Local Geological Sites (LGS)

LGS are recognised for their local geological diversity and earth heritage value. Carter's Pit in Burwell was designated an LGS as it is a rare visible example of a "clunch" quarry within the Cretaceous Grey Chalk. The quarry was dug to obtain the Totternhoe Stone, a hard band of impure chalk much prized locally as a building stone. Today, the rock exposed is the Zig Zag Chalk horizon which overlies the Totternhoe Stone.

The Landscape

Burwell lies just above the upslope of the Chalk escarpment, on the band of Totternhoe Stone that stretches from around Quy to out past Burwell in a south west/north east trend. To the west at fen level, patches of peat or river terrace deposits cover the low-lying (between 0m and 5m OD) West Melbury Marly Chalk and the Gault clay further out into the Fens. To the east, the ground gradually rises into the White Chalk Group.

Historical importance

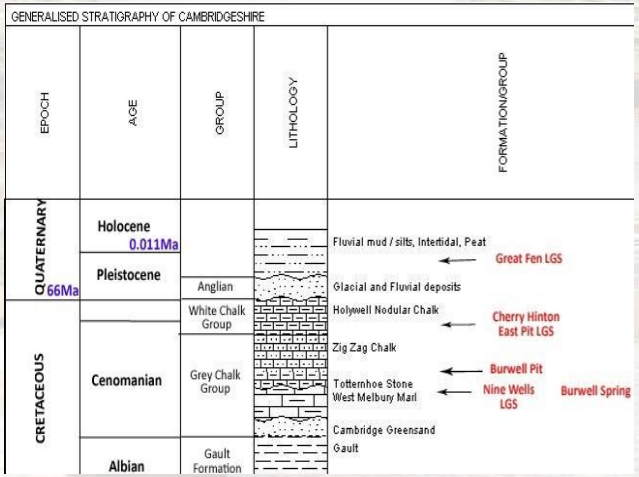
The village is pockmarked with clunch quarries, Carter's Pit being the most extensive. Stone from Burwell was used in many notable buildings in Cambridge and also Ely Cathedral. The earliest record is 1252 and the last working was 1952. The village museum has some excellent exhibits relating to Carter's Pit and the clunch workings.

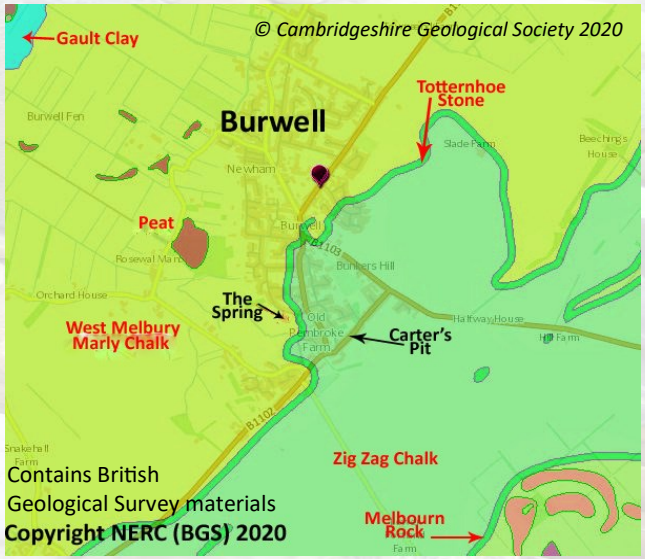
Image taken from an exhibit in Burwell Museum

The Outcrop

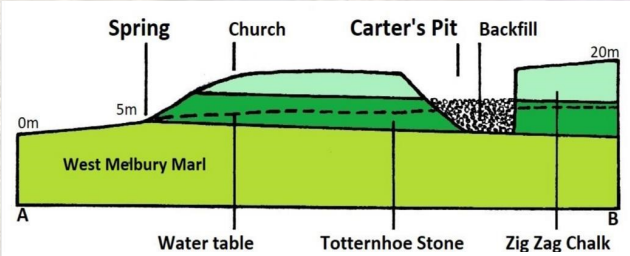
The main reason for the quarry was to reach the Totternhoe Stone (locally called Burwell Rock or clunch) (see schematic section). This is a harder Chalk band that contains more broken shell fragments (Inoceramus bivalve) and less clay than units below. It can be traced from Bedfordshire through Cambridgeshire and, being harder, it is preferred as a building stone. This band is said to be comparatively fossiliferous with probable examples to be seen in the Sedgwick Museum. The base of this unit is fractured which makes it more pervious: this is the junction from which springs issue. This horizon is approximately 6m thick, the zone where this rock was quarried is likely to be below the current backfilled floor. Most of the visible exposure is the Zig Zag Chalk, a softer finer grained chalk which tends to have a curvilinear blocky weathering pattern. This rock was used in local lime kilns and perhaps in the vernacular buildings. It also has marly bands to its base which is unconformable with the Totternhoe Stone below.

Fossil Terebratulid brachiopod in local Chalk wall





Geology map showing the relative position of the Burwell LGS sites



Schematic section (not to scale) to show relationship between geological structure, relief, and drainage. AB represents c. 2kms. Vertical exaggeration c. x12.

Image of old workings in the quarry (copyright NERC 2021)

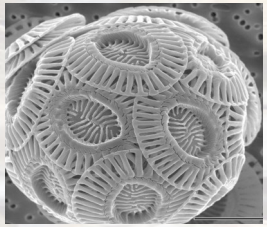
How did chalk form?

Chalk rock is only found in the Cretaceous (named from the Latin for "chalk") and is fairly unique in that it is not being formed at the present day—thus giving the lie to Hutton's theory of uniformitarianism! It spreads from Northern Ireland, across most of Britain to Denmark and N. France.

Generally, the Chalk was deposited in sea temperatures of over 20°C with a CO2 rich atmosphere causing dense marine algal blooms. These blooms were composed of Coccolithophores which in turn were made up by collections of calcareous discs (Coccoliths). When they died, the discs disaggregated and sank to the sea floor. Deposition rates have been estimated to be 1cm in 500 –1000 years.

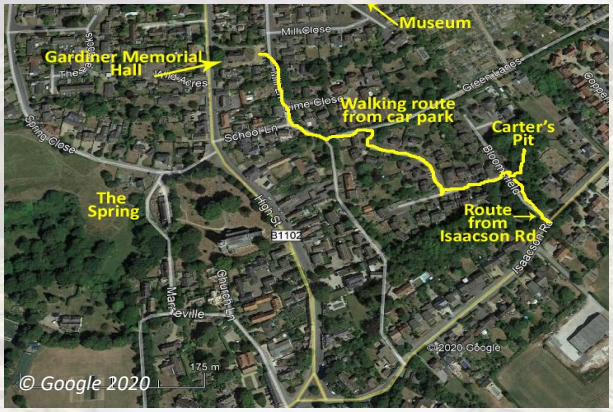
Although seemingly uniform, the Chalk is actually quite variable and some distinctive layers can be traced for tens of miles, if not further. The Lower Chalk, now called the Grey Chalk, is more impure, having distinct hard bands and fossiliferous layers. The purer White Chalk above (for example, the cliffs at Dover or Old Harry Rocks in Dorset) is often typified by flint horizons (much sought by Neolithic Man). These flints are silicon nodules often formed around body and trace fossils. The silicon came mostly from sponges which took a lot of time to dissolve. Flints are mostly seen in the fields in southern Cambridgeshire.

Burwell in the Cretaceous was on the edge of a sub-sea swell called the Anglo - Brabant Ridge. This gave shallower seas and the Chalk deposits are classed as "Transitional" between the different "chalks" to the north (Hunstanton) and those of the south (e.g. Kent and Sussex).



A scanning electron microscope image showing the calcite plates (coccoliths) of a coccolithophore
Image sourced from: Alison R. Taylor; CC BY-2.5

How to get there: The OS co-ordinates of the site are TL583662. Burwell is reached by bus from Cambridge and Newmarket. The bus stop is next to the church on the High St. Some parking is behind the Gardiner Memorial on the High St. The pit is accessed from the Bloomfield estate - a path to it leads off to the right at the base of the entrance hill: between the pumping station and the yellow grit bin. The site is owned by East Cambs District Council (Open Spaces). Keep away from th quarry face and do not damage the exposed faces. can be overgrown by brambles and there are a few steps to negotiate.



There is a second LGS in Burwell, Castle Spring, within walking distance of this quarry. Download the leaflet from **www.cambsgeology.org.**

Also known as Geosites (previously, Regionally Important Geological Sites), LGS are the most important sites of local geoconservation value. Further information on LGS and the geology of Cambridgeshire can be found on our website.

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Carter's Pit

Burwell

Cambridgeshire Local Geological Site

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