

# Lancashire's Geology

## Lancashire (including Blackburn with Darwen and Blackpool)

The underlying geology of Lancashire is comparatively simple and is formed from four major rock types from three main geological periods:

The **Lower Carboniferous** is represented by the shallow marine Carboniferous Limestone which outcrops at Silverdale and the Ribble Valley, running through Clitheroe into Yorkshire. The deltaic, **Upper Carboniferous** Millstone Grit, forms the core of the upland area of the Forest of Bowland and the higher moors to the east of Chorley, while the succeeding Coal Measures underlie Blackburn, Accrington and Burnley in the south of the County. The coastal lowlands of the west of the County are generally formed of **Permian and Triassic** sandstones and mudstones.

Lancashire was completely covered by ice during the last glacial advance of the **Quaternary**, or Ice Ages, and as a consequence the solid geology is largely covered by layers of glacially derived sediments. These form a skin of superficial deposits, or till, which in places are so thick as to eradicate all visual clues as to the nature of the underlying solid geology. This drift has been eroded and shaped by fluvial, marine, aeolian and frost processes, which combine to create distinctive features and landscapes.

### Geological highlights:

- The Carboniferous Limestone of the Lancashire area formed on the bed of a warm, shallow sea which covered this area some 340 million years ago. An important feature of the Carboniferous limestones of this area is the occurrence of mound-like structures, generally referred to as **reef-knolls**, which formed during deposition of lime-rich muds, partly as a result of the growth, on the sea-bed, of large colonies of marine animals, probably crinoids (sea-lillies) and bryozoans. The small hills running east-west between the villages of **Worston and Downham near Clitheroe** are some of the best known examples of these early Carboniferous reef-knolls.
- At **Silverdale** in the north-west of Lancashire the Carboniferous Limestone supports the most important single example of **limestone pavement** in Britain. This weathering feature of hard limestones arises through the gradual dissolution of the limestone by rainwater, which is slightly acidic. This process creates a number of diagnostic features commonly including massive, flat, tabular limestone blocks (clints) with intersecting vertical fissures (grikes). Pockets of soil formed in the grikes and surface depressions on the clints support the widest range of characteristic plant species recorded on any limestone pavement in Britain. The shady grikes shelter harts-tongue fern and other fern species, while plants such as tutsan and bloody cranesbill grow on the pavement. Due to the build up of organic material some of the surface depressions contain plants associated with more acid conditions such as tormentil, often in close association with typical lime-loving species.
- **Pendle Hill**, to the east of Clitheroe is a striking and prominent hill rising to 557m which is of geological and cultural significance. The hill is formed by Upper Carboniferous shales and sandstones with the Pendle Grit Formation, the oldest Millstone Grit sandstone seen in the central Pennines, forming the resistant cap to the Hill. This is underlain by the Upper Bowland Shale Formation, the resistant Pendleside Sandstone and the Lower Bowland Shale Formation respectively, their outcrops being marked by changes in slope. From a cultural perspective, Pendle Hill is a place of inspiration for Quakers, as it was here that their founder, George Fox (1652), allegedly had a visionary experience on top of the hill. The Hill is also strongly associated with the Pendle Witches of 1612.
- The post-glacial deposits on the **Fylde Plain** to the south of the Ribble Estuary largely comprise **windblown sands**, the Shirdley Hill Sand, with small patches of underlying till and marine clay. In addition, there are major areas of basin peat in the east around Simonswood Moss and coastal peats south-east of Hightown. The coastal peats together with the Shirdley Hill Sands have produced soils which are of high agricultural quality (Grades 1 and 2) over much of the area. The Shirdley Hill Sands are a very pure silica sand that has been extracted in the area for use in the glassmaking industry. Excavations have shown that glass making occurred in the Simonswood area during the 17th Century, probably by French Huguenot glassmakers. As late as the 1970's the fields around Bickerstaffe and Lathom were still being excavated for the Shirdley Hill sand by the Pilkington Brothers Glass Company.
- In certain areas of the County there are a number of drumlin fields. **Drumlins** are smooth, streamlined hills composed of till that have their long axis oriented in the direction of ice movement; the blunt nose points upstream and the gentler slope tails off downstream. One such area of drumlins occurs around the **mouth of the River Wyre** in north-west Lancashire, where a number of drumlins occur, all of which are orientated north-east to south-west. These were probably deposited during the melt of the last great ice sheet probably around 9000 years ago and consist of a variety of materials including sands, clays and gravels.

*All information on this page has been reproduced from the Natural England website and is subject to © Natural England Copyright 2012. The full details can be found on the Natural England website by clicking here.*