

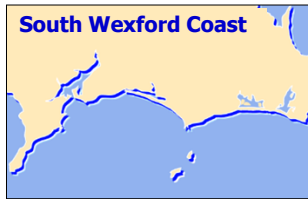
Common Fossils at Hook Head

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Version 201705

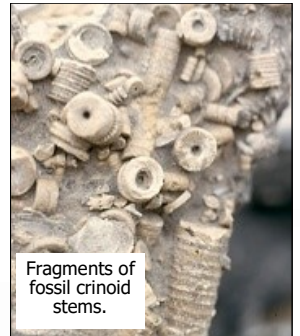
Hook Head is the western boundary of the South Wexford Coast, a natural heritage coastline.

Fossils are the preserved remains of plants and animals from the distant past. Hook Head is one of Ireland's most important fossil sites. The kinds of fossils most commonly seen in the rocks adjacent to the lighthouse are crinoids, sea mats, lamp shells and corals. These fossils are preserved in limestone rock.



Crinoids are marine animals related to starfish.

In the adult form, the upside-down 'starfish' was supported on a stalk or stem attached to the sea floor. Fossil crinoid stems are long, narrow cylinders that look somewhat like bolts. In side view they are rectangular; in section they are either circular or elliptical. Forty-eight species of crinoid have been recorded at Hook Head.



Fragments of fossil crinoid stems.

Crinoids are also known as 'sea lilies'. Like a field of lilies waving in the breeze, colonies of crinoids swayed in the current on the floor of the Carboniferous seas waving their arms in the plankton-rich water while feeding on suspended particles of food.

Limestone rock

- ◆ Limestone rock is the most common rock type found in Ireland.
- ◆ Limestone is the only rock type found around the lighthouse at Hook Head.
- ◆ Limestone is a sedimentary rock.
- ◆ The limestone around Hook Head was laid down on the seafloor about 345 million years ago.
- ◆ Limestone formed underwater when layers of limey sediment were laid down on the seafloor.
- ◆ The climate 345 million years ago was sub-tropical.
- ◆ The limestone formed on an open, gently-sloping shelf in a warm, shallow, sub-tropical sea that teemed with marine life.
- ◆ Some of these ancient life forms are preserved today as fossils.



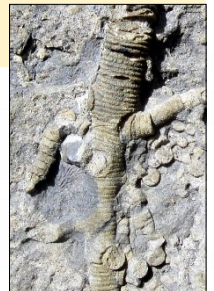
Limestone rock at Hook Head.



10cm long fossil crinoid stem (above) with a cup-like head and crown of feather-like arms attached (left). The €1 coin indicates scale. Some species of crinoid have branched stems (right, top), others have stem-discs or ossicles of different shapes (right, top and bottom).

Rosy Feather-star

Crinoids (Phylum Echinodermata, Class Crinoidea) are marine animals closely related to starfish and sea urchins. While many crinoid species occur as fossils, some representatives of the group are alive today. The Rosy Feather-star *Antedon bifida* is a modern species of crinoid that survives and thrives in the waters off Hook Head and the South Wexford Coast.



Ballysteen Formation.

The limestones found around the lighthouse at Hook Head belong to the Ballysteen Formation. In the study of geology, the formation is the basic unit of mapping. A formation is a sequence of rock types that can be

mapped over a relatively large area of countryside. Formations are named after the localities in which they were first defined or are best developed.

The Ballysteen Formation (BA) is named after the village of Ballysteen near Pallaskenry, Co Limerick.

The Ballysteen Formation at Hook Head is a 450m thick, dark-grey, fossil-rich deposit of inter-bedded bioclastic limestone and shale. Shale is a fine-grained rock formed by the compaction of clay or silt and splitting readily along closely-spaced, parallel planes. The clay and silt was deposited by southward-flowing rivers from the Caledonian mountains that lay to the north and east. Carbonate minerals formed naturally in seawater but

being poorly soluble, they precipitated and became part of the sediment.

Many life forms also extracted lime from the seawater and used it to form hard parts of their bodies, shells, etc. Fragments of the lime-rich skeletons of dead marine animals are called bioclasts. Undersea currents, probably generated by periodic storms, worked and reworked the bioclasts gathering them up, transporting them and incorporating them into the surface layers of the beds of muddy, lime-rich sediment to form bioclastic limestone.

Ballysteen Formation rocks were formed during the early Carboniferous Period (Mississippian sub-period; 359-331 million years before present).



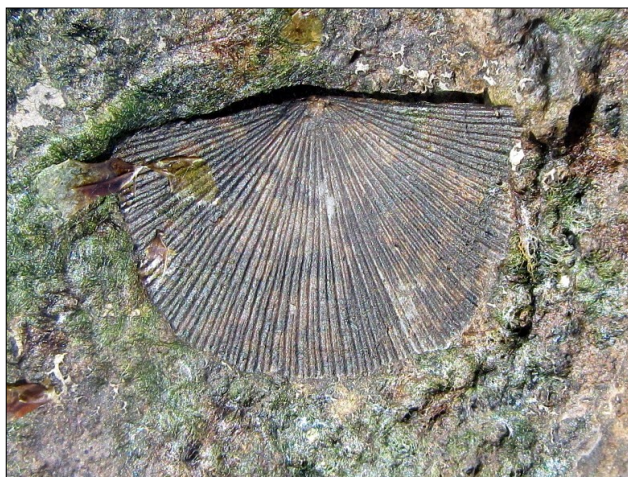
Legal protection.

Fossils are regarded as part of Ireland's natural heritage. Under the *Wildlife (Amendment) Act, 2000* (No 30 of 2000) and the *Foreshore Acts, 1933-2014* fossils and the rocks on the foreshore at Hook Head are afforded legal protection making it an offense to wilfully damage them.

Sea mats. Sea mat is the common name given to the remains of colonies of tiny marine creatures called bryozoans (Phylum Bryozoa). The mat refers to the hard skeleton (pictured) left behind when the soft colony decayed. Bits of sea mat look like fragments of lace or net curtain with an open, delicate, web-like pattern. Each tiny compartment of the net housed an individual member of the colony. The colony grew as mature animals budded off young thereby forming a clone of genetically identical individuals.



Lamp shells. Lamp shells are so called because some of the bigger ones resemble early Roman oil lamps. The animals that lived in these shells are known as brachiopods (Phylum Brachiopoda). Over 30 species of brachiopod have been recorded at Hook Head. The limestone immediately south of the lighthouse is so rich in *Linoproductus* shells that the beds are named after that species. Some of the species found at Hook Head are featured here.



Corals. Corals are animals. Some corals are colonial and live together in such large groups that their skeletons form reefs. However, the corals found at Hook Head are all solitary (Phylum Cnidaria. Class Anthozoa, Order Rugosa). They are often large and are cone-shaped (pictured), either straight like an ice cream cone or curved like a cow's horn but rough, wrinkled and ridged.



Synthesis. Bioclasts (pictured below) are a common sight in the rocks around Hook Head. Bioclasts are collections of skeletal fragments of intact, near-intact and broken lamp shells, discs from the stems of crinoids, scraps of the remains of sea mats, pieces of coral and various other assorted bits and bobs all jumbled together.



Undersea currents, probably generated by periodic storms, worked and reworked the bioclasts gathering them up, transporting them and incorporating them into the surface layers of the beds of muddy, lime-rich sediment to form bioclastic limestone. This leaflet is an introduction to the various groups represented; identifying specimens to species level is a matter for fossil experts.

Other fossils. The most commonly seen fossil groups in the limestone at Hook Head are the crinoids, sea mats, lamp shells and corals described above. Other fossils that have been recorded in the area include molluscs (sea shells, sea snails and nautiloids), primitive arthropods (trilobites), sea urchins (pictured), sharks' teeth and several micro-fossils.



Further reading

Meere, P., Mac Carthy, I., Reavy, J., Allen, A., and Higgs, K. 2013. *Geology of Ireland: A Field Guide*. Cork: The Collins Press.

Tietzsch-Tyler, D., and Sleeman, A. G. 1994. *Geology of South Wexford*. Dublin: Geological Survey of Ireland.