

The Binsey Boat: a post-medieval story of the Thames at Port Meadow, Oxford

By BRIAN DURHAM, REBECCA BRISCOE and COLIN MCKEWAN

SUMMARY

This report describes a small scale rescue of part of a boat subject to river erosion, with quite unexpected implications for three areas of enquiry: the evolution of the Oxford Thames from commercial waterway to leisure activities; the challenge of reconstructing a possibly unique river craft from small areas of its inner hull; and reflections on the geomorphology of one of the most closely studied flood plains in England. The story started in 2003 when cabling works on the east bank of the Thames at Medley exposed a boat eroding from the bank, notified to Oxford City Council's archaeologist. The boat was of clench bolt construction and its exposed remains presented a risk to bathers, stock and navigation. In the context of Port Meadow's protected status and the uncertain age of the vessel it was clear that any investigation would have to be a carefully designed so as not to compromise the vessel or its surroundings.

With the aid of the English Heritage Maritime Team and students of the OUDCE MSc in Landscape Archaeology course, the boat was investigated in early June 2004 along with a topographical, geophysical and environmental survey of the surrounding area. The boat was tentatively established as a punt-like vessel, approximately 20.6 m. long by 2 m. wide. Its hull construction had similarities to a canal narrow boat, but the exposed end, whether bow or stern, was squared. No tree-ring date could be recovered from the fast-grown timbers, but the historical evidence would support a late 18th or 19th-century date for its abandonment. Auger survey of the river bank suggests it was abandoned in riverside reed beds rather than in a separate channel. Its form is such that it may have been used for transporting loose, heavy cargo, such as sand or gravel along the Thames and would have been robust enough to navigate flash locks like the one that functioned at Medley from 1790 to 1926.

This report draws on archaeological, historical and ecological research to better understand the remains of the boat in context of the protected meadow, and so proposes a strategy for its conservation and any further investigation.

The 'Binsey Boat' is eroding from the Thames bank at Port Meadow, an area of common land stretching across 342.5 acres of gravel terrace to the north west of Oxford, subject to statutory protection. Port Meadow extends along the east side of the Thames from Wolvercote in the north to Medley in the south (Fig. 1), bounded to the east by a restored refuse tip and the railway, and to the south by more restored tip and the Castle Mill Stream. Its geology, topography and previous archaeological and non-archaeological interventions are introduced here, with a section on the history of this part of the Thames as a working waterway, creating a context for a description and discussion of the boat and its demise.

Port Meadow's surface geology consists of an undulating gravel surface deposited at the end of the last Ice Age, overlain by alluvial clays and silts deposited differentially in lower lying areas, leading to a marked variation in soil depth across the meadow.¹ It is part of the Thames floodplain, and areas of it are seasonally inundated. The geology has been explored by various intrusive surveys as outlined below. Both hydrological and anthropogenic

¹ G. Lambrick and A. McDonald, 'The Archaeology of Port Meadow and Wolvercote Common, Oxford', in G. Lambrick (ed.), *Archaeology and Nature Conservation* (1985), 95-109.
Published in Oxoniensia 2006, (c) Oxfordshire Architectural and Historical Society

changes have affected it, and although generally flat it has many subtle variations in topography, some caused by the re-cutting of river channels. In the southern area of the meadow where the majority of this study is focussed, there is clear aerial photo evidence of a previous meander of the river, now manifested as a seasonal oxbow lake, and of many drainage channels and gullies some of which are man-made.

Historic maps show that the Thames has been far from static in the Port Meadow region: we are grateful to William Scott-Jackson for drawing attention to some straightening since Cole's map of 1696 (pers.comm.), and comparison of the 1879 OS suggests change in the area of the boat itself in the last 120 years. It remains unclear whether these are consequences of natural channel migration, of human action or a combination of the two.

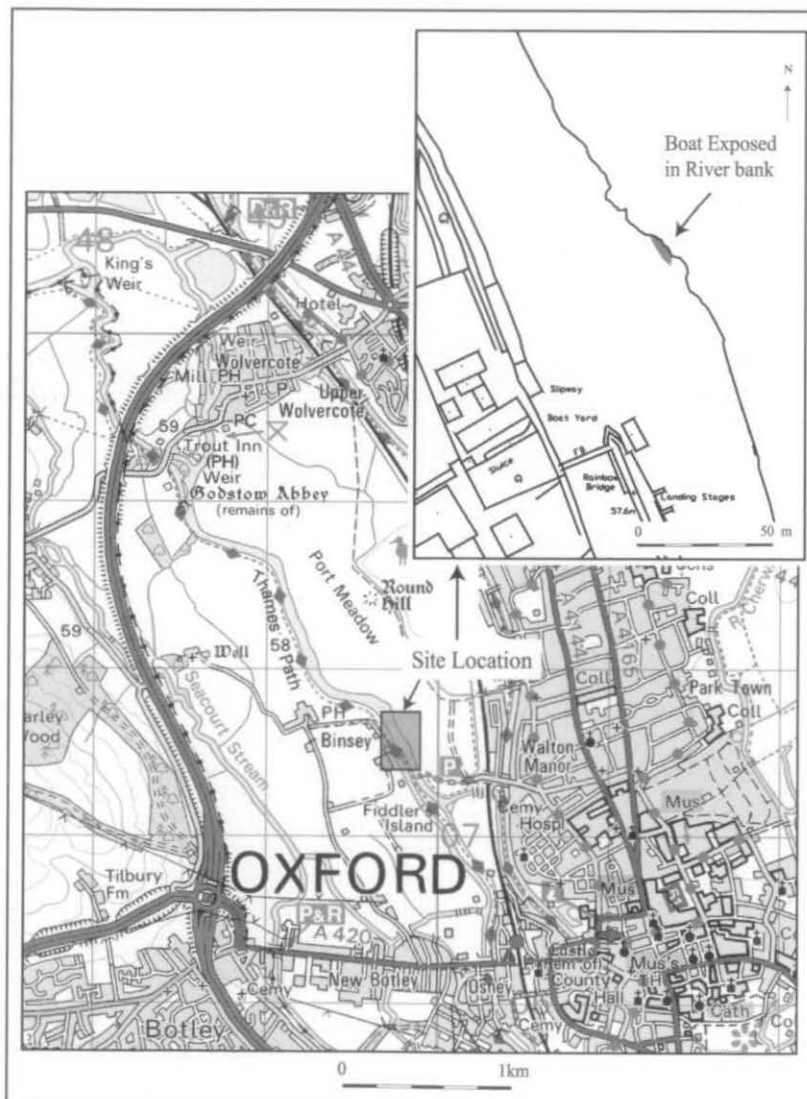


Fig. 1. Location of remains of boat at Port Meadow, Oxford

Published in Oxoniensia 2006, (c) Oxfordshire Architectural and Historical Society



Fig. 2. View north (upriver) with cofferdams protecting Trenches 1 to 3 under excavation. Moored opposite is the Queen's College Barge.

Several documentary sources refer in particular to changing river levels, the dredging of channels and relocation of associated features such as towpaths from which can be inferred changes in the river, and one aim of the investigation was to use the boat as a very large artefact to ask critical questions of the topology.

The biggest anthropogenic impact on the topology of the meadow (besides the crop/grass mark evidence discussed below) has arisen in the southern part of the meadow through municipal rubbish tipping between 1883 and 1920 (Fig. 3), which has significantly raised this part of the meadow above flood level. More recently ecological management has encouraged the silting of formerly active drainage channels to conserve the habitat of the endangered creeping marshwort (*Apium repens*).

GENERAL HISTORICAL BACKGROUND (Figs. 3-6)

Port Meadow is an area of significant archaeological and ecological importance, designated as both a Scheduled Ancient Monument (SAM) and a Special Area of Conservation (cSAC). These designations are largely a reflection of the meadow's use as common pasture since Domesday, which has allowed a level of preservation of archaeological features that is unparalleled in the Thames Valley.

Evidence from aerial photographs, crop or grass marks and small-scale excavations has revealed human activity focussed on the central area of the meadow, and the following owes much to Lambrick's work on the archaeological features of the meadow and to the Victoria



Fig. 3. Cropmark plot of Port Meadow and Binsey, after Lambrick and McDonald, *op. cit.* note 1, Fig. 2)

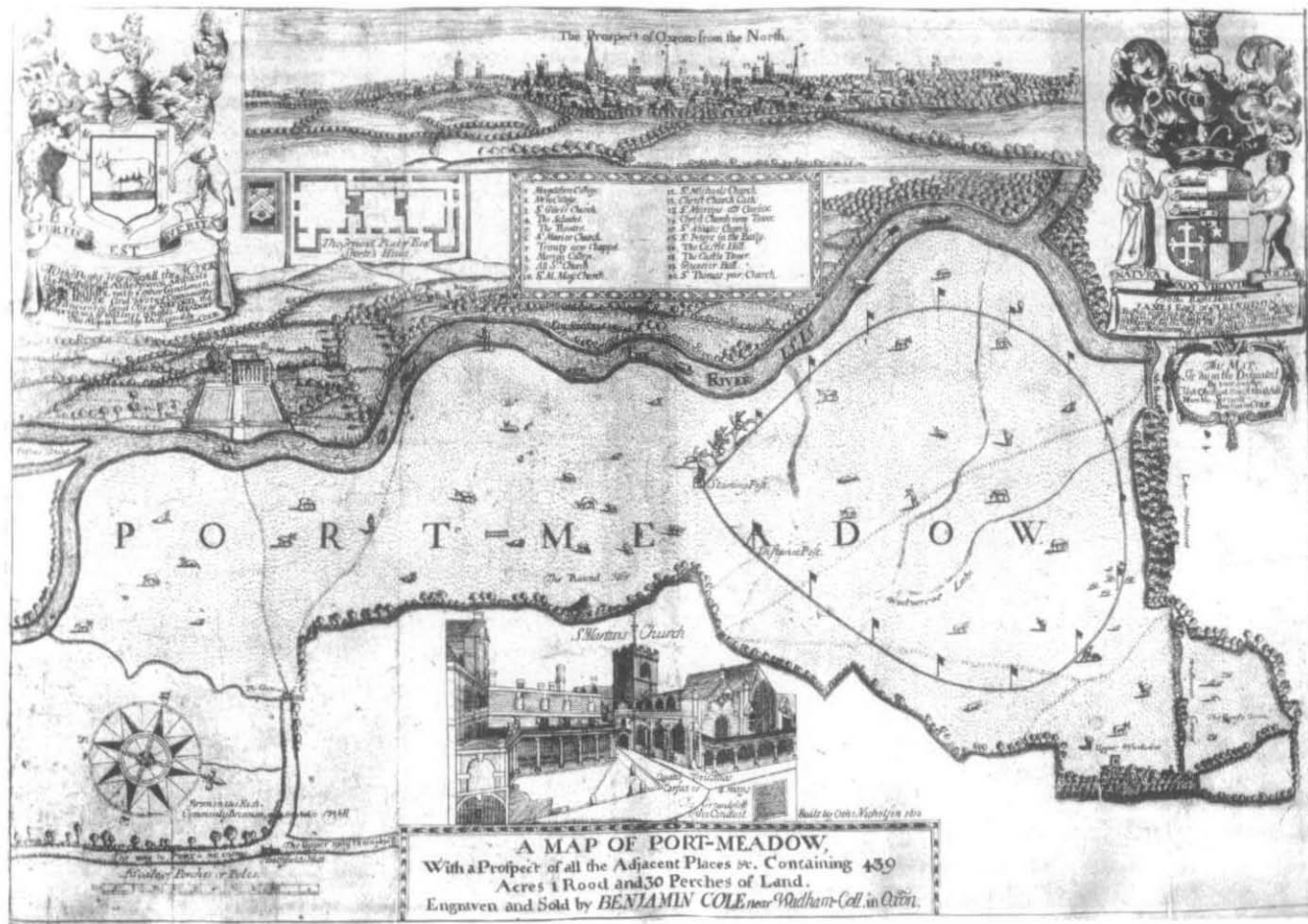


Fig. 4. Benjamin Cole's map of Port Meadow (1696) © Oxfordshire County Council Photographic Archive
Published in Oxoniensia 2006, (c) Oxfordshire Architectural and Historical Society

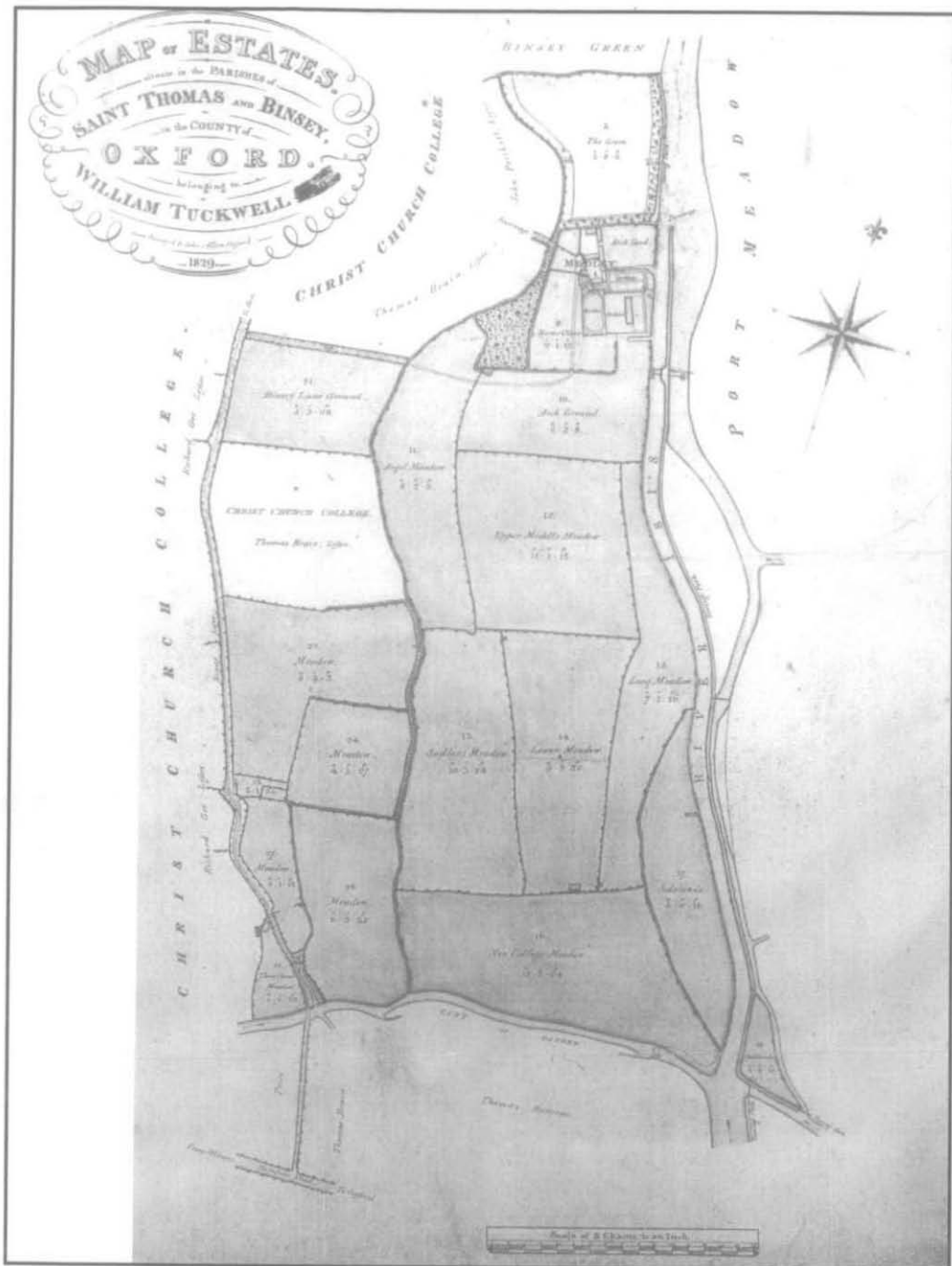


Fig. 5. William Tuckwell's estates in St Thomas and Binsey (1829) © Oxfordshire County Council Photographic Archive

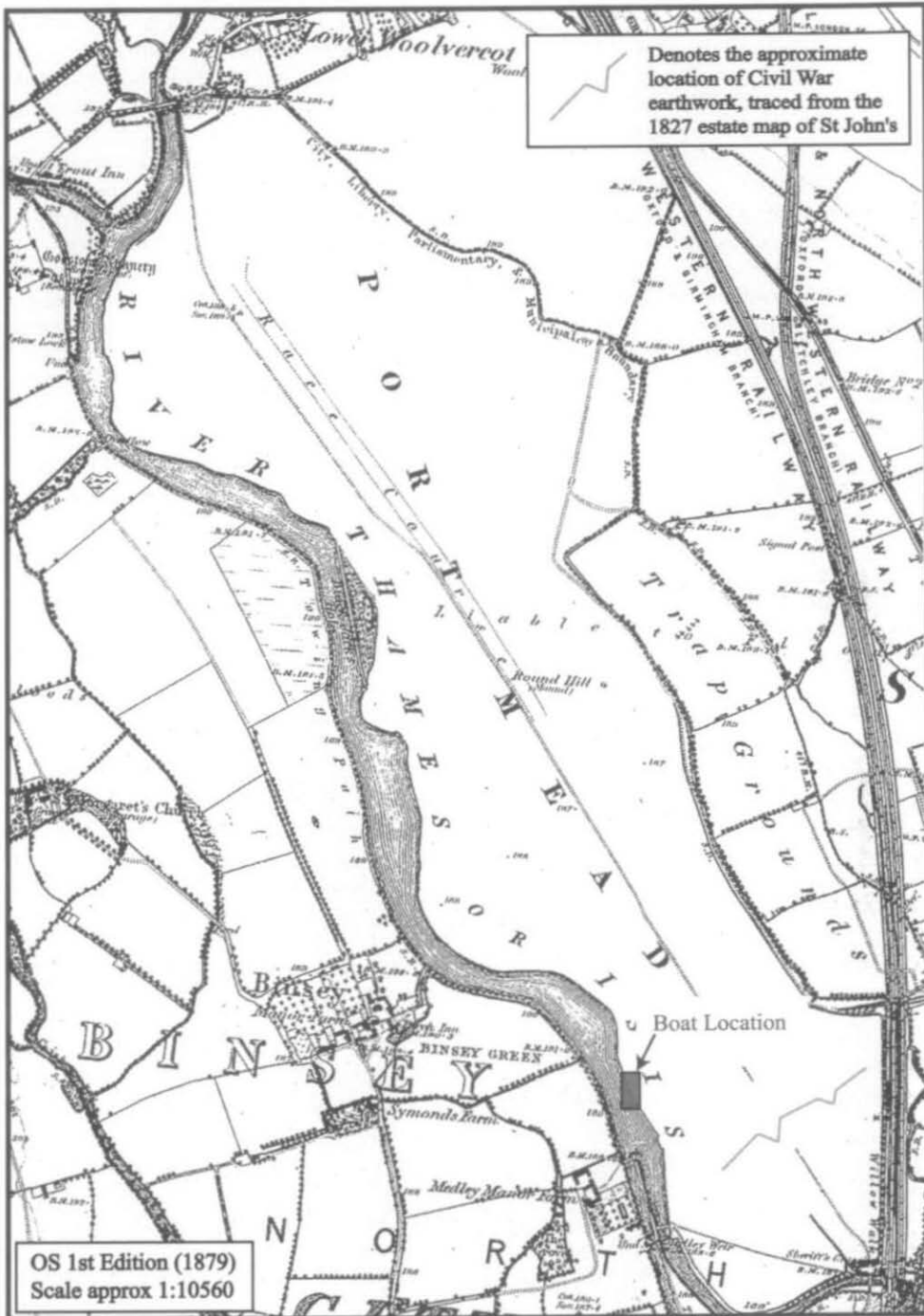


Fig. 6. 1st Edition Ordnance Survey (1879) scale 1:10,560, with angled earthwork overlaid from 1827 St John's College estate map

County History's account.² The first datable features are the remains of at least six Bronze Age ring ditches (Fig. 3), probably flat disc barrows which vary in size from 10 to 30 metres in diameter. The largest of these, marked on the OS map as 'Round Hill', was excavated by Sheriff Hunt in 1842. The earthwork that remains today may be largely Hunt's reconstruction, and was further investigated, inconclusively, by T. E. Lawrence as a schoolboy.³ Also evident from the aerial photographs are a series of crop/grass marks relating to Middle Iron-Age farmsteads (Fig. 3), specialised pastoral sites closely related to the higher gravel terrace settlements nearby.⁴ Evidence of Roman and Saxon activity on the meadow is sparse, with only a small number of individual finds, including a Saxon spearhead.

From 1086 onwards Port Meadow was predominantly used for pasture, reed and sedge collection, with intercommoning rights granted to Wolvercote, Binsey and Medley as well as the freemen of Oxford.⁵ During the Civil War three hay crops were taken (1644-6);⁶ an angled embankment running from Medley to the foot of the second terrace behind Kingston Road may be a low defensive line of this period or a waterwork created in the Royalist 'flooding of the meadows' in May 1645 (Fig. 6).⁷ Other post-medieval activities leaving visible marks on the meadow include (illegal) gravel quarrying during the 16th and 17th centuries (Fig. 3). The meadow was also used as a racecourse from 1680-1880, the line of the pear-shaped course being recorded on Cole's 1696 map, and a later apparently straight course also appearing on the first edition ordnance survey (1879) (Figs. 4 and 6 respectively). The course of the earlier track is still visible where causeways cross the drainage ditches and streams in the north of the meadow (Fig. 3). Historic maps show Taunt's 'willowy island' and 'mud bank' at Black Jack's Hole, which seem to be the remains of a flash lock (below, 'Synthesis of Investigations').

Latterly, the biggest impact has been the military encampment of the Royal Flying Corps during the First World War, which remains visible as concrete platforms and latrine pits (Fig. 3) and less obviously in the continued existence of the pedestrian track from Walton Well Road to Medley Boat Station, built in 1860 but enhanced during the Second World War when a crashed Wellington bomber had to be rescued from the River. The southern and eastern parts of the meadow were also used as allotments from the First World War through to the 1960s, and as a municipal rubbish dump from 1883 to 1970, which was subsequently re-turfed. Currently the meadow provides a recreational area for walkers and pleasure boaters, along with seasonal ice-skating on the flooded stretches at the south of the meadow.

WEIRS, BOATS AND BARGES AT OXFORD – BRIAN DURHAM

Whatever its date and reason for abandonment, the Binsey boat is of a size and robustness that nicely illustrates some dramatic events in the later history of watermen in this part of the Thames, as researched by Mary Prior in a DPhil thesis published in 1982. Though comparatively small, this was a working boat, and Prior notes that for navigational reasons a

² *V.C.H. Oxon.* iv, 279-82; Lambrick and MacDonald op. cit.; G. H. Lambrick and M. A. Robinson, 'The development of floodplain grassland in the Upper Thames valley' in M. Jones (ed.), *Archaeology and the flora of the British Isles* (1988), 55-75 esp. 58 and 65-8 and figs. 20, 23-25; tables 4-8.

³ *V.C.H. Oxon.* iv, 282; A. W. Lawrence (ed.), *T. E. Lawrence by his Friends* (1937), 33-4.

⁴ Lambrick and Robinson op. cit.

⁵ *V.C.H. Oxon.* iv, 281.

⁶ *Ibid.*, n. 13.

⁷ Estate map of 1827 in St John's College shows the bank extending to the canal, *V.C.H. Oxon.* iv, 80.

man who only had 'barges' could not trade above Oxford, while a man who only had 'boats' was not well equipped to trade downstream. She notes that most towing of vessels was done by 'halers' who tended to be based at the downstream end of the journey, so the halers (perhaps 'haulers') working above Oxford would be based at Oxford, however the term 'haler' is not found in the Oxford records.⁸

Georgian navigational changes, and the Medley Flash Lock

The big economic changes relevant to the boat under investigation came with the opening of the Oxford Canal in 1790, and the building of a flash lock at Medley and pound locks at Godstow and Osney that same year (Fig. 5).⁹ Locks were constructed to ease navigation on flowing rivers, and worked by retaining water behind a weir to create flat water upstream. Pound locks were of the familiar type with wooden gates, flash locks instead had 'paddles' which for navigation purposes were rotated to be in line with the stream and then lifted out. Once sufficient space had been created the boat would pass through on the 'flash' of water, whether by gravity downstream or by winching upstream. The site marked on Fig. 6 as Black Jack's Hole appears to have once been a flash lock that would have become redundant with the construction of Medley Weir 1 km. downstream of it.

Construction of the Medley weir would logically have raised the level of the river above it. This would risk flooding if not embanked, and upstream of Black Jack's Hole there is just such a bank on the meadow-ward side, but nothing survives for Medley weir (the excavated boat is on the right line). This is relevant because Thacker records a towpath dispute at the time (1790).¹⁰ He confirms that the towpath had previously been on this east side of the river bank along Port Meadow (no doubt using the bank above Black Jack's Hole), and with the new lock the Commissioners decided that it should so continue 'in the bed of the river', perhaps descriptive of changed water levels above the new weir. This towpath was however soon washed away, resulting in the path being moved to the west bank in 1798 where it remains to this day. This however meant the towing horses (or the halers if any still existed) changing from east to west bank above the new lock, and until the construction in 1865 of the present bow-shaped iron bridge over the navigation channel at Medley, this meant them crossing by the ford immediately north of Medley Manor as indicated on the tithe map of 1829 (Fig. 5), or a diversion for the horses of 'two miles and a half' when the river was in spate. A similar effect happened upstream of Godstow Lock at the same time, which 'destroyed a fordway to Pixey Mead' and turned fine pasture into worthless grass.¹¹ Such events may therefore be relevant to the interpretation of the excavated boat.

These river navigation changes were evidently sparked by the arrival of the Oxford Canal, but as the canal boatmen began to occupy residences in Fisher Row the river barge trade was in decline. While the census of 1841 showed more fishermen in the area than at any time since the end of the 16th century, there was something unnatural and untimely about this; the redundant bargemen had reversed the trend of the earlier period, and returned to fishing. The number of men was large however, and the waters limited. Ironically, having rendered the barging trade largely obsolescent in the first flush of industrialisation, the canals were in turn to suffer the same fate at the hands of the railways in the next wave of technological improvement.¹²

⁸ M. Prior, *Fisher Row, Fishermen, Bargemen, and Canal Boatmen in Oxford 1500-1900* (1982).

⁹ Prior, *op. cit.*, 187, though not shown on diagram Fig 3.3, 157.

¹⁰ F. Thacker, *The Thames highway: a history of the locks and weirs* (1920), 103, 105.

¹¹ J. Kemplay, *The Thames Locks* (2000), 40.

¹² Prior *op. cit.*, 259-61.

River and canal families at Oxford

The social implication of these changes for Port Meadow's recent history is bound up with two Oxford dynasties. Less than one month from the opening of the canal, the Magistrates dispersed a crowd at Gloucester Green gathered for a pitched battle between Beesley and Bossom, bargemen; the contest was therefore moved to Botley over the county boundary, where it is recorded that Beesley was victorious having fractured a rib of his antagonist. This was a conflict between river and canal.¹³ Given the dwindling employment from the river, many freemen felt Port Meadow to be threatened, complaining about a new lock, probably Medley Lock.¹⁴ In 1838 freemen were claiming right to vote in City and in County elections under the Reform Bill (they had always voted previously as freemen), and barristers tried Thomas Beesley junior as an exemplar of more than two thousand Oxford freemen. Beesley proved successfully that he had exercised his right of fishing in the waters for many years, and had cut the sedge and rushes a good deal in his time.¹⁵

From trade to leisure on the 19th-century Thames

From 1815 rowing had been a competitive sport in the university, and up river the families of fishermen were engaged in perfecting their own form of racing, punt-racing using the fisherman's punt in the first instance.¹⁶ This meant a serious contest; although for some time deliberate fouling had been prohibited, it is recorded that in 1848 a contestant drove his opponent into the bank of Port Meadow keeping him in that position for the next 30 yards.¹⁷ Contests were treated as something between the duel, the joust and the prizefight, the Bossoms and the Beesleys being the Capulets and the Montagues of the river. By the 1870–80s punt-racing became recognised as a sport.¹⁸ But high jinks of this kind should not mask the underlying economic reality of the inexorable decline in waterborne trade. Some of the poor who, in the cold winter of 1860–61, built a 'walk' from Walton to Medley may have been dispossessed boatmen. Prior links the growth of the pleasure boating business at Medley, captured photographically by Taunt in 1880 complete with Bossom and Beesley trade signs, as in part a job-creation scheme for the dying commercial river trade.¹⁹

Later navigational developments

Further evidence of the physical changes the weirs brought to the river are indicated by the Floods Inquiry in 1883 which published its intention to 'remove Medley weir, which forms a great impediment and has doubtless in a great measure contributed to the wretched state of the river above it'. This was not accomplished until 1926, when the Thames Conservancy also undertook dredging of the river north of Medley in the following two years, deepening the river channel by removing 45,000 tons of material from the riverbed.²⁰ The possible impact of this work is difficult to discern but is discussed below with reference to the changing nature of the river channel.

¹³ Ibid. 265.

¹⁴ Ibid. 270.

¹⁵ Ibid. 284.

¹⁶ Ibid. 302; C. Hibbert (ed.), *Encyclopaedia of Oxford* (1988), 365.

¹⁷ Prior op. cit., 303.

¹⁸ Ibid. 305.

¹⁹ Prior op. cit.; *VCH Oxon.* iv, 282, 428; Oxfordshire County Council CC72/02170, reproduced below Fig. 19; Hibbert op. cit., 342–3.

²⁰ Kemplay, op. cit. n. 11, 18.

THE BINSEY BOAT ARCHAEOLOGICAL INVESTIGATION

The history of archaeological investigation on Port Meadow began in 1842 with Sheriff Hunt's excavation and reconstruction of the Bronze Age barrow known as Round Hill,²¹ and this structure remained the only known archaeological feature until the aerial photography of Major Allen during the 1930s revealed for the first time the range and extent of archaeological remains. Allen's photography prompted an investigation by the University Archaeological Society under R. J. C. Atkinson, including ground survey and some trial trenching. They established the existence of the Bronze Age barrows and areas of Iron Age settlement, which was added to by P. P. Rhodes' examination of photographs taken by the RAF during the Second World War.²²

Work undertaken since the 1950s has focussed on combining historical and ecological studies of the meadow under its SSSI and later its cSAC status. Areas of grass-marks were scheduled in 1973 for their protection, and after (permitted) investigations by Lambrick and McDonald (1985) and Lambrick and Robinson (1988) protection was extended to the whole of the meadow in 1990, excluding refuse dumping at the southernmost end.²³ Latterly much work has been done on hydrological studies partly in preparation for the implementation of flood prevention schemes, but no intrusive archaeology has happened till the discovery of the boat remains eroding from the riverbank in 2003, deemed to be within the river and therefore technically outside the scheduled area.

Aims for the investigation and conservation of the boat

Following his discovery in 2003, Tom Ballance as boat yard owner investigated the boat with small pits to confirm its line and length. This happened in ignorance of the need for scheduled monument consent, but his pits were recorded archaeologically during the June 2004 fieldwork, and new intervention was, by agreement with English Heritage, confined to below water line and hence outside the SAM. The further investigations were designed to: develop a means of safe excavation below river level by non-specialist helpers; achieve an understanding of the vessel, its construction date, design, draft, working function, circumstances and date of abandonment; seek an explanation why silting over the vessel evidently had brought it flush with the meadow surface, while elsewhere on the meadow prehistoric features survive as earthworks; and prepare a scheme for reinstating the former bank line to protect the remains and in so doing to protect other vessels and grazing animals from the boat.

Desk Based Survey and map regression (Fig. 7)

A survey of historical literature and photographs was undertaken at the Centre for Oxfordshire Studies by both Brian Durham and Rebecca Briscoe, designed to illuminate the context of the boat and its place in the history of Port Meadow. Aside from the social history (above 'Weirs, boats and barges') the desk-based element focussed on mapped changes in the course of the river at the location of the boat. Additionally the National Rivers Authority levels survey was consulted (spot-heights at 50 m. intervals) in starting to reconstruct the profile and gradient of the wider meadow.²⁴

²¹ *V.C.H. Oxon*, iv, 282; Lawrence, *op. cit.* note 3.

²² R. J. C. Atkinson, 'Archaeological sites on Port Meadow', in *Oxoniensia*, vii (1942), 24-35; R. J. C. Atkinson and A. McKenzie, 'Notes', *Oxoniensia*, xi and xii (1946-7), 163; P. P. Rhodes, 'New Archaeological sites at Binsey and Port Meadow, Oxford', *Oxoniensia*, xiv (1949), 81-4.

²³ Lambrick and McDonald, *op. cit.* n. 2; Lambrick and Robinson, *op. cit.* n. 2.

²⁴ N. R. A. Survey A00N 1595 (English Heritage, 1990); B. Durham, 'Legends of our time, Oxford's inheritance in the 21st century: the Tom Hassall Lecture for 2006', to appear in *Oxoniensia*, lxii (2007).

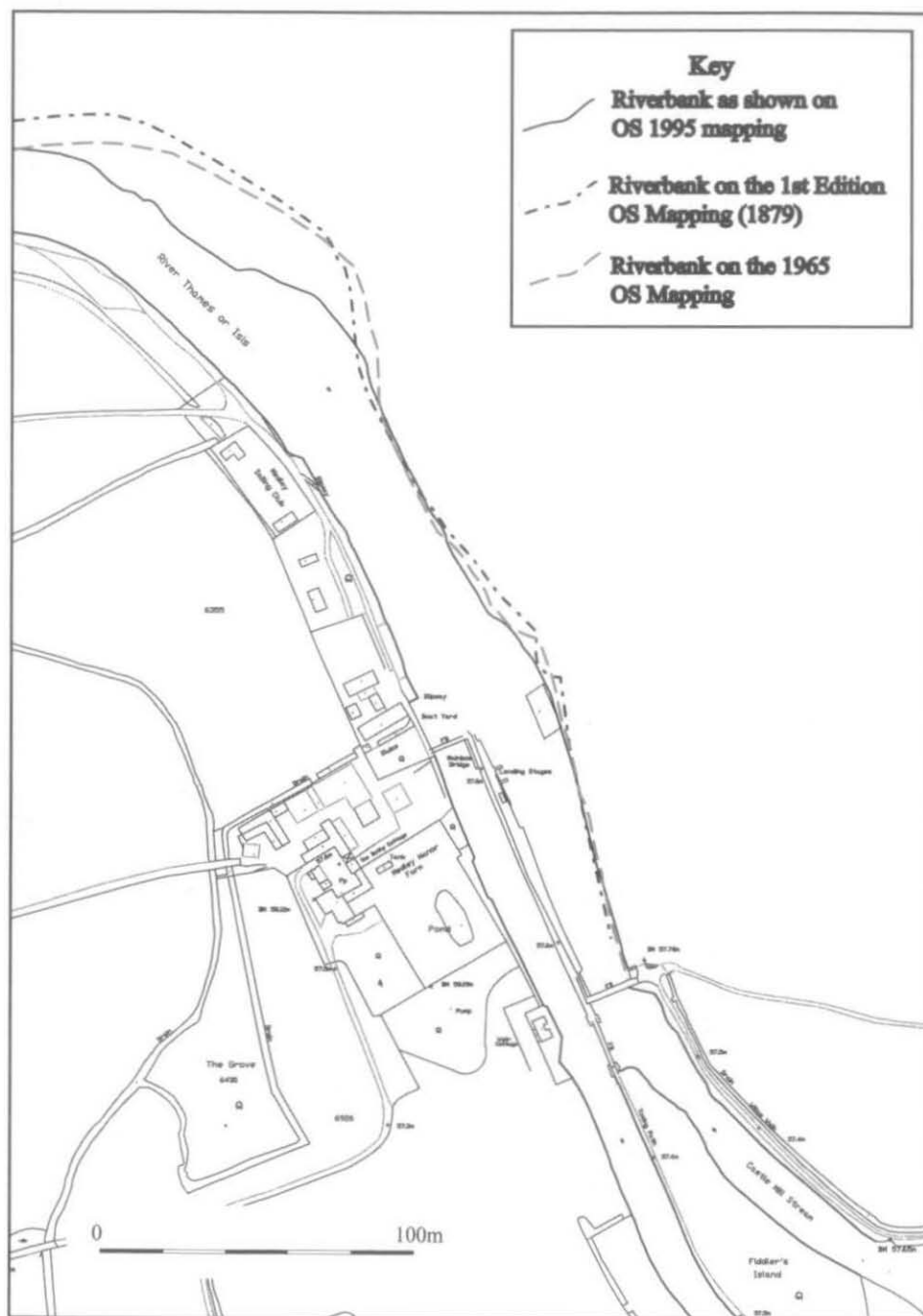


Fig. 7. Ordnance Survey, 1879, 1965 and 1995 composite overlay

Map regression sought evidence of changes in the management of this section of the river over the range of possible dates for the boat. An attempt to align Cole's map of 1696 (Fig. 4) spatially with the National Grid proved valuable for general changes in the course of the river channel, but was felt to be unreliable for detailed changes in the area of the boat site itself (William Scott-Jackson pers. comm.). For the later mapping, Fig. 4 illustrates the evidence of the tithe map of 1829, which can be compared against the Ordnance Survey 1st edition (1:10,560) 50 years later (Fig. 6). Subsequent Ordnance Survey editions however show the identical 1879 line until the 1965 1:25,000 edition; but these lines are so similar to the 1879 line that one is tempted to suspect it was not resurveyed. Consultation of the archives of the Thames Conservancy concerning removal of the Medley weir and extensive dredging during the late 1920s posed the question whether such intervention could have had no impact on the river's course, and the 1st edition (1879), 1965 and 1995 maps were therefore re-scaled and overlaid digitally, resulting in Fig. 7, which shows a more complex pattern.

At the river bend north of the boat there is evidence of significant scouring of the meadow bank between 1879 and 1965, followed by extensive silting, perhaps a very delayed effect of the dredging. Moving downstream, the area of the boat itself shows steady accretion from 1879 through 1965 and 1995, explaining the use of 'marsh' symbols on the 1965 mapping and corroborating a report by the boat yard owner. Immediately downstream of this however, the changes become complex, with scouring before 1965 followed by accretion by 1995. It must be accepted that some of this switchback activity could arise from unmapped changes in the use of the riverbank for moorings, starting at this point. This is the more apparent because the most recent mapping, that done in 2004 by English Heritage, seems to show a return to scouring. If this is confirmed, and it has only become apparent with the use of mapping software at time of writing, it would appear to implicate the moorings (Pl.XXV), but pending confirmation we have not added the line to Fig. 7 (see instead Figs. 1 and 9).

A general pattern of river change can therefore be read in conjunction with the cycle of sedimentation and erosion concluded from the fieldwork below. Although the causes of river migration are hard to identify,²⁵ increased sedimentation here may be a consequence of the removal of the weir and deepening of the river channel, increasing the velocity of the middle section of the river and allowing accretion of deposits on the eastern bank; similarly increased erosion may arise from the insertion of mooring areas and landing stages, causing a change in the path and speed of currents, thus exposing the vessel.

Geophysical Survey Paul Linford and Andrew Payne (Fig. 8)

The English Heritage Geophysics Team visited Binsey during May 2004 to carry out a geophysical survey to help characterise the parts of the boat buried beneath the riverbank. More complete information about this work can be found in English Heritage's Research Department Report.²⁶ Surveys were conducted over an area of 0.1 hectare immediately adjacent to the find spot using both a magnetometer and an earth resistance meter. The survey grid was established using a Trimble kinematic differential global positioning system (GPS), and two semi-permanent ground markers were left at the site to allow for co-registration with other survey components of the project.

²⁵ A.G. Brown, *Alluvial Geoarchaeology, floodplain archaeology and environmental change* (1997).

²⁶ P. Linford, *Port Meadow, Binsey, Oxford: Report on geophysical survey, May 2004* (English Heritage Research Department Report 58, 2006).

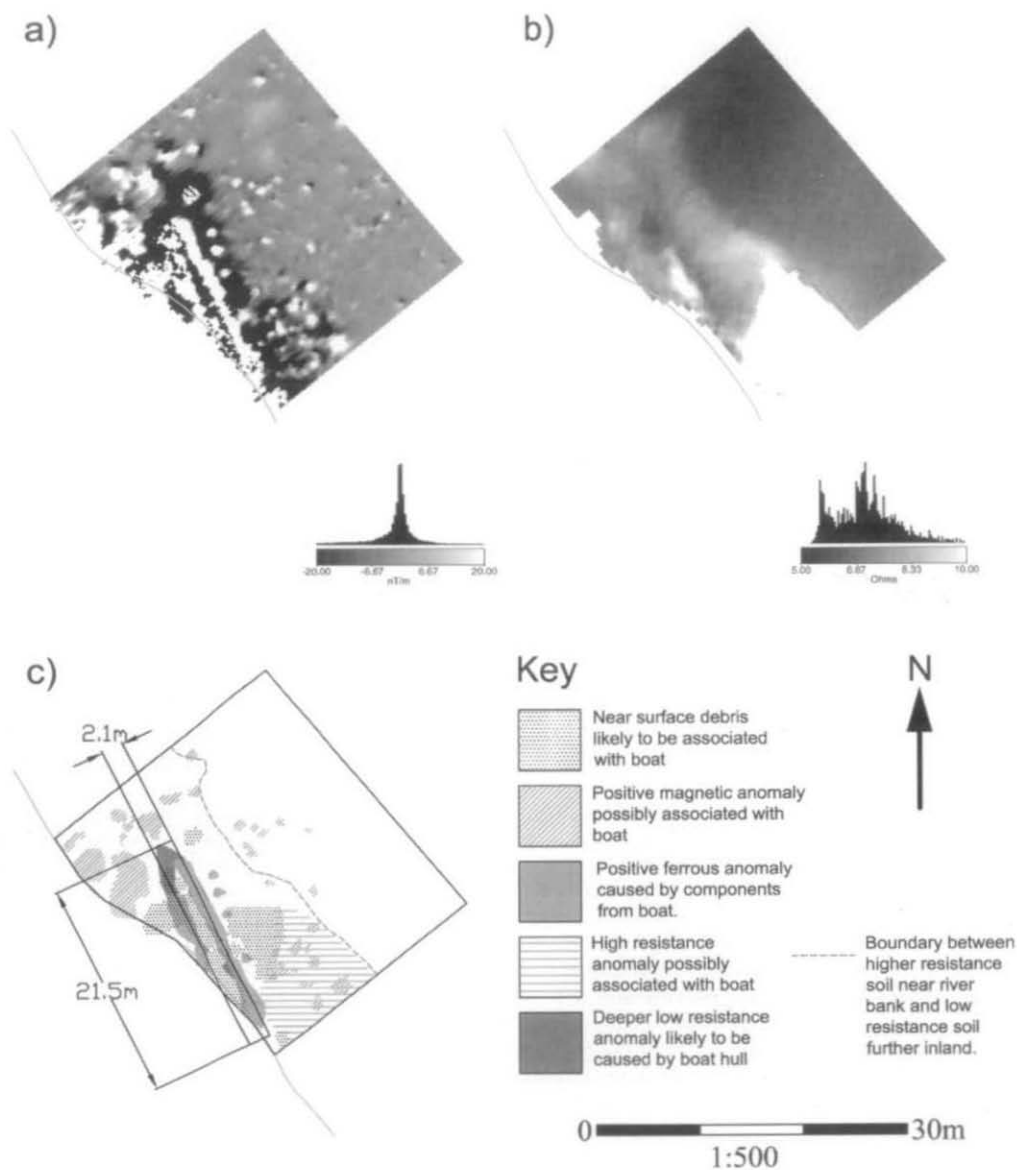


Fig. 8. Geophysical survey: a) magnetometer survey; b) earth resistance survey showing the results from the 0.5m mobile electrode separation measurements; c) interpretation of the geophysical anomalies showing approximate inferred dimensions of the boat.

Magnetometer Survey (Fig. 8a)

Observation of the exposed part of the boat showed that ferrous material was likely to be found associated with it, hence an initial magnetometer survey was carried out using a Bartington Grad601B dual sensor fluxgate gradiometer to pinpoint the location of any buried remains. Traverses were separated by 0.25 m. with measurements taken at 0.125 m. intervals along each. The results are depicted in Fig. 8a, corrected for differences in the zero-offset of the two sensors by zeroing the median of each traverse. Slight shifting of each traverse to maximise correlation with its neighbours was also performed to compensate for variations in the operator's pace.²⁷

The most striking feature of the magnetic survey are the two parallel linear anomalies indicated in Fig. 8a running almost N-S. They have peak magnetic gradients around 100 nT/m. and meet the river bank at the points where the two sides of the prow visible in the water emerge. A parallel line of four discrete anomalies of similar magnitude has also been detected and it is likely that they are all caused by ferrous material associated with the buried boat structure. Overlying the linear anomalies, several amorphous areas of steep rapidly varying magnetic gradients have been detected. These are characteristic of near-surface ferrous material and, given their positions, are likely to be caused by scatters of debris from the boat. The wider area is scattered with further discrete strongly magnetised responses with diameters between 0.5-1 m. and peak magnitudes in the range 30-100 nT/m. These are also likely to be caused by buried ferrous objects, possibly associated with the boat.

Earth resistance survey (Fig. 8b)

A second survey was carried out using a Geoscan Research RM15 earth resistance meter connected to an MPX15 multiplexer. The latter allowed two separate twin-electrode coverages to be collected simultaneously with electrode separations of 0.5 m. and 1.0 m. respectively, giving limited characterisation of relative anomaly depth.

Readings were collected at 0.5 m. intervals along traverses spaced 0.5 m. apart for the former survey and at 0.5 m. intervals along traverses spaced 1.0 m. apart for the latter. Extreme values caused by high contact resistance were removed from both datasets using an adaptive thresholding median filter²⁸ with radius 1 m. and the results for the near surface 0.5 m. electrode separation survey are depicted as a linear greyscale plot in Fig. 8b.

Earth resistance measurements were lowest in the north corner of the survey probably due to drainage patterns induced by local topography. However, at the south corner readings up to 28 ohms have been recorded in a region about 10 m. across which has been indicated in Fig. 8c. Given its sharply defined edges and high electrical contrast with the surrounding area, this almost certainly represents an artificial intervention, perhaps material introduced to strengthen the river bank. Running approximately NW from the NE edge of this feature, a boundary can be discerned in the earth resistance survey (the dashed line in Fig. 8c) separating a region of higher earth resistance anomalies in the vicinity of the buried boat remains from lower values further inland. It is likely that this represents the extent of compacted soil fill surrounding the sunken boat, possibly suggesting it was deliberately buried as further strengthening of the river bank.

Two relatively deeply buried (~1 m.) parallel linear low resistance anomalies have also been detected running NNW from the river bank for about 17 m. before apparently converging. Although their interpretation is not entirely clear, the measurements suggest a tapered or rounded north end to the boat. These anomalies correlate with the two linear magnetic anomalies described above and it is likely that they are caused by the two sides of the hull of the boat. However, it is not possible to determine whether the material causing the increased electrical conductivity is metal or waterlogged wood. The electrical anomalies extend about 2 m. further at their NNW end than the longer of the two corresponding magnetic anomalies extending the estimate of the length of the buried portion of the

²⁷ M. Ciminale and M. Loddo, 'Aspects of Magnetic Data Processing', *Archaeological Prospection*, 8 (2001), 239-46.

²⁸ I. Scollar, A. Tabbagh, A. Hesse and I. Herzog (eds.), *Archaeological Prospecting and Remote Sensing* (1990), 492.

boat to 19 m. Overlying these, in the same area that the magnetometer survey detected near-surface ferrous anomalies, the earth resistance survey indicates the presence of both high and low near-surface resistance anomalies further suggestive of scattered boat debris.

Discussion of results of geophysical survey (Fig. 8c)

Reviewing the geophysical survey evidence in terms of its implications for the boat design, the large amounts of ferrous material buried in the vicinity indicate extensive use of metal in its construction. The earth resistance survey has detected evidence of resistive compacted material adjacent to the river bank suggesting efforts to shore it against erosion. This perhaps indicates the reason why the boat was buried: having come to the end of its useful life it was deliberately sunk and incorporated into the river bank as additional strengthening material.

Conclusions

Both surveys have detected anomalies that can be directly associated with the structure of the buried boat and, using GPS measurements of the exposed remains as well as the geophysical evidence, it is possible to suggest approximate overall dimensions for the buried boat (Fig. 8c). At 21.5 m. length x 2 m.-2.1 m. beam these accord well with those derived from the digging (below, 20.6 m. x 2 m.) and incidentally with Bradshaw's *maximum size of vessels that can use the Oxford Canal mainline* (72' (22 m.) and 7' (2.13 m.) respectively). Whether river punt or canal narrowboat the vessel could have traversed that waterway.²⁹

Aerial Survey

In addition to the archaeological and ecological investigations, the Environment Agency has undertaken Light Detection and Ranging (LiDAR) survey of the Oxford floodplain, including Port Meadow, at a resolution of 1 m. and height of ± 0.25 m., as a mapping and interpretational tool for its flood risk management scheme. At the time of writing the LiDAR data has been released only for the northern part of the meadow, but more will be available for archaeological examination in the near future, as the possibilities for identifying archaeological surface features using this technique are beginning to be recognised.³⁰

In the southern area of Port Meadow, no features have been visible on aerial photographs, with the exception of the angled bank of presumed civil war period that is still occasionally visible (Figs. 6 and 10). This absence has been attributed both to a lack of significant archaeological features combined with the obstruction caused by heavy alluviation and municipal dumping in the area. Analysis of LiDAR survey may soon allow this hypothesis to be tested because by contrast with conventional photographic survey it is not reliant on low light angles or seasonal differentiation in groundwater levels.

INTRUSIVE FIELDWORK: EXCAVATION AND AUGER SURVEY (Fig. 9)

The investigation of the boat and its surroundings was undertaken by M.Sc. students of OUDCE's Landscape Archaeology course, supervised by Colin McKewan of the English Heritage Marine Archaeology Team and Dr. Helen Lewis of OUDCE. The excavation methodology allowed for a professional level of below-water investigation to augment the geophysical findings (above), to address the aims without exposing students to risk from the river, and with the protected status of the meadow as a prime consideration. Environmental survey, again by OUDCE students, sought by means of an auger transect to address other aims concerning the landscape context of the vessel, and to inform a strategy for conserving the vessel in its present location, avoiding risk to people and navigation.

²⁹ H. R. de Salis, *Bradshaw's Canals and Navigable Rivers of England and Wales 1904*, (1969), 305.

³⁰ R.H. Bewley and B.J. Devereux, *Antiquity*, lxxix, 305; R. Briscoe, *The Archaeological Potential of LiDAR Survey in the Thames Floodplain Port Meadow and its Environs* (M. Sc. thesis, Oxford, 2006). MSc project at OUDCE under Oxford City Council placement.

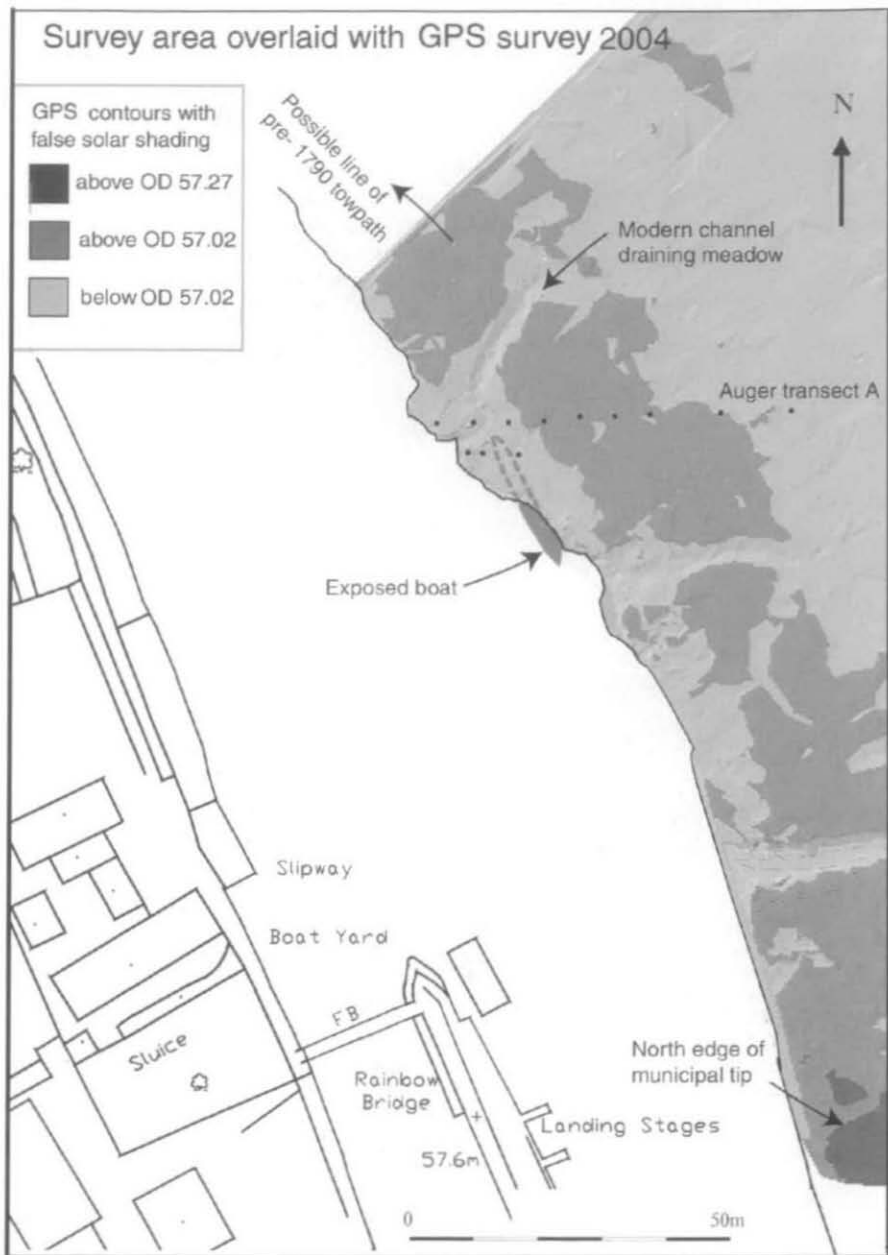


Fig. 9. Location of topographical survey, trenching and geoarchaeological survey. Transect A shows auger locations A/2 – A/57, and all of Transect B.

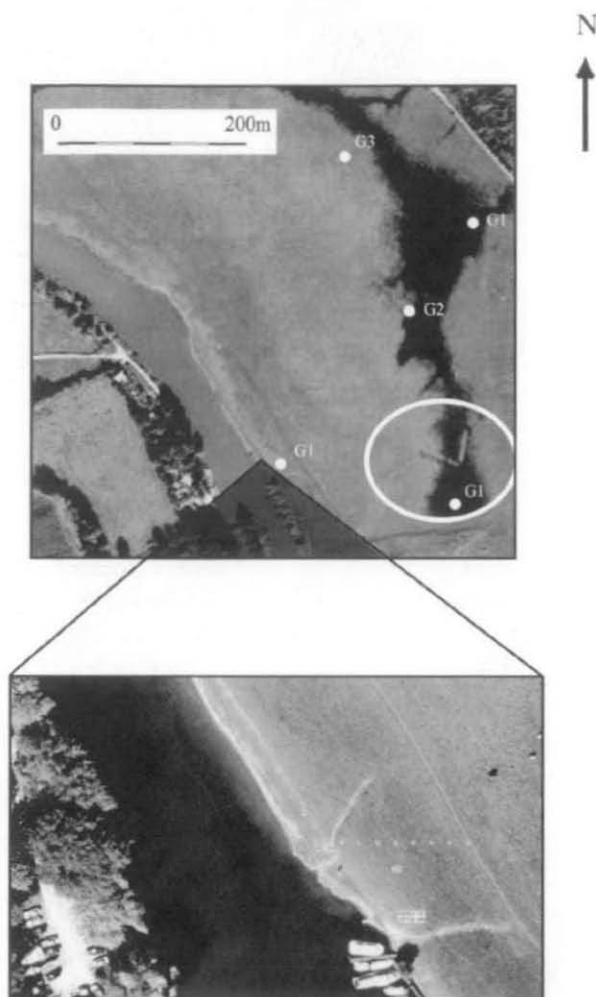


Fig. 10. Aerial Photograph showing the Civil War Earthwork, and location of Gowling's Environmental Boreholes. © Getmapping plc

Below-water investigations by Colin McKewan and Brian Durham (Figs. 11-14)

Methodology

The excavation of the boat was complicated both by difficulty of physical access and by the protected status of the environs, requiring a balance between its physical conservation and archaeological investigation, with limited resources. Given that the south end of the vessel had been exposed in 2003 (recorded as Trench 1), two sample trenches within the modern channel were designed to expose the projected keelson and riverward side of the vessel around mid ships, to achieve the stated aims. For maximum information the trenches were made to coincide with the eroded 2003 test pits, thereby providing partial sections through the full meadow profile above the boat.



Fig. 11. View of Trench 1 following timber sampling, showing keelson, floor plank, side planks and clench bolts, 0.3 m. scale.



Fig. 12. View of Trench 2 from SW including a 'Tom Ballance slot'. Note longitudinal floor planking, and flap of iron 'tingle' alongside side timber. Scale 0.3 m.

To make best use of staff untrained in aquatic excavation, the investigation was to be done within sandbag cofferdams. Twenty pre-filled bags were used to form a small cofferdam around Trench 2 (Fig. 12). This was bailed out, and as excavation progressed the upcast was used to fill further bags, thereby extending the original dam to enclose Trench 3, and then forming a separate dam enclosing the pointed end (Trench 1). Thus an initial outlay 100 empty synthetic sand bags allowed investigation of representative parts of the entire exposed vessel. The dams worked well for the two midships trenches (see Fig. 13), less well at the bow end where its water retention was compromised by loose concrete bagwork in the river (overlying recently realigned cables). In the area between the dams, additional knees were recorded by feel to complete the record.

The above methodology meant that the main investigation could be undertaken from the riverbank or by kneeling on the cofferdams. Thus only the experienced English Heritage Maritime Team (EHMT) archaeologist needed to enter the river outside the cofferdams, in the interests of safe working. Exposed boat timbers were cleaned so that their profiles could be recorded in plan and section (Figs. 12-13). Samples of timber were taken for dendrochronological dating and of caulking for material analysis at the English Heritage Centre for Archaeology, Fort Cumberland.

Investigation of deposits above the boat (Figs. 12, 14)

Unusually for an excavation, a substantial part of the subject was already visible, with converging timbers of the end of a boat, fixed by iron bolts to its floor, the top ends of the bolts sticking up where the timber had rotted away. The west side of the hull was covered in mixed and disturbed river silts within the modern channel, which in archaeological terms



Fig. 13. View of Trench 3 from west, showing keelson, floor planking and a knee.

were the latest deposits, overlying bank deposits that in turn covered the uneroded parts of the vessel. Bank deposits included the soil profile of the meadow itself as exposed in the 2003 slots, 0.33 m. thickness of silt (L208) beneath a relatively organic turf horizon with grass roots. Beneath the silt was a dark layer (0.06 m., L207) and then a gravely layer (0.11 m., L206). The lowest of the series was 0.15 m. of silt in the hold of the boat (L204) which yielded two sherds of pottery and other *c.* 19th-century finds that helped create a chronology for the boat. It seemed unlikely that the hooves of animals drinking from the river will have carried artefacts down from present ground level, but this cannot perhaps be excluded for a former 'marsh' phase (see Environmental Survey). Against the outside of the vessel was an organic silt (L202) not represented inside the vessel.

Construction details of the vessel. (Figs. 11-14)

From the Ballance investigations and geophysical results the vessel can be characterised as a punt-like vernacular craft 20.6 m. long and 2 m. wide. The new investigations provided evidence for 40 cm. of sidewall height, and for constructional details around midships. Side and floor timbers proved to be of oak, with elm bottom planks. The 'transverse' bottom planking was fixed to the side planking with iron bolts, and knees, keelson and lining timbers were fastened to the bottom planking by hand made nails.

There was a natural temptation to use the term 'bow' for the pointed exposed end of the vessel, but since a 'punt' could have two similar ends, and since the geophysical report is inconclusive on the shape of the buried end, for clarity an arbitrary convention was needed. Based on metal strapwork (both *in situ* and river finds) at the exposed end, and the possibility that the buried end is relatively more 'rounded', the exposed south (downstream) end will be referred to by the terms 'bow', 'stem' and 'prow', with the clear proviso that this is hypothetical, because the end preserved under the meadow may prove to be identical.

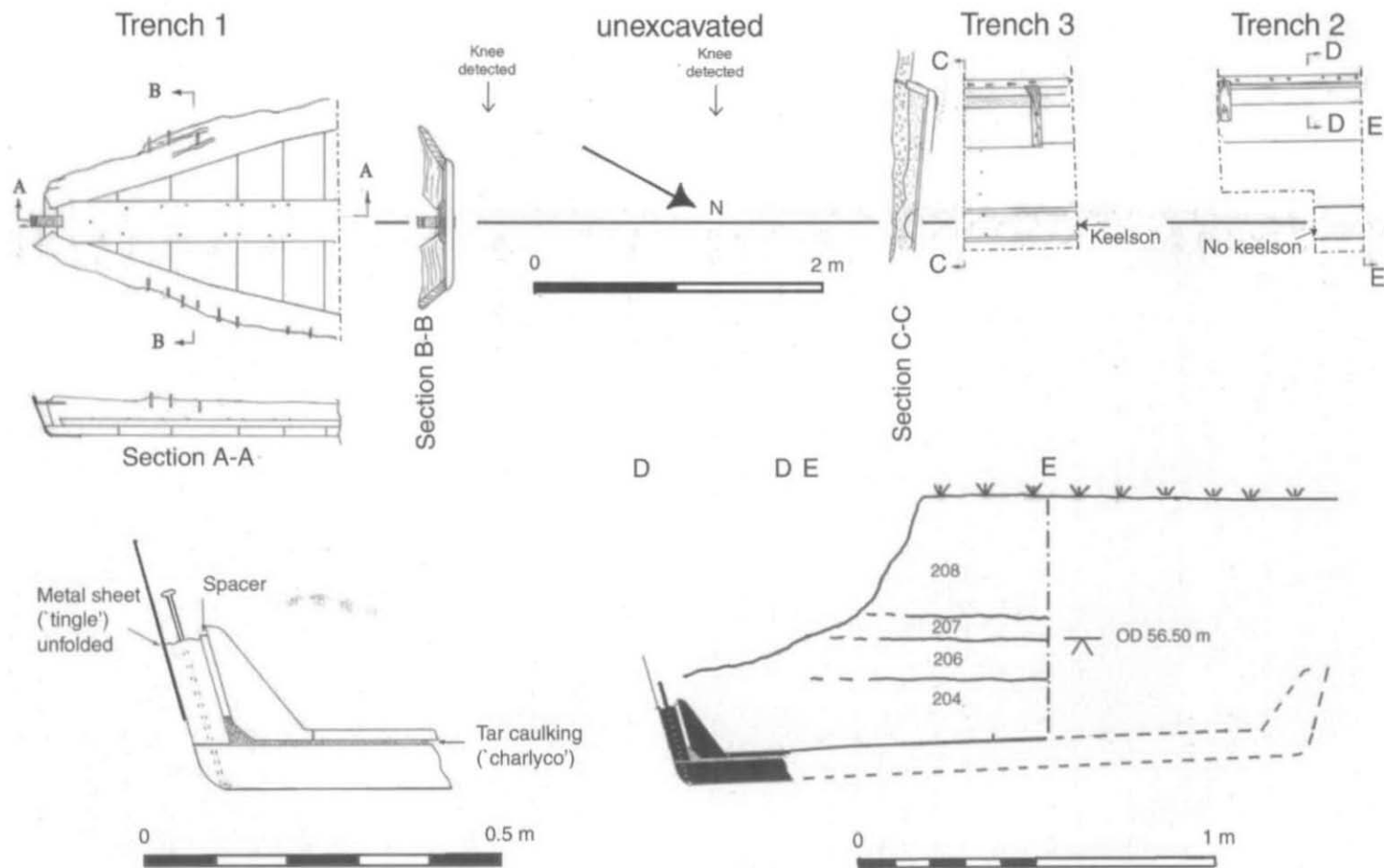


Fig. 14. Excavation plan and sections 2004

The 'bow end' showed single-height side planks fastened to the ends of the transverse floor timbers by iron 'clench bolts' passing upwards through the full height of the side planks, through a rove (lozenge-shaped washer) and hammered flat (clenched), forming a successfully strong joint. Clench bolts are used widely in Scandinavian, Saxon and medieval boat construction. No stem post was found, but an ironware strap that would have been attached to the front of the vessel was still in place, its lower end being nailed underneath the bottom planking. Considered with a V-shaped strap recovered previously from this area by Tom Ballance, this gave an initial indication of the shape and height of the original 'bow' (Figs. 14-16; 18, but see 'Synthesis' below for 'transom'). The bottom planks varied in width but their thickness seemed to be a consistent 60 mm. (2½ inches). There was no secondary floor, no evidence of caulking between the bottom planks and no external iron sheeting at the point where samples were taken for dating purposes, contrasting with the waterproofing system of the main hull (below).

Moving to midships (Trenches 2 and 3), the keelson seemed of too small section (250 mm. x 50 mm. at the bow, 200 mm. wide x 60 mm. high at one third along the vessel) to add much stiffness. In Trench 2 it was absent at 9.5 m., and probing from the meadow surface suggested it had ended between 8 and 9 m. It is suggested therefore that the clench-bolted joint with the lower side planks provided the main length-wise stiffening. This joint was supported by knees at about 7.4 m. and 8.7 m. (excavated), and others at about 3.55 m. and 5.15 m. (located by feel in the riverbed). Each knee was still attached to the bottom plank and side timbers by iron nails. The lack of consistent spacing between knees (1.6 m., 2.25 m. and 1.3 m.) may mean that they were fixed central to individual floor planks.

Like the bow, the midships side planks were fastened to the bottom planks by iron clench bolts (0.28 m. length, 0.125 m. interval). Beneath the hull were strips or 'skids' of thin wrought iron along the bottom outer edges, and evidence of similar metal sheeting along the sides, which must have been applied after the bolts were in place, assumed to be a later repair which would be known as a 'tingle'. A further side plank appears to have existed here, based on the evidence of an additional 4" (100 mm) strip of 'tingle' overlapping that on the lower plank (Fig. 12). Such additional side planking may have been fixed with nails to the lower side plank, because there were many long nails in the sediment beside the hull.

The 'hold' was floored with 15 mm.-thick oak planking running fore and aft (i.e. perpendicular to the bottom planks), shaped around the knees, and fastened to the bottom planks with short iron nails. These floor timbers were laid on and probably protecting a coating of 'charlyco' (see below, Samples), which would have created a seal between them and the bottom timbers. However this waterproofing did not exist in the 'bow' area (see above), where there were neither floor planking, caulking nor tingle, and it is not clear how the water was kept out. This is one of the issues debated below as to the form of the bow. If there had been a bulkhead between the hold and the bow area, evidence for it may survive in the ground between Trenches 1 and 3.

The internal angle between the side planking and the floor was lined with a timber of sub-triangular section fitted between successive knees (see Fig. 14). Its form was established during sampling for dendrochronology, and included a 10 mm. wood packer on the inside, then the inner plank fastened to both the outer side plank and the floor timber, with a filler of 'charlyco' that extended up the side for approximately 30 mm. This combination must have helped create a watertight seal between the outer side planks and the bottom planks, but would not have contributed any stiffening to the hull because it was interrupted at each knee: its sub-triangular section would have avoided a ledge along the top, which may have helped in handling any granular cargo.

Finds from the investigation (Fig. 15)

In terms of stratified finds this was an unusual dig in that it was designed not to impact the scheduled deposits of Port Meadow. What this meant was that finds fell broadly into:

- River finds: Iron finds including a V-shaped strap from river collected by Tom Ballance in 2003 (Layer 2); iron finds from disturbed river silts in 2004. Trench 1 includes 7 nails and 3 clench bolts from Layer 101; Trench 2 includes 22 nails and a clench bolt from (Layer 201),
- Artefacts within 'hold' of boat: Two pot sherds, a bottle base and a horse shoe from the deposit immediately above the floor of the boat (L 207). Maureen Mellor describes this assemblage as unlikely to be older than 1825 based on chronology of Staffordshire types.
- Concreted material within hold: abundant fragments may have been the residue of the last load, but in places perhaps a lining layer. This may have been an attempt at secondary waterproofing, or alternatively the vessel had at some stage carried a setting material and not all of it was unloaded. There are two variants, one broadly a fine mortar mix, the other characterised by small bubble-shaped voids.

Physical dating of the boat

English Heritage report that none of the timbers sampled yielded a significant match with any existing dendrochronology series due to a lack of rings or the material not being oak. Without this, their advice was that it will not be useful to seek a radiocarbon date.

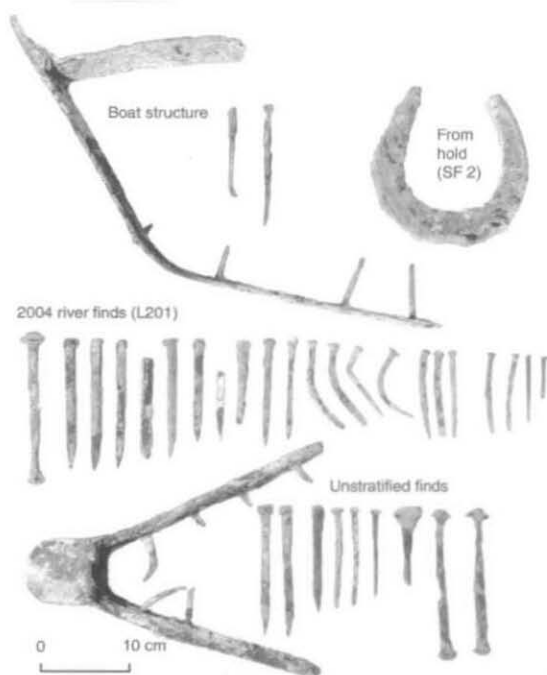


Fig. 15. Iron finds: Top from left: *in situ* strap from 'bow'; nails from keelson; horseshoe from hold; middle: bolts and nails from beside hull; below: 2003 unstratified finds from near 'bow'.

Port Meadow, Oxford: geo-archaeological and environmental survey 2004, west-east, 2.5 m north of boat

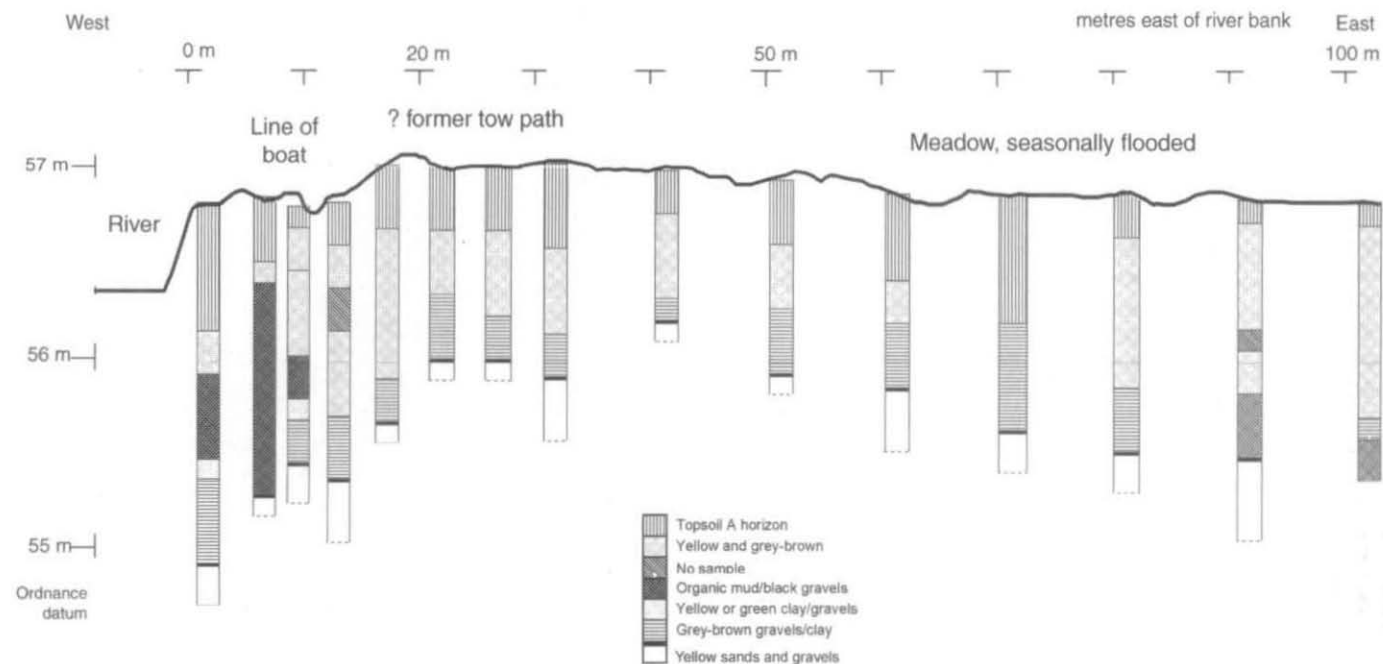


Fig. 16. Riverbank geoarchaeological Transect A.

Samples of caulking and lining materials

Samples of the caulking were collected from between or beneath planks, and have been appraised by conservation staff at English Heritage's conservation lab at the Centre for Archaeology, Fort Cumberland. A verbal report on samples from: between the 'port' side plank and the bottom plank in the bow; between the inner and outer planks amidships; were of a tar-like substance mixed with organic fibres that could be grass or straw. This could be the traditional local 'charlyco' caulking medium, described as tar mixed with horse manure (pers. comm. T Ballance). A third sample from below the centre board, which was below the keelson, was exclusively organic fibre (possibly grass or straw). The samples are in cold storage in the Centre for Archaeology (Portsmouth) conservation laboratory.

GEO-ARCHAEOLOGICAL AND ENVIRONMENTAL SURVEY by HELEN LEWIS,
MIKE LANGFORD, WILLIAM SCOTT-JACKSON & SHARON BISHOP (Figs. 9 and 16)

In order to assess the extent and nature of the deposits in which the boat had been abandoned relative to the meadow overall, Auger Survey Transect A (Fig. 9) was undertaken from the modern river edge for 102 m. It crossed the line of the boat 2 m. north of its projected north ('stern') end as determined through test pits and magnetometer survey. Along this transect (and a second line B, 3.5 m. to the south) investigation was carried out using dutch and gravel auger heads at intervals of two, five and ten metres, increasing with distance from the Thames (Fig. 9). In addition, three auger holes were drilled on the river-ward side of the boat, and the bank section along the river to the north of the boat was recorded (Fig. 16). Auger hole locations are specified as 'A' and 'B' coupled with metres distance due east from the river edge of the respective transect.

Auger Survey: Transect A

The main survey Line A (Fig. 9-10, 16) indicated three main profiles across the part of the meadow examined.

Deposits at river end of transect

Around the boat the augured profile shows (from top): a fine textured upper topsoil; an alluvial A horizon (0.3-0.5 m.); dark grey to black organic muds with fine gravel (0.2-0.6 m.). These have the character of an organic channel fill, which might (on further examination of the organic content) prove to be a reed bed at the edge of a slow moving part of the river. This appeared to match the dark organic



Fig. 17. View of 'bow' end reconstructed ex-situ. For discussion of the V-shaped strapwork (probably now unrelated) see 'Synthesis of the Investigation'.

layer reported surrounding the boat (L 202.), but not found inside it. Inland of the boat this sequence ends between A/9m and A/12 m, perhaps indicating the Thames bank against which the boat had been moored or beached in shallow slow moving water. If so, this wedge of deposit has accumulated in at most 220 years, possibly accelerated by the presence of the boat remains and possibly other local obstructions (see below).

These presumed modern channel deposits overlie (from top): a variety of thin (<0.1 m.) alluvial layers (yellow sand, green clayey silt); a layer of grey to black clay and gravel (0.1 – 0.4 m.). The latter appears to cover the entire transect (although only black where it underlies organic muds), and presumably represents the pre-boat channel deposit. In turn it overlies a ubiquitous yellow sand and gravel layer, assumed to be the top of the geology of the flood plain, presumably resulting from periglacial deposition under much higher energy. It should however be noted that the coarser gravels underlying the river edge sequence have not been definitely related to the deeper gravels, and this might be addressed in future.

Landward (east) end of transect, evidence of silted channel

Moving away from the Thames, the underlying yellow sand and gravel layer appears to rise up, with the covering sediments and soils becoming shallower (<1 m. profile). A variant profile was revealed beyond c. A/70 m, where the underlying yellow sand and gravel layer dips again. Here the sequence from top is: thin topsoil (<0.2 m.); thick yellowish brown clay layer (0.8 m.); sequence of thin (<0.3 m.) grey and yellowish brown clay layers; black and grey-black clay, which becomes gravelly in auger hole A/102 m. This mirrors the sequence at the western end of the transect (if with a shallower gradient), suggesting that the last 20 m. or so of the transect encounters a palaeochannel or ponding deposit, as would be anticipated from the 'oxbow' inferred from aerial photographs and vegetation changes.

Oxidised and reduced sediment characteristics across the transect

In seeking to understand conditions adjacent to the boat at the edge of the meadow, an overall pattern of oxidised and reduced sediments shows as mottling, which represents the wet-dry nature of the floodplain and localised moisture conditions within deposits. The A/9 m auger hole coincided with a modern gully, below which a distinctive layer of green clayey silt was found underlying the organic mud, and a brown gravel and clay layer overlying it. It is likely that these layers reflect processes associated with the modern gully. The deposit was matched in B/1.5 to B/10 m but not at B/12 m.

Distribution of anthropogenic inclusions in auger transect

Charcoal was found at two locations, in each case accompanied by fine white flecks of an unidentified material at B/0 (0.6-0.8 m. depth), and at A/17 at 0.6 – 0.9 m. depth. The concentration was conspicuous at the river bank, which revealed pieces of burnt wood eroding out, and this was repeated at A/2 m (0.6 – 0.7 m. depth). The material at A/17 m is less obviously related to any known archaeology, although it is only a few metres inland from the suggested pre-boat river edge, and could relate to bank activities in a similar time frame.

Auger survey Transect B (profile not illustrated)

Transect B was parallel to and 3.5 m. south of Transect A, and shorter in order to concentrate on the infilled channel, also closer to the buried boat, intended to further investigate the presence of charcoal in the riverside profiles. Burnt wood was recorded along the bank immediately to the west of the boat's location, along with other unburnt timbers. The sedimentary sequence was similar to Transect A, with organic mud at depth adjacent to the current shoreline, and at B/9.9 – B/11.9 m included green coloured reduced gravels and silts up to the projected old river edge (see Transect A). Transect B contained a lot more fine shell remains than seen in Transect A, although both transects revealed preserved molluscs at several depths.

Conclusion of auger survey

In conclusion the augering has plotted the profile of the top of the flood plain gravel, confirmed the existence of timbers other than the boat that might be part of bank construction, contributing to obstruction of flow and hence silting, and indicated an episode of burning. Further work might include investigation of the pattern of timbering, analysis of the alluvial column for mollusca and other remains relevant to the silting sequence at the boat, and the agricultural use of the meadow.

Existing Environment Agency Borehole Data by Rebecca Briscoe

In addition to the above auger survey, the desk-based research assessed records of two historic borehole surveys from Port Meadow concerned primarily with ecological and hydrological studies. The earlier (1970s) was collecting data for hydrological studies in the north of the meadow, the later was conducted in 2003 by David Gowing for the Environment Agency with relation to the ecological management of the meadow as a Site of Special Scientific Interest and the protection of the endangered species *Apium repens*. This survey was located in the south of the meadow within 350m. of the boat site (Fig. 10) and as such provides background information to place the auger transect in context with the Meadow generally.

Integration of the borehole and auger data

The 'oxbow' area, enclosed on its south and east sides by the municipal dump is, on the evidence of the National Rivers Authority levels survey, significantly flatter than the average 0.06% gradient of the upper and middle parts of the Meadow.³¹ Gowing's records show gravel within the oxbow at depths of 0.65 m, 2 x 0.8 m; 2 x 1.2 m, suggesting that it was never more than a low-energy channel. On this assumption the auger survey at A/42 m may be showing a typical meadow profile without such truncation, close to the original height of the flood plain which in overall gradient would be expected at about OD 56.3 m. It may therefore be that a transect further south would find that the two channels had diverged sufficiently that the red-brown loess capping known in the north part of the meadow would be represented.

SYNTHESIS OF THE INVESTIGATIONS ON PORT MEADOW by BRIAN DURHAM and REBECCA BRISCOE

This technical investigation of an eroding boat has brought a fresh look at a corner of Port Meadow that, with a history of flooding and municipal dumping, had previously been poor relation to the prehistoric landscapes upstream. In the event the Civil War earthwork (Figs. 6, 10) and the boat prove to fit into the well documented navigational, commercial and leisure history of the River Thames at this point over the past 250 years.

This wider picture depends to some extent on a reconstruction of the boat as the largest artefact, even if without a physical date. Conder illustrates a range of robust working boats of this period, box boats and mine boats of the 1770s where the bow tapers for something like one quarter of the length of the boat as in the Port Meadow example, and the later more blunt-ended canal narrowboats, in one case lifted out showing its transverse-planked bottom construction.³² However each of these examples, designed for flat water, would have a stem-post around three times the height of the strapwork surviving in place at Oxford (Figs. 14, 18), and consultation with boat historians suggest instead a 'unique' form, which may indicate a purpose not previously known or widely documented on the river.³³

³¹ NRA op. cit. n. 24; Durham forthcoming, op. cit. n. 24

³² T. Conder, *Canal narrowboats and barges* (2004), 14, 15, 18.

³³ Gus Milne, pers. comm.

Revisiting all drawings and images allows however a tentative reconstruction of the missing 'stem-post'. Given the average 37 degree splay of the side planking at this point (Fig. 11), and the flat ends of all surviving timbers, the records infer that the missing stem-post was in fact a shaped cross-member or 'transom'. This would be vertical or slightly tilted outwards, 0.25 m. wide where it rested on the end-most bottom plank, with the side planks rebated into it, and the keelson butting against it. This gives a trapezoidal shape which at gunwale height (inferred from the fixed strapwork) would be around 0.6 m. wide. Thus the V-shaped strap, which was an unconnected river find, could have no relationship to this construction. Fig. 18 presents the splayed sides as supporting a small deck for a 'punter' to stand, in the manner of the familiar Thames leisure punt, and this in turn could explain the absence of secondary flooring at this end. Questions arise however: why should such a transom have disappeared so completely while its iron strapping survived? Perhaps as a short cross-member it was of inferior timber, and vulnerable because it presented two end-grains for decay. Again, given the photographic evidence of minute transoms on the pleasure craft of 1880 (Fig. 19), is it saying that river boat-builders felt the need to put a square member in the stern of a boat? Or could the other end be identical?

The historical background might suggest a working boat employed in the gathering and transportation of osiers, or for fishing. Colin McKewan writes that 'it is possible the vessel was intended for transporting building materials up or down the Thames. The limited excavation provided no evidence of a mast step, rigging fastenings or any other internal fitting, implying that the vessel was not sailed or rowed, but was punted as hypothesised'. The robust construction certainly indicates the ability to transport heavy cargo. Bradshaw characterises canal boats on their draught unladen, and the tonnage per inch of loading, i.e. typically two tons will cause a boat to sink 1 inch (25 mm.) in the water.³⁴ Assuming the need for 4 inches (0.2 m.) freeboard for a river craft to cope with weirs and locks, the options for reconstructing the wall height (bottom to gunwale) can be based on the limited evidence of gunwale height, essentially the 0.25 m. height strapwork at the transom (Fig. 14) and the knees of maximum 0.15 m. height.

Four scenarios can be speculated: firstly: as excavated, keelson flat from stem to stern, 1.8 m. wide at bottom, gunwale height 0.4 m.; secondly: assume straight side planking sprung together to form the exposed end (Fig. 18) giving gunwale height 0.6 m.; thirdly: assume the 2:1 proportions of the much smaller mahogany Thames leisure punt, giving a gunwale height of 0.83 m. (Fig. 18); finally assume the proportions of a 'Rickmansworth-type' canal narrow-boat with gunwale height of 1.22 m. – 168 m. A crude estimate of payload can be achieved by assuming two tapered ends giving conservatively about 33 square metres in plan, then allowing for 0.23 m. (9") draught unladen and 0.10 m. (4") freeboard for passing a flash lock. The effective loading displacement will be respectively: 2.3 cu. m.; 9 cu. m.; and 16.5 cu. m. for the first three examples. This would be reduced by perhaps 1 cu. m. in each case for the reduced buoyancy if the ends were swept-up ('swimhead', Fig. 18). One cubic metre of water displaced equates to one metric tonne of cargo (= 0.984 imperial ton), so the Port Meadow boat would be carrying significantly less than Bradshaw's 2 imperial tons per inch depth of loading.

Other features of the boat's construction also have implications for its relationship to the Thames at this point, for example the external plating or 'tingle' implies repair or reinforcement that might be needed for shooting flash locks. Option 2 is illustrated in Fig. 18, and Jo Bell (pers. comm.) describes this concept as a 'working boat ... (that would have

³⁴ De Salis op. cit. note 29, 20-24.

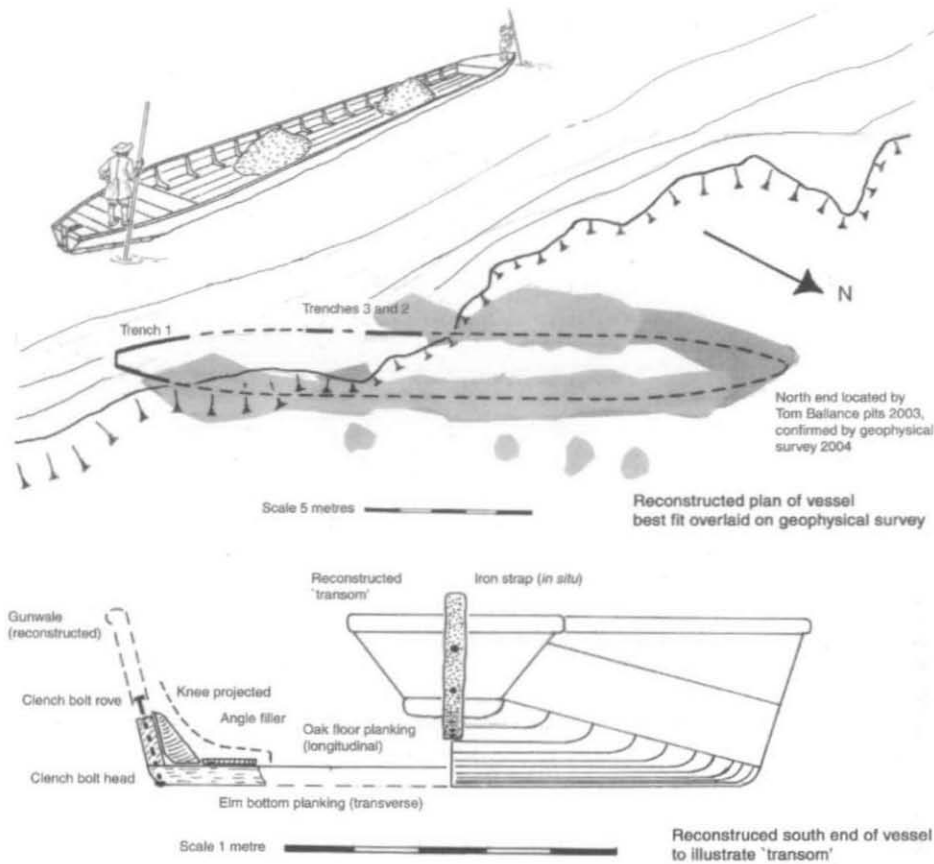


Fig. 18. Reconstruction sketches of the Binsey Boat: c. AD 1800 waterman figures by Edith Gollnast

been)... too big to be "punted" along the river'. In the absence of any other evidence for its propulsion it may have been towed without a mast, which would agree with the suggestion from Linford and Payne (above) that this was an Oxford Canal narrowboat, which would indeed have been towed without a mast. None of the options can yet be totally excluded, but Option 2, a working punt with potentially nine tons load capacity, remains the conservative preference.

Whatever its form and date, the circumstances surrounding its final resting place may also be relevant to the bigger picture. Abandonment remains a possibility because Taunt mentions an abandoned coal barge a little upstream of Black Jack's Hole in 1899.³⁵ The auger survey confirmed that the Port Meadow boat did not lie within a palaeochannel but appeared to have been deposited along a former bank edge, an hypothesis supported by the list towards the river. Both the auger and geophysical surveys suggest the possibility of a mooring, with a concentration of charcoal noted by the former that could have been the demise of its superstructure (Lewis et al. above).

³⁵ H. Taunt, *Godstow with its legend of Fair Rosamund, Medley, Wytham & Binsey with the lost village of Seacourt* (1900), 5, 11-12.



Fig. 19. Henry Taunt photograph of Medley weir stream mooring around 1880, showing offices of Beesley (right) and Bossom (left). Site of excavated boat would be beyond these moorings, with pale coloured grazing animal

In the absence of physical dating, a chronology for the beaching and abandonment of the vessel can only be argued from the blue transfer earthenware recovered from the hold. Given the contrast with silt outside the vessel the hold contents may have been its final load, and the finds indicate a date no earlier than 1825. Assuming the reliability of the bank line recorded for 1879, the boat must already have been in place and invisible by that date; Figure 19 reproduces Taunt's view dated 1880 (pers. comm. M. Graham) showing a houseboat aligned NNE, while the excavated hull points NNW. If this was newly-forming bank it is likely to have gone through a phase like the modern wetland within Lewis et al's suggested 'oxbow' to the east, which has been the subject of intensive ecological investigation related to the habitat of the threatened *Apium repens*. Information from Dr David Gowing on the water table monitoring and ground investigation (above) shows that this is not a deep oxbow, but matches extensive areas of flood plain scoured to around 1.2 m. below valley floor gradient, implying a low-energy process.³⁶ No mapping shows this channel open, but

³⁶ M. Robinson 'The palaeohydrology of the St Aldates area of Oxford' in A. Dodd, *Oxford before the University* (2003); M. Robinson, 'Waterlogged plant and invertebrate remains and mollusca' in G. Hey, *Yarnton* (2004), 381, 383; Durham op. cit. n. 24.

superficially it could represent a former channel of which the Castle Mill Stream was a leet. The presence of municipal dumping, creating a *de facto* flood-plain dam at this point, may present an opportunity for modelling the effects of historically more significant features like hedge-banks and causeways.

Resolution of some of the remaining questions may come from a research framework for the Meadow including the following heads:

- *The Boat*: Further documentary research for similar types of boat and their employment along the Thames in the late 19th century.
- *The river bank*: Further auger investigation of the character of the burnt material stratified in the river bank where at threat of erosion, possibly also soil micromorphological study of the bank sediment monolith;
- *Overbank alluviation*: Investigate relationship of silt with the presumed Civil War earthwork and with the municipal dumping.
- *Port Meadow SAM*: Study of LiDAR data against air photographs for areas of the meadow outside Briscoe's study.³⁷

In the mean time, the hull lies against a river bank that evidently carried the Thames towpath, and logically was reinforced in 1790 when the water level would have risen to the level of the new Medley Weir, only to be abandoned in 1798 after flood damage. Given the possibility of disturbance by grazing animals (ceramic evidence), the process of construction of Medley Lock in 1790 might still be an option for deliberate beaching or scuttling of this vessel. The next obvious scenario would be preparatory to the creation of a leisure-boat station in the 1870s, when it might have been beached to form an upstream wing-wall. In either case the mismatch between the bow-strap height and the length of the vessel could be argued to mean that its back was deliberately broken in scuttling, and that its original hull profile was significantly deeper than the 0.4 m. argued from surviving structure. Whether this implies that the hull had the form of a working river punt or of a canal narrow-boat is open to speculation but not critical to the wider picture, which is that 0.3 m. of silt was to be deposited in no more than two centuries on a meadow that in places has none. This 'overbank alluviation' may result from the construction of the new lock or from the creation of a *de facto* causeway/barrage on the flood plain using municipal refuse. Thus the discovery has focused an impressive range of skills and energies on part of Oxford's Thames flood plain that can only improve its understanding in the longer term.

CONSERVATION STRATEGY

Currently the site remains exposed to the erosional forces of the river. On completion of the excavation the cofferdams were dismantled and the filled bags laid in the excavated slots as a temporary protection. A key aim of the project was however to devise a strategy to protect the remains by the artificial reconstruction of the riverbank. It is hoped in the medium term that this will be achieved by the installation of a new bank line fronted with sweet chestnut fascicles, and infilled behind with material generated by management of ditches elsewhere on the meadow, planned for the summer of 2007.

³⁷ Briscoe *op. cit.* note 30

ACKNOWLEDGEMENTS

The illustrations were prepared by Rebecca Briscoe. The authors wish to acknowledge the assistance of all contributors to this report. We owe a major debt of gratitude to English Heritage staff at Guildford, the Maritime and Survey Teams at Fort Cumberland and Cambridge, their Dendrochronological Unit at Sheffield, and consultation from their Science Advisor Dominique de Moulins. Especial thanks also to Dr D. Griffiths and students of the MSc in Landscape Archaeology who were our work force. For access, permissions and on-site facilities we acknowledge assistance from Oxford City Council including staff in *Asset Management* and *Planning* business units, from the Freeman of Oxford, from the Wolvercote Commoners, from English Nature, from the Environment Agency and not least from Tom Ballance and his staff at Medley Boat Station.

Finally we thank many, many boat specialists who have stretched their imaginations to help reconstruct the Port Meadow Boat.

The Society is grateful to the Mark Fitch Fund for a grant to fund the publication of this paper.



Plate XXIV. Cellar with stairs as in fig. 2 on p. 418. Photograph by Nick Allen. [Adderbury p. 417]



Plate XXV. Port Meadow Boat Trench 1 from north: timber sampling by English Heritage specialist staff. Behind are the modern moorings that may be affecting flow. [Durham p. 435]

Published in Oxoniensia 2006, (c) Oxfordshire Architectural and Historical Society