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KILDARE

AREA OF COUNTY: 1,693 square kilometres or 653 square miles

COUNTY TOWN: Naas

OTHER TOWNS: Athy, Kildare, Maynooth, Newbridge

GEOLOGY HIGHLIGHTS: Chair of Kildare inlier, the Curragh glacial deposits, warm springs

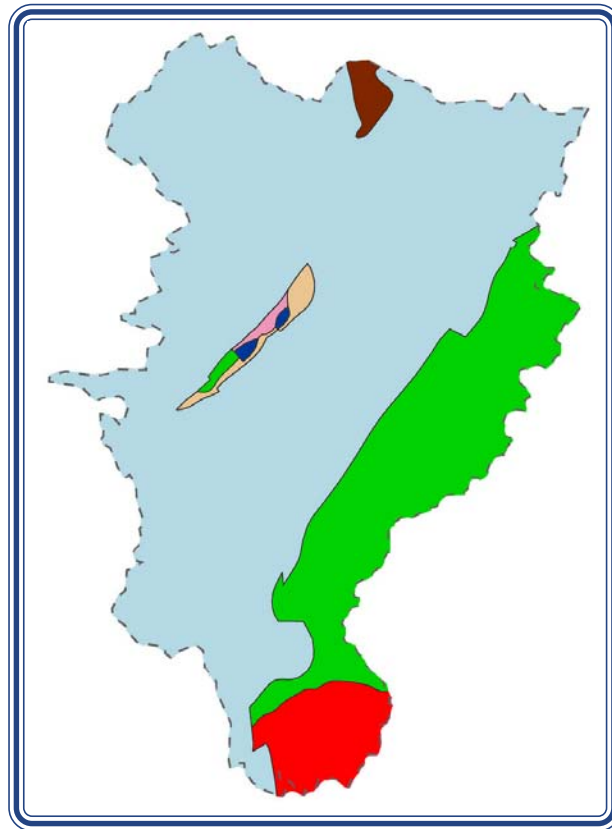
AGE OF ROCKS: Ordovician to Carboniferous



The Curragh

These grassland plains are underlain with glacial sand and gravel. The hills of the older Kildare Inlier act as landmarks in the distance.

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Geological Map of County Kildare

Pink: Ordovician; **Dark blue:** Ordovician volcanic rocks; **Green:** Silurian; **Red:** Granite; **Beige:** Devonian sandstones and conglomerates; **Light blue:** Lower Carboniferous limestone; **Dark Brown:** Upper Carboniferous shales.

Geological history

The oldest rocks in Kildare are of Ordovician age (490-450 million years ago [Ma]) and are in the Kildare Inlier (an area of older rocks surrounded by younger rocks). Silurian rocks (430 Ma) also occur there and in a wide belt in the southeast of the county. All these rocks were formed under an ocean that separated two continents. At the Chair of Kildare and at the Hill of Allen there were two volcanic islands for a short time. The hard volcanic rocks they erupted are more resistant to erosion and have become isolated hills in the plains of Kildare. When the volcanoes were erupting, the shallow waters around them were populated by marine animals and some of the rocks formed then now contain fossils from that time.

As the ocean closed the mud and sand deposited in the Silurian was converted into rock and became deformed and uplifted as part of a mountain range, not



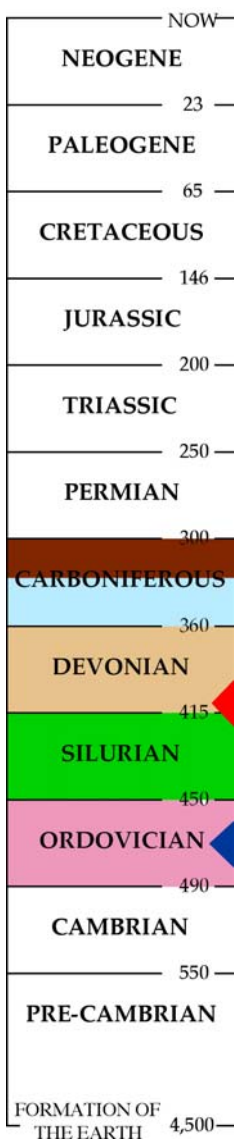
Crinoids in Carboniferous limestone at Ballykane Hill

just in Kildare but throughout Ireland. Around 400 Ma during the Devonian the rocks were then affected by a chain of plutons of granite that were intruded throughout Leinster. The Tullow Granite is found in the south of the county, but is shared with Carlow and Wicklow. It was formed underground and the molten igneous rock cooled slowly.

The rocks that covered it have since been eroded away.

General subsidence permitted the sea to invade the lower ground from the south during the Carboniferous period. The depth of the sea and type of bottom varied from place to place, producing a variety of limestone (carbonate) sediments at any one time; for instance, oolites, which form in only very shallow water occur mainly around the present Kildare Inlier. After a time carbonate mud banks or "reefs" (Waulsortian Limestones) developed as upstanding mounds on the sea floor across parts of the Kildare area (and much of the Midlands of Ireland). Growth of these mounds was probably due to the rapid accumulation of fine carbonate mud produced by unknown organisms. A rich fauna (including sea lilies (crinoids) pictured above) and varying micro-organisms lived on the mounds.

Volcanic activity also occurred near Edenderry during a period of subsidence and faulting. The Carboniferous coalfield rocks (like those at Castlecomer) may once have covered Kildare, but have been eroded away since. During the Tertiary period, tropical weathering may have affected the landscape but the biggest changes were during the last 1.6 million years when ice ages came and went. The last one ended about 10,000 years ago, giving Kildare some key geological characteristics. Meltwater from the ice sheets deposited enormous volumes



Geological timescale showing age of rocks in Kildare.

of sand and gravel, up to 70m thick in places such as the Curragh. After the ice melted big depressions surrounded by glacial deposits formed shallow lakes where the great raised bogs of the midlands, like the Bog of Allen built up. Likewise, spreads of blanket bog that cover the upland areas of the county to the east formed in the 10,000 years following the end of the Ice Age. The alluvial deposits of the rivers, including the Liffey and Barrow, were also deposited during this period.

Warm Springs

Kildare is known for having some warm springs. Whilst these are not really hot like in Iceland or active volcanic areas, they are notable in Ireland, with temperatures a few degrees above normal. The warm water probably comes from deep underground along old fault lines. Louisa Bridge warm spring (right) near Leixlip was a Victorian spa!



Mining & Building Stones

Small old quarries in limestone indicate local use for building stone in the past. Modern quarrying for aggregate occurs in several areas, usually to supply the Dublin region or for use in Kildare. The andesite volcanic rocks of the Hill of Allen (pictured right) are very good for using on road surfaces and for railway ballast amongst other uses. The rock needs crushing, but sands and gravels are more easily extracted from the ground, particularly around the protected area of the Curragh.



Quarry for road materials at the Hill of Allen.

Map adapted with permission from Geological Survey of Ireland 1:1,000,000 map 2003.
Image credits: Matthew Parkes (all).