An Exposure of the Bristol Avon Gravels at Shirehampton, near Bristol, June 1959

By
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(O.S. 2½ in. Map, Sheet ST 57)*

The exposure described in this note was first observed by G. C. B., who examined the manhole section, sketched the stratification and photographed the exposure. As he was unable to visit the site again, A. M. A. made a later visit to obtain additional information about the height of the deposit. The site (Ref. 303702) is that of a main manhole approximately opposite the middle of the so-called "Old Tithe Barn" in Shirehampton High Street. A small Corporation of Bristol housing estate (called "West Camp, Shirehampton") is being built here to the north of the road, the site running back uphill towards Penpole Point. The manhole referred to lies 71 ft. NNE. of the wall on the south side of the road. From this manhole a sewer trench ran up the slope in a NNE. direction for over 200 ft. and contractor's test holes were dug higher up the slope and along roughly the same line. Various deposits exposed by these cuttings are described below.

The section at the site of the manhole was as given opposite (see also *Fig.* 3). The thicknesses were estimated by G. C. B., the levels have been added by A. M. A. from figures supplied by the site foreman.

A. M. A. was told by the foreman that the trench had been excavated to 6 in. below the measured level. This would make the thickness of Pleistocene deposits exposed approximately 8 ft. When seen by A. M. A. the section was somewhat obscured by the effects of a recent rainstorm but the top of the gravel (layer 2) was found to be about 4 ft. 6 in. to 5 ft. below road level.

Layers 1 to 5 were bedded roughly horizontally, layer 6 was unstratified. The gravel of layers 1 and 2 was comparatively well rounded and fine, the majority of pebbles being less than 3 in. across and large blocks absent. The deposit was not stratified in the strict sense but locally sandier bands could be seen. The great majority of pebbles had flattened cross-sections and lay horizontally. The gravel appeared to consist mainly of Jurassic Limestone with some flint and chert. A tip of gravel derived from the cutting appeared to contain more flint than chert. Some of the flint was less well rounded, even sub-angular or broken, but well-rounded flint pebbles up 4 in. were seen. No Pleistocene molluscs, animal remains or human implements were found

* All four- and six-figure grid references given refer to this sheet.

but derived specimens of *Gryphaea obliquata* J. Sowerby and *Ostrea hisingeri*, both from the Blue Lias, were picked up on the tip.

Layer No.	Description of Deposit	Thickness ft. in.	Height above O.D.
—	Asphalt of modern road	0 6 to 0 9	110·57 ft. (surface)
6	Light red-brown clayey sand with occasional small stone fragments, passes into 6a below.	1 3 to 1 6	
6a	As layer 6 but contains yellow sandstone fragments and sand derived from the layer below.	up to 1 0	
5	Pale yellow "earthy" sand, apparently horizontally bedded.	0 3 to 0 9	
4	Reddish-brown sand, more "earthy" than 5, horizontally bedded, the lower part stone-free, some small gravel stones in the top 3 in.	0 8 to 0 10	
3	Pale yellow "earthy" sand, horizontally bedded.	0 1 to 0 6	
2	"Gravelly earth", the top 9 in. or so is fine gravel with sandy matrix similar to layer 3.		
1	Small chert and limestone gravel, plus a little earth and sand. (Base not reached)	together about 4 0 seen.	102·50 ft. (bottom of trench)
	Total, about	8 3	

(The descriptions of the layers are based on notes made by G. C. B., supplemented by colour photopraphs.)

The transition from layer 3 to 4 was sharp, a little more so than that from layer 4 to layer 5. The transition from layer 5 to 6a was less well defined, some of the matrix of layer 6a being apparently derived from layer 5. No information was obtained about the rock bench which presumably underlies these deposits.

Layer 5 was visible in the sewer trench (filled in by the time of A. M. A.'s visit) for some 40 ft. to the NNE. before disappearing beneath the bottom of the trench. At this point there was about 5 ft. of overburden consisting mainly of reddish-brown, sandy, loamy hillwash (slightly clayey in texture), which had been cut away along the line of the road. The ground surface at this point was 122 ft. above O.D.

The deposits which have been described form part of a terrace whose northern edge is visible about 200 ft. NNE. of the manhole. Here bedrock was exposed in the bottom of the sewer trench. There is a marked change of slope here from the gentler grade of the terrace to the south, to the steeper

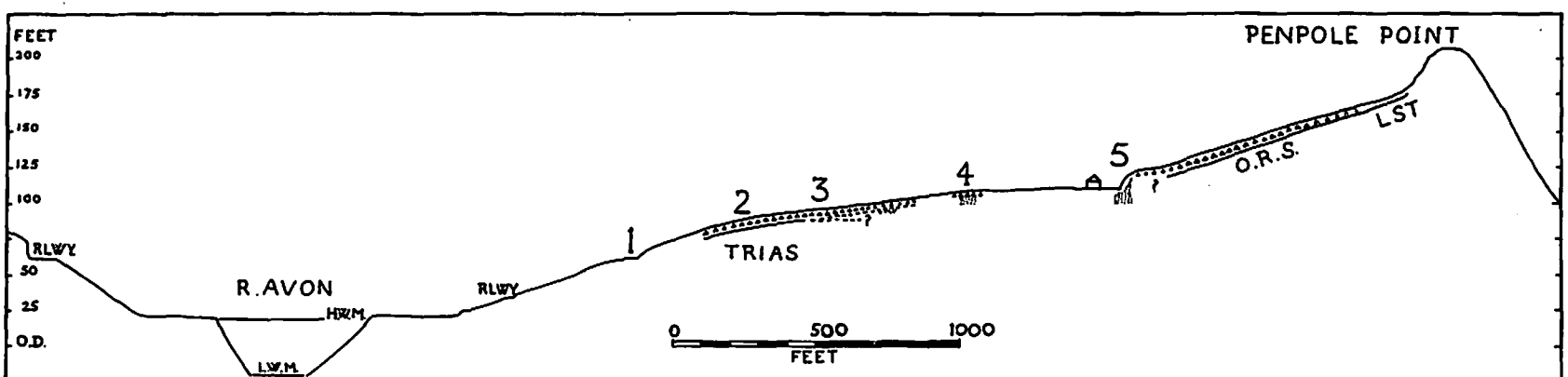

Fig. 5.—Transverse section of the Bristol Avon valley at Shirehampton to show the "Hundred Foot Terrace" (Vertical scale 2½ times horizontal scale).

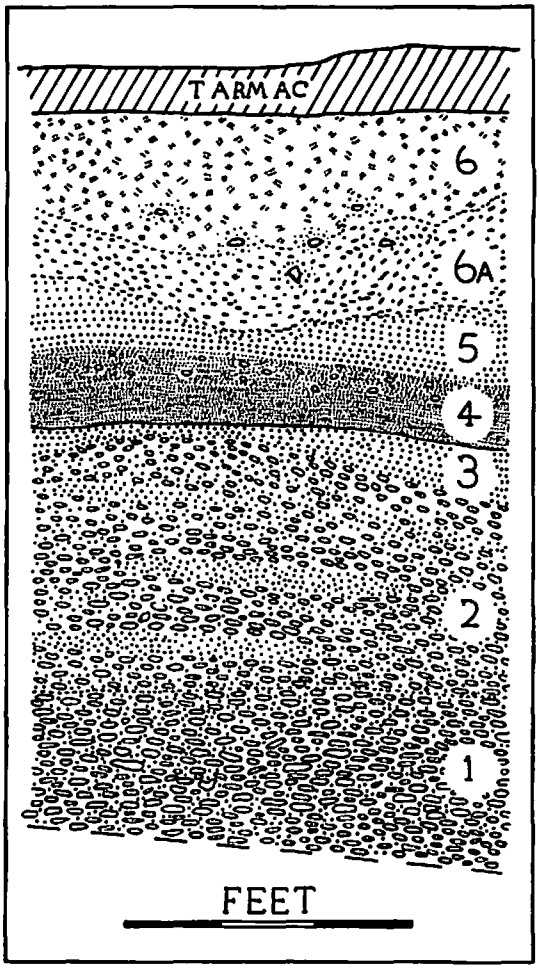

Fig. 6.—West Camp, Shirehampton; Sketch section of manhole cutting to show Pleistocene deposits (partly from a photograph).

Explanation of *Fig.* 5.—References of ends of section are 219617 and 334736. 1. Portway, A.4; 2. Burnham Road; 3. Walton Road and Allotments; 4. Shirehampton Burial Ground; 5. High Street and West Camp Site. Stratified river deposits are represented by stippling, "Head" by triangles. O.R.S. = Old Red Sandstone, LST = Limestone Shales. Trias = Keuper Marl, etc.

slope leading up to Penpole Point (about 200 ft. O.D.) The surface level of this break of slope is at about 128–136 ft. above O.D. The contractors' test holes were sited on the steeper slope above the terrace. Their details are as follows:

Test Hole 1: surface app. 188 ft. O.D.

(1) Topsoil	to 1 ft. 0 in.
(2) Red clay with limestone fragments	to 3 ft. 6 in.
(3) Limestone	

Test Hole 2: surface at 190 ft. O.D., stratification as T.H.1.

Test Hole 3: surface app. 170 ft. O.D.

(1) Topsoil	to 1 ft. 6 in.
(2) Limestone and clay	to 4 ft. 0 in.
(3) Limestone	

Test Hole 4: surface app. 148 ft. O.D.

(1) Topsoil	to 1 ft. 6 in.
(2) Sandy clay	to 3 ft. 6 in.
(3) Sand with small percentage of clay	to 8 ft. 0 in.
(4) Hard sandstone	

Test Hole 3 only was seen by A. M. A. and the descriptions of the deposits are those recorded by the contractors.

INTERPRETATION

Layers 1 to 5 are apparently waterlaid. The character of the gravel and the absence of marine faunal remains suggests that the deposits are fluviatile or estuarine rather than marine. The gravel implies a free-flowing stream whereas the sandy-loamy deposits indicate a slower current. These upper sandy deposits have clearly been truncated by erosion. The unstratified clayey sand of layer 6 and 6a is believed to be the same as the deposit seen on the slope and exposed as layers 2 and 3 of Test Hole 4. It is interpreted as a hill slope deposit formed by sub-aerial erosion of the hillside during a period of periglacial climate when the vegetation cover was largely broken down.

The differences between the stratification recorded in the Test Holes 1, 2, and 3 and that from Test Hole 4 seems to be due to changes in the nature of the bedrock. Sanders (1864, Sheet 6) shows Trias Marl extending for nearly 100 yd. to the north of the road, Old Red Sandstone on the slope and the Lower Limestone Shales higher up. The limestone of Test Hole 3 (seen by A. M. A.) is presumably the Lower Limestone Shales as mapped by Sanders. The "Hard Sandstone" of Test Hole 4 was not seen, but is probably the Old Red Sandstone, to judge from the position of the Test hole on the slope.

COMPARISONS AND GENERAL OBSERVATIONS

The deposits described above have been interpreted as largely fluviatile in origin. They form part of what R. Hughes called the Old Barrow Hill

terrace, although at that locality (Ref. 2871) the deposits were not stratified and appeared to have been largely disturbed by solifluction. The exposure in the Shirehampton Burial Ground (Ref. 3969. *Fig.* 5, 4) described by Fry (Davies and Fry 1929, p. 165) is clearly part of the same deposit. Hughes (MS., unpublished) records a bed of Jurassic gravel 6 ft. deep exposed in road widening at the top of Shirehampton Hill opposite the Vicarage (Ref. 295705). This site is within 100 yd. of the present one. He also records that when part "of the adjacent embankment was removed" (presumably the side of a cutting at this point) "a pocket of gravel, the apex of which was 3 ft. above road level" was exposed. It is however almost certain that this was made ground (information from J. Clevedon Brown). Hughes mentions pockets of gravel as having been found on the slope towards Penpole Point to an altitude of approximately 150 ft. O.D. These pockets however contained fragments of animal bone and were probably Late Pleistocene slope deposits or "head" similar to the clay with limestone fragments recorded from Testholes 1, 2 and 3 (information from J. C. B.).

The sites so far mentioned are all on the lateral part of the terrace. Sections nearer the middle of the valley were noted by Hughes in Walton Road (Ref. 2967. *Fig.* 5, 3) at approximately 100 ft. ($\pm$ *circa* 5 ft.) O.D. Here sandy and clayey loam with chert, flint and quartzose rocks, to about 5 ft. thick, rested on Trias or re-arranged deposits derived from the Trias (2–4 ft.), with Trias Marl beneath. Another cutting "30 yards away" showed the loamy deposits resting on 1 ft. of river gravel. Hughes also records a trench excavated "to drain the cemetery . . ., starting from Burnham Road" (Ref. 2867. *Fig.* 5, 2) at approximately 75 ft. O.D., rising to over 100 ft., with 5 ft. of sandy and clayey, gravelly loam resting on Trias, this bedding being traced as far east as Shirehampton Parish Hall (Ref. 3266) at about 100 ft. O.D. These exposures clearly record the riverward edge of the terrace from which the fluviatile deposits have largely been removed or re-arranged by later erosion.

At the West Camp site, the upper limit of the gravel lies at about 106 ft. O.D., and the top of the waterlaid sands as preserved in the manhole section, about 18 in. higher, although the evidence of the sewer trench suggests that they reach at least 117 ft. O.D. The flood-plain surface of the terrace at this point can hardly have been below about 120 ft. O.D., and perhaps, to judge from the topography of the site, lay between 120 and 130 ft. Hughes' observations taken in conjunction with ours suggest that the Trias bench of the terrace lies between 100 and 90/95 ft. above O.D.; although apparently in no case has the bench been recorded beneath stratified waterlaid deposits.

Many Palaeolithic implements have been found on this terrace and on a similar feature across the river at Pill and Ham Green. Some found at lower

levels are probably derived from this terrace. These Palaeoliths include hand-axes referred to the Middle Acheulian (Lacaille 1954). An early notice records "elephant teeth" from the gravels at Shirehampton (Rutter, 1829, p. 315) but there is otherwise no record of finds of Pleistocene mammalian remains. Downstream this terrace may possibly be related to an erosion feature consisting of a platform backed by a very degraded cliff, their junction lying somewhere in the region of 100 ft. above present high tide level. This feature which is first visible near Portishead, can be traced widely on the Somerset shore of the Bristol Channel and is presumably of marine origin.

Localities at which this feature has been observed include Uphill, Bleadon, Clevedon and the Nailsea area (Trueman 1939); and Brean Down, Worle Hill (Weston-super-Mare), Middle Hope (ST 345665), and Woodhill, Portishead (ST 468772). A similar feature is present on the Glamorgan shore near Barry. Immediately to the southwest of Shirehampton, in the Gordano valley, J. Clevedon Brown has observed an analogous flat at about the 100 ft. contour. If this apparent relation is correct the terrace at Shirehampton will have lain close to the head of the estuary of the river. According to Zeuner (1959, p. 356) the "Hundred Foot" marine level should belong to the Mindel-Riss, "Hoxnian" or "Great" Interglacial. No correlative terrace belonging to the River Severn is known, none of the terraces of this river being now thought to be certainly older than the Catuvellaunian (= Riss—Saale) Glaciation (Bishop 1958).

Above the Shirehampton area, the Clifton Gorge is devoid of terrace remains, but from there on, a terrace feature at about 100 ft. above the present flood plain of the River Avon can be traced intermittently at least as far as Bath. Surface finds of Palaeoliths have been reported as far upstream as Kelston (Fry 1956). In the stretch between Keynsham and Bath there are probably at least four terraces at lower levels, including a buried channel. The most important section exposed in the 100 ft. terrace was at Twerton (Victoria Gravel Pit) (Winwood 1888). There the basal deposit was a coarse gravel with some large angular blocks, and containing mammalian bones and teeth. The species recorded include *Elephas primigenius*, *Elephas antiquus* (1 tooth only), *Coelodonta antiquitatis*, *Bos. sp* and *Equus*. The poor sorting of the deposit and the fauna imply that there the aggradation took place in a period of peri glacial climate. The presence of Mammoth and Woolly Rhinoceros probably indicates a stage not earlier than the Catuvellaunian Glaciation. The *antiquus* molar may be either derived from an interglacial deposit or else represents a stray from another biotope. Cold "climatic aggradations" are characteristic of the upper reaches of rivers whereas "warm" aggradations graded to relatively high interglacial sea-level phases characterize the estuarine reaches (Zeuner 1959, p. 48–9). The exposure described in this note appears to belong to the latter class.

ACKNOWLEDGEMENTS

We are indebted to Durnford Construction Ltd. and their site foreman, Mr. W. J. Kenna, for information about the levels and for details of test holes, to Dr. D. T. Donovan for identifying the molluscs; and to J. Clevedon Brown for making available the Hughes MS. in his possession and for much help in discussion.

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