

# THE GEOLOGY OF PANSHANGER PARK (1)

The River Mimram flowing through the park has cut into a sequence of two thick Quaternary Gravels over the Chalk. These are known as the Westmill Lower Gravel and Westmill Upper Gravel. They are separated by a thin layer of grey chalky clay known as the Ware Till (Fig. 1).

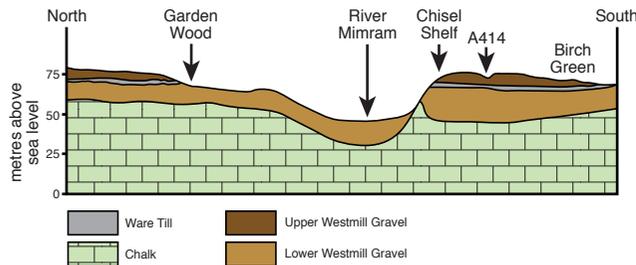


Fig. 1. North-south cross section of the Mimram Valley at Panshanger, showing Chalk, Westmill Lower Gravel (of proto-Thames), Ware Till and Westmill Upper Gravel (glacial outwash).

**The Lower Westmill Gravel** was deposited about 0.5 million years ago by the River Thames when it flowed north-eastwards across Hertfordshire into East Anglia and the North Sea (Fig. 2). It is composed almost entirely of flint pebbles derived ultimately from flint nodules in the Chalk of the Chilterns, but there are also a few quartz pebbles transported from

much older rocks in the south Midlands and even Wales. Across Hertfordshire the Thames eroded WSW-ENE channels in the Chalk bedrock, leaving intervening ridges of Chalk. An especially narrow Chalk ridge has historically been quarried at two places in the Chisel Shelf woodland on the steep southern side of the Mimram Valley (Fig. 1). The gravel filling a large channel beneath the centre of the present Mimram Valley was previously quarried in several large pits. Because these disused gravel pits are close to the present watertable, they form the large lakes that are an excellent habitat for water birds and other aquatic wildlife.

**The Ware Till** occurs higher up the valley sides and was deposited beneath a glacier that invaded north-east Hertfordshire from East Anglia during the Anglian Glaciation around 0.45 million years ago. It contains abundant fragments of chalk because the glacier had slowly traversed large areas of the Chalk outcrop in Lincolnshire, Norfolk and Suffolk (Fig. 3). However, the glacier must have originated even further north, because the till also contains far-travelled rocks (erratics) from northern England, southern Scotland and even Scandinavia. The grey clay matrix of the till was derived from bedrock clay formations in the East Midlands, some of which contain the mineral pyrite ( $\text{FeS}_2$ ).

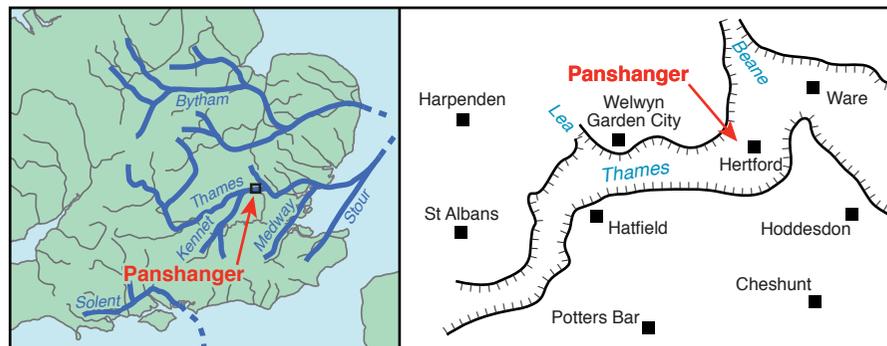


Fig. 2. Rivers of SE England 0.5 million years ago (in blue) (left) and extent of the proto-Thames Valley in the Panshanger area at the time of the Westmill Lower Gravel (right).

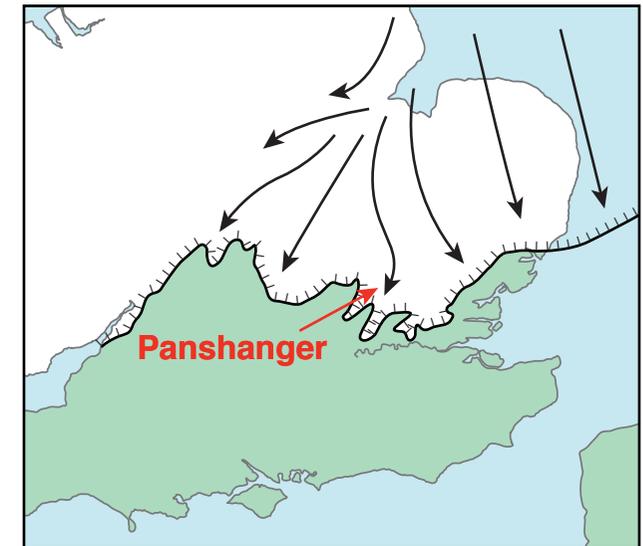


Fig. 3. Extent of the Anglian glacier and directions of ice movement in SE England about 0.45 million years ago in the Anglian glaciation.

**The Upper Westmill Gravel** forms the higher ground on either side of the Mimram Valley. It contains abundant chalk fragments, flint pebbles and the same range of erratics as the Ware Till, so it was deposited by water released from the Anglian ice sheet as it melted. The presence of chemically reactive minerals, such as chalk, pyrite and some of the other erratics, made the Upper Westmill Gravel less suitable for aggregate (e.g. production of concrete) than the Lower Westmill Gravel (dominantly inert flint).

