
Wilden, Hereford and Worcester

[SO 823 730]

Highlights

This is a key site with major remnants of the Severn Terraces, which have been the basis for reconstruction of depositional conditions and the sequence of changes of the river at a significant stage of its development after deglaciation.

Introduction

The site is of particular importance because it relates to a critical time in the history of the Severn valley at about 15 000 BP. At this locality, examples of each of the major terraces of the Severn exist. The terrace deposits are preserved most extensively south of Ironbridge Gorge where four major-, and up to three higher-level, terrace remnants have been identified (Wills, 1938; Beckinsale and Richardson, 1964). The lower terrace levels are traceable over considerable distances before plunging beneath the modern floodplain south of Gloucester. The sequence covers the period from the warming of the early Windermere Interstadial to the cold conditions of the Loch Lomond readvance.

Description

Wilden lies on the Worcestershire Stour, near its junction with the Severn at Stourport, and in this region all four terraces of the Middle and Lower Severn (in descending order, Kidderminster, Main, Worcester and Power House) are well developed.

The highest widely distributed terrace deposit, the Kidderminster, is traceable from the mouth of the Severn as far as Bewdley and thence upstream to the River Stour. The terrace has been correlated directly at Tewkesbury with the Avon No. 4 Terrace (Tomlinson, 1925). Wills (1938) deduced from the distribution of the terrace fragments and the erratic content that the Kidderminster Terrace pre-dated the Devensian Irish Sea glaciation, arguing that the absence of terrace fragments from the Severn Valley upstream of the Stour confluence was evidence for a Devensian glacial origin for the diversion of the Severn through the Ironbridge Gorge. It is important to note that the Kidderminster Terrace is strikingly developed along the Stour, but not along the Severn upstream from Stourport. This shows that the reach of the Severn between Stourport and Ironbridge must have been insignificant until the time of development of the Main Terrace.

The most extensive deposit is the Main Terrace which is traceable from Apley Park near Bridgnorth, where it is approximately 30 m above the present floodplain, to Gloucester, where it descends beneath the modern alluvium. This deposit has a variable width and thickness, but in places has a cross-valley extent in excess of 1 km and a thickness of up to 10 m. Wills divided the deposit into two units; a lower Main Terrace running into Ironbridge Gorge (related to Avon No. 2); and an upper terrace unit which he associated with No. 3 Avon Terrace. However, there is little evidence for the presence of multiple levels in other areas and Shotton (1953) has shown that the correlation of an upper surface with the Avon No. 3 Terrace is unlikely. The terrace spread south to the south of the Ironbridge gorge and the typical erratics, from the Irish Sea, SW Scotland and the Lake District that were transported by the Late Devensian (Irish Sea) glacier, are represented. Radiocarbon dates from No. 2 Terrace of the River Avon, which grades into the Main Terrace at Tewkesbury, suggest that this event was not earlier than 25 000 BP and possibly later, although no single absolute date has yet been determined on any of the terrace deposits along the main river.

The surface of the Worcester Terrace lies approximately 8 m below that of the Main Terrace, and is traceable from Tewkesbury to Bewdley, and also in the Bridgnorth and Bewdley area. Wills (1938) correlated the terraces with the Avon No. 1 Terrace and with the Uffington Terrace north of the Ironbridge Gorge. However, Coope and Shotton (1981) argued that the Worcester Terrace has no correlative in the Avon basin, and Shaw (1969) and Jones (1982) suggested

that correlation of the terrace fragments between north and south of the gorge may be unsound, due to the likely presence of stagnant ice in the area downstream of the Uffington Terrace at the time of its formation. Shotton (1977) and Shotton and Coope (1983), have proposed that the Worcester Terrace is an outwash deposit of the Late Devensian glaciation, although Wills (1938) and Poole and Whiteman (1961) attempted to relate the terrace to a level of Lake Lapworth. On the basis of its erratic content, it has been proposed that the Worcester Terrace could have been associated with the Ellesmere readvance (Beckinsale and Richardson, 1964; Shotton and Coope, 1983).

Attitudinally below the Worcester Terrace, there are a number of discontinuous low terraces. Wills (1938) collectively named these the Power House Terrace, and proposed that they represented the upper part of an infilling of a channel deeper than the bed of the present river. Williams (1968) recognized a sand and gravel unit up to 12 m thick under most of the lower Severn that Brown (1982) considered to be the first depositional unit of the Lateglacial or postglacial valley fill. Below Worcester, these deposits underlie the Holocene alluvium, but in the vicinity of Bridgnorth the low terrace deposits lie approximately 8 m above the current floodplain surface and at Stourport the Power House Terrace is evident up to 2.5 m above the floodplain. A Holocene floodplain sequence is also recorded at Wilden (Wilden Marsh, 50 m north of the Power House Terrace exposure) with 3 m of basal gravels, wood peat and fen peat capped by silt and clay. The sediments have provided an unusually complete Holocene pollen record which includes a flooding episode, hiatus c. 3000 BP and increased overbank deposition of silt and clay over the last two millennia (Brown, 1988).

The Power House Terrace cannot be regarded as a unitary sedimentary body and dates are not necessarily applicable elsewhere. However, at Stourport the culmination of gravel deposition has been radiocarbon dated at 12750 ± 220 BP (Shotton and Coope, 1983). The Power House Terrace is also visible at Hartlebury Common Nature Reserve (NGR 5082 0750 sic [SO 822 708]) as a distinct surface. At Harlebury Common there is also a palaeochannel (Rush Pool) in the terrace surface, infilled with peat deposited through most of the Holocene. There is, however, probably a mid-Holocene hiatus in the sequence (Brown, 1984).

Interpretation

In a study of the terraces of the lower Severn, including the Main and Worcester terraces (Dawson and Gardiner, 1987), the sedimentary characteristics were needed to indicate the character of a deposition of the sediments. Thus at the time of deposition of the Main Terrace, flow is interpreted to have been in a low sinuosity that, at least locally, was dominated by large channels containing sandy bedforms and bars (Dawson, 1985).

Several approaches were employed to estimate palaeodischarges. The calculations (Dawson and Gardiner, 1987) indicated that mean annual flood discharges during an initial stage in the deposition of the Worcester Terrace were four to seven times greater than similar discharges during the formation of the Main Terrace. It seems that Worcester Terrace mean annual flood discharges were 3.8 times greater than present-day mean annual flood values at Bewdley. It was concluded (Dawson and Gardiner, 1987) that palaeodischarges were greatest during the deglacial period, increasing after the formulation of the Main Terrace to a maximum prior to the aggradation of the Worcester Terrace, when there was a period of high sediment availability.

On an eroded surface of the remnant of the Power House Terrace, there are organic deposits that have a maximum date of about 13 000 BP and which contain a typically Lateglacial insect fauna. A similar Lateglacial deposit occurs upon Avon No. 1 Terrace gravels at Fladbury, giving a maximum possible date for the Power House/Avon No. 1 Terrace.

Organic deposits of this age occur in cutoff channel deposits in the valley bottom here (Shotton and Coope, 1983), suggesting that this time the rivers adopted a meandering mode within lateral cut and fill. The organic deposits lie upon an uneven surface of the gravels, filling some sort of hollow or channel. If, however, the river is followed below the point where the new course joins the original channel, it is seen to cut into a gravel bank at least 2 m high, bounding the conspicuous terrace remnant that lies to the south. This exposed material of the Power House Terrace is made entirely of gravel with no trace of organic deposits. This is further evidence of the irregular nature of the top of the gravels and strengthens the case that there is an appreciable lapse in time between their deposition and any overlying peats and silts of Lateglacial age.

Regularization of the River Stour entailed cutting a section through the Power House Terrace, which stands only 2.6 m above the alluvial level. In places, coarse gravel reaches the terrace surface, as can be seen where the river cuts naturally into the terrace. However, the diversionary cut made by the then Water Authority revealed a broad channel filled with sand, silts and peats, going in places below the present river level, and lying upon the terrace gravel. Seven radiocarbon dates led to the conclusion that the channel infilling commenced about 13 000 years ago and gave way to inorganic sand close to 10 000 years ago. Evidence from insect —mainly beetle — remains strongly supports the dates, and the fauna indicate climatic conditions at their warmest at the older date, not becoming really cold until the latest samples.

Conclusion

Starting with the time when the final surface of the Main Terrace formed the floodplain, not earlier than 25 000 years ago, and finishing with the deposition of the Wilden gravels prior to being overlain by channel deposits from 13 000 BP, there was an astonishingly rapid sequence of events in not more than 12 000 years, and conceivably in as little as 5000 years (levels refer to Stourport):

1. erosion into the Main Terrace at 43.5 m OD down to the rock base of the Worcester Terrace at 22.9 m OD (−20.6 m);
2. aggradation of the Worcester Terrace gravels to 31.1 m OD (+ 8.2 m);
3. erosion into the Worcester deposits down to an estimated base at 13.4 m OD (−17.7 m).

References