CLARE

AREA OF COUNTY: 3,147 square kilometres or 1,215 square miles

COUNTY TOWN: Ennis

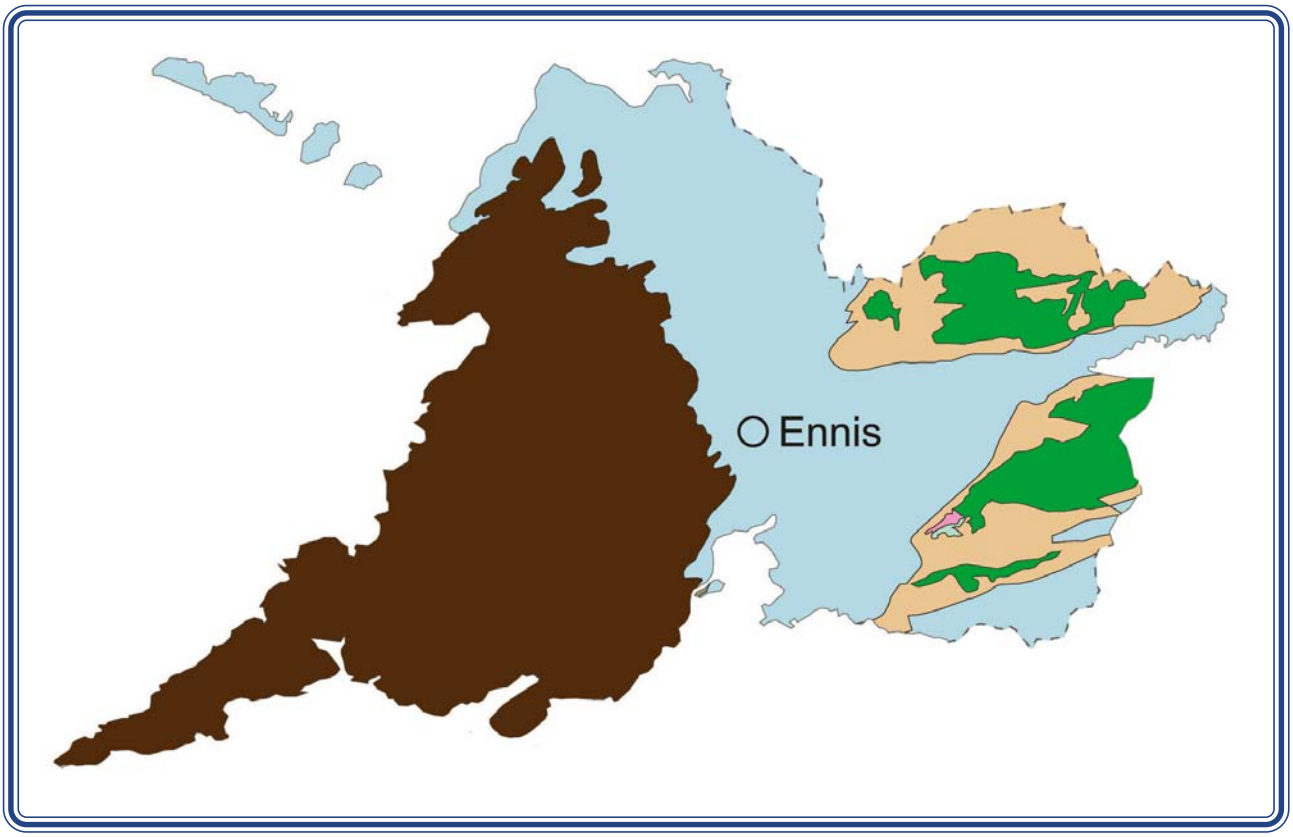
OTHER TOWNS: Ballyvaughan, Corrofin, Doolin, Ennistymon, Lisdoonvarna

GEOLOGY HIGHLIGHTS: Limestone topography, Liscannor Flagstones, Karst landforms and caves

AGE OF ROCKS: Ordovician - Carboniferous

Upper Carboniferous sandstones and shales, Cliffs of Moher

These impressive cliffs are composed of sediments deposited in a large river delta that built into an ocean lying towards the southwest during the Upper Carboniferous.



Geological Map of County Clare

Pink: Ordovician; **Green:** Silurian; **Beige:** Devonian sandstones; **Light blue:** Lower Carboniferous limestone; **Brown:** Upper Carboniferous shales and sandstones

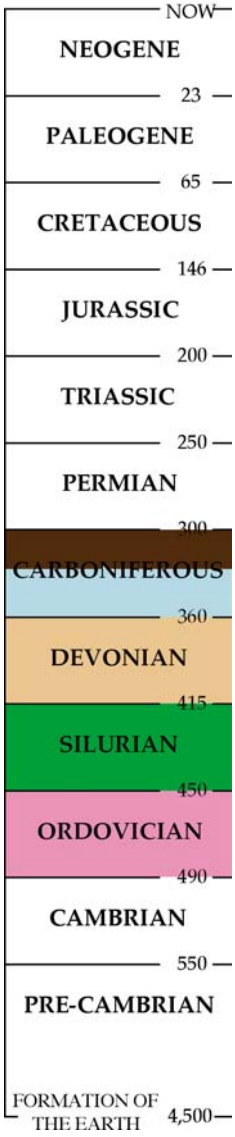
Geological history

The geology of County Clare can be conveniently divided into three regions. In the east of the County Silurian sediments deposited in a shallow sea about 440 kmillion years ago [Ma] are surrounded by Devonian sandstones (415 to 360 Ma) laid down when the region was land. Rising sea level in the early Carboniferous, around 360 Ma, drowned the Devonian landmass and deposited a great thickness of limestone, now so clearly exposed across the Burren and beneath the lowlands to the east. Later in the Carboniferous, around 320 Ma, rivers flowing from the south-west built deltas into this shallow sea. As more and more sand and mud was deposited on these deltas, they often became unstable. Sometimes enormous volumes of sediment slumped down into deeper water, breaking and folding the still soft layers as it went. These delta sediments, and some of the spectacular slump folding in them, are superbly exposed in the cliffs of south-west Clare.

During the Ice Age of the last 2 Ma or so, the glaciers and ice sheets

A limestone landscape at Mullaghmore in the Burren. Limestone has been gently folded during the Variscan mountain-building episode

Upper Carboniferous strata at Fisherstreet



Geological timescale showing age of rocks in Clare.

stripped away much of the shale and soil cover on the limestone. Exposed to the high rainfall of the west of Ireland, the limestone has been slowly dissolved both above ground and below, in a process called karstification.

Karst topography and caves

The Burren is a classic karst landscape where all or most of the river drainage is underground. Similar landscapes include Croatia and Yorkshire. As the ice of the last Ice Age melted the water carved out great caverns deep in the limestone as it descended down cracks in the rocks. Now rain water may widen the joints and cracks on the surface (called clints and grykes) and streams disappear underground through swallow holes. Ailwee Cave is an extensive cave system that once was the home to Brown bears 9,000 years ago. As water dripped through caves calcium carbonate can get deposited as stalactites (pointing downwards) or stalagmites (pointing upwards) which may merge to form a column. Occasionally large deep circular depressions called poljes form by solution. At Carran this feature is 200 feet deep and one mile long. Dry river valleys are a common feature of the Burren when the

water has disappeared underground. The Cahir River is the only overground river in the Burren, and it flows over glacial till that is impervious.

The Liscannor Flagstones

Some of the Upper Carboniferous rocks contain fossils. Goniatites are small coiled-shelled relatives of the squid that are found in the marine shales, but the flagstones quarried at Liscannor are more widely known. These contain trace fossils or tracks called *Olivellites* (pictured right) that meander across the surface and produce a beautiful pattern. The muddy sand across which they moved was deposited in deepish water and small arthropods burrowed through it in the searh for food. While the burrows have been preserved there is no sign of the organism that made them. As the rock contains flecks of the silvery mineral mica it can be easily split and was once used for roofing, and now for decorative paving.

Mining and Quarrying

Various small mines were worked in the 19th Century for lead, silver, zinc and copper. One of these, at Kilbreckan, near Quinn, produced several unusual minerals. In 1841 a distinctive silver-bearing mineral was sent from here to James Apjohn, a professor at Trinity College Dublin. His analysis showed that it was a new mineral, which he named Kilbrickenite after the locality where it was first found. Phosphate was mined for the manufacture of chemical fertilisers at several localities along the southern edge of the Burren, but none of these sites have been worked for more than half a century. Today a few large limestone quarries, mostly in the south-east of the county, are worked for aggregate and road metal.

Suggested reading

• Mike Simms: *Exploring the limestone landscapes of the Burren and the Gort Lowlands* (2006) Mike Simms, Belfast.

Map adapted with permission from Geological Survey of Ireland 1:1,000,000 map 2003.
Image credits: Mike Simms 1, 3 (right), 4; Patrick Wyse Jackson 3 (left).

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