

GRAIG FAWR

UPLAND LANDSCAPES OF THE PENNANT PLATEAU

Discover geology and landscape: walking trails in rural Swansea

SCRATCHING THE SURFACE

CRAFU'R WYNEB

GRAIG FAWR

TIRWEDDAU UCHELDIROL LLWYFANDIR TYWODFAEN PENNANT

Darganfod daeareg a thirwedd: llwybrau cerdded yn ardal Abertawe

7 KM
3 HOURS
GPS COMPATIBLE



START
GRID REF.
SN 62990 085 15

at the Garnswllt Activity Centre where there is roadside parking. Buses stop in Garnswllt; the Activity Centre is 800 metres up the road from the bus stop.

PATH CONDITIONS

The trail follows paths and tracks that can be very wet. Some paths are faint and this trail is not recommended on a misty day.

MAPS



Ordnance Survey 1:50,000 map 159 (Swansea & Gower)
1:25,000 Explorer map 165 (Swansea)
Geological Survey 1:50,000 Sheet 230 (Ammanford)



REFRESHMENTS

Ammanford and Felindre

SAFETY

This trail is not recommended in poor visibility. Grid references are for guidance only. Follow the Countryside Code (<http://naturalresourceswales.gov.uk>) and the Geological Fieldwork Code (www.rockwatch.org.uk/geological_code). Respect people, protect the environment and stay safe. Wear sensible clothing and footwear.

FURTHER INFORMATION

Local walking groups www.swansea.gov.uk/walking
Local geology www.swga.org.uk
For junior geologists www.rockwatch.org.uk
Geology and geological maps www.bgs.ac.uk
Garnswllt Activity Centre www.garnswlltactivitycentre.co.uk/
Gower Society www.thegowersociety.org.uk
Wildlife Trust www.welshwildlife.org
Archaeology www.ggat.org.uk

The Geology of South Wales: A field guide
by Gareth T. George (gareth@geoserv.co.uk, 2008)

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Design: iconcreativdesign.com

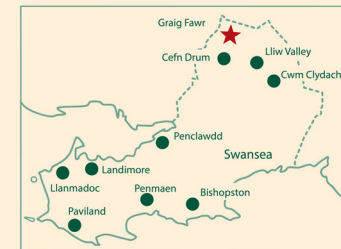
7 KM
3 AWR
YN CYDWEDDU
Â GPS

North Swansea is a high moorland plateau formed by tough sandstone. This trail explores the landscape and ecology of this area and discovers the processes that form rocks and shape landscapes. Choose a clear day to make the most of the wonderful views. The trail is 7 km (4½ miles); allow 3 hours.

I'r gogledd o Abertawe ceir llwyfandir gweundir uchel wedi'i ffurfio o dywodfaen gwydn. Mae'r daith hon yn archwilio tirwedd ac ecoleg yr ardal ac yn darganfod y prosesau sy'n ffurfio creigiau ac yn llunio tirweddau. Dewiswch ddiwrnod braf er mwyn manteisio ar y golygfeydd godidog. Mae'r daith yn 7 km (4½ milltir) o hyd ac mae'n cymryd tua 3 awr.



Look for other trails in this series!



SCRATCHING THE SURFACE



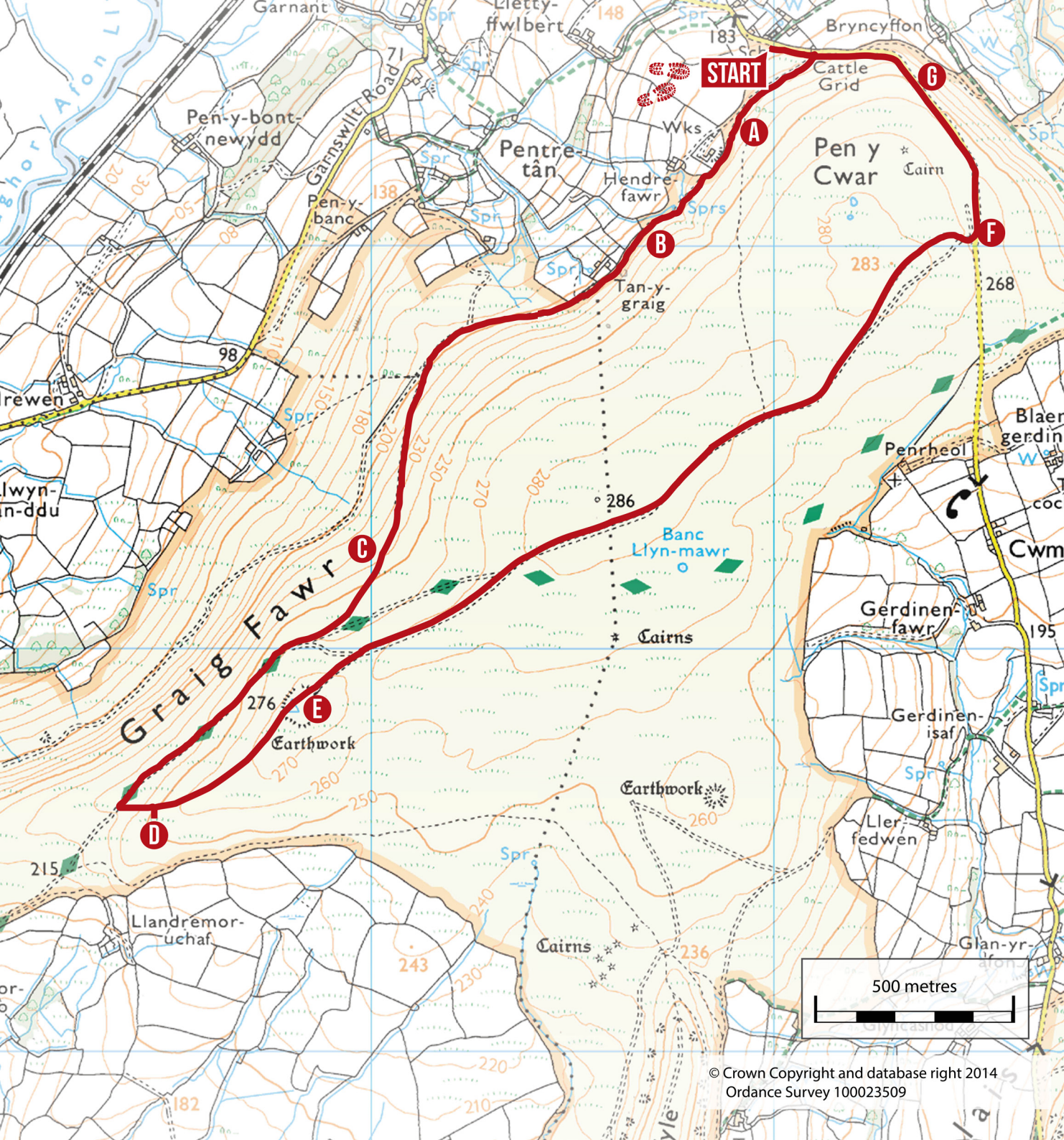
CRAFU'R WYNEB

Discover geology and landscape: walking trails in rural Swansea

Darganfod daeareg a thirwedd: llwybrau cerdded yn ardal Abertawe

© 2015 Geraint Owen and Siwan Davies (Swansea University)
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<http://geography.swan.ac.uk/scratchingthesurface/>





Walk carefully up the road, cross the cattle-grid and follow the stony track on the right for 230 metres to a fork.
[0.4 km; SN 62939 08361].

- A** Bedrock beneath your feet is covered by superficial deposits that are exposed at the edges of the track. Angular blocks of broken bedrock are surrounded by mud in a deposit called head, that formed from debris washed down the steep slope after the last glacial episode 20,000 years ago. The top few centimetres of the head are a dark soil, which includes decaying plant material.



Superficial deposits

Take the left fork and continue for 450 metres. Stop just after crossing a narrow valley, where the path curves right.
[0.8 km; SN 62743 08080]

- B** Blocks of sandstone bedrock washed out of the head are made of tiny sand grains cemented together. The grains were brought here by rivers 320 million years ago, in the late Carboniferous period. Over millions of years they were cemented together as deposits over 1000 metres thick built up, called the Pennant Sandstone. These tough rocks resist erosion, forming an upland plateau with Graig Fawr at its north-western edge.

Late Carboniferous South Wales was a swampy lowland river plain close to the equator, covered in lush vegetation, like today's Amazon Basin. Rotting vegetation formed peat swamps, that were compressed to form coal. There are over 40 coal seams in the Pennant Sandstone. Black fragments in the sandstone blocks are pieces of fossil plants and you may find the impressions of stems or branches. Plate tectonics and continental drift have since moved South Wales to its present latitude.



Fossil plant debris



Fossil plant stems

Today's vegetation is typical of wet upland Wales. Mosses are common, including sphagnum mosses which retain large quantities of water, forming peat bogs. Rushes flourish in wetter parts and bracken covers large areas in the summer. Coarse grasses and stunted shoots of heather, wimberry (bilberry) and other flowering plants are evidence of heavy grazing. Woody shrubs like gorse grow in areas of lighter grazing and woodland would develop if there was no grazing. Birds include red kites and ravens, joined in summer by wheatears and cuckoos.



Moorland vegetation

Follow the track for 1 km. Just after it curves left, follow a path alongside a ditch on the left that rises obliquely up the hillside (leave the track at 1.65 km, SN 62155 07729). After 400 metres, where the ditch becomes less distinct just before a very reedy area, take a clear path on the right and stop in 50 metres at a white boulder. [2.1 km; SN 62052 07296]



Sandstone erratic at C

C This boulder is tough, quartz-rich sandstone from the Twrch Sandstone, which forms the bedrock in the Black Mountain beyond Ammanford, 10 km to the north. This is an erratic, stranded here when glaciers melted 20,000 years ago.



Meanders in the River Loughor

The channel of the River Loughor far below is dominated by meanders. The river erodes the outer banks of the bends and deposits sediment on the inner banks, or point bars. Over decades and centuries, the meanders become ever more tortuous. Eventually the river cuts through the narrow neck, leaving the old loop as a crescent-shaped oxbow lake. You can see several meanders that are close to being cut off. As you continue, see if you can spot any oxbow lakes.

The path curves right and meets a grassy track. Follow this to the right. After an area of reedy ground, the track descends and meets another track, with an erratic on the right made of pebbly conglomerate carried from the Black Mountain. Turn left and follow the track uphill, noticing rock crags on the right. In about 200 metres, at the top of a steep section, follow faint paths on the right to reach the crags. [3.4 km; SN 61378 06523]



Sandstone crags at D

D These crags are sandstone bedrock protruding through the superficial deposits. Ledges are the surfaces of beds of sand deposited 320 million years ago. They were originally horizontal, but 300 million years ago they were tilted gently to the south as the rocks were squeezed, crumpled and pushed upwards to form mountains. The mountains have been worn down by erosion, and today's ground surface cuts across tilted, or dipping, beds.

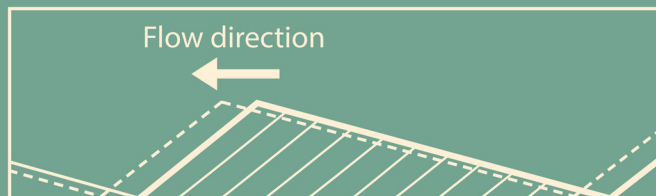
The rock also has steeper layers, called cross-bedding, which form when sand in a river is shaped into dunes. Dunes move as sand cascades down their steeper downstream faces, and successive positions of these lee faces form cross-bedding. The cross-bedding here is inclined towards the north, showing that Carboniferous rivers flowed that way. The Pennant Sandstone is made of sand eroded from mountains to the south, which later spread northwards, squeezing and uplifting the rocks.

The ground below the crags forms a flatter terrace. The Pennant Sandstone includes intervals of mudstone and coal that are less resistant to erosion, and the terrace corresponds to an interval of mudstone.

The River Loughor widens beyond the bridges to the south, where it is influenced by the tide and opens into the estuary. The high ground beyond is the Gower peninsula. The hills directly beyond the bridges are also made of Pennant Sandstone; a Scratching the Surface trail at Penclawdd explores them. The high ground further to the right is Llanmadoc Hill, underlain by older rocks and explored by a trail at Llanmadoc.



Cross-bedding



Return to the track, turn right and continue uphill for 600 metres to the pillar on the summit of Garn Fawr. [4.0 km; SN 61812 06864]

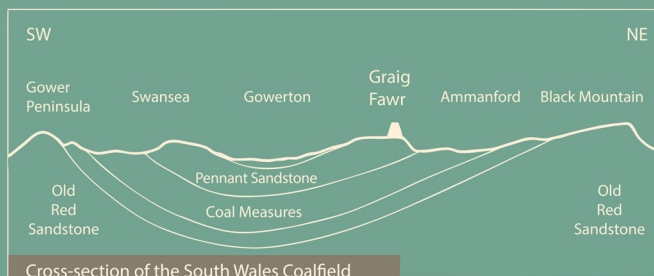
E Enjoy the panoramic view! The white-painted triangulation pillar, or trig point, dates from when maps were made using land-based surveys. Pillars were erected at prominent points within sight of several others, enabling surveyors to map the ground elevation. Nowadays, this is done using satellites, but trig points remain useful markers for hill-walkers.

To the right of your direction of travel are more hills of Pennant Sandstone. Most are asymmetrical, with short, steep scarp slopes facing left (north) and longer, gentler dip slopes facing to the right. This asymmetry shows that the ground is underlain by alternating layers of tough sandstone and weaker mudstone that dip gently to the south. Erosion rapidly wears away the mudstone, so the ground surface follows the sandstone beds.



Asymmetrical hillslopes

The high ground beyond the wind turbines (north) is the Black Mountain, the western part of the Brecon Beacons. It is underlain by Old Red Sandstone, which formed about 370 million years ago, in the Devonian period. Similar rocks form high ground on Gower, but at Graig Fawr you would have to drill a hole over a mile deep to reach them! The Earth movements that tilted the beds bent them into a basin-like fold, or syncline - the South Wales Coalfield. Erosion has planed through this, exposing the youngest rocks in the centre. Tough Old Red Sandstone in the north and south forms high ground. Pennant Sandstone is also resistant to erosion, forming high ground here in north Swansea and in the city (Kilvey Hill, Townhill). The youngest rocks, also coal-bearing, form the lower ground of Llanelli, Gowerton, Gorseinon and beneath the Loughor estuary. Between the Pennant Sandstone and the Old Red Sandstone, the Coal Measures are mostly mudstone, with coal seams and thin sandstones. Erosion of the mudstone forms the lower ground where towns like Ammanford have developed.



Cross-section of the South Wales Coalfield

Society's thirst for energy is evident in the landscape. The nearest hill to the right, across the Camffrwd Valley, is Twyn Tyle. Excavations part-way up the hillside are where miners tunnelled into the hillside to excavate coal. The slanting line of excavations reflects the gentle southerly dip of the bedding. A Scratching the Surface trail at Cefn Drum explores this landscape. The towns in the valleys developed around larger coal mines that have now closed. Pylons carry electricity and buried pipelines transport oil and gas. Burning fossil fuels extracted from rocks, like coal, oil and gas, is unsustainable and releases stored carbon dioxide, changing the Earth's climate. But renewable forms of electricity generation also impact on the landscape, and you can see wind turbines on Mynydd y Betws and a solar farm beyond the River Loughor.



Twyn Tyle from Graig Fawr

Continue towards the wind turbines, following a broad track for 2.2 km to the road between Felindre and Garnswllt. [6.2 km; SN 63500 08034]



The view North East from E

F This section gives a real flavour of upland hill-walking in open countryside. The deep valley beyond the road has been eroded along the line of the Bettws Fault. When the rocks were squeezed and folded 300 million years ago, blocks of rock also slipped past each other along faults. Rocks close to a fault are weakened by this process and more readily eroded.

Turn left and walk carefully down the road for 400 metres to the second of several cuttings on the left. [6.6 km; SN 63376 08384]

G The road descends the steep northern scarp face of the Pennant Sandstone, like the north-facing slopes you saw from E, but on a larger scale. The cutting exposes the bedrock beneath the superficial deposits. Some of the slabs on the ground contain fossils of the plants that grew here 320 million years ago.

Continue carefully down the road to return to the start point.

FINISH



Meanders in the River Loughor