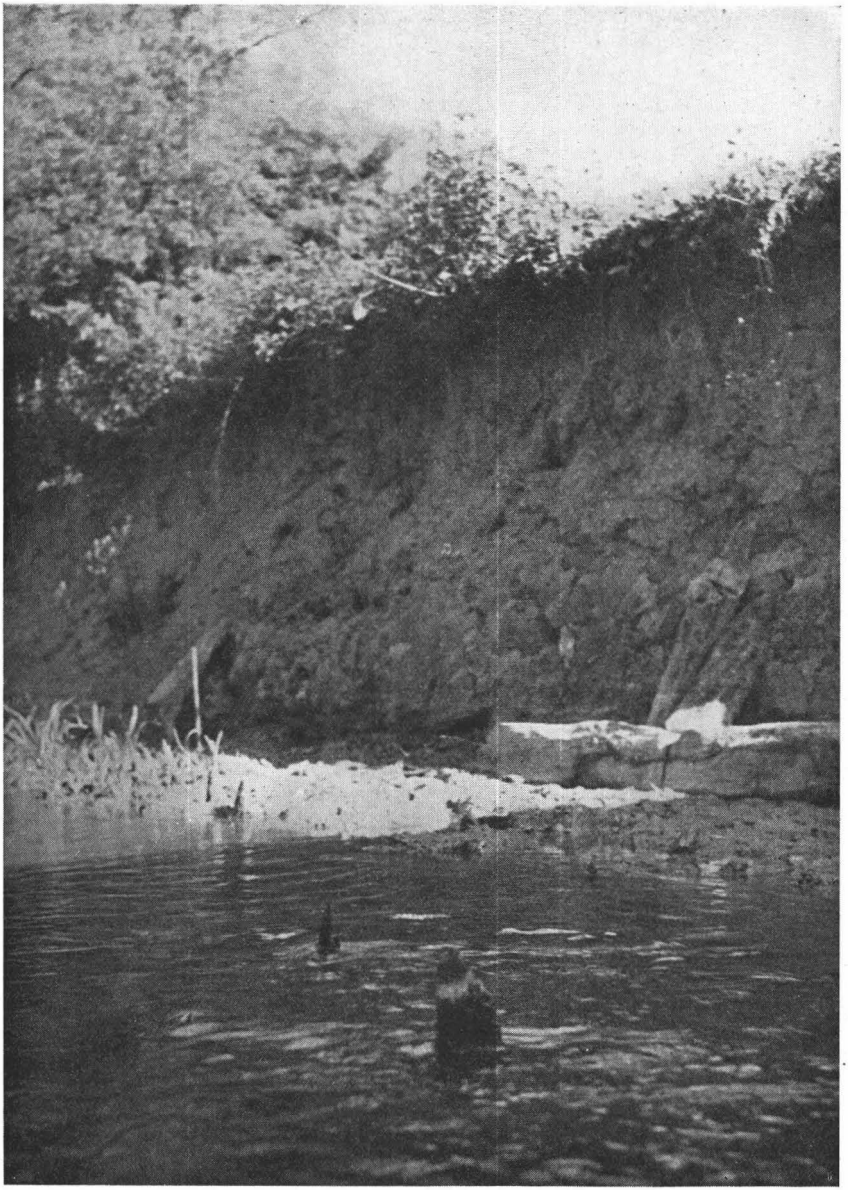
REMAINS OF THE ROMAN BRIDGE OVER THE ARUN, ALFOLDEAN

WITH CONSIDERATIONS RELATIVE TO THE PRESERVATION OF ANCIENT WOOD

By S. E. Winbolt

When I first came to Sussex with Christ's Hospital in 1902 I was attracted to Alfoldean Roman Station by Mr. Hilaire Belloc's *Stane Street*, and having roughly identified the site, I began to speculate as to where Stane Street crossed the river by a bridge: a ford was quite impossible owing to steep banks. Many times I looked for signs of abutments, but it was not till 1923 when I was excavating the Camp that, having found the Roman road inside the area, I was able to judge within a few feet its exact site on both banks. (*S.A.C.* lxv. 112.) At last in May 1934 an opportunity for closer investigation occurred, when the West Sussex County Council was underpinning the foundations of the modern bridge, the east side of which is 17 ft. westward of the west side of the Roman line. A friendly foreman—an old acquaintance—and gang of men in waders were able to help. The water was at its lowest in my experience—only a few inches deep, and I was greatly encouraged by what I saw in the bed.

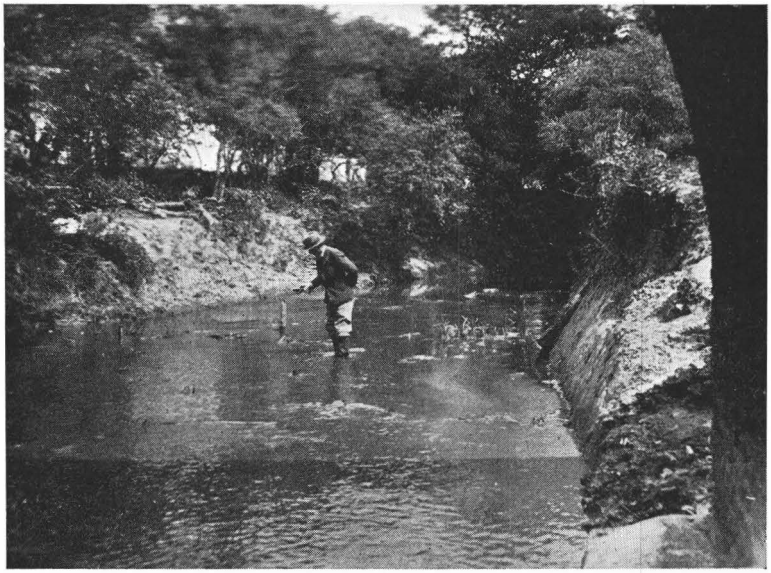
Precisely on the line of the Roman road it was thickly strewn with shaped stones, Roman bricks and roof tiles, and a series of some twenty black stakes near the south bank, but not quite parallel with it, and extending for 24 ft. east to west; their heads were just showing above the water, on the average about 4–5 in. above the mud. A man got out for me one very heavy squared sandstone —1 ft. 3 in. $\times$5 in.—notched at one corner (now in the Horsham Museum). One evening a friend got out five similar stones, two with corner notches, and deposited them on the north bank; but when I came a day or two



ALFOLDEAN ROMAN BRIDGE. *Photograph by T. Ward.*

Tops of anchoring stakes near south bank.

later, alas, the men had requisitioned them, and they are now built into the north-east abutment of the modern bridge. Some thirty big parts and a great quantity of smaller fragments of Roman bricks and roof tiles were got out, some of which are exceptionally heavy—indeed the heaviest I have ever handled. Some of them are



ALFOLDEAN ROMAN BRIDGE. *Photograph by V. Winbolt.*
Getting out Roman tiles at lowest water.

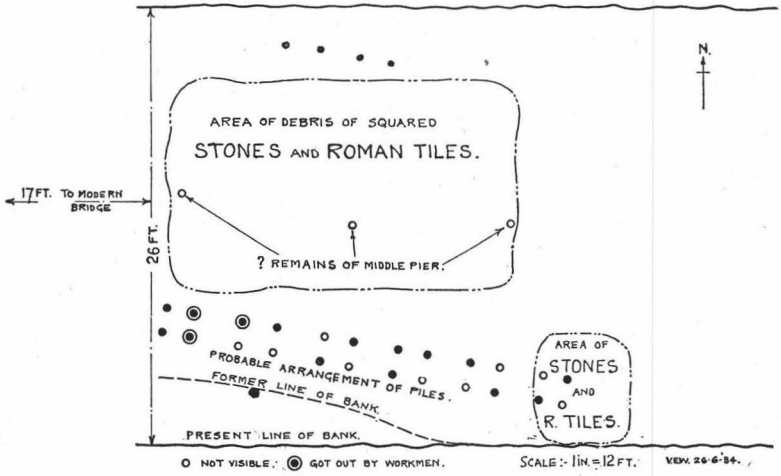
bricks with bosses on them—probably an early form of brick, as is attested both at Ashtead and Folkestone (specimens in Lewes and Horsham Museums). At the week-end the foreman and one of his men dug down into the river bed and got out four of the stakes, two thinner ones of which had been tied together to do duty for one thicker one. A single stake (Lewes Museum) is 3 ft. 2 in. long, 7 in. at its widest, and 3 in. thick, the two used together (Horsham Museum) being of the same length and together a little thicker. Another I used for sections. They are of oak. Down the sides they have deepish fissures, while along the flat sides they are much scaled;

their square-pointed ends are in comparatively good preservation. They came out whole, though a little abraded by the spades. When I got them home, I soused them with water once a day for a fortnight to prevent their drying out too quickly. Then, on the advice of Dr. R. E. M. Wheeler, I dressed them thoroughly with glycerine, and finally blew paraffin wax into them with a blow-lamp. They are absolutely black both in section and on the exterior and of a consistency rather like that of cheese, but tougher; after treatment they look as if they will hold together for another century. The men sounded for a corresponding row of stakes near the north bank, but unsuccessfully. The silt here was much deeper. By October much of this had shifted, and four of the north-side stakes showed their heads.

STAKES (Lewes Museum).

The high probability that the remains described are those of the Roman bridge may be stated as follows: (i) They are precisely in the established line of Stane Street as we found it in the Camp some 45 yds. to the south, and in the line since proved to the north (*S.A.C.* LXV. 112 and *The Times*, 3rd April 1928). (ii) The mass of squared stones and heavy tiles (one of these almost completely carbonized), which have proved too massive to be washed downstream, belonged to bridge piers. The river is now 26 ft. wide between banks, the southern of which has recently been cut back a little. I premise a masonry pier projecting 4 ft. from either bank, and a similar 4 ft. pier, with a cut-water facing east, in mid-stream. This would imply two spans of 7 ft. each. There are scantier remains of anchoring stakes in mid-stream. The debris of masonry lies in two areas, the chief mass occupying rather more than half of the bed mainly in the middle; the other is near the south bank on the east side, and perhaps represents a guard-house. A timber road-

way supported on masonry piers would explain this debris. It is likely that the material of the bank piers was robbed for building or road purposes, but that the centre of the bridge, having collapsed into the river, was too inaccessible. Usually there are several feet of water here, and at flood times water flows within a foot or two of the



PROBABLE REMAINS OF ROMAN BRIDGE AT ALFOLDEAN.

crown of the arch. The roadway of the Roman bridge might well have been 18–20 ft. wide. If the spans were of timber baulks, these would without doubt have been carried away downstream; but heavy masonry falling *en masse* into river sludge would be very difficult to shift even with the strongest current. (iii) The stakes, which appear to have been in groups of four about 2 ft. apart each way, and about 3 ft. between the groups, were driven down into the clay bed simply to anchor the soil. On the soil so anchored were laid flat timber baulks to serve as the footings for the masonry piers.

[It is interesting to note that the trouble with the modern bridge was due to the soil's not being so anchored: as a consequence the swirl of waters had

undermined the timber footings to a depth of 7–8 ft. so that there remained only the precarious support of loose sludge. The Roman method, exemplified at Pevensey (*S.A.C.* LI. 104), proves to be superior to that of 1809. Incidentally, I got to the Horsham Museum specimens of the oak footings of 1809, which after a century and a quarter in their damp position are as good as new.]

(iv) The strong probability is that in the line of Stane Street there has been no bridge since the Roman bridge fell into decay in Saxon times (say, about A.D. 600). For some time prior to 1809 Stane Street for about a mile south of the river was a derelict green lane—a cul-de-sac with no river-crossing; the river was then crossed by Dedisham bridge some ¾ mile to the west, or another bridge about the same distance farther west. It is true that in *The High Stream of Arundel* it is said (footnote 6) that 'An indictment of the Sussex Assizes in the third year of Charles I refers to "Dedisham, alias Alfoldean, Bridge as in a dangerous state and in need of repair"'; but, as is pointed out (footnote 5), there was confusion between these bridges, and both were indiscriminately called either Dedisham or Affleden. If there was an Alfoldean bridge in medieval times, it was on the site of the modern bridge. Otherwise it is inconceivable that the awkward western diversion of the road at this point and the consequent causeway northwards to Roman Gate would have been made anew in 1809. The southern approach of Stane Street to the Roman bridge has been a ploughed field since soon after its destruction, so that a Roman paved yard in the Camp and Roman structures situated immediately up against the Roman road on its last side remained undisturbed. Very similar remains, 28 oak piles and loose stones, of a Roman bridge were found in 1933 where Dere Street crossed the Tees at Piercebridge (*J.R.S.* XXIV. 202).

On these grounds I think an experienced excavator would without hesitation accept the Roman origin of these bridge remains, while even a native of Slinfold unversed in archæology might boggle at them. The

former has developed a lively faith in such possibilities from having often realized them; the latter's want of knowledge disinclines him to believe that these can be Roman bricks or stones after 18½ centuries of immersion in a river. [I detected some slight amusement among the men at my assertion that they were Roman, and at my willingness to part with coin of the realm to secure them.] Still less easily can ordinary folk be persuaded that these stakes were driven in by Roman engineers about A.D. 60–70; and as even antiquaries are not all versed in the subject of preservation of ancient wood and timbers, it may be well briefly to review some established facts.

The Preservation of Ancient Wood

A claim made for the survival of ancient wood as wood and not charred dust generally rouses the sceptic. It is worth while, then, to state the case and exemplify it. I have myself dug out of the moist grey clay of the Sussex Weald at 8 ft. down parts of alder trees—twigs, bits of small branches and *leaves*—which have not seen the light for very many thousands of years. The following are a few out of very many well-attested cases of such survival. A. Prehistoric, i–iv. B. Roman, v–viii.

A. *Prehistoric*

(Italics in all cases mine)

(i) Two good planks and other pieces of wood from Upper Palæolithic levels, in Ipswich Museum. *P.S.E.A.* v, pt. 2, pp. 232 et seq.; photograph, p. 242.

(ii) Timber work from the Long Barrow (excavated 1933) at Thickthorn, Farnham, Dorset, is in the Dorchester Museum.

(iii) Early Iron Age gate-posts at Hembury Fort, Devon, 1933. 'The base of a huge oak post', in Exeter Museum. ('The Neolithic wood was all charred, though some recognizable branches occurred under the guard-house hearth.' Miss Dorothy Liddell.) Of the Early Iron Age specimens Mr. J. C. Maby writes that they 'showed definite signs of coal formation, turning to soft-brown coal, or lignite, with disappearance of microstructure'.

(iv) *Lake Villages of Somerset*, Arthur Bulleid, 1934, p. 47 and Pl. XVII. Early Iron Age. *Found in peat*: wooden handles of tools, a wheel spoke, 14⅛ in. long, fragments of a tub, 6¼ in.

long, ladles, &c. Of framework 63 pieces; a ladder with 4 steps, beams and planks with mortice holes; a canoe, 17 ft. by 12 in. deep. Glastonbury Museum.

B. *Roman*

(v) Vitruvius states that oak and alder in damp situations will last 'ad diuturnitatem'. Strood Roman Causeway at Rochester, described by G. Payne (*Arch. Cant.* XXIII. 4–6). *In marsh mud numerous oak piles, c.* 4 ft. long, braced together with timber sills.

(vi) At Sutton Coldfield, found in peat (1762) in a Roman Causeway over a morass rotted branches of fir-trees, but 'the trunks of some of the trees dug up were sound, with the marks of the axe upon them'. *Gentleman's Magazine*, XXXII. 403, quoted by T. W. Wilkinson in *From Track to By-pass*, p. 21.

(vii) Pevensey Castle, excavated for S.A.S. in 1906–8. Information from John E. Ray. Under the Roman wall were found stakes, driven into the clay, 2 ft. to 4 ft. long. '*They were definitely wood, and could be withdrawn whole*' (*S.A.C.* LI. 104). In a well. 'The well was formed by split baulks notched at the end and laid at right-angles to one another, thus building up a square well about 3 ft. across each way. These extended to a depth of about 11 ft. They were in a good state of preservation, and the well was excavated by us within them, leaving the side timbers *in situ*. Right at the bottom of the well, underneath Roman sandals and other R.-B. remains, were what appeared to be part of the wooden bottom of a wooden bucket—found in conjunction with some rope.' Lewes Museum.

(viii) At Newcastle, Roman bridge over the Tyne. In 1771 it was found that 'the mediaeval builders had availed themselves of portions of the *stone piers* of their Roman predecessors, and that *the foundations of these were laid on oak piles*'. Ward, *R.-B. Buildings*, 233.

The *locus classicus* on the subject is the reports of the Society of Antiquaries on the excavations at Silchester, 1891–1908.

The decay or preservation of uncharred wood when buried 'depends entirely upon the precise physico-chemical conditions of inhumation, rather than upon age; and under the more or less anaërobic conditions at the bottom of river silt, a peat bog &c. . . . the incentive to change and decay of originally sound wood is obviously very small indeed. Hence *ageing is relative to environment rather than to time.*' This, with my italics, is quoted from Mr. J. Cecil Maby, of Oxford, to whom I sent two speci-

mens of the Alfoldean stake wood. From his report (31st May 1934) I continue to quote. Of specimens sent he writes that 'they might very well be of Roman date, but might also be considerably older. . . . The lower end of such a timber . . . would probably take at least a thousand years to attain to its present completely blackened coloration and relatively "cheesy" consistency. On the other hand, such a condition, once attained, will evidently last without much appreciable change for many thousands of years. For instance, I have examined and reported upon very similar samples of oak wood, of equivalent colour and consistency, believed to have been of far greater age. These likewise came from river-bed and estuarine sources—which appear to be the proper conditions for such blackening-cum-preservation of oak wood.'

The Alfoldean stakes are still completely wood, showing no signs of turning towards lignite. 'The blackening of bog or water-logged oak has nothing to do with either fire-charring or decomposition of the wood substance towards lignite, of course; but is evidently due to the action of infiltrated iron salts upon the tannic and gallic acids natural to the wood.' The Arun flows over sandstone which is well known to have a high iron content. 'No doubt infiltration would occur from the river water, through the upper exposed ends of the piles in your case; but blackening either by this means or from the action of the moist clay (rich in iron) would be very slow, I should say, judging from oak posts that have been below ground many years in wet clay of various types. Infiltration would be most rapid with the grain, in a longitudinal direction. The uniformity and absolute blackness of the actual coloration suggests very long reaction indeed. . . . The black coloration of both your oak samples was removed by treatment with hydrochloric acid, which was then found to be rich in iron, and the bleached wood also gave the standard reactions for ligno-celluloses; indicating that the blackening was due to infiltration of iron salts (reacting with the tannin), and that decay or chemical metamorphosis had been slight.' Further, Mr.

Maby writes: 'I have had woods as soft as Birch, Poplar and Pine, rated at "not less than 8,000 years and possibly twice as old", showing so little decay as to be still sectionable without special embedding methods; while others as hard as oak, or still harder tropical woods, may have so far decomposed as to have almost turned to lignite coal in two or three thousand years, in less favourable conditions.'