DUBLIN

AREA OF COUNTY: 921 square kilometres or 356 square miles

COUNTY TOWN: Dublin

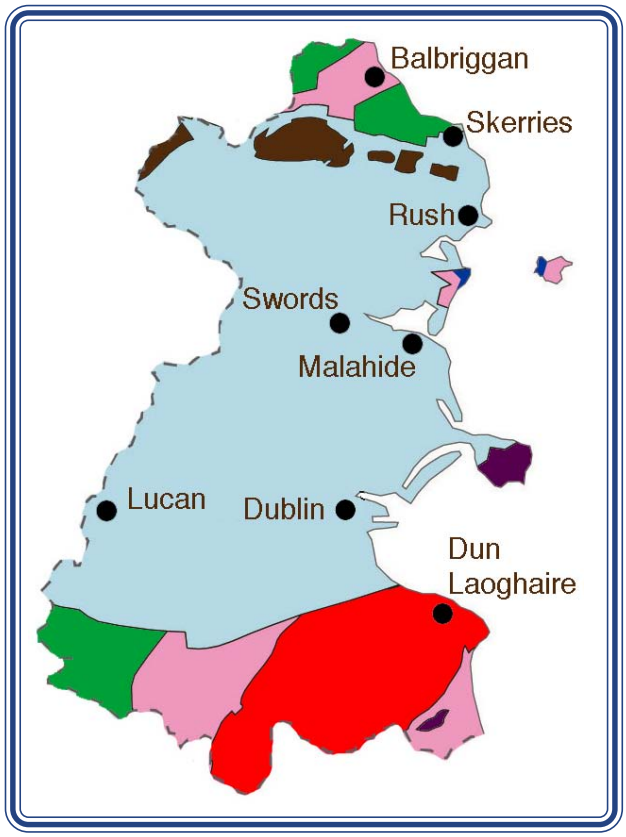
OTHER TOWNS: Balbriggan, Dun Laoghaire, Lucan, Malahide, Rush, Skerries, Swords

GEOLOGY HIGHLIGHTS: Howth Head quartzites, Granite mountains, volcanic rocks at Portrane and Lambay, Carboniferous limestone along north Dublin coast, Killiney metamorphic rocks and glacial deposits

AGE OF ROCKS: Cambrian to Carboniferous; Quaternary

Folded Carboniferous limestone at Loughshinney, north County Dublin

These limestones were folded into tight folds during a period of mountain-building when Africa collided with Europe.



Geological Map of County Dublin

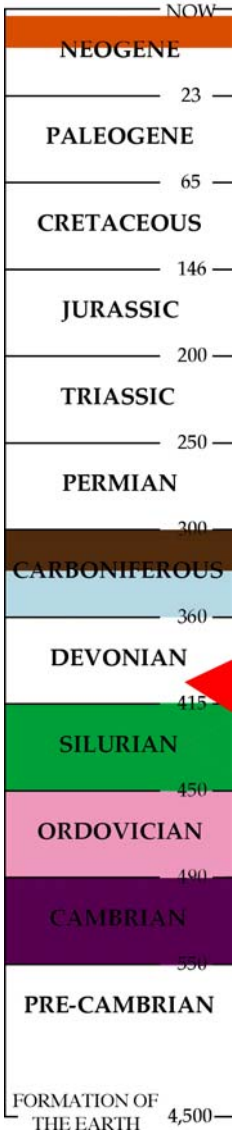
Purple: Cambrian; **Pink:** Ordovician & Silurian; **Green:** Silurian; **Dark blue:** Ordovician volcanic rocks; **Light blue:** Lower Carboniferous limestone; **Brown:** Upper Carboniferous shales; **Red:** Granite.

Geological history

The oldest rocks in Dublin occur on Howth Head where Cambrian shales and quartzites crop out. These were deposited in an ocean 500 million years ago [Ma] that separated two continents. It slowly closed so that during the Ordovician period (490-450 Ma) the crust was unstable and volcanoes began to erupt at what is now Portrane and Lambay producing a distinctive green flecky rock called Andesite. These rocks were deposited in a shallow ocean than contained many organisms including corals and trilobites. Later during the Devonian period (405 Ma) further disruption caused the granite of the Dublin mountains to be injected deep within the surface crust. As it did so it baked the rocks through which it moved and metamorphosed them into schist which can be seen at Killiney. The molten granite magma slowly cooled and formed the pale rocks that were once used as a building material in the city. Some muddy sediments were deposited in the Silurian sea, but any

Ordovician limestones form the cliffs at Portrane while a range of other rocks types are found on Lambay Island.

Devonian rocks have now been eroded away. During the Lower Carboniferous the area was covered by a warm shallow tropical seas where corals, crinoids, brachiopods, lived. Later rivers carried muds and sands that overlie the limestone in north Co. Dublin. During the Ice Age a glacier flowed down the Irish Sea and carried rocks from Scotland including a distinctive bluish microgranite from Ailsa Craig, and this ice met with ice flowing from the Irish Midlands. When it melted it deposited glacial till or boulder clay which is well-exposed along Killiney beach.



Geological timescale showing age of rocks in Dublin.

Dublin fossils

The oldest fossils from Dublin are those contained in the Cambrian slates and shales on Howth Head - there are no shells to be seen, instead only the traces and burrows preserved in the rocks. These are called trace fossils, and include *Pucksia machenri*. The Ordovician limestones at Portrane contain many fossil corals and brachiopods preserved in silica (glass) and geologists have extracted them by dissolving away the limestone that surrounds them. On the coast at Malahide and Portmarnock fossils of crinoids, brachiopods and bryozoans can be seen in the black Carboniferous limestones. In the mid-1800s a large number of skeletons of Giant Irish Deer (*Megaloceros giganteus*) which became extinct only 10,000 years ago were dug up from Ballybetagh Bog, close to Enniskerry, near the Wicklow border.

Mining and Building Stones

Lead mining in the 1700 and early 1800s took place in very small mines at Clontarf and Killiney. A well known mine at Ballycorus in south Dublin provided some lead, but soon ran

Christ Church Cathedral: Dublin's oldest stone building. Built in 1192 of black Calp Limestone quarried locally, imported cream-coloured Dundry Limestone and later roofed with green slates from Westmoreland, England.

out of ore. The lead smelter built on site was kept going by ore brought from Glendalough and other Wicklow mines. There was a big chimney built about 1.5 km away up a hill, to carry away toxic fumes. Some of the lead condensed on the inside of the tunnel and was collected every few months. The chimney has lost the brick top but is still a well known landmark.

Over 100 different stone types have been used for buildings in Dublin, but of these few have been quarried in the County. The most famous Dublin stone is Calp Limestone which is a black muddy limestone that was used for Christ Church Cathedral and the Old Library in Trinity College. Dalkey Quarry provided granite blocks for Dun Laoghaire pier, and many buildings used Leinster Granite from near Blessington or Limestone from Milverton near Skerries. The harbour at Dun Laoghaire is so big it shows up easily on satellite images. The rock to build it came from Dalkey Quarry and was carried down by a small railway. Dalkey and many smaller quarries also provided the granite building stone seen all over Dublin in larger houses and structures. Today many buildings are constructed of concrete or blocks which is produced from Carboniferous limestone quarried at Feltrim and Belgard near Clondalkin.

Geology museums and information

• Geological Museum, Trinity College, Dublin 2 (wysjcknp@tcd.ie); National Museum of Ireland (www.museum.ie); Geological Survey of Ireland (www.gsi.ie)

Suggested reading

• Patrick Wyse Jackson: *The Building Stones of Dublin* (1993) Country House.
• Patrick Wyse Jackson and others: *Field Guide to the Geology of some localities in County Dublin* (1993) TCD & ENFO.

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