



## Quarry in Volcanic Vent Rock

The vertical cooling joints of the dolerite can be seen, and the absence of onion weathering shows that this is a different type of dolerite from the quartz dolerite seen in Craigmear quarry. This rock is part of the later intrusion of dolerite that fills the extinct volcanic pipe and makes up the summit of the hill.

At the end of the outcrop take a path down hill towards the Ballo Reservoir. At a crossroads in the path at the base of the summit go left (N) and follow the path at the base of the summit back to the main track. At the track go right and return to the car park.

## Find Out More

The Living Lomonds Landscape Partnership is an association of organisations in Fife and Perth & Kinross. Our aim is to re-connect people with the living legacy of the Lomond and Benarty Hills through a range of community based activities, volunteering opportunities and projects. Visit the Living Lomonds website [www.livinglomonds.org.uk](http://www.livinglomonds.org.uk) to print more copies of this leaflet and other themed walks in the area.

### MAKE YOUR WALK ENJOYABLE

Please wear sturdy footwear, take suitable clothing and some water and be aware that the weather can quickly change. A walking pole could be useful. Loose blocks of stone in the quarry can be a trip hazard.

### SCOTTISH OUTDOOR ACCESS CODE

In the spirit of responsible access, please follow the **Scottish Outdoor Access Code**.

### TRAVEL

- From Falkland, take the road to Leslie and stop at the Craigmear car park [NO 227 062]
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Local Transport links can be found via [www.travelinescotland.com](http://www.travelinescotland.com)

geoHeritage Fife was set up in 2000 to:

- \* publicise Fife's geological heritage
- \* provide educational resources in geology
- \* promote geotourism

geoHeritage Fife | 01334 828623 | Scottish Charity No. SC 032509

Fife Local Geodiversity Sites (LGS) is concerned with identifying and assessing important sites and notifying the statutory planning authority of these sites. Fife RIGS was incorporated into geoHeritage Fife in 2005.

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KINBURN (St Andrews)  
CHARITABLE TRUST



# West Lomond

## Geology Themed Walk



Re-connecting people  
with the hills

Historic Landscape



LOTTERY FUNDED

Welcome to our West Lomond Geology Walk. This is one of a series of leaflets, which explains the geology of Lomond Hills and how they were shaped by volcanic activity and many climates, including hot deserts, tropical humidity and several Ice Ages over millions of years. We hope that an understanding of geology will add a new dimension to walking in the Living Lomonds area. If you enjoyed this walk you can find more geology walks at [www.livinglomonds.org.uk](http://www.livinglomonds.org.uk)

### GRADING - WEST LOMOND

**Terrain:** (Strenuous) Wide undulating well surfaced path, with some fairly long steep sections leading to the base of the hill, this takes you to a long steep arduous slope to the summit.



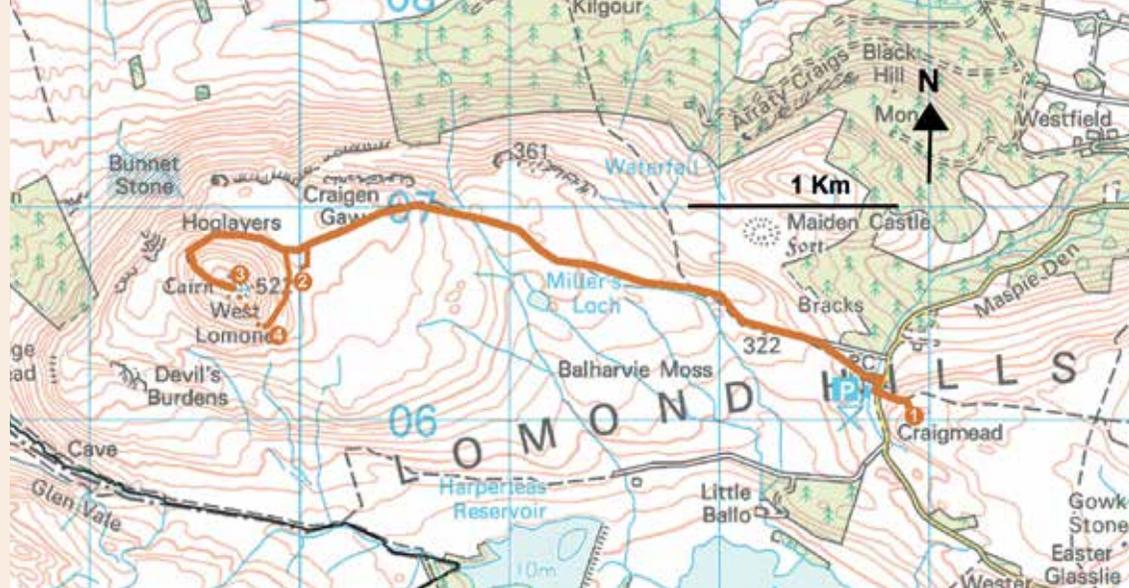
**strenuous**

**Distance:** 5 miles/8km

**Time:** 2 hrs

## Geological History

The oldest rocks of the area are sedimentary rocks deposited in southern desert latitudes during the Devonian period 410-354 million years (Ma) ago. Most of the local rocks formed during the Carboniferous Period, 354 -299 Ma, when this part of the Earth lay close to the Equator. The landscape was dominated by rivers carrying sediment eroded from the Highlands into deltas and lagoons. These layers of sediment now form sandstone and mudstone. Coal seams formed from lush tropical forests. Limestone



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was deposited when the sea flooded low lying areas, preserving fossils of shells, "sea lilies" (crinoids) and corals.

The Lomond Hills, the Bishop Hill and Benarty are the result of the intrusion 307Ma ago of a layer of molten rock between layers of sedimentary rock, to form a sill of the dark-coloured igneous rock quartz dolerite. Rock previously overlying the sill has mostly been eroded away, and the hard dolerite has protected the underlying sedimentary rock from later erosion. The sill forms the ridge between the Lomonds, the shoulder at the west end of the West Lomond, and the upper parts of the Bishop Hill and Benarty. The Lomond Hills peaks are two extinct volcanic pipes, now filled with 297 Ma old olivine dolerite.

Between 19 000 and 13 000 years ago the area was covered by ice, which sculpted the underlying landscape.

### GLOSSARY

**DOLERITE:** A coarse -grained igneous rock rich in iron, calcium and magnesium. Prefixed by "Quartz" or "Olivine" depending on the characteristic mineral.

**IGNEOUS:** Rock formed from the cooling of molten rock (magma).

**JOINTING:** Cracks in rocks.

**LIMESTONE:** A sedimentary rock made of calcium carbonate, often containing fossils.

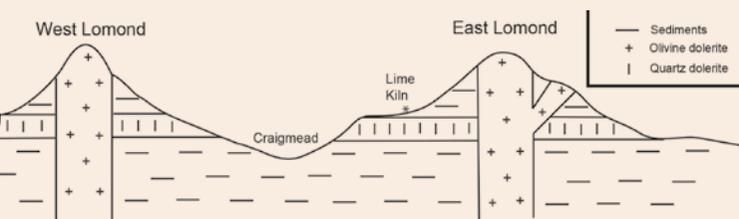
**METAMORPHIC:** A rock modified by intense heat and/or pressure.

**MUDSTONE:** A rock formed by the accumulation of mud.

**SANDSTONE:** A rock formed by the accumulation of sand grains.

**SEDIMENTARY:** Rocks formed from sediments eroded from older rocks.

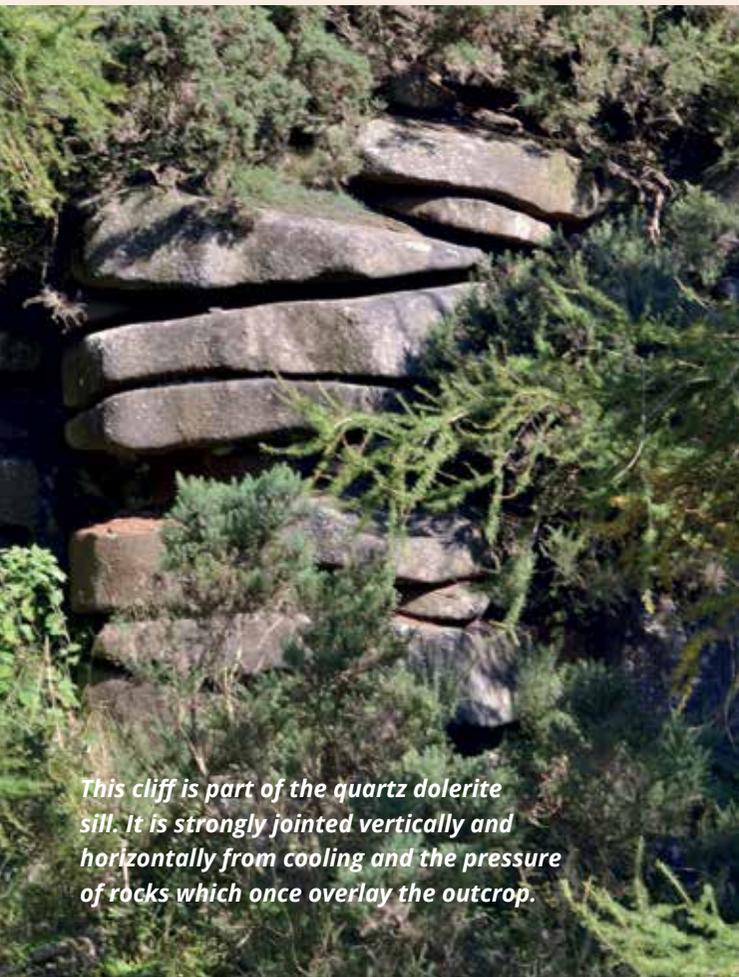
**SILL:** A layer of molten magma injected into pre-existing rocks



Geological cross-section of the Lomond Hills

## "THE ROUTE"

From the Craigmead car park, cross the road and take the path to the East Lomond. Go through the first gate and turn right into the woods to a rock face.



*This cliff is part of the quartz dolerite sill. It is strongly jointed vertically and horizontally from cooling and the pressure of rocks which once overlay the outcrop.*

## Craigmead Quarry

Just to the left of the cliff shown (left), is an example of spheroidal or "onion" weathering, which is characteristic of this rock, where the dolerite erodes in curved, peeling layers



Return to Craigmead Car Park and take the path at the rear of the car park signposted "To West Lomond". At the metal pedestrian gate go left on to a clear track up hill. At the corner of the woods behind the car park take either fork in the path, joining an older track with stone walls on each side.

The older track is metalled with stone fragments of mudstone and limestone from a local quarry. The old stone wall is mostly made of blocks of dolerite from the sill.

At the next gate look towards the summit of the West Lomond. The "shoulder" on each side marks the level of the top of the igneous sill.

Just before reaching the base of the West Lomond summit, go left into an abandoned limestone quarry.



Shoulder marks the top of the sill

## Wilkie's Quarry

The limestone is overlain by a fine grained buff-coloured mudstone, containing occasional plant fossils.



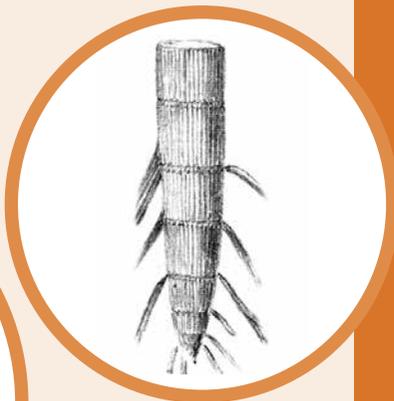
*The wavy tops of algal reef structures are visible in the quarry wall. Tiny crinoid fragments 1-2 mm across are abundant in the limestone and occasional solitary fossil corals can be seen.*



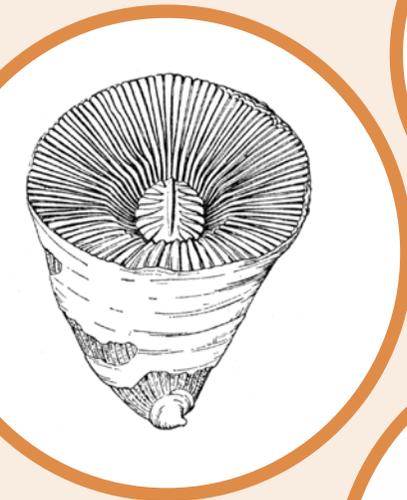


At the west end of the quarry the rock becomes brown in colour, which may be due to alteration of the limestone from faulting and the proximity of the igneous sill.

Plant stem fossil (*Calamites*)



Coral fossil

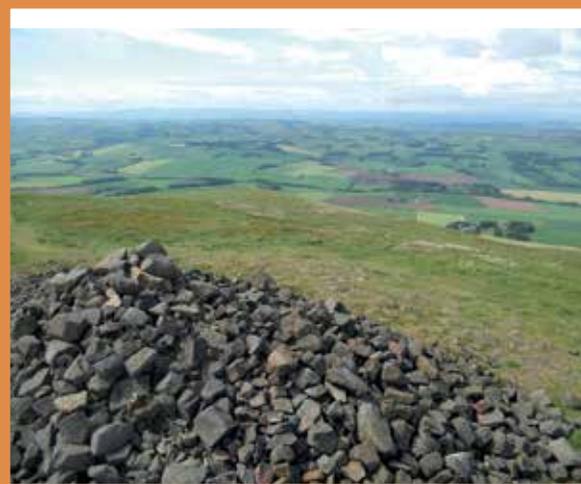


Crinoids ("sea lilies") as stems and isolated rings (ossicles)



Return to the main path and turn left (west). Do not go up the first steep path to the summit to the left but continue west on the wide path along the base of the summit. Go left up the third path to the summit, which curves round the west side of the hill.

## West Lomond Summit



To the north and north west the mountains of the southern Highlands are made of hard, ancient metamorphic rock.

To the east is the volcanic neck of the summit of East Lomond, with the twin peaks of Largo Law (another extinct volcano) in the distance. The hummocky ground between the two Lomonds shows the irregular nature of the top of the sill and other intrusions.



To the south is the Bishop Hill and Benarty. Both of these hills are topped with the quartz dolerite sill, protecting from erosion the underlying softer sedimentary rocks that make up the bulk of these hills.

To the south west are the Cleish, Touch, Fintry and Gargunnock Hills, all of lavas of Carboniferous age, with a steep, ice-scoured scarp slope at the W end.

To the west is the great mass of the Ochil Hills, made of older lava flows of Devonian age. The lower land between these hills is underlain by softer sedimentary rock.

From the summit descend by the SE path towards Ballo and Harperleas Reservoirs. The path is steep at the bottom, so care is needed.

**ALTERNATIVE ROUTE:** retrace your steps from the summit back towards where the track levels out, just before the limestone quarry. Take the track to the right (S) and follow it until you see the quarry (locality 4).

At the bottom of the summit look (N) towards a large cliff. The rock and ground is unstable here. Do not approach close to the cliff.