

<sup>28</sup> N. Pevsner, *The Buildings of England: North East Norfolk and Norwich* (Harmondsworth, 1962), 237.

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### A POSSIBLE MEDIEVAL TRADE IN IRON ORES IN THE SEVERN ESTUARY OF SOUTH-WEST BRITAIN (Pl. VIII, B, c; Fig. 10)

The two great iron industries in the last two-and-half millennia in southern Britain were based in the Weald of Kent,<sup>1</sup> where low-grade clay-ironstones (siderite) were exploited, and to the W. on the margins of the inner Bristol Channel–Severn Estuary, especially the Forest of Dean.<sup>2</sup> The ores worked there are high-grade, predominantly goethite and some haematite.

There were significant organizational differences between the two industries, at least during the lengthy Roman period. Writing of the Wealden enterprise, Cleere and Crossley<sup>3</sup> state that ‘three components — slag-heap, working area and ore source — may be considered as constant features of every site.’ In the Forest of Dean, by contrast, apparently little ore was smelted where extracted, even if the work was on a semi-industrial or industrial scale.<sup>4</sup> Generally the ore was transported away for some distance — in the case of Worcester perhaps over 40–50 km — before being processed at villas, settlements or towns. The river apparently was crucial in facilitating the export of these valuable ores to smelting sites on both margins of the Severn Estuary.<sup>5</sup> The purpose of this note is to point to archaeological evidence from three sites which suggests that there was also an export trade in the ores during the later medieval phase of the iron industry on the margins of the inner Bristol Channel–Severn Estuary.

#### *Hills Flats*

Hills Flats (Fig. 10a, b) is an extensive, intertidal rock-platform associated with salt marshes on the SE. bank of the Severn about half-way between Bristol and Gloucester. Over the last two millennia, coastal erosion has forced the mouth of the tidal stream which drained across enclosed wetlands to reach the edge of the platform back over a distance of *c.* 350 m. The tidal silts that infill the substantial palaeochannel which marks this former course have yielded 12th- to 14-century artefacts and evidence of a contemporaneous landing place.<sup>6</sup> The landing place, believed to have collapsed deep into the tidal channel during the retreat of the mouth through the wetlands, is represented by an exposed concentration along the NE. bank of the palaeochannel of more than 150 roughly quarried blocks of local stone. Many of these blocks are now in the process of being released by erosion from the pale brown silt which otherwise occupies the palaeochannel.

Accompanying the emerging blocks in the silt are clusters of lumps of dark brown ore up to 412 g in weight in an unworn, as-mined condition; a pristine, 14th-century sherd was with one cluster. The ore is massive, crystalline goethite, unaccompanied by manganese compounds and such gangue minerals as quartz and calcite. No haematite was found, other than occasionally as a red, powdery dusting on natural surfaces. Typically, the larger goethite crystals adopt a radiating to stellate form and occur in patches or below the microbotryoidal surfaces that line small cavities in the ore. Occasional lumps partly assume an irregular, warty-stalactitic habit. These characteristics strongly suggest a source for the ore in the Forest of Dean,<sup>7</sup> rather than SE. Wales,<sup>8</sup> the Mendip and Bristol area,<sup>9</sup> or SW. England.<sup>10</sup>

The site of the stone blocks is best interpreted as a landing place, the clusters of pristine lumps of iron ore being one of the cargoes handled.

#### *Woolaston Grange*

Woolaston manor was a large estate on the NW. bank of the Severn possessed by the Cistercian community of Tintern Abbey from 1131 up to the Dissolution.<sup>11</sup> The modern

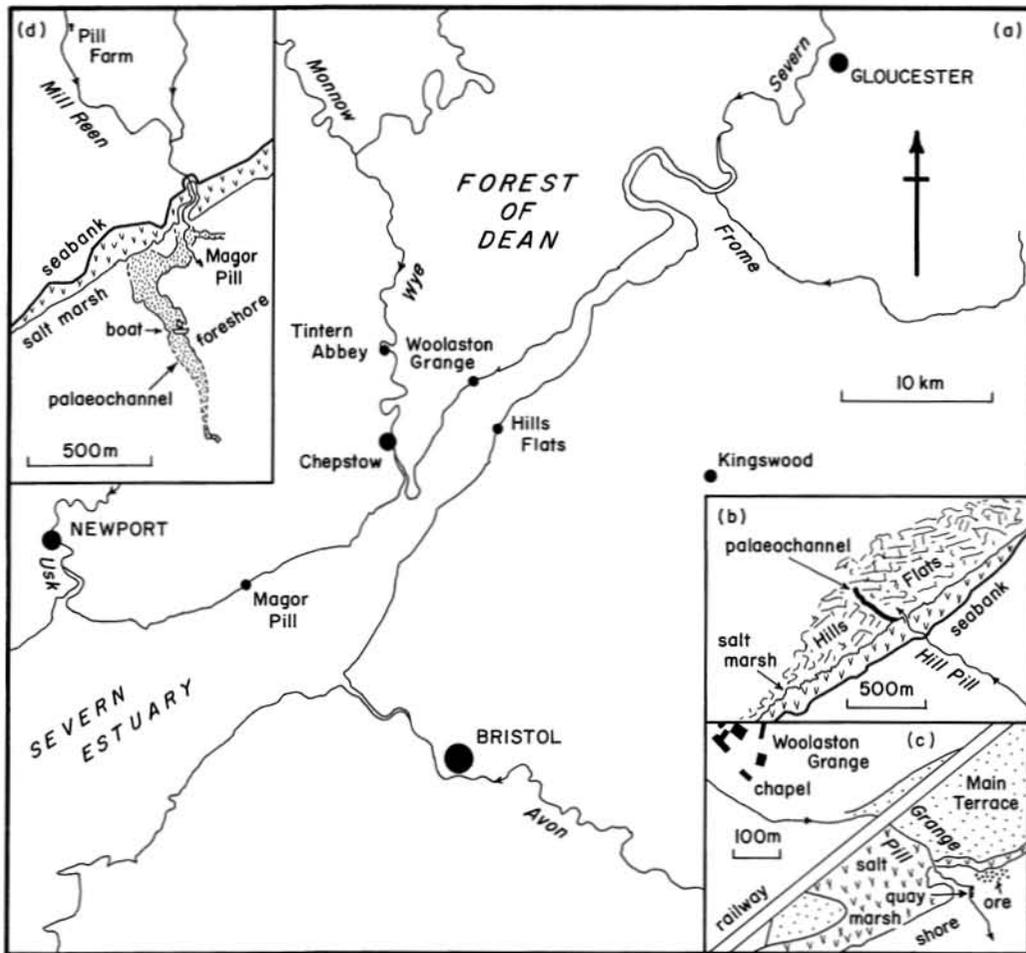


FIG. 10

The Severn Estuary and its margins, showing places mentioned in the text

farmstead of Woolaston Grange, the site of a medieval monastic chapel, lies beside Grange Pill, a tidal stream that drains SE. to the margin of a small rock platform (Guscar Rocks) almost opposite Hills Flats (Fig. 10a, c). On the left bank of this stream, well out in today's intertidal zone, are the basal wrecks of two elaborate stone-and-timber quays which may be presumed to have been under monastic control.<sup>12</sup> Partly on dendrochronological grounds, the upper quay was assigned a mid 12th-century date, the lower quay being interpreted as a seaward extension of the early 13th century.<sup>13</sup> Finally, early in the 15th century, or even after the Dissolution, the lower quay was lost and the upper structure extended landward.

The development of the quay seems to have been dictated by coastal erosion. When it was built, Grange Pill probably flowed in a deep channel embedded in a salt marsh or gravel terrace (First or Main Terrace)<sup>14</sup> that ranged significantly further seaward than the present development (Fig. 10c). Coastal erosion subsequently cut back the terrace to the low cliff visible today. The narrow salt marsh to seaward of this cliff is post-medieval but

pre-industrial in origin, since its basal deposits yield clay tobacco pipes and the lower silts are uncontaminated by heavy metals such as zinc, lead and copper.

Loose lumps of iron ore are being exposed to view on the shore close to the quay as a consequence of the retreat of the salt-marsh cliff (Fig. 10c). Weighing up to 186 g, the pieces are accompanied by mainly sandstone and vein-quartz pebbles chiefly over a narrow, beach-like area (*c.* 0.1 ha) *c.* 60 m long. A few small, heavily abraded 12th- to 15th-century sherds were also found in this area. Generally speaking, the pieces of ore are densely to very densely distributed, in many places overlying each other and totalling more than 95% of the surface; as much as 5 tonnes of ore may in total be present. The lumps have slightly rounded edges and corners, and partly smoothed, dull to lightly polished faces (Pl. VIII, A). The ore is predominantly goethite, closely similar in form and lack of associated minerals with that at Hills Flats. The occasional stalactitic piece consists of interlayered, brown (crystalline) and yellow (ochreous) goethite and haematite; lumps of crystalline haematite are rare. As at Hills Flats, this combination of features links the ore to sources in the Forest of Dean.<sup>15</sup> The terrace gravels, which contain a tiny proportion of rolled iron ore of local origin, may have also slightly contributed to the deposit on the shore, but size for size, representative pieces collected from the terrace gravels in the area of the site are on the average the more rounded (Pl. VIII, C).

The occurrence of ore at Woolaston Grange is less securely interpreted than at Hills Flats, but the spread possibly represents what survived coastal erosion, wave action and temporary burial after being brought to the site in medieval times and stored in dumps on the ground near the quay while awaiting shipment. An origin in the terrace gravels is less plausible, because of the sheer amount of ore, the association with abraded medieval sherds, and the lower degree of wear of the ore from the shore as compared to lumps from the terrace.

#### *Magor Pill*

The tidal stream called Magor Pill, on the Gwent coast south-west of Chepstow (Fig. 10a), reproduces all of the salient features of Hill Pill.<sup>16</sup> Severe coastal erosion combined with human intervention has left exposed on the shore a complex of silted-up channels that held the stream during Iron Age, Roman, medieval and early modern times (Fig. 10d), to judge from the artefacts thinly stratified (but not in a primary context) in the palaeochannel sediments. That important landing facilities (called Abergwaitha in the 13th century) were present at the site from the 12th to the 14th century and in early modern times is fully supported by the abundant, transposed, mainly imported pottery that can be picked up loose and from among semi-mobile gravels on the shore.<sup>17</sup> On which bank of Magor Pill stood Abergwaitha is unknown, but it may be noted that the estate immediately SW. of the stream is Moor Grange (modern Lower Grange), another property of the Tintern Cistercians, held probably by *c.* 1150 and certainly by 1223–24.<sup>18</sup> Even if the community did not own and control the landing facilities at Abergwaitha, those in charge at the grange would have been well placed to exploit them.

Embedded in the silts filling one palaeochannel (Fig. 10d) is part of a clinker-built, keel-type, wooden boat *c.* 15 m long, dated dendrochronologically to not earlier than the mid 13th century.<sup>19</sup> Nearby, pristine to slightly worn medieval sherds of this general date also lie stratified in the silts. Toward the bottom of the boat excavation revealed a substantial heap of dense, dark-coloured material (168 kg), lying on a weight-distributing roundwood hurdle, identified as iron ore. An examination was subsequently made of a random sub-sample of the ore (12.1 kg), composed of 57 pristine lumps from 6 g to more than 2 kg in weight and presenting a much greater variety than at either Hills Flats or Woolaston Grange. Most of the ore is dark brown goethite accompanied in a minority of specimens by a little haematite. Typically, massive, almost banded goethite containing small cavities lined with microbotryoidal growths is combined with stalactitic forms varying from warty-cylindrical to strongly folded and curtain-like. Well-crystalized quartz is thinly

dispersed through most specimens and in some, as pyramidally-terminated crystals, coats the surface of cavities. In many specimens it is accompanied as gangue by calcite and, occasionally, ferroan dolomite. A black manganese oxide lines the cavities in some lumps, varying from a mere film to a millimetre-scale layer. A few samples consist of pale brown and dark brown goethite with a little quartz arranged in millimetre- to centimetre-scale bands; small cavities with a microbotryoidal lining are present, but no laminae of calcite occurred between the bands. The sub-sample contained a few lumps of soft and earthy to hard goethitic ochre banded in yellow and brown; material similar to this was present in the boat as a dispersed powder. The sub-sample contained only one small specimen in which haematite in combined crystalline and earthy forms predominated.

The ore at Magor Pill originated neither in the Forest of Dean, where quartz gangue is almost never seen,<sup>20</sup> nor in the W. Somerset–N. Devon field, where spathic ore (siderite) altering to haematite and manganiferous ochres predominates.<sup>21</sup> It has some resemblance, especially in the quartz-calcite gangue, to the ores of SE. Wales,<sup>22</sup> of which those at Llanharry W. of Cardiff are the best known,<sup>23</sup> but lacks the goethite-haematite-calcite banding and perfect stalactitic form described as typical, and is much lower in haematite. The ores from the boat are closest to those of the Bristol–Mendip area, which are chiefly goethite and a range of ochres, accompanied by some haematite and manganese oxides, and a quartz-calcite gangue.<sup>24</sup> It is a reasonable inference that such valuable materials were a cargo on the boat at Magor and not ballast; the boat, however, could have been wrecked in the Pill, and need not necessarily have been trading there.

### Discussion

Brief details have been presented of three coastal sites on the Severn Estuary where iron ore is found distant from mines and in association with later medieval structures or artefacts, and in contexts where either intended or actual transport by boat cannot be excluded. There can be little doubt that the bulk of the ore was intended for smelting, but the ochres (reddle, reddling) could also have been exploited as pigments.

Many British monastic communities included some or all of mining, smelting and forging in their economy. For example, the Cistercians of Tintern, by the tidal river Wye, possessed forges and had an iron mine somewhere in the Forest of Dean,<sup>25</sup> probably N. of the known possessions,<sup>26</sup> which appear not to include significant deposits.<sup>27</sup> By 1138, Tintern had established a daughter-house at Kingswood c. 25 km NE. of Bristol, and came to own numerous properties in the city itself.<sup>28</sup> The most direct route between Tintern and Kingswood involved a river-crossing between Woolaston Grange and Hill (Fig. 10a), where the daughter had possessions,<sup>29</sup> and there can be no doubt that the monks operated ships. They are known to have plied to Bristol, and for a long period they were free from tolls.<sup>30</sup> The later medieval procurement of ores and the extent of iron smelting at sites remote from mines is an issue that merits further archaeological assessment in the region. The Roman pattern seems to be repeated in medieval times.

### ACKNOWLEDGEMENTS

I would like to thank Grenville Astill (University of Reading) and Michael Fulford (University of Reading) for discussion and suggestions for improvement, and Nigel Nayling (Glamorgan-Gwent Archaeological Trust) for the opportunity to examine the boat and its contents in the field and for an advance copy of the report on the Magor boat. Graham Patterson kindly confirmed certain minerals.

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### NOTES

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- <sup>26</sup> Williams, op. cit. in note 11, map 1.
- <sup>27</sup> Welch and Trotter, op. cit. in note 14, 140-42.
- <sup>28</sup> Williams, op. cit. in note 11, 5.
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## A MEDIEVAL DEPICTION OF INFANT-FEEDING IN WINCHESTER CATHEDRAL (Figs. 11, 12; Pl. x, A)

There are sixty-eight misericord seats in the early 14th-century choir stalls of Winchester Cathedral, all but two of which have scenes carved upon their undersides. With the exception of a carving of a mitred bishop, all of the subjects depicted on the seats are secular in content, depicting the usual medley of animals, monsters, and grotesque faces, common to this particular form of medieval art. The Winchester carvings have been