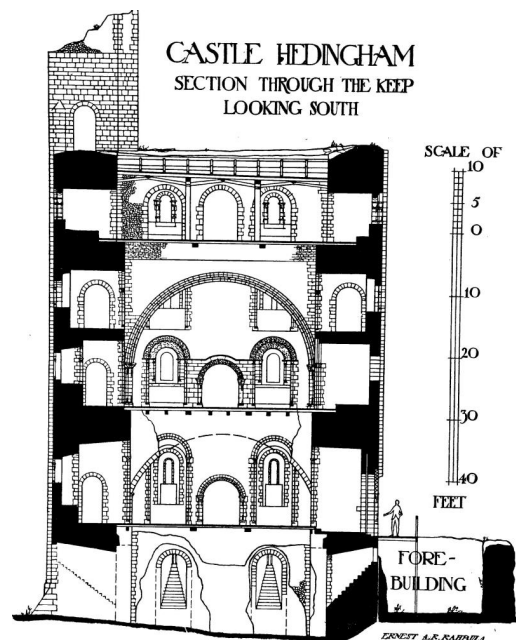


The Transport of Barnack Stone to Hedingham Castle in the 1140s

Hedingham Castle, perched on its earth mound or 'motte', dominates the village of Castle Hedingham in the rolling Essex countryside, a few miles north of Halstead. It is justifiably described as the best-preserved Norman keep in England. Its construction began around 1140, probably on the site of a slightly earlier, wooden castle, on an estate given to Aubrey de Vere by William the Conqueror, who had made de Vere his chamberlain following the Conquest. In 1133 his son Aubrey II had, in turn, been made master chamberlain to Henry I and in 1141. His son, Aubrey III, was granted the Earldom of Oxford by the Empress Matilda and construction of the keep may have reflected the enhanced status this gave the family. It may also have reflected the need for added protection during the civil war of 1138 – 1153, known as 'The Anarchy'. Because of its size it would have taken many years to construct, possibly decades.



Hedingham Castle from the southwest, and cross section (RCHM)

The castle was occupied by members of the de Vere family until 1625¹. By 1713 it had passed away from the de Veres and was purchased by Sir William Ashhurst, who had been Lord Mayor of London in the 1690s. After his death in 1720, the estate passed to his great-granddaughter, Margaret Elizabeth Lindsay, the wife of Lewis Majendie, a Lisbon merchant of Huguenot descent, and the Majendie family owned the castle for 250 years until Miss Musette Majendie left it to her cousin, The Honourable Thomas Lindsay, who was himself descended from the de Veres. His son, Jason Lindsay, his wife Demetra and their children, now live in the manor house adjacent to the castle keep.

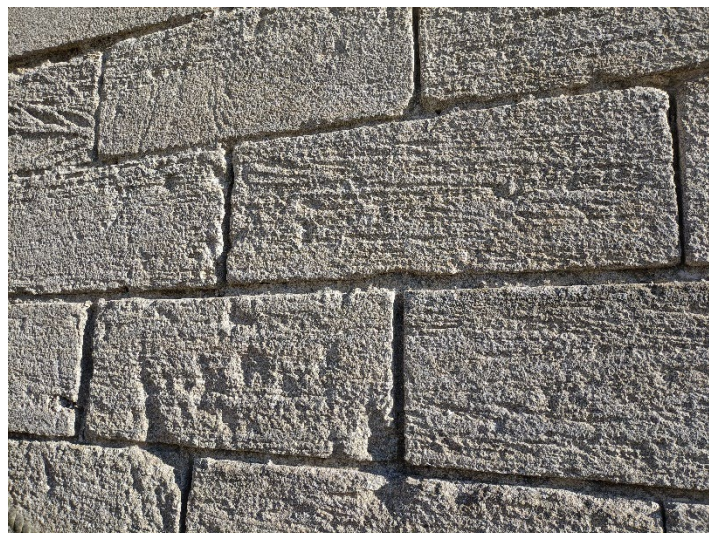
The keep is impressively tall, commanding the surrounding landscape by virtue of being sited on a natural outcrop of clay. The east and west sides are 16.3m long and the north-south sides 17.8m. The

¹ Among the more famous earls to have ownership was Edward de Vere, the 17th Earl of Oxford, who some believe may be the writer of the works of William Shakespeare

main part of the keep stands more than 21m high. The walls are an average 3m thick, constructed from flint rubble bound with lime mortar and faced with Barnack, one of the oolitic limestones that make up the Jurassic limestone belt running diagonally across Northamptonshire and North Cambridgeshire. Oolitic limestone is made up of tiny grains of calcite (the ooids that make it 'oolitic') but Barnack can be easily distinguished from the other oolitic limestones by the veins of hard shelly material between the bands of calcite. It makes the stone immensely hard and durable once it has weathered but very workable when first quarried. These qualities made it a highly prized building material and it was used for large parts of Peterborough and Ely Cathedrals, the Abbey of Bury St Edmunds and many East Anglian churches. In fact, demand for it was so great that the quarry had run out of usable stone by the mid-15th century. Architect and historian Donovan Purcell, in his book *Cambridge Stone*, summed up its importance when he wrote: "no more enduring limestone has ever been quarried in England than that which came from the 'hills and holes' of Barnack"².



The 'hills and holes' of the disused Barnack quarry



Close up of Hedingham's Barnack stone

² Donovan Purcell *Cambridge Stone* p.29

The Barnack quarry site is located between Peterborough and Stamford. This is some 80 miles northwest of Heddingham and raises the question: how were the 13,000 or so blocks of stone (required just for the keep), weighing a total of about 2,000 metric tons, transported to the castle construction site at a time when the road system was virtually non-existent, and the area in between was, at various times, a dangerous battle ground? ³

In Saxon England the main source of traction, for ploughing and haulage, was provided by oxen, horses being seen as something of a luxury.⁴ The transition to using horses for such purposes (through technical innovations in things like harnessing) began in the 12th century with the Normans but took several centuries to complete. Across the country in the early 1100s heavy materials such as stone would have been pulled on sledges hauled by teams of oxen with as many as sixteen in harness. Sledges were used, rather than anything with wheels or axles, because these would be certain to founder in the deep ruts and potholes that bedevilled what passed for roads in those days. It is possible that ox-drawn sledges pulled loads for distances of several miles, but progress would have been desperately slow. Instead, river transport was the preferred method of moving bulk materials. The cost of river transport has been shown to be at least ten times cheaper than road transport and nowhere in lowland areas was more than 15 miles from a navigable river.⁵ Rivers, largely hidden away in our rural landscape, are seen today mainly as playgrounds for pleasure craft, for strolling by, or for fishing, and it is easy to forget just how important they were for transport and communication in England, from Roman times up until the establishment of the railway and turnpike road systems in the 19th century.



Illustration of an ox-drawn sledge

As for early medieval roads there is little historic evidence of a linked-up system of roads and trackways beyond a few 'itineraries', linear maps that described what travellers might find on their route from one major town to another. But, however rudimentary the system might have been, the

³ Based on four elevations of the keep, each about 360m², facing blocks 660x240mm x 400mm thick, plus say 50% for work below ground and internal work including the magnificent arch in the Great Hall, and an assumed weight 2.5 tons/m³. To this we should add the (now lost) barbican entrance tower, other accommodation towers, castle walls and gate towers. The Norman church in the village is also entirely built from Barnack.

⁴ John Langdon *Horses Oxen and Technological Innovation*

⁵ Michael Chisholm *The medieval network of navigable Fenland waterways II: Barnack stone transport*

roads left by the Romans still clearly played an important role, acting as a sort of early motorway network. It has long been thought that in 1066 Harold II marched his troops from London to York along the Roman road of Ermine Street (the Roman superhighway now known as the A1) to fight the Battle of Stamford Bridge, and then back again to meet William the Conqueror's invading army on the south coast, the 200-mile journey south said to have taken just four days. If so the Roman roads must have still been in serviceable condition. F.M Stenton, in his paper 'The Road System of Medieval England', describes how England relied on these principal Roman roads, but also mentions the lack of connectivity that the Imperial occupiers might have previously enjoyed:

Late in the 11th century there emerges a tradition of four great roads, Watling Street, Ermine Street, The Foss Way and the Icknield Way on each of which travellers enjoyed the king's special peace... But the emphasis laid on these four roads also suggests that the English people of this period had entirely lost the Roman conception of a series of well-defined routes connecting every part of southern England with London [which] did not possess the unique importance which had belonged to it under Roman government.⁶

In Stenton's, slightly luke-warm, argument for a functioning Roman Road system in the early Middle Ages perhaps a greater truth lies. Exciting new research⁷ suggests that Harold's army's march south was just as unlikely as it sounds. Down to a misinterpretation of the texts by 19th century historians the presence of a fleet of ships was in fact available to Harold and, although some soldiers may have made the journey by road, probably on horseback, most of the army would have used the sea route to London and then on foot from there. After all, as well as their own ships they had the many abandoned ships of Hardrada's invasion fleet sitting there conveniently on the shores of the Humber. Still a voyage of a few days, and subject to the vagaries of tides and weather, but much less tiring for troops exhausted by battle. This inability to see travel by ship as the most natural mode of transport (even in Victorian England when water transport remained much more common than it is today) is an interesting clue to the inside-out way of thinking that leads to travel by road being seen as the obvious choice.



Two of Harold II's ships pictured on the Bayeux Tapestry

⁶ F.M. Stenton *The Road System of Medieval England* Economic History review VII 1. Nov 1936

⁷ The new research is by Tom License of the University of East Anglia. March 2026

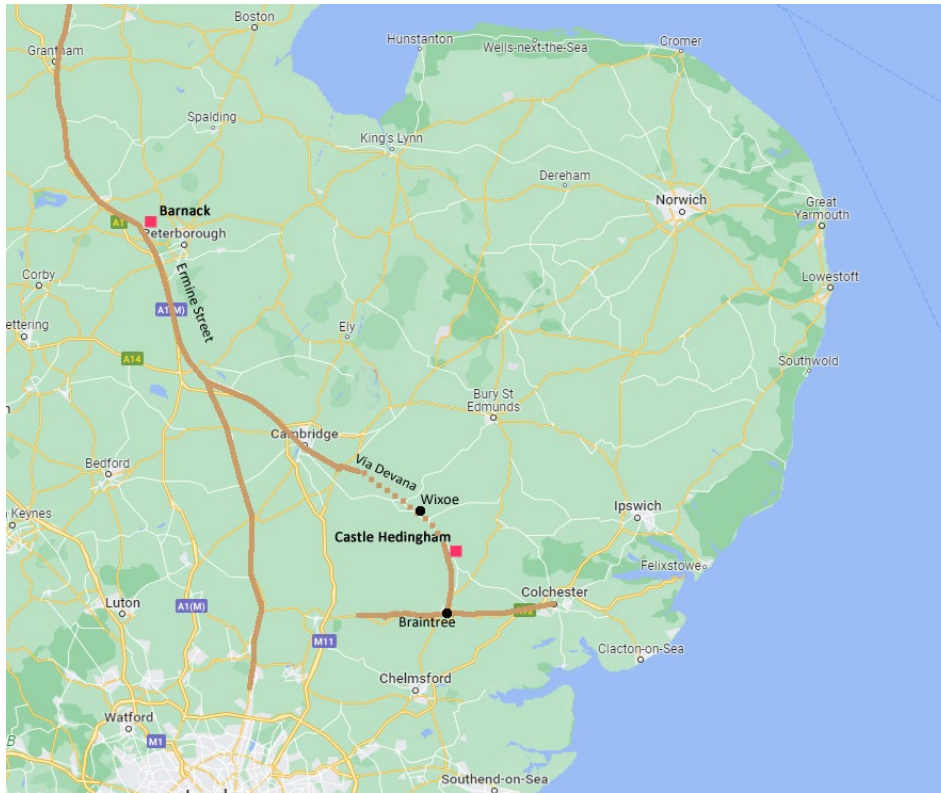


Fig 1 The Roman Road route

So did a similar choice face the builders of Hedingham Castle? Barnack quarry is situated just a few hundred yards from Ermine Street, and Hedingham is very close to a more minor Roman Road that connected Godmanchester, on Ermine Street, to Colchester, via Cambridge; a road later named the *Via Devana*. Could the stone for the building of de Vere's castle have been dragged by oxen along this route? (See Fig 1) At a speed of, say, 10 miles a day it might have been possible to make the trip in a week but, at two, possibly three, tons a load, it would have needed up to a thousand such trips. Also, the final stretch stretch from Cambridge to Wixoe (an important Roman road intersection) would have involved some quite hilly sections across the chalk escarpment south east of Cambridge and the difficult boulder clay country beyond. It is unlikely the sledges would have survived such a journey.

With all this in mind we can say, with relative certainty, that the alternative method - transport by water - was used instead. After all, this was how the builders of the Cambridge colleges brought in the great quantities of limestone for their projects in the 13th- 15th centuries, from Barnack and the neighbouring quarries of Weldon, Ketton, Clipsham and Ancaster. In fact, there was a ready-made system of navigable waterways already in place. Purcell describes how, prior to the founding of the University in the 1200s, the great area of fenland in central and north Cambridgeshire acted as an extensive transport hub:

In the eleventh century the normal means of access to Ely, as to the other great Fenland Monasteries of Crowland, Thorney and Ramsey was by boat; and as late as the 14th century the Sacrist Rolls of Ely still show the Sacrist and other officers of the convent using the Fenland waterways as the most convenient means of transport to Barnwell [on the edge of Cambridge] and Littleport, Kings Lynn and Boston and to other places round or upon the Fens.⁸

⁸ Purcell *Ibid* p. 94

Many of these waterways had been used, and improved, by the Romans, who it seemed worked just as hard on canal building as they did on their roads. One such canal was known as the Car Dyke which skirted the whole of the western edge of the fens from Lincoln to Cambridge. It might have begun as a 'catchwater drain', to help channel upland water away from the fen for reclamation projects, but it seems likely it was used for navigation as well. Another Roman canal, the Foss Dyke, connected Lincoln with the River Trent, thus connecting the East Anglian river system to the northeast of England. It is probable the Magnesian limestone quarried in Yorkshire, used for the first phase of Kings College Chapel in the 1440s, came via this route. (*see Fig 2*)



A surviving section of the Car Dyke near Waterbeach, Cambridgeshire (photo: David Gruar)

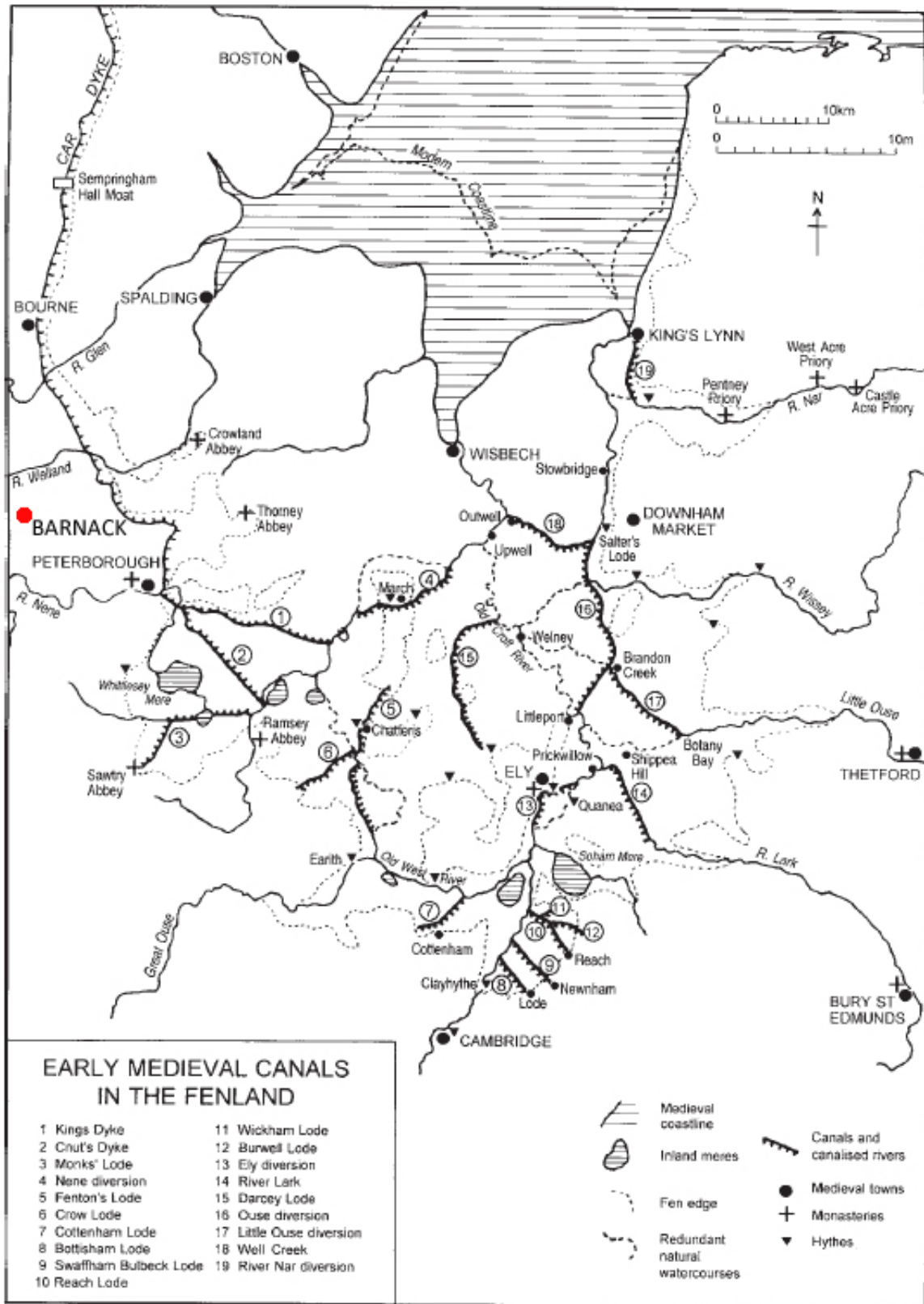


Fig 2 'Early Medieval Canals in the Fenland', with Barnack shown between the Welland and the Nene. From *Canal Construction in the Early Middle Ages: An Introductory Review* by James Bond (In *Waterways and canal-building in Medieval England* edited by John Blair p.184

Although there is no written evidence that these waterways were used to transport the stone to Cambridge, some physical evidence remains. Two blocks of Barnack, named 'Robin Hood and Little John', stand in a riverside meadow just west of Peterborough, marking the site of a medieval wharf on the River Nene only five miles from Barnack. Even more tellingly four large blocks of Barnack stone were found at the bottom of Whittlesey Mere. Before it was drained in the 19th century the mere was a huge lake, the largest body of inland water in England outside the Lake District, and part of the old River Nene navigation route. It seems likely the stones, weighing about a ton each, either fell from their barge, or the barge sank, on their way to a fenland abbey such as Sawtry or Ramsey. They now stand in a row alongside some farm buildings on the pancake-flat expanse of the former lake.⁹



Blocks of Barnack stone on the site of Whittlesey Mere

F.M. Stenton also relates the story of how, in 1319, Edward II invited the scholars of Kings Hall in Cambridge to spend Christmas with him at York:

The elder scholars, travelling by road, covered the distance of 151 miles [...] on hackneys in five days. The younger scholars, who were presumably thought unequal to the hardships of the road, left Cambridge on December 20th by water. In two days they had reached Spalding. They passed the third day on horseback, travelling between Spalding and Boston, their luggage following them in carts. The fourth and fifth days were passed in a great boat, which brought them from Boston to Lincoln. The sixth, being the feast of Christmas, was spent at Lincoln. On the seventh day they passed through the Foss Dyke in two boats from Lincoln to Torksey, where another great boat was hired for them in which they reached York two days later, on the ninth day after their departure from Cambridge, and three days late for the entertainment promised by the king.¹⁰

It is an engaging tale which raises as many questions as it answers. Why did the hapless young scholars (presumably on a smaller student grant than their elders!) take horses rather than a boat from Spalding to Boston? And why didn't they use the Car Dyke all the way to Lincoln? The whole thing reads like one of those nightmares where you never seem to arrive at your destination— and for a Christmas party with the King too! They must have been beside themselves, facing the long return journey in the dead of winter having missed the whole thing. But the story shows how travel by water between Cambridge and York was not only feasible but seen as a serious alternative to journeying by road. It also demonstrates that, while it may not have been ideal for some young men in a hurry

⁹ Purcell *Ibid* p.98

¹⁰ FM Stenton *Ibid*

carrying a few Christmas presents, if you had a few tonnes of stone to transport and a bit more time on your hands, it would be the *obvious* way to travel.

In this way it is possible to imagine a water route from Barnack to Hedingham that would involve a very short road journey at each end and, in the middle, a sea route on larger craft (*see Fig 3*). Likely candidates for the downstream leg are the River Welland and the River Nene, both just a few miles from Barnack with well documented evidence of them being used for moving stone.¹¹ The stone would then have been transferred to coastal lighters at the ports of Fosdyke, just beyond Spalding, or Kings Lynn for their sea journey around East Anglia. Two candidates for the upstream leg are the River Colne and the River Blackwater. For the Colne the cargo would have been transferred somewhere like Wivenhoe into river-going vessels for the journey inland. The Colne flows right past Castle Hedingham, and although today it is so narrow it is difficult to imagine it being navigable this far up, historian Jane Greatorex makes a good case for a disembarkation point where the present Station Road bridge crosses the river, just a mile or so south of the castle, with possibly a further water channel dug to take the stone even closer¹².

Alternatively, the river port of Halstead, further down the Colne, could have been used with the stone loaded onto ox-drawn sledges for the final part of the journey. There is a good route from Halstead to Castle Hedingham of only 5 miles on a road that was almost certainly in existence in the 12th century. Another candidate is the River Blackwater, with the cargo transferred at Maldon for a short trip up the River Chelmer as far as Beeleigh Falls, where the Blackwater joins, then upriver to Bocking, where the Roman Road from Braintree to Wixoe crosses the river. The journey from there to Castle Hedingham is about 8 miles, with quite an uphill stretch at the start but if the Roman Road was still in reasonable condition it might well have taken wheeled carts in smaller loads, reducing the transport time still further.

The type of craft used for water transport were, according to Purcell, developed from the smaller longships used by the Vikings who raided the Fens, and then went on to settle there.¹³ With their shallow draught and central mast these 'lighters' or 'shouts', as they became known, were ideal for navigating the fens and marshes. The larger versions, known as East Coast keels, and cog-ships, their flat-bottomed counterparts, were also sea-going and this opened up the possibility of connecting the rivers together via the coastal routes. Inland the boats were pulled by horses (and sometimes men), with some wind assistance when the wind was behind the beam. At sea, and on more open stretches of river, sail-power was supplemented with oars. Together these craft formed an entire transport network, with goods being transferred from the river-going to the sea-going vessels for part, or most, of their journey. The river craft could carry between 7 and 10 tons of stone,¹⁴ the sea going boats much more, and at 5 knots the 150-mile sea journey could be completed in a day or so.

We tend to think of the sea as being used for long distances, crossing from one country or continent to another, but coastal navigation, with boats hugging the coast on relatively short journeys, from port to port and from haven to haven, was the prime method of moving goods around Britain from prehistoric times well into the 19th century. Nature writer Robert Macfarlane invites us to carry out a 'thought experiment' to imagine how these 'sea roads' worked:

¹¹ The course of these rivers has changed somewhat in the last millennia, as has the coastline. The River Nene for example wound south of its current course via the large inland sea of Whittlesey Mere.

¹² J Greatorex *Outrageous Fortune, an account of the de Vere earls of Oxford's Norman Keep* p.48

¹³ Purcell *Ibid* p.99

¹⁴ Chisholm *Ibid* p 11

“Blank out the land interiors” Macfarlane writes “..consider them featureless, as you might previously have considered the sea. Instead, populate the.. waters with paths and tracks: a travel system that joins port to port, island to island, headland to headland, river mouth to river mouth. The sea has become the land, in that it is now the usual medium of transit: not barrier but corridor”¹⁵

In October 1066, King Harold, weighing his options, would have found this view of travel entirely natural and reasonable, and so we can guess, would the builders of Hedingham Castle.

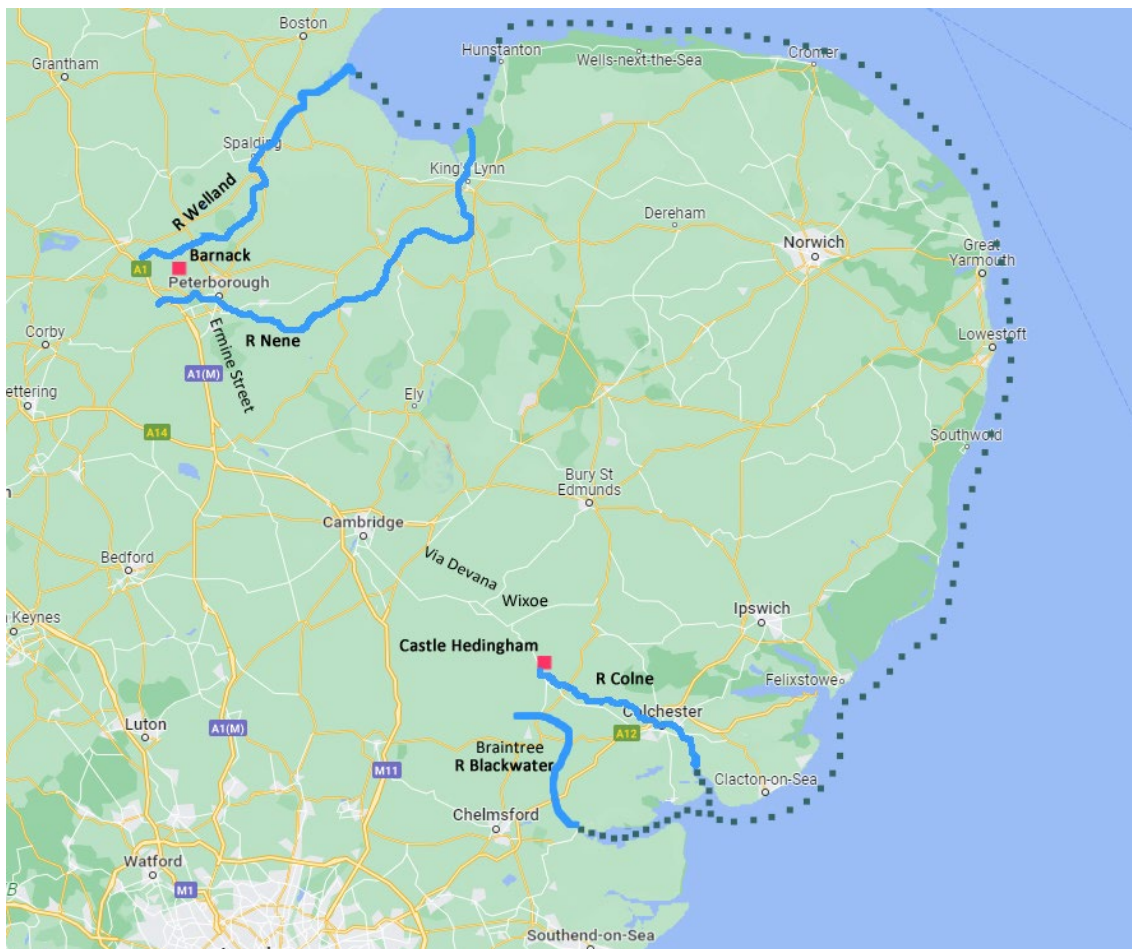


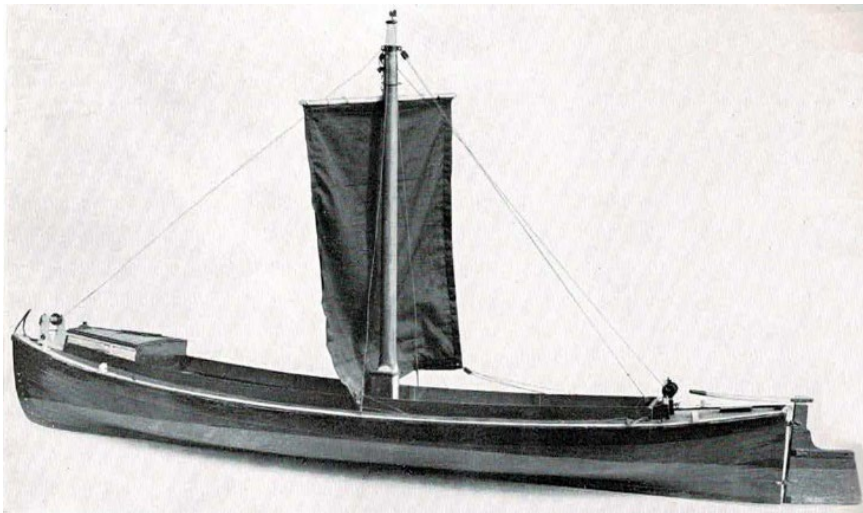
Fig 3 Possible River and Sea Routes from Barnack to Castle Hedingham

But how were these unpredictable rivers, with their seasonal shallows and changing courses, navigated by cargo-carrying craft in the 1100s? Dredging and cut-off channels had been used for centuries to make navigation easier (the monasteries were particularly instrumental in this) but locks as we know them, with two pairs of gates (known as ‘pound’ locks because the enclosure between the gates resembled a cattle pound) were not invented until the 16th century and were not widely in use until the 18th century.

There was an early version of the pound lock where a single lock ‘gate’ was constructed using boards and paddles. This was known as a ‘flash lock’ and river craft would queue up to ‘ride the wave’ of

¹⁵ Robert Macfarlane *The Old Ways* p. 93

water gushing downstream when the boards were struck, a manoeuvre that must have been rather exciting, not to say hazardous! These flash locks often occurred at the weirs which were constructed to serve the many watermills that grew up along the rivers and had the double-edged effect of providing deeper water upstream and more controlled flow whilst constituting a major obstruction to navigate through. Going upstream was more much more arduous of course and winches were used to pull boats up through the flowing stream, which must have been an enormously difficult procedure.¹⁶



Model of an East Coast Keel, derived from a Viking longship¹⁷



A pair of lighters on the River Stour in the late 1800s (note the narrowness of the river and the immense load pulled by one horse)¹⁸

¹⁶ Operation of the flash lock had to be negotiated with the millowner who relied on the head of water for his watermill.

¹⁷ From *Cambridge Stone* ibid

¹⁸ From O'Dell *The Essex & Suffolk Stour*

Although the lighters had very little draught, they could still be stranded in shallows between these flash locks, or at fording places, especially when carrying heavy loads. For such eventualities boatmen were known to carry their own portable 'staunching tackle'. The system, said to have been originally developed by the Romans on the River Lee and other inland waterways, consisted of a kit of posts, an empty boat and canvas sheets. A temporary weir would be constructed to raise water levels by a foot or two. The tackle would then be stowed away until the next shallow stretch.¹⁹ Possibly two sets of staunches could be used as a primitive pound lock, and more rudimentary weirs were also built using whatever was to hand: turfs, logs, or shovel-loads of mud.²⁰ This, and the hauling out of wet canvas once it had served its purpose, would have all been very laborious and time-consuming. But the enormous financial incentive of, say, a Norman lord ordering 2,000 tons of stone for the construction of his castle, not to say the use of brute force by a conquering nation, must have been a great motivator. In reality there was probably a combination of flash locks, temporary staunches, and semi-permanent staunches at known tricky spots, and boats working in teams on busy stretches. As for transporting the tackle, there were horses and small boys who went up and down the riverbanks, jumping the various obstacles along the way, as painted by John Constable on the nearby River Stour.

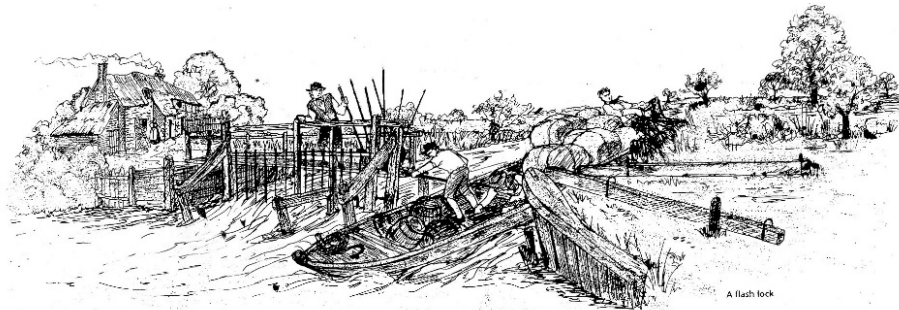


Illustration of riding a flash lock by Ted Coles



'The Leaping Horse' by John Constable

¹⁹ H. McKnight *Shell Book of Inland Waterways* 1975 p.34, quoted in Sean Odell's *The Essex and Suffolk Stour- A History* p.45

²⁰ This kind of resourcefulness can be demonstrated by the story of a boater as late as the 1960s who wanted to exercise his right to boat to the head of the Thames navigation in a motor launch, he hit shallows and, allegedly, drove a herd of cows into the water to impede the flow and raise the water level (as quoted by Tony Brooks in *Canal World Forum*).

Conclusion

A short history such as this cannot really offer a true 'conclusion', only a laying out of possible scenarios. The basic problem - how the enormous tonnage of stone required for the building of Hedingham Castle could have been brought from the quarry at Barnack in the early 12th century – remains unsolved with any real certainty. River and sea transport seems the most likely means, given the relative ease of moving bulky materials on boats, however tricky the navigation must have been at times, but road transport cannot be ruled out, especially for the shorter 'upstream' stretches. James Masschaele, in his paper 'Transport Costs in Medieval England', makes the point that there would have been a big difference between a maximum possible head of navigation and a regularly effective one (i.e. there would have been a law of diminishing returns on narrow rivers with unreliable flow) and that the improvements in land transport during the twelfth century may have reduced this cost differential.²¹

It may be that there was a combination of some, or all, of these methods and routes, depending on the circumstances, the period of construction lasting many years as it must have, the state of the 12th century civil war which waxed and waned, the changing seasons, the varying local conditions, uncooperative millers, and aggressive landowners. The written records might have told us, there must have been some, but they are almost certainly lost. Whatever the mode of transport the task was an incredibly hard one, even at 10 tons a load on river-going craft it would still have required more than 200 trips. Perhaps as much as anything it is a testament to how life had changed so utterly in post-conquest England, enabling a new class of super-rich Norman lords to complete such an enormous undertaking.

Jeremy Lander

March 2026

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²¹ J. Masschaele *Economic History Review* 46 1993 pp 266-279,

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