BROADLAND FORDS AND CAUSEWAYS

By CHARLES GREEN

I. INTRODUCTION

THE discovery of a Roman seaport town at Caister-on-Sea, Norfolk, in 1951, led to the examination of many secondary topographical problems. Important among these was that of the land-communications between the town and the main-road system to the west and the north. This problem was much complicated by the fact that the upland " island " of Flegg, in which Caister lay, was separated from the Norfolk " mainland " by broad alluvium-filled valleys in which lay many freshwater lakes, the Broads. It was further believed that, in Romano-British times, these valleys formed arms of a great estuary open to the sea. The filling with alluvium which had since taken place, it was thought, had not yet been completed, the broads being residual sheets of water which reflected the once-prevailing estuarine conditions.

It was soon to be shown, however, that the broads were not naturally-formed residual lakes but artifacts, peat-cuttings later to be flooded by seepage, but dug in post-Roman times after the marine transgression of the estuarine phase had come to an end (Lambert 1952 ; Jennings and Lambert 1953 ; Lambert and Jennings 1960). Further work then demonstrated that these cuttings had been made during the half-millennium following A.D. 900, at a time when relative changes in the height of land and sea levels had led to a marine regression culminating about the end of the eleventh century, and so to improved drainage in the middle valleys of the Bure, Yare and Waveney and their tributaries (Smith 1960 ; Green and Hutchinson 1960).

Thus it was made clear that the open water of the Broads themselves was non-existent in Roman times. The data accumulated during these researches had also provided evidence which defined fairly closely the limit of the marine transgression, now shown to be less extensive than had often been thought. It showed, too, that many of the broads themselves had been dug in freshwater fen, of the status of alder carr, which had not been transgressed by the sea.

In the light of the new evidence, many of the difficulties in reconstructing the line of land-communications disappeared. A suggested probable route, based on the incidence of " street " names was put forward (Green and Hutchinson 1960, Fig. 4). This involved the crossing of a narrow channel of estuarine water at a point in the Thurne valley and, apart from this, the remainder of the line on the east side of Barton and Sutton broads crossed no obstacle more difficult than small extents of fen and a small freshwater stream, the Ant, at a point high up its valley, to join the main east–west road, as at present known, near Smallburgh village.

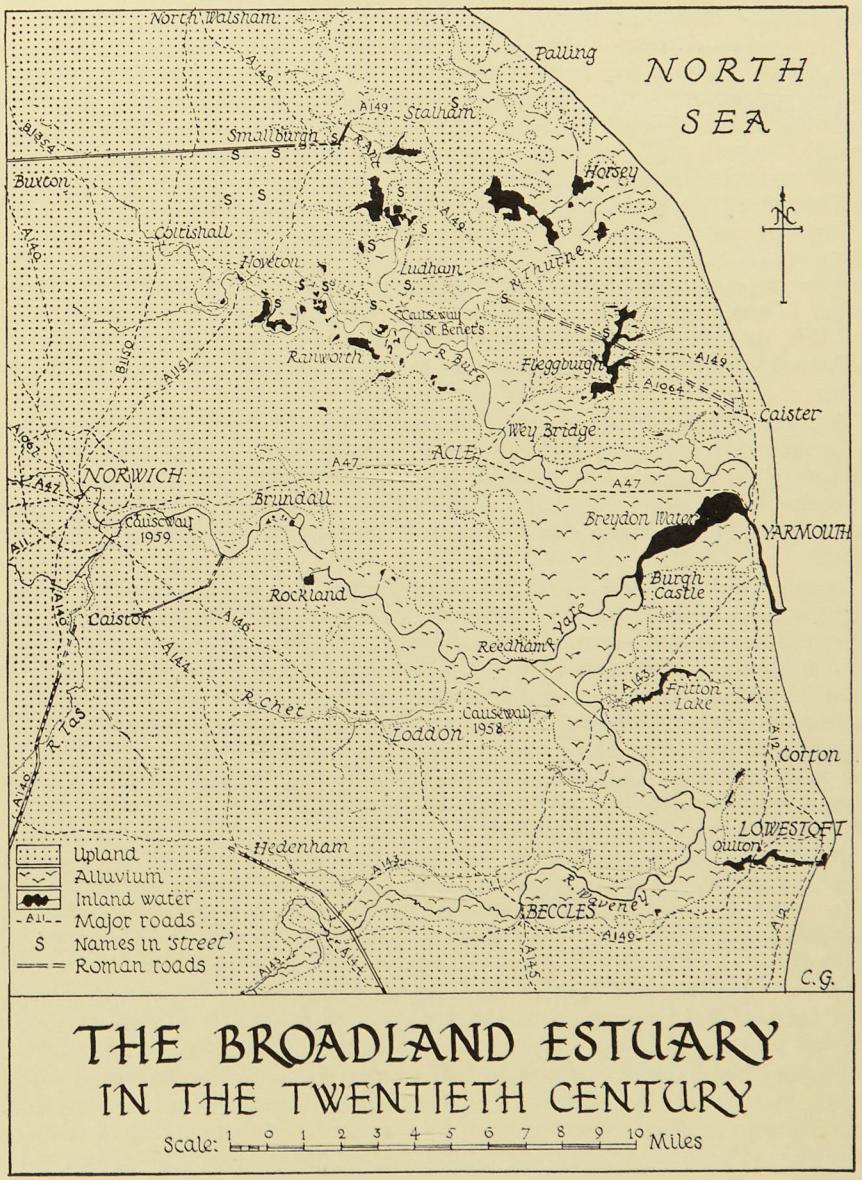

North Walsham
Palling
NORTH SEA
Stalham
Smallburgh
Horsey
Buxton
Coltishall
Hoveton
Ludham
R. Thurne
Causeway St. Benet's
Ranworth
R. Bure
Fleggburgh
A1064
Caister
Wey Bridge
ACLE
NORWICH
A47
Brundall
Causeway 1959
Breydon Water
YARMOUTH
Burgh Castle
Rockland
Caistor
Reedham
Yare
Fritton Lake
R. Chet
Causeway 1958
Loddon
Corton
LOWESTOFT
Oulton
Hedenham
R. Waveney
BECCLES
R. Tas
Upland
Alluvium
Inland water
Major roads
Names in 'street'
Roman roads
C.G.
THE BROADLAND ESTUARY
IN THE TWENTIETH CENTURY
Scale: 1 0 1 2 3 4 5 6 7 8 9 10 Miles

Fig. 1.

The line of this main east-west road has already been established. Branching from Ermine Street at Castor-by-Peterborough in Northamptonshire, it ran to the Romano-British settlement at Fengate on the outskirts of that city. Then, after crossing the Fenland basin on a causeway, it emerged on to the Norfolk upland at Denver. From here it ran north-east to cross the Wensum at Worthing and the Bure at Buxton. From the Bure valley it ran almost due east through Scottow and Sloley to a point in Smallburgh parish where the present-day Sloley—Smallburgh road bears to the north-east some half-mile west of Smallburgh village (Grid Ref. 63/322240). A test-excavation by Clarke in 1951, just to the east of this point, failed to reveal any continuation towards the hamlet of Low Street but, as has recently been demonstrated by the writer at Scottow (report forthcoming), the absence of road foundation in a single local section is not final negative evidence. It therefore seemed probable that the road did, in fact, continue eastward to Low Street and then, turning almost northward, approach the Ant and cross at the point where Wayford Bridge now stands.

Schram had already drawn attention to the Wayford Bridge crossing as being of considerably antiquity and it seemed possible that, in the days before the building of the bridge, a ford existed, as the name implies, of which the structural remnants might yet be detected either below or near to the modern crossing where, on the north bank, the stream runs close to a boldly-projecting curve of upland.

It appeared also that a crossing-point might have existed near the present-day Ludham Bridge on the Ludham–Horning road. The attempt to reconstruct the Roman road-communication (op. cit.) had also suggested an alternative route from the north bank of the Thurne, again marked by various " street " names, between this point and Hoveton, whence it may have run along the approximate line of " Market Street " to Sloley and the east-west road. Ludham Bridge itself lies in a direct line between the hamlets of Upper Street on the west bank and Johnson's Street on the east. Though no clear evidence of their Roman origin was known, the suggestive juxtaposition of these names and the river-crossing could not be ignored.

An examination of the Roman " harbour road " at Caister had given evidence of the use of horse-drawn carts to transport goods to and from town and harbour. If, as seemed probable, these carts were also used to transport goods to the hinterland, suitable roads would have to be made. In the absence of artificial drainage in the Broadland fens, causeways would be necessary, constructed either on a corduroy of logs or on faggoted brushwood. Such causeways and their foundations it seemed, would probably underlie the present-day roads, but any possible deviation offered an opportunity of testing the hypothesis.

Further possibilities supervened. If Roman fords were constructed within a century or two of the maximum of the marine transgression, the succeeding Saxo-Norman marine regression with its consequent down-cutting of river-beds and a fall in the freshwater table, would have led to certain modifications in ford-structure. A narrow channel would, it seems, have been made in the middle to prevent the waters of the stream being dammed. It would not be until the

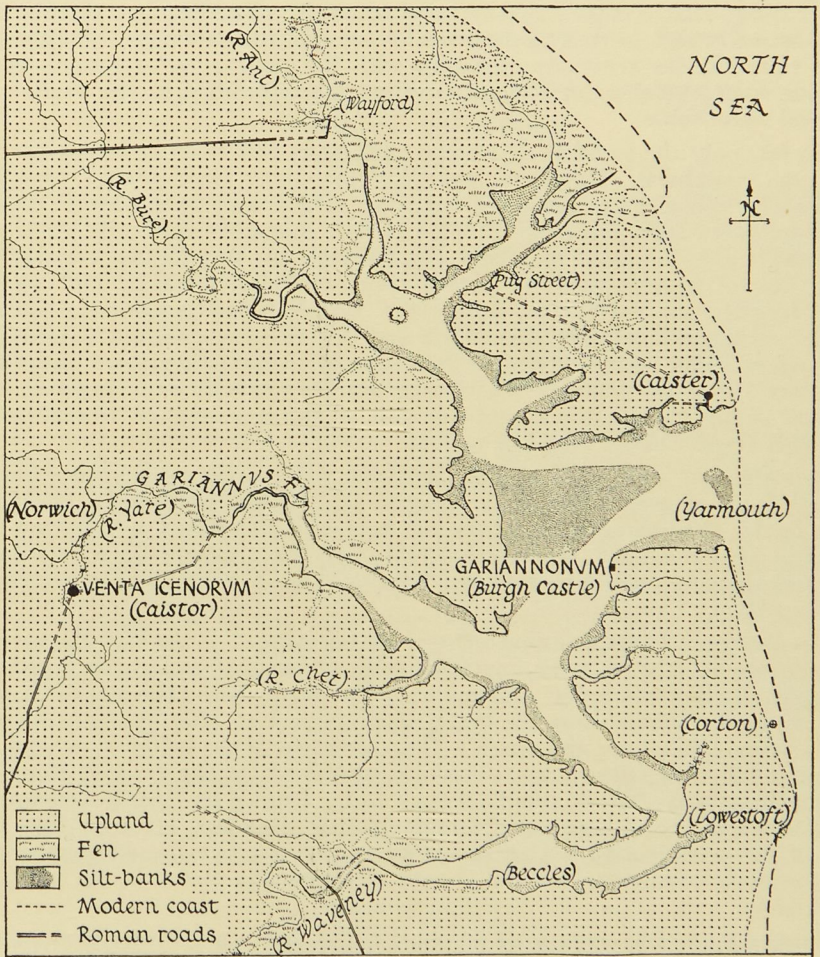

(R. Ant)
(Wayford)
(R. Bure)
NORTH SEA
N
(Ivy Street)
(Caister)
GARIANNVS FL.
(Norwich)
(R. Yare)
(Yarmouth)
GARIANNONVM
(Burgh Castle)
VENTA ICENORVM
(Caistor)
(R. Chet)
(Corton)
(Lowestoft)
Upland
Fen
Silt-banks
Modern coast
Roman roads
(Beccles)
(R. Waveney)
THE BROADLAND ESTUARY
CIRCA A.D. 300; A RECONSTRUCTION
N.B. ROADS & MAJOR SITES ONLY ARE SHOWN
Scale: 1 0 1 2 3 4 5 6 7 8 9 10 Miles
C.G.

Fig. 2.

rising waters in the fourteenth and fifteenth centuries once again deepened at the crossing, that repairs would have to be made. By this time there would have been a bridge, so that the ford would have lost its usefulness. It appeared from this that the remnants of a ford with the central part removed would provide some evidence for Roman crossings later modified to the needs of a lowered water-table.

So far, only the problem of Roman causeways and fords in freshwater fen has been considered. There are, however, other roads which to-day cross the marine-clay filling of the earlier true estuary. These, such as that which crosses the Bure valley from Billockby to Acle (A1064), altogether some mile and three-quarters long from upland to upland with a bridge, the Wey Bridge, crossing the river, cannot have existed in Roman times. Yet reference in 1101 to the Weybrigg at Acle shows that, during the Saxo-Norman regression, when the former estuarine silt-banks stood high and dry as sheep-pastures (Green and Hutchinson 1960, 141), convenient roadways or tracks across them came into use from village to village. Whether or not these tracks were faggoted it is difficult to say, though it is improbable that, at the maximum of the regression, any such reinforcement would be necessary.

But after the great flood of A.D. 1287 when fairly rapid submergence began, risk of floods increased and as flood-banks or " walls " were raised along the river banks, the linking roads across the flats were also raised on causeways of equal or greater height. These causeways, too, may perhaps have been built on bases of faggots, which would lessen the risk of loss of height by compaction or disintegration.

Another point seemed to be worthy of consideration. If the Wey Bridge was in existence as early as 1101, any ford which preceded it must have been constructed shortly before the maximum of the regression. The depth of any such ford, therefore, below the water level seemed to offer evidence for the level-changes noted on the coast. These considerations led to a scheme of investigation being drawn up. This was approved by the Norfolk Research Committee and application was then made to the Council for British Archæology for a research grant from the Carnegie United Kingdom Trust towards the cost of the investigation. This was to be carried out by selected members of the Research Committee and the general direction was placed in the hands of the writer.

Two types of field-work were involved. The first was the survey and close scrutiny of the causeway-approaches to the river-crossings ; the second was the sounding and probing of the actual crossings themselves below and near to the modern bridges. The preliminary surveys were made in the autumn of 1958 and the final investigations of the river-crossings in the spring of 1959.

My thanks are due to the officers of the Norfolk Research Committee for help given in various ways and to those members of the Committee who shared the actual field work. Special mention must be made of the help given by Mr. C. Collier, Chief Inspector to the Port and Haven Commissioners of Great Yarmouth. His wide knowledge of these water-channels and the resources he was able to put

at our service combined to ease a difficult task. I am also grateful to Mr. C. J. Macdonald, County Surveyor of Norfolk, who provided a number of boring records in Norfolk valleys and gave facilities for inspecting excavated sections.

II. THE WEY BRIDGE, ACLE—FLEGGBURGH
(Grid Ref.: 63/414117)

INTRODUCTION

This bridge, opened to traffic in 1931, straddles the River Bure in a single span of steel. It lies approximately three-quarters of a mile from the upland edge in Acle parish and a mile from the upland at Billockby in Fleggburgh parish, the river being the boundary between the two parishes. It is approached on either side by a causeway standing some 2 ft. higher than the surrounding marsh-pastures, the " quarry-dykes " lying parallel throughout its length. Apart from a narrow grass verge, it is metalled throughout, being an integral part of the road A1064, the old road from Yarmouth and Caister-on-Sea to Acle and Norwich.

There have been earlier bridges. Before 1931, the bridge was three-arched of brick and stone. An account preserved in the Bridewell Museum, Norwich, says that it was probably built in 1830 on an older foundation. The first reference, therefore, to the " Weybrigg " in 1101 must be to a still earlier bridge, which itself was probably replaced in late or post-medieval times by yet another. There is no direct evidence of the date of construction of this first bridge, but this can hardly have been earlier than the Conquest. At the height of the marine transgression shortly before the beginning of Roman times, this mile and three-quarters was an open arm of the sea. By the end of the fourth century, the relative fall of sea level and the deposition of silt had narrowed the channel. It was not, however, until a later day, when the level-changes has restricted the reach of the up-channel tide-stream and had lifted the silt-banks permanently above the water-level, that a road-crossing became practicable. The strong Danish settlement in Flegg at this time (Green and Hutchinson, 1960) would seem to offer a clue both to the need for and the date of this crossing. At so early a date (*circa* A.D. 900) a bridge would be improbable and, in the absence of a substantial flood tide, a paved ford became practicable.

FIELD-WORK

The causeway is well sited. The long promontory of upland, on which Billockby stands, thrusts boldly into the valley-flats and is opposed by a comparable, if less bold, promontory on the Acle side. They provide the most direct and least complicated route from south-western Flegg to the old Acle market.

The dyke-bordered causeway, as it stands to-day, is the product of activity in late and post-medieval days. At the time of the first crossing no raised causeway would be necessary and the track was probably a simple drove-road across the firm flats. But after the great flood of A.D. 1287, when fairly rapid submergence of the land began anew, the raising of river " walls " and the

gradual digging of dykes must have been accompanied by similar structural work to protect the through-roads. For this purpose the line of the track must have been laid down and the side-dykes dug, the excavated clay being piled to form the causeway. It was noted that, though the causeway on either side of the river is straight and parallel to the same line, the two parts are not strictly in alignment, for that from Billockby as it approached the river deviates a little from its true line to meet the track from Acle. It may perhaps be inferred that work started roughly simultaneously from each upland and, when the river was approached, the slight discrepancy in alignment was noted and allowed for on the Billockby side.

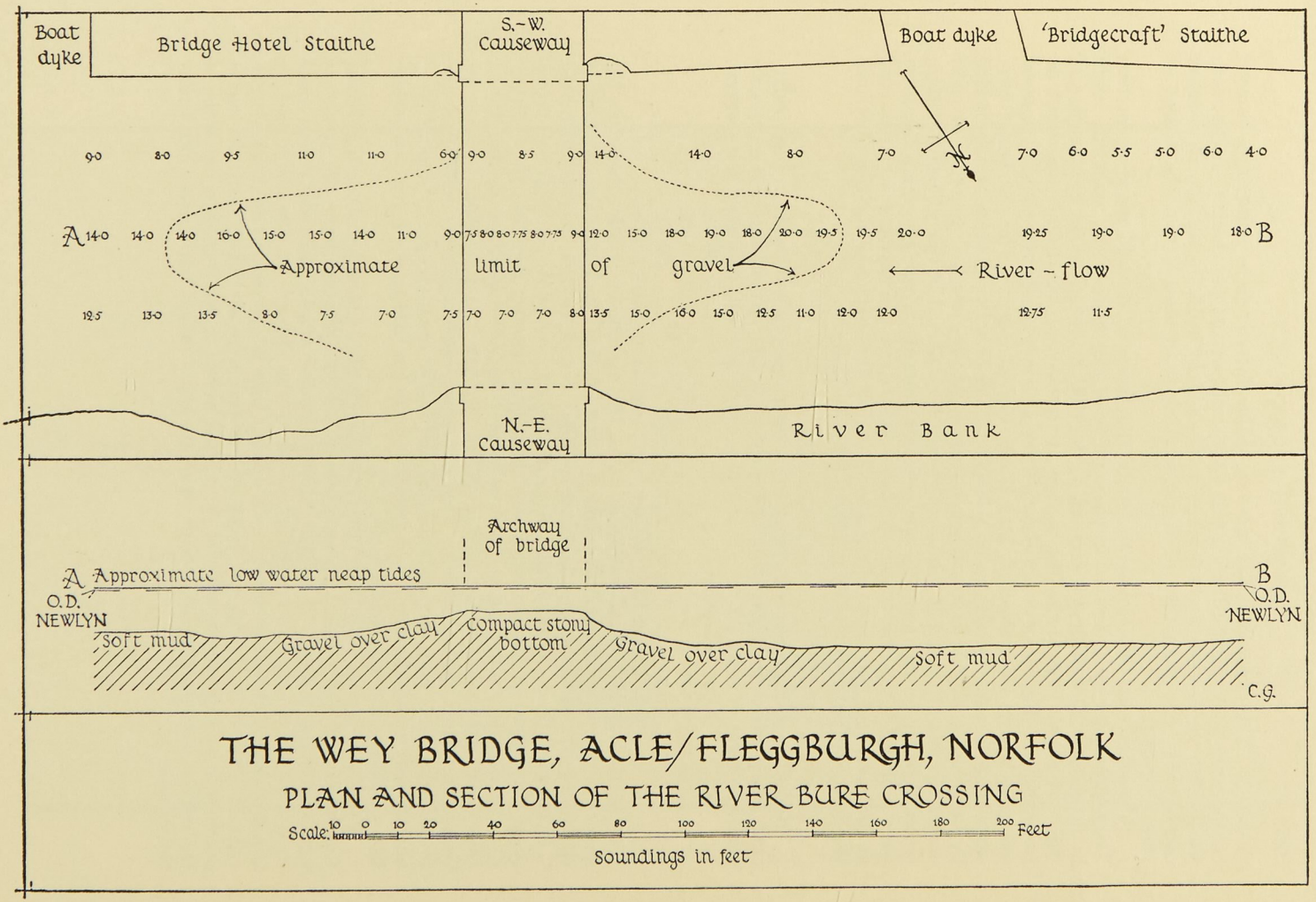
Search in the dyke-edges and probings at convenient points failed to reveal any traces either of brushwood or of stony ballast. This basal substructure, if in fact it is present, would however be narrower than the present metalled road and so lies concealed. The opportunity for further research into the structure of the causeway, therefore, will be found only in that given by major road-work.

When investigating the river-crossing, preliminary survey-work in a dinghy soon made clear that both depth of water and strength of stream made necessary the use of a power-propelled craft. With this, three main runs were made in an upstream direction, near and at the slack of low water. In addition, supplementary runs and intermediate tests were made, as described below. The depth-gauges of the Port and Haven Commissioners, based on "Harbour Datum" at Great Yarmouth, gave the water levels and these, corrected for reference to O.D. Newlyn, are shown in the section (Fig. 3). Metal-tipped graduated sounding-poles were used, which enabled the river-bed structure to be assessed. The length of the runs was greater than those shown in the plan (Fig. 3) and proved that the normal river-bottom was of soft mud.

Well above the bridge, the centre of the channel showed a depth of 18–19 ft. and, at a comparable distance below the bridge, a rather less depth of some 15 ft. But, as the bridge was approached, both above and below, a tongue of gravel was noted in the centre of the stream. This was at first a thin skin resting on stiff clay easily distinguishable from the normal soft bottom. As the bridge was neared the gravel thickened and the width of the tongue increased. There was at first no significant difference of depth but, as the bridge came closer, the gravel tongue rose steadily, downstream in a roughly plane surface or a slightly convex curve, but upstream in a concave curve. Close to the bridge, the edges of the tongue reached practically to the bank on either side (see Fig. 3).

The bridge itself stood over a raised bank of compact stony metalling, probably large flint cobbles of the type found in the neighbouring upland boulder clay. Similar flints have commonly been and are still used for packing the space between the irregular face of the river bank and the vertical timber casing of a landing staithe.

This raised bank was approximately level both across and along the line of the stream, the greatest depth being on the south-western (Acle) side. The comparatively recent removal of the old three-arched bridge had led to the belief that scoured channels between the sites of the masonry piers would have been



THE WEY BRIDGE, ACLE/FLEGGBURGH, NORFOLK

PLAN AND SECTION OF THE RIVER BURE CROSSING

Scale: 10 0 10 20 40 60 80 100 120 140 160 180 200 Feet

Soundings in feet

Fig. 3.

detected. This however was not so. The intermediate soundings showed comparable readings and it is certain that, right across the channel, underneath the bridge, there runs a compact stony causeway with its surface at a depth considerably less than that of the river bed at distances from the bridge of 100 ft. or more.

Attempts were also made to locate the bases of the old masonry arches. These failed, for no difference in the quality of this underwater structure could be detected. The Bridewell account of the 1830 bridge gives the explanation of this. It says : " Owing to the nature of the ground, the bridge was built on timber piles. Each pier consisted of a bunch of sixty to seventy roughly squared oak piles driven close together into the bed of the river. The pile heads were sawn off level and a platform on which building could commence was provided by means of a double layer of oak boards carefully dowelled together at right angles to each other. This platform, which is exhibited in the adjacent garden, rested directly on the heads of the piles and formed a base on which the piers were built." From this it may be inferred that all the masonry was removed in 1931 and that the heads of the piles lie below the surface of the river bottom. Without excavation, they lie too deep for detection.

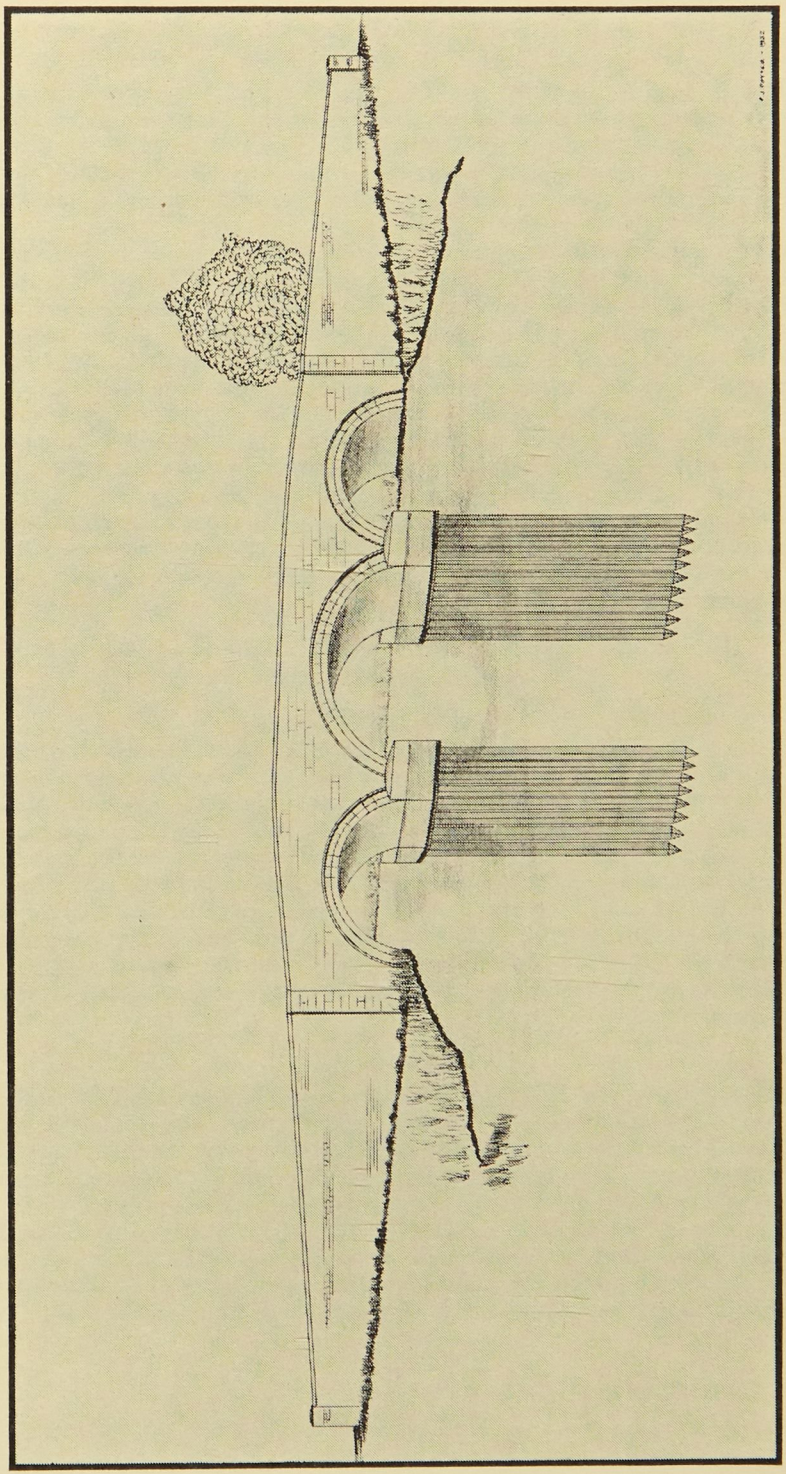
DISCUSSION

Recently, a testing-bore for a possible water supply was made in the Bridge-craft Boatyard on the right bank of the river just above the bridge, at a distance from the river of some 25 ft. Taken to a depth of 65 ft. this gave the section :

Blue estuarine clay	30 ft.
Peat..	3 ft.
Blue-grey " ooze " (estuarine)	30 ft.
Marine shells (*Cardium*, etc.) resting on Dark sands	

This section gives precise confirmation of the statements made above on the nature of the valley-filling. Resting on what formerly had been the dry floor of the valley (the dark sands), the " Lower Clay " is an estuarine deposit left by the " Neolithic " (Zone VII) transgression of the sea. Over it, the peat-bed represents the period of marine regression during the Bronze Age and the " Upper Clay " the greater marine transgression of Iron Age—Romano-British times. (For a full discussion of the dating of the " Lower " and " Upper " clays, see Green and Hutchinson, 1960.) This opportune bore confirms fully that the present-day river runs in a residual channel in the much deeper " Upper Clay " and the soft muddy bottom, detected away from the bridge, is a recent accumulation overlying the hard-packed clay.

From this it may be inferred that the gravels of the tongues above and below the bridge are not natural accumulations but are derived from the structure underlying the bridge. If, as has been suggested above, this was constructed in late Saxon times, it would have served, in the absence of tide-water and by the dropping of the water levels, as a shallow ford which cattle could easily have crossed. From it, during the more recent submergence when the tides again reached to and above the crossing, the scour seems to have washed out some of the lighter constituents and spread them in these tongues both above and below the bridge.



(*By permission of the Norwich Museums Committee*)

Fig. 4. The nineteenth-century Wey Bridge, Acle, demolished in 1931.

That the ford is of ancient standing may also be inferred from the fact that the river is deeper above the bridge than below and that the tongue above the bridge is cut in a rising concave curve. The long-continued resistance of this underwater bar has caused the ebb-tide, reinforced by the flow of the river water, to erode more deeply here than below the bridge where no resistance is met.

To interpret the actual levels is less easy. The average level of the ford's surface is some 7 ft. below O.D. Newlyn, and its base estimated from the river-bed level below the bridge, some 15 ft. below O.D. The estimated relative fall in height of the land since the end of the thirteenth century, as evidenced at the South Denes site, Great Yarmouth, is 13 ft. (Green and Hutchinson, 1960, 135), which would bring the surface of the ford above the water level of that day, though its base would still be below water. But how far the original structure may have been disturbed and modified by the building of the bridges it is impossible to estimate. It is clear that the piers of the former bridge must have been embedded in it and the demolition of this bridge may also have added something to the format of the ridge. It is however certain that an early stony causeway of apparently homogeneous structure crosses the river at this ancient crossing and the evidence available suggests that this was a crossing for men and cattle in late Saxon times.

III. WAYFORD BRIDGE, SMALLBURGH—STALHAM
(Grid Ref. : 63/348248)

INTRODUCTION

This is a small horizontal-girder bridge of 13·75 ft. span resting on brick piers to which the roadway on either side rises in a comparatively short steep ramp. It crosses the river Ant in its upper course from the parish of Smallburgh on the south to that of Stalham on the north, the river being the parish boundary. On the south side it is reached by a three-furlong causeway over the fen adjoining the hamlet of Low Street, but on the north side it abuts directly on to an upland spur. As has already been mentioned, the name gives evidence of an ancient crossing, though the date of its first bridging is unknown. The causeway-road is bordered on either side by " quarry-dykes " and the present surface, which forms part of the modern main road A149, is completely metalled except for a narrow grass verge.

FIELD-WORK

The position of the bridge appears to be well-chosen as it is placed at a point where the valley narrows between upland spurs. In Roman times, also, it could well have been chosen as the most suitable point for the crossing of the upper Ant valley. The east–west road was accordingly followed from Sloley, and showed in places a marked *agger* on the north side of the present road. This, however, was lost at the angle in the present road to the west of the Public Assistance Institution at Smallburgh (Grid Ref. : 63/322240) and could not again be detected between this point and Low Street. But in this hamlet, in the lane running north-west from the main road, there was a slight " roll " which

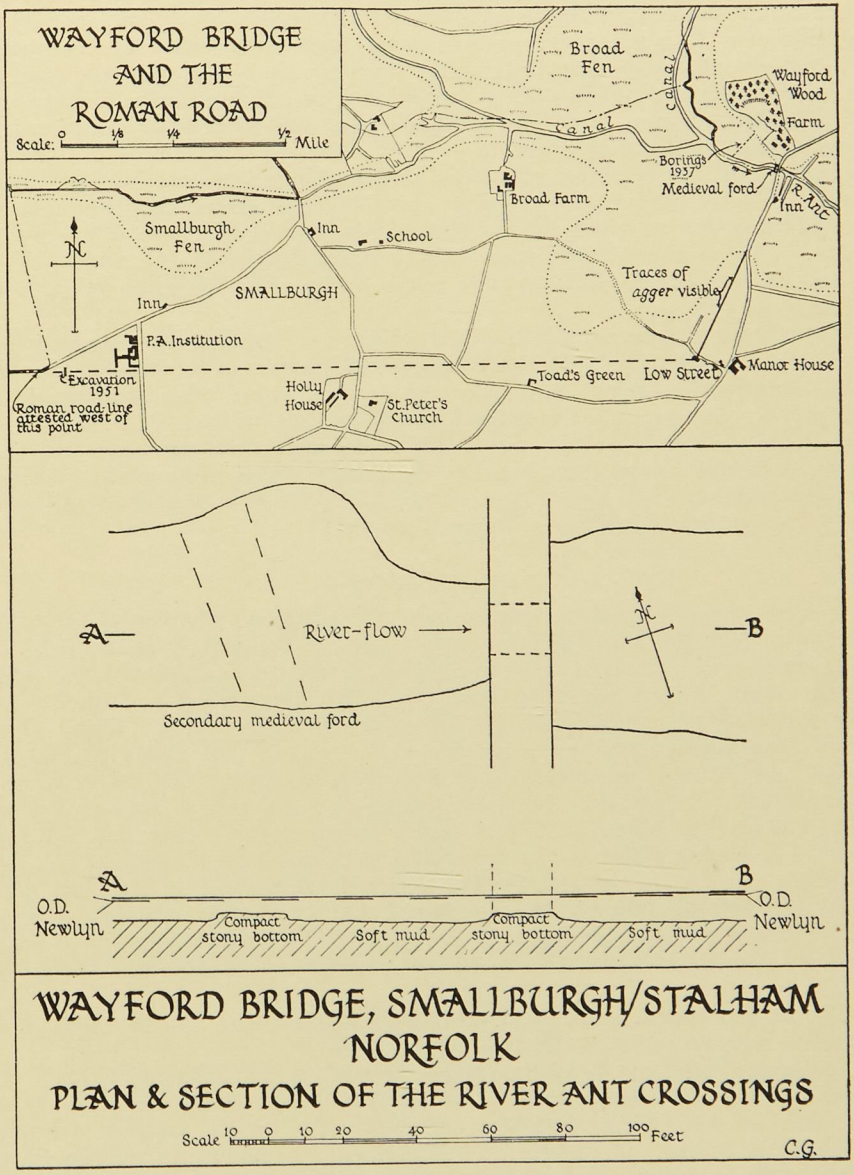

WAYFORD BRIDGE AND THE ROMAN ROAD
Scale: 0 1/8 1/4 1/2 Mile
Broad Fen
Canal
Wayford Wood
Farm
Canal
Borings 1937
Medieval ford
R. Ant
Inn
Broad Farm
Smallburgh Fen
Inn
School
N
Traces of agger visible
SMALLBURGH
Inn
P.A. Institution
Excavation 1951
Roman road-line arrested west of this point
Holly House
St. Peter's Church
Toad's Green
Low Street
Manor House
A
River-flow
B
N
Secondary medieval ford
A
B
O.D. Newlyn
Compact stony bottom
Soft mud
Compact stony bottom
Soft mud
O.D. Newlyn
WAYFORD BRIDGE, SMALLBURGH/STALHAM NORFOLK
PLAN & SECTION OF THE RIVER ANT CROSSINGS
Scale 10 0 10 20 40 60 80 100 Feet
C.G.

Fig. 5.

was approximately on the same line. Here the old road seemed to have turned to the north-north-east through an angle of 60° to follow an upland spur on the east side of a deep fen-creek. Traces of an *agger* were visible in the gardens and orchards along this line until, at the northern tip of the spur, the road ran out into the fen and within a few yards seemed to pass under the modern road to the bridge. Again, as at Acle Bridge, major road-work only will reveal the presence of an underlying structure.

In the bed of the river, soundings and probings were carried out from a dinghy. Under the bridge a compact stony layer projected slightly above the level of the soft mud which formed the river-bottom both above and below the bridge. The surface of this stony ridge dipped slightly in the middle of the stream, being about 3·0 ft. deep close to the bridge piers and some 5·0 ft. in the middle.

A medieval stirrup, now in the Castle Museum, Norwich, was dredged some years ago from the river-bed a short distance to the west of the bridge. Probing in this area soon revealed the presence of a second stony ridge running slightly obliquely to the river, at an average distance from the bridge of 60 ft. (see Fig. 5). Beyond this, the river bottom was again coated with soft mud. No trace of a causeway to this second ridge could be detected. At the time of the investigation, the water level at the bridge, as read from the Port and Haven Commissioners' gauge, was a few inches higher than O.D.

DISCUSSION

A series of bores across the valley on a line a little to the west of the bridge (Jennings, 1952, 39, Fig. 18) has shown that it is completely peat-filled. The filling consists of a topmost layer of sedge-peat resting on a mixed layer, which in turn covers a humified brushwood peat with alder wood and birch twigs. This section shows conclusively that the estuarine water of the " Upper Clay " marine transgression did not penetrate as far up the Ant valley as Wayford Bridge. In Roman times, the valley here held freshwater fen traversed by a small stream. A corduroy causeway across the fen and a stone-paved ford across the stream would have provided a satisfactory crossing for a Roman road. The paving below the bridge would seem to be the remains of this ford. Doubtless erosion by the stream has removed the surface of the ford which would have stood a little higher when in use. It seems clear, therefore, that the east–west road continued along its line from the western boundary of Smallburgh to Low Street and then turned north-north-east to cross the Ant by this ford.

The further course of the road through Stalham to the Thurne valley in the south has not yet satisfactorily been ascertained.

The second crossing above the bridge probably had a different history. The absence of causeway suggests that, at the time of the ford's construction and early use, the fen to the south was sufficiently dry for the purpose without a prepared approach. The width and position of the paving in relation to the road suggest that this was in use in medieval times as a cattle-crossing ; the recorded stirrup perhaps tends to confirm this date.

IV. LUDHAM BRIDGE, LUDHAM—HORNING

(Grid Ref. : 63/372171)

INTRODUCTION

Before its reconstruction, which began late in 1959, this was a horizontal-girder bridge resting on brick piers some 25 ft. apart. It spans the river Ant to carry the modern road between Ludham and Horning, the river forming the parish boundary. Here the upland edges lie little more than half a mile apart and the road is causewayed to the bridge on either side of the river, with parallel " quarry-ditches." On the western upland bank lies the hamlet of Upper Street and on the eastern, Johnson's Street. These names had hinted at the possibility of a crossing in Roman times. But a ford across the river at that time would have been an impossibility, for here the valley is filled, as Jennings (1952, 42, Fig. 26) has shown, with clay, good evidence that a deep estuarine channel of up to half a mile in width lay between its shores.

FIELD-WORK

It was soon realized that no satisfactory results could be obtained by sounding and probing the river-bed underneath the bridge, for to-day the river passes beneath the bridge in a narrow artificial channel less than a third of its natural width above and below and the earlier channel is completely obscured. However, a visit to the bridge in January, 1960, while reconstruction work was in progress, enabled a section in the estuarine clay to be examined. A bore made by the County Surveyor close to the bridge, showed a rather greater depth than that of Jennings, which was taken a little to the north-west. This new boring showed an accumulation of estuarine clay (the " Upper Clay ") resting at —28·0 ft. O.D. on peat. At —35.0 ft., this gave place to silt (the " Lower Clay ") which at —41·0 ft. O.D. rested on black sand, the valley bottom. Clearly then, in Roman times, the Ant valley at this point was an open estuarine channel, the central part of which, even at low water, would doubtless be too deep to ford. Here then a crossing would have needed a ferry-boat at all states of tide. But in the absence of any trace of road-remains on the adjacent upland or of occupational material from an adjoining settlement, the " street " names cannot be regarded as significant evidence of a Roman road.

That there may have been an early medieval forded crossing, similar to that at the Wey Bridge, is likely enough. But the obscuring of the river bed by the artificial construction of the channel makes it impossible to prove this.

GENERAL CONCLUSIONS

Certain broad conclusions may be reached from the foregoing evidence. During Roman times, when the " Upper Clay " marine transgression was little past its maximum and still extensive, corduroy causeways and paved fords would be limited to the upper valleys of Broadland rivers, or to some side valleys, where the filling was of freshwater-fen origin, for the lower reaches of the rivers, transgressed by the sea, could not have been crossed in this fashion. Crossings of this type are that at Wayford Bridge and, doubtless, that where

the present-day road A149 crosses the Ormesby–Rollesby broad from Ormesby Common to Low Street, Rollesby. Here, it is probable, the " Flegg Road " from Roman Caister crossed the fen-filled valley on its way to the Thurne.

In late Saxon times, as the marine regression progressed, the clay filling of the former estuarine reaches came to stand above the tide and became grass-grown pastures. The rivers were limited to narrow channels through the clay and crossing became possible. At this time it is improbable that corduroy-causeways were needed on this heavy clay, but a hard bottom to cross the river channel would be required. An example of this type of crossing is that beneath the Wey Bridge across the Bure where to-day, the combined river and tidal stream have deepened sufficiently to make a forded crossing impossible. Such crossings could have continued in use until the later Middle Ages when the rising water-table, due to the modern marine transgression, put them out of use. They were normally replaced by bridge or boat. By this time, too, the approaches to the river banks would be liable to floods, so the original trackways were bordered by dykes and the upcast was piled to lift the track on a modest causeway.

An interesting example of this type is that causeway which leaves the Horning upland to run to St. Benedict's Abbey in Cow Holm. To-day this is cut by the lowest reach of the Ant, but as Jennings (1952, 45) has already pointed out, this is probably a comparatively recent development, as the original course of the Ant during the Saxo-Norman regression lay along what is now the " Hundred Dyke " to the Thurne. This line is still followed by the Ludham—Horning parish boundary and its widely-spaced " walls " suggest the former presence of a much wider stream than the modern dyke.

Minor causeways, frequently gravel-paved, have been detected in the Broads themselves (e.g., Lambert and Jennings, 1960, 58), but these were simply pathways between the peat-cuttings laid down for the convenience of the workers. More interesting is that recently recorded from Thorpe-next-Haddiscoe. In 1958, while setting pylons for an electric power line running south-west from Yarmouth, immediately to the west-north-west of Willow Farm and just within the parish boundary with Thurlton, the excavation for Pylon No. 42 (Grid Ref. : 62/43459912) exposed a " brushwood causeway " in the peat at a depth between —8·0 and —16·0 ft. O.D. This information was given to Mr. R. Rainbird Clarke by the engineer-in-charge and a short note published in Norfolk Research Committee Bulletin No. 11 (1958). In the absence of further evidence little more can be said. But the site of this find is within a few yards of the upland edge and it seems probable that this was a Bronze Age track over the peat near the edge of the " Lower Clay," before the later marine transgression flooded the area. If so, this is apparently the earliest recorded causeway in east Norfolk. It is a pointer to the many more which may lie hidden below the upper filling of the Broadland valleys.

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