

Geologists of Jackson Hole

Field Trip to the Scottish Highlands

LEADER – DONALD M FISHER (CHARTERED GEOLOGIST)
DETAILED ITINERARY
MAY 17 TO MAY 31, 2015

This trip is restricted to 20 people. You may sign up any time after 6 pm on Thursday, May 1, 2014 as explained at the bottom of the summary email.

Spend 15 days in beautiful Scotland with the geology (details in red) explained by Donald Fisher and Mike Adler. Also listed (details in blue) are some possible cultural alternative activities depending on time, available transportation, and interest explained by Donald's wife, Wendy, and Virginia Adler. Photographs by Mike Adler.



17th MAY (DAY 1)

Afternoon:- Arrive **Inverness Airport** and be met by Donald and Wendy Fisher. Join coach and travel to the **Coul House Hotel** about 15 miles from Inverness.

Overnight stay at Coul House Hotel

Inverness: For those who might spend some time here before or after our geology trip, some sites not to miss are just outside of town.

Culloden Battlefield: In 1745, a 1 hour battle that changed Highland culture forever.

Clava Cairns: This Bronze Age, 5000 year old site consists of 3 large burial cairns with standing stones.

Urquhart Castle: A commanding location with history going back to King William the Lion in 12th C.

Cawdor Castle: parts of this Castle date back to 1327.

18th MAY (DAY 2)

Morning:- Coach to **Kinlochbervie Hotel**, arriving around **12.00 noon**.

Afternoon:- Coach northwards to Durness area on north coast. Guided easy tour around Smoo Cave, visit Sango Beach, Durness Visitor Information Centre and Balnakiel Beach.

Cambro-Ordovician Limestone (500 million years), Moine Thrust Zone. Smoo Cave is one of the largest sea caves in UK. Beautiful coastal scenery and beaches.



Smoo
Cave,
Durness

Kinlochbervie: one of west coast's major fishing ports.

Oldshoremore: This is a tiny crofter's village scattered around a stunning white beach.

Blairmore: This offers a 4 mile footpath to Sandlewood Bay taking 3 hours, return.

Return to Kinlochbervie Hotel for dinner. **Overnight stay Kinlochbervie Hotel.**

19th MAY (DAY 3)

Morning:- Head northwards to east of Durness. Guided easy walk at beach east of Durness.

Classic (text-book) examples of boudinage and polyphase deformation in Lewisian Gneiss (3 billion years). Cambrian/PreCambrian boundary. Stunning coastline and unspoiled beaches. A very special place with very special geology.



Boudinage in
3 Billion year
old gneiss

Then further east to Loch Eriboll.

Basal Cambrian Quartzite (540 million years).

Afternoon:- Guided walk to Ben Arnabol Thrust. One km walk over varied terrain and 300' elevation gain. *Moine Thrust Zone.*

Walk up close to see a major fault with 3000 million year Lewisian gneiss over 500 million year Cambrian Quartzite

Durness area: **Balnakiel:** This hamlet is overlooked by a 17th C. church ruin and features skull-and-crossbones carving marking grave of a notorious highwayman, Donald MacMarchow.

Balnakiel Craft Village: Here you can buy weavings, pottery, paintings, leatherwork and woodwork. Chocolatier and café called Cocoa Mountain is nearby.

Towards Tongue: Strathnaver Museum (Mackay Country History and Highland Clearances). **Dunrobin Castle** on east coast (home to Dukes of Sutherland, parts of Castle date back to 1300s, plus stunning gardens, inspired by the gardens at Versailles).

Return to Kinlochbervie Hotel for dinner. **Overnight stay Kinlochbervie Hotel.**

(a)



3 Billion year Lewisean Gneiss faulted over 550 Million year Cambrian quartzite pipe rock at Mt Arnabol

20th MAY (DAY 4)

All Day:- Head north to Gualin. Guided walk into Strath Dionard. Flat easy walk on trail up to 6 km one way.

Classic U-shaped glaciated valley (best example to be seen in UK?) within Lewisian Gneiss and Cambrian Quartzite. Classic imbricate structure within Moine Thrust Zone. Stunning rock scapes and mountain scenery.

East coast: Town of **Dornoch** – Dornoch Cathedral (dates to early 1200s) and possibility of meeting great grandson of Benjamin Peach, famous Victorian Geologists. **Dornoch Jail** (excellent ambience, a former jail, now an excellent up-market clothing shop, for some inspired and tasteful shopping).

Return to Kinlochbervie Hotel for dinner. **Overnight stay Kinlochbervie Hotel.**



Cambrian Quartzite & Pipe Rock Unconformably over Lewisian Gneiss, Mt Arkle, Loch Stack

21st MAY (DAY 5)

Morning:- Depart Kinlochbervie for **Ullapool**. Stop at “Multi-Coloured Rock Stop” and then at Scourie - guided easy walk to the “Geologist’s” Scourie Dyke.

This is the best of all the Scourie Dykes (it’s the type locality - 2.4 billion years) cutting Lewisian Gneiss (3 billion years). World-famous locality with very special geology. Certainly not to be missed.

Afternoon:- Proceed southwards, stopping at Skiag (double unconformity), Pipe Rock at Skiag Bridge, Stronchrubie Cliffs and Rock Route localities, arriving Ullapool around 5.00pm.

Cambrian Quarzite/Torridonian Sandstone Unconformity (545 million/1 billion years) above Torridonian Sandstone/Lewisian Gneiss Unconformity (1 billion/3 billion years). Worm trace fossils in Pipe Rock (the type locality - 535 million years). Classic imbricate structures at Stronchrubie – world-famous locality of Inchnadamph.

Ullapool (attractive fishing port on shores of Loch Broom):

Museum, Visitor Center: This is located in a converted church in West Argyle St., closed Sunday.

Achfary and Loch Stack: (Duke of Westminster’s Estate - stunning views). Walk around village of Scourie.

Overnight stay Royal Hotel, Ullapool.

Double unconformity
Beinn Garbh, 3
Billion year gneiss ,1
Billion year
sandstone, 550
Million year
quartzite, Loch
Assynt, Skaig Bridge



22nd MAY (DAY 6)

Morning:- Head north. Guided walk around Knockan Crag NNR. Two hour easy-moderate walk on good trail with 350' elevation gain.

The very best and most accessible exposure of the Moine Thrust structure (you can touch it and “hold 500 million years of time between your fingers”). Classic locality visited by Victorian Geologists Ben Peach and John Horne. World-famous locality within the “Cradle of Geology”.

Afternoon:- Guided walk to the Megagrooves of Elphin. Easy-moderate walk with 300' elevation gain.

Recently described glacial features within basal Cambrian Quartzite (540 million years). Examination of alternative theories applying within a “fast ice” glacial environment. A genuinely fascinating site which will promote much discussion. Stunning mountain scenery within the “Cradle of Geology”.

Elphin: N. to Ledmore to visit craft shop with hand knit items.

Loch Assynt: Ardvreck Castle, Lochinver (Assynt Visitor Centre),

Return to Royal Hotel for dinner. **Overnight stay Royal Hotel, Ullapool.**



View of cliff side at Knockan Crag (~400' high) showing 5 sedimentary layers faulted by 800 Million year old Moine Schist (bottom to top, quartzite, pipe rock, fucoid beds, salterella grit, limestone, faulted by Moine schist on top)

23rd MAY (DAY 7)

All Day:- Head north to Kylesku, stopping at Peach and Horne Memorial at Inchnadamph: (See original visitors' book signed by famous Victorian Geologists Benjamin Peach and John Horne at hotel).

Guided walk to Loch Glendhu . Easy level walk.

Classic glaciated sea loch/fiord within the "Cradle of Geology". World-famous exposures of the Loch Glencoul Thrust (Basal/Sole Thrust of the Moine Thrust Zone). Lewisian Gneiss (3 billion years) thrust over Basal Cambrian Quartzite (540 million years). Classic (text-book) Post-Glacial scree formations in Cambrian Quartzite. World-famous locality within the "Cradle of Geology", stunning mountain scenery and fascinating wildlife. This is a very special place with equally special geology – not to be missed.

Loch Glencoul: . Possibility of a boat trip from Kylesku to see Loch Glencoul and **Eas a Chual Aluinn:** Britain's highest waterfall with stunning and dramatic scenery, excellent wildlife.

Return to Royal Hotel for dinner. **Overnight stay Royal Hotel, Ullapool.**



The Glencoul Thrust , 3 Billion year Lewisian gneiss faulting over 550 million year Cambrian quartzite lying unconformably over the same 3 Billion year gneiss

24th MAY (DAY 8)

All Day:- Head north and west to Lochinver. On way, visit the Torridonian andstone/Lewisian Gneiss Unconformity (1 billion/3 billion years) at Loch Assynt. Then guided walk to the Split Rock and stromatolites at Clachtoll. Then guided walk at Stoer to see the Stac Fada Formation (within basal Torridonian Sandstone) – this was only recently reinterpreted as representing part of a massive meteorite impact ejecta deposit. Easy 2 hour walk along shoreline with 300' elevation gain. Possible beautiful moderate 8 mile round trip walk to point of Steor and Old Man of Steor.

Split Rock feature has been adopted as one of the “iconic symbols” of the Assynt area. Clachtoll stromatolites are the oldest recognised life-forms in Europe, at 1.2 billion years. Meteorite impact ejecta deposit (1.2 billion years) is one of only 5 known such sites occurring around the World. Stunning coastal and mountain scenery. A very special place with very special geology.

Lochinver area:

Achmelvich offers a walk along a beautiful beach with Iron Age broch and other ruins.

Ardvreck Castle (ruins) dates from 1597, but has a spectacular setting on Loch Assynt (if not already visited).

Bone Caves is Scotland's oldest historical sight with some objects 8,000 years old.

Return to Royal Hotel for dinner. **Overnight stay Royal Hotel, Ullapool.**



Old Man of Steor, left and point of Steor, right



Split Rock at Clachtoll, a geological hotspot, Torridonian sandstone(1 billion yr)
lying unconformably over Lewisian Gneiss(3 billion yr)



25th MAY (DAY 9)

All Day:- Guided walk up either Cul Mor or Quinag. Difficult 6 hour hike with 2500' elevation gain. Other activities will be available.

Excellent views of Moine Thrust Zone. Dramatic and stunning mountain scenery within the "Cradle of Geology". The very best views of Suilven (a classic Inselberg and iconic mountain) and other dramatic mountains from Cul Mor. Quinag equally dramatic. Stunning mountain scenery and very special geology within the "Cradle of Geology".

Walks: These 3 choices might be an alternative to the hikes on Day 9.

Ullapool Hill or Meall Mhor (886') is a walk of about 1-2 hour return.

Rhue Lighthouse is a coastal walk of about 6 miles.

Rhidorroch Estate walk offers views across Loch and takes about 5-6 hours.

Return to Royal Hotel for dinner. **Overnight stay Royal Hotel, Ullapool.**



Cul Mor in foreground with 1 Billion year sandstone over 3 Billion year gneiss

26th MAY (DAY 10)

Morning:- Guided walk up Stac Pollaidh. Moderate 3 hour walk with 1600' elevation gain up a good trail with magnificent views of surrounding mountains and sea shore.

Classic Inselberg feature formed in Torridonian Sandstone (1 billion years) sitting atop surface platform of Lewisian Gneiss (3 billion years). Classic mountainscapes with Late- and Post-Glacial erosion at mountain top. Stunning views of Suilven and other mountains within the "Cradle of Geology" – definitely not to be missed.

Afternoon:- Guided walk to Garvie Bay (1.2 billion year stromatolites in Torridonian Sandstone) + Stac Fada Formation (other aspects). Achiltibuie and Achnahaird Beach.

Very special geology, stunning coastal and mountain scenery.

Achiltibuie is an old crofting village with views to the Summer Isles and a Smokehouse is 5 miles away.

Return to Royal Hotel for dinner. **Overnight stay Royal Hotel, Ullapool.**



Suilven from Stac Pollaich, 1 Billion year sandstone over 3 Billion gneiss

27th MAY (DAY 11)

Morning:- Depart Ullapool for **Portree**, Isle of Skye.

Stopping at Corrieshalloch Gorge and Loch Maree. Then via Applecross Peninsula and over Bealach na Ba.

Corrieshalloch Gorge very dramatic Post-Glacial feature (a “nick point”). Loch Maree scenery/views absolutely stunning. Views from Applecross Peninsula westwards over towards Isle of Skye. Excellent examples of Late- and Post-Glacial raised beaches along coast. Bealach na Ba is UK’s best example of glaciated rockscapes and extremely dramatic – lots to see and certainly not to be missed.

Inverewe Gardens: absolutely beautiful, and visitor centre offers lunch.

Glenelg Brochs: Dun Troddan and Dun Telve are large, very well preserved brochs of Iron Age.

Arriving Royal Hotel, Portree for dinner. **Overnight stay Royal Hotel, Portree.**



Portree, Isle of Skye

28th MAY (DAY 12)

Morning:- Head southwards via Broadford and Torrinn. Easy guided walk along the Camasunary Trail.

Tertiary igneous geology and the most dramatic mountainscapes. Excellent views of the Cuillin Mountains (black gabbro), Eastern Red Hills (granophyre) and their geological relationships.

Mid-Afternoon:- Visit Elgol + sail to Loch Coruisk.

Perhaps the most dramatic and picturesque views of the whole trip (just!). Stunning geology (Tertiary igneous plus Jurassic sediments).

Elgol: a turn-off at Kilmarie on way to Elgol to visit **Dun Ringill** which is a D-shaped dun with its flat side on the edge of a cliff. Great views and walk.

Return to Royal Hotel, Portree for dinner. **Overnight stay Royal Hotel, Portree.**



Black Cuillin mountains

29th MAY (DAY 13)

All Day:- To West Skye, visit Dunvegan Castle (home of Macleod Clanchiefs for 800 years), Neist Point and Talisker Distillery.

Tertiary igneous geology – mostly basalt lava flows and their relationships to opening of Atlantic Ocean. Simply stunning scenery.

Dunvegan area: Dun Fiadhairt involves a small hike with beautiful views back to the castle.

Trumpan Church on the Waternish Penninsula has interesting tales and great views and sunset.

Also on Waternish Penninsula: Skyeskyns is a traditional tannery in Loch Bay open daily 9-6. Stein Inn is the island's oldest pub. Shilasdair is close by and good for handspun Scottish merino wools and cashmere, 10-6.

Dun Beag might be a possible stop on return to Portree... glorious setting and 2,000 years old

Return to Royal Hotel, Portree for dinner. **Overnight stay Royal Hotel, Portree.**



Dunvegan castle

30th MAY (DAY 14)

All Day:- To North Skye, Flora MacDonald's Grave, Quirang, Staffin, Kilt Rock, moderate guided walk up to Old Man of Storr.

Mixture of Tertiary geology, Jurassic sediments and present-day geomorphological processes. Quirang is UK's most active landslip zone affecting Tertiary basalts on top of Jurassic sediments, resulting in a "lunar landscape". Extremely dramatic. Stunning scenery and certainly not to be missed.

Trotternish Peninsula: Think of these peninsulas like the pseudopods of an amoeba. Duntulm Castle is in ruins and slowly falling into the sea. Approach is questionable.

Durrinish Peninsula: An 11 mile hike to MacLeod's Maidens is strongly recommended if time permits.

Return to Royal Hotel, Portree for dinner. **Overnight stay Royal Hotel, Portree.**



Old Man of Storr, tertiary lava flows

31st MAY (DAY 15)

Morning:- Depart Portree for **Inverness Airport**, arriving about **1.00pm**.