

# Medieval Fishtraps in the Severn Estuary

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*with contributions by*

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*THIS PAPER describes the discovery of a number of medieval wooden fishtraps and their associated fishbaskets, found in a small area of the Severn Estuary. It compares the archaeological with the documentary evidence to reveal a continuing tradition dating back to at least the 10th century.*

There has been a growing recognition of the archaeological evidence for medieval fishing practices in the British Isles, though recent publications have concentrated on rivers and fishponds.<sup>1</sup> Studies of medieval food supply clearly show that sea and estuarine fish were as, if not more, important than coarse fish in the diet, which often appears to be a luxury item. This article describes a succession of fishtraps dating back perhaps as far as the 9th century A.D. and extending into post-medieval times, discovered in a small area of the intertidal zone of the Severn Estuary. It will demonstrate that the methods used still endure in the estuary today and prove the longevity of traditional fishing practices in the Severn Estuary at least.

These discoveries arose out of a systematic survey and series of selective excavations undertaken in advance of the construction of the Welsh abutment of the Second Severn Crossing (Fig. 1).<sup>2</sup> This work was funded by the Welsh Office Highways Directorate and undertaken by Cadw: Welsh Historic Monuments. The limit of the survey was defined by an area of the intertidal zone 300 m to either side of the centre line of the bridgeworks, but in practice the survey extended even wider, and in total c. 50 ha were examined in detail (Fig. 2).

The area was known to contain evidence for fishtraps through survey work undertaken by Derek Upton and Bob Trett<sup>3</sup> and from the archaeological assessment of the route of the Second Severn Crossing undertaken by the Glamorgan-Gwent Archaeological Trust.<sup>4</sup> However no systematic fieldwork of any area of the Severn Estuary had been attempted by the time this project was undertaken in August–November 1991.

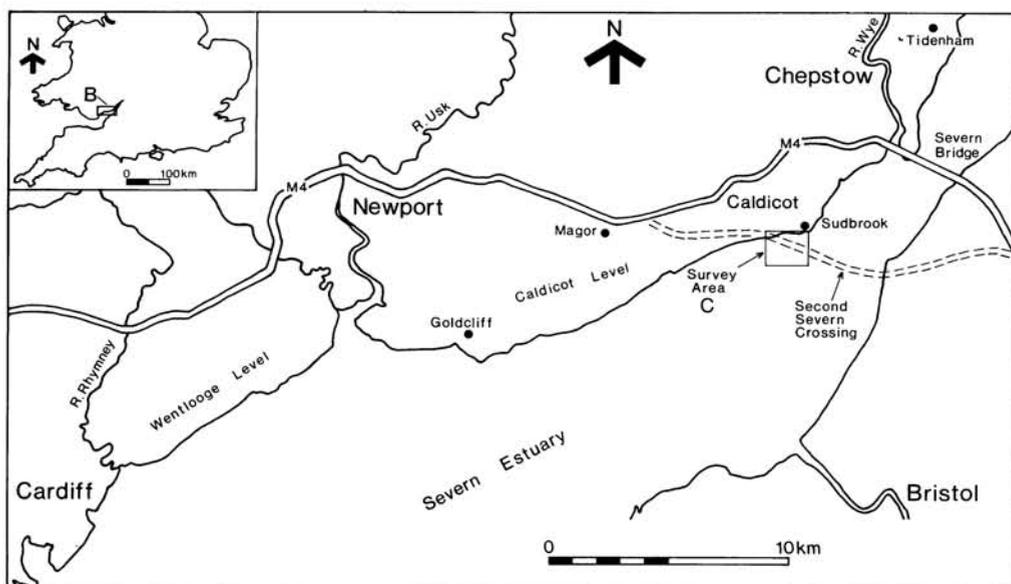


FIG. 1

Location map showing the survey area

#### TOPOGRAPHY

The surviving topography clearly influenced the location of the fishtraps that were discovered and affected the nature of the archaeological work that was undertaken. The study area lay immediately W. of Sudbrook Point, a promontory of Keuper sandstone which, with its equivalent promontory on the English side, Redwick Point, constricts the estuary at its mid-point. Running SW. of Sudbrook Point across the study area was a band of Keuper Marl visible at two places in the intertidal zone. On the line of the Keuper Marl were banks and fans of river gravels. The most significant of these banks was the Bar (see Fig. 2) a boomerang-shaped bank, *c.* 550 m long and up to 120 m wide. At its highest point it stood *c.* 1.5 m above the surrounding alluvium. To the NE. of the Bar, the gravel formed broad fans on the margin of which could be seen distinctive ice wedges into which the gravels had fallen, showing as lines of upright stones. Before and during this project a number of Lower Palaeolithic implements were discovered within the gravels which might suggest a date for their original deposition.<sup>5</sup> Around the margins of the Bar were a number of exposures of peat and extending into the W. edge of the study area were the remnants of a submerged oak forest. All these features were from the Atlantic Period with the submerged forest producing radiocarbon dates of 5210–4460 B.C. (Beta — 54827, Beta — 54829).

The remainder of the intertidal zone was covered by alluvial silts and clays belonging to the Wentlooge and Rumney formations.<sup>6</sup> The combination of all these sedimentary factors produced a triangular survey area 1.25 km wide at its W. end and as little as 0.17 km wide at its E. end. The other significant features were the

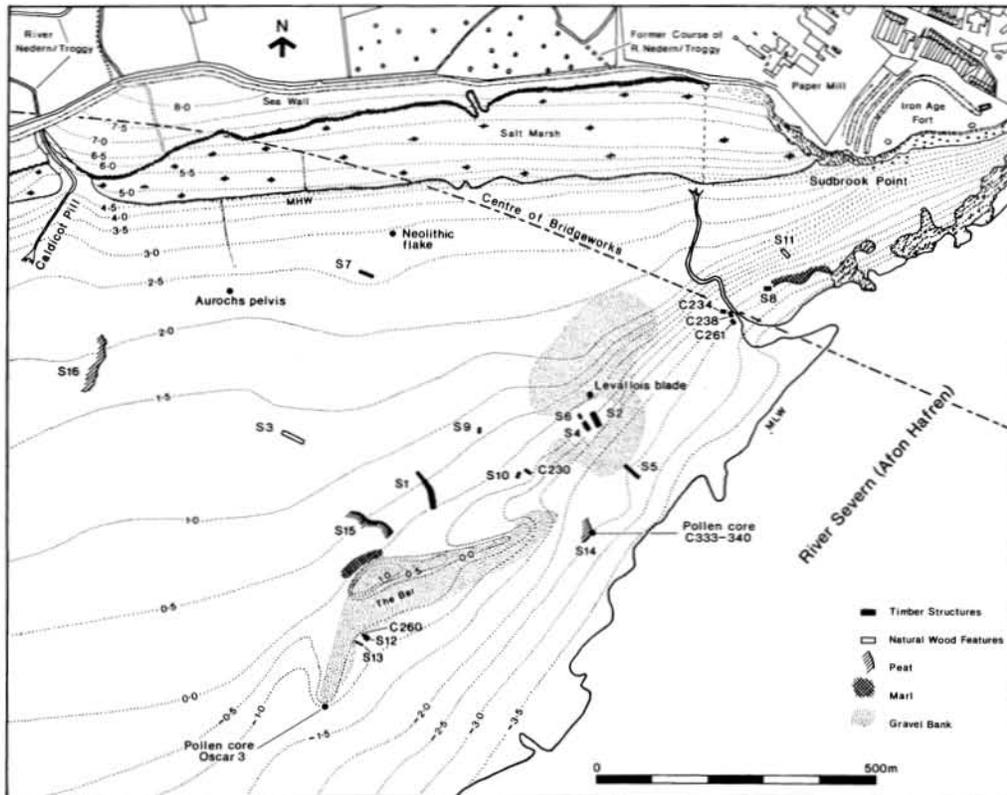


FIG. 2

General plan of the survey area showing the location of individual sites and contexts

outfalls of the River Nedern or Troggy. The present outfall is at Caldicot Pill which lay beyond the W. edge of the survey area. However the course of the river seems to have been artificially diverted to this point in the medieval or post-medieval periods where it became the site of ship-building.<sup>7</sup> The dating is confirmed by the discovery of late medieval and early post-medieval pottery at the Pill. The former course of the river which can be traced on immediately post-war aerial photographs had an outfall *c.* 200 m W. of Sudbrook Point. Its channel is still a significant feature of the intertidal zone and is used for the discharge of effluent from the Sudbrook Paper Mill. Derek Upton has recovered a complete Roman grey ware jar from this channel suggesting the river had this course at this period.

#### ARCHAEOLOGICAL STRATEGY AND TECHNIQUES

Working in the intertidal zone presents some unique problems.<sup>8</sup> The most obvious and disruptive is that the tide floods the area twice a day, making working hours limited and often unsociable. The tidal range within the Severn Estuary is very large so the incoming flood moves at great speed, making safety a considerable

concern. To combat this problem, a complex strategy was devised to investigate the sites and features which were found over a wide area and which ranged between +2.5 m and -3.0 m AOD, all below the mean high water mark. This took account of the twice daily inundation by the sea and the fluctuations of neap and spring tides.

A much more limiting factor was a layer of mobile soft sediment deposited by the river which blanketed much of the study area. This could be up to 0.5 m deep in places, which not only masked any archaeological remains but also made areas unsafe to cross. Though the original aim was to undertake systematic gridded survey the work increasingly became opportunistic. Another problem caused by the mobile sediment was that any area cleared or section dug was refilled by modern sediment on every tide. For those sites below the paper mill outfall, this problem was compounded by the continuous washing of the area by hot cellulose-rich water and wood pulp.

After strong winds and high tides the modern sediment was swept from different parts of the study area and frequently sorties were made to check any fresh exposures. However at no time was the whole study area clear of the sediment, so some sites may have gone unrecorded.

The final major constraint was that the sites were spread out over a kilometre and some were over a kilometre from the nearest vehicular access. Everything had to be carried across deep, sticky mud by hand, including all necessary equipment out to site and all samples and wooden objects on the return journey. This was partly overcome by establishing tool depots which could be anchored into the sediment and left to be covered by the tide.

The archaeological fieldwork fell into three sections. Firstly a topographic survey undertaken by EDM showing the full extent and detail of the study area was undertaken (Fig. 2). The same method was used to establish reference points out in the intertidal zone, locate the position of all the palaeoenvironmental and sedimentological samples and lay out a regular grid at 100 m intervals as the basis of the fieldwalking. Where these grids were free of mobile sediment they were divided into four 25 m square sections and systematically walked to locate any structures, individual posts or finds, the position of which was marked by a cane and dayglow orange bunting. A total of 91 of the 25 m square grids were treated in this way; other sites and finds were made by chance.

When the structures had been found and located on the main plan, they were treated in more detail, with the areas being cleared of superficial sediment and mobile gravels, often revealing much greater structural complexity, and then investigated and sampled by narrow trenches or box sections. About 200 wood samples were taken ranging from cross-sections for dating and wood identification to whole stakes and a complete fishbasket. Nearly all the structures found seem to relate to medieval fishing.

### FISHTRAPS AND FISHBASKETS

Of the sites and finds discovered during the survey, 16 relate to the catching of fish in fixed traps and their transport back to the seashore. These sites divide into

three types: post settings; hurdle structures and possible trackways; and woven fishtraps and fishbaskets.

#### POST SETTINGS

These were the most numerous of the sites investigated. They lay mainly around the periphery of the Bar, and on the gravels to the NE. of this feature, and varied from simple alignments of only three stakes to dense clusters of 250 timbers.

*Site 4: (Figs. 3, 15) 620±60 BP (Beta — 54825)*

A group of vertical timber stakes and posts was located on the gravel fans to the NE. of the Bar (Fig. 2), at an elevation of *c.* -1 m AOD. The timbers formed a series of five V-shaped post settings joined at the arms and extending side by side for a little under 15 m in a NE.-SW. direction. The openings of each V faced upstream and their apexes on the

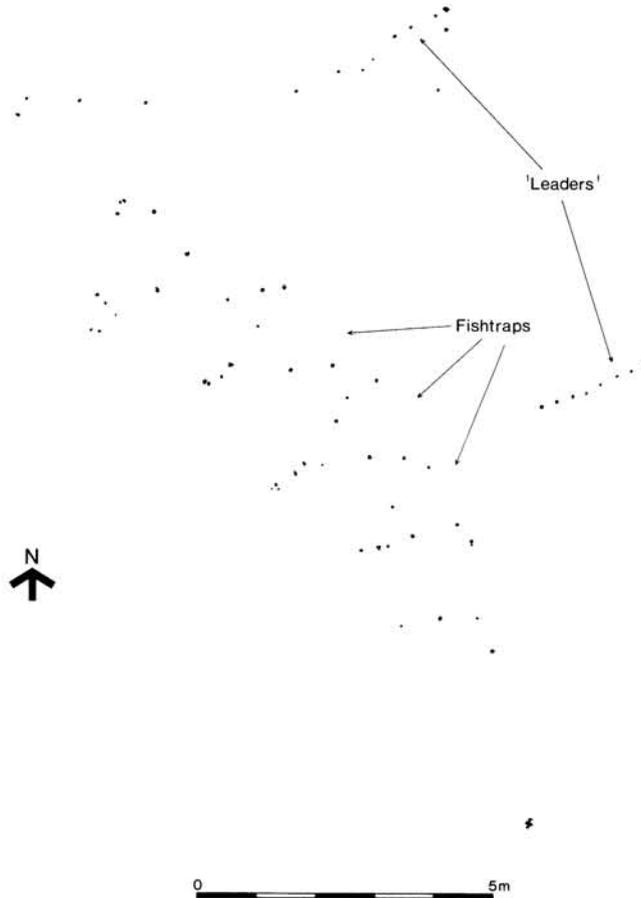


FIG. 3

Plan of site 4. Note V-shaped fishtraps and 'leader' fences (L. Godbold)

downstream side were, in some cases, marked by a small concentration of stakes. The Vs measured 2–3 m in length and were 1.5–2 m in width across their openings. On the upstream side of these structures, there were linear alignments of eight or nine posts extending from the main structure in a NE. direction for a distance of up to 4.7 m.

There were 72 timbers in all. The majority were whole roundwood, but twelve had been split, mostly by quartering or radially splitting. 35 timbers were sampled and 26 of these were lifted complete. The timbers had all snapped or decayed at or just above the present surface. They varied in length between 0.10 and 0.32 m with one large example 0.54 m long. The roundwoods were 24–53 mm in diameter with the split timbers being larger, being between 36–72 mm. Most of the timbers were straight or very straight grained, and driven through bands of gravel in a sandy-clay matrix. A typical section is shown in Fig. 7c.

Site 6: (Fig. 4)  $640 \pm 60$  BP (Beta — 54824)

The site lay only 10 m NW. of site 4. It consisted of 21 vertical timbers arranged to form two V-shaped post settings with perhaps the remains of a third represented by five further posts to the S. The axis of each V-shaped structure was orientated NE.–SW. with the apexes

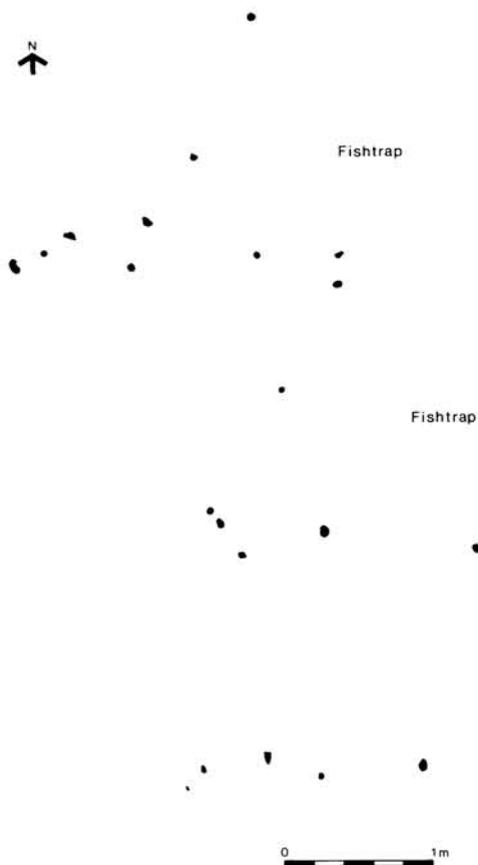


FIG. 4

Plan of site 6. Note two V-shaped fishtraps and remains of a third to the south (L. Godbold)



FIG. 5

Plan of site 2. Palimpsest of V-shaped fishtraps (L. Godbold)

pointing downstream. The N. structure was *c.* 2 m long by 1.7 m across the opening and that to the S. 1.5 m long and 2 m wide.

The timbers were mostly roundwood 35–75 mm diameter, but included four split stakes with an average width of 63 mm. Ten timbers were sampled including seven removed complete. Unlike sites 4 and 2 the stakes had been driven through alternate layers of sandy clay and light gravel, and a typical section appears in Fig. 7c.

*Site 2: (Figs. 5, 14) 620 ± 50 BP (Beta — 54823)*

This was the largest of the sites investigated and lay *c.* 20 m upstream of sites 4 and 6. It consisted of 240 vertical roundwood posts and split timber stakes, forming an apparently amorphous grouping *c.* 25 m long by 10 m wide, running NW.–SE. and at an elevation dropping from –0.5 m to –1.5 m AOD.

More detailed consideration of the plan, in the light of the simpler plans of sites 4 and 6, reveals a series of overlapping, vaguely V-shaped post settings with the axis of each V orientated NE.–SW. and their apexes pointing downstream. These were 3–5 m wide across their openings. The apex of each setting was marked by a small concentration of stakes.

A total of 56 timbers was sampled from this site, including 37 which were excavated complete, mainly from box sections. All 30 split timbers were included in the sample. The diameter of the roundwoods was 29–130 mm, whilst the split woods were 28–124 mm wide, averaging 81 mm. The length of the complete samples, all of which were truncated at or just above the modern surface, were 0.10–0.94 m but over 60% were under 0.3 m in length. One large roundwood post, WS607 (Fig. 7a) had a through mortise, 76 by 35 mm, cut near the eroded top of the timber. The tenon had been secured by a round timber dowel, 20 mm in diameter. This timber had been sharpened to a pencil point on four faces at very shallow angles. The toolmarks had a dull appearance suggesting it had been worked after seasoning and so it had probably been reused. The timbers had been driven into layers of gravel within a sandy-clay matrix.

*Interpretation of Sites 4, 6 and 2*

These three sites have much in common. They are similar in form, with lines of V-shaped structures facing upstream and with their apexes reinforced by concentrations of small stakes. They are made of a mixture of roundwood and split timbers driven into the gravel fans NE. of the Bar. They lie within 40 m of each other and it is quite possible that site 6 and site 4 were originally part of the same structure. The single radiocarbon dates obtained from each of these sites could be contemporary though it is unlikely that site 2 would have been standing directly in front of sites 4 and 6. The plans of sites 4 and 6 suggest that they were short-lived whilst the complexity of site 2 indicates that this structure was repaired and remodelled over a longer period.

*Site 5: (Fig. 6) tree ring felling' date AD 1203/4*

The site lay on a gradual SE. facing slope at the foot of the gravel fan where sites 2, 4 and 6 were sited (Fig. 2). It comprised 44 posts and stakes on a slightly curving NW.–SE. alignment. This was one of the lowest sites investigated and extended from –2.5 m AOD in the NW. to –3.2 m AOD in the S.E., where it was only 70 m distant from mean low water mark.

The timbers formed an intermittently spaced double row running for a distance of *c.* 30 m with the rows varying between 0.7 m and 1.5 m apart. Most of the timbers were roundwood but there were also 10 split stakes. Twenty of the timbers were sampled for study of which four were retrieved intact and were 0.42 m to 0.88 m long and had all been pointed. The roundwoods were 38–128 mm in diameter and the split timbers were 75–140 mm wide. The timbers had been driven into alternating bands of gravel and clay (Fig. 7d).

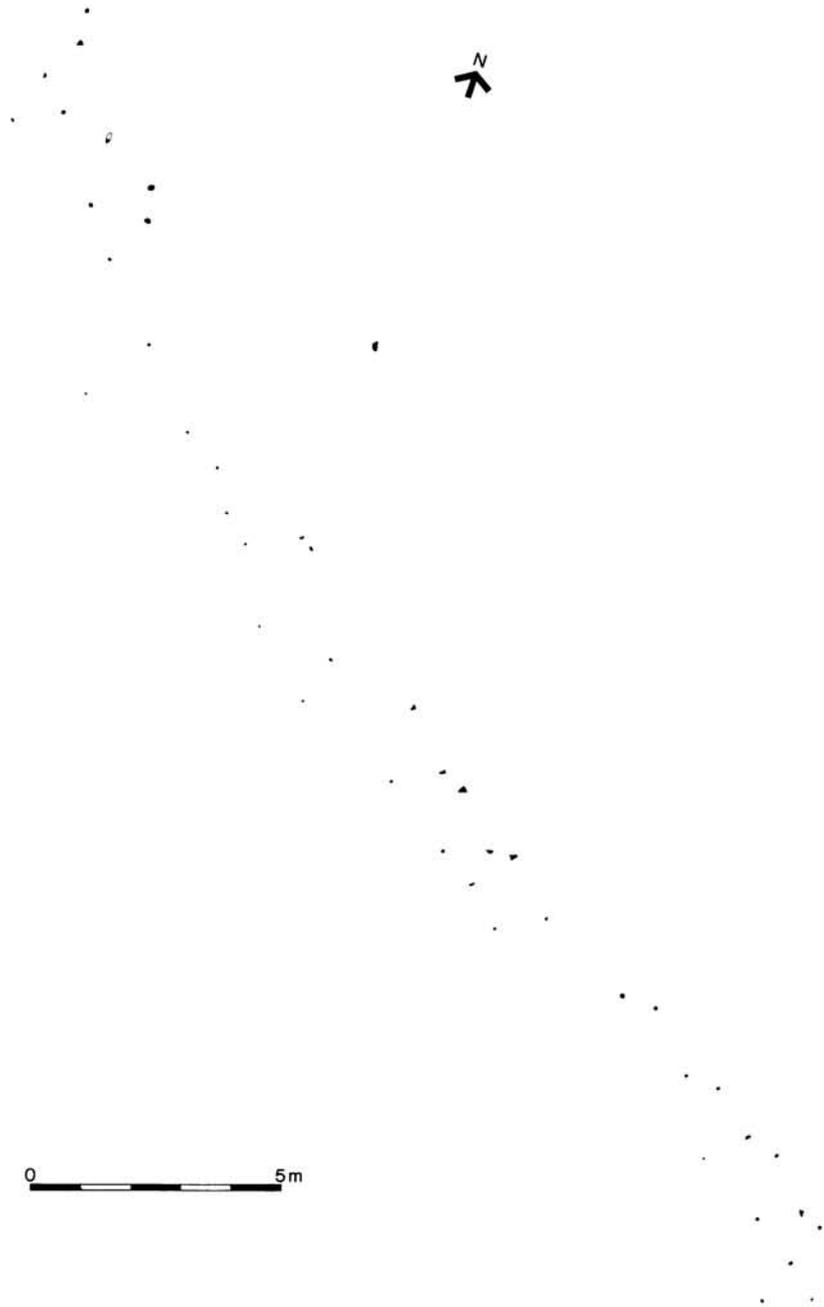
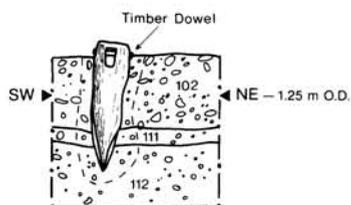
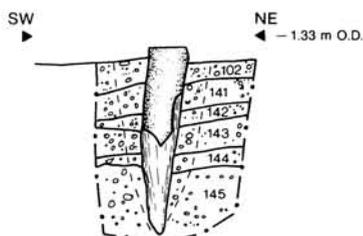


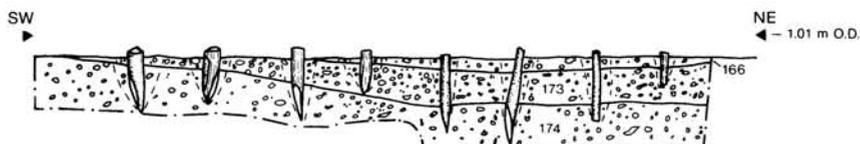
FIG. 6  
Plan of site 5 (L. Godbold)



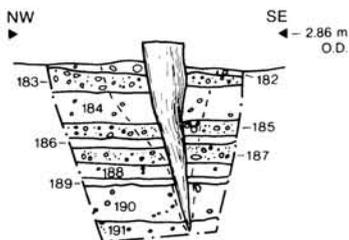
a. Wood sample 607 (*Site 2*): Roundwood post with through-mortice and timber dowel. Remains of tenon survive within the joint.



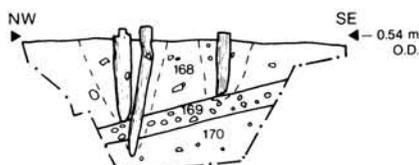
b. Wood sample 629 (*Site 2*): Elm roundwood post with large area of bark intact.



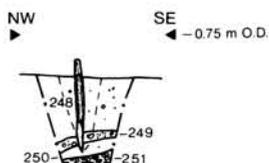
c. Wood samples (*L-R*) 693-699 (oak), and 700 (beech) (*Site 4*): Roundwood posts, several retaining traces of bark. These timbers are the remains of a hurdle 'leader' fence.



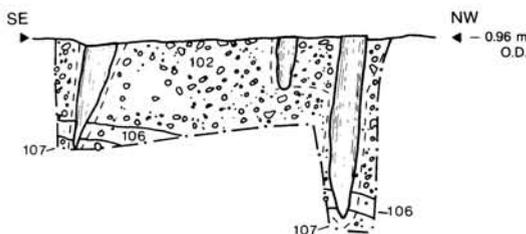
d. Wood sample 710 (*Site 5*): Radially split oak post.



e. Wood samples (*L-R*) 677 and 678 (pomoideae sp.) and 679 (oak) (*Site 6*): Roundwood posts.



f. Wood sample 781 (*Site 12*): Hazel roundwood stake — bark largely intact.



g. Wood samples (*L-R*) 605 radially split beech, 604 oak roundwood and 603 half split oak. (*Site 2*).



FIG. 7

Typical sections from the excavation of the post settings, showing the posts *in situ* (L. Godbold)

*Interpretation of Site 5*

This alignment is very different in form to those described in sites 2, 4 and 6. The wide crescent faces upstream so if it were a fishtrap it would be expected to operate on the ebb tide, to catch fish swimming in front of the gravel banks. Some of the posts appear to group linearly in pairs, especially at the SE. end where at least five pairings can be seen, with a small number at the NW. end. These could have been placed to support either side of a brushwood hurdle fence which would have channelled fish into the centre of the crescent where a fishtrap may have been situated. The larger section posts here hint at the possibility of such a trap. For the same reason a trap may have been placed at the NW. extremity. Alternatively the post pairings may each have held individual basketwork fishtraps.

*Site 7*

This site was a discontinuous row of small roundwood stakes lying *c.* 140 m S. of the salt marsh in the N. part of the survey area (Fig. 2). It was composed of 48 vertical timbers forming an intermittent NW.-SE. alignment running for *c.* 26 m. It was 0.2-0.4 m in breadth and appeared to consist of 8 groups of between 3 and 8 timbers each. This was the highest site investigated lying just above +2.5 m AOD. The roundwood 19-50 mm in diameter, averaging *c.* 30 mm, and the four samples lifted were 0.08-0.45 m long.

The interpretation of this site is not clear. It ran vaguely parallel with the shoreline but given the discontinuous and insubstantial nature of the posts it cannot represent an attempt at reclamation. The uprights seem too weak to support hurdle weirs and so it seems most likely to have secured nets. If so it is likely to be relatively modern in date.

*Sites 12 and 13: 960±70 BP (Beta — 54831)*

Site 12 was found on the S. side of the Bar. It consisted of a dense grouping of 230-50 roundwood posts 20-90 mm in diameter, all contained within a sub-oval area measuring *c.* 11 m × 12 m, at an elevation of -0.9 m AOD. This site was the largest of several post settings on the seaward side of the Bar. However, as with site 13, it lay distant from the centreline of the bridgeworks and little time could be devoted to its recording and excavation. Nevertheless the density of the timbers, the presence of a small interwoven fishbasket (context 260) located on its periphery, and a linear alignment of vertical timbers, site 13, 10 m to the W. are strongly suggestive of some form of fishtrap. One small hazel roundwood was lifted measuring 0.23 m in diameter and 0.31 m in length, driven into pure dark grey-brown clay.

A sample of hazel taken earlier from this site by R. Trett and D. Upton produced a radiocarbon date of 1020±70 BP (GU — 3238) which overlaps with that obtained from the sample taken during this survey and confirms an early medieval date for this structure.

Site 13 consisted of a line of about 70 roundwood uprights 20-60 mm in diameter which formed an irregularly-spaced row of posts 0.7 m broad and 6 m long, orientated in a NW.-SE. direction.

*Interpretation of Sites 12 and 13*

It is not clear without further investigation and detailed planning how these sites functioned. They are located in what are shallow embayments on the seaward fringe of the Bar. The posts are not strung out to catch fish as they travel upstream or if they are being drawn downstream by the ebb tide. Perhaps the steep slope of the Bar provided local conditions suitable for some other form of trap.

*Sites 9 and 10*

These were two isolated rows of three roundwood posts of similar size to those found in other sites. However, too little survived for any interpretation to be made.

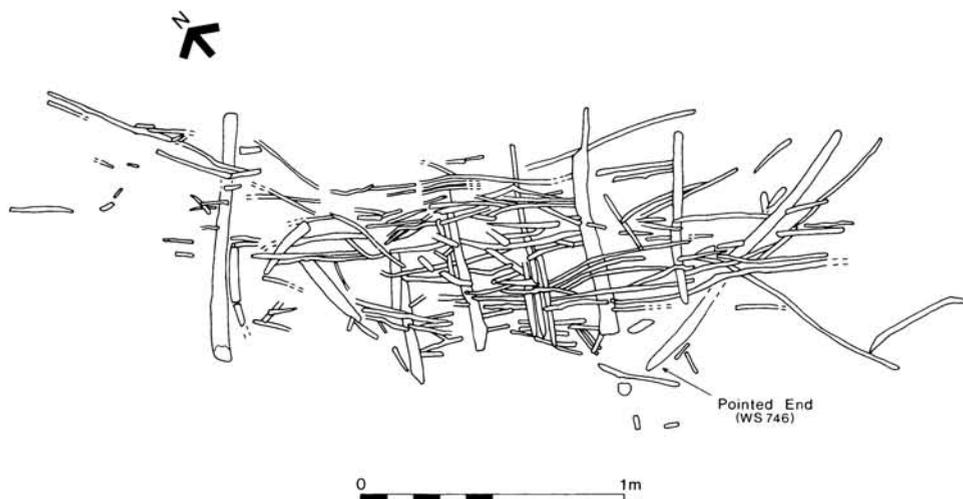


FIG. 8

Plan of context 230

## HURDLE STRUCTURES AND POSSIBLE TRACKWAYS

*Context 230: (Figs. 8, 15) 1120 ± 90 BP (Beta — 54828)*

A length of interwoven timber hurdle was found lying partly embedded in blue-grey estuarine clay, 70 m N. of the NE. end of the bar (Fig. 2). It was *c.* 3.5 m long and 1.2 m wide, and was aligned NW.–SE. The hurdling was composed of twelve sails linked by closely interwoven roundwood rods. Eleven of the sails were roundwood 25–55 mm in diameter, with an average of 37 mm. The single radially split oak sail was 19 mm thick and 23 mm wide. The rods were 10–25 mm in diameter, averaging 16 mm.

The structure was fairly well-preserved in its central area but had disaggregated at its extremities. The upper surfaces were weathered and had suffered faunal/fungal attack. Twenty-nine samples were taken from this structure and the range of species and the technology will be described in the relevant sections below.

*Context 261: (Figs. 9, 15; Pl. III, A) 1090 ± 80 BP (Beta — 56188)*

An interwoven timber hurdle structure was found lying embedded in grey-brown estuarine clay, 8 m W. of the mouth of the paper mill outfall in the E. of the survey area (Fig. 2). When first located, it was almost completely submerged in the clay, only a small area of the structure being exposed. It measured *c.* 1.9 m long by 1.5 m wide, aligned NW.–SE. The centre was quite well-preserved but it was breaking apart on the margins.

The hurdling was made of seven roundwood sails around which were woven thin roundwood rods. The sails were set 0.2–0.3 m apart, but some had been arranged in pairs, presumably to strengthen the structure. The sails were 23–42 mm thick and the rods were 10–20 mm in diameter.

*Interpretation of contexts 230 and 261*

These lengths of hurdling could either have stood upright and acted as fences or 'leaders' to direct fish into the traps on an ebb tide, or been laid flat and used as trackways or 'duckboards' across particularly soft ground. Trett and Upton recorded a hurdle structure in

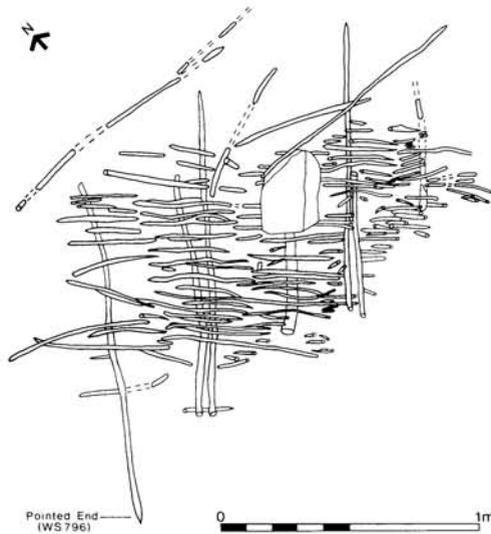


FIG. 9  
Plan of context 261

1987 at a position estimated to be 16 m W. of context 230, but which had eroded away by 1991. This they identified as a trackway. A host of roundwood trackways of Iron Age date have been found 15 km down the estuary at Goldcliff but these are narrower and have been pegged in place.<sup>9</sup>

An important feature of contexts 230 and 261 are that the sails are sharpened at one end and no pegs were found holding them into the alluvium. Context 261 is immediately adjacent to what may be a contemporary fishtrap, context 238 (see p. 34). Given that leaders were clearly used at site 4, these two structures are best interpreted as sections of larger fishtraps.

*Site 1: 150 ± 50 BP (Beta — 54826)*

This site was located in the centre of the survey area *c.* 80 m N. of the Bar (Fig. 2). It consisted of over 70 widely-dispersed horizontal timbers stretched out over 75 m and covering an area between 3–10 m wide. These were associated with the occasional small vertical roundwood 'peg'. The timbers varied widely in form and manufacture and derived from a wide range of species (Table 2, p. 37). They lay across an area of soft sediment where the ground began to dip slightly into a shallow channel behind the Bar. This site is best explained as some form of trackway perhaps giving access to the fishing areas beyond the Bar but the radiocarbon date shows that it is relatively modern in date.

WOVEN FISHTRAPS AND FISHBASKETS

*Site 8: (Fig. 10; Pl. III, B) 280 ± 60 BP (Beta — 54833)*

The site was located at the E. end of the survey area *c.* 250 m SW. of Sudbrook Point (Fig. 2), and only 60 m distant from the low water mark at an elevation of *c.* -2.5 m AOD. It was V-shaped in plan, composed of small vertical roundwoods with its apex pointing towards the W. It was 3.2 m long and *c.* 2.4 m wide at the opening at the E. end. The tops of the timbers were weathered and eroded to within 30–40 mm of the surface of the surrounding mud.

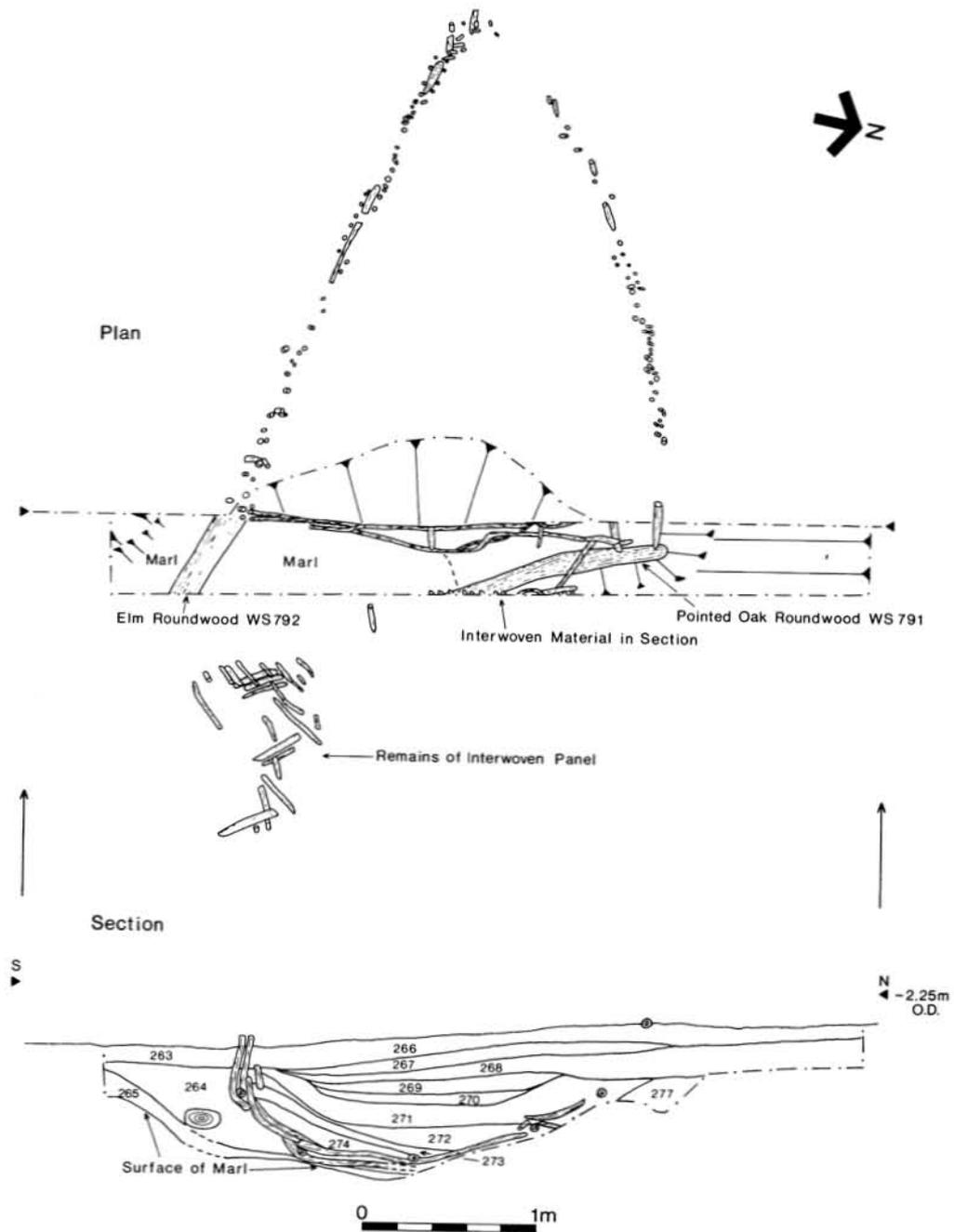


FIG. 10  
Plan and section of site 8

The opening was investigated by excavating a section 4.4 m long by 0.5 m wide. This exposed a large basketwork structure made of long lengths of roundwood, interwoven and curving downwards to a depth of 0.9 m forming a broad U-shape in profile. The basic framework was made of longitudinal rods 40–50 mm in diameter, spaced 0.35–0.60 m apart, woven with lateral roundwoods 20–30 mm in diameter. Lying across the S. side of the opening was a large horizontal, oval-shaped, elm timber. Another large timber, this time of oak, lay on the N. side partly across the mouth of the structure, though this may have been displaced. The latter timber was pencil pointed at one end.

Immediately to the E. of the structure and protruding from the opposite face of the section was a piece of interwoven material. Although likely to be part of the structure it did not seem to be in its original position. The section showed that this whole feature was sitting on a thin layer of sandy clay directly above a channel or depression in the marl bedrock, with the fill of the structure being layers of estuarine silt.

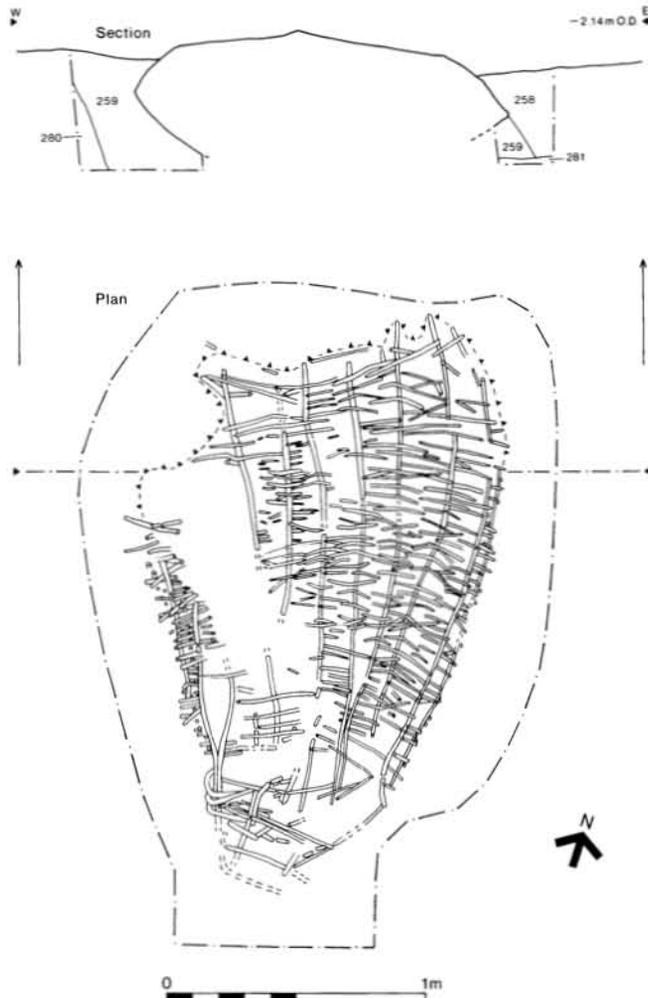


FIG. 11

Plan and section of context 238

*Context 238: (Fig. 11; Pl. IV, A) 960±60 BP (Beta — 54832)*

A large interwoven fishtrap was found lying partly buried in estuarine silts 8 m W. of the paper mill outfall at the E. end of the survey area (Fig. 2). It was conical in shape, tapering throughout its length from N. to S. It was damaged at the N. end and survived for a length of 2.2 m. The E. side had a noticeable bulge but the cross-section shows that this resulted from the compression of the original oval or circular profile. It was 1.5 m at its widest point and 0.65 m wide at its S. end.

The structure was formed of longitudinal roundwood rods spaced at a maximum of 0.2 m apart but tapering together at the S. end. These timbers measured 15–18 mm in diameter. Around these were woven thinner roundwoods 7–15 mm thick, placed close together. At the S. end the timbers had been twisted around probably to form an end. Whether or not it had an opening at this point was not proven, though this would be likely, otherwise the catch could only be retrieved with difficulty.

Context 238 was lying on a surface of dark-grey sandy clay, and filled with estuarine clays. It faced the outfall of the R. Ncdern in a shallow channel. There was no evidence that it was originally fixed in this position or had floated free.

#### *Interpretation of Site 8 and Context 238*

Both these features represent the form of V-shaped fishtraps presumed to have been mounted in the post settings of sites 2, 4 and 6. However, they come from different periods, with context 238 being significantly earlier and site 8 significantly later. However, they do closely parallel the putt, one of the woven fishtraps still in use into recent times which were mounted in ranks. Site 8 does seem to have been fixed within a natural channel and stood by itself, whilst context 238 may not be in its original location.

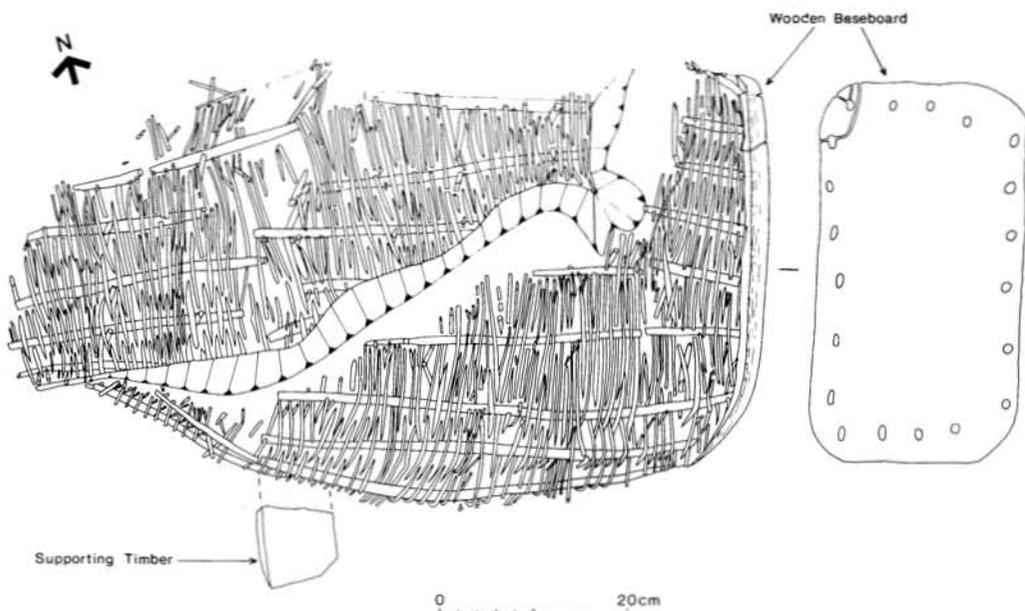


FIG. 12

Plan of context 234; fishbasket showing the timber baseboard and supporting post

*Context 234: (Fig. 12; Pl. IV, B) 590±70 BP (Beta — 54830)*

A small fishbasket was found buried in grey-brown estuarine silt, 16 m W. of the mouth of the paper mill outfall at the E. end of the survey area (Fig. 2). It was sub-oval in shape and 0.82 m long. The S. side of the basket curved slightly throughout its length but on the N. side it was acutely curved so as to form an offset rounded point at the W. end. It measured 0.44 m across its widest point just E. of centre. At the E. end the sides tapered slightly to meet a 16 mm thick timber board which seems to have been the base of the basket. The board was 0.35 m wide and 0.22 m high, with rounded corners.

The basketwork was constructed by pulling 20 longitudinal rods, 9–10 mm in diameter, through holes drilled in the baseboard. Closely interwoven around these rods were thin pieces of withy 5–6 mm in diameter. The basketwork is incomplete and it is not clear where the opening was, being either in the tapered end or, less likely, in the damaged N. or upper side. Lying immediately adjacent to the S. side was a 0.68 m long split ash stake with tapered ends. A broken piece of split withy was observed to be extending from the side of the basket across the ash stake. There are four depressions in the surface of the stake which may have indicated other attachments.

The S. side of the basket was fixed or supported by a split timber laying at right angles beneath it and protruding for 0.11 m. The basket lay on the surface of a grey-brown very sandy clay and was surrounded and filled with estuarine clays. It was retrieved intact over two days with considerable difficulty. It is now being conserved within the National Museum of Wales. No additional details have been found during the cleaning for conservation. The function of this basket is not entirely clear. In form it resembles the interwoven eel baskets (known as 'putcheons' or 'weels') used on the R. Severn or, with its narrow neck, an urn-shaped basket used to store lampreys called a 'hard weel'. However, there is no internal structure to prevent the fish escaping.

The ash stake bound to the side of the basket may represent a carrying handle and, with the solid timber base clearly intended to support some weight, this artefact may have been a carrying basket known in the Severn Valley as a 'welch' or a 'witcher'. However, no exact parallel for this basket has been found except for a similar fishbasket with a baseboard found by Derek Upton within an old channel at Magor Pill, 5 km to the W. of Sudbrook Point.

#### DATING EVIDENCE

No artifactual evidence was found in direct association with any of the timber structures. Therefore the dating of the fishtraps and fishbaskets relies on radiocarbon dating or in one case dendrochronological dating. Two other radiocarbon dates taken from earlier samples removed from the site are given for comparison.

#### *Radiocarbon (Table 1)*

Samples from ten of the sites and contexts believed to be associated with fishing were submitted to Beta Analytic Inc of Florida for radiocarbon dating. One date was obtained for each of the major sites with the exception of site 5 which had already produced a dendrochronological site. These dates are given in the order they are described in the text giving the uncalibrated age first, the calibrated age at one standard deviation or 68% confidence limits second, and at two standard deviations or 95% confidence limits third. The calibrations are based on the calibration curve produced by Stuiver and Pearson.<sup>10</sup> The dates from earlier samples taken by Trett and Upton are also included.

#### DENDROCHRONOLOGY *By* J. HILLAM<sup>11</sup>

Eight samples were submitted from the archaeological sites for tree-ring dating. Five of these, all from site 2, were identified as beech. An attempt was made to cross-match with a

TABLE I  
 RADIOCARBON DATES

Site types	No.	Uncalibrated date and Laboratory No.	Calibrated date at 1 sigma. All dates A.D.	Calibrated date at 2 sigma. All dates A.D.
<i>Post Settings</i>	Site 4	620 ± 60 BP (Beta — 54825)	1283-1401	1270-1420
	Site 6	640 ± 60 BP (Beta — 54824)	1279-1395	1260-1410
	Site 2	620 ± 50 BP (Beta — 54826)	1285-1398	1270-1410
	Site 12	960 ± 70 BP (Beta — 54831)	1007-1163	960-1230
		1020 ± 70 BP (GU — 3238)	968-1035	890-1170
<i>Hurdle Structures and Trackways</i>	Con 230	1120 ± 90 BP (Beta — 54828)	789-1008	680-1040
		1050 ± 60 BP (CAR — 1068)	901-1021	783-1152
	Con 261	1090 ± 80 BP (Beta — 56188)	883-1015	770-1113
	Site 1	150 ± 50 BP (Beta — 54826)	1666-1955	1650-1955
<i>Woven Fishtraps and Baskets</i>	Site 8	280 ± 60 BP (Beta — 54833)	1514-1660	1460-1955
	Con 238	960 ± 60 BP (Beta — 54832)	1012-1160	970-1220
	Con 234	590 ± 70 BP (Beta — 54830)	1287-1414	1270-1440

London beech chronology which spans the period A.D. 817-1272, unfortunately without success. Three samples of oak were submitted from site 5. Two of these, WS 712 and 715, both radially split timbers, had spring vessels forming, indicating that they were felled in that season. However, WS 715 had only 35 rings and was rejected, whilst WS 712 with 64 rings could not be reliably dated when tested against reference chronologies for the periods 252 B.C. to A.D. 294 and A.D. 404 to the present day. Success was achieved with the third sample, WS 736. This was a quartered section of oak with 91 rings, whose ring sequence spanned the period A.D. 1113 to 1203 when tested against the aforementioned chronologies. This tree was probably felled in A.D. 1203 or 1204, although the season of felling could not be determined. This sample matched well with chronologies from London and Germany; the match with London was considered so good as to suggest that it might have come from that area.

#### WOOD IDENTIFICATION AND TREE-RING STUDIES *By* S. JOHNSON<sup>12</sup>

A total of 198 wood samples from 17 separate sites and contexts were identified. Two of the sites were natural contexts, i.e. fallen trees and tree stumps and the remainder were wooden structures or features. The natural contexts, which are prehistoric, have been omitted from this discussion. The number of samples from each individual site or context varied from 1 to 56 samples.

With the exception of the holly (*Ilex aquifolium*), most of the wood was very well preserved and all the samples were identifiable. Identifications were made under high magnification with reference to Schweingruber<sup>13</sup> and modern reference slides. The identifications are summarized in Table 2.

Overall, oak (*Quercus* spp.) and hazel (*Corylus avellana*) were the most commonly occurring species (57 samples each). Oak was present at seven sites and was the most numerous species at three of these. Hazel was present in the samples from eleven sites and at eight of these it was either the most common or the only species present. Beech (*Fagus*

TABLE 2  
WOOD IDENTIFICATION

Site/ Context	Site type	Date	Taxa										TOTAL				
			Quercus	Fraxinus	Ulmus	Fagus	Corylus	Alnus	Betula	Salix	Ilex	Acer		Cornus/Pomoideae			
1	H/TW	C17+	3	1	2	4	3	1	1	1							16
2	PS	C14	18	4	7	17	8	1		1							56
4	PS	C14	18	2		6	4								3		33
5	PS	C13	12	1	5									1	1		20
6	PS	C14	3		1	3							1		2		10
7	PS	-						3	1								4
8	FB	C16/17	1		1		4										6
9	PS	-					1										1
10	PS	-					1										1
12	PS	C10/12					1										1
12/260	FB											1					1
230	H/TW	C8/11	2				20						3	2	2		29
234	FB	C14		1													1
238	FB	C11/12					6										6
261	H/TW	C8-11			16	30	57	3	1	2	5	6	1	4			192
TOTAL			57	9	16	30	57	3	1	2	5	6	1	4			192

Key: H/TW = Hurdle/trackway, PS = Post setting, FB = Fishbasket. Natural contexts (i.e. prehistoric submerged forest) have been omitted from the table.

*sylvatica*) was also well represented (30 samples) although it occurred on only four sites, one of which is relatively modern (Site 1). Elm (*Ulmus* spp.) occurred fairly regularly (16 samples from five sites) and there were smaller amounts of ash (*Fraxinus excelsior*), field maple (*Acer campestre*), holly (*Ilex aquifolium*) and *Pomoideae* (apple/hawthorn type). The remaining taxa occurred only rarely.

The post settings, sites 2, 4 and 6, are similar in character, date (c. 14th century), and location. They are the only medieval sites where beech was present, used as split timbers. Site 5, dating to at least a century earlier, has no beech present. In Gwent, beech is towards the W. limit of its natural range in Britain, and has been found in medieval Monmouth.<sup>14</sup> Its use in the post settings is surprising, however, since the timber is classed as 'perishable', i.e. has a useful outdoor life of under five years.<sup>15</sup>

Samples from the hurdle structure, context 230, showed a difference between the sails and rods. Ten samples from the sails were identified as three holly, two each of oaks, hazel and *Pomoideae* (apple/hawthorn type) and one field maple. In contrast, one rod sample was field maple, and the rest were hazel (18 samples). It appears that hazel was preferentially used for the rods. It is particularly suitable for this use and has been used to make hurdles and wattle structures since the neolithic.<sup>16</sup> However, the occurrence of the odd maple rod indicates that although hazel may have been preferred, it was not used exclusively.

Context 230 was the only one which produced enough roundwood samples of a single species to make tree ring analysis worthwhile. The diameters and ages of the hazel samples were plotted as a scattergram (Fig. 13). This shows a range of ages between 2 and 24 years with a concentration at 2-3 years, and a range of diameters between 12 and 39 mm, all but one between 12 and 24 mm. This range of diameters fits well with the usual range of

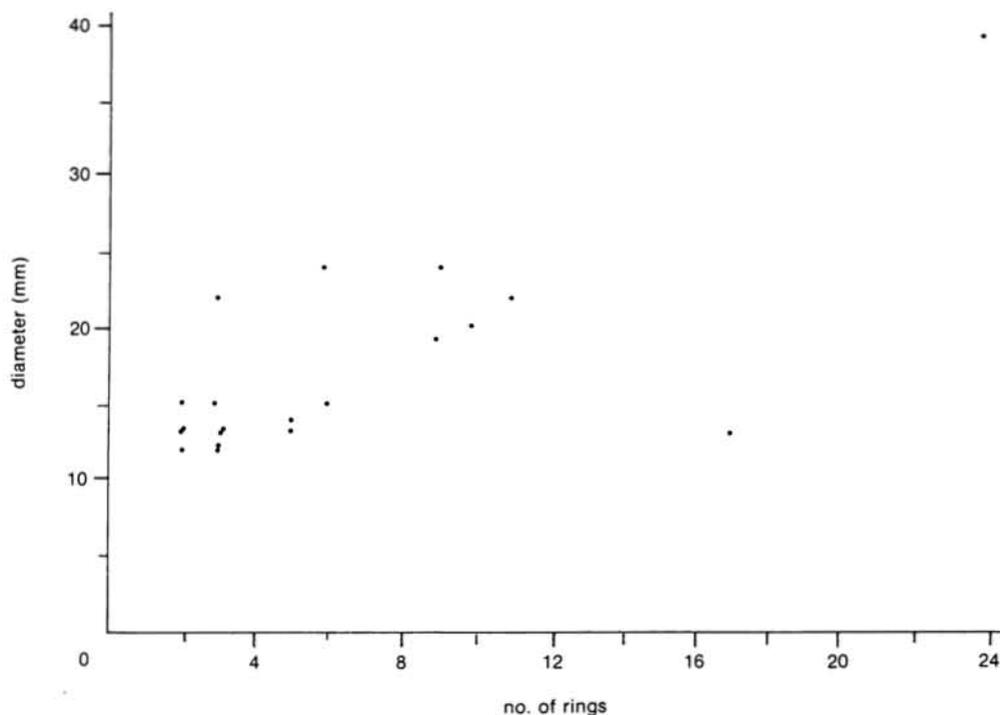


FIG. 13

Scatter diagram showing the age and diameter characteristics of the hazel samples from context 230

10–25 mm observed in other hurdle structures.<sup>17</sup> The age range of the material, however, makes it unlikely that it derives from a ‘normal’ coppice cycle of 5–8 years.<sup>18</sup> It is, however, comparable with the age range of material from the Honeygore Track which, it has been suggested, was ‘draw felled’, that is selected on the basis of size rather than age.<sup>19</sup> However, the sample size from that trackway was much larger than that under discussion here, and the suggestion could be made with rather more confidence than is possible with this much smaller sample.

The six examples from the hurdle structure, context 261, from both rods and sails, were all hazel, as were the interwoven elements of the fishtrap, site 8, and the large fishbasket, context 238. Single samples of the two small fishbaskets, contexts 234 and 260, were willow and it is likely that they were woven with this species throughout. Both willow and hazel have been used for fishbaskets on the Severn in recent years<sup>20</sup> and a recently excavated Saxon basket celtrap from Burghfield in Berkshire was constructed of very closely woven split hazel stems.<sup>21</sup>

Structures comparable to those in the Severn Estuary have been excavated on the Trent at Colwick, Nottinghamshire. There, the posts used in the medieval fishweir, radiocarbon dated to A.D. 1050–1245 (calibrated to one standard deviation), were mainly oak 100–50 mm diameter, with a few holly. Samples of wattling from the weir showed that three rods were elder and six sails were hawthorn. In the Saxon weir at Colwick, dated to A.D. 872–949, holly 70–100 mm diameter was more numerous with smaller amounts of oak and hawthorn. The wattling associated with this weir was mostly hazel with smaller quantities of holly, ash and willow.<sup>23</sup>

In considering the source of supply of the wood used in the construction of these structures and baskets on the Severn there are a number of factors which must be taken into account. Perhaps the most obvious is the wide date range covered by these sites; it is unlikely that the source of the wood from the earlier contexts 261 and 230 was the same as that used for the much later sites 1 and 8. For the earlier sites there are really too few samples to discuss the woodland resource, except for the hazel from context 230 discussed above. Sites dated to the 13th and 14th centuries provided about 60% of the wood samples, and give a better indication of the wood species used at that time. Most of the species found are unlikely to have grown in any quantity in the immediate vicinity of the sites; the exceptions to this are the few examples of alder and willow which grow on the Level today. Most of the species present are more likely to have grown on higher, drier ground and this is particularly true of beech and field maple.

It is tempting to see the source of the wood as some kind of mixed, managed woodland with standard trees and coppice. By this date the use of woodland was almost certainly well regulated<sup>24</sup> and the size and age of the oak from sites 2 and 4 is suggestive of oak coppice although there are too few samples to be certain. Woodland, however, was probably not the only source of timber. It is possible that some of the timber came from trees which grew in fields and hedgerows; elm was more commonly referred to as a hedgerow tree than a woodland tree.<sup>25</sup>

There are also other possibilities which need to be taken into account when considering possible sources of supply. The timber trade was well established by the time many of these sites were in use<sup>26</sup> and Hillam has suggested a London area origin for one of the oak timbers from site 5 (see p. 36). A further point to consider is that the wood used in these structures was not necessarily ‘new’. O’Sullivan has found evidence from site 2 which suggests that some timber may have been reused (see below).

#### WOOD TECHNOLOGY AND RAW MATERIALS *By* A. O’SULLIVAN

##### *Methodology*

The material examined for evidence for woodworking techniques varied in form, including small sections of cut roundwood and large split and carved posts and beams.

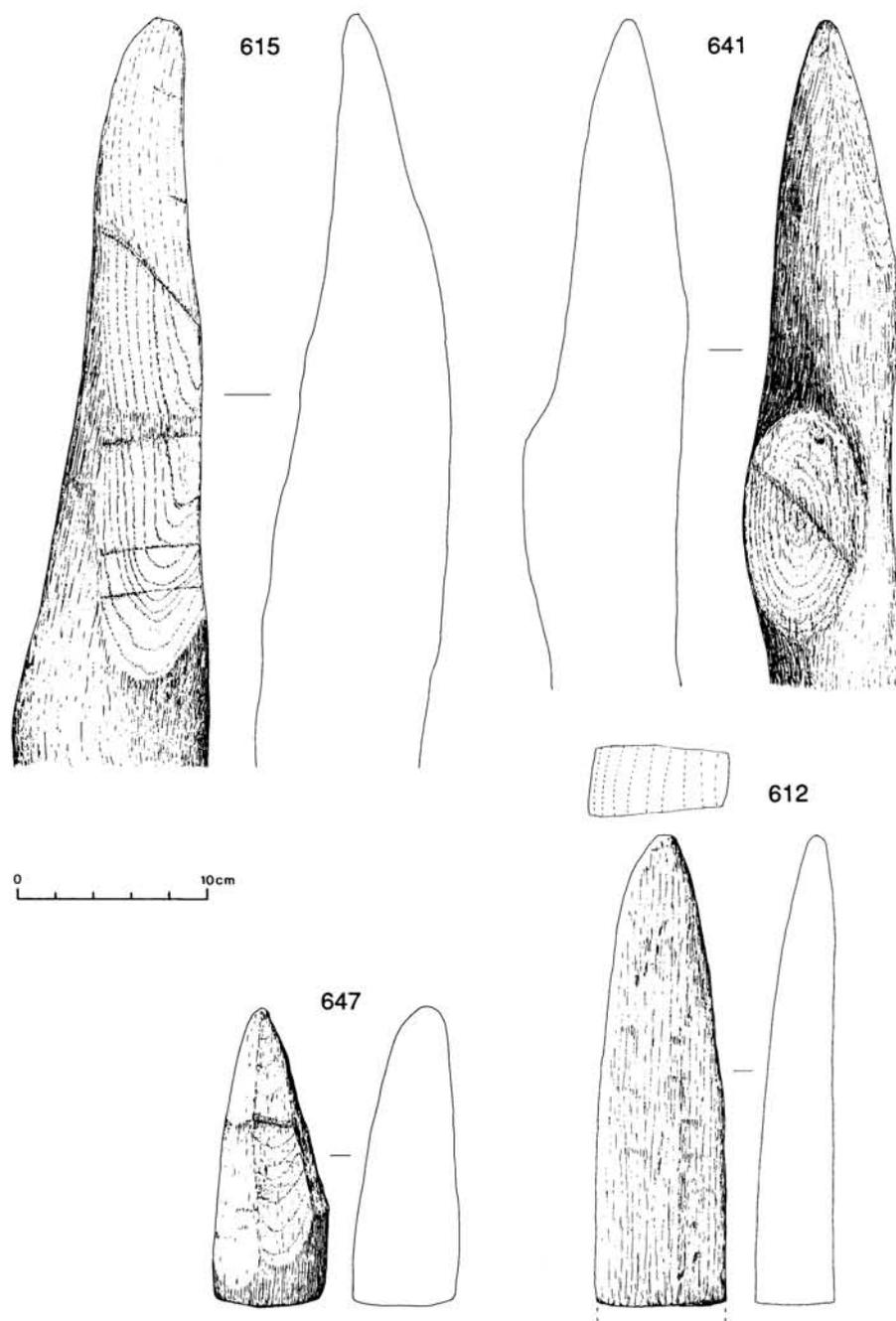


FIG. 14

Worked ends from site 2. 615, 641: Elm roundwood with wedge variant point; 647: oak roundwood with pencil point; 612: Beech radially split with pencil point (A. O'Sullivan)

Although the wood itself was well-preserved the eroded and sediment-scraped surfaces of the worked ends meant that the toolmarks were rather more variable in quality. Each piece was examined under oblique lighting and formal attributes recorded on Wood Record Sheets.<sup>27</sup> The terminology used here is based on previous studies of worked wood from prehistoric and medieval raised bog trackways in Somerset, England<sup>28</sup> and Co. Longford, Ireland.<sup>29</sup> The bulk of the wood report is in the site archive, or included in the site descriptions given in this paper. The material has provided a useful insight into basic woodworking techniques in medieval Wales.

Raw material can be taken to denote the species (see S. Johnson, this paper), size and quality (grain, knots, number of side branches, etc.) of wood used and the method and type of its primary conversion.<sup>30</sup> Point shape indicates the form of point produced and indirectly the style of working and level of effort given to each piece (Figs. 14, 15). Chisel-ends were cut down one side of the stem only either on one worked surface, or with two adjacent cut faces (chisel variant). Wedge ends were cut on directly opposing faces of the trunk, or on almost adjacent faces (wedge variant). Pencil ends were cut on three or more faces, completely around the diameter of the trunk. The cutting angle denotes the angle of the worked surface to the length of the trunk, with both the minimum and maximum angles recorded. The more shallow cutting angles ( $0^{\circ}$ – $20^{\circ}$ ) represented a desire for a sharper point, using thin, flat axe blades to make successful cuts. These angles can be grouped into ranges  $0^{\circ}$ – $20^{\circ}$  (very shallow),  $21^{\circ}$ – $40^{\circ}$  (shallow),  $41^{\circ}$ – $60^{\circ}$  (medium),  $61^{\circ}$ – $80^{\circ}$  (steep) and finally  $81^{\circ}$ – $90^{\circ}$  (straight). The surface of a worked end is made up of one or more toolmarks, although the number surviving bear little relation to the original number of axe blows.<sup>31</sup> Toolmarks vary in shape — flat, slightly concave or concave — length and width. The junctions between each individual toolmark can be clean, ragged or stepped. Such attributes when measured and compared can be informative about the type, size and shape of axe used. Jam curves tend to be even more informative, resulting when the axe blade becomes embedded in the wood leaving the curve of its own edge mirrored as a low ridge on the worked surface. Blade signatures occur when uneven blade edges leave their own unique ridges and striae on the toolmark, when correlated these can be used to loosely indicate the number of axes used in a structure.

#### *Post Settings*

The best evidence for woodworking and the nature of raw materials used came from the c. 14th-century stake and post concentrations — sites 2, 4 and 6 — because of the large number of samples. Straight or very straight grained oak, beech and ash posts were clearly taken from mature knot-free poles. Fine, straight beams of regular cross-section were typically radially cleft using either wooden wedges or axes. That they were not sawn is indicated by the irregularity of the cleft surface. On site 2, cleaving trunks into radials was the most common type of conversion where of a total of thirty posts, eighteen were radially cleft. Other types of converted timber were also produced, including halved, quartered and, occasionally, tangentially cleft beams.

The size or diameter of trunk utilized varies widely within structures. On site 2, for example, the roundwood samples typically measured 29–130 mm diameter, with the split timbers somewhat similar in width (28–124 mm). However, when the size of the original living trunks from which these cleft timbers were taken was estimated, they appeared to have typically measured 0.2–0.3 m in diameter. Clearly a deliberate attempt was being made to have both roundwood and cleft components of similar size, both measuring 81 mm in average diameter/width. Although different sized trees were being felled, the stability of the structure required the ultimate size of each upright to be broadly similar. On site 4, roundwood posts measured 24–53 mm diameter (average 38 mm). The cleft posts measured slightly larger at 36–72 mm in width, but were taken from original trunks of 44–144 mm diameter (average 98 mm).

After felling and cleaving, the trunks were then sharpened to a point, probably not on-site given the lack of woodworking debris recovered in excavation (see Figs. 14, 15). A

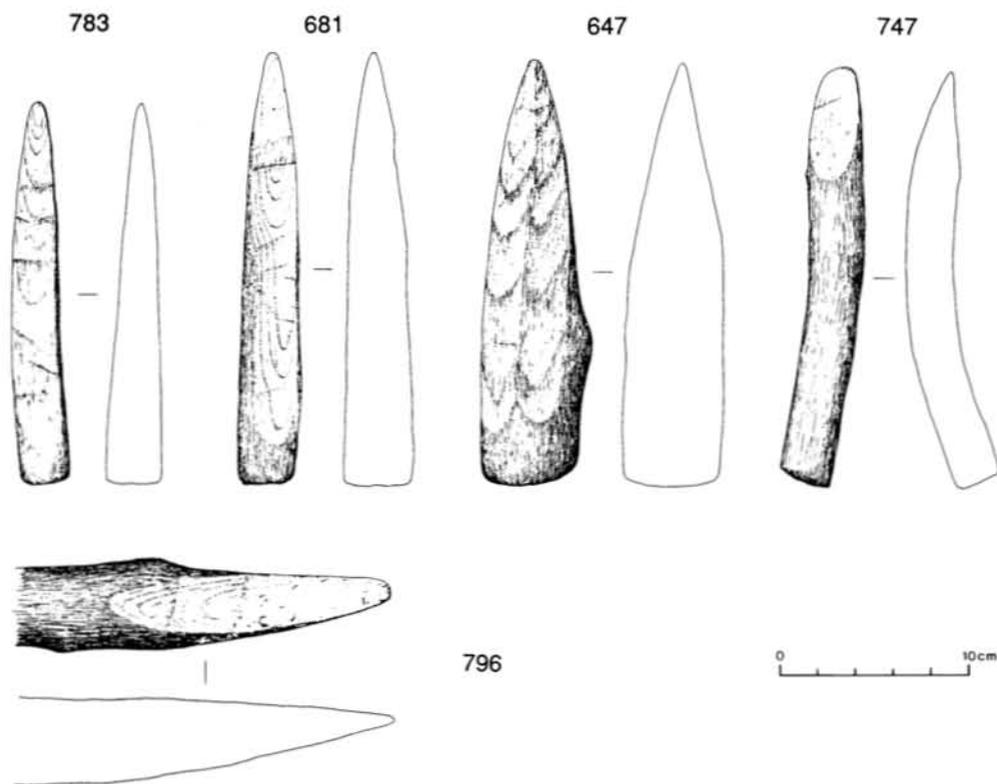


FIG. 15

Worked ends. Site 4, 783, 681: Oak roundwood with pencil point; 647: Oak roundwood with wedge variant point. Context 230, 747: Hazel roundwood with chisel point. Context 261, 796: Hazel roundwood with wedge variant point (A. O'Sullivan)

stylistic uniformity, if such a grand term can be used, can be seen in the nature of the points from each site. These were typically carved all around to pencil-ends, although wedge variants were also a common type. The flat, narrow toolmarks with their cleanly cut surfaces and junctions indicate the use of sharp thin-bladed iron axes. On site 2 the jam curves indicate that some of these axes were quite narrow with slightly curving edges, measuring *c.* 7.5 cm in blade width. At both sites 2 and 4, the axe blade signatures indicate that at least three axes were used in the preparation of the posts. At site 4, a selection of points may have been trimmed with a knife (WS 681). The only evidence for more advanced joinery comes from a large roundwood post (WS 607; Fig. 7a) found on site 2. This had a through-mortise, 75 mm by 35 mm, inserted towards the top of a roundwood post. The remains of a rectangular tenon from an oak beam is fixed in place by a radially split and trimmed round dowel 20 mm in diameter. The toolmarks on the end of this post are dull in appearance, as is typically found on timber which is worked after seasoning. The likelihood is that this post represents secondary reuse of wood from another structure.

The trunks used in site 5 (A.D. 1203/4) were of poor quality in contrast to sites 2, 4 and 6. Half the timbers were taken from knotty oak and elm trunks, with numerous side branches and an irregular grain. This wood most probably represents the topwood of felled trees. Here the roundwood posts, 38–128 mm diameter, measured substantially smaller than the

typically radially cleft timbers, 75–280 mm wide. Toolmarks, however, indicated the use of broad flat, iron blades.

The few samples taken from the simple post setting site 7 (undated) were from straight grained hazel and alder roundwood, with an average diameter of 24 mm. The worked ends were simple chisel-ends and chisel variants cut at very shallow angles. The most likely tool used was a flat, iron billhook. Sites 9 and 10 (undated) produced wood worked in a similar fashion. The single sample from site 12 (11th century A.D.) was a narrow straight-grained roundwood rod worked on two adjacent faces to a basic point.

#### *Hurdle Structures*

The early medieval hurdle structure, context 230, provided 29 samples for wood analysis. These hazel, holly and oak rods and sails were mostly left as whole roundwood (although one was radially cleft), 10–55 mm in diameter. The chisel shaped worked ends had been quickly slashed at one side at very shallow cutting angles by a flat, thin blade, most probably a billhook. One sample, WS 747, had a curved heel although this does not necessarily imply deliberate woodland management (Fig. 15).

The woven hazel rods from the early medieval hurdle, context 261, were not particularly straight grained, being taken from any available source, with diameters of 14–42 mm. Two worked ends survived; one, WS 796, was a sail cut on three intersecting sides forming a long tapering point, the other was a slashed chisel end (Fig. 15).

#### *Woven Fishtraps and Fishbaskets*

Limited sampling was carried out on these sites, and few comments can be made. Site 8 (early post-medieval in date) was made up of knotty hazel roundwood, 21–36 mm in diameter. The worked ends were entirely eroded, but one shallowly cut chisel-end was noted. A roundwood post, WS 791, lying across the mouth of the trap had been carefully trimmed to a pencil point. Apart from the description of the fishbasket (context 234) and the fishtrap (context 238) given earlier, no evidence for woodworking was available from these sites.

#### *Medieval Woodworking on the Severn Estuary*

A range of early medieval woodworking evidence is represented in the Severn Estuary fisheries wood. Little distinction, other than the styles of trimming the points peculiar to each labourer, can be made as yet between the sites of different periods. Underwood rods, poles and larger timber trunks were felled, occasionally it seems by billhooks or narrow-bladed woodmen's axes.<sup>32</sup> The quality of the raw material varied between straight rods, to topwood branches to larger trunks. These trunks were cleft in half, and typically cleft again into radial sections. However, there was no evidence for hewing the beams to a finished surface. Bark and sapwood was left on the wood. Thereafter the material was roughly trimmed of side branches, cut to lengths (bucked) and trimmed to a point. Points varied from simple slashed rods, to quickly produced wedge variants trimmed on two closely adjacent sides, to more carefully produced pencil-ends. The complete size of the iron axes used on these points cannot be reconstructed, but the occasionally very straight edges suggest that they were typically broad bladed axes, possibly of the T-shaped form. The blade signatures indicate a number of different axes were used on any one structure, possibly implying a number of people involved. A single example of a jointed timber was found, itself quite crude, on site 2. It is likely that as much of the woodworking as possible was carried out on the adjacent dryland, given the difficulty of hauling unworked material down on to the mudflats.

#### DOCUMENTARY EVIDENCE OF MEDIEVAL AND LATER FISHING IN THE SEVERN ESTUARY

Having identified structures relating to the catching of fish by fixed traps or 'fixed engines' extending back to perhaps as far as the 9th century it is important to

review the contemporary documentary evidence. The early evidence is strongly weighted to the English part of the estuary and to those weirs and traps in monastic hands.

Charter evidence suggests the existence of fishweirs in the estuary as far back as the 7th century. Perhaps the earliest of these is a grant in *c.* 690 of the estates of Henbury and Aust, including a fishery, to St Peter's Church, Worcester.<sup>33</sup> Aust is where the present road bridge crosses the estuary. Another charter, supposedly of 706, refers to a grant of an estate at Ombersley on the Upper Severn Estuary to Evesham Abbey which included two weirs. A weir is mentioned at Upton-on-Severn in 962 and weirs on either side of the Severn or the Bristol Avon may have formed part of a grant by Edward the Confessor of part of the estate of Deerhurst and Pershore to Westminster Abbey.<sup>34</sup> A 10th-century Saxon charter of the estate of Tidenham in Gloucestershire, owned by Bath Abbey, lists a total of 64 *cytweiras* (basket weirs) on the Severn.<sup>35</sup> Domesday records several fisheries on the Rivers Severn, Wye and Usk, and the Tidenham estate was still well-represented owning 65 fisheries including 53 on the Severn, and 5½ on the Wye.

Tintern Abbey held fishing rights at Woolaston and Alvredstone, and in 1411–12 paid John Bridde of Magor for the construction of a new weir at 'Erlisgout' at Moor Grange, now Lower Grange on the W. side of the estuary.<sup>35</sup> In the 15th century, St Augustine's Abbey in Bristol is recorded as holding weirs at Radley, Arlingham and Ashleworth. Llanthony Priory had several weirs around Gloucester and also downstream at Tidenham and Awre.<sup>37</sup> Finally, during the reign of Henry VI, the Priory of de Chandos at Goldcliff in Gwent was given to Eton College on its foundation, along with the priory lands and its fishery. Though the fishweirs were sold by the college in 1919, they remain the only weirs still operating on the Welsh side of the estuary (Pl. v, A, B).

Within the survey area the more fragmentary documentary evidence parallels that given above. The earliest evidence for fishing comes from an entry in the *Liber Landavensis*. This records a grant made by Brochwael, son of Meurig, to the church of Llandaff in the late 9th century. This included the 'free approach for ships at the mouth of the *taroci* and all its weirs for fisheries'.<sup>38</sup> The *taroci* is taken to be the R. Troggy whose mouth at this date is likely to have been at the paper mill outfall. Care needs to be taken with this charter evidence as it derives from a 12th-century transcription but the named individuals led Davies to suggest a date of *c.* 895 for this grant.

A fishery was listed in the Inquisition Post Mortem of the seventh Humphrey de Bohun, who died in 1298, among the holdings of his manor of Caldicot and Newton.<sup>39</sup> The rights along the shore of this manor were referred to again in the 17th century when it was stated 'that the lord's tide or Friday's tide from the first Friday next after Palm Sunday until the next Friday before All Saints, all along the Severn or sea coast within this manor is a royalty belonging to his majesty'.<sup>40</sup> These rights were evidently still valued in the 18th century. In 1770, a survey carried out by a William Foord on behalf of the Duchy of Lancaster covering the manors of Caldicot and Newton included a fishery on the coast at Caldicot called Denny Sands.<sup>41</sup> In 1777, a lease was signed concerning fishing rights let by Morgan Lewis of St Pierre,

described as the 'Lord of the Manor of Portescuet (Portskewett), Sudbrook and Harpstone' to John Hoggard of Black Rock 'sole and several rights of fishing and separate pishury in the River Severn with appurtenances . . . from St. Pierre's Pill to the mouth of the pill called Sudbrooke's Pill' (Sudbrook Pill equates to the former course of the River Nedern/Troggy at the paper mill outfall).<sup>42</sup> This was a seven year lease at a rent of £2 2s. *od.* plus 'the first salmon fish taken in the season'.<sup>43</sup> A further lease dated 1 January 1789 mentions a widow, Margaret Hoggard, holding the 'fishing and the liberty of fishing in the River Severn in the manor and parish of Portescuet'.<sup>44</sup>

#### PUTTS, PUTCHERS AND FISHBASKETS

The use of basketwork fishtraps is a traditional method of fishing practised on the R. Severn and its estuary for many years, especially the types known as putts and putchers which are peculiar and exclusive to the Severn Valley. This custom has endured to the present day, and putchers, although now mostly made of metal, are still in use at many locations on both banks of the river.

#### *Putts (Pl. v, A, B)*

Putts are the older of the two forms having been referred to in an Act of Parliament of 1778 as 'ancient fisheries'.<sup>45</sup> In their developed form putts were a large closely woven conical-shaped basketwork fishtrap assembled in three sections known separately as 'kipe' (kype), 'butt' and 'forewheel' and were woven from hazel, willow and whitethorn. The cone-shaped kipe was between 1.3 m and 1.8 m wide at the mouth. It was open at the rear where it fitted tightly inside the smaller urn-shaped butt. This in turn, was fitted into the even smaller forewheel, also urn-shaped, which retained the actual catch. The forewheel had an opening at the rear plugged by a wooden bung which could be removed to withdraw the catch. The whole assembly was between 3.2 m and 4.2 m in length and was secured to the river bed by wooden posts flanking both sides of the trap with the forewheel held in place by a forked staked, or two stakes crossed over each other. The complete trap was secured to the posts by lengths of withy. Putts were used in weirs formed of a row of these traps lying side by side on the river bed with their mouths facing the ebb tide. Some weirs contained as many as 120 baskets.<sup>46</sup> The close weave of the putts enabled them to trap a wide variety of fish ranging from shrimps to salmon. At the Goldcliff fishery, Gwent, S. Wales, shrimps were the principal prey and these were boiled at the fishery.<sup>47</sup> The use of this type of trap declined during the early years of this century and they were last recorded in use on the river in 1983.

Documentary evidence supports the early use of basketwork fishtraps on the lower Severn. One of the most comprehensive of the Saxon charters is that of Tidenham 2 km to the NE. of Chepstow, where in 956 King Edwy granted a large estate of 30 hides to the abbot of Bath.<sup>48</sup> A survey of the property lists a total of 104 weirs, *cytwevas* and *haecwevas*, in use on the Rivers Severn and Wye.<sup>49</sup> Seebohm interprets the meaning of these words as wattled basketweirs and hedge-weirs

respectively, and suggests especially that *cyts* can be compared to the later type of basket traps called putts.<sup>50</sup> The charter records 64 *cytwevas* on the Severn at three locations immediately N. of the site of the present road bridge; 30 at Stroat, 13 at Beachley and 21 at Sedbury. References to putts occur in later documents. 'St. Augustine's Abbey in Bristol held the manor of Ashleworth above Gloucester with putts (putta) on the Severn. In 1491 the weir was leased with land called the Neyte and the loppings of willows from Withygrove and Calcroft in Ashleworth, the lessees to keep the fishery in repair . . . The same Abbey had ten and a half putts at Rodley . . .'.<sup>51</sup> In 1533 an Act of Parliament refers to a 'butte' possibly a reference to a trap of the putt type.<sup>52</sup> Woolaston Grange, formerly owned by Tintern Abbey, came into ownership of the Earl of Worcester in 1551 with the right to fish in the Severn, and the abbot had the privilege to 'fish and make Puttes and engens in the river of Severn in the parish of Woolaston'.<sup>53</sup>

#### *Putchers (Pl. v, c)*

By comparison with putts, putcher fishing is a relatively recent innovation and was described in 1862 as 'of modern invention'. At the Purton fishery in Gloucestershire they were apparently first installed in 1838 and the Duke of Beaufort's fishery at Redwick in Gwent began to use them between 1843 and 1848.<sup>54</sup> However, they were evidently in use on the river several decades before these dates. The Special Commission for English Fisheries sat at Chepstow in 1866. It heard evidence of claims for the certification of fixed engines, and accepted evidence from several witnesses that putchers had been fished at several locations on the Severn for at least the past 60 years.<sup>55</sup>

Putchers are conical in shape, about 1.5 m long and 0.60 m to 0.70 m wide at the mouth. They are set in tiers up to five baskets high (Pl. v, c). The report of the Commissioners of Salmon Fisheries in 1861 described them as having 'a mouth from three to five feet wide' perhaps suggesting that in their original form they were slightly larger. However, this may possibly be the result of confusion with the larger kipe, as in the aforementioned court case they were described as 'about five feet (in length), the diameter about twenty inches at the mouth'. Originally they were made of willow, but unlike putts, they were openly woven, designed only to catch salmon. Since the 1940s, willow putchers have been gradually replaced by more durable forms made of galvanized wire and aluminium.

#### *Fishbaskets*

Portable basketwork traps, used mainly for catching eels, are known to have been used on the rivers and estuaries of England and Wales since the medieval period. Illustrations in the 14th-century *Luttrell Psalter* depict eel traps in a mill race. They are known as 'kiddles' on the Thames estuary, 'grigs' in East Anglia and 'hives' in Lincolnshire and Cambridgeshire.<sup>56</sup> In the Severn Valley there is an established tradition for the use of such traps. In the upper reaches of the valley they are called 'wills', whilst in the lower Severn area two forms are known to have been in use in

recent times — the ‘putcheon’ and the ‘weel’. Both were of a similar shape, with a bell-shaped mouth, slightly bulging in the middle and tapering to a small opening at the rear. The opening was commonly stopped with a wooden plug. The putcheon was *c.* 1.02 m long and 0.26 m wide at the mouth and the weel could be up to 1.27 m in length by 0.36 m at the mouth.<sup>57</sup> However, only eight miles to the NE. of the survey area on the E. bank at Oldbury-on-Severn, the tradition exists of the weel as a much shorter basket of only 0.61 m in length and the putcheon as a larger basket up to 1.37 m long.<sup>58</sup> They were usually made from willow. Apart from eel weels, lampreys were also trapped on the river in basketwork traps called ‘lampern weels’ similar in size to eel weels. Lampreys and lamperns were also stored alive in the river in an urn-shaped basket called a ‘hard weel’.<sup>59</sup>

### *Hedges and Leaders*

In the Severn Valley and Estuary, interwoven hurdle fences, known as ‘hedges’ or ‘leaders’, were commonly used in conjunction with weirs of putts and putchers, extending from the sides of the weirs to channel fish into the mouth of the traps. They are referred to in the Salmon Commissioners Report of 1861 ‘Many of them (putts and putchers) having brush or wickerwork hedges or weirs erected so as to drive or guide the salmon on to the front or fishing face of the stage’. The Inspectors of Salmon Fishing in 1862 reported that at Count Rocks in Gloucester ranks of putts and putchers ‘aided by hedges of wattles stretch out for nearly three quarters of a mile across that moiety of the channel . . .’.<sup>60</sup>

Seeböhm suggests that the *haecweras* mentioned in the 10th-century Tidenham charter may have been wattle hedges to guide fish to putts, or alternatively artificial weirs called ‘cribs’ used in connection with a form of fishing from a boat known as stop-net fishing.<sup>61</sup>

### *Regulation of Weirs and Fishtraps*

Concern that fish stocks were being damaged by weirs led to a series of Acts which attempted to regulate their use. The salmon appears to have first been mentioned in Magna Carta and in 1285 an Act was passed specifying a penalty for taking them at certain times of the year; Acts dealing with the building of weirs were also passed in the time of Edward III.<sup>62</sup> In 1346–47 legislation was enacted ‘Remedying annoyances in the Four Great Rivers of England, Thames, Severn, Ouse and Trent’. Five years later a further order instructed that all ‘Wears, Mills, Stanks, Stakes, and Kiddles which disturbed the passage of ships and boats in the great rivers of England should be utterly pulled down’.<sup>63</sup> More legislation was passed during the 14th and 15th centuries, and in 1394 Justices of the Peace were ordered to act against illegal weirs and those responsible for them. In 1396 actions were taken without success against four religious houses at the Gloucestershire Sessions including the abbots of Tewkesbury and St Augustine’s, Bristol, who both had weirs on the Severn. These and subsequent Acts were largely unsuccessful until the Salmon Fisheries Acts of 1861 and 1865.

All the fishing structures recorded in the survey were of a medieval date, with the exception of site 8 which was likely to be early post-medieval, and it seems that fishing with putts and similar traps had died out in the area by that date.

## DISCUSSION

The survey has provided evidence for the first time that the traditional methods of fishing in the Severn Estuary extend back at least to the early medieval period. Interwoven basketwork traps either in ranks or singly, but associated with hurdle hedges or weirs, have been in operation within this part of the estuary for nearly 1,000 years. The dating evidence, based almost completely on radiocarbon dating, groups the sites into three broad timespans. Four sites, the interwoven fishtrap, context 238, the hurdle leaders, contexts 230 and 260, and the oval-shaped post setting, site 12, have mean calibrated dates ranging from *c.* 900 to 1080. Four other sites have very similar radiocarbon dates clustering in the late 13th and 14th centuries. These are the three post settings forming V-shaped frameworks for fishtraps, sites 2, 4 and 6 and the small fishbasket, context 234. A little earlier, and different in form, is the post setting at site 5 which has produced a tree-ring felling date of 1203/4. Finally, there is one fixed fishtrap, site 8, which has produced an early post-medieval radiocarbon date and the discontinuous trackway, site 1, of modern date.

It may be coincidence that these date clusters broadly relate to the documentary evidence for fishing in the study area. The Llandaff Charter 235b specifically mentions fishweirs at the mouth of a river identified as the Troggy at a date of *c.* 895, estimated from the name of the king mentioned.<sup>64</sup> The charters are transcribed and may have been modified to establish rights due to the Bishops of Llandaff, so must be viewed with care, but it is perhaps significant that the same king was also granting weirs to the same bishop further down the estuary at Pwll Meurig.<sup>65</sup> Given that the mouth of the R. Troggy in early medieval times is believed to have been where the paper mill outfall now is and this was the location of two of the pre-Conquest sites, contexts 238 and 261, a direct link with the field evidence may be postulated.

Land W. of the paper mill outfall belonged to the manor of Caldicot and Newton in the high medieval period. The fishery formed one of the rights of the lord of the manor and is specifically mentioned in the *Inquisition Post Mortem* of Humphrey de Bohun (died 1298), dating to the beginning of the calibrated date range of the cluster of sites 2, 4 and 6. The manor E. of the paper mill outfall is that of Portskewett, Sudbrook and Harpstone where two late 18th-century leases refer to the fisheries, and site 8 is the only post-medieval fishtrap found in the project. By the time of the Royal Commission into the Salmon Fishery in 1860, no fixed engines remained in use in the study area.

The form and construction of the fishtraps discovered during the project can be related to those used historically and to the present day in the Severn Estuary. The *cytweras* and *haecweras* of the Tidenham Charter have been interpreted by Seebohm as meaning wattled basketweirs and hedgeweirs respectively,<sup>66</sup> the two forms represented by the pre-Conquest sites in the project area. The V-shaped settings of sites 2,

4 and 6, and the V-shaped traps represented by context 238 and site 8 relate to the putt, a fishtrap first referred to in the late 15th century and still in use in the estuary until comparatively recently.

The continuous use of basket traps in the estuary for at least 1,000 years is probably related to the turbidity of the water in the estuary and its swift flowing currents, which together with its high tidal range produces conditions particularly suitable for this type of fishweir. The close weave of putts was designed to catch a wide range of fish from shrimps upwards. The catching of estuarine and river fish may have provided an important supplement to the diet based on local agricultural produce, which was subject to seasonal fluctuations and disruption by crop failures or animal disease.

Other traditional methods of fishing in the Severn Estuary such as stop net fishing, lave netting and various forms of eel and elver fishing, are unlikely to leave any archaeological evidence in the intertidal zone. However, it is likely that the 'fixed engines' of the type found in the study area do survive and are widespread throughout the estuary. Derek Upton has found post settings and woven features at several locations on both shores particularly between the 1991 survey area and Magor Pill, and around Uskmouth on the Welsh side; and between Severn Beach and Avonmouth on the English side. Further south, timber features have been noted on the foreshore in front of Kingston Seymour, Avon<sup>67</sup> and also at Brean Sands and Burnham-on-Sea, Somerset.<sup>68</sup> Investigations of the surviving licensed sites should reveal evidence of a long continuity of use as these must remain the most favourable locations for catching fish in the estuary.

The recording of these archaeological structures remains in its infancy. Moving around the Welsh coast from the Severn Estuary, a fishtrap resembling site 5 has recently been recorded on Whiteford Beach on the Gower. Wishbone shaped and measuring 150 m long, this trap was made of hazel and alder stakes driven into the sand and clay substitute, and has produced a mean radiocarbon date of A.D. 1250. There are historical links to Neath Abbey.<sup>69</sup> Along the shingle coast of Cardigan Bay, there is a line of fishtraps or *goredi* between Aberarth and Aberaeron, Dyfed, originally associated with Strata Florida Abbey.<sup>70</sup> A recent survey by Somers has shown that these structures extend continuously for nearly 400 m, and are made up of broad line of large boulders along the midshore, forming shallow arcs which impound the fish on the ebb tide.<sup>71</sup> At intervals, there is a sluice or setting for a grille or trap. Similar structures have been noted further N. at Llanon and Aberystwyth.

The Menai Straits in N. Wales has a large tidal range and swift currents, and has produced evidence for a number of substantial stone fishtraps.<sup>72</sup> The largest of these have walls up to 600 m long and still stand up to 2.8 m high. Wattling and stakes are incorporated into some of the structures and there are well-constructed stone sluices with slots for the insertion of wooden traps or grilles. Surviving on a small island in the Straits is a more specialized trap, the Ynys Gored Goch, worked by unusually strong currents.<sup>73</sup>

On the E. coast of England, there are remains of wooden fishtraps which can be equated to those in the Severn. The most dramatic recent discovery has been made in the Blackwater Estuary, Essex. Here, up to a dozen lines of parallel timber stakes,

with evidence for wattling between, form a series of broad V-shapes to catch the fish on the ebb tide. It is estimated that over 13,000 posts survive and radiocarbon dates — one centring in the mid 7th century and another around the late 9th/early 10th century — have been obtained.<sup>74</sup> This form of trap, known as a 'Keddle', relied on a net rather than a woven basket to trap the fish, and continued in use throughout the medieval period and Tudor times, into the late 19th century on the lower reaches of the Thames and the Essex Coast.<sup>75</sup> The problems that the erection of these substantial structures caused to existing fishing interests and coastal navigation is well-illustrated in a long-running legal dispute in the Colne Estuary in the 14th century.<sup>76</sup>

There have been detailed descriptions of individual traps and more general surveys in Ireland<sup>77</sup> and some fishing alignments near Halskov, Denmark which rival those surviving in the Blackwater estuary.<sup>78</sup> However, the documentary evidence suggests that fishtraps in the intertidal zone should be widespread around the British Isles and Ireland, especially where there are large tidal ranges and extensive intertidal areas. For the medieval period the best documentation is associated with monastic houses, see for example the evidence for Norton Priory's fisheries in the River Mersey<sup>79</sup> and from the Tudor period and later in wills, inventories and legal disputes.<sup>80</sup> Many of the traditional methods survived to be recorded in modern times.<sup>81</sup>

Catching the fish was only the beginning of the cycle leading to them being served on the table. Intertidal fisheries were rights normally held in the medieval period by monastic houses, bishops and manorial landlords. It was possible that they supplied fresh fish direct to these households with some being sold in local markets. However, most fish that was to be stored or transported over some distance would need to be dried, salted or smoked. So along the banks of the Severn estuary there must be sites where the fish was processed. These are beginning to be recognised alongside freshwater fisheries such as the R. Witham.<sup>82</sup> Fish houses were built at Goldcliff and Chepstow and a smokery at Porton in modern times<sup>83</sup> but the form of their medieval equivalents is unknown.

Once preserved, fish could be traded over long distances. Medieval Ireland exported pilchards, hake, cod, herring and salmon to England and the continent<sup>84</sup> and Aberdeen merchants sold salmon in Scandinavia in the late Middle Ages.<sup>85</sup> However, the destination and means of trade of the Severn fishery remain unexplored. The procuring of fish for a major household involved drawing on many sources. The supply to the Royal Household in Elizabeth's reign is well-documented.<sup>86</sup> Dried cod and ling from the Iceland fishery were supplied free under the provisions of a charter given to the fishermen by Henry VIII. Other salt and smoked fish such as salmon was procured in Berwick and other border towns. Fresh sea fish was obtained by purveyors in the seacoast towns of Kent, chiefly the large market at Rye. Coarse or freshwater fish could be obtained from dealers who kept their own ponds on large estates. These could be transferred alive to holding ponds close to the royal residences until needed. The best evidence of trading to ordinary people can be seen in the establishment of specialized fish markets, shambles or stalls in medieval towns<sup>87</sup> and the many regulations that arose to control their use and the

disposal of their offal.<sup>88</sup> The study of the later medieval records of Winchester has shown how the numbers of fishmongers changed over time, and their relative importance to the butchers. This must reflect the fluctuations between fish and meat in the urban diet.<sup>89</sup>

There is documentary evidence for the fishmongers of Gloucester in the period 1350–1450.<sup>90</sup> They had a varied trade dealing in preserved sea fish and in fresh salmon, eels, shad and lampreys from the Severn.

A Gloucester lamprey could be worth as much as 10s during Lent — perhaps six or eight weeks wages for a labouring man — and the supply of such fish to the court and to noble households was very profitable to the small group of Gloucester men who bought these from the Severn fishermen or who themselves were able to rent fish-weirs from the crown or monasteries who owned them<sup>91</sup>

The end of the food chain is again the province of the archaeologist and fish bones are being recognized in increasing numbers from rubbish deposits. However, this work has not been systematic and as yet few assemblages have been analysed and published to compare with the documentary evidence for the sale of fish. One site in the Severn Estuary area, an excavation of a house in Bow Street, Langport, Somerset has produced a series of stratified deposits dating from the 13th and 14th centuries, with numbers of fish bones.<sup>92</sup> Langport is documented as having medieval fisheries, believed to concentrate on eels. It would also have easy access to fish caught in the estuarine traps such as those found in this project. However, a mixture of fish species was represented including deep sea species such as cod, haddock, ling and hake and other sea fish such as herring and mackerel, which do come into inshore waters seasonally. There was also a range of estuarine fish which might have been taken in the fishtraps found in the project. These include the thornback ray, gurnard, sea-bream, grey mullet, plaice and a variety of other flat fish. Eels were present, but the salmon which seems to be the principal target of the modern Severn fisherman was not represented at all.

The discovery of a succession of fishtraps in this small area of the Severn Estuary, which was the subject of this study, is probably not unusual. As the number of intertidal field projects grows and the recognition that the plans of both timber and stone structures can survive intact, despite centuries of tidal inundation, the discovery of medieval and perhaps earlier fishtraps will become commonplace. However, these remains will reflect local traditions, building materials and the opportunities provided by particular features of the immediate topography and tidal conditions.

Individual and small groups of traps may have supplied a local market, but the larger complexes required a significant capital outlay to build and maintain. It is not surprising that many of those described above were built or run by monastic houses. Others may have been built as commercial enterprises, providing a rental income to the owner of the fishing rights, and a supply of fish to urban fishmongers for sale in town or to major households. The three broad periods of the fishtraps identified in the study area, the 10th/early 11th centuries, 13th and 14th centuries, and the early post-medieval period, correspond to the periods of urban prosperity in the main towns around the estuary. The fishery at Caldicot may have been a marginal

enterprise, which explains why it did not survive to be recorded by the various commissions held in the mid 19th century.

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- <sup>50</sup> F. Seebohm, *The English Village Community*, 4th ed. (London, 1890), 151–53.
- <sup>51</sup> Bond, op. cit. in note 37, 89.
- <sup>52</sup> 25 Henry VIII, C. 7.
- <sup>53</sup> Williams, op. cit. in note 36, 125.
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- <sup>58</sup> Jenkins, op. cit. in note 20, 282.
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