

*This Walk has been developed by the local community group,
Drimarone Development Ltd, in association with the
Western Development Tourism Programme.*

*Original copies of the Guide are available from The Bluestack Centre
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Walking through Time..... **.....linking the Natural & Cultural Landscapes**

Welcome to Drimarone and the Bluestack Centre!

These three routes through scenic South Donegal encompass a wide range of landscapes and views from 'off the beaten track', which you can enjoy through a combination of driving, cycling and walking.

South Donegal has a rich natural and cultural heritage. These routes have been designed to explore the fundamental relationships between the landscape and the cultural history of the area. The routes are colour coded and points of interest are marked along the way.

The concept of time is often difficult to grasp when dealing with earth processes. The oldest rocks in the South Donegal region are 600 million years old and form many of the hills of the Bluestack Mountains. If the time period of 600 million years is condensed into a single day, then the Ice Age ended about 2 seconds to midnight and humans first appeared in Donegal about 1 second to midnight.

During those 24 hours, the granites of the Bluestack Mountains were formed at 8.00am and the sandstones and limestones that frame Donegal Bay were deposited just before noon. The basalt dykes that are associated with the volcanism that formed the Giants Causeway were intruded at 9.45pm. This is one way of understanding how little time we have actually inhabited this part of Donegal. However, in that short time span humans have adapted and utilised the landscape to support their lifestyles.

Among the earliest examples of human activity along the routes are the megalithic tomb at Disert and the earthen mound at the north end of Lough Mourne which are pre-Christian, providing evidence of the complex social and agricultural organisation of early settlers. Megalithic standing stones are common throughout the region.

Donegal Town dates back to ninth century Viking times. The Vikings established a fortress at the mouth of the River Eske and it is possible that this gave the town and the county its name – Dun-na-nGall, meaning Fort of the Foreigners. Planned settlement patterns were imposed in the seventeenth and eighteenth centuries on the ancient town as evidenced by the formal market square, the 'Diamond'. These settlement patterns derived from the plantation of Ulster and were important in encouraging settlers and subsequent economic development.

More recent developments such as roads and railways (now disused) utilise the natural attributes of the area by exploiting valleys and gaps sculpted by ice along geological faults. Additionally, natural energy is captured by the windfarms to the south of Barnesmore and at Meenaguse, and by the small-scale hydroelectric schemes on the Lowrymore River.

The routes and stops suggested in this booklet allow the variety of the South Donegal landscape and its cultural heritage to be appreciated.

We hope you enjoy yourself - why not come again?

Geological History of South Donegal The southern part of Donegal has had a long and complex geological history. The oldest rocks in the area of this map are the quartzites that form **Carnaween** in the west of the area. These rocks are from the **Proterozoic** era and are over 600 million years old. The other major rock types from this era are the Lough Mourne and Lough Eske Formations. These were **sedimentary rocks** that have been subjected to heat and pressure which has converted them to **metamorphic rocks**.

The **Barnesmore Granite** was intruded into the Proterozoic Lough Mourne and Lough Eske Formations 400 million years ago during the **Devonian** period. The granite was molten when it ascended through the earth's crust and solidified in its present location. The Barnesmore granite is made up of three different types of granite and forms the hills from Barnesmore in the east to the Struell Valley in the west.

Then 325 million years ago in the **Carboniferous** period, sandstones, limestones and shales were laid down under water. At this time there was a precursor to Donegal Bay which was larger than the present day bay. It stretched from Killybegs in the west through Lough Eske in the centre to Laghy in the east. The rivers in Carboniferous times were eroding the same hills as we see today (although these would have been much higher and less rounded) and carrying sediment into the bay to form the sandstones which occur around Drumkeelan and upon which the stonemasonry industry is based.

Sometimes the Carboniferous rocks lie unconformably on top of the Proterozoic rocks and sometimes they have been faulted against them by earth movements. One of these faults is the Boundary Fault which trends from Killybegs to Lough Eske, and exerts a fundamental control on the landscape in this area. The higher ground lies to the north of the fault and comprises Proterozoic metamorphic rocks and the Devonian granite at Barnesmore. The ground is higher because these rocks are harder and more resistant to erosion than the softer Carboniferous rocks that lie to the south of the Boundary Fault. The fault is drawn as the change in slope at the base of the mountains.

However, most faults in the area trend northeast-southwest and control many of the features and landforms in the area. The Leennan Fault, which lies to the west of Carnaween, continues southwestwards into Mayo and northeastwards into Scotland. It is part of this fault system that created the weakness in the rocks that allowed the sea to erode the natural harbour at Killybegs. Other faults that transect the area are the Carnaween, Belshade, Barnesmore Lough and the Laghy Faults. One of the most visible faults is the Barnesmore Fault which is the main control on the landscape in the Barnesmore Gap. All methods of communication and services follow the fault through the gap (road, rail, power, telephone).

Then, some 60 million years ago during the **Tertiary** period, basalt dykes (long narrow linear features) were intruded. These generally trend northwest-southeast and can be seen on some mountains as ridges or depressions, depending on how they are affected by erosion. There are also several basalt plugs (circular, hill-size intrusions) around Donegal Town. These rocks are the same age and type as those that formed the Giants Causeway in Co. Antrim.

One of the most significant events to have affected Donegal was the glaciation of the **Great Ice Age**. This ended some 10,000 years ago, comparatively recently in geological time, and is responsible for sculpting the landscape that we see today. Southern Donegal has well-developed and well-preserved examples of upland and lowland glacial features.

Glaciers would have been present in the Struell, Eglisish and Barnesmore areas and at times most of the area would have been covered by an ice sheet, hundreds of metres thick. The glaciers exploited the already existing river systems and changed the shape of the valleys from V-shaped to U-shaped. This resulted in the development of upland features such as **hanging valleys**. The ice sheet and glaciers carried the material eroded from the uplands to the lowlands

where it was deposited whenever temperatures rose and the ice melted. Features characteristic of glacial deposition are **drumlins**, **kettle hole lakes** and **kames**. Associated with the temperature rise and melting of the ice sheets was a rise in sea level. This is seen spectacularly in Donegal Bay where most of the islands in the bay are actually 'drowned drumlins'.

Green 1

Viewpoint for a panorama of the **Bluestacks** (*blue ricks*). To the northwest of **Banagher Hill** (*peaked hill*) are the Precambrian schist and Devonian granite hills of the main Bluestack range (**Croaghconnellagh, Croaghnageer, Croaghanirwore, Croaghbarnes**). The lower lying ground in the foreground is Carboniferous **Ballyshannon Limestone**.

Green 2

Viewpoint across to **Banagher Hill**. On the lower ground, above the lough shore, are strips of willow and alder woodland, growing on Ballyshannon Limestone. Above this are coniferous plantations and rocky fields of the Banagher Sandstones. It is possible that **Lough Eske** owes its location to the juxtaposition of the 325 million year old Carboniferous rocks on the western side and the 600 million year old Precambrian rocks on the eastern side of the lough. The contact between the two represents a weakness which has been exploited by erosion to create the depression in which Lough Eske formed.

Green 3

The hills visible from this location are Carboniferous sandstones and Precambrian schists. **Benson's Hill** lies on the eastern side of the lough. The rising hills around the northern end of the lough (from east to west are) **Croaghloughaderry, Altagarranduff** and **Brockaghy** and comprise Precambrian **Lough Mourne Schists**. The hills of the **Barnesmore Granite** lie behind these. It is probable that **Lough Eske** may have been larger than it is now as the northern end of the lough has become silted-up over the years by sediment from the **Corraber River**. Also occurring along the road are examples of 'lazy beds' - fields with cultivated ridges still visible. It is possible that these fields have not been used since the Famine.

On **Brockaghy** (*badger field*), to the west, a depression, several metres wide with marked straight sides is present. This represents a Tertiary basalt dyke - the same age and rock as formed the Giants Causeway. Gold has been discovered in small quantities in the **Edergole** area and there are several quartz veins on the sides of the track which may be related to gold mineralization.



Edergole

Also visible on some of the rock faces are striations – grooves cut into the rock by the abrasion of the ice as it passed. At the end of the track is a small hydroelectric scheme, the generating station is in the forest below. Above the hydro scheme the valley of the **Corraber River** is marked by a geological fault which the river has exploited. Looking back down the valley are views of Lough Eske and the patchwork of fields, forestry and vegetation. The irregular stands of rhododendrons contrast starkly with the planned monoculture of the managed coniferous forests.



Lazy Beds



Corraber River



Striations



Quartz vein - possibly associated with gold



North end of lough Eske

Green 4

Car park and viewpoint. The road has now crossed from the Precambrian Lough Mourne Schists into the Carboniferous Banagher Sandstone. One mile further down the road is an outcrop of sandy limestone, which is part of the Banagher Sandstone. The pattern of weathering, displaying a ridged surface, is typical of this type of rock.



Panorama from viewpoint

Green 5

Famine Pots are relics from the failures of the potato crops in the 1840s. They were introduced into Ireland by the Society of Friends (Quakers) and were used to make soup in communal kitchens. The soups were made from any scraps that were available and is reported that even nettles were used as vegetables.



Famine pot

Green 6

The trace of the **Belshade Fault** trends down the **Eglish Valley** (*church*) and lies at the foot of the hills and marks the contact between the Carboniferous rocks, the Precambrian rocks and the Barnesmore Granite. The hills on the east are **Barnesmore Granite**, the hills in the centre and west are Precambrian **Lough Mourne Schists**. The contact between the granite and the schists

lies in the little valley between the two ridges. The rock types can be differentiated at a distance by the steep faces that form in the granite and the sloping faces that represent the Lough Mourne Schists. Along the ridge to the west (left) are two knobs of rock. These are small granite outcrops, related to the Barnesmore Granite, and their distinctive knobby shape indicates their difference from the Lough Mourne Schists. The slope profile of the western part of the ridge changes from steep at the top to shallower at the bottom and marks the trace of a second fault – the **Boundary Fault**. Coinciding with this change in slope is a change in vegetation that is reflecting the underlying rocks. The heather-dominated lower slopes of the western part of the hill are Carboniferous sandstones while the grassier upper parts are Lough Mourne Schists. Travelling down the valley, there are examples of houses abandoned during the Famine, lazy beds and stone kilns used to burn limestone to provide fertilizer.



Panorama of northwestern side of the English valley



Houses deserted during the Famine



Granite knolls. Note vegetation change on carboniferous rocks in foreground

Green 7

Meenataggart Hall was one of three community halls in the area where dances and meetings were held on a regular basis until the 1950s. People came on foot and by bicycle from a 15-20km radius to attend the dances on a Sunday evening. Dances started at 8.30pm and ended at midnight. The admission charge was 6d (3 cents). However, Christmas night dances went on until 2.30am and cost 1 shilling to attend (6 cents)



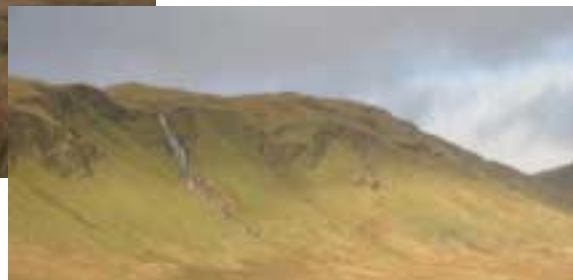
Meenataggart Hall

Green 8

View of U-shaped **Struell Valley** (*stream*). The shape of the valley was cut from a V-shaped river valley by a glacier in the **Ice Age**. The erosion by the ice cut away the lower sections of the streams on the sides of the valley and they now form 'hanging valleys' with waterfalls. The Grey Mare's Tail waterfall is an example of this. The rocks on the sides of the Struell Valley are the **Lough Mourne Schists** and the **Barnesmore Granite** is at the end of the valley.



Struell Valley



Grey Mares Tail waterfall

Green 9

Views of **Meenaguse Lough** which sits in glacial deposits and together with the small lake to the east may represent 'kettle hole' lakes. These lakes formed as the ice sheets retreated, leaving behind large blocks of ice, isolated from the main ice mass, which were partially or completely buried by sand and gravel. When the ice melted, hollows were left which now often contain lakes. The derelict house on the north side of the road, with abundant fuschia surrounding it was the residence of Bob Bernen during the 1960s and 70s. Bernan was an American author who was drawn to Donegal and wrote *'Tales from the Bluestacks'* and *'The Hills: more tales from the Bluestacks'*.

In areas adjacent to blanket bog **bog myrtle** is common. The blanket bog has the typical abundance of **ling heather and sphagnum moss** as well as a variety of other **mosses and lichens** especially ***Cladonia impexa***, growing on the stems of the heather. Even at high elevations looking down over Meenaguse people have planted trees along boundaries close to houses to provide wind breaks. Again, **fuschia** is a favourite plant here (it was introduced into Irish gardens in the late 1700s from South America).



Meenaguse Lough

Green 10

The mountain on the west is **Carnaween** and is composed of quartzite. A major fault trends along the lower slopes of the mountain and joins the **Boundary Fault**. This fault trends southeast to **Killybegs** (*small churches*) where it caused a weakness in the rocks that the sea exploited to form the natural harbour, which gave rise to Ireland's major fishing port. Local legend says that Diarmaid and Gráinne spent a night on the summit of Carnaween during their elopement and pursuit by Fionn.



Carnaween

Green 11

Disert means a place of solitude or hermitage and it is believed that early monks came to study and pray here. The long history of the site is evidenced by the **megalith** to the east of the altar which is believed to mark the burial site of a druid chieftain. Although adult burials ceased at Disert around 1840, infant burials continued until the 1930s. Numerous local traditions have built up surrounding the site ranging from ways to improve virility to methods of curing eye disorders and backache. Clay from the site was, until recently, put into the foundations of new houses in the belief that it would banish rats.

The area around the well and burial site at Disert presents a restricted but interesting flora. **Bluebells** thrive in the area, even in intensely grazed fields, probably due to the non-application of artificial fertilizers. **Foxgloves** grow where protected by stone walls and exposed tree roots. **Thistles** are common and are reportedly a favourite food of donkeys. Many fields are **bracken** choked in the summer months, possibly another indication of the absence of artificial fertilizers. Near the parking area on the way to Disert a small stream has incised a deep gorge which has

been fenced off and contains a stand of hazel trees with a local rich flora of **primroses, lesser celandine and wood anemone**. Along the road cut there also **dog violets, foxglove, wild strawberry and various fern and moss** varieties present.



Altar at Disert

Megalith at Disert



Blue 1

The panorama looks north to the western part of the Blue Stacks. The most westerly peak is **Binbane**, the long ridge to the east is **Cloghmeen Hill** which passes into the more rugged peak of **Carnaween**. The windfarm is at **Meenaguse** and the mountain to the east of this is Binnasruell.

All the low hills in the foreground are underlain by the harder 300 million year old Carboniferous age Drumkeelan Sandstone and have had ice-deposited drumlins superimposed. The low ground before the mountains is also underlain by 300 million year old shales, limestones and sandstones. However, the rocks that form the mountains are 600 million years old and are made up of quartzites – sandstones that have been heated and compressed by the earth's forces and have become even harder and more resistant to erosion. A major geological fault has brought older rocks of the mountains into contact with the younger rocks of the foreground. The trace of this fault runs along the break in slope of the mountains. The shapes of all the hills are controlled by the rocks. For example, Binbane has a gentle slope to the west which becomes steeper towards the summit. This is due to different rocks, one of which is more resistant to erosion than the other. The

elevation of the ground also controls land usage; e.g. the lower and drumlin-covered ground has subsistence farms and irregular settlements. The area has also more modern land uses such as windfarms and commercial forestry.

Blue 2

Donegal Town is a 17th century planned plantation town. One of the main results of the plantation was that rural parts of Ireland, controlled by Gaelic Chiefs, were urbanized through planned towns, which encouraged settlers. Typically a planned town will have; a market square (the Diamond), a castle, a Protestant church occupying the dominant position in the town and wide and regular streets. In the Diamond is the monument to the Four Masters (made of Drumkeelan Sandstone).



Four Masters Memorial, Donegal Town

The Four Masters compiled the most extensive of all the compilations of the ancient annals of Ireland. The principal compiler of the Annals was **Michael O'Clery**, a native of Donegal and a trained antiquary and poet, who joined the Franciscan Order. O'Clery went to Belgium, but was sent back to Ireland to collect the lives of Irish saints and he retired to the secluded convent of Donegal while engaged upon this work (1632-1636). The 'Annals of the Four Masters' are so-called because the compilers were learned masters in antiquarian lore.

They are written in an archaic language, and document the reigns, deaths, genealogies, etc., not only of the high-kings of Ireland, but also of the provincial kings, chiefs, and heads of distinguished families, men of science, historians, poets, etc. They record the demise and succession of saints, abbots, bishops, and ecclesiastical dignitaries. They tell of the foundation and occasionally the overthrow of countless churches, castles, abbeys, convents, and religious institutions. They give details of battles, murders, tribal wars, wars with the foreigners, battles with Norsemen, Normans, and English, and political changes. There is no event in the whole of Irish history from the birth of Christ down to the beginning of the seventeenth century that the first enquiry of the student should be: "What do the Four Masters say of this?"

Blue 3

St Patricks Church or The Memorial Church of the Four Masters was dedicated on 17th March 1935. All the material used in the building is of Irish origin – the walls are Barnesmore Granite, the door and window surrounds are of Drumkeelan Sandstone and the roof slates are from St Johnston. The mortar is lime based and was used extensively in natural stone buildings.



**St Patrick's Church,
Donegal Town**



Ballyshannon Limestone

Blue 4.

The rocks on the southeastern side of the road are part of the **Ballyshannon Limestone**. This is a mid grey limestone, with vertical calcite veins and fossil fragments. Sometimes the fragments are easily visible and there are ring-like pieces (about the size of a 1• coin) which formed the stems of **crinoids**, commonly known as sea lilies (related to starfish and sea urchins). They were most abundant 300 million years ago. In between the limestone beds are thin black shales. If you want to look at these rocks, take care, as the road is often very busy.



Plant Fossil

Blue 5

The rocks on the southeastern side of road are **sandstones**, which lie below the limestones at the previous stop and are therefore older than them. This is because younger rocks form on top of older rocks. The sandstone beds are clearly visible and also have thin shales

between them. These sandstones represent an ancient river delta whose rivers drained the

Highlands to the north into the precursor of Donegal Bay. Some parts of the outcrop have plant fossils. If you want to look at these rocks, take care, as the road is often very busy.



Map of Donegal and placenames

Blue 6

This location is accessed by a small car park on the northwestern side of the road. The surround of the plaque marking the construction of the **Barnesmore Gap** road is of Ballyshannon Limestone. However, the black rock which carries the inscription is called gabbro and is probably from South Africa and may be 2000 million years old – much older than any rocks in Donegal. The monolith bearing the large

map of Donegal is carved in Drumkeelan Sandstone. Note that in the text of John O'Donovan that Barnesmore Gap is referred to as the 'Gap of Danger'. The Four Masters record that Barnesmore was a 'refuge for robbers and rogues before Red Hugh banished them.' Prior to the railway in 1882 this was the only way to travel through the Gap which was well named as the 'Gap of Danger' as highwaymen and robbers plundered the stagecoaches on the road. If caught, the villains risked being hung at a gallows near the old Derg Bridge Halt, to the south of Lough Mourne. O'Donovan was the person charged with the responsibility of recording all the townlands of Donegal for the first Ordnance Survey of Ireland. He used local knowledge and also the Annals of the Four Masters to set down the place names as we know them today. On the north-facing side of the monolith the place names of Donegal are inscribed. Before the path of the present road, the old road through the Barnesmore Gap was along the slopes of Croaghconnellagh and traces of it can still be seen.



Weir in Lowrymore River



Bedrock folds in river

The path beside the monolith leads to a small hydroelectric station. A weir has been constructed in **Lowrymore River** to allow abstraction of water through a large pipe (under the wooden walkway). This flow drives the turbines in the plant house and then passes back into the river. In the river bank opposite the plant house are examples of folding in the 600 million year old Lough Eske Psammities.



Barnesmore Gap

Straight ahead is the classic U-shaped profile of a glaciated valley. On the southeastern side is **Barnesmore** and on the northwestern side is **Croaghconnellagh**. The **Barnesmore Fault** that caused the weakness in the granites and quartzites of the Barnesmore area allowed this to be exploited by an ancient river which eroded the original valley. Then, during the Ice Age (10,000 years ago) a glacier sculpted the present-day shape of the Barnesmore Gap from the old river valley. The Gap forms the most direct route between Donegal Town and

Ballybofey and also provides access for road, electricity, telephone and formerly rail.



Meander in Lowrymory River

Blue 7

The car park at **Biddy O'Barnes** pub marks the position where the 600 million year old Lough Mourne Grits are in contact with the Barnesmore Granite – the stone that was used to build St Patricks church. The granite rose

400 million years ago. Crossing the river to the south a track climbs onto the old railway line. It is a 4km walk to the next bridge crossing over the Lowrymory River.



Straightening of Lowrymory River

The walk follows part of the old **West Donegal Railway** which dates from 1882. There were two halts on the line in this area – the Derg Bridge Halt was north of the Castlederg road, to the south of Lough Mourne and the Barnesmore Halt, lay some 8km to the south of Derg Bridge Halt. There is no trace of the

platform or siding at the Derg Bridge Halt remaining. The siding was constructed in 1946 to transport locally quarried sand and gravel to Ballyshannon to construct the Erne hydroelectric scheme at Assaroe. Folklore has it that the railway was responsible for reintroducing the beech tree to Donegal and the course of the railway line can be traced by picking out the beeches which were planted as lineside hedging. Retaining walls to support the track still remain on parts of the line through the Gap.

The walls and stiles are made from Barnesmore granite. About 100m along the track, in a small partially overgrown cutting the contact between the Lough Mourne Grits and the Barnesmore Granite is present. Other features visible from the former rail line include river meanders, areas of the river which have been straightened and armoured to prevent erosion, a series of deeply



Wall with stile in Barnesmore Granite

incised streams which follow joints in the granite and large boulders on the lower slopes which have broken off through freeze-thaw action and rolled down the hillside.



Ice-deposited boulder clay and water-lain sands

Blue 8

Walk up track to sand and gravel quarrying operation. Most of the moraine is composed of till with Lough Mourne Grits and also some basalt. The basalt probably comes from the numerous dykes that traverse Donegal. Some of the sections through the glacial material indicate that the ice advanced and retreated several times as ice-deposited unsorted till is overlain by water-deposited sands and gravels. Sandmartins have made their nests in the sandy layers of the glacial gravels.



Area of Bog burst

In this area peat bog is well developed in parts. In the 1960s there was a 'bog burst' which caused tons of bog material to flow into the Lowrymore River. Bog bursts tend to happen in winter perhaps due to increased amounts of spring water entering the bog and causing the core of the bog to liquefy and flow.

Blue 9

Inside the gate is the old railway line which is visible alongside the lough— cross this and walk along path parallel to conifer plantation for 100m and turn left towards trees for 30m. At this location is an example of a mound which may date from pre-Christian times. There is a thin cover of peat in this area as evidenced by the small quarry on the eastern side of the lough.

Lough Mourne is elongated northeast-southwest along the Barnesmore Fault. It is probable that the fault has caused a weakness in the underlying rocks that has been eroded and filled with water. Therefore the fault may be the reason for the presence of the lough and the formation of Gap to the south.



Mound at
Lough Mourne



Drumlin Landscape

Red 1

On either side of the road at this location are good examples of **drumlins** (*small hills*) which are formed from boulder clay - an unlayered deposit of rocks, pebbles, gravel, sand and clay deposited at the base of an ice sheet. Drumlins are particularly well developed in Ireland and form a 'basket of eggs' belt that stretches from Mayo in the west to Strangford Lough in the east. In south Donegal, the drumlins are orientated northeast-southwest and mark the direction of the movement of the ice. Drumlins have a blunter, steeper end and a tapered end; the blunt end indicates the direction from where the ice came – in the case of south Donegal, from the northeast.

This part of the journey presents a varied and natural flora. **Hazel, alder, birch** and **willow** trees line the road. Dry banks on either side of the road host a rich flora of **primrose, lesser celandine, spurge, wood anemone, bluebell and foxglove** with occasional patches of winter flowering *petasites fragrans*. **Honeysuckle** vines hang from the trees on the overgrown hedgerows. An

abundance of **moss** on stones and tree barks indicates the overall damp nature of the area, partly due to the shelter offered from the winds by the surrounding drumlins.

Red 2

View over **Donegal Bay**. Drumlin landscape in the foreground with the 'Green Islands' in the bay joined by a **tombolo**. The **sandspit** on the far side of the bay is at **Murvagh**. A sandspit is formed when material is deposited with one end attached to the land and the other projecting into the open sea, typically across the mouth of a river estuary – in this case the River Eske. A tombolo is formed where a spit links an island to the mainland. The hills in the distance are in Co. Sligo and are composed of Carboniferous limestone.



Donegal Bay

Red 3

On the southern side of the road are a series of quarries in **Drumkeelan Sandstone** (*narrow ridge*). The sandstone is flat lying and easy to quarry. The flaggy nature of the sandstone is good for facing buildings and construction. Drumkeelan Sandstone used to be mined from underground and provided building stone for the National Museum, the National Library, the Dáil, Sligo Town Hall and Assaroe Abbey in Ballyshannon. The Abbey was constructed in 1179 and Drumkeelan Sandstone was probably shipped from Mountcharles. A medieval miners lamp, carved from stone was also found underground.



Of note is the little amount of glacial cover - even in an area where most hills are glacially-deposited drumlins, little or no till was deposited on the Drumkeelan Sandstone ridge.

Drumkeelan Sandstone Quarry

Red 4

The outcrops on the shore are of **Ballyshannon Limestone**. The limestone dips at low angles to the southeast and contains abundant fossils. These include solitary and colonial **corals**, **bivalves** and **crinoids**. Corals are simple animals that secrete skeletons made of calcium carbonate. Corals are among the simplest multicellular animals and are characterized by their radial symmetry. They are close relatives of sea anemones and jellyfish and are the main reef builders in modern oceans. Corals can be either colonial or solitary. The views to the northwest are of **Crownarad** and **Slieve League** - both mountains are made of quartzite - a rock very resistant to erosion. Many hedgerows in the area provide a good environment for **montbretia** to spread from old houses. Good examples of **great horse tail** can also occasionally be seen along the roadside.



Ballyshannon Limestone



Fossil debris of crinoids



Solitary coral (Caninia) fossil



Bivalve fossil

Red 5

This location is a **coral beach**. The beach formed because of two parallel faults in the rocks at each end of the causeway. These faults created weaknesses in the rocks which were eroded by the sea and formed the inlet. The beach 'sand' is made up of very fine coral debris. At the last location the limestone contained large corals which flourished in warm water 325 million years old and on this beach there are small fragments of modern cold water corals. On the far side of the beach are examples of folds in the rocks caused by earth movements millions of years ago.



Coral beach



**Folding in
Carboniferous rocks**

Red 6

Walk along the beach to the south to examine the sea-washed section of the drumlin that forms **Ball Hill**. There are two glacial boulder clays present at this location, a mid grey lower boulder clay and a dark grey

upper boulder clay. Most of the rocks in the boulder clays are limestone. However, there are some pieces from the **Barnesmore Granite** which have been carried 16km from the northeast by the ice. Many of the boulders on the upper reaches of the beach have been washed out from the boulder clay. The '**Green Islands**' are the remnants of two drumlins that lie to the south of Ball Hill. These islands have been joined together in recent times by a **tombolo**. The evidence for this is the well-layered sandy and shelly sediments that join the older ice deposited drumlins. At the southern end of the Green Islands, the view across to **Murvagh** raises the question as to why the southern shore of the bay is sandy and the northern shore boulder strewn? This is due to the development of Murvagh as a sandspit where sea currents trend northwards and move sand to form a spit. The shape of the spit reflects the influences of both the sea and the channel of the **River Eske** (*fish river*).



View of eroded drumlin. Ball Hill



Upper and lower boulder clay at Ball Hill



Cobble of Barnesmore Granite in boulder clay



Tombolo joining Green Islands

Red 7

The house at **St Ernan's** was built on an island in 1824-26 by John Hamilton (a nephew of the Duke of Wellington) and was only passable by walking at low tide or by boat at high tide. At half tide neither was possible. Hamilton was a good landlord and undertook many schemes to provide employment for his tenants, including a mill, a school and road construction. However, he had a personal desire to link the island to the mainland. Hamilton was advised that this would not succeed due to the strong sea current, but after several failures the causeway was constructed. His tenants did most of the construction free-of-charge, which is commemorated on the plaque part way across the causeway. St Ernan's is now a country house hotel. Looking west provides the contrast between the man-made causeway at St Ernan's and the sea-built causeway (tombolo) at the Green Islands.



Causeway to St Ernan's

Red 8

Murvagh is a sandspit that has formed due to the swash and backwash of waves which move sand about a beach - **longshore drift**. At Murvagh, the zigzag movement of the sand caused by the swash and backwash has not happened and deposition has taken place at the northern end of the spit. The channel between Murvagh and the Green Islands is called the 'Hassans' and is kept open by the River Eske.

Please note: The maps included here are much reduced and should be used for location of the routes only. They are extracts from the [Ordnance Survey Discovery Series; Sheets 10 & 11](#) which are widely available in bookshops etc. and are ideal for the level of detail required here.

Alternatively the Bluestack Centre can supply original copies of the guide which includes maps. (see front for details)



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