular, 1.7 mm in diameter and regular in spacing, whereas the perforations on the repair are irregularly spaced, not all circular and range from 1.7 to 2.65 mm.

The strainer was deposited within the Bassin Uni, which in turn was placed inside the basin and the Irchester bowl, with the rim facing the ground surface. A similar form of wine strainer was recorded in the Langdale hoard (NMGW-9C0216). The strainer is part of a small group which date from the first century A.D. with broad flanges and no handles, including examples from the Coygan Caves and Helmsdale.²³

2. Bassin Uni (FIG. 4.2)

A Bassin Uni is a basin with an out-turned rim.²⁴ The incomplete basin (250 mm in diameter) has a crimped out-turned rim (10 mm wide) and a slight omphalos base. The crimped edge was achieved by hammering the upper surface. The hammer marks are *c.* 5 mm wide and *c.* 5 mm apart. The vessel tapers from the rim to the break where the base has become detached. The sides of the vessel are decorated with repoussé decoration in bands. A Bassin Uni from the Wotton hoard²⁵ has repoussé decoration consisting of herringbone and square stamps.

3. The carinated basin (FIG. 4.3)

The carinated basin is 110 mm in height and *c.* 270 mm in diameter at the 7 mm wide out-turned rim, narrowing to 260 mm in diameter before expanding to 270 mm, then tapering towards the base. The basin has been constructed from two pieces of copper alloy. The omphalos base is 110 mm in diameter and has a central perforation from its production on a lathe. At the base is a foot-ring and a raised centre.

The basin is similar in form to two carinated basins from the Helmsdale hoard which is thought to date to the second half of the second century to the fourth century.²⁶ The basin also bears similarities to the carinated bowl from the Drapers' Garden hoard.²⁷ All three had been repaired, but there appear to be no repairs in the surviving fragments of this basin.

4. The Irchester bowl (FIG. 4.4)

The Irchester bowl is 99 mm in height. From the convex base the body expands to its maximum width just below the rim (286 mm) before tapering inwards slightly to the rim (284 mm), which has a 3 mm thick bevelled edge. The omphalos base has an internal diameter of 93 mm.

The strainer and possibly the carinated basin would have been antiques when the hoard, dated by the Irchester bowl to the fourth or fifth century, was deposited. The basin could date as early as the first half of the second century²⁸ and the symmetrical strainers were probably produced in Britain during the first century A.D.;²⁹ the Langdale hoard was deposited *c.* A.D. 25–75. The repairs to the strainer also suggest a prolonged period of use prior to final deposition.

²³ Tomalin 1989; Spearman and Wilthew 1990.

²⁴ Lundock 2015, 18.

²⁵ Kennett 1971, 130 no. 9.

²⁶ Spearman and Wilthew 1990, 69–71.

²⁷ Gerrard 2009, 172 no. 14.

²⁸ Spearman and Wilthew 1990, 76; Gerrard 2009, 173.

²⁹ Tomalin 1989.

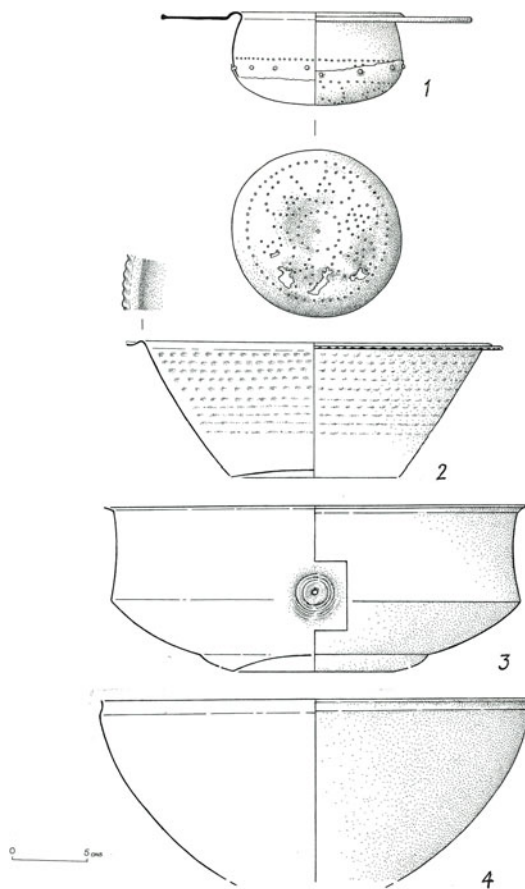


FIG. 4. (1) Copper-alloy symmetrical wine strainer; (2) Copper-alloy Bassin Uni; (3) Copper-alloy carinated basin; (4) Copper-alloy Irchester bowl.

THE PEWSEY HOARD: THE ORGANIC MATERIAL

Visible plant macrofossils were present between vessel A and vessel B and in the interior of vessel B, as the pan scales were originally wrapped. Sub-samples were taken for pollen analysis from the surface corrosion deposits, plant packing material and the interior and exterior sediments. The remaining material was sieved and sorted for identifiable and quantifiable plant macrofossils.

SAMPLING AND QUANTIFICATION

Eleven samples were taken for plant macrofossil analysis (TABLE 1): nine dry-sieved samples were taken from between and within the vessels of the hoard, while the sediment retrieved from the fill of the pit was processed by flotation. Visible flower heads from the interior of vessel C had been placed in a crystal box by the detectorists. All remaining loose material was 100 per cent sampled by vessel. The flotation samples were processed at Fort Cumberland, Historic England, using a standard Siraf type flotation machine, with flots collected on a 250 μ m mesh and the residue retained on a 500 μ m mesh. No ancient plant remains were present in the flotation samples.

Given the fragility of the remains within the hoard, samples were dry sieved only over a stack of sieves from 4 mm to 0.25 mm and sorted under a binocular microscope at x10 to x40. Any quantifiable and identifiable material (seeds, seed pods, flower heads, bracts and chaff items) was extracted. Stem material was taken from the large sieves (>2 mm). Stem fragments were not extracted from the smaller sieves although an approximate relative abundance was recorded (present, common or abundant).

TABLE 1. LIST OF PLANT MACROFOSSIL SAMPLES ASSESSED

Group	Sample	Vessel	Description	Sample Volume
1	1	Scale pan A	Contents	20 ml
1	2	Scale pan B	Contents	30 ml
1	3	Scale pan C	Contents	18 ml
1	4	Scale pan D	Contents	5 ml
3	5	Cauldron	Bottom inside of cauldron/underside vessel A	150 ml
2	6	Vessel A	Contents	50 ml
2	7	Vessel A/B	Sediment from outer base vessel B/interior of A	100 ml
2	8	Vessel B	Contents	150 ml
2	9	Vessel C	Contents	300 ml
	1000/1	104	Pit fill after removal of hoard – flotation sample	4 litres

Identification was made based on the examination of microscopic structure, and with the aid of floras, seed atlases and the modern comparative botanical reference collection held at Fort Cumberland, and fresh material collected from the hoard's immediate environment during the summer of 2016. Quantification was based on counts of individual items (seed, flower head or chaff) where possible. For fragmented material such as stem segments or leaf fragments a relative abundance score was used (present, common or abundant). *Pteridium aquilinum* (bracken) frond fragments were counted on the basis of pinnule or frond tips, while the presence of large fragments supporting several pinnule tips was noted. Nomenclature and habitat information follows Stace.³⁰

Fourteen samples (FIG. 5) were taken to assess the pollen content, with standard preparation procedures used.³¹ The volume of sediment available from each sample was determined by the availability of sediment still adhering to each vessel. Due to the highly minerogenic nature of some of the samples the maximum available sediment was processed in order to ensure that a pollen residue could be extracted, although three sediment samples failed to yield any pollen.

Determinable pollen and spore types were identified to the lowest possible taxonomic level as defined by Bennett,³² with plant nomenclature ordered according to Stace.³³ Pollen counts of 100 total land pollen (TLP; excluding aquatics and pteridophytes) were sought from each sample, with counting extended to 400 TLP for sample P5 from the interior of vessel B. Statistical analysis was performed using rarefaction and cluster analysis, using both CONISS and TWINSpan, which showed a broad agreement with the groups used for the macrofossils based upon position within the hoard.

PRESERVATION

The exceptional plant macrofossil and pollen preservation was the result of the unique micro-environmental conditions within the hoard, caused by the production of corrosion salts

³⁰ Stace 2010.

³¹ Moore *et al.* 1991.

³² Bennett 1994; Bennett *et al.* 1994.

³³ Stace 2010.



FIG. 5. Summary pollen diagram (selected taxa) of samples obtained from the Pewsey hoard.

upon the metalwork surfaces.³⁴ When plant material comes into contact with metals that are corroding rapidly, the salts can cover or impregnate the organic material and act as a natural fungicide,³⁵ inhibiting attack by micro-organisms in the soil. The macrofossil plant material recovered from the vessel hoard was completely desiccated and variably encrusted with green copper, blue-grey or grey to white glassy metallic deposits, or coated in fine silt, while other fragments were desiccated with no visible metallic deposits. Not all the preserved plant material had been in direct contact with the sides of the vessels, although the better preserved material was enclosed within the centre of the hoard creating an unusual environment evidently highly conducive to metallic mineral preservation. The material was extremely brittle and fragile, but sufficiently well preserved that petals and bracts were recognisable and in two examples the bracts of the *Centaurea* sp. (knapweed) flowers were intact enough to enable identification to species level. The hairs on the underside of the *Pteridium aquilinum* (bracken) fronds were visible on most specimens, even when coated in either sediment or metallic corrosion deposits. It was possible to radiocarbon date a single flower of *Centaurea nigra* (common knapweed or hardheads) and *Centaurea* sp. stems, an indication that sufficient carbon remained. Subsequent attempts to date further flowers and bracken have failed. Both lead and copper signals were obtained when coated plant items were examined under the XRF at Fort Cumberland.

BOTANICAL COMPOSITION

The plant macrofossil material and pollen can be divided into three groups in terms of sample composition, character and context: Group 1, derived from the interior of the hoard (from within vessel B and the upturned Irchester bowl (vessel C) and including material from the pan scales); Group 2, the sample from the bowl (vessel A), on which vessel B stood; and Group 3, the samples from the cauldron and base of the pit.

Group 1

The macrofossil material from the interior of the hoard was dominated by the remains of *Pteridium aquilinum* (FIG. 6), flowers and stems of *Centaurea* sp. (FIG. 7), and unidentified herbaceous stem fragments. Two flowers were identified as *Centaurea nigra* (common knapweed or hardheads). One flower head had broken open and the mature seeds were visible, indicating the plants were at a late stage of flowering. *Pteridium aquilinum* (bracken) is a very widely distributed fern, which is most suited to woodland edge habitats and slightly acidic soil, although it will thrive on any undisturbed soils. It is particularly characteristic of upland, sheep-grazed habitats where the selective grazing of the sheep limits growth of competitive vegetation. In lowland habitats it tends to be restricted to areas that are not ploughed or grazed by cattle and is commonly encountered on woodland edges, road sides and at the base of walls. In much of Wiltshire bracken is limited to the base of hedgerows or walls and field margins; it commonly occurs as an understory of semi-natural oak, ash and hazel woodland on clay with flints.³⁶ Bracken occurs sporadically at the base of hedgerows in the Vale of Pewsey (pers. obsv.). The fronds of bracken emerge in May and are fully open by June or July, dying back during the autumn frosts. *Centaurea nigra* is a summer-flowering, purple thistle-type flowered member of the daisy family, which is typical of ungrazed grassland on a range of soils types. It flowers throughout the summer months (June to September).

³⁴ Keepax 1975; Watson 2002.

³⁵ Biek 1963, 125; see Greig 1991a, 152.

³⁶ Natural England, NCA profile 116.



FIG. 6. *Pteridium aquilinum* pinnule tips from Group 1. (© Historic England)



FIG. 7. *Centaurea* sp. flowers from Group 1. (© Historic England)

A range of other plant taxa was represented by occasional seeds, pod fragments and calyxes of grassland taxa or taxa of broad habitat requirements. *Ranunculus* cf. *repens* (creeping buttercup) and *Rumex* cf. *longifolius* (northern dock), both only tentatively identified, are characteristic of wetter meadows or seasonally flooded grassland. Other grassland taxa present were seeds of a *Primula* species (primrose, cowslip), *Polygala* cf. *vulgaris* (common milkwort), *Leontodon saxatilis* (lesser hawkbit), unidentified grasses and *Carex* sp. (sedges), as well as seeds and calyxes of *Trifolium* sp. (clovers), and seed and pod fragments of *Vicia/Lathyrus* sp. (vetches/vetchlings/tare). All of these taxa will grow in grassy woodland edge environments or at the base of walls. Seed pods and seeds of *Viola odorata* (sweet violet) were also identified, a plant that again occupies grassy ground at the base of walls or on woodland edges. *Viola odorata* and *Primula* are spring flowering, although the seed capsules will persist on the plant into summer. *Vicia* type vetches are twining plants, found commonly in long grassland or amongst bracken, where they scramble up the taller vegetation. In addition to the grassland/woodland edge species, a few taxa of arable fields and/or disturbed habitats were recorded, including the seeds of *Chenopodium album* (fat hen), *Polygonum aviculare* (knotgrass), *Fallopia convolvulus* (black bindweed) and *Spergula arvensis* (corn spurrey).

Pollen sample P5, taken from the packing material within vessel B, was distinctive from all other pollen samples by the dominance of *Succisa pratensis* (devil's-bit scabious; 67% TLP), with Poaceae (grasses; 19%), *Valerianella* (cornsalads; 3%) and traces of *Centaurea nigra* (1%) and *Pteridium aquilinum* (0.5%). With the exception of sample P3 (the contents of scale pan C), *Succisa pratensis* pollen is not found within any other samples and therefore is definitively associated with the Group 1 packing material rather than being a post-burial contaminant. The dominance of *Succisa pratensis* is surprising given its absence within the plant macrofossil assemblage, while *Centaurea nigra* and *Pteridium aquilinum*, the dominant macrofossil components, only have a low pollen abundance. The spores of *Pteridium aquilinum* are derived from sori located on the underside of fronds, but these are not produced every year.³⁷ Analysis of the fronds contained within the hoard packing material demonstrated an absence of sori accounting for the very low spore presence within the pollen samples. The absence of *Succisa pratensis* flowers within the plant macrofossil assemblage may be due to their fragility compared to those of knapweed. In the absence of replicate pollen samples from the packing material fill, it is not possible to reflect on how representative this single sample is of the pollen associated with the packing material as a whole. Pollen samples (P6 and P8) taken from the sediment within the Irchester bowl (vessel C) contained a very different pollen assemblage (pollen group P-C), with stronger similarities to samples associated with Group 2.

A few insect remains were found with this sample group, all coated in green copper residues apart from one silt-coated mite. The insects tended to be small arthropods, mostly likely Diplopoda (millipedes and centipedes) and had presumably crawled into the vessels or were living on the bracken.

Group 2

The plant macrofossil assemblage between the bowl (vessel A) and vessel (B) was much more limited than the interior (Group 1) assemblages and consisted of a single glume base of *Triticum spelta* (spelt wheat) and occasional fragments of *Pteridium aquilinum* as well as a small number of weed seeds. Spelt is a hulled wheat in which the chaff does not fall freely from the ear unless it is processed (usually by pounding or milling). It would not be expected to occur on the ground within an arable field, but rather at a processing site or where processing by-products had been deposited. The occasional fragment of *Pteridium*

³⁷ Marrs and Watt 2006.

aquilinum must have fallen into the bowl (vessel A) at the time of packing or potentially during excavation and handling of the hoard. The absence of flowers and the much more limited quantities of bracken from the bowl would suggest that either packing material was not placed between these vessels, or that preservation was less favourable in this vessel and the material has not survived.

The pollen associated with the bowl (along with sediment within the Irchester bowl: sample P8; and internal base of the cauldron: sample P14; pollen group P-B) showed a greater pollen diversity than that from the packing material (pollen group P-A) and included pollen indicators of ground disturbance and/or nutrient enrichment (*Urtica dioica* (common nettle), *Plantago lanceolata* (ribwort plantain), *Cichorium intybus*-type (including dandelion and chicory) and *Pteridium aquilinum*) and calcareous grassland/arable fields (*Papaver rhoeas*-type (poppies) and *Valerianella* (cornsalads)). The samples within this group are all derived from the interior of the hoard (i.e. within the cauldron) and, with the exception of samples P8 and P4, from samples directly adhering to the vessels as opposed to the sediment. Poaceae values are between 49 and 67 per cent, and can be sub-divided between those associated with sediment fills (>65%) and those directly adhering to the vessels (<65%). This division is mirrored by the presence of *Avena-Triticum*-type (oat-wheat) and *Calluna vulgaris* (heather), which, with the exception of sample P3, are predominantly found in sediment samples external to the cauldron (pollen group P-C; equivalent to macrofossil group 3). Sample P3 is also the only other sample containing *Succisa pratensis*. As such it is probable that sample P3 contains a mixed assemblage containing elements from all three groups.

Group 3

The macrofossil sample derived from the interior of the outer vessel, the large cauldron, produced only modern cereal chaff and a very few stem fragments. The modern chaff must have fallen into the pit during the removal of the vessel hoard. The deposits from the base of the pit, which were taken retrospectively, similarly produced large quantities of modern cereal chaff derived from recent arable activity within the field. The modern chaff is entirely derived from *Triticum aestivum* (bread wheat), a free-threshing cereal which, in contrast to spelt wheat, sheds its chaff in the field, resulting in often substantial amounts of chaff on the surface of the plough soil.

Group 3 pollen samples (pollen group P-C) are all associated with either the cauldron exterior or sediment samples within it. Pollen preservation was poorer in these samples, with a higher number of corroded and degraded grains, along with lower pollen concentrations. These samples are distinct from those within pollen group P-B by having lower pollen richness and higher Poaceae (68–78%) and *Avena-Triticum*-type (6–13%) values. These are likely to reflect pollen derived from the local burial site, either at the time of burial or during removal of the vessel, as demonstrated by the correlation of high cereal pollen percentages and presence of *Triticum aestivum* chaff.

DETERMINATION OF SEASON

The bracken had fully unfurled at the time it was cut, suggesting a mid to late summer or autumnal date for its collection. As a packing medium it is more likely that the bracken would be cut while green when it is more pliable, although it is not possible to confirm this. *Centaurea nigra* is a summer-flowering plant, in bloom from July to late August, although the dried heads will persist into September or October. Flowering time for other taxa ranges from spring to late summer (flowering time is given in TABLE 2). Where seeds are recovered we can assume the plant material was collected after flowering, although for many taxa the

TABLE 2. THE PLANT MACROFOSSILS RECOVERED FROM THE VESSEL SUMMARISED BY SAMPLE GROUP

Latin name	Common name/plant part	Main habitat/soil type	Sample group Vol. (ml) Flowering period	1	2	3
				523	150	150
<i>Pteridium aquilinum</i> (L.) Kuhn	Bracken pinnule tip	Woodland edge, acid	(May– Oct) ¹	532*	5	
<i>Pteridium aquilinum</i> (L.) Kuhn	Pinnae segments			72	1	
<i>Viola odorata</i> L. type	Sweet violet, pod segments	Woods, scrub, base rich	Feb–April	2		
<i>Viola odorata</i> L. type	Sweet violet, seeds	Woods, scrub, base rich	Feb–April	2		
<i>Ranunculus acris</i> / <i>repens/bulbosus</i>	Buttercups	Grassland	May–Aug	3		
<i>Ranunculus</i> cf. <i>repens</i> L.	Creeping buttercup	Damp grassland	May–Aug	2		
<i>Fumaria</i> sp.	Fumitory, seed	Arable, waste	May–Oct	1		
<i>Urtica dioica</i> L.	Common nettle, seed	Ruderal, woodland	May–Aug	1		
<i>Chenopodium album</i> L.	Fat hen, seed	Ruderal/arable	July–Sept	4		
Chenopodiaceae	Goosefoot family, seed			3		
<i>Spergula arvensis</i> L.	Corn spurrey, seed	Arable, calcifuge, sandy	June–Sept	1		
<i>Polygonum aviculare</i> L.	Knotgrass	Arable, ruderal	May–Oct	1		
<i>Fallopia convolvulus</i> (L.) Á. Löve	Black-bindweed seed	Arable, ruderal	May–Oct	1		
<i>Rumex</i> cf. <i>longifolium</i> L.	Northern dock	Wet meadows	July–Aug	1		
<i>Rumex</i> sp.	Docks			1		
<i>Primula</i> sp.	Primrose, Cowslip	Weeds, hedgebanks, grass	April–May	1		
<i>Potentilla erecta</i> (L.) Rawusch	Tormentil	Grass, scrub, mostly acid	May–Sept	1	1	
<i>Vicia</i> type	Vetch/Vetchling/Tare, pod frag.	Grassland	May–Oct	4		
<i>Trifolium</i> sp.	Clovers, calyx	Mostly grass	May–Sept	4		
cf. <i>Trifolium</i> sp.	cf. Clovers, seed			4		
<i>Polygala</i> cf. <i>vularis</i> L.	Common milkwort, seed	Grassland	May–Sept	1		
<i>Centaurea nigra</i> L.	Common knapweed, flower head	Grass, not grazed	June–late Aug	2		
<i>Centaurea</i> sp.	Knapweed flower head			22*		
<i>Centaurea</i> sp.	Knapweed seeds			13		
cf. <i>Centaurea</i> sp.	cf. Knapweed stem segments (g)			0.141*		
<i>Leontodon saxatilis</i> Lam.	Lesser hawkbit	Grass, calc to lightly acid	May–June	1		
<i>Carex</i> sp.	Sedges			2		
<i>Carex</i> sp.	Sedge, utricle			1		
Poaceae	grass, small seed			10		
cf. Poaceae	grass, large seeded (testa only)			5		
<i>Triticum spelta</i> L.	Spelt wheat glume base					1
cf. <i>Triticum spelta</i> L.	cf. Spelt wheat glume base			1		

Continued

TABLE 2. CONTINUED

Latin name	Common name/plant part	Main habitat/soil type	Sample group	1	2	3
			Vol. (ml)	523	150	150
			Flowering period			
Cerealia type chaff fragment	lemma/palea? shredded			1	+	
Indet. fruit (small)					1	
Indet. seed				8		
Indet. pod frags				2		
Indet. flower base/ attachment points				4		
Indet. cf. petal frags?					+	
Indet. stem frag.				++++	+	+
Fibrous string or textile frag.				1		
Indet. cf. moss?				+		
<i>Corylus/Alnus</i> type charcoal				2		
Assorted insect/arthropod fragments				++		
Modern chaff: <i>Triticum aestivum</i> lemma/palea, straw frags	glumes, grass			++		+++

* Material submitted for radiocarbon dating

¹ period in full leaf

flowers and seed pods will overlap and (particularly in the case of the *Primula* and *Viola*) seed pods will persist for weeks or months after flowering. The known time of flowering of plants represented by the main pollen types within the packing material and directly adhering to the vessels can also be used to estimate when the hoard was packed (flowering seasons are given in TABLE 3). When combined with the plant macrofossil evidence, the pollen evidence strongly suggests a July or August date for the cutting of the vegetation. It is not possible to establish how quickly the hoard was buried after packing. Experiments by the authors suggest bracken begins to dry and fold within a day or two of being cut, while the robustness of knapweed flowers means they may stay intact for several months. However, if the pollen external to the cauldron is contemporary with the original burial, then the hoard must have been buried in late summer or early autumn.

TABLE 3. FLOWERING SEASONS OF MAIN POLLEN TYPES ASSOCIATED WITH PACKING MATERIAL / ADHERING VESSELS

Latin name	Common name	Main habitat/soil type	Flowering period
<i>Papaver rhoeas</i> L.	Common poppy	Arable, waste	June–July
<i>Urtica dioica</i> L.	Common nettle	Ruderal, woodland	May–Aug
<i>Plantago lanceolata</i> L.	Ribwort plantain	Grassland	June–Aug
<i>Valerianella</i> sp.	Cornsalads	Arable, grass	April–June
<i>Succisa pratensis</i> (L.) Moench	Devil's-bit scabious	Woods, grass, damp ground	June–Oct
<i>Centaurea nigra</i> L.	Common knapweed	Grass, not grazed	June–late Aug
<i>Centaurea cyanus</i> L.	Cornflower	Arable	June–Aug

ORIGIN OF THE PLANT MATERIAL

The extraordinary assemblage of plant material recovered from within the Pewsey hoard is assumed to derive from vegetation used as packing material. Both the plant macrofossil and pollen evidence indicate a distinctive interior assemblage with only limited transfer of material to the outer elements of the hoard, and an absence of intrusive material in the interior. Collectively this biological evidence suggests much of the material may have been collected from environments today commonly associated in Wiltshire with woodland edges (including hedgerows), the base of walls, road sides or field margins. Grasses and knapweeds, coupled with sorrel, buttercups, ribwort plantain, primroses/oxlips and vetchling are all typically found within neutral grassland. In addition, the presence of betony, devil's bit scabious and vetch may be taken as an indicator of long continuity in the management of this grassland and the absence of phases of land use change such as ploughing or conversion to crops. While it may be feasible that the packing material was derived from a single location, it remains a possibility that it may have been sourced from different plant communities scattered around a settlement.

While the purple of the knapweed against the green of fresh bracken would have been striking, there is no evidence to indicate a deliberate floral bouquet offering. Bracken has a long history of use as a packing medium,³⁸ particularly for fresh fruit³⁹ and fish,⁴⁰ and it is likely the knapweed flowers, grasses and other vegetation was simply collected alongside the bracken. The soils of the Vale of Pewsey are variable from chalk marl to acidic Greensand, and there are considerable areas of overlap, such that the material could have been collected within a limited area despite the varied soil requirements of the different taxa.

The presence of a single spelt wheat glume base is of interest given the date for the deposit, although the presence of a single glume base is, of course, difficult to interpret. Spelt, a hulled wheat, in which the grain is held in tightly adhering glumes, is very much associated with Iron Age and Roman populations in Britain and was largely replaced by free-threshing wheat early in the Saxon period.⁴¹

WIDER ENVIRONMENT

The pollen and plant macrofossils associated with the packing material demonstrate a largely open grassland environment with probable areas of woodland edge along with enclosure/exclosure features such as walls and hedgerows. The pollen assemblage suggests areas of grassland, possibly grazed, associated with plants such as nettles, plantains and bracken, with some arable activity within the wider area suggested by the presence of poppies and cornsalads. The low presence/absence of cereal pollen in these interior samples suggests that grain crops were not within the immediate vicinity when the hoard was packed. Small woodland components are indicated by the presence of *Alnus glutinosa* (alder) and *Corylus avellana* (hazel), though any such woodland is likely to be restricted to localised areas of scrub or, for *Alnus glutinosa*, damp ground associated with the upper reaches of the river Avon.

Pollen associated with the exterior of the hoard showed a very different environment containing higher grass and cereal pollen values, implying burial within an arable field. Whether this reflects an arable field at the time of burial of the hoard, or contamination during its recent recovery, is unclear. The presence of modern chaff associated with the cauldron suggests in-wash during its recovery. However, in many instances pollen samples were taken from the thin residues directly adhering to the

³⁸ Campbell and Pelling 2013.

³⁹ Rymer 1976, 177.

⁴⁰ Page 1988, 27, fig. 3.

⁴¹ van der Veen and Palmer 1997; van der Veen *et al.* 2013; Greig 1991b.

hoard surfaces — surfaces that would have been in direct contact with the soil at the point of burial and subsequently became incorporated within the corrosion layers that permitted their preservation. It is therefore possible that this hoard burial site was an arable field at both burial and recovery stages; if this is correct, then it is probable that the hoard was deliberately buried below the plough zone.

RADIOCARBON DATING

Six samples including *Centaurea nigra* flower-heads, *Centaurea* stems and *Pteridium aquilinum* frond fragments were submitted to the ¹⁴CHRONO Centre, Queen's University, Belfast, Oxford Radiocarbon Accelerator Unit (ORAU) and Scottish Universities Environmental Research Centre (SUERC) for radiocarbon dating. The four samples submitted to ORAU and SUERC both failed during pre-treatment (TABLE 4).

Radiocarbon dating laboratory methods

The samples dated at the ¹⁴CHRONO Centre were pretreated using an acid wash, graphitised using hydrogen reduction,⁴² and dated by Accelerator Mass Spectrometry (AMS).⁴³

Quality assurance

The Queen's University laboratory maintains a continual programme of quality assurance procedures, in addition to participating in international inter-comparisons.⁴⁴ These tests indicate no significant offsets and demonstrate the validity of the precision quoted.

Radiocarbon results

The radiocarbon results given in TABLE 4 are quoted according to the international standard set at the Trondheim convention.⁴⁵ The measurements are conventional radiocarbon age.⁴⁶

The two radiocarbon determinations are not statistically consistent ($T^2=4.4$; $T^*(5\%)=3.8$; $v=1^{47}$), and given the other evidence all suggests that the plant remains were collected and deposited as part of a single event, this reproducibility is not within statistical expectations. Given the two measurements are consistent at the 1% confidence level, it is probable that one of them is a statistical outlier.

Bayesian modelling

The chronological modelling described below has been undertaken using OxCal 4.2,⁴⁸ and the internationally agreed calibration curve for the northern hemisphere (IntCal13⁴⁹). The model is defined by the OxCal CQL2 keywords and by the brackets on the left-hand side of FIG. 8. In the diagram, calibrated radiocarbon dates are shown in outline and the posterior density estimates produced by the chronological modelling are shown in solid black. The Highest Posterior Density intervals that describe the posterior distributions are given in italics.

⁴² Vogel *et al.* 1984.

⁴³ Reimer *et al.* 2015.

⁴⁴ Scott *et al.* 2010.

⁴⁵ Stuiver and Kra 1986.

⁴⁶ Stuiver and Polach 1977.

⁴⁷ Ward and Wilson 1978.

⁴⁸ Bronk Ramsey 1995; 2009a.

⁴⁹ Reimer *et al.* 2013.

The chronological model

The model shown in FIG. 8 uses the OxCal function COMBINE and s-type outlier model,⁵⁰ with each date being given a prior probability of 5% of being an outlier. In cases where measurements fail a χ^2 test, outlier detection⁵¹ can be used to downweight those measurements that most disagree with the others. The s-type outlier model assumes that any offsets are proportional to the uncertainty quoted in the date and means any shift in a measurement is drawn from a normal distribution that has double the measurement uncertainty.⁵²

Only UBA-32636 (14%) has a posterior outlier probability of more than 10%, and the outlier analysis downweights this date proportionately. The model provides an estimate for the date of deposition of the Pewsey hoard of *cal A.D. 255–295 (5% probability) or cal A.D. 320–430 (91% probability)*, probably *cal A.D. 340–405 (68% probability)*.⁵³ Further analysis shows it is 91.9% probable that the hoard was deposited before A.D. 410.

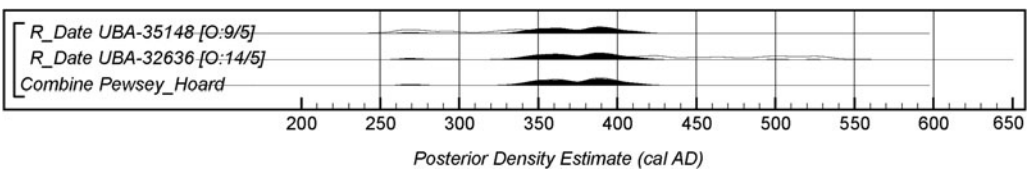


FIG. 8. Probability distribution of the dates from the Pewsey hoard. Each distribution represents the relative probability that an event occurs at a particular time. For each of the dates two distributions have been plotted: one in outline, which is the result of simple radiocarbon calibration, and a solid one, based on the chronological model used. Other distributions are based on the chronological model defined here, and shown in black. For example, the distribution ‘Pewsey Hoard’ is the estimated date when deposition of the hoard took place. Posterior/prior outlier probabilities are shown in square brackets. The large square brackets down the left-hand side of the figure along with the OxCal keywords define the model exactly.

TABLE 4. PEWSEY VESSEL HOARD: RADIOCARBON RESULTS

Laboratory no.	Material & Context	$\delta^{13}\text{C}$ (‰)	Radiocarbon Age (BP)
UBA-32636	Flower-head, <i>Centaurea nigra</i> (single) from a vessel hoard	-24.1 ± 0.22	1608 ± 37
GU43870	As UBA-32636		Failed to provide sufficient carbon
P42981	As UBA-32636		Dissolved during the base wash
P42532	<i>Pteridium aquilinum</i> frond fragments		Failed to provide sufficient carbon
GU44613	<i>Pteridium aquilinum</i> frond fragments		Failed to provide sufficient carbon
UBA-35148	<i>Centaurea</i> sp. stems	-26.2 ± 0.22	1714 ± 29

⁵⁰ Bronk Ramsey 2009a.

⁵¹ Bronk Ramsey 2009b; Christen 1994.

⁵² Christen 1994.

⁵³ This estimate is almost identical to the calibrated date range (*cal A.D. 265–420 (2 σ) or 345–405 (1 σ)*) of the weighted mean of the two measurements 1674 ± 23 BP).

THE WILCOT VESSEL HOARD: ORGANIC MATERIAL

Unlike the Pewsey hoard, the Wilcot vessel hoard was in a fragile state with the bases of most vessels (except the strainer) broken, which had allowed the overlying soils to penetrate the interior of the hoard. No visible plant macrofossil remains survived. Nonetheless, a pollen assessment of both the interior and exterior surfaces of the hoard was undertaken to establish whether any palaeoenvironmental signal could be recovered. Fifteen samples were examined from the four vessels, with the majority containing a pollen assemblage dominated by *Cichorium intybus*-type (chicory type, including dandelion) and Poaceae (grasses), a consistent presence of *Calluna vulgaris* (heather) and *Pteridium aquilinum* (bracken), and *Avena-Triticum*-type (oat-wheat) also well represented in most samples (FIG. 9). These samples show some strong similarities to the Pewsey hoard pollen group P-C (macrofossil group 3) samples. Unfortunately, at the time of recovery of the Wilcot hoard no surface sediment samples were taken by the finders that could have been used to establish the modern pollen signal at the site. This could have determined whether the sediment sampled from the hoard itself is a recent addition (and therefore breakage of the vessels bases was also recent).

Even though the Wilcot hoard pollen samples are dominated by locally derived pollen present within the soil, there still remains a secondary pollen signal that may relate to the pre-depositional environment. Statistically the two most distinctive samples (group W-A) are those from under the external rim of the Bassin Uni (sample W12) and from within the interior of the external surface of the strainer (sample W14). The main distinguishing features are the absence of *Calluna vulgaris* pollen, higher Poaceae and lower *Cichorium intybus*-type, along with a significantly higher pollen concentration in sample W12. Samples from the strainer (W13–15) also contained a higher abundance of Cyperaceae pollen. This could be derived from the local vegetation indicative of damp or wet areas or from contact with the strainer during use, from liquids passing over it (either straining or washing), or could relate to packing material. Alternatively, Cyperaceae pollen could derive from a domestic context such as sedges used as flooring or roofing.

VESSEL HOARDS IN CONTEXT

Radiocarbon dating allows us to locate the deposition of the Pewsey hoard in the fourth or early fifth century, and artefactual evidence indicates that the Wilcot hoard was deposited in the same period. The phenomenon of widespread hoarding in the fourth and fifth centuries in Britain is unusual, as hoarding in the wider Roman Empire beyond Britain is uncommon at this time.⁵⁴ Considerable resources have been invested in understanding the reasons for this pattern in recent decades, particularly since the advent of the PAS and the *Coin Hoards of Roman Britain* series.⁵⁵ Hoarding has previously been interpreted as a result of the apparently especially rapid ending of Roman imperial authority in Britain.⁵⁶ Kennett⁵⁷ in his study of late Roman bronze hoards also suggests that the deposition of these hoards is indicative of the troubled nature of the last years of Roman Britain. Guest argues that the hoarding of late Roman metalwork perhaps belongs to the post-Roman period, which shares characteristics of the practices of ‘barbarian societies’

⁵⁴ Kent 1994; Bland 1997; Guest 1997b; Hobbs 2005; 2006; Bland 2013; Bland *et al.* 2013; Bland 2014; Guest 2014; Lundock 2015.

⁵⁵ Manning 1972; Kent 1994; Robertson 2000; Hobbs 2005; 2006; Lee 2009; Bland 2013; Bland *et al.* 2013; Bland 2014; Lundock 2015; Bland *et al.* in press.

⁵⁶ Walton 2012; Bland 2013; 2014; Guest 2014.

⁵⁷ Kennett 1971, 148.

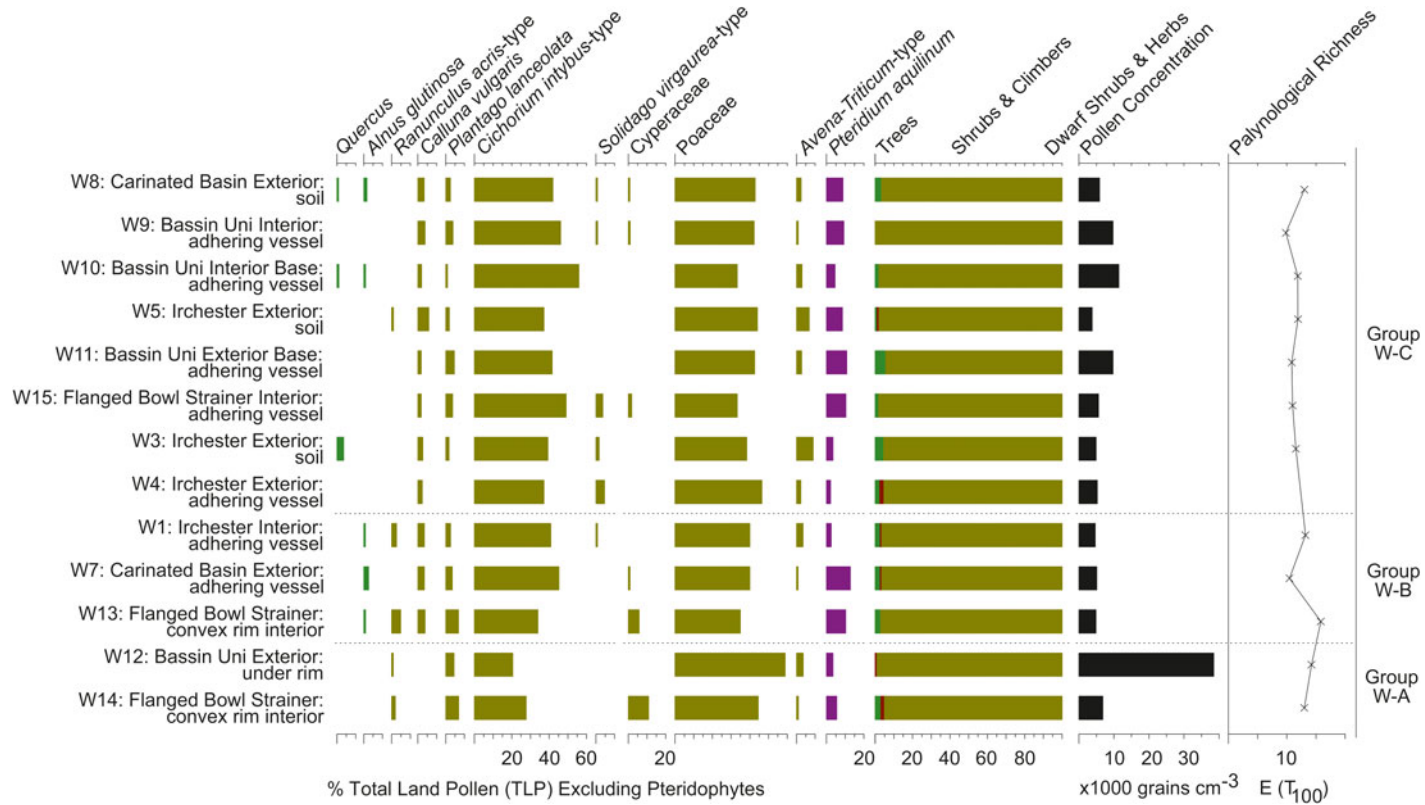


FIG. 9. Summary pollen diagram (selected taxa) of samples obtained from the Wilcot hoard.

as hoarding is more common outside the Empire's frontiers, particularly in Scandinavia.⁵⁸ A number of recent studies have emphasised that hoarding occurs for reasons beyond traditional interpretations.⁵⁹ In general, it is important to distinguish between vessel and coin hoards, and between base and precious metal hoards.

Vessel hoards form part of a wider pattern of hoarding in late Roman Britain, and several late Roman copper-alloy vessel hoards contain cauldrons and Irchester bowls.⁶⁰ Their distribution (FIG. 10) appears to predominantly mirror broader distribution patterns of material wealth in Roman Britain.⁶¹ Unfortunately, the Drapers' Gardens hoard from London is the only example excavated using modern archaeological techniques.⁶² The hoard was deposited after A.D. 375 and consists of 20 copper-alloy, lead and iron vessels, including an Irchester bowl.⁶³ As with the Wilcot hoard and possibly the Pewsey hoard, some of these vessels are early Roman, demonstrating that they had been curated for a long period.⁶⁴ The hoard's association with deliberately broken artefacts and a partial juvenile red deer skeleton has led to its interpretation as a votive deposit, perhaps marking the end of occupation in one particular part of *Londinium*.⁶⁵ The red deer was aged four or five months, perhaps suggesting that the hoard was deposited in the autumn or early winter.⁶⁶ As discussed above, the Pewsey hoard was probably deposited in late summer or early autumn of a year in the period *cal* A.D. 340–405 (68% probability).

The Pewsey hoard is unusual in a number of respects. The inclusion of scale pans is unparalleled in copper-alloy hoards from the fourth century. An equal arm balance and a steelyard were included in the Santon hoard of late Iron Age and early Roman objects deposited within a cauldron.⁶⁷ The inclusion of the scale pans suggests that this was not exclusively a hoard of tableware or vessels for ablution.⁶⁸ No scale arm, chains or weights are present in the Pewsey hoard, suggesting that the scale pans were selected from a wider repertoire of material culture for deposition, other elements of which were unavailable or rejected. Cauldrons are also unusual in vessel hoards from Roman Britain; Lundock⁶⁹ lists only 17 cauldrons from such hoards, all of which are from late Roman structured deposits. Many such structured deposits consist of vessels nestled within one another in a similar manner to the Pewsey vessel hoard, e.g. those from Wilcot, Irchester, Amersham and Weeting.⁷⁰ Such copper-alloy hoards have recently been interpreted as votive deposits; metal vessels may have been perceived to be appropriate gifts to the gods in this period.⁷¹

Ideas of structured deposition were first explicitly articulated by Richards and Thomas⁷² and were further developed by Hill⁷³ for Iron Age Wessex; Pollard,⁷⁴ Garrow⁷⁵ and

⁵⁸ Hobbs 2006; Guest 2014.

⁵⁹ Hobbs 2006; Bland 2013; Guest 2014, 126; Hobbs 2016.

⁶⁰ Lundock 2015.

⁶¹ Walton 2012.

⁶² Gerrard 2009.

⁶³ Gerrard 2009.

⁶⁴ Gerrard 2009, 554.

⁶⁵ Gerrard 2009.

⁶⁶ Gerrard 2009, 179.

⁶⁷ Smith 1909; Smither 2016.

⁶⁸ Lundock 2015.

⁶⁹ Lundock 2015, 195–206.

⁷⁰ Kennett 1971; Gregory 1977; Farley *et al.* 1988.

⁷¹ Gerrard 2009; Lundock 2015.

⁷² Richards and Thomas 1984.

⁷³ Hill 1995.

⁷⁴ Pollard 2001.

⁷⁵ Garrow 2006.

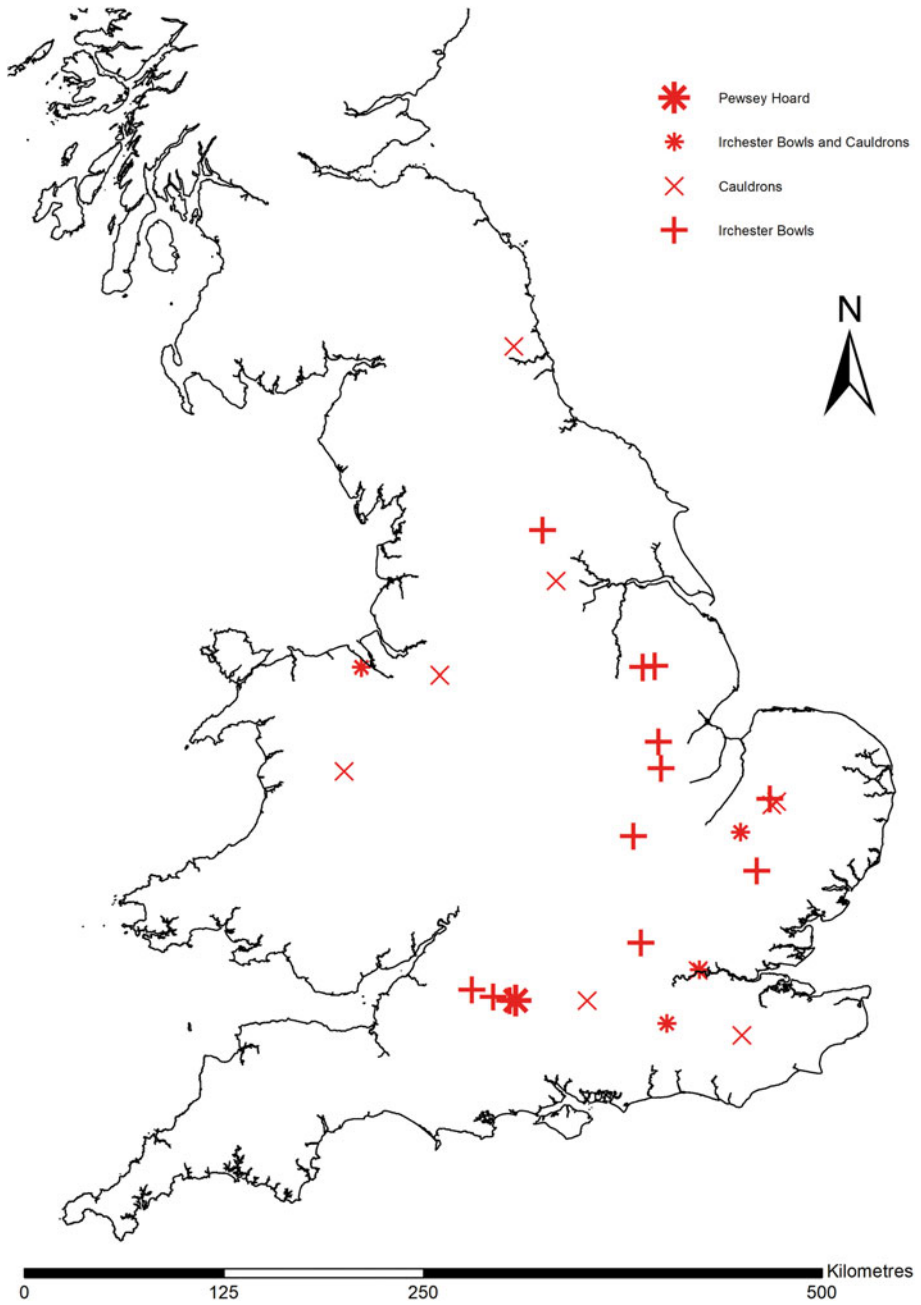


FIG. 10. Distribution of Irchester bowls and cauldrons in Britain.

many others for the Neolithic; and Clarke,⁷⁶ Fulford,⁷⁷ Woodward and Woodward,⁷⁸ and Hingley⁷⁹ (amongst many others) for the Roman period. There has sometimes been an elision of the concepts of 'structured' and 'ritual' deposition in work that has attempted to follow these studies,⁸⁰ with the extent to which a deposit is made in a formalised or spatially organised manner, or contains unusual (or unusually altered) artefacts or ecofacts used to suggest a range of ritual associations.⁸¹ Diverse and interwoven motivations are cited for the creation of such deposits, from apotropaic or chthonic practices⁸² to symbolising a transition in the terms of interaction between a community and place. Chadwick⁸³ highlights that the dichotomy between structured/ritual and unstructured/ordinary is false, and that the depositional practices that are often interpreted as 'ritual' and 'structured' are only part of the spectrum of practice deriving from wider *habitus* and cosmologies. Whilst some acts of deposition were part of formalised, perhaps even mysticised, acts, these represent points on a continuum stretching from *defixiones*⁸⁴ and large-scale animal sacrifice⁸⁵ to the shifting of middens⁸⁶ and disposal of domestic waste.⁸⁷ It is thus not useful to consider the structured nature of the deposition of these hoards as evidence for ritual in a general sense, or as an interpretation in itself.⁸⁸ Instead, the character of the deposits and social contexts of deposition should be examined to locate this particular act within local and regional practice.

The Pewsey vessel hoard clearly demonstrates a degree of formality and care in its packing and deposition. The interior of vessel B, which contained four scale pans, was packed with bracken, a widely used packing material in more recent times,⁸⁹ and a range of stem material and flowers that may have been gathered from local grassland or along boundaries such as woodland edges, walls or hedgerows. The placement of the vessels and the packing demonstrates care, the focus of which appears to be the scale pans. Indeed, the evidence presented above suggests that the entire configuration of the vessels and packing enfolds and protects the four scale pans; although no mineralogical preservation was present in the outer layers of the hoard, the difference in character of the plant macrofossil assemblage suggests that only the inner cavity of the hoard was packed with plant material.

The closest parallel in terms of packing comes from a set of bowls recovered from the Hoxne hoard, which were wrapped within linen cloth (identified from the fibres within textile fragments adhering to the outer vessel), while wheat (*Triticum* sp.) straw was used as padding between the stacked bowls.⁹⁰ The paucity of comparable examples from Roman Britain is likely due to the unusual preservation of this hoard, rather than a lack of organic packing material generally. Scale pans have not been found in other vessel hoards⁹¹ and represent a divergence in function from other elements of the hoard, which appear to comprise bowls associated with eating and

⁷⁶ Clarke 1997.

⁷⁷ Fulford 2001.

⁷⁸ Woodward and Woodward 2004.

⁷⁹ Hingley 2006.

⁸⁰ e.g. Lundock 2015.

⁸¹ cf. Chadwick 2010.

⁸² Serjeantson and Morris 2011.

⁸³ Chadwick 2012.

⁸⁴ Tomlin 2010.

⁸⁵ King 2005.

⁸⁶ Chadwick 2012, 290.

⁸⁷ Gardner 2002, 331.

⁸⁸ cf. Garrow 2011; Chadwick 2012.

⁸⁹ Campbell and Pelling 2013.

⁹⁰ Johns 2010, 95; Cartwright 2010, 191.

⁹¹ Lundock 2015.

accompanying ablutions. The paired scale pans indicate that they were from an equal balance or a dual balance used to weigh smaller quantities of goods rather than steelyards, which were used to weigh heavier goods such as grain. Smither⁹² argues that most weighing instruments were used in the more 'Romanised' areas of Britain, and while they occur from the first century onwards they become more common in rural areas only in the fourth century. It is suggested that equal and dual balances played an important role in metal-working and cloth-dying and were associated with trade and production.⁹³ Finds of individual scale pans from the Roman period are uncommon, with Smither⁹⁴ recording only 13 examples.

Two explanations appear plausible for the presence and centrality of the scale pans in this structured deposit. Firstly, the scale pans may have been included because of their economic value alongside other copper-alloy vessels. This argument explains the combination of objects of different functions by considering them more broadly as metal artefacts valuable to the community or individual burying them. Although copper-alloy vessels are not found in hoards considered to be created primarily as repositories of economic value in the late Roman or post-Roman period (e.g. Traprain Law or the Hoxne hoard⁹⁵), this is not necessarily the case in southern Britain where coinage appears to be the principal means of deposited wealth.⁹⁶ Value is also relative; the vessels may not have belonged to a particularly wealthy and powerful group or individual and could have been the most valuable possessions of a farming community, while value may also be imbued through use, ownership or gift. This argument does not, however, fully explain either the careful configuration of the vessels overall, or the care taken to pack the scale pans in particular.

Secondly, it may be that the symbolic or social associations of the scale pans led to their careful packaging. The four scale pans appear to be pairs and would represent two sets of equal or dual balance scales. It is suggested that these scales played an important role in manufacture and are less common on rural sites.⁹⁷ It is likely that the scale pans had associations with weighing and measuring, particularly small or valuable objects where a higher degree of precision was essential, although their burial without the other components of the scales suggests an element of symbolic inclusion in the burial assemblage, rather than a direct practical reference.

The hoard was probably buried in late summer, around the time of the arable harvest, or just after, possibly in an arable field. The timing of deposition may have been significant: the late weeks of summer would have seen intensive activity in processing crops and preparing grain for storage.⁹⁸ Late summer was a key period for agricultural communities in the ancient world, and one celebrated in Roman Italy and beyond with festivals in late August.⁹⁹ Taken together, the material associations of the two hoards' constituent artefacts, their context and the seasonality of deposition suggest that these acts of deposition may have been apotropaic rituals, aimed to engender continuing fertility, particularly at a time of increasing social instability, through the deposition of items of symbolic and cultural value associated with weighing and dining.¹⁰⁰

⁹² Smither 2016.

⁹³ Smither 2016; 2017.

⁹⁴ Smither 2016.

⁹⁵ Hunter and Painter 2013; Johns 2010.

⁹⁶ Hobbs 2005.

⁹⁷ Smither 2016.

⁹⁸ Stevens 2003.

⁹⁹ Henig 1983.

¹⁰⁰ Chadwick 2012 provides wider insight into such practices.

REGIONAL CONTEXT

To understand the context in which the Pewsey and Wilcot hoards were deposited, we must consider their social and landscape context in the late Roman period. At this time the Vale of Pewsey was a mixed agricultural and industrial landscape, possibly with wetlands in its lowest lying areas. Late Roman Wiltshire was a productive and wealthy agricultural landscape, able to produce considerable quantities of grain for export to the Continent¹⁰¹ alongside other goods traded in the region.¹⁰² Two Roman kilns excavated in the nineteenth century within a short distance of the Pewsey hoard¹⁰³ are associated with the production of early Roman Savernake ware, similar to the kilns from Orme, further north-west of the hoard.¹⁰⁴ Swan¹⁰⁵ also suggests that a Romano-British settlement of second- to fourth-century date was associated with the kiln site, but no other reference to this has been found. Two possible villas at Sunnyhill Farm and Milton Lilbourne lie short distances to the west and south-east of the Pewsey hoard respectively, although their identifications as villas rest on limited evidence of structural material and box-flue tiles respectively.¹⁰⁶ A more securely identified villa lies further west, at Stanchester,¹⁰⁷ north-west of Wilcot, across a stream from the location where the Wilcot hoard was deposited; and a second rural settlement with masonry buildings has been excavated *c.* 1 km to the north-east.¹⁰⁸ Further Roman settlements have been identified on the southern escarpment of the Marlborough Downs,¹⁰⁹ and in the valley base further to the west.¹¹⁰ Draper¹¹¹ demonstrates that several such agricultural settlements across Wiltshire were occupied until the very end of the fourth century, and probably into the fifth.

In general, secure late Roman and post-Roman evidence in much of Wiltshire is limited. Late Roman coinage is the largest dataset available for the end of the Roman period and its distribution provides a proxy for economic and social activities. To this end, a synthesis of all late Roman coins and coin hoards from Wiltshire has been undertaken using PAS data, including data from the 'Hoarding in Iron Age and Roman Britain' project,¹¹² itself incorporating data from Robertson.¹¹³ These numismatic data were analysed using Reece's ABCD analysis, rather than the finer grained Reece period analysis,¹¹⁴ allowing a broader view of coin use and length of circulation.¹¹⁵ Despite this, the broader brush ABCD analysis is also flawed when analysing trends in the fourth century, as Reece's period D (A.D. 330–402) combines the Valentinianic period with the periods before and after; in Wiltshire and surrounding counties Valentinianic period coins are found in far greater quantities than the national average.¹¹⁶ Reece's period D has therefore been split into D (A.D. 330–364, pre-Valentinianic) and E (A.D. 364–402, Valentinianic and later).¹¹⁷

¹⁰¹ Moorhead 2001b, 94–5; Draper 2006.

¹⁰² Timby 2001; Draper 2006.

¹⁰³ Cunnington 1893.

¹⁰⁴ Swan 1975.

¹⁰⁵ Swan 1975, 37.

¹⁰⁶ Scott 1993, 204.

¹⁰⁷ Scott 1993, 209.

¹⁰⁸ Thompson 1971; Scott 1993, 209.

¹⁰⁹ Swan 1975; Timby 2001; Carpenter and Winton 2011.

¹¹⁰ Corney *et al.* 1994; Carpenter and Winton 2011; Linford *et al.* 2013a; 2013b.

¹¹¹ Draper 2006, 54–5.

¹¹² Bland 2013; 2018.

¹¹³ Robertson 2000.

¹¹⁴ Reece 1973; 1995; Walton 2012; Moorhead 2001a; 2015.

¹¹⁵ Reece 1988.

¹¹⁶ Moorhead 2001a.

¹¹⁷ Henry and Ellis-Schön 2017; Henry 2018b.

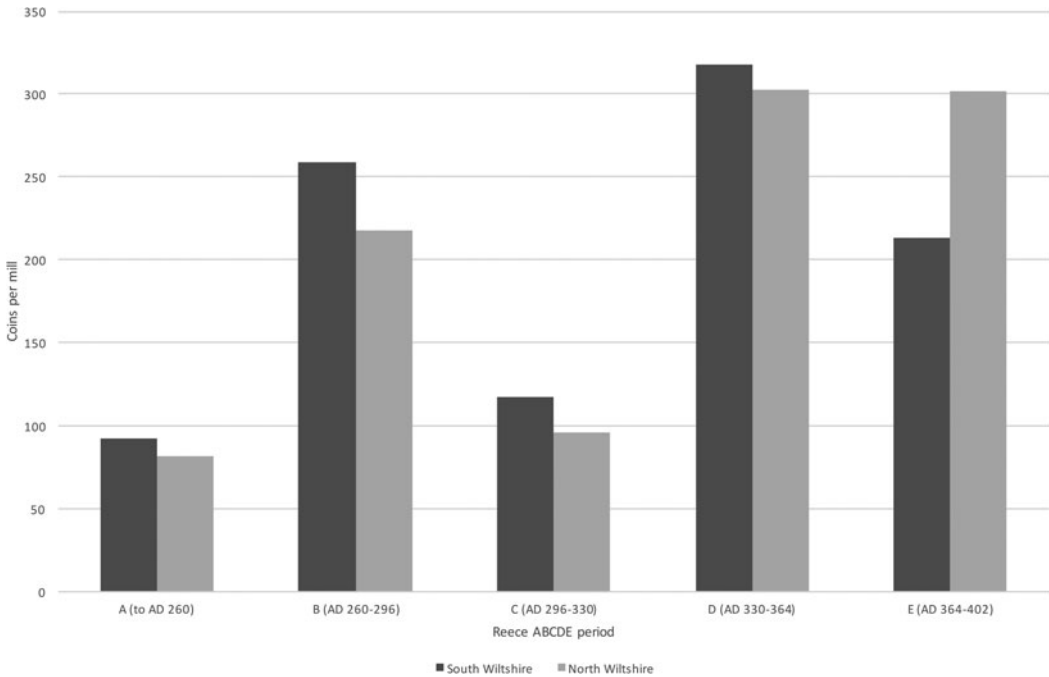


FIG. 11. Reece ABCDE diagram of coin finds from north and south Wiltshire.

This regional Valentinianic peak may highlight an increase in rural activity possibly associated with the increased export of grain to the Continent beginning in the reign of Julian the Apostate (A.D. 355–363)¹¹⁸ and the presence of state operatives in the region.¹¹⁹ Copper-alloy Valentinianic issues often show significant levels of wear¹²⁰ and have been found in hoards such as Bishops Cannings, which was deposited after A.D. 402.¹²¹ This suggests that at least some Valentinianic coins remained in circulation and served a monetary purpose along with later Theodosian bronze issues circulating in large quantities as part of a tri-metallic currency system which was in use into the early fifth century.¹²²

The PAS numismatic dataset from Wiltshire for Period D consists of 14 coin hoards and 4,935 stray finds, with 28 coin hoards and 3,863 stray finds for Period E. Brindle¹²³ has set out the biases in the PAS dataset for Wiltshire, developing the pioneering work of Robbins.¹²⁴ Henry¹²⁵ has mapped ‘hard’ constraints (where metal-detecting is banned) and ‘soft’ constraints (where metal-detecting is unlikely) on metal-detecting in Wiltshire, and these are shown alongside coin distributions here to provide context for areas that would otherwise appear as indicating an absence of evidence. The major biases of distribution include large Ministry of Defence and

¹¹⁸ Moorhead 2001b; Moorhead and Stuttard 2012, 206–8; Bland *et al.* 2013, 133; Brindle 2014.

¹¹⁹ Moorhead 2005, 158; Esmonde Cleary 2017.

¹²⁰ Moorhead 2001a.

¹²¹ Guest 1997a; 1997b; Moorhead 2001a.

¹²² Guest 1997b; Moorhead 2001a; 2006; Walton 2012; Bland *et al.* 2013; Guest 2014; Moorhead and Walton 2014.

¹²³ Brindle 2014, 15–21.

¹²⁴ Robbins 2013.

¹²⁵ Henry 2018b.

National Trust landholdings, where metal-detecting is prohibited, and the urban sprawl of Swindon, which prevents detecting in much of the north-east of the county.

The distributions for north and south Wiltshire — Salisbury Plain forms the division — show that proportionally more coins are found in Period E than Period D in north Wiltshire (FIG. 11). The distribution of finds in these periods reinforces this pattern, with a significant shift in Period E in the distribution of large coin hoards and coin finds in general towards the central part of north Wiltshire, primarily the Vale of Pewsey and the hinterlands of *Cunetio*, *Verlucio* and Wanborough to the north of the Vale (FIG. 12).

This shift is further emphasised by the distribution of late Roman belt fittings, which cluster quite strongly in the same region as Period E coins, and by the contrast between the distributions of clipped and unclipped silver siliquae (FIG. 13). Belt fittings are a key artefact group associated with late Roman military groups¹²⁶ and as such likely to be associated with late Roman — including Theodosian — activity at *Cunetio* and possibly *Verlucio*.¹²⁷ After A.D. 364 there is a sharp increase in the supply of gold and silver coinage that correlates with the increase in siliquae recorded as stray finds in Britain.¹²⁸ The clipping of siliquae is generally accepted to have become widespread at the beginning of the fifth century and to have continued until at least A.D. 420, and possibly even to the middle of the fifth century;¹²⁹ it thus coincides with the latest part of the possible date range for both vessel hoards. King¹³⁰ suggests that clipping is a post-Roman phenomenon undertaken by the British, because clipping is common in areas of the South-West, where there is no evidence of Saxon settlement in the earlier fifth century.¹³¹ Moorhead¹³² notes that regions with less Anglo-Saxon contact could provide a setting for the continued use of bronze coinage and clipped coins are likely to have circulated with bronze issues.¹³³ Clipping thus provides an indication of coin use in the decades after the end of Roman Britain.¹³⁴ Twenty-one hoards have been recorded from Wiltshire which have *termini post quem* of A.D. 378 or later, including heavily clipped examples, such as a hoard from Everleigh near Pewsey.¹³⁵ A small number of unclipped hoards from the county also have very late *termini post quem*, including the Stanchester hoard, found close to the Wilcot hoard, which included three solidi of Honorius dating to A.D. 405–406.¹³⁶

The concentration of clipping in central-north Wiltshire is thus likely to demonstrate the continued use of Roman coinage with the implication of a monetary economy into the early post-Roman period, i.e. the latter part of the possible date range of these vessel hoards. Given the lack of clipping in southern Wiltshire, despite considerable quantities of siliquae in circulation, the clipping in central-north Wiltshire requires explanation. For clipping to occur, siliquae (along with nummi) must surely still have played an important role as currency or in exchange.¹³⁷ Clipped siliquae and nummi minted after A.D. 408 from the parish of Box in Wiltshire suggest the presence of, or at least contact with, late Roman officialdom amongst sections of post-Roman society.¹³⁸ The evidence for a continuing monetary use for siliquae, possible contact with late Roman officialdom and the concentration of very late Roman belt

¹²⁶ Hawkes and Dunning 1961; Esmonde Cleary 2017; Leahy 2007.

¹²⁷ Corney 2001.

¹²⁸ Bland 2013; 2018; Henry and Algar 2018.

¹²⁹ King 1981; Spufford 1988; Abdy 2000; Guest 2005; Walton 2012; Abdy 2013; Bland *et al.* 2013; Bland 2018.

¹³⁰ King 1981.

¹³¹ Austin 2014.

¹³² Moorhead 2006.

¹³³ Walton 2012, 111.

¹³⁴ Walton 2012.

¹³⁵ Hinds 2009; Henry and Algar 2018.

¹³⁶ Abdy 2000; 2009.

¹³⁷ Guest 2005, 114; Hobbs 2005; Walton 2012; Moorhead and Walton 2014; Esmonde Cleary 2017.

¹³⁸ Moorhead 2006; Walton 2012.

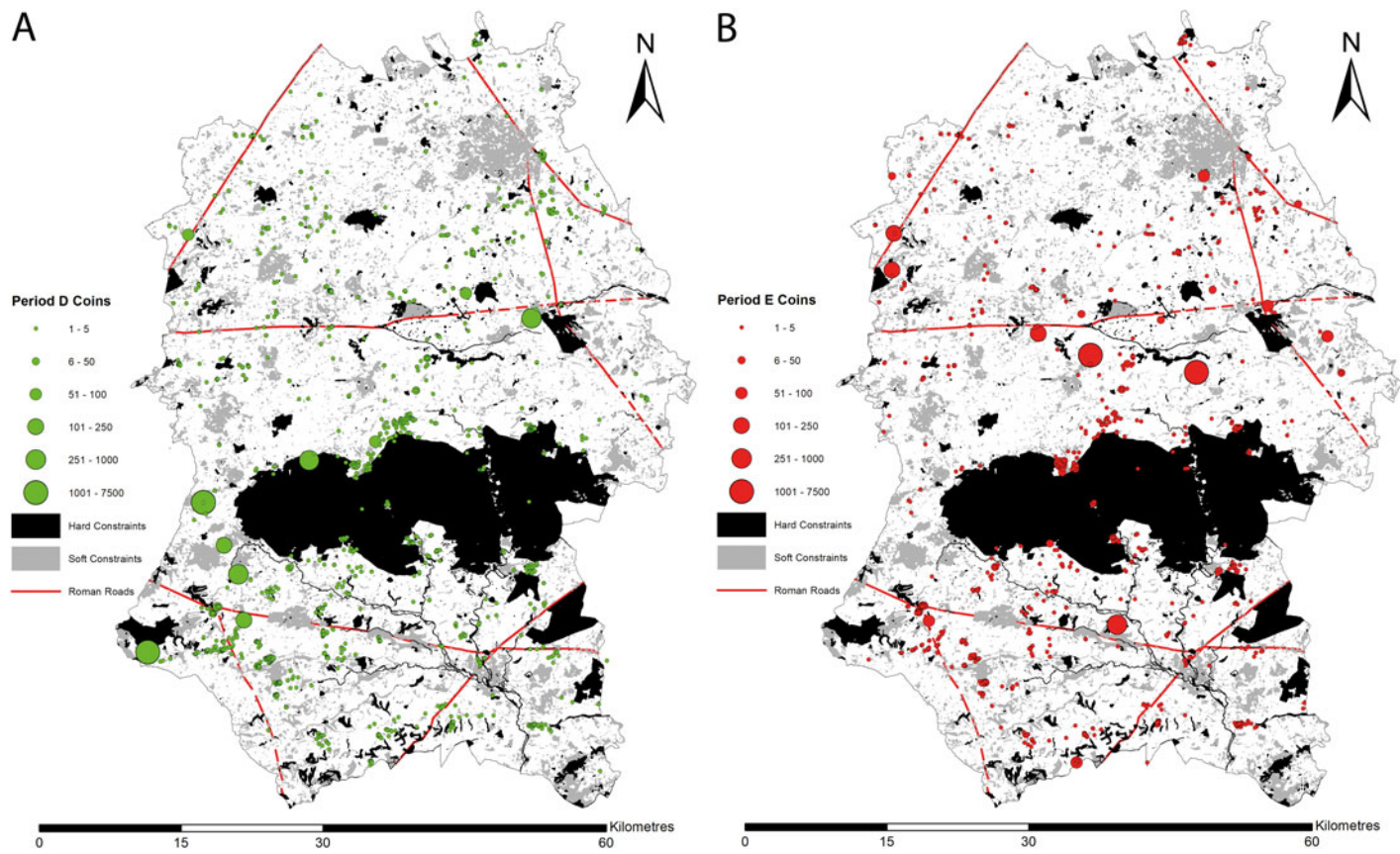


FIG. 12. Distribution of Period D (A) and Period E (B) coins in Wiltshire.

findings suggest that this area of central Wiltshire may have seen continuity of control into the immediate post-Roman period by late Roman military groups based on the fortified towns of *Cunetio* and *Verlucio*.¹³⁹

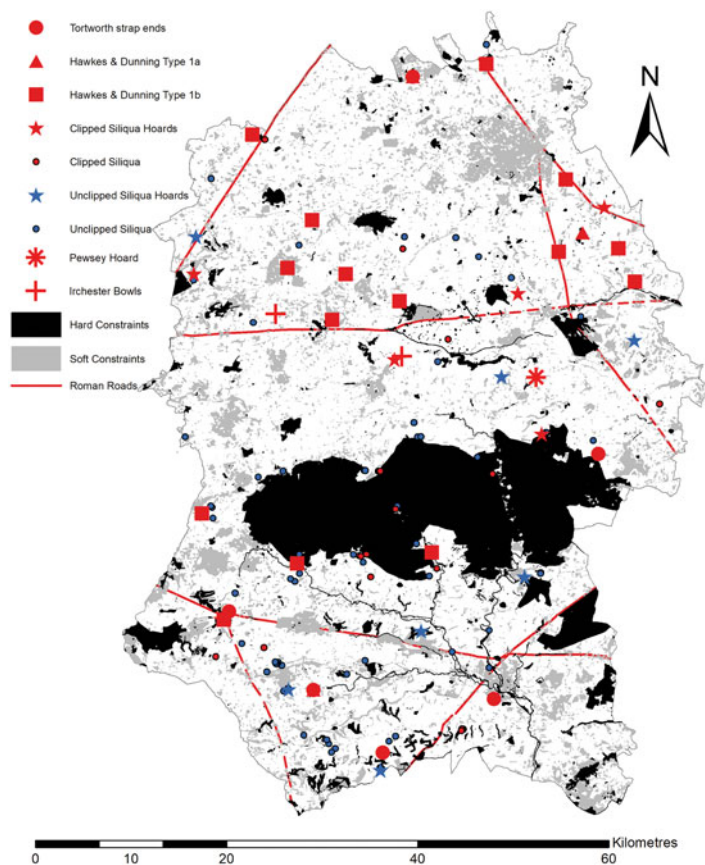


FIG. 13. Distribution of hoards containing siliquae with no clipping, hoards containing siliquae including clipped coins, clipped and unclipped siliquae stray finds, Hawkes and Dunning belt fittings, Tortworth strap ends, Irchester bowls and the Pewsey hoard.

A HOLISTIC VIEW OF THE PEWSEY AND WILCOT VESSEL HOARDS

The Pewsey and Wilcot hoards provide insights into the late fourth and early fifth centuries in the Vale of Pewsey, on the cusp of major changes to landscape and society. The unusual configuration of the Pewsey hoard and the survival of organic remains demonstrate that considerable care was taken to protect the scale pans at the centre of the hoard; although preservation conditions were not so beneficial for the Wilcot hoard, the nestled pans hint that similar care was taken in deposition. The collection of Romano-British vessels and scale pans and their symbolic associations with

¹³⁹ Corney 2001.

Romano-British ways of eating, ablution and weighing, their deposition in an apparently apotropaic act echoing long-held traditions in Iron Age and Romano-British rural life and the presence of spelt wheat, all attest to an enmeshment of lifeways with long-term roots in the locality.

The hoards were deposited at a time and in a place where social and economic circumstances were beginning to change significantly; but these were not impulsive acts in order to protect material wealth from raiders. Instead, their deposition may illustrate the continuing importance of ensuring a good harvest, even in unstable times. It is also possible that the chronological and symbolic transition of the harvest provided a stimulus for this deposition in a wider sense. The community or individual depositing these vessels were entering a period of social, economic and political upheaval, but as the regional evidence for coinage shows, in some respects the Vale of Pewsey saw significant continuity in the later fourth and early fifth centuries in comparison to southern Wiltshire and beyond. Society in the west of Britain changed differently in the late fourth and fifth century A.D. to that in eastern Britain,¹⁴⁰ but still saw major changes such as the collapse of the monetary economy,¹⁴¹ a reduction in agricultural output,¹⁴² the abandonment of villas, many of which had already seen changes from luxury accommodation to industrial activity,¹⁴³ and the advent of new styles of material culture, ways of burial and settlement.¹⁴⁴ This wider transition may have altered attitudes to the vessels in the hoard, perhaps making them more appropriate for deposition than they had been in previous years. The knowledge and attachment to Romano-British practices discussed above may also have extended to the realisation of their passing. Of course, this is speculation, but there must have been a powerful combination of factors behind the deposition of such vessels, given the rarity of such hoards.

The circumstances of the retrieval of these hoards were not ideal, but their reporting to the PAS and the retention of sediment and plant material from these hoards by their finders have allowed a series of rare insights into hoarding in late Roman Wiltshire and beyond. Without the PAS and the relationships it has built with metal-detectorists, all of this information would have been lost. This case study also demonstrates the importance of engagement with environmental and scientific dating specialists when hoards are discovered, even if finds have not been archaeologically excavated, and the importance of not cleaning such artefacts prior to this advice being sought. Every effort must be made to undertake similar work on other late and potentially post-Roman material, to allow more nuanced narratives of this period of upheaval and change across England.

ACKNOWLEDGEMENTS

The analysis of the Pewsey hoard is a collaboration between the Portable Antiquities Scheme, COARS (University of Southampton), Historic England and the Wiltshire Museum, Devizes. The radiocarbon dates were funded by Historic England. Thank you to Nick Griffiths for his assistance with the illustrations and Steve Baker for assistance with the photography. Thanks to Dr Derek Pitman, Dr James Gerrard, Dr Bruce Eagles, Nick Griffiths and Mark Corney for their assistance with the article. The macrofossil analysis was undertaken by Dr Ruth Pelling, Senior Archaeobotanist at Historic England. Funding for the pollen analysis for both the Pewsey and Wilcot hoards undertaken by Dr Michael Grant came from a Community Outreach Grant provided by COARS. The Association for Roman Archaeology funded the illustrations for the Pewsey hoard by Nick Griffiths and the conservation of the organic materials. The

¹⁴⁰ White 2007; Gerrard 2013.

¹⁴¹ Guest 1997b; Moorhead 2001b.

¹⁴² Gerrard 2013.

¹⁴³ Draper 2006, 51–4; King *in press*.

¹⁴⁴ Eagles 2001; Annable and Eagles 2010.

Roman Finds Group funded the illustrations of the Wilcot hoard by Nick Griffiths. Wiltshire Museum funded the analysis of the ceramic material from the excavation of the Pewsey hoard. The excavation of the findspot was directed by Dr David Roberts (Historic England) with the assistance of the Assistant County Archaeologist, the Wiltshire Archaeology Field Group and the finders. Artefactual analysis from the excavation and post-excavation management were conducted by Rebecca Venn of the PAST Landscapes Project. Richard Henry led the development of the research presented in this paper, and undertook artefactual analysis. David Roberts contributed extensively to the discussions of regional context and landscape, including creating distribution maps and ¹⁴CHRONO Centre, Queen's University Belfast undertook the radiocarbon dating. Neither hoard meets the criteria of the Treasure Act 1996 and therefore thanks should be given to the finders who after their initial discovery reported the find. The finders of the Pewsey hoard generously donated the organic material from the hoard to Wiltshire Museum to allow detailed further research (DZSWS:2016.15).

University of York (R.H.)

Richard.Henry@york.ac.uk

Coastal and Offshore Archaeological Research Services (COARS), Ocean and Earth Science, National Oceanography Centre Southampton, University of Southampton (M.J.G.)

M.J.Grant@soton.ac.uk

Historic England (R.P.; D.R.; P.M.)

Ruth.Pelling@historicengland.org.uk

David.Roberts@historicengland.org.uk

Peter.Marshall@historicengland.org.uk

BIBLIOGRAPHY

- Abdy, R. 2000: 'Stanchester, Wiltshire', in R. Bland and L. Voden-Decker (eds), *Treasure Annual Report 2000*, 123–4, <https://finds.org.uk/documents/treasurereports/2000.pdf> (Accessed 27/10/2016)
- Abdy, R. 2009: 'Stanchester, Wiltshire', in R. Abdy, E. Ghey, C. Hughes and I. Leins (eds), *Coin Hoards from the British Isles, Vol. XII*, Wetteren, 366–74
- Abdy, R. 2013: 'The Patching hoard', in Hunter and Painter 2013, 105–13
- Annable, F.K., and Eagles, B. 2010: *The Anglo-Saxon Cemetery at Blacknall Field, Pewsey, Wiltshire*, Devizes
- Austin, M. 2014: 'Rethinking Hardown Hill: our westernmost early Anglo-Saxon cemetery', *The Antiquaries Journal* 94, 49–69
- Bennett, K.D. 1994: *Annotated Catalogue of Pollen and Pteridophyte Spore Types of the British Isles*, unpub. manuscript, University of Cambridge
- Bennett, K.D., Whittington, G., and Edwards, K.J. 1994: 'Recent plant nomenclatural changes and pollen morphology in the British Isles', *Quaternary Newsletter* 73, 1–6
- Biek, L. 1963: *Archaeology and the Microscope*, London
- Bienert, B. 2007: *Die römischen Bronzegefäße im Rheinischen Landesmuseum Trier*, *Trierer Zeitschrift* 31, Trier
- Bland, R. 1997: 'The changing patterns of hoards of precious-metal coins in the Late Empire', *L'antiquité tardive* 5, 29–55
- Bland, R. 2013: 'Hoarding in Britain: an overview', *British Numismatic Journal* 83, 214–38
- Bland, R. 2014: 'Hoarding in Iron Age and Roman Britain 2: the puzzle of the late Roman period', *British Numismatic Journal* 84, 9–38
- Bland, R. 2018: *Coin Hoards and Hoarding in Roman Britain AD 43–c.498*, London
- Bland, R., and Orna-Ornstein, J. (eds) 1997: *Coin Hoards from Roman Britain X*, London
- Bland, R., Moorhead, T.S.N., and Walton, P. 2013: 'Finds of late Roman silver coins from Britain: the contribution of the Portable Antiquities Scheme', in Hunter and Painter 2013, 117–66
- Bland, R., Chadwick, A., Ghey, E., Haselgrove, C., and Mattingly, D. in press: *Iron Age and Roman Coin Hoards in Britain*, Oxford

- Brindle, T. 2014: *Portable Antiquities Scheme and Roman Britain*, London
- Bronk Ramsey, C. 1995: 'Radiocarbon calibration and analysis of stratigraphy: the OxCal program', *Radiocarbon* 37, 425–30
- Bronk Ramsey, C. 2009a: 'Bayesian analysis of radiocarbon dates', *Radiocarbon* 51, 337–60
- Bronk Ramsey, C. 2009b: 'Dealing with outliers and offsets in radiocarbon dating', *Radiocarbon* 51, 1023–45
- Campbell, G., and Pelling, R. 2013: *The Palaeoethnobotany of Pteridium aquilinum (L.) Kuhn (Bracken): Myriad Past and Present Uses from Documentary Evidence and the Archaeobotanical Record*, Poster presented at the IWGP, Thessaloniki, <http://iwgp-2013.web.auth.gr/images/Posters/campbell%20and%20pelling.pdf> (Accessed 27/10/2016)
- Carpenter, E., and Winton, H. 2011: *Marden Henge and Environs, Vale of Pewsey, Wiltshire; National Mapping Programme Report*, English Heritage Research Department Report Series 76-2011, Portsmouth
- Cartwright, C. 2010: 'Wood and other organic remains', in Johns 2010, 189–92
- Chadwick, A.M. 2010: *Fields for Discourse: Landscape and Materialities of Being in South and West Yorkshire and Nottinghamshire during the Iron Age and Romano-British Periods*, unpub. PhD thesis, University of Wales, Newport, http://archaeologydataservice.ac.uk/archiveDS/archiveDownload?t=arch-991-1/dissemination/pdf/Chadwick_Final_Pdfed_volumes/Chadwick_PhD_thesis_2008_Vol_I.pdf (Accessed 07/04/17)
- Chadwick, A.M. 2012: 'Routine magic, mundane ritual? Towards a unified notion of depositional practice', *Oxford Journal of Archaeology* 31, 283–315
- Christen, J.A. 1994: 'Summarizing a set of radiocarbon determinations – a robust approach', *Applied Statistics-Journal of the Royal Statistical Society Series C* 43, 489–503
- Clarke, S. 1997: 'Abandonment, rubbish disposal and "special deposits" at Newstead', in K.I. Meadows, C. R. Lenke and J. Heron (eds), *TRAC 96. Proceedings of the Sixth Annual Theoretical Roman Archaeology Conference (Sheffield)*, Oxford, 73–81
- Corney, M. 2001: 'Romano-British nucleated settlements', in Ellis 2001, 5–38
- Corney, M., Gaffney, C.F., and Gater, J.A. 1994: 'Geophysical investigations at the Charlton Villa, Wiltshire (England)', *Archaeological Prospection* 1, 121–8
- Cunnington, B.H. 1893: 'Notes on the discovery of Romano-British kilns and pottery at Broomsgrove, Milton, Pewsey', *Wiltshire Archaeological and Natural History Magazine* 27, 294–301
- Draper, S.A. 2006: *Landscape, Settlement and Society: Wiltshire in the First Millennium AD*, BAR British Series 419, Oxford
- Eagles, B. 2001: 'Anglo-Saxon presence and culture in Wiltshire c. AD 450–c. 675', in Ellis, 199–233
- Ellis, P. (ed.) 2001: *Roman Wiltshire and After. Papers in Honour of Ken Annable*, Devizes
- Esmonde Cleary, S. 2017: 'Roman state involvement in Britain in the later 4th century: an ebbing tide?', in N. Roymans, S. Heeren and W. de Clercq (eds), *Social Dynamics in the Northwest Frontiers of the Roman Empire: Beyond Decline or Transformation*, Amsterdam, 179–202
- Farley, M., Henig, M., and Taylor, J. 1988: 'A hoard of late Roman bronze bowls and mounts from the Misbourne Valley, near Amersham, Bucks.', *Britannia* 19, 357–66
- Fulford, M. 2001: 'Links with the past: pervasive "ritual" behaviour in Roman Britain', *Britannia* 32, 199–218
- Gardner, A. 2002: 'Social identity and the duality of structure in late Roman-period Britain', *Journal of Social Archaeology* 2, 323–51
- Garrow, D. 2006: *Pits, Settlement and Deposition during the Neolithic and Early Bronze Age in East Anglia*, BAR British Series 414, Oxford
- Garrow, D. 2011: 'Concluding discussion: pits and perspective', in H. Anderson-Whymark and J. Thomas (eds), *Regional Perspectives on Neolithic Pit Deposition*, Oxford, 216–25
- Gerrard, J. 2009: 'The Drapers' Gardens hoard: a preliminary account', *Britannia* 40, 163–83
- Gerrard, J. 2013: *The Ruin of Roman Britain; An Archaeological Perspective*, Cambridge
- Gregory, T. 1977: 'A hoard of late Roman metalwork from Weeting, Norfolk', *Norfolk Archaeology* 36, 265–72
- Greig, J.R.A. 1991a: 'The environmental evidence from pollen preserved by copper salts from Iron Age and Anglian graves at Kirkburn and Garton Station', in I. Stead (ed.), *Iron Age Cemeteries in East Yorkshire*, English Heritage Archaeological Report 22, 151–5

- Greig, J.R.A. 1991b: 'The British Isles', in W. van Zeist, K. Wasylikowa and K.E Behre (eds), *Progress in Old World Palaeoethnobotany*, Rotterdam, 299–334
- Guest, P. 1997a: 'Bishops Cannings (Blagan Hill) Wiltshire', in Bland and Orna-Ornstein 1997, 426–62
- Guest, P. 1997b: 'Hoards from the end of the Roman Empire', in Bland and Orna-Ornstein 1997, 411–23
- Guest, P. 2014: 'The hoarding of Roman metal objects in fifth-century Britain', in Haarer 2014, 117–29
- Haarer, F.K. (ed.) 2014: *AD 410: The History and Archaeology of Late Roman and Post-Roman Britain*, London
- Hawkes, S., and Dunning, G. 1961: 'Soldiers and settlers in Britain, fourth to fifth century: with a catalogue of animal-ornamented buckles and related belt-fittings', *Medieval Archaeology* 5, 1–70
- Henig, M. 1983: *Religion in Roman Britain*, London
- Henry, R. 2015: *WILT-0F898C: A Roman Hoard*, <https://finds.org.uk/database/artefacts/record/id/720549> (Accessed 04/05/17)
- Henry, R. 2018a: *WILT-047110: A Roman Hoard*, <https://finds.org.uk/database/artefacts/record/id/890951> (Accessed 12/04/18)
- Henry, R. 2018b: 'Using the Wiltshire and Swindon Historic Environment Record for archaeological research in southwest Wiltshire', *Wiltshire Archaeological and Natural History Magazine* 111, 230–45
- Henry, R., and Algar, D. 2018: 'A late Roman silver coin hoard from Tisbury in context: a case study for dispersal through agricultural activity', *Wiltshire Archaeological and Natural History Magazine* 111, 311–17
- Henry, R., and Ellis-Schön, J. 2017: 'The Finding Pitt-Rivers Project: a reassessment of the numismatic assemblage from Woodcutts in context', *Wiltshire Archaeological and Natural History Magazine* 110, 179–90
- Henry, R., Grant, M., Pelling, R., and Roberts, D. 2017: 'The Pewsey vessel hoard, an initial assessment', *Wiltshire Archaeological and Natural History Magazine* 110, 230–3
- Hill, J.D. 1995: *Ritual and Rubbish in the Iron Age of Wessex: A Study of the Formation of a Specific Archaeological Record*, BAR British Series 242, Oxford
- Hinds, K. 2009: *WILT-9C29F2: A Roman Coin Hoard*, <https://finds.org.uk/database/artefacts/record/id/254352> (Accessed 04/05/17)
- Hingley, R. 2006: 'The deposition of iron objects in Britain during the later prehistoric and Roman periods: contextual analysis and the significance of iron', *Britannia* 37, 213–57
- Hobbs, R. 2005: 'Why are there always so many spoons? Hoards of precious metals in late Roman Britain', in N. Crummy (ed.), *Image, Craft and the Classical World. Essays in Honour of Donald Bailey and Catherine Johns*, Monographies Instrumentum 29, Montagnac, 197–208
- Hobbs, R. 2006: *Late Roman Precious Metal Deposits, AD 200–700: Changes over Time and Space*, BAR International Series 1504, Oxford
- Hobbs, R. 2016: *The Mildenhall Treasure: Late Roman Plate from East Anglia*, London
- Hunter, F., and Painter, K. (eds) 2013: *Late Roman Silver: the Traprain Treasure in Context*, Edinburgh
- Johns, C. 2010: *The Hoxne Late Roman Treasure: Gold and Silver Plate*, London
- Keepax, C. 1975: 'Scanning electron microscopy of wood replaced by iron corrosion products', *Journal of Archaeological Science* 2, 145–50
- Kendrick, T. 1932: 'British hanging bowls', *Antiquity* 6, 161–84
- Kennett, D. 1971: 'Late Roman bronze vessel hoards in Britain', *Jahrbuch des Romisch-Germanischen Zentralmuseums Mainz 16 Jahrgang*, 1969, 123–48
- Kent, J.P.C. 1994: *The Roman Imperial Coinage. Vol. X. The Divided Empire and the Fall of the Western Parts*, London, 395–491
- King, A. 2005: 'Animal remains from temples in Roman Britain', *Britannia* 36, 329–69
- King, A.C. in press: 'Dinnington and Yarford; two Roman villas in south and west Somerset', in M. Henig, G. Soffe and K. Adcock (eds), *Villas, Sanctuaries and Settlement in the Romano-British Countryside: New Perspectives and Controversies*, Oxford
- King, C.E. 1981: 'Late Roman silver hoards in Britain and the problem of *clipped siliquae*', *The British Numismatic Journal* 51, 5–31
- Leahy, K. 2007: 'Soldiers and settlers in Britain, fourth to fifth century – revisited', in M. Henig and T. J. Smith (eds), *Collectanea Antiqua: Essays in Memory of Sonia Chadwick Hawkes*, BAR International Series 1673, Oxford, 133–44

- Lee, R. 2009: *The Production, Use and Disposal of Romano-British Pewter Tableware*, BAR British Series 478, Oxford
- Linford, N., Linford, P., and Payne, A. 2013a: *Charlton Barrows and Roman Villa, Wiltshire. Report on Geophysical Surveys, July 2012 and March 2013*, English Heritage Research Report Series 9-2013, Portsmouth
- Linford, N., Linford, P., and Payne, A. 2013b: *Marden Barrows and Wilsford Henge, Wiltshire. Report on Geophysical Surveys, September 2012*, English Heritage Research Report Series 8-2013, Portsmouth
- Lundock, J. 2015: *A Study of the Deposition and Distribution of Copper Alloy Vessels in Roman Britain*, Oxford
- Manning, W.H. 1972: 'Ironwork hoards in Iron Age and Roman Britain', *Britannia* 3, 224–50
- Marrs, R.H., and Watt, A.S. 2006: 'Biological flora of the British Isles: *Pteridium aquilinum* (L.) Kuhn', *Journal of Ecology* 94, 1272–321
- McQueen, M. 2018: *Wilcot Hoard Geophysical Report*, unpub. report submitted to the Portable Antiquities Scheme
- Miles, D. 1976: 'Two bronze bowls from Sutton Courtenay', *Oxoniensia* 41, 70–8
- Moore, P.D., Webb, J.A., and Collinson, M.E. 1991: *Pollen Analysis* (2nd edn), Oxford
- Moorhead, T.S.N., 2001a: *Roman Coin Finds from Wiltshire*, unpub. MPhil thesis, University College London
- Moorhead, T.S.N. 2001b: 'Roman coin finds from Wiltshire' in Ellis 2001, 85–105
- Moorhead, T.S.N. 2005: 'Three Roman coin hoards from Wiltshire terminating in coins of Probus (AD 276–82)', *Wiltshire Archaeological and Natural History Magazine* 102, 150–9
- Moorhead, T.S.N. 2006: 'Roman bronze coinage in sub-Roman and early Anglo-Saxon England', in B. Cook and G. Williams (eds), *Coinage and History in the North Sea World c. 500–1250. Essays in Honour of Marion Archibald. The Northern World*, Leiden, 99–109
- Moorhead, T.S.N. 2015: 'A survey of Roman coin finds in Hertfordshire', in K. Lockyear (ed.), *Archaeology in Hertfordshire Recent Research: a Festschrift for Tony Rook*, Hatfield, 135–64
- Moorhead, T.S.N., and Stuttard, D. 2012: *The Romans who Shaped Britain*, London
- Moorhead, T.S.N., and Walton, P.J. 2014: 'Coinage at the end of Roman Britain', in Haarer 2014, 99–116
- Page, C.N. 1988: *Ferns*, London
- Pollard, J. 2001: 'The aesthetics of depositional practice', *World Archaeology* 33, 315–33
- Reimer, P.J., Bard, E., Bayliss, A., Beck, J.W., Blackwell, P., Bronk Ramsey, C., Buck, C.E., Cheng, H., Edwards, R.L., Friedrich, M., Grootes, P.M., Guilderson, T.P., Hafliðason, H., Hajdas, I., Hatté, C., Heaton, T.J., Hoffmann, D.L., Hogg, A.G., Hughen, K.A., Kaiser, K.F., Kromer, B., Manning, S.W., Niu, M., Reimer, R.W., Richards, D.A., Scott, E.M., Southon, J.R., Staff, R.A., Turney, C.S.M., and van der Plicht, J. 2013: 'IntCal13 and Marine13 radiocarbon age calibration curves 0–50,000 years cal BP', *Radiocarbon* 55, 1869–87
- Reimer, P., Hoper, S., McDonald, J., Reimer, R., Svyatko, S., and Thompson, M. 2015: *The Queen's University, Belfast, Laboratory Protocols Used For AMS Radiocarbon Dating at The ¹⁴CHRONO Centre*, English Heritage Research Report Series 5-2015, Portsmouth
- Reece, R. 1973: 'Coinage in the Western Empire', *Britannia* 4, 227–51
- Reece, R. 1988: 'Interpreting Roman hoards', *World Archaeology* 20, 261–9
- Reece, R. 1995: 'Site-finds in Roman Britain', *Britannia* 26, 179–206
- Richards, C.C., and Thomas, J.S. 1984: 'Ritual activity and structured deposition in Later Neolithic Wessex', in R. Bradley and J. Gardiner (eds), *Neolithic Studies: a Review of Some Current Research*, BAR British Series 133, Oxford, 189–218
- Robbins, K. 2013: 'Balancing the scales: exploring the variable effects of collection bias on data collected by the Portable Antiquities Scheme', *Landscapes* 14, 54–72
- Roberts, D., and McQueen, M. 2015: *Field Report (PAS15A)*, unpub. report submitted to the Portable Antiquities Scheme
- Robertson, A.S. 2000: *An Inventory of Romano-British Coin Hoards*, Royal Numismatic Society Special Publication 20, London
- Rymer, L. 1976: 'The history and ethnobotany of bracken', *Journal of the Linnean Society* 76, 151–76
- Scott, E. 1993: *A Gazetteer of Roman Villas in Britain*, Leicester Archaeology Monographs 1, Leicester
- Scott, E.M., Cook, G., and Naysmith, P. 2010: 'The fifth international radiocarbon intercomparison (VIRI): an assessment of laboratory performance in stage 3', *Radiocarbon* 53, 859–65

- Serjeantson, D., and Morris, J. 2011: 'Ravens and crows in Iron Age and Roman Britain', *Oxford Journal of Archaeology* 30, 85–107
- Smith, R. 1909: 'A hoard of metal found at Santon Downham, Suffolk', *Proceedings of the Cambridge Antiquarian Society*, 146–63
- Smith, R. 1916: 'Paper delivered 1915, Jan. 28', *Proceedings of the Society of Antiquaries* 27, 77–95
- Smither, P. 2016: *Romano-British Weighing Instruments: Weighing up the Evidence*, unpub. MRes dissertation, University of Reading.
- Smither, P. 2017: *Weighing Instruments*, Roman Finds Group Datasheet 8
- Spearman, R., and Wilthew, P. 1990: 'The Helmsdale bowls: a re-assessment', *Proceedings of the Society of Antiquaries of Scotland* 120, 63–77
- Spufford, P. 1988: *Money and its Uses in Medieval Europe*, Cambridge
- Stace, C. 2010: *New Flora of the British Isles* (3rd edn), Cambridge
- Stevens, C. 2003: 'An investigation of agricultural production and consumption models for prehistoric and Roman Britain', *Environmental Archaeology* 8, 61–76
- Stuiver, M., and Kra, R.S. 1986: 'Editorial comment', *Radiocarbon* 28(2B), ii
- Stuiver, M., and Polach, H.A. 1977: 'Reporting of ¹⁴C data', *Radiocarbon* 19, 355–63
- Swan, V.G. 1975: 'Oare reconsidered and the origins of Savernake Ware in Wiltshire', *Britannia* 6, 36–61
- Thompson, N.P. 1971. 'Two Romano-British buildings in the Pewsey Vale, Draycot Farm, Wilcot (in Archaeological Research in the Pewsey Vale)', *Wiltshire Archaeological and Natural History Magazine* 66, 58–76
- Timby, J. 2001: 'A reappraisal of Savernake Ware', in Ellis 2001, 73–84
- Tomalin, D.J. 1989. 'A Roman symmetrical flanged bronze strainer found in Surrey and its counterparts in Highland Britain', *Surrey Archaeological Collections* 79, 53–75
- Tomlin, R. 2010: 'Cursing a thief in Iberia and Britain', in R.L. Gordon and F.M. Simon (eds), *Magical Practice in the Latin West; Papers from the International Conference held at the University of Zaragoza, 30 Sept.–1 Oct. 2005*, Leiden, 245–74
- van der Veen, M., and Palmer, C. 1997: 'Environmental factors and the yield potential of ancient wheat crops', *Journal of Archaeological Science* 24, 163–82
- van der Veen, M., Hill, A., and Livarda, A. 2013: 'Retrieving the archaeobotany of medieval Britain (c. AD450–1500): problems, pitfalls and priorities', *Medieval Archaeology* 57, 151–82
- Venn, R. 2015: *Finds Summary Report, Devizes Museum (PAS15A)*, unpub. report submitted to the Portable Antiquities Scheme
- Vogel, J.S., Southon, J.R., Nelson, D.E., and Brown, T.A. 1984: 'Performance of catalytically condensed carbon for use in Accelerator Mass Spectrometry', *Nuclear Instruments and Methods in Physics Research B* 233, 289–93
- Walton, P.J., 2012: *Rethinking Roman Britain: Coinage and Archaeology*, Wetteren
- Ward, G.K., and Wilson, S.R. 1978: 'Procedures for comparing and combining radiocarbon age determinations: a critique', *Archaeometry* 20, 19–31
- Watson, J. 2002: *Organic Material Associated with Metalwork from the Anglo-Saxon Cemetery at Edix Hill, Barrington, Cambridgeshire*, Centre for Archaeology Report 88-2002, English Heritage
- White, R.H. 2007: *Britannia Prima: Britain's Last Province*, Stroud
- Woodward, P., and Woodward, A. 2004: 'Dedicating the town; urban foundation deposits in Roman Britain', *World Archaeology* 36, 68–86