
The medieval network of navigable Fenland waterways II: Barnack stone transport

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Barnack stone was used for medieval ecclesiastical building throughout the Fens but scholars have been puzzled about the waterway route or routes used for transport. The conventional wisdom is that the stone was taken from Barnack south overland to the Nene for transshipment to barges. However, the quarries were substantially nearer the Welland and this river was connected to the Nene and Ouse river systems at Crowland, a fact that that has not been given adequate recognition. Some stone clearly did move southwards, and the actual transshipment site on the Nene is identified for the first time. The Welland site for transshipment is also identified. Examination of relative land and water transport distances and costs shows that it would have been cheaper for much if not most of the stone to have been taken to the Welland, the longer water journeys being more than compensated by shorter land haulage.

It is well known that Barnack stone was used in large quantities throughout the Fens and as far afield as Thetford and Bury St Edmunds, for the construction of abbeys, cathedrals and churches. The stone reached Cambridge, probably as early as the second quarter of the eleventh century, for inclusion in the foundations of part of St Bene't church (Royal Commission for Historic Monuments [England] 1959, 264); but most of the stone was used after 1066 until the fifteenth century, by which time the quarries were largely exhausted and the great period of ecclesiastical building had ended. Despite the widespread use of the stone, scholars have been puzzled about the route or routes used for transporting it across the Fens. This puzzle seems to stem from the fact no author identified has explicitly accepted that there was a water link from Crowland on the Welland and thus to the Nene and Ouse river systems, as demonstrated in Part 1 (Chisholm 2010) and shown in Figure 1.

Two contributions in a recent volume illustrate the problem:

In the 1110s stone from Barnack – next to Stamford – was freighted down the Nene [Old Nene] to its confluence with the Ouse, up the Ouse ... to its tributary the Lark ... (Blair 2007, 15).

The most likely route for the carriage of the Barnack stone would have been down the River Welland to Deeping and then

southwards along Car Dyke to Peterborough, and thence by the River Nene to Ramsey (Bond 2007, 176–177).

Blair implies that the stone was first carried south to the Nene, whereas Bond indicates northward movement to the Welland. In both cases, some dubious 'evidence' is cited. Blair claims that his view can be inferred from two writs by Henry I, protecting Bury St Edmunds and Ramsey from attempts by the Peterborough monks to levy tolls for passage along the Nene. Neither writ can be construed to say this:

Writ of 1105

Precept by Henry I to William de Cahaines the sheriff [of Northamptonshire] and the monks of Peterborough: That no toll is to be taken from the stone which is being conveyed to make the church of St Edmund. They are to restore without delay the ships which they have seized. (Johnson and Cronne 1956, item 694, 42).

Charter of 1116–23

Precept by Henry I to the Abbot of Peterborough: That the Abbot of Ramsey have stone [from Barnack] for the building of his church as Alwin, his predecessor, had it. If the Abbot of Peterborough does not do this Hugh of Leicester is to do so. (Johnson and Cronne 1956, item 1410, 189).

The first document does not specify tolls by land or water, or the route in question. Furthermore, the jurisdiction of the sheriff and the monks was bounded by the Welland to the north, almost as far as Crowland, and the Nene to the south; therefore, the tolls in question could have applied whichever of the two routes was used, and the impounded vessels could have been on the Welland as readily as on the Nene. No inference can be drawn regarding the direction in which stone was taken. The only clear conclusion from this writ and the other cited by Blair is that Henry I was protecting Bury St Edmunds and Ramsey against impediments and charges imposed by the abbot of Peterborough for the acquisition of stone, whether these were tolls for land or water carriage.

There is an equivalent difficulty about the suggestion that Car Dyke was used to transfer stone from the Welland to the Nene system of waterways. Bond (following Alexander 1995) cites a lost load of Barnack stone on the Lincolnshire Car Dyke, west of the Welland (Phillips 1931, 106; Trollope 1872, 65), but this

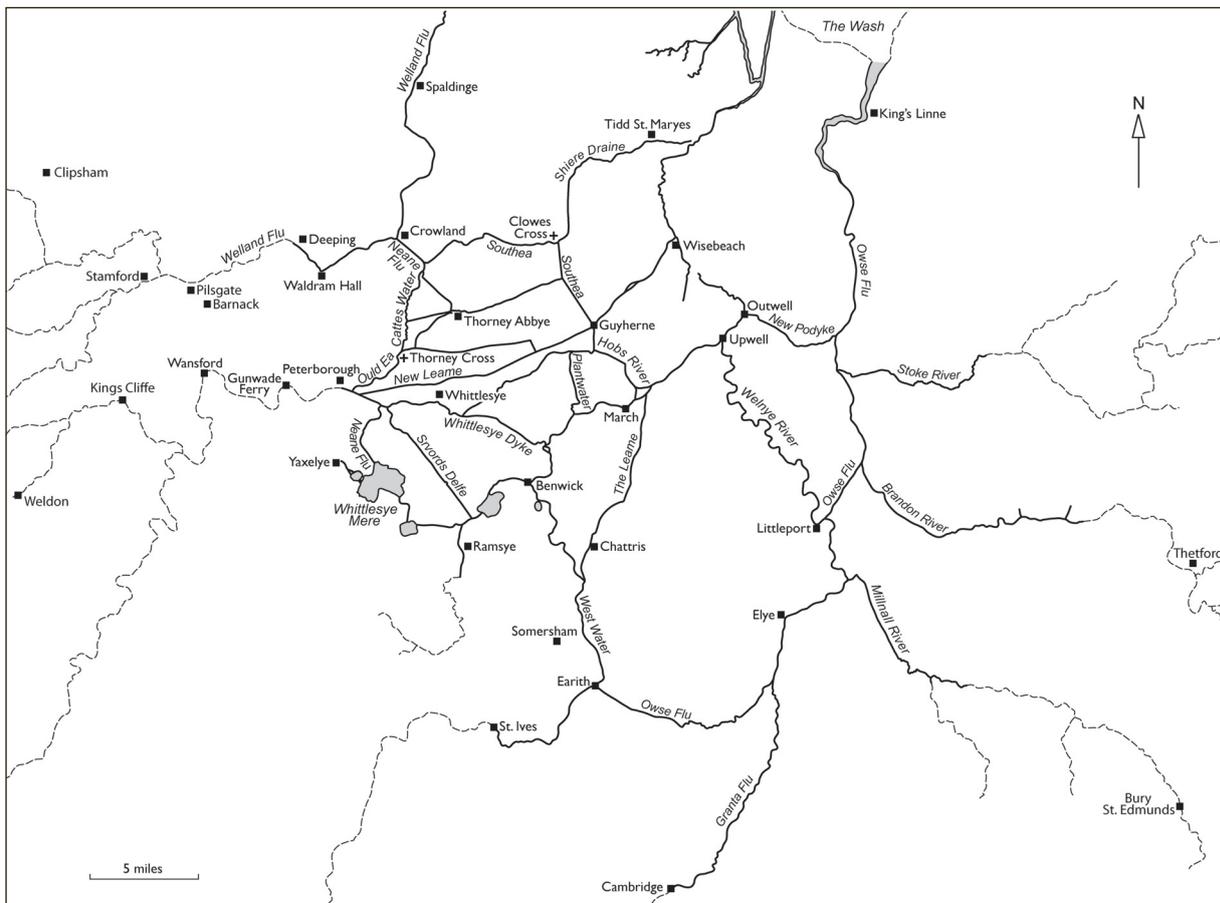


Figure 1. The main elements of the waterway system in 1604 as portrayed by William Hayward. Copied by Payler Smyth in 1727. The pecked lines show rivers extended beyond the compass of Hayward's map. Hayward's spelling is used for the names shown on his map. The partial outline of The Wash shows the modern coastline. The channel between Cats Water and Clowes Cross does not carry a name on Hayward's map but there is no doubt that it was South Ea, as shown in the Figure. Sources: Facsimile copy of Cambridgeshire Archives R59/31/40/1, and Ordnance Survey. Reproduced from Part I (Chisholm 2010).

provides no evidence that the Northamptonshire section of the Dyke was usable; so far as is known, there is no documentary evidence for this Roman channel being open in medieval times, and no archaeological finds have been reported indicating medieval use (Hall 1987, 28).

Southward movement of stone to the Nene

This route has attracted the attention of scholars on the basis of physical evidence in the form of abandoned blocks of stone and some limited documentary evidence. In the present context, the sizeable stones found in Whittlesey Mere (Astbury 1957, 44; Hall 1992, 32) can be discounted because, as will be shown below, they could have reached the Mere via the Welland with equal if not greater ease than along the Nene past Peterborough. Seemingly much more solid evidence is provided by the stones known as Robin Hood and Little John (TL 138 983) illustrated

by Purcell (1967, Plate 37a), thought to mark a rood of land granted to Bury St Edmunds, near Gunwade Ferry (in recent times, Gunwade Ferry has been referred to as Milton Ferry but for the present purpose it is less confusing to retain the older usage). The two stones stand about 125 metres (410 feet) from the Nene, well above the river and close to the old road that now ends as Ferry Hill. In addition, there are the hitherto unreported stone nearby on the bank of the Nene (TL 142 983), and two stones at Southorpe (TF 082 033), shown to the author by Alan Dawn in 2009. Robin Hood and Little John are reputed to carry the insignia of Bury St Edmunds (Astbury 1957, 157; Gover *et al.* 1933, 233), in the form of three arrows, but inspection shows no evidence that they were marked in this way; however, the stone on the river bank is so blazoned.

The firmest documentary evidence identified for southward movement of Barnack stone to the Nene is a charter from 1222–26, by which the Abbot of Peterborough confirmed the grant to Bury St

Edmunds of one rood of land in Castor field, near Gunwade Ferry, previously made by William son of Reginald. In addition, the Abbot and monks of Bury St Edmunds were granted:

Free carriage by the public road from Barnack to the water, and of the right to transport marble and any other stone or anything else bought for their own use by the river Nene between Alwalton and Peterborough ... for an annual rent of 6s (Brooke and Postan 1960, 193. See also Gransden 2007, p 230–32; Purcell 1967, 71–2).

William son of Reginald was active in the late twelfth century or early in the thirteenth (Tim Halliday pers. comm.), suggesting that the original grant of the rood of land had occurred not long before 1222–26.

That there had been a long history of trouble between Peterborough and Bury St Edmunds is shown by an order to Peterborough issued by William the Conqueror, that Abbot Baldwin of Bury (1065–97) be permitted to have as much stone as he needed for the monastic church ‘as he has had up till now and not to make any further hindrance for him in bringing stone to the water which you have formerly done’ (Battely 1745, 50). The church was consecrated in 1095.

Care is needed interpreting the material presented above. Tidal rivers were regarded as free navigations and legally exempt from tolls (Willan 1964, 22), and the Nene was tidal to Gunwade Ferry (Dawn 2009, 2). The exemption for traffic between Alwalton and Peterborough applied to carriage over the non-tidal river, particularly relevant for Alwalton marble, used in small quantities for decorative effects, which stone could only be moved along the Nene. However, this quarry apparently had a short life, approximately from 1180 to 1230 (Purcell 1967, 74), and Bury St Edmunds may have received only one shipment (Alexander 1995, 120). The exemption did not apply to Barnack stone loaded at Gunwade Ferry because the river was legally free from that point downstream.

It seems clear that some Barnack stone did indeed move south to the Nene, but there are unresolved issues. The stone was taken to a very large number of final destinations in and around the Fens and one would expect that some large blocks would have been lost or abandoned at a number of places while in transit. However, the only ones reported in the Fens are all located in Whittlesey Mere and near Gunwade Ferry. Therefore, is it the case that other stones were salvaged, and that the known stones are the few surviving pieces of evidence? If so, their utility in marking the stone route is questionable.

Assuming that Robin Hood and Little John do mark the access route to the Nene granted to Bury St Edmunds, how did other users obtain their Barnack stone? Was a right of passage over the same land granted to other abbeys and users of Barnack stone, or were rights granted separately? Sandra Raban has drawn attention to rights granted to Thorney in 1296. The church and monks of Thorney Abbey received the benefit of a wayleave over three roods of land at Gunwade, lying between the King’s highway and the Nene, a right that suggests the movement of

stone to the river. But the land in question was arable and meadow, over which the clergy and their tenants were given:

Free authority and power ... at any time of year for walking, riding, carting, fetching, depositing and meeting in groups, having under its control stone and timber and whatever else touches the uses of the aforesaid monastery or its manors ... (Raban pers. comm. Translation of text from vol. 2 of the *Red Book of Thorney*, Cambridge University Library Add MS 3021, f. 2270).

The grant does not mention a hythe, nor does it specify the origin of the stone. Of equal interest is the fact that by 1296 most of the buildings at Thorney requiring new stone had been completed. Part of the abbey church had been finished and was in use by 1098, the remainder being completed in 1109. From 1238, a period of prosperity saw much new building, followed by almost twenty years from 1305 during which there was extensive re-building (Ellis and Salzman 1967, 213–14). Therefore, the wayleave was granted at the very end of the new build phase, and the following period of re-building would presumably have seen the re-use of stone already on site, implying relatively little need for new material from quarries. Therefore, for somewhat over two hundred years, Thorney apparently obtained its stone without any problem, as appears also to have been the case for five of the seven other abbeys (not counting Peterborough) identified by Alexander (1995, 115) as having quarrying rights at Barnack. Consequently, it would seem that Bury St Edmunds and Ramsey had particular problems that were not shared by others who used Barnack stone, and therefore it may be that the route used by Bury was not the only one employed.

There is a further complication noted by Raban (pers. comm, translation from the *Abbot of Peterborough’s Receiver’s Accounts*, Northamptonshire Record Office F(M) ff. 232 and 233). There was a hythe known as Woodhythe from which stone was shipped down the Nene to Thorney Cross and thence to Eye. A small quantity of this stone was carted from Barnack in 1307–08. In 1303–04, four and a half pits were dug near Woodhythe, and 851 loads were carted therefrom to Woodhythe, destined for the new grange at Eye. This hythe is identified by Bridges (1791, 538) as being near Burgberry, the home farm of Peterborough Abbey, less than half a mile north-west of the church (Steane 1974, fig. 10). There were two other hythes at Peterborough – Bolhythe (with Bolhythe Gate) and another immediately to the west known as The Hythe, both opening onto the river immediately south of Peterborough (King 1980–81, fig. 1).

So far as is known, no author has previously identified the Gunwade site at which stone was loaded onto barges. For the moment, let us assume that Robin Hood and Little John do mark the rood of land granted to Bury St Edmunds. Figure 2 reproduces information from the first edition of the OS six inch series, surveyed in 1885–7 and published in 1892 with the stones named at the northern end of a narrow strip

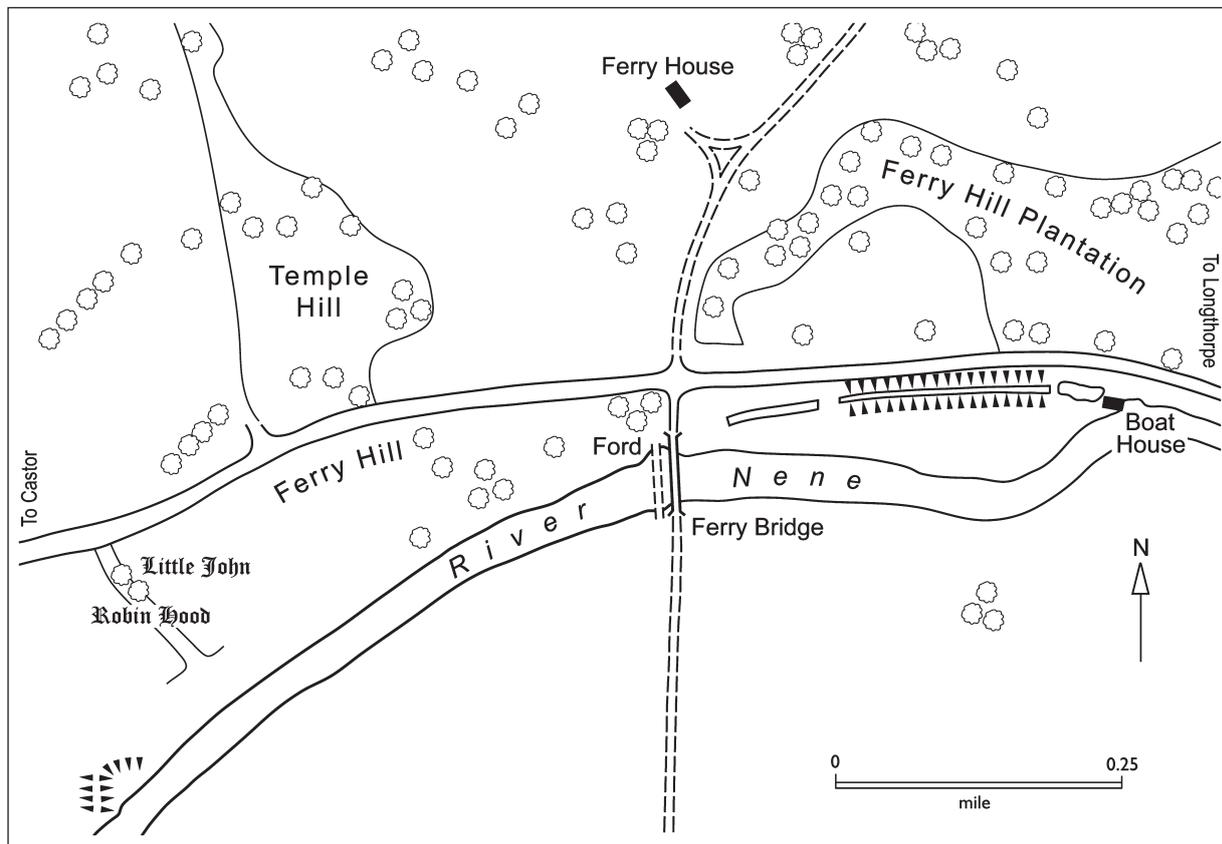


Figure 2. Gunwade Ferry and environs 1885-7.
Source: OS six inch sheet Northamptonshire 8 SW, published 1892.

of trees and scrub that might originally have reached the river. According to the *Oxford English Dictionary* (1933), a linear rood varied from six to eight yards, and a rood as an areal unit was forty square roods. If we take the upper figure for a linear rood, then the distance from the road to the river of 480 feet implies that the strip of land would have been 48 feet wide. Alternatively, if the rood was six yards, the original grant could have been 27 feet wide extending to the river. So although the strip shown in Figure 2, as portrayed by the first edition of the twenty-five inch series (1885), was about 70 feet wide, it may be that the land associated with the two stones in the nineteenth century was that granted to Bury St Edmunds in the thirteenth century, with subsequent enlargement.

However, even if Figure 2 is taken to show the location of the land grant, it is unlikely stone was actually moved that way to the river, for three reasons. First, the relative relief from the road to the river is about 60 feet over a horizontal distance of 480 feet, a direct average gradient of one in eight, or just over 7° – a steep hill. Second, the bank to which the land points is innocent of any apparent evidence for loading boats. Somewhat further upstream, there is a point where the bank has been visibly modified, creating a riverside platform backed by a steep slope topped by a bank (Figure 2), but it is unlikely this

was reached from Robin Hood and Little John. Third, the two stones are upstream of the ford recorded by the OS, a feature that would have made navigation difficult at times of low flow and maybe more generally. Topographically, the point of loading would have been below the ford, not above, giving an approach gradient about one third of that past the two stones.

Milton estate records provide some useful evidence. The manor was acquired by the William Fitzwilliam family in 1502, the property being granted:

Together with the fishing and wharfage at Gunwade on the River Nene (Vellacott 1970, 476).

Although the location of the wharfage is not specified, it must have been the channel parallel with the river just downstream of the ford and bridge, shown in Figure 2 as it existed at the end of the nineteenth century. Examined on the ground, the channel is still plainly visible, cut into the hill on the landward side and with a raised and clearly artificial embankment toward the river. At the western end, a substantial area of low damp ground can be seen; the narrow channel had some shallow standing water at mid-summer 2010 (25 July); and the eastern pond remains, cut off from the river by the foundations of the defunct boat house. The channel would have been readily accessible at the western end from the old public

highway adjacent to the river crossing.

This channel is recorded on a plan of the Milton Lordship dated 1582 held by the Northamptonshire Record Office (Map 1202). On the back of the plan two dates have been written in different hands – 1532 and 1582. Northamptonshire RO officers are satisfied that it is 1582 on the basis of independent evidence in the form of a letter from Thoby Houghton dated 5 October 1583 (Fitz Corr 82). The plan was evidently a hasty piece of work, which explains why it falls below the standard one might have expected for 1582. (Eleanor Winyard pers. comm.) The channel is shown as being uniform in width for its whole length, having no connection with the river upstream but being apparently connected downstream. Starting immediately below Gunwade Ferry, it was graced with a small bridge over, and provided with what appears to be direct access onto the public road from Peterborough to the Great North Road (A1) at Wansford. Immediately upstream of the Ferry, two water mills occupied the north bank of the Nene, supplied by a leat from spring-fed storage ponds on the higher land. No link is shown between the leat and the artificial cut. There can be no doubt that this channel is artificial. The configuration and location suggest that it was not a fish pond, and in any case the 1582 plan records fish ponds elsewhere on the estate. The only possible conclusion is that the feature records the site of the wharfage referred to in 1502, and therefore to the site where stone was loaded, including, no doubt, Barnack stone.

First recorded about 1150 (Gover *et al.* 1933, 232), Gunwade as a place-name signifies the ford or ferry of Gunni, a name of Scandinavian origin. Local place-name evidence suggests very strongly that the ferry was much more important than the ford. Ferry House (TF 143 987) has been identified as corresponding in location to Gonewade in the twelfth century (Gover *et al.* 1933, 232). Ordnance Survey maps of various dates record Gunwade Ferry beside Ferry Bridge, approached along the road known as Ferry Hill, the Bridge today leading to Ferry Meadows Country Park. The rising land north of the river downstream from the crossing is known as Ferry Hill. In striking contrast, there appears to be no surviving local place-name element such as ‘hythe’ denoting a place for river commerce. The clear implication is that although stone – and not just Barnack stone – was loaded onto barges at Gunwade, the main significance of the locality was the river crossing.

With some degree of certainty, we may conclude that stone was loaded onto barges in the artificial cut just downstream from the ford and ferry, today marked by Ferry Bridge (built in 1716). Located below the ford, the site had direct access from the public highway, approached from the west down a hill of reasonable declivity. It seems clear that the documentary and other evidence relating to the southward movement of Barnack stone needs to be reconsidered, and that too much credence has hitherto been given to Robin Hood and Little John as the point of access to the river.

Northward movement of stone to the Welland

We know that Barnack stone was extensively used in Stamford (Briston and Halliday 2009, xvii; Alan Dawn pers. comm; Purcell 1967, 31). It is difficult to believe that this stone went south and then all the way round by Crowland, but we do not know whether it was taken to the Welland and then upstream, or directly overland to Stamford. We do know that the abbeys at Crowland and Spalding were both constructed of Barnack stone, and that some was purchased for Norwich Cathedral in 1301 (Purcell 1967, 31). For these three destinations, the Welland was the obvious river to use, being navigable to Stamford (see Part I); some stone must have moved northwards from Barnack. In addition, and hitherto not specifically noted in this context, the water link from Crowland to Cat’s Water/South Eau would have allowed stone to reach destinations across the Fens.

The following account was first published in 1906:

There seems to have been a tradition of the existence of a haven at the foot of Pillsgate Hill ... Whether the ‘portecros’ in a Pillsgate rental ... refers to this it may be impossible to decide. In any case there would seem to exist even at the present time [1906] traces of wharves on the Welland near at hand (Vellacott 1970, 293 fn.)

This tradition is ascribed to Morton (1712, 110), who says:

The tradition that ... there was formerly a haven, that came up to Pillsgate Hill Foot, is so far true, that a great quantity of the stone dug up at Barneck quarry was in former times brought hither to be carried off by water; so that as long as that quarry, or the occasion for it lasted, it was a considerable fresh water haven.

Morton does not give a source for this information and elsewhere in the volume he records unlikely matters in an uncritical manner. Therefore, in the absence of corroborating evidence, it is easy to discount his text on the ground that he is an unreliable witness and modern scholars have apparently assumed that his information about Pilsgate cannot be accepted.

However, Morton’s account is supported by Francis Peck, a notable Stamford antiquarian whose major work has hitherto been unremarked in the present context. His volume was first published in 1727 and at one point he takes issue with Morton about the point at which a Roman road, a branch of Ermine Street, enters Lincolnshire from the south. Peck points out that this road (King Street, see Figure 3) reaches Lincolnshire at a point further north than the Lolham Bridges noted by Morton, nearer to West Deeping, observing:

However the great pit, over which the biggest bridge is now erected, in my judgment seems formerly to have communicated with some other pits both above and below it, but particularly that towards Stamford, now called Pilsgate haven. (Peck 1979, I.10).

Peck does not repeat Morton’s observations about a haven at Pilsgate, implicitly accepting that account but adding detail of his own – recording the contemporary currency of the term Pilsgate haven and not-

ing that formerly it went by another name. There is no suggestion by Peck that the hythe was still used in the early eighteenth century.

Use of the term 'pit' is revealing. According to the *Oxford English Dictionary* (1933), this word has the basic meaning of an artificial construction, one variant being 'A hole dug or sunk in the ground for water; a well, a water-hole; a pond, pool', with the earliest cited reference being 890–901, but now obsolete. Consequently, the pits to which Peck referred may be regarded as artificial enlargements in the watercourse(s), an interpretation supported by other evidence considered below.

Pilsgate place-name evidence for a hythe

Additional evidence lies in local names identifying topographical features. The single reference to *portecros* noted by Vellacott (1970 293 fn.) considered on its own is ambiguous for the following reason. In Old English, the prefix 'port' carried two meanings relevant in the present context: that of harbour or haven; and of town, burgh or city. More precisely, the latter meaning was that of a place where trade was conducted, which in Saxon times meant an urban area, usually fortified (e.g. Stenton 1971, 525–36). Surviving documents show that roads were often used by the Saxons for the identification of parcels of land and other properties:

These references are all simple descriptions of the roads thus mentioned, and they never indicate the towns or villages between which these roads ran ... A port straet, that is a road leading to a town or market, a cynges ferdstraet, along which the local militia could move, a herestraet, suitable for the passage of an army, if only a primitive Saxon army of thirty-five men and upwards, were obviously regarded as more important than roads known locally as the foul way, the stubby way or the clay way. (Stenton 1936, p 2–3; emphasis in the original.)

Pilsgate Manor included Barnack and a recently published study translates and annotates documents from the Sacrist of Peterborough pertaining to the thirteenth to fifteenth centuries (Briston and Halliday 2009). The material allows one to examine the post-Norman significance of the 'port' prefix in some detail. Figure 3 reproduces the main features of the Briston and Halliday end piece map relevant in the present context, omitting, for example, property boundaries.

The Sacrist's documents relate primarily to the ownership of, or rights and obligations relating to, parcels of land, which are identified by reference to neighbouring properties and also other features, including roads. Two Roman roads run through Pilsgate Manor, one being Ermine Street, which is shown in the records as Langdike; the other is Mikeldike (or King Street, still preserved on modern Ordnance Survey maps), and the text also contains some references to the royal road or way. These two roads aside, some of the local roads bore names of locally descriptive significance, such as Littledykegate and Saltersgate, but otherwise the large number of

roads included in the text but mostly not identified cartographically were named by reference to the place of origin or destination, with but one exception, Portgate/Portway (Figure 3).

There are five place-names recorded by Briston and Halliday with the prefix 'port', some of which are in documents that can be dated:

Portgate, both shortly before and after 1290
 Portcross, 1340/41 to 1408/09
 Portcross balk, 1340/41 to 1364/65
 Portway, 1408/09
 Porthill, all un-dated

Collectively, these five local names account for 8% of the space occupied by the place name index, recording the relative frequency with which they occur in the documents included in the volume, indicating that 'port' was probably very significant for the manor from an early date.

Portgate, which appears to have been superseded by Portway as a name, ran from east to west, to the foot of Pilsgate Hill. One undated document (no. 290), probably 1364–5, defines a number of words used in the Pilsgate documents relating to rights and obligations, including some land from which the hay crop was sold:

Portgate is a certain way in le Dunfeld of Badyngton by which one goes from Makeseye [Maxey] to Staunford [Stamford], the grass of which way is sold annually ... (Briston and Halliday 2009, 341).

The need for this clarification implies a degree of uncertainty about Portgate, which could reflect one of two possible situations. It may be that Portgate retained 'port' in the ancient but by then unfamiliar meaning of a town or burgh, i.e. Stamford. Alternatively, Dunfeld being some distance from the possible site of a hythe at the foot of Pilsgate Hill, it may have been necessary to explain that the local name derived therefrom happened to be the route from Maxey to Stamford.

There are several reasons for thinking that 'port' did not mean Stamford. As already noted, the great majority of local roads were identified by the place of origin or destination. Furthermore, as Figure 3 shows, the road leading southeast from Ufford was known as Burgate, Burg or Burgh being an abbreviation of St Peter's Burg the monastery and, by extension, Peterborough. The earliest Pilsgate reference to Peterborough is early in the thirteenth century but the burgh usage for the town had been locally established long before then (Peck 1979). The Pilsgate documents record Walcotegate, Burlegate (leading to Burghley) and also the Way from Stamford. In some cases, the place of origin/destination is signified by its function – the way to the stonemill, the way from the windmill and the path to the watermill.

The Briston and Halliday study shows Stamfordgate as recorded twice prior to 1290, and a single undated document in the volume (no. 299k) records the following references: Stanfordweye, Burlegate and Walcotegate as roads associated with named places, plus Portweye, Portcros and Porthull. Local usage

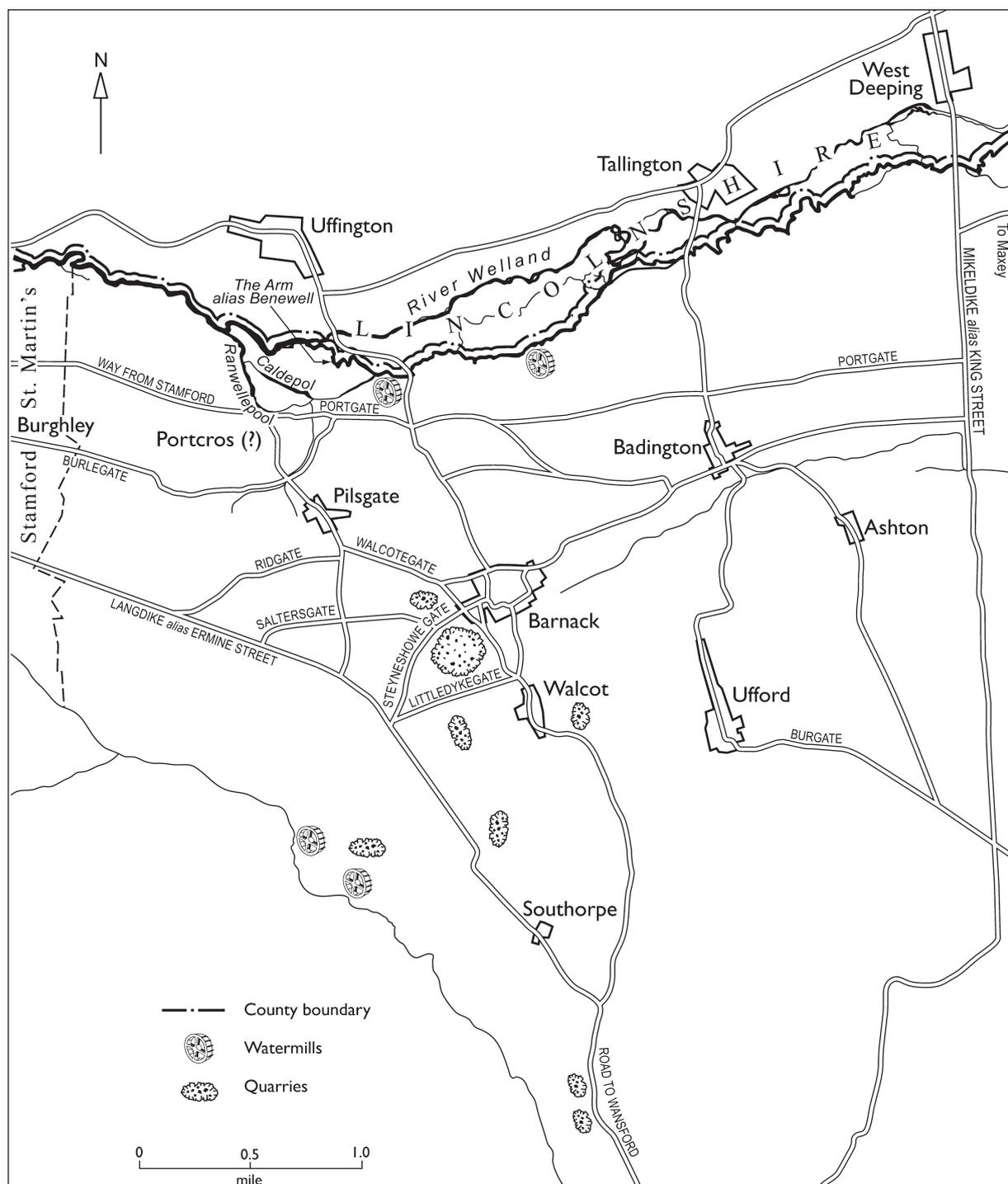


Figure 3. Medieval Pilsgate Manor drawn to emphasise the roads, places and watercourses. Note that the county boundary has been added; for the sake of clarity, it is offset from the centre of the watercourses.

Source: Briston and Halliday 2009, end piece map.

clearly differentiated Stanfordweye from Portweye, indicating that the 'port' prefix cannot have referred to Stamford. Furthermore, Peterborough and Stamford as places are mentioned in several documents, including a grant of rent, confirmed to the Abbot of Burgh St Peter, 'from the church of St Michael for two church-

yards in Staunford', dated before April 1274 (Briston and Halliday 2009, no. 77); Stamford was named, not identified by the general term 'port'.

Several crosses are recorded, including Pilsgatecross and Walcotecross, both local places, and White Cross, conveying the impression that the

crosses were locally significant. There appears to be no Burghcross recorded on the way to Peterborough, notwithstanding that the Manor belonged to the monastery there. Several natural hills were locally recognised and used for identification purposes, including Clayhill, Green Hill and le Caldepol Hill, meaning that Porthill would be consistent with local usage if it stood above a hythe or port. It is difficult to visualise how Porthill could refer to Stamford, since the road to that town follows the valley, precluding reference to a hill within Pilsgate on the way to and fro, other than the hill north of Pilsgate, which does not bear any identified name. Although some Stamford interests owned land in Pilsgate, there is no suggestion that a particular hill slope became identified with that town, other than by interpreting 'port' in that way.

Viewed in context, it seems that the place-name element 'port', including Portcross, cannot have meant Stamford but in fact signified the presence of a hythe. The nearest point on the Welland accessible from Barnack by road is at the foot of Pilsgate Hill, so although there are now no visible remnants of wharves, the local topography makes it certain that if there were a hythe or port it would have been there. The configuration of medieval watercourses identified by Briston and Halliday suggests that a port did in fact exist, for the following reasons. It is well known that rivers formed convenient county boundaries, the southern boundary of Lincolnshire being an example. For the area covered by Figure 3, the county boundary to this day follows the single channel in the northwest, 'The Arm alias Benewell', and then the southernmost of the two channels towards the east and Tallington. The channel thus identified therefore represents either the sole or main course of the river in pre-Norman times, and not the channel identified as the Welland by Briston and Halliday. South of 'The Arm' is the watercourse that forms a loop, hugging the upland that rises from the floodplain. Ranwellepool is part of this loop, which may have originated as a meander but, given the terrain, it is extremely unlikely that the channel would have narrowed suddenly southwards for natural reasons. Caldepool, cutting off part of the main loop, does not follow a natural line. These watercourses have every appearance of being, at least in part, deliberately engineered.

The first datable record in the Pilsgate documents for Ranwellepool is the end of the twelfth century or early in the next, perhaps a century before the first dated place-name with 'port' as the prefix, and Caldepol is known to have existed before 1280. These channels are clearly distinguished from the Welland, for which the earliest Pilsgate reference is either the last quarter of the thirteenth century or before 1280. Manifestly, these landscape features were early regarded as locally important.

The Ranwellepool loop is clearly visible in the landscape today, as a ditch line with trees, at the foot of the rising ground. Ranwellepool itself is now a shallow but substantial depression, consistent with a pool up to 30 metres wide. According to the *Oxford*

English Dictionary (1933), the word pool is mainly, but not exclusively, applied to natural features; the second definition of 'a deep or still place in a river or stream', can be traced back to about 1000, with The Pool on the Thames in London cited as an undated example. It is a reasonable inference that the remnants of Ranwellpool mark the site of Pilsgate haven, identified by Peck as a pit, created as an enlarged channel alongside permanently dry land, and it seems clear that this had been done some considerable time before the thirteenth century ended.

Figure 3 shows two 'Welland' watermills, one reasonably firmly located beside the road to Uffington and the other less confidently placed by Briston and Halliday somewhat to the east, both on the county boundary watercourse. These mill locations are consistent with the use of Ranwellpool as a hythe, the water being held up above the western mill to give a head of water. Ranwellpool had access to the northern channel of the Welland, known to have been navigable in medieval times to Stamford (see Part I). This interpretation is consistent with the fact that medieval water mills did not necessarily impede navigation (Hooke 2007, 43).

Given the evidence cited above, it seems to be clear beyond reasonable doubt that a hythe did exist at the foot of Pilsgate hill, known as Ranwellpool in the Pilsgate Manor records and subsequently as Pilsgate haven. Two reasons may be offered for the existence of a hythe on the navigable Welland. First, within and around the Fens in the medieval period, manors, villages and towns went to considerable lengths to secure access to navigable waterways and there is no reason to suppose that Pilsgate Manor was any different in this regard (see Cole 2007; Gardiner 2007). Second, there was the specific matter of evacuating stone from the Barnack quarries to Stamford, Crowland and Spalding if nowhere else. The existence of a hythe at Pilsgate deserves to be accepted until or unless conclusive proof to the contrary should be forthcoming.

Further considerations

This conclusion poses a problem – why is Pilsgate haven not mentioned in the Sacrist's documents published by Briston and Halliday? It may be that Ranwellpool was the locally accepted name that everyone recognised as a hythe. Or it may be that there are records other than the Sacrist's that have not been examined, or which contain unreported references. Or again it may be that no relevant ecclesiastical records have survived. Meantime, the apparent absence of medieval documentary evidence for a hythe cannot be construed as proof for its non-existence.

The Sacrist's documents for Pilsgate include some references to quarries at various dates from 1340/41 to 1408/09 but the ownership is not identified, although there is an undated mention of a plot of land owned by Crowland Abbey in a location suggesting it was a quarry. A small number of other religious houses held land but these holdings were not quarries, and there is no mention of quarries owned by

major religious houses such as Bury St Edmunds, Ely and Ramsey (Briston and Halliday 2009, xxiv–xxvi). However, we do know that Prior John of Spalding (1253–1274 – see Dugdale 1846, 209) received from Sir Hugh Faunel of Walcote two quarries at Barnack, ‘to hold freely, with free access’ (Spalding Gentlemen’s Society, manuscript *Translation of Spalding Register* vol. 3, Fo.316d, 351–2). Both these plots were within his desmesne ‘in the territory of Walcote’, and therefore presumably south of Barnack. One of the plots is located by reference to adjoining plots at all four points of the compass, the one to the south being owned by the Abbot of Crowland – and therefore probably also a stone quarry, likely to be the land identified by Briston and Halliday.

Two routes for the transport of Barnack stone

Only two authors have been identified who view the Welland via Crowland as a route for transporting stone into the Fens alternative to the Nene, though neither author explicitly mentions Crowland Cut to Nene Terrace (see Part I). Barley (1938, 17) states, without citing evidence, that Peterborough and the other abbeys obtained their stone this way, but Gransden (2007, 232) is more circumspect. She is also the only author identified who explicitly notes the complex nature of the agreements needed for moving any stone through the Fens. We may visualise that those who wished to obtain the stone had two major issues to resolve – the ‘politics’ of control over quarrying rights and movement overland and by water, and the economics of so doing. We will examine the economics of transport but before that a brief comment is in order about the politics involved.

The complexity of the ‘political’ dimension may be illustrated by the following observations. The relevant volume of the Victoria County History contains a map of the Isle of Ely after the creation of the Ely Bishopric in 1109 (Miller 1967, map facing 2). With the exception of three comparatively small areas of commons, the entire Isle was held as manors of five religious houses, forming a complicated jigsaw. Elsewhere in the Fens, it is well known that Sawtry Abbey had major problems with Ramsey Abbey over access to Whittlesey Mere in the twelfth century (Astbury 1957, 155–6), but less familiar are the general problems that Abbey had into the 1440s (Inskip Ladds 1914, 356–62). Thorney was also embroiled in ‘continual disputes over boundaries, rights of way by land and water’ with the abbeys at Crowland, Ely, Peterborough and Ramsey (Ellis and Salzman, 1967, 213).

The economics of stone transport

In strictly economic terms, would it have made sense to send Barnack stone to Bury St Edmunds and elsewhere along the Welland and through Crowland Cut instead of southwards to the Nene? The answer depends upon the relative distances by land and water, and the relative costs of transport thereby. Therefore,

the first matter to consider is where stone was loaded onto barges. The thirteenth century land grant to Bury St Edmunds mentioned above points to the vicinity of Gunwade Ferry as the point of transshipment for Barnack stone; though Purcell says that transshipment for Weldon, Kings’s Cliffe and Ketton stone moved upriver to Wansford over time, he counters that observation by citing two cases of these stones being loaded at Gunwade Ferry in the sixteenth century (Purcell 1967, 41 and 98–9). Jenkins (1992–93) appears to be mistaken in assuming that Wansford was the loading point for Barnack stone destined for Peterborough Abbey and for our purpose it will be assumed that Gunwade Ferry was used, some six or seven miles from the main Barnack quarries (Purcell (1967, 98). The equivalent site on the Welland at the foot of Pilsgate Hill was less than two miles north of the quarries. Therefore, on a conservative estimate, use of the Welland would save about four miles of overland haulage. Note that part of the village of Barnack is built on land formerly quarried (Alan Dawn pers. comm.), The village is north of the Hills and Holes that are generally taken to mark the area of quarrying, and therefore closer to the Welland, implying that the relative advantage of the Welland would have been somewhat greater in the early years of quarrying than has been assumed. Note also that Alexander (1995, 27) is mistaken in saying that the quarries were nearer the Nene than the Welland.

Water distances have been measured from Gunwade Ferry and Pilsgate haven using the author’s facsimile copy of Hayward’s 1604 one inch map, used to compile Figure 1, supplemented by the Cassini Old Series reproduction (at 1:50,000) of the first Ordnance Survey maps, originally published at the same scale Hayward used. Shipment from Pilsgate haven to Bury St Edmunds would add about nine statute miles of water transport compared with the distance from Gunwade Ferry. The question to be asked, therefore, is whether saving four miles of overland transport would have warranted the extra nine miles of water carriage.

It is generally reckoned that land transport costs in Saxon and Norman England were considerably greater than for water carriage, especially for bulky goods, and that there was little change in the relative costs until the seventeenth century. Jones (2000, 61) says that land transport was ten times more costly than by water; he probably derived this figure from Thorold Rogers (1866, Chap. XXVII). Dealing with the period from 1259–1400, Rogers cites a considerable number of land carriage costs, tentatively concluding that the average was somewhat less than 2d. per ton mile; Salzman (1964, 206) accepts 2d. Some authors have estimated that the cost of carting twelve miles would double or more than double the medieval *ex quarry* cost of stone (Knoop and Jones 1967, pp. 45–48; Salzman 1967, 119–122).

For river carriage, Rogers has only two observations for circumstances comparable to the Fens, both for the Thames in the early fourteenth century, showing costs at 0.2d. per ton mile – land carriage was ten

times more costly than by water. This is near the top of the range in relativities identified by Jackman (1962, 208) for the seventeenth century, the range being from three to eleven times. Even as late as 1583–4, Corpus Christi College found that carting stone about twelve miles from Kingscliffe to Gunwade Ferry cost three shillings a ton, the same cost as for onward shipment to Cambridge by water (Willis and Clarke 1886, 293), a distance in excess of about 62 miles; in this case, land transport was about five times as costly as by water. The cost of this stone *ex quarry* was 4s. a ton. The estimates noted above are consistent with the experience of the Exchequer removing from London to York in 1322. Twenty three carts, each drawn by five horses, carried the records etc. to Torksey, whence four boats took all the baggage plus the main body of men, who previously walked, to their destination (Broome 1925, 296), indicating that water transport was considerably more efficient than by cart.

This conventional view about relative costs has been challenged by Masschaele (1993), using evidence for 1296 to 1352. To provision armies for conflicts with the French and the Scots, the king needed to obtain provisions, including foodstuffs from rural areas. A form of requisitioning took place, recorded in purveyance accounts, listing quantities and carriage costs overland and by inland waterways – 362 and 69 observations respectively. From these observations, he calculated that carting overland cost 1.5d. per ton mile, and the figure by water was half that, 0.7d. Masschaele goes to considerable lengths to argue that the food purchases and freight arrangements were made at market rates, implicitly claiming that the requisitioning process had no material impact on market prices for transport, a view undermined by the accounts given by Prestwich (1996, 254–257) and Willard (1926); purveyance was deeply unpopular precisely because there was requisitioning in the name of the Crown, with arbitrary payments and ‘requests’ for loans – of both goods and transport. For these reasons, the purveyance documents cannot provide useful information about normal costs of land and water transport, either absolutely or relatively (see Rogers 1866, 659).

Something very similar occurred early in the sixteenth century, tersely noted by Purcell (1967, 39 and 99–100) as an emergency. King’s College suddenly received a large sum of money from Henry VII, enabling work to resume on the chapel in 1508. The emergency was the need to stockpile stone so that masons could be kept employed during the forthcoming winter, and the impossibility of finding enough watermen to bring all that was needed in the time available. With its history of royal patronage, radical steps were taken by the College to bring 150–160 tons of stone from Clipsham and Weldon overland:

The great number of different carters who took part – more than a hundred all told – and the variety in the size of the loads they carried, suggest that although this was the busy harvest season, carts, teams and labour were ruthlessly commandeered (J. Saltmarsh undated, King’s College MS JS 1/74, V.ii.22).

By way of example, we may now return to the balance of advantage in moving Barnack stone to Bury St Edmunds via the Welland or taking it south to the Nene. Using the Welland would have saved about four miles of overland haulage but involved nine extra miles of water carriage. If land haulage was only twice the cost of water carriage, then the extra miles by water would have been marginally more expensive than the saving on land carriage; the overall difference in transport cost moving the stone north or south from the quarries would have been very small. However, the evidence is persuasive that land haulage was substantially more than twice as costly as land carriage. Assuming a 10:1 ratio, 2d. per ton mile for land transport and 0.2d. by water, use of the longer water route would have been 6.2d. cheaper for every ton.

The significance of this saving may be gauged in the following way. Early in the sixteenth century, Weldon and Clipsham stone (sources more distant than Barnack, see Figure 1) for King’s College chapel was received at delivered prices of 64d. and 66d. per ton respectively (J. Saltmarsh undated, King’s College MS JS 1/64, 3). A saving of just over 6d. would be about 10% of the delivered price. Even if water transport had been only five times more costly than land transport, the longer route by the Welland would have saved about 5% of the delivered price. Savings of this magnitude would not have been ignored.

Similar calculations can be made for getting stone to Whittlesey Mere, about nineteen more miles by water from Pilsgate haven than from Gunwade Ferry but saving four miles of land carriage. If land transport was 4.75 times more costly than by water, the two routes would have been equally competitive but on the evidence above it is virtually certain that the ratio was nearer 10:1 than 4.75:1; transport cost considerations point very strongly to the Welland as the preferred route to Whittlesey Mere. This does not prove that stones found there were taken down the Welland but it does show that their presence is not conclusive proof that Barnack stone was always taken south to Gunwade Ferry. There was a viable alternative route through Crowland that, in strictly economic terms, would have been preferred except, perhaps, for quarries south of the modern Hills and Holes adjacent to Barnack.

These estimates may be put in perspective by the fact that just over 6,000 tons of Clipsham and Weldon stone were purchased for King’s College chapel in Cambridge in the two years 1509/10 and 1510/11 (Woodman 1986, 233). This figure for part of one building implies that tens of thousands of tons of Barnack stone had previously been used across the Fens. In a situation where total transport costs – by land and water – increased the quarry price of stone by at least 50%, even 100%, there would have been a strong incentive to minimise haulage costs and therefore to use the cheaper of the two available routes, determined primarily by the location of the originating quarry and the destination to which consignments were shipped.

Trinity Bridge, Crowland, and the size of craft used

It might be objected that Trinity Bridge in Crowland would not have permitted craft of a size adequate for carrying Barnack stone to pass from the Welland into Crowland Cut. This stone bridge, built 1360–90 and replacing a pre-existing wooden bridge (see Part I), has three arches, set at about 120° to each other, making a tight turn for vessels. To see whether this objection has merit, we need first to consider the dimensions of medieval river craft, and for this purpose we need to convert differing measures of weight and volume to a common metric, the ton of 2,240 pounds. Consequently, figures expressed in long tons must be treated with care.

Available information suggests that there was little change during the medieval period in the size of vessel navigating the Fenland rivers. Table 1 shows that, in 1294–1348, vessels ranged from 4.8 tons to 17.1 on the Ouse/Cam/Nene, whereas in 1566 the largest vessel documented was 12 tons (Table 2). When construction of King's College chapel resumed in 1508, accounts for stone delivered by boat were generally aggregated over a period of time for payment but three individual boatloads are recorded, respectively seven, eight and nine tons of stone (J. Saltmarsh undated, King's College MS JS 1/64, 5), and another of 14 tons originating from a quarry at either Weldon or Clipsham.

Table 1. Cargo capacity of river vessels 1294–1348.

	No. of voyages	Tons		
		Mean	Median	Range
Witham (Lincoln-Boston)	1	13.4		
Great Ouse/Cam/Nene etc.	17	9.4	9.5	4.8–17.1
Nene (Yaxley-Lynn)	6	9.5		
Little Ouse (Lakenheath-Lynn)	1	7.2		
Cam/Ouse (Cambridge or St Ives-Lynn)	9	9.7		

N.B. The original records use quarters as the unit of measurement. Langdon (2007 table 4) shows the tonnage equivalent of quarters, at 5.83 quarters for a long ton and this ratio has been used to obtain the tonnage figures. Capacity is based on the cargo actually carried. Source: Langdon 2007, table 3 and Appendix.

Table 2. Cargo capacity of river vessels 1566.

Based at	No. of craft	Capacity range, tons
Ely	3	6–8
March	8	1–2
Wisbech	14	3–12

N.B. Capacity based on the vessels' capabilities, not tonnage actually carried. Source: Elye et al. 1909.

Other information is consistent with the figures given above. According to Masschaele (1993, 272), for the purveyance of grain in the early fourteenth century, the normal vessel, used nationally, was the *battelum*, able to carry close to 50 quarters; he uses 48 lbs for a bushel, implying a vessel capacity of close to 8.6 tons. When Ramsey abbey was being built, Spoerry *et al.* (2008, 202) infer that vessels carrying more than seven metric tonnes were employed. As for the Ouse, which was the best Fenland navigation, archaeological investigations at Ely have revealed cuts perpendicular to the river that served as docks, the earliest of which probably date from the late fourteenth century or early in the fifteenth, and the latest to the sixteenth century. These cuts would have accommodated craft capable of carrying 15 to 25 tons (Cessford *et al.* 2006; Chisholm 2008, 157), but that does not prove vessels of this size were actually in use. Such tonnages would be well in excess of the figure cited in a seventeenth pamphlet extolling the virtues of Vermuyden's drainage works, in which the author states that previously an Ely-based lighterman commonly had gone to Lynn with five-ton cargoes (Anon. 1654, 22).

It seems clear that vessels carrying in the order of ten tons and even larger would have been common on the main Fenland waterways throughout the period we are considering: on the Ouse in particular there were probably larger craft; on the other hand, vessels using the upper reaches of rivers are likely to have been smaller. Spoerry *et al.* (2008, 202) estimate that vessels carrying cargoes in excess of seven tonnes to Ramsey would have been nine metres long and three in the beam, drawing less than one metre of water. As a flat bottomed, snub-nosed barge, such a vessel drawing half a metre would displace somewhat more than twelve cubic metres of water when loaded. Jenkins (1992–93) estimates that such a barge would itself weigh four tons and could therefore carry eight tons.

Trinity Bridge in Crowland would have permitted vessels of this size to pass. The three arches each span almost 5.1 metres at present-day ground level, with intervening buttresses of 2.3, 2.4 and 3.0 metres. Below ground level, the buttresses descend to about 1.7 metres before the stonework begins to encroach upon the currently visible channel space. Only the assumed footings go below two metres from the ground (Waters 2005, fig. 3), indicating that the waterways were quite shallow and the surface not far below the present land surface. Therefore, the present-day ground level dimensions provide a close approximation to the medieval navigable space. Drawn to scale, this footprint allows a simple rectangle measuring 9×3 metres to pass through the Bridge in any direction. However, the clearance would have been limited and there was the river's current with which to contend, so it would have been necessary to warp the vessels, i.e., control their passage through the Bridge by the use of ropes. A bridge with the dimensions of Trinity Bridge would have permitted vessels to enter Crowland Cut with Barnack stone and therefore to reach the whole of the Fens from the Welland. That

the Bridge did accommodate such vessels is strongly suggested by the grant made by James I (1603–25) for the restoration of navigation on the Welland between Stamford and the Deepings. The specification was for vessels carrying ten tons (Harrod 1785, pages following 534), implying that this had been the traditional carrying capacity of vessels plying through Crowland to Stamford, a figure consistent with what we know about the size of craft able to reach the head of navigation on other Fenland rivers (Chisholm 2007).

Conclusion

In the past, it has been widely assumed that Barnack stone was carried south to the Nene for onward shipment across the Fens, and it is clear that some did follow this route. However, there are persuasive reasons for believing that stone also moved northward for shipment down the Welland, and that this route would have been cheaper than by the Nene for many cargoes across the Fens. We can only guess whether the southward or northward route was the more important, and whether the balance of advantage changed over time. It may be that documentary and/or archaeological evidence will be found in future that will shed further light on the matter. There is no doubt that both Bury St Edmunds and Ramsey had major difficulties with Peterborough but it appears that disputes with other religious houses have not been reported by scholars, were not ever recorded or did not occur. Did they really have no difficulties with Peterborough? Meantime, one can confidently say that the Welland did provide a viable route through Crowland for distributing Barnack stone across the Fens, with the probability that it was the favoured route for many destinations.

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Bibliography

- Alexander, JS 1995 Building stone from the East Midlands quarries: sources, transportation and usage. *Medieval Archaeology* 39: 107–135.
- Anon. 1654 *News from the Fens, or, An Answer to a Pamphlet Entitled, Navigation Prejudiced by the Fen Drainers*. London: written by a 'Wel-wisher to His Lordship, and to the noble work of draining'.
- Astbury, AK 1957 *The Black Fens*. Cambridge: The Golden Head.
- Barley, MW 1938 Lincolnshire rivers in the Middle Ages. *The Architectural and Archaeological Society of the County of Lincoln Report* 93: 1–22.
- Battely, J 1745 *Antiquities S. Edmundi Burgi*. Oxford: Sheldonian Theatre.
- Blair, J 2007 Introduction, in J Blair (ed.) *Waterways and Canal-Building in Medieval England*: 1–18. Oxford: Oxford University Press (OUP).
- Bond, J 2007 Canal construction in the early middle ages: an introductory review, in J Blair (ed.) *Waterways and Canal-Building in Medieval England and Wales*: 153–206. Oxford: OUP.
- Bridges, J 1791 *The History and Antiquities of Northamptonshire Vol. 2*. Oxford.
- Briston, ME and Halliday, TM (ed.) 2009 *The Pilsgate Manor of the Sacrist of Peterborough Abbey. Part B of the Register of George Fraunceys, sacrist, c. 1404*. Northampton: Northamptonshire Record Society.
- Brooke, CNL and Postan, MM (ed.) 1960 *Carte Navitorum. A Peterborough Abbey cartulary of the fourteenth century*. Northamptonshire Record Society Vol. XX.
- Broome, DM 1925 Exchequer migrations to York in the thirteenth and fourteenth centuries, in AG Little and FM Powicke (ed.) *Essays in Medieval History Presented to Thomas Frederick Tout*: 291–300. Manchester: Printed for the subscribers.
- Cessford, C, Alexander, M and Dickens, A 2006 *Between Broad Street and the Great Ouse: waterfront archaeology in Ely*. East Anglian Archaeology Report 114: Cambridge: Cambridge Archaeological Unit.
- Chisholm, M 2007 Re-assessing the navigation impact of draining the Fens in the seventeenth century. *Proceedings of the Cambridge Antiquarian Society (PCAS)* 96: 175–192.
- Chisholm, M 2008 The Old Plough: a neglected property of Ely Porta Manor. *PCAS* 97: 149–168.
- Chisholm, M 2010 The medieval network of navigable Fenland waterways I: Crowland. *PCAS* 99: 125–138.
- Cole, A 2007 The place-name evidence for water transport in early medieval England, in J Blair (ed.) *Waterways and Canal-Building in Medieval England*: 55–84. Oxford: OUP.
- Dawn, A 2009 The story of the River Nene. *Musings* 1–3. Peterborough Museum and Art Gallery, Newsletter 60.
- Dugdale, W 1846 *Monasticum Anglicanum Vol. 3*. London: James Bohn. [first published in Latin].
- Ellis, D and Salzman LF 1967 Religious houses, in *The Victoria History of the Counties of England. Cambridge and the Isle of Ely Vol. 2*: 197–318. London: Dawsons.
- Elye, R, Pepper, H, Beaupre E, and Balan R 1909 Shipping of the Isle of Ely, 1566. *Fenland Notes and Queries* 7: 93–99.
- Gardiner, M 2007 Hythes, small ports, and other landing places in later medieval England, in J Blair (ed.) *Waterways and Canal-Building in Medieval England*: 85–109. Oxford: OUP.
- Gover, JEB, Mawer, A and Stenton, FM 1933 *The Place-Names of Northamptonshire*. Cambridge: Cambridge University Press.
- Gransden, A 2007 *A History of the Abbey of Bury St Edmunds 1182–1256*. Woodbridge: Boydell Press.
- Hall, D 1987 *Fenland Landscapes and Settlement between Peterborough and March, The Fenland Project No. 2*. East Anglian Archaeology Report 35. Cambridge: Cambridgeshire Archaeological Committee.
- Hall, D 1992 *The South-Western Cambridgeshire Fenlands. The Fenland Project No. 6*. East Anglian Archaeology Report 56. Cambridge: Cambridgeshire Archaeological Committee.
- Harrod, W (ed.) 1785 *The Antiquities of Stamford and St Martin's, Vol. 2*. Stamford: W. Harrod.
- Hooke, D 2007 Uses of waterways in Anglo-Saxon

- England, in J Blair (ed.) *Waterways and Canal-Building in Medieval England*: 37–54. Oxford: OUP.
- Inskip Ladds, S 1914 Sawtry Abbey, Huntingdonshire. *Transactions of the Cambridgeshire and Huntingdonshire Archaeological Society* III: 295–322 and 339–374.
- Jackman, WT 1962 *The Development of Transportation in Modern England*. London: Frank Cass. [First published 1916].
- Jenkins, HJK 1992–93 Medieval barge traffic and the building of Peterborough cathedral. *Northamptonshire Past and Present* VIII: 225–261.
- Johnson, C and Cronne, HA (ed.) 1956 *Regesta Regum Anglo-Normannorum 1066–1135*. Oxford: Clarendon Press.
- Jones, ET 2000 River navigation in medieval England. *Journal of Historical Geography* 26: 60–82.
- King, E 1980–81 The town of Peterborough in the early Middle Ages. *Northamptonshire Past and Present* 4: 187–195.
- Knoop, D and Jones, GP 1967 *The Medieval Mason. An economic history of English stone building in the later Middle Ages and early modern times*, 3rd edition. Manchester: Manchester University Press. [First published 1933].
- Langdon, J 2007 The efficiency of inland water transport in medieval England, in J Blair (ed.) *Waterways and Canal-Building in Medieval England*: 110–30. Oxford: OUP.
- Masschaele, J 1993 Transport costs in medieval England. *Economic History Review* XLVI: 266–79.
- Miller, E 1967 The Liberty of Ely. *The Victoria History of the Counties of England. Cambridge and the Isle of Ely, Vol. 3*: 1–26. London: Dawsons.
- Morton, J 1712 *The Natural History of Northamptonshire*. London.
- Peck, F 1979 *Academia Tertia Anglicana; or, the Antiquarian Annals of Stanford*. Wakefield: EP Publishing. [First published 1727].
- Phillips, CW 1931 The Car Dyke, Lincolnshire. *Antiquity* 5: 106–9.
- Prestwich, M 1996 *Armies and Warfare in the Middle Ages. The English experience*. New Haven and London: Yale University Press.
- Purcell, D 1967 *Cambridge Stone*. London: Faber.
- Rogers, JET 1866 *A History of Agriculture and Prices in England Vol. 1 (1259–1400)*. Oxford: Clarendon Press.
- Royal Commission on Historical Monuments 1959 *City of Cambridge, Vol. 2*. London: HMSO.
- Salzman, LF 1964 *English Trade in the Middle Ages*. London: H. Pordes. First published 1931.
- Salzman, LF 1967 *Building in England down to 1540. A documentary history*. Oxford: Clarendon Press.
- Spoerry, P, Atkins, R, Macaulay, S and Popescu, ES 2008 Ramsey Abbey, Cambridgeshire: excavations at the site of a fenland monastery. *Medieval Archaeology* 52: 171–210.
- Steane, J 1974 *The Northamptonshire Landscape. Northamptonshire and the Soke of Peterborough*. London: Hodder and Stoughton.
- Stenton, FM 1936 The road system of medieval England. *Economic History Review* VII: 1–21.
- Stenton, FM 1971 *Anglo-Saxon England*. Oxford: Clarendon Press. 3rd edition.
- Trollope, E 1872 *Sleaford and the Wapentakes of Flaxwell and Aswardhurn in the County of Lincoln*. London and Sleaford.
- Vellacott, CH 1970 Quarries. *The Victoria History of the Counties of England. Northamptonshire, Vol. 2*: 293–8. London: Dawsons.
- Waters, RA 2005 Repair and stabilisation of Trinity Bridge, Crowland, UK. *Proceedings of the Institution of Civil Engineers. Bridge Engineering* 158: 9–13.
- Willan, TS 1964 *River Navigation in England 1600–1750*. London: Frank Cass. [First published 1936].
- Willard, JF 1926 Inland transportation in England during the fourteenth century. *Speculum* 1: 361–374.
- Willis, R and Clarke, JW 1886 *The Architectural History of the University of Cambridge Vol. 1*. Cambridge: Cambridge University Press.
- Woodman, F 1986 *The Architectural History of King's College Chapel*. London: Routledge and Kegan Paul.