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The Gates of Prudhoe Castle

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SUMMARY

The late medieval gates of Prudhoe Castle were restored and re-hung in 2003. During this work the complex history of their repairs and alterations was examined and samples of wood taken for dendrochronological dating. One of the trees used was felled in AD 1459–1484. The paper describes the ironwork and carpentry techniques employed, and sets the gates in their historical context.

INTRODUCTION

In 1966 the tenth Duke of Northumberland placed the remains of Prudhoe Castle in the guardianship of the Ministry of Public Building and Works. The pair of oak gates hanging in the castle gatehouse were subsequently taken off their hinges for repair and safekeeping while a major programme of masonry consolidation was undertaken before the castle opened to the public in 1986. The gates themselves were then dismantled by unscrewing or, where necessary, cutting the iron bolts and rivets and by knocking out the timber pegs. They lingered in pieces for some years in Tynemouth Priory workshop awaiting the attention of the Ministry's carpenters. Eventually they were returned to the stables at the rear of Prudhoe Castle manor house where they languished as the cost of repairing them steadily increased. But vandalism at the castle was also on the increase, so money for this historic conservation work was eventually made available in 2001. English Heritage management realised that, if mended and closed at night, the gates might once again serve their original purpose in deterring illegal entry. The

gates were finally re-hung in April 2003. This is an account of what was done to repair and re-hang the gates and what has been learnt about them during their absence from the gatehouse.

There are no early antiquarian drawings of the gates themselves. The Buck brothers' 1728 engraving of Prudhoe (reproduced in Saunders 1993) shows the archway in shadow, which might imply that they were then hanging and closed. The engraving published in 1814 shows the right-hand gate open (fig. 1), but Walter Scott's accompanying text rather implies that the gates had lost their frontal boards because he wrote 'a lattice or open gate still remains, joined with studs of iron' (Scott 1814, 91–92), copying exactly the words of Hutchinson in 1778 (1778, 124). About a decade later Anthony Salvin's drawing of the top corner of one gate (fig. 2) may or may not indicate the boards are missing. Salvin, the fourth duke's architect, restored parts of Prudhoe and was probably responsible for the insertion of the massive iron tie-bars in the upper walls of the gatehouse (fig. 4b, below), but it is not known if he worked on the gates. The earliest photograph we can find, taken in 1944, shows the gates hanging, but open so there are no details of their construction visible (National Monuments Record, A44/10748).

The earliest detailed written description of the castle, William Stockdale's survey in 1586, does not mention the gates either; though his concise description of the gatehouse itself can still serve as an adequate summary of this building before the gates themselves are discussed (quoted from Dodds (1926, 125), punctuation modernised):

The Gate is a Tower of Massy Worke on both sydes to the topp of the Vault. Above the Vault



Fig. 1 The gatehouse from the north, showing gate or probably gates open, from an engraving published in Scott 1814.

is the Chappell, and above the Chappell a Chamber which is called the Wardrobe. It is covered with Lead, but in great Ruine both in Leade and Timber. It is in Length tenn Yards and in breadth six yards or thereabouts.

It is apparent that the present cobbled surface of the gateway is modern because there is a gap beneath the gates wide enough for a person to slide under. The original surface would have been higher here and then fallen more steeply outside the gates (fig. 3, section A-A). Dodds adds 'the gateway has no portcullis, and is an early example of its class, the date of which

may be referred to the second quarter of the twelfth century' (1926, 125–6). The present gates, which form a pointed arch, hang within this much earlier round-headed archway. The original gates were secured with a massive timber bar drawn from a hole measuring 10 by 12 inches in the east side of the gateway and slotted into a hole in the wall opposite. The hole and the slot are partly obscured when the present gates are closed. The existing pintles appear to be at least as old as these gates: they may even be contemporary with the masonry and thus the primary gates.

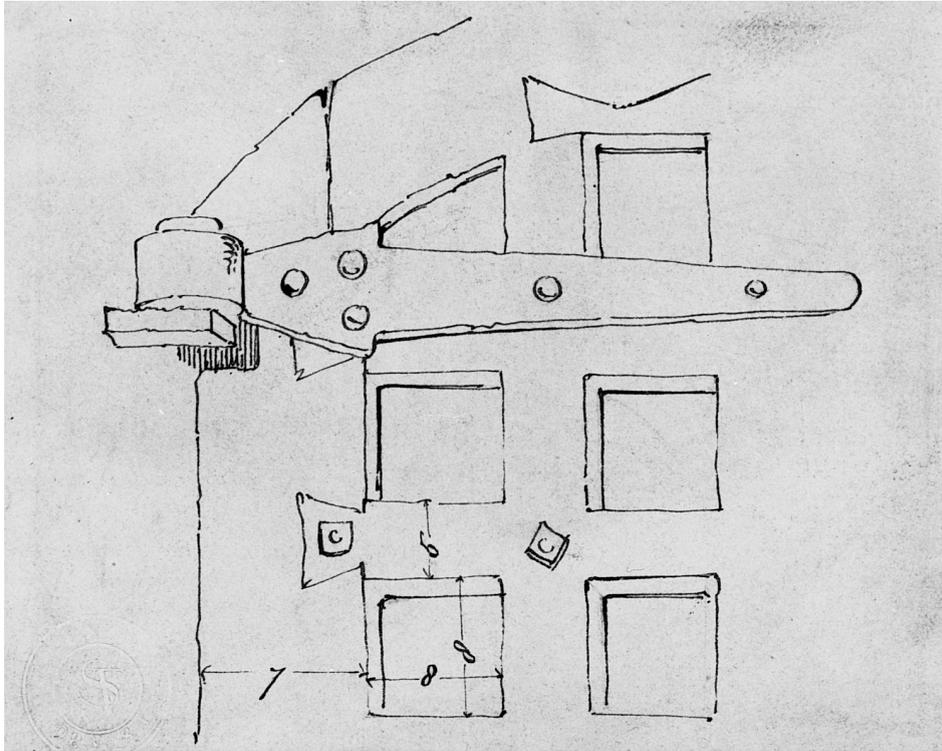


Fig. 2 Drawing of inside top of hinge-stile of the right gate, by Anthony Salvin, n.d. but c.1824. Copyright RIBA Library Drawings Collection.

DESCRIPTION (figs. 4 and 5)

Both gates are basically portcullis-braced with ledges dovetailed to the hanging and opening stiles. The curved top member of the frame is morticed and pegged into the stiles. The frame is covered with flat boards on the front, with moulded ribs covering the joints of the boards, except in the centre where the gates meet. The hanging and opening stiles are 25 mm thicker than the ledges and uprights of the frame so that the front of the boards finishes flush with the front of the stiles. The gates measure 3.77 m high and their combined width is 3.04 m. They hang on two pairs of pintles within an archway which is 3.17 m wide.

Right gate

The frame has already undergone some repairs. There is a scarf joint on the opening stile under 13 (see drawing, fig. 5). The angle of the scarf rebate is such that the lower end of the stile has to be secondary and it was slipped under the dovetail at 13. The bottom of stile 1 is also replaced between 6 and 7. The ledges 6–11 are replacements. Ledge 8 is a re-used piece of wood: on the hanging side it has a square, not dovetailed, tenon and on the other end the ledge tapers to produce a very small tenon. The right end of 12 is a scarfed repair.

The original iron fastenings were blunt nails with a prominent round head set in a

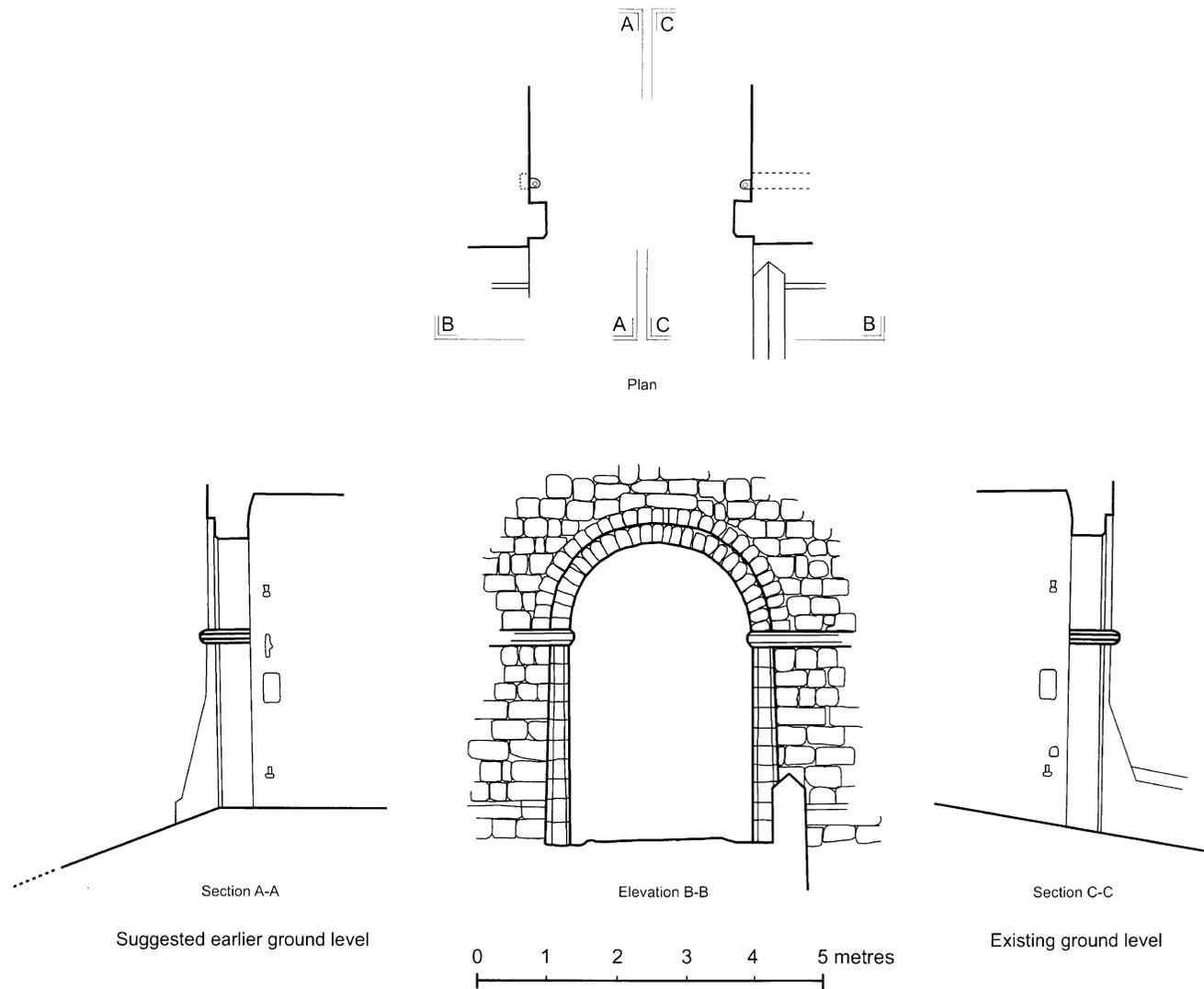


Fig. 3 Plan and cross-section of the gatehouse southern arch and jambs where the gates now hang (1:100).



a

Fig. 4 The newly repaired and re-hung gates, a. from the outside, b. from the inside.



b

counter-sunk hole on the front of the door frame. The nail projected slightly beyond the rear plane of the door, a rectangular rove was threaded over it, and then the tip of the nail was hot-hammered (up set) into the rove to produce a tight fit. During the process of dismantling, the original nail heads became detached, so the rove and shank of the nail survive independently from the head. The medieval roves are of irregular size but rectangular. The modern roves are circular and are attached to coach bolts with screw threads.

The inside of the boards which are butt-joined show distinct traces of maroon paint.

Left Gate

The details of construction for the left gate are the same as for the right, except that the left leaf had a wicket cut into it as a secondary feature.

The upper ledges 24–29 are original. The stile 33, from which the wicket hangs, has a scarf joint at the top of the wicket, and all the lower ledges, 23–18, are replacements. The hanging stile is original down to 20.

Once again the iron corroborates the evidence of the carpentry. All the new work is attached by round-headed coach bolts (on 18–24), rectangular medieval roves are used on 25–29 but two modern coach bolts attach 25 and 26 to 31. The portcullis frames were assembled and bolted to the stiles and head before the boards were nailed; ribs were attached by longer bolts which also secured the cross joints to the frame.

The wicket is simply made with three ledges across the back. The front is boarded and ribbed like the rest of the leaf. Its nails are simply clenched on the back. This would suggest it was constructed before the modern repairs, because no coach bolts are used. The boards of the wicket are re-used: there is a narrow line of maroon paint surviving adjacent to one of the (later) ribs. This indicates that the exterior of the boards were once painted red. An original wide rib was fitted over the board; the paint then wore away except where it was protected under the rib. Finally a narrower rib

was installed, leaving the thin strip of paint visible.

Hinges and other ironwork (figs 5 and 6)

The top hinge on each door is a plain strap with an enlargement at the hanging end and a raised nib at the tip. These hinges are original. The bottom hinges are plain straps with smaller eyes than those at the top. They appear to be replacements. The T strap reinforces the lower left hinge which is shorter than the others since the wicket occupies much of the width of the door leaf. It appears from the pattern of redundant holes that this T strap has been reversed in order to off-set the door slightly from the timber post fixed into the original masonry rebate on this side. This adjustment has the benefit that the bottom edge of the door rises to clear the steeply sloping cobbled passage floor as the door opens inwards over it. The wicket hinges are plain straps with a flattened disc at their tip.

Attached to the walls within the gate are hooks and stays of various lengths either to hold the gates open or secure them when shut. The corresponding eyes on the doors are clearly not original and it seems likely that much of this superficial ironwork is nineteenth-century replacement.

ANALYSIS AND DATING

Several forms of evidence can be used to date the various phases of these gates. First there is the dendrochronology which is the most certain: a sample obtained in 2002 gives us a felling date of A.D. 1459–84 for one ledge timber with the crucial heartwood-sapwood boundaries. Other samples show a similar felling date, so construction of the gates is likely to have been then or shortly afterwards in the second half of the fifteenth century (see below, Appendix I).

There are few distinctive features on the carpentry of the Prudhoe gates to enable close dating based on style and technique alone. From the fourteenth century onwards this sturdy type of portcullis bracing is frequently

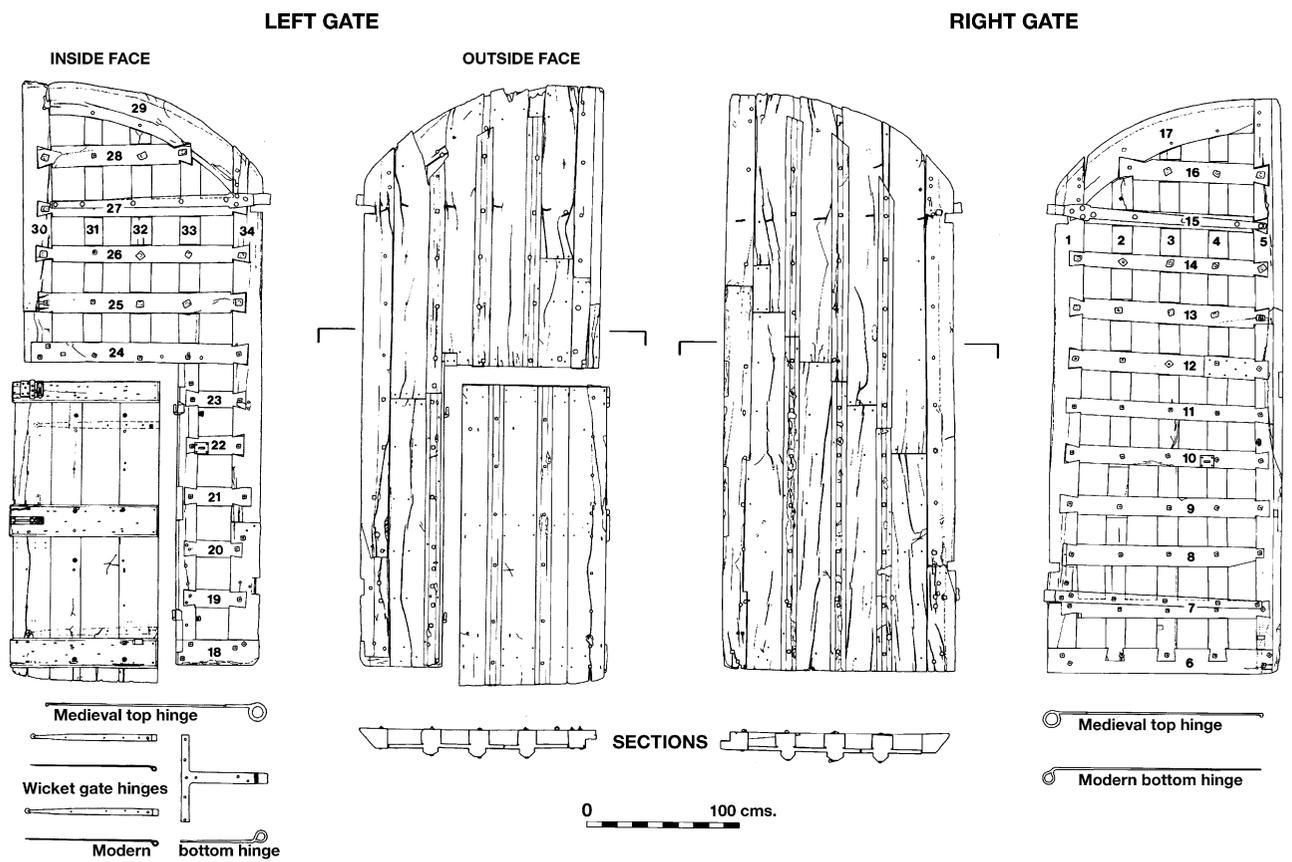


Fig. 5 Survey of the gatehouse gates in 1986, from an original drawing at 1:10 by Mark Fenton for English Heritage, reproduced here at 1:50.



Fig. 6 Examples of the various iron bolts and nails used in the gates.

found in castles, precinct gateways and on church doors. For example, rectangular members forming a dense portcullis bracing are found after 1303 on the inner door of the Pyx Chamber at Westminster Abbey while the ledges used on the Pyx door are also dovetailed into the edging members. At St Augustine's Abbey, Canterbury, profile ribs covering the joints of boarding on the exterior of the gates of the Great Gate are found after 1309 (Geddes 1999, 24–27, 217).

The ironwork features have an equally long lifespan. Roves of flat washer type are used after *c.* 1250, sometimes rhomboid but more usually square. Hinges with a diamond or rectangular enlargement at the hanging end are

very common from the second half of the fourteenth century onwards, but begin as early as *c.* 1330 (Geddes 1999, 28, 7). By contrast, coach bolts with a standard screw thread were only invented in 1841 when Sir Joseph Whitworth refined the machinery that was needed for cutting accurately angled threads in metal. Although screw threads were clearly understood and used before this date, the mass production of standard bolts only began in the mid-nineteenth century. The main repairs to the gates, judging from the coach bolts are therefore later than *c.* 1841. That may be the time when the gradient of the passage floor was altered to the present steady rise (fig. 3, section C–C). Careful adjustments on the hinges were

required then, to throw the gates slightly upwards as they were opened, an action similar to that of modern rising butt hinges. The wicket gate could have been added at any time from the late middle ages to the eighteenth century.

DISCUSSION

The earliest surviving castle gates in Britain are now thought to be the twelfth-century gates at Chepstow Castle, Monmouthshire (Kenyon and O'Connor 2003, 53) but their construction is fundamentally different from that of Prudhoe. The gates at Chepstow are round-headed and they have lattice (diagonal) bracing, not portcullis, and their frontal boards are horizontal. Closer in date to Prudhoe are the gates to the Founders' Tower at Magdalen College, Oxford. Although not dated by dendrochronology, they are clearly part of the west cloister range building campaign of 1475–76. Here documentary evidence for the building is corroborated by dendrochronology on the adjacent three roof rafters (Miles and Worthington 2000, 90–113). However the carpentry of these gates is far more complex than at Prudhoe. They have carved decoration on the front, and a wide variety of diagonal and horizontal braces on the back. This indicates that attempting to date these types of gates on the basis of construction is fraught with difficulties. At best it is only possible to deduce when certain features begin to be used, not their actual date of use in a particular context.

The Chepstow right gate has a wicket, but like Prudhoe's this was not original. The first use of wicket gate is not known but at Windsor Castle in 1311–1312 two iron hinges (*gemelles*) were bought for the *Wicketto magne porte* (Hope 1913, 101). At Barnard Castle in 1391–1392 a new lock was made for *le wicket de dongiongate* (Austin forthcoming). A wicket gate was a useful means of access for pedestrians after the gates themselves were closed and was normally made as small as possible for security, as at Durham Castle, for example, where Bishop Tunstall's early sixteenth-century gatehouse has a wicket gate of only 4 ft by 2 ft

6 ins. Durham precinct gateway, on the other hand, has a separate archway for pedestrians, as found in many monastic and university college gatehouses. The construction of the wicket at Prudhoe considerably weakened the gate by cutting through the bottom of its frame. This act of vandalism was clearly done long after the gates had any serious defensive purpose. Normally by leaving the bottom of the frame to form a step or trip, additional control could be kept over those stooping and entering through a gateway.

Contemporary medieval comparisons for the Prudhoe gates in the north of England are hard to identify, partly because lack of dendrochronological analysis means that surviving examples are of uncertain date. The castles at Alnwick, Bothal and Tynemouth all have gatehouses with barbicans attached like Prudhoe. The gates of Alnwick are 'modern' (Knowles, 1909, 293), as are the pair of pinewood gates at Tynemouth. Amongst the gates of English Heritage's northern castles only the single west postern of c. 1385 at Carlisle may be earlier. De Ireby's Tower (c. 1378–1383), the principal gateway into the castle, has a massive pair of gates but their date is unknown. It is hoped that more tree-ring dating of timbers can be carried out on these and other gates in the near future.

APPENDIX I: Dendrochronology

*A. J. Arnold, the late R. R. Laxton and
C. D. Litton (University of Nottingham)*

The following summary of the results of tree-ring analysis from both the gates is taken from the authors' Report 37/2002 for English Heritage's Centre for Archaeology.

Thirteen samples were obtained from the portcullis frames of both gates; three of these were discarded prior to analysis due to their short ring-width sequences. The analysis carried out on the remaining ten cores resulted in the production of a single site sequence.

Site sequence PRUASQ01 is of 127 rings and contains ten samples. It was successfully

matched at a first-ring date of A.D. 1318 and a last ring date of A.D. 1444. Of these samples only one, PRU-A04, has the heartwood/sapwood boundary ring, which suggests a felling date for the timber represented to within the range A.D. 1459–84. Although an estimated felling date range cannot be calculated for any of the other samples, they all have last ring dates earlier than that of PRU-A04. The earliest any of the trees represented by these samples could have been felled is A.D. 1425 (PRU-A08), and they all could have been felled at the same time as PRU-A04, especially as given the high degree with which the samples match each other and PRU-A04 they are likely to have come from the same tree or only a couple of trees.

Tree-ring analysis has dated the felling of one of the trees used in its manufacture to A.D. 1459–84, with it being highly probable that most of the other samples have a similar felling date. Construction of these gates is likely to have been at or shortly after the felling date, in the second half of the fifteenth century.

APPENDIX II: Paint Research Reports

*Pamela Lewes (January 1987) and
Helen Hughes (1990)*

Samples of the painted wood were removed from a small section of one gate which had been sent to the Ancient Monuments Laboratory. These were set in resin and examined under high magnification.

Under high magnification the surface of the wood appeared to be very weathered suggesting that the wood had been exposed to the elements prior to the application of the existing decorations. This suggests that the original finish applied to the gate (if there was one?) had either weathered away or had been stripped off. An accumulation of four separate painted decorations was found on the samples. It is possible that a greater accumulation of paint survives on other less exposed elements of the gate. The earliest decoration was in a coarse dark grey oil paint which had been applied over

a light grey undercoat. The second existing decoration was in coarse dark brown oil paint. The final two decorations are in a deep maroon coloured oil paint. Evidence from the carpentry suggests that all of these decorations post date the late nineteenth century repairs.

APPENDIX III: Conservation work carried out in 2003 (fig. 7)

Robin Dower

It is not known exactly when the gates were taken down and put into storage. Keen's excavation report of 1983 implies that they had already been removed from the site by then (Keen 1983, 181). Mark Fenton's drawing of 1986 for English Heritage must have been done when they were in the workshop but before they were dismantled. The accuracy of Fenton's record has proved a significant benefit in the re-assembly and reinstatement of the gates, illustrating the importance of accurate observation as the foundation to conservation.

Physical damage to the timber of the gates was widespread. A number of the facing boards were severely split and large areas were missing particularly from the lower boards added in the nineteenth century when extensive repairs had evidently been necessary. Dovetails on the frame ledges were damaged or broken off and old scarf joint repairs formed in animal glues had opened up with weathering and relied only on nails to hold them together. Luckily very little "natural" decay from fungal or insect attack had been sustained though shrinkage cracks and shakes were extensive.

The fact that the gates had been dismantled allowed an approach to conservation which might not have been attempted had they been fully assembled. Each piece of timber could be separately handled and repaired before the whole gate was re-assembled, missing and damaged dovetails could be pieced in and scarf joints were all re-opened and glued afresh. For this work it was considered appropriate to use modern epoxy based wood glues so that each repaired piece could be restored to long-term full strength.

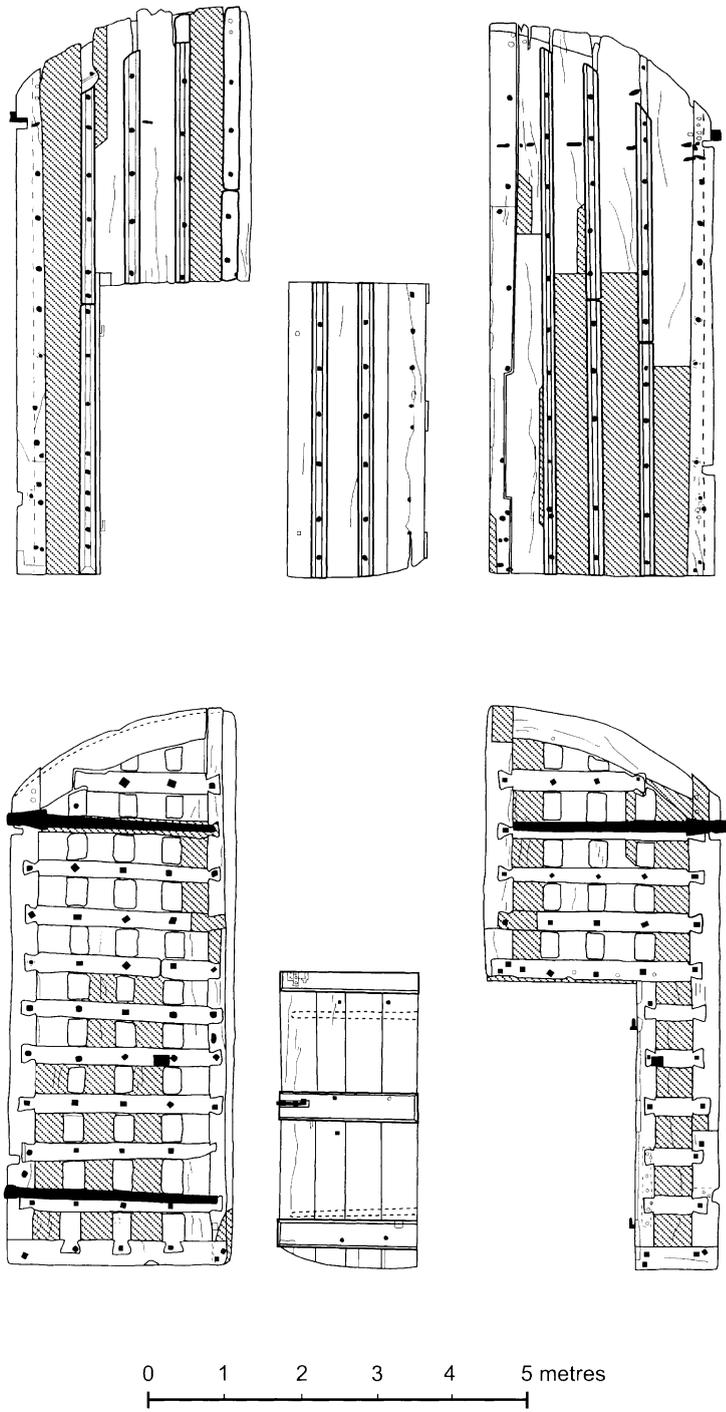


Fig. 7 The gates showing timber replaced in 2003. The new boards have not been treated or painted and should tone down to match the original wood in a few years' time. (1:100)

However, epoxy resin glues are too strong and unforgiving to use in assembly joining; so, where needed, in mortice and tenon joints traditional animal glues were used. Other halved cross-joints and the dovetail joints were re-assembled and bolted using animal glue. This approach will allow easy dismantling should future repairs ever be necessary.

The most difficult problem created by the dismantling was that so many of the bolts and rivets which held the gates together had to be cut to free them, with the result that most were too short for re-use. They had been bagged up but all had suffered some degree of rusting, the nineteenth-century bolts as much as the medieval rivets. Some of the longer bolts were re-used in the stiles where the original bolts had been shorter but new hand-forged wrought iron bolts with threaded ends and nuts were supplied for the rib through-frame positions. All the original roves (the rectangular flat plate washers on the inside face of the gates) were retained.

The gates are extremely heavy, large and awkward to handle in the confined space of the gatehouse. Lifting machinery was brought in for the installation and it is good to report that no damage was done either to the gates themselves or to the surrounding masonry. They hang again on their original pintles and to our great satisfaction the pair of leaves close to each other with but a 5 mm gap between them; a tribute to the fine craftsmanship both of the original and of today's joiners.

After the gates were hung there remained further decisions about security and superficial ironmongery. A new wrought iron bar has been fitted to drop into place below the gates when shut, to prevent anyone sliding beneath the bottom. A bolt connects the wicket more securely to the left hand gate and a modern rim mounted lock is fitted to the wicket so that custodial staff can gain access from outside as well as locking the wicket from within.

The gates have not been treated in any way. The new green oak boards are expected to weather quickly to the colour of the original

timber. Traces of paint on the inside of the gates will remain visible so that observers will be able to note a phase in the historic treatment of these magnificent surviving timbers.

ACKNOWLEDGEMENTS

The authors thank the following for their help in the repair of the gates and the production of this article: Historic Property Restoration Ltd: Chris Green and his two carpenters Alan Shaw and Norman Wilson; the authors of appendices I and II; Smith & Co. (Ironfounders) and Chris Topp their blacksmith; Hexhamshire Hardwoods Ltd. for new timber from Northumberland; Raymond Stockdale, Stev Hayward and the late Douglas Jones, respectively superintendent of works, project manager and area manager within English Heritage; and Jacqui Hutton for help with some of the drawings.

This article has been published with the aid of a grant from English Heritage.

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