NOTES AND NEWS

21 That seems to be the implication of the working debris found at the manorial site at Faccombe Netherton, Hampshire, since a skilled smith would surely not have had permanent employment there; see Backhouse et al., op. cit. in note 1, 97–98, and J. Fairbrother, Faccombe Netherton. Excavations of a Saxon and Medieval Manor Complex, British Mus. Occ. Paper 74 (1995), 272.
23 J. Bayley and K. Barclay, ‘The crucibles, heating trays, parting sherds, and related material’, 175–97 in Biddle, op. cit. in note 2, 188.
24 Crowfoot, op. cit. in note 15, 480–81.
25 Hinton, op. cit. in note 2, no. 1057.
26 Ibid., no. 1056.
27 Ibid., no. 1101 and pp. 508–99.
28 Wamers, op. cit. in note 6.
29 Dumville, op. cit. in note 9, 88 n. 160.
30 I am grateful to Geoffrey Denford, Winchester Museums Service, for showing me the mount, and to Nick Griffiths for the drawing.

NORWICH CASTLE BRIDGE (Pl. IX, A, B; Figs. 5–9)

Norwich Castle Bridge is located on the southern side of Norwich Castle Mound (Fig. 5) which is itself situated within the heart of the medieval city. It connects the mound (TG 2318 0846) to the area of the S. bailey, much of which was excavated between 1989 and 1991 during the construction of a major retail development. The construction programme provided a rare opportunity to study the structure of the bridge when in 1990 a temporary bridge to the mound was erected. Closure of the stone bridge allowed Norwich City Council Engineers Department to examine its fabric, in order that an informed weight limit might be imposed. Three trial trenches along the top of the bridge (Fig. 6) were excavated by Norfolk Archaeological Unit and the results added to those of three other trenches, funded by Ove Arup Ltd and placed around the base of the southern abutment. Further excavation (by Norwich City Council Estates Department) has sought to locate the source of a water leak. Detailed results of all these excavations are available in the Norfolk Sites and Monuments record.

The early Castle at Norwich

A royal castle was established in Norwich shortly after the Norman Conquest, and was defensible by 1075 when it withstood a siege by Ralph de Guader. The precise layout of this timber castle is not fully understood but the preliminary results of the archaeological excavations S. of the mound suggest that it may have consisted of a motte, placed on a spur of high ground reaching into the city from the S., with a roughly square bailey to the E. This early castle, imposed at least in part upon the late Saxon town, sat centrally between two other Norman precincts — those of the French Borough to the W. (established before 1075) and the cathedral to the NE. (established in 1094).

The erection of a stone keep on the mound is thought to have been on the initiative of William Rufus, and certainly by 1101 stone masons working on the cathedral were also constructing windows for the basement of the keep. A stone keep was part of a re-design of the castle defences that enclosed a bailey to the S. and may have prompted an enlargement of the mound. A bridge to the S., if not already in existence, would have become necessary as the main focus of the castle swung away from the E. to the S.

The Stone Bridge

A stone bridge is first documented in 1173 when repairs were necessary. This bridge is substantially the one investigated between 1989 and 1993. It comprises four main
Fig. 5
Norwich Castle bridge in relation to the major earthworks of Norwich Castle. Drawn by Steven Ashley
Location of archaeological trial trenches on and around the bridge. Grid references reflect the last three digits of six-figure Ordnance Survey co-ordinates. Drawn by Steven Ashley.
integrated components (Fig. 7) whose core-work consists of local flint bonded with a soft cream-coloured mortar. The visible faces were originally dressed with Caen limestone. Two abutments (or piers) extend into the mound ditch from its northern and southern edges, these being separated by a pair of parallel central arches. The area between the abutments and arches was originally a void spanned with timber. A drawbridge pit may have been one of the features of the northern abutment, since it too was originally hollow.

Archaeological excavation within, and adjacent to, the southern abutment demonstrated how it may have been constructed. Flint and mortar was poured into temporary shuttering in a series of lifts, gradually creating a hollow, four-sided, 'box' that projected into the ditch. The interior was progressively backfilled with sand interleaved with lenses of ash and mortar. Occasionally sherds of pottery were recovered from the backfill, most being of the local 12th-century early Medieval ware. Internal plinths were incorporated into the design of the abutment, allowing the width of the E. and W. walls to decrease as their height grew. These walls were topped with a parapet produced by two further plinths, the mortar of which showed signs of heavy weathering. A series of metalled road surfaces, containing 12th- to 14th-century pottery, lapped against the parapet.

It is to be presumed that the two central arches were constructed in the same manner as, and were built contemporaneously with, the abutments in order to provide a strong integrated structure. A timber covering to the southern half of the void was demonstrated by the discovery of three square cavities within the internal face of the eastern span (Fig. 7).
These had been inserted at the time of build and would originally have held massive cross timbers (0.45 m by 0.45 m, with a possible length of 4.40 m). They were spaced at approximately 2.30 m intervals, the third sitting directly over the apex of the arch. The internal face of the arch was not investigated N. of its apex, but it is possible that a drawbridge may have spanned the northern half of the void. Where seen, the internal faces of the void all showed signs of heavy weathering consistent with a prolonged exposure to the elements.

A trench through the northern abutment demonstrated that this had also been void. Partial excavation and examination with an auger suggested the chamber was originally 4 m deep and had had a horizontal base (possibly later surfaced with brick). Its width and length were not determined. The void may have been designed to house a drawbridge or drawbridge mechanism. It is equally likely however that the abutment was left empty simply to prevent excessive loading of the central arches.

The exposed faces of the bridge are today of flint and brick, with limestone dressings. Excavation alongside buried portions of the southern abutment have, however, exposed a facing of Caen limestone ashlar, a stone also employed extensively as facing during the Norman construction of the keep and cathedral. Coursed ashlar survives to a height of 3.5 m from the base of the abutment (Fig. 8), which sits at a level where chalk underlies the natural sands and gravels of the area. Nine 45° chamfered plinths form the base of this abutment, each exhibiting distinctive diagonal tool marks.

The use of a dressed (and expensive) facing indicates that the abutment footings were designed to be seen. The height of the arch above the base of the ditch would therefore have been nearly 15 m, although gradual backfilling of the ditch means that that figure is now halved. The arch has a diameter of slightly over 12 m making it a noteworthy exception to the recent assertion that 'almost all the [medieval] bridges with individual arch spans of c. 9 to 12 yds [c. 8.22 to 10.97 m] are north of the Humber ...' Whilst the comparison may be slightly unfair, since the quotation refers primarily to river bridges, the statement serves to highlight the rare survival of so large an arch.

The historical and archaeological evidence therefore suggests a 12th-century origin for the main structure of the bridge. There is also, however, evidence of substantial alterations in the early 13th-century, when gatehouses may have been added to the top and middle of the bridge.

13th-century work

Of a middle gatehouse nothing now remains. Antiquarian etchings by Corbridge in 1727 and Buck in 1738 (Pl. IX, A, B), however, show two walls above, and integrated with, the central arches. Kirkpatrick, writing in the 1720s, noted that 'No entrance could be had to the Castle or the top of the Hill but by the Castle-gate only, which was on the bridge, and was enclosed with a high wall on each side and on the midst of it was the gate vaulted over and with a lofty and strong tower upon it'. The etchings also indicate buttresses on either side of the northern abutment, these being of unequal width and depth and presumably therefore a necessary later addition to the bridge. Corbridge showed that the gatehouse walls extended N. of the arch on to the abutment, suggesting the buttressing was designed to support the weight of the gatehouse over the potentially weak E. and W. walls of the abutment. Buck's drawing indicates additionally that blind arcading had survived on the inner faces of the walls. This is shown in the Gothic style of centred arches (considered stylistically to have been applied from the early 13th century) with bell capitals suggesting, as Kirkpatrick had noted, that vaulting had supported an upper chamber.

The date at which the gatehouse at the top of the bridge appeared, or was perhaps replaced, is not known. What is known, however, is that it embodied twin circular towers, the bases of which survive. This more sophisticated type of gatehouse is generally accepted to have appeared in the 1220s and those at Norwich resemble architecturally those of Montgomery castle, built from 1224. Both have towers, solid at their lowest level, with
ELEVATION OF BURIED PART OF CASTLE BRIDGE

Fig. 8
North facing section of the southern abutment base. Drawn by Hoste Spalding
chambers behind them (Fig. 7). The chambers of the Norwich example are well preserved and demonstrate both stone door jambs and shuttering marks to their barrel vaults.

It appears, therefore, that both gatehouses may date from the first half of the 13th century. This is not surprising given the general strengthening of castles in the period. Indeed Norwich Castle gained an example of that great 13th-century fortification, a barbican (the ditch and well of which have been recently excavated), at broadly the same time as the upper and middle gatehouses of the bridge appear to have been built. These features can be seen as integral parts of the new defences that may have been deemed necessary by the wars of 1215-24. More particularly they may have been a response to the seizure of the castle by Prince Louis in 1216.

A third gatehouse certainly existed near the base of the bridge. Large fragments of it were pushed, or fell, into a nearby hollow during post-medieval landscaping of the barbican. It is doubtful however that the gatehouse represented by these fragments was ever a part of the bridge complex. It is more likely that the building stood c. 12-15 m further S. and guarded the barbican ditch crossing. The crossing was by bridge and it may be this that was referred to in 1777 when it was observed that 'the ruins of the second [bridge] remained till the ditches were levelled in 1738 [the first presumably being that over the southern bailey ditch]. The third now standing, is a handsome bridge of but one arch of 41 ft [12.5 m] diameter'.

The Bridge in decay

Repairs to the bridge were made in 1267 and again in 1328 when two seasons lapsed between the order and presentation of the final account for the work. In 1345 the Crown relinquished control of most of the castle to the City. The exceptions to this change of ownership were the keep, outer gatehouse and bridge which remained the property of the Crown until 1887. A period of rapid decay set in and by 1390 repairs to what remained of the castle cost so much that an enquiry followed. By the 16th century the barbican well (immediately W. of the base of the bridge) had been abandoned completely to backfilling. It seems reasonable to suppose that the 15th- and 16th-century backfill of the northern abutment was part of the same process. Archaeological excavation of this material showed that attempts had been made to consolidate the fill with gravel layers before a dump of building material was used to bring the surface level up.

The backfilling of the abutment suggests that the drawbridge (if that had been the void's purpose) was no longer in use and it may have been in this period that an internal brick arch was inserted between the two central spans. Although Cunningham's engraving of 1556 may show such an arch the first clear depiction is on a plan of 1576. This could be the arch of which, in 1829 (a year before it was replaced by the current span), it was said 'the soffite of the arch is constructed with bricks, which have induced some to pronounce it of Roman workmanship'. Samuel Woodward observed the repairs of 1830. 'The interior of the arch was removed entirely. The two side walls with their arches were the only original part. The interior space, having perpendicular walls faced with flint both at the upper and lower ends, must have been covered with a drawbridge'. Further evidence comes from an entry in the Norfolk Quarter Sessions order book for January 1664. A John Burges was paid £3 4s. 0d. for 'amending and gravelling way upon the bridge' indicating perhaps that the central span was by then solid.

The Modern Bridge

Corbridge's excellent drawing of 1727 (Pl. IX, A) shows the E. elevation of the bridge faced with ashlar, perhaps the original Caen stone or a 13th-century application. Part of this facing remains visible today beneath the western impost of the northern abutment. Because these upper reaches of ashlar are not in evidence on Wilkins' detailed engraving of 1795 it seems likely that major refacing work must have taken place in the century preceding the 19th-century renovations. The work may have been conducted at the same
time as the remains of the central gatehouse were demolished, which in itself may have coincided with improvements to the S. bailey area in 1738, during landscaping for a new, unified, cattle market. Harrod, however, placed the demolition slightly later, in the middle of the 18th century, around which time (the late 1740s) we know reconstruction of the keep’s battlements was underway.

Major 19th-century work to the bridge appears to have been conducted in several phases, as in previous centuries. In 1803–05, for example, John Sell Cotman, the Norwich School painter, depicted restoration work in progress and in 1810 Soane added the pair of existing gatehouses to the base of the bridge. Woodward observed the arch being replaced in 1829/30; the keystone to the replacement was exposed in 1992 and found to have been inscribed with the date ‘May 19 1830’. The work Cotman observed appears to have been refacing or consolidation and it may have been during this work that the buttresses to the northern abutment were removed, since the last known drawing of them is dated October 1805.

Argument over the origins of the bridge began in the late 18th century. King thought the bridge Saxon and its arch ‘one of the noblest and most perfect Saxon arches now extant’. Woodward, in 1847, agreed. Harrod, ten years later, was the first to suggest it could have been Norman and Rye, in 1926, scorned both to suggest that ‘it was built about the same time as Bishops Bridge [now believed to be of 14th-century date]’. Later it was to metamorphose into a 19th-century structure.

Conclusions

Although these arguments are now largely resolved, the main historical phases of the bridge’s evolution understood and sufficient information acquired to allow reconstruction drawings to be made (Fig. 9), many questions remain to be answered. For instance, is the bridge principally of 12th-century origin, or were the 13th-century improvements more
substantial than the present evidence suggests? Was a drawbridge an original or 13th-century feature? When did the first internal arch appear? Was there ever a gatehouse at the foot of the bridge? These are questions which further excavation should address. What is already obvious is that the bridge is not the product of one or two major builds but a fluid system of improvement and restoration determined by its environment. The result of this evolution is a major monument whose value lies both in its antiquity and its continued function of the task for which it was designed.

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NOTES


2 A. Shelley, Report of excavations at the Castle Bridge, Norwich (1992). A Norfolk Archaeological Unit report lodged with the Norwich Sites and Monuments record. Reports of subsequent excavations on the bridge are also available in the SMR.


6 Heslop, op. cit. in note 4, 10. From Pipe Rolls.

7 D. Harrison, 'Medieval Bridges', Current Archaeology, 122 (1990), 73–75.

8 W. Herring (ed.), Notes concerning Norwich Castle from a manuscript volume of the collections of Mr John Kirkpatrick (Norwich, 1847).

9 S. Heywood, pers. comm.

10 J. R. Kenyon, Medieval Fortifications (Leicester, 1996), 93.

11 Ibid, 65.

12 Norfolk Tour, Third edition (Norwich, 1777), 16. The third bridge is the subject of this paper.

13 Cathedral Library Rolls. From notes on documentation by Magot Tillyard to be published as part of the Castle Mall excavation report, op. cit. in note 1.


15 M. Tillyard, op. cit. in note 13.

16 Braun and Hohenburg, Civitates Orbis Terrarum (1576). In G. Stephen, A Descriptive List of Norwich Plans 1741–1914 (Norwich, 1926), 193. This is perhaps a copy of the earlier work.

17 A General History of the County of Norfolk intended to convey all the information of a Norfolk Tour: Vol. III (Norwich, 1829), 1019.

18 S. Woodward, History and Antiquities of Norwich Castle (London and Norwich, 1847), 11.

19 W. Wilkins, Plate xxxvi, Archaeologia, 12 (1795), 173.

20 H. Harrod, Gleanings among the Castles and Convents of Norfolk (Norwich, 1857), 147.

21 Heslop, op. cit. in note 4, 17.

22 J. S. Cotman, Norwich Bridge (1803/5), pencil sketch in Norwich Castle Museum. The sketch is dated stylistically only. It is illustrated as Fig. 92 in B. S. Ayers, Norwich (London, 1994), 113.

23 R. Ladbroke, untitled (October 22, 1805). A copy of this painting is kept at Norwich Castle Museum. Caution must be exercised over the date of the depiction, as with others listed here, since they may be copies of earlier works.


25 S. Woodward, op. cit. in note 19, 11.

26 H. Harrod, op. cit. in note 21.

27 W. Hyt, Some historical essays chiefly relating to Norfolk Part 2 (Norwich, 1926), 134. Bishops Bridge is the only surviving medieval bridge across the River Wensum in Norwich. The present structure dates from the second quarter of the 14th century.
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,1 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.2 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 Crossley3 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.4 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.5 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 14th-century artefacts and evidence of a contemporaneous landing place.6 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,7 rather than SE. Wales,8 the Mendip and Bristol area,9 or SW. England.10

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.11 The modern