GALWAY

AREA OF COUNTY: 6,148 square kilometres or 2,373 square miles

COUNTY TOWN: Galway

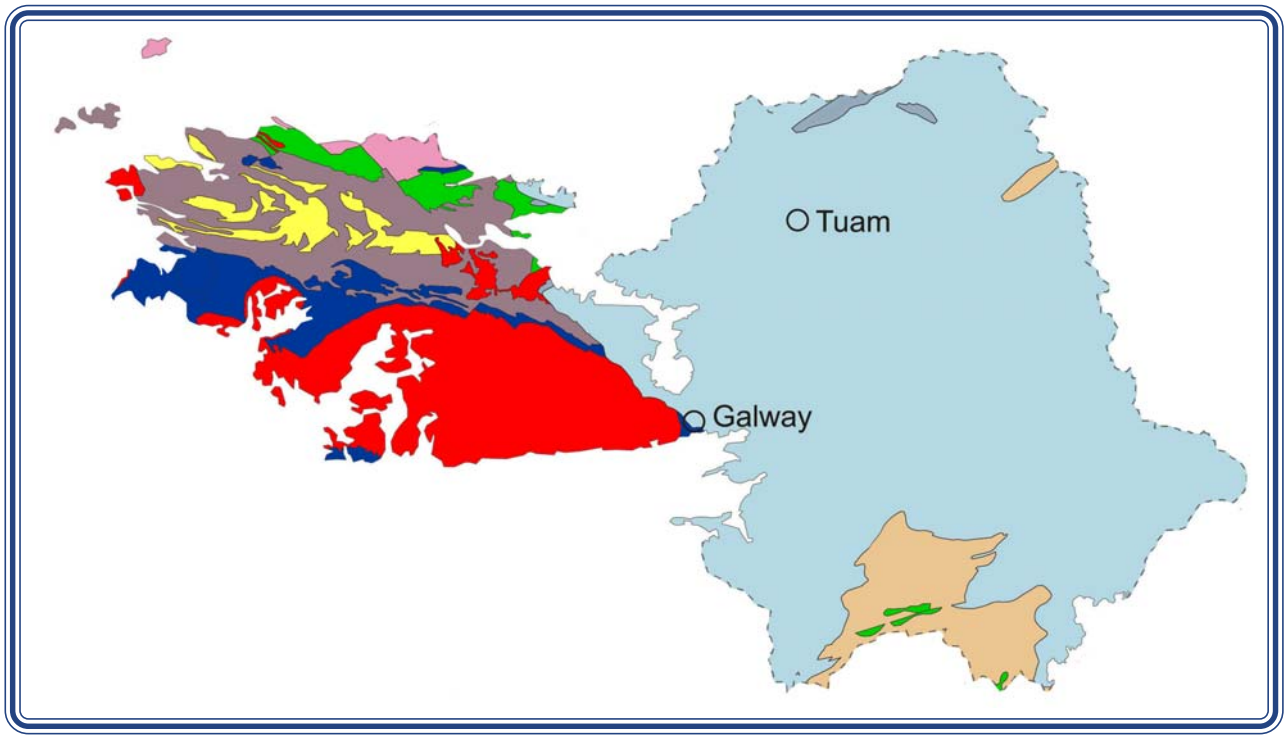
OTHER TOWNS: Athenry, Ballinasloe, Clifden, Gort, Loughrea, Oughterard, Portumna, Tuam.

GEOLOGY HIGHLIGHTS: Galway Granite, Connemara metamorphic rocks and mountains, Connemara marble, Glengowla Mine, Aran Islands

AGE OF ROCKS: Precambrian; Cambrian-Carboniferous; Tertiary

Bencollaghduff, Twelve Bens, Co. Galway

The ancient quartzite peaks of the Twelve Bens, deeply eroded by glaciers during the last Ice Age.



Geological Map of County Galway

Pale purple: Precambrian Dalradian rocks; **Pale Yellow:** Precambrian quartzites; **Pink:** Ordovician; **Dark blue:** Ordovician igneous & volcanic rocks; **Green:** Silurian; **Red:** Granite; **Beige:** Devonian sandstones and conglomerates; **Blue grey:** Lower Carboniferous sandstones; **Light blue:** Lower Carboniferous limestone.

Geological history

Galway has some of the most complex geology in the whole of Ireland. Ancient metamorphic rocks such as schist and gneiss (pronounced as 'nice') occur through Connemara from Galway City to Inishbofin. The whole of Connemara is a very big structure with massive folds. It is part of the Dalradian sequence that also occurs in North Mayo, Donegal and through into western Scotland. There are even older Precambrian rocks in a very few places exposed by massive faults. Many large areas, such as Connemara, are defined as terranes. These are sequences of rocks that were formed in one place and are now alongside other sequences that were originally formed a long way apart. Major faults in the Earth's crust (perhaps like the San Andreas Fault in California) have brought them together over millions of years.

The Twelve Bens of Connemara are made of metamorphosed sandstone, which is quartzite. They form hills because they are more resistant to erosion over long periods than the other rocks. Running along the base of the hills are areas of metamorphosed limestone, which is marble. Marble is white if the

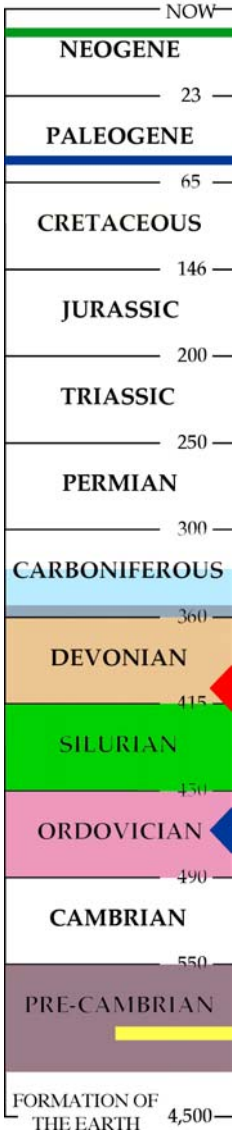
Drumlin at Salthill - this is a good place to see a cross-section through such a structure.

limestone was pure, but the addition of a few impurities means that the Connemara marble has green bands through it.

The Galway Granite is found in south Connemara from Galway City through to Roundstone. It is not one single rock type, but was formed by the intrusion of nine or so large granite masses (called batholiths or plutons) about 400 million years ago. It was formed underground and the molten igneous rock cooled slowly. The rocks that covered it have since been eroded away.

At the same time as the granite was injected below ground, Devonian age rivers were eroding hills and depositing sands and gravels in lower lying areas. Some of these sandstones and conglomerates are seen in Slieve Aughty in the south of the county. Appearing as small inliers, or 'windows' to see below these rocks, are Silurian age slaty rocks. Virtually all of Galway east of the city is covered by limestone, deposited in a shallow tropical sea around 330 Ma ago. This has been eroded down over millions of years, since it was formed and then raised to become land. Although it has some caves in it and some karstic features it has not become like the Burren in Clare because in the Ice Ages a thin veneer of sediment was deposited on most of it. So the limestone terrain of east Galway has good soils for grazing with neat fields and limestone walls. In the Aran Islands, the terrain is more like the Burren, with the only evidence of glaciations being some odd boulders of Galway Granite on the bare limestone pavement.

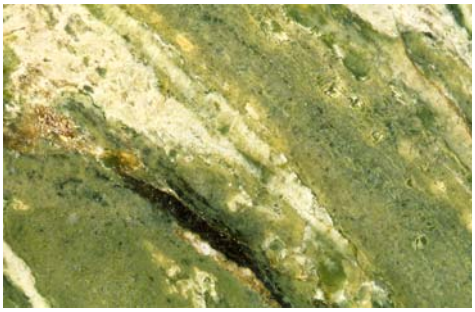
Rocks younger than the Carboniferous are found in only a few tiny patches in Co Galway (not shown on map). A few dolerite dykes, fractures up which volcanic lava moved around 60 Ma ago in the Paleogene (blue on timescale), have been found in the extreme west. Near Headford, pockets of sand and lignite (brown coal) around 3 Ma are preserved in deeply weathered limestone (green on timescale).



Geological timescale showing age of rocks in Galway.

Galway fossils

The metamorphic and igneous rocks of Connemara do not contain fossils, but the limestone plains of east Galway include many fossils, as the limestone represents a former tropical sea, teeming with life. Some of the Ordovician and Silurian rocks between Killary harbour and the Connemara mountains do contain fossils of shells, trilobites, graptolites and nautiloids for example but only in certain places.



Quarry at Streamstown, Clifden (left) where Connemara Marble (right) is extracted

Mining & Building Stones

Historical mining of lead, zinc and other minerals took place in many small mines in the 1800s, but especially around Oughterard and Maam. The tourist show mine at Glengowla is the best place to see how these mines operated. Stone extraction has been a feature of Galway for centuries with such diversity of rock types. Most notable are the Connemara marble quarries around Clifden and Recess. This marble has the mineral serpentine giving it a streaky green appearance, well known for ornamental uses. Limestone quarries near Galway City also produced Galway Black Marble – really a very dark polished limestone. In the 1950s revival of Irish mining, Tynagh Mine took special place as the first of the big new mines that produced metal ores in Ireland. Near Headford, some wind-blown pure sands collected in hollows and caves and have been quarried for glassmaking in recent decades.

Suggested reading

• Martin Feely, 2002. *Galway in Stone. A Geological Walk in the Heart of Galway*. Geoscapes, Dublin.

Map adapted with permission from Geological Survey of Ireland 1:1,000,000 map 2003.
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