



Scratching the Surface:

Striving for excellence in public engagement with geoscience through 'virtual guided walks'

Geraint Owen

Department of Geography, Swansea University

g.owen@swansea.ac.uk

[@gerainthowen](https://www.instagram.com/gerainthowen)



Scratching the Surface:

Striving for excellence in public engagement with geoscience through 'virtual guided walks'



Swansea University
Prifysgol Abertawe



Cronfa Amaethyddol Ewrop ar gyfer Datblygu
Gwledig: Ewrop yn Buddsoddi
mewn Ardaloedd Gwledig
The European Agricultural Fund for
Rural Development: Europe Investing in
Rural Areas



Llywodraeth Cymru
Welsh Government



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PENMAEN AND THREE CLIFFS BAY
GEOLOGY, PREHISTORY AND HISTORY IN SOUTH GOWER

Discover geology and landscape: walking trails in rural Swansea

9.5 KM
4 HOURS
GPS COMPATIBLE

SCRATCHING THE SURFACE

CRAFU'R WYNEB

PEN-MAEN A BAE'R TRI CHLOGWYN

DAEAREG, CYNHANES A HANES YN NE GWYR

Darganfod daeareg a thirwedd: llwybrau cerdded yn ardal Abertawe

9.5 KM
4 AWR
YN CYWEDDU A GPS



LLIW VALLEY RESERVOIRS

FLOODED VALLEYS AND OLD MINES
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

3 HOURS
WALKING TIME

GRAIG FAWR

UPLAND LANDSCAPES OF THE PENNANT PLATEAU
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

7 KM
3 HOURS
WALKING TIME

PAVILAND CLIFFS

SPECTACULAR SOUTH GOWER: CLIFFS AND CAVES IN CARBONIFEROUS LIMESTONE
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

3 HOURS
WALKING TIME

CLOGWYNI PEN-Y-FAI

GWYCHTER DE GWYR, CLOGWYNI AC GOFAU
YN Y DALCHAFEN CARBONIFERAIDD
Darganfod deasing a thirwedd:
Wybrau cerdded yn ardal Abertawe

CRAFU'R WYNEB

8.5 KM
3 AWR
WYBRAU CERDDED

CWM CLYDACH AND GELLIONNEN CHAPEL

FORMING THE SOUTH WALES
LANDSCAPE
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

9 KM
4 HOURS
WALKING TIME

BISHOPSTON VALLEY AND BARLAND COMMON

CONTRASTING LANDSCAPES OF LIMESTONE AND SHALE
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

6 KM
4 HOURS
WALKING TIME

PENCLAWDD AND THE MORLAIS VALLEY

A CORNER OF THE COALFIELD IN NORTH-EAST GOWER
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

8.5 KM
4 HOURS
WALKING TIME

PENMAEN AND THREE CLIFFS BAY

GEOLOGY, PREHISTORY AND HISTORY IN SOUTH GOWER
Discover geology and landscape:
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SCRATCHING THE SURFACE

9.5 KM
4 HOURS
WALKING TIME

CEFN DRUM AND CWM DULAIS

COAL AND COAL MINING
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

11 KM
4 HOURS
WALKING TIME



CRAFU'R WYNEB

PEN-MAEN A BAE'R TRI CHLOGWYN

DAEARED, CYNHAWES A HANES YN NE GWYR

Darganfod deasing a thirwedd:
Wybrau cerdded yn ardal Abertawe

9.5 KM
4 AWR
WYBRAU CERDDED



CRAFU'R WYNEB

CEFN DRUM A CHWM DULAIS

GLO A CHODI GLO

Darganfod deasing a thirwedd:
Wybrau cerdded yn ardal Abertawe

11 KM
4 AWR
WYBRAU CERDDED

LLANMADOC HILL

GOWER ROCKS AND SCENERY
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

8.5 KM
4 HOURS
WALKING TIME

BRYN LLANMADOC

CREIGWALL A RGGYFFERDD GWYR
Darganfod deasing a thirwedd:
Wybrau cerdded yn ardal Abertawe

CRAFU'R WYNEB

8.5 KM
4 AWR
WYBRAU CERDDED

LANDIMORE, CHERITON AND RYER'S DOWN

VARIED LANDSCAPES OF NORTH GOWER
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

8 KM
3 HOURS
WALKING TIME

LANDIMOR, CHERITON AND RYER'S DOWN

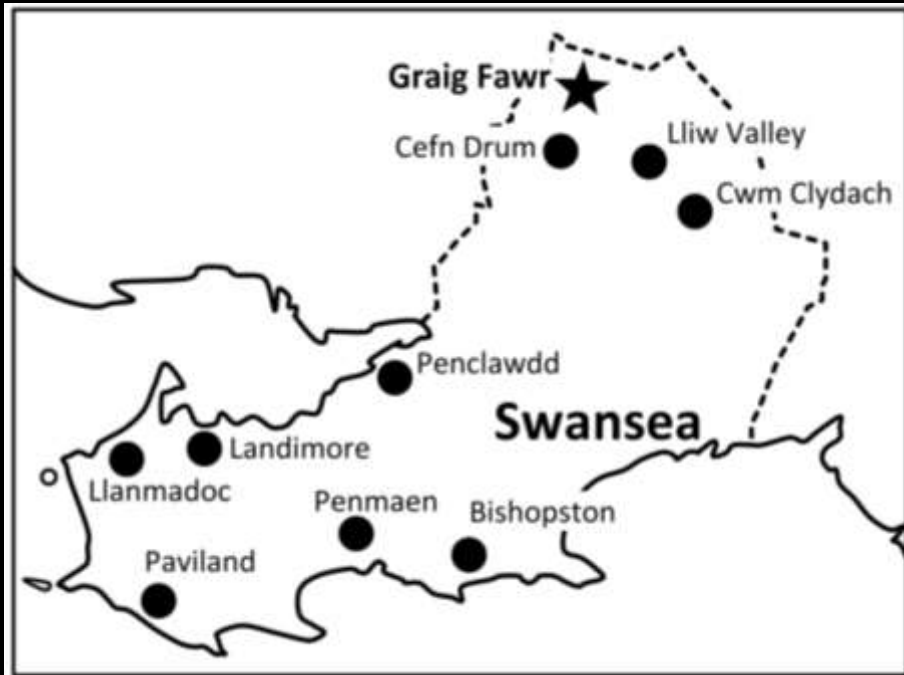
VARIED LANDSCAPES OF NORTH GOWER
Discover geology and landscape:
walking trails in rural Swansea

SCRATCHING THE SURFACE

8 KM
4 AWR
WYBRAU CERDDED

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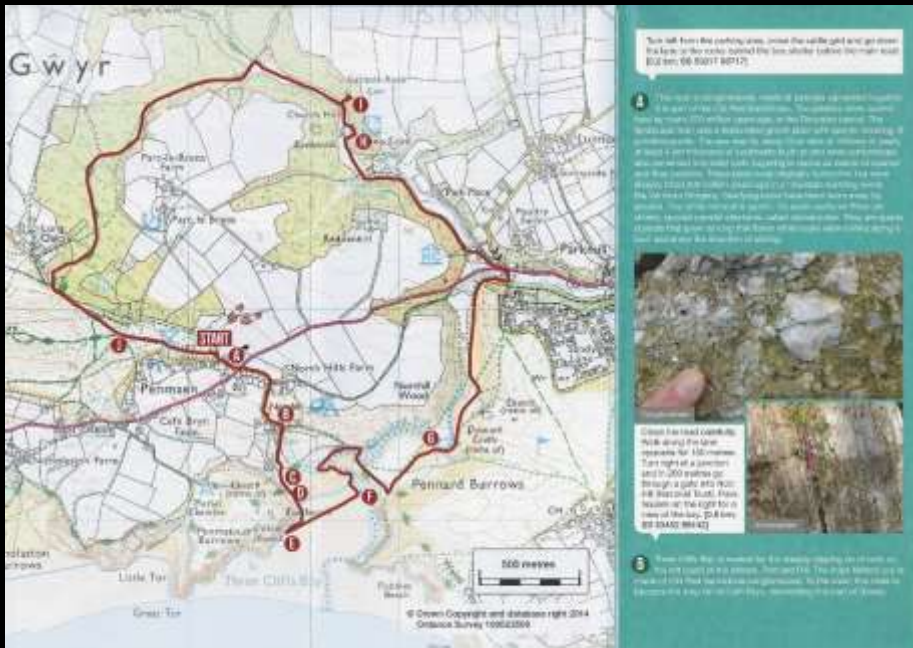




- Funded by EU & Welsh Assembly through CCS
- With colleague Siwan Davies
- Scratching the Surface
- 10 trails
- Walking & geology
- Rural areas of Swansea



- Geology/landscape interest
- Other interest – industry, archaeology
- 3-5 miles
- Destination
- Amenities
- Bilingual
- Practical
- Map, route, information





- Linked to 'live' activities – talks and guided walks

SCRATCHING THE SURFACE

Home Full Menu Contact Us Links

RURAL GEOLOGY AND LANDSCAPE: TRAILS IN RURAL SWANSEA

Walkers Group

- Celtic Drum and Gern Ddu
- Gern Ddu and Gollan's Chapel
- Grog Fair
- Llanrhaydn

Walkers group

- St. David's Bay
- Llanrhaydn
- Llanrhaydn Hill
- Porthkerry
- Porthkerry and The Mumbles Valley
- Porthkerry and The Mumbles Valley

ABOUT

Scratching the Surface website provides online guides and information about Swansea. They will take you through the history and development of the Swansea region and its surrounding areas. The website provides a range of online guides and information about the Swansea region and its surrounding areas. The website provides a range of online guides and information about the Swansea region and its surrounding areas.

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- Supported by website with downloads, audio trails, GPX, 'Ask an expert'

'Live' guided walks

Walk leader must ensure that users:

- Don't get lost; stay safe
- Know what to look at
- Know what it means
- Stay interested



How to ensure these aims are met in a 'virtual' walk?

Know your audience

- What are they (not) interested in?
- What do they (not) know?



Focus on the familiar

**Begin with
something
obvious,
unusual,
interesting or
familiar**

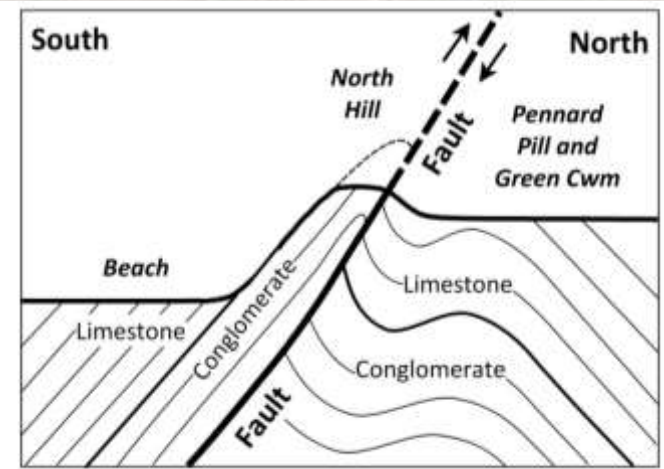
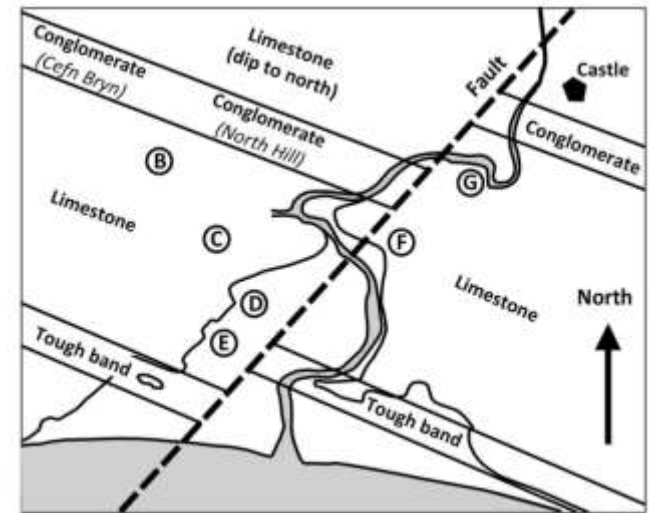


Tell a story

- **Continuous narrative versus key features**
- **Spark their curiosity**
- **Build up a case from clues**



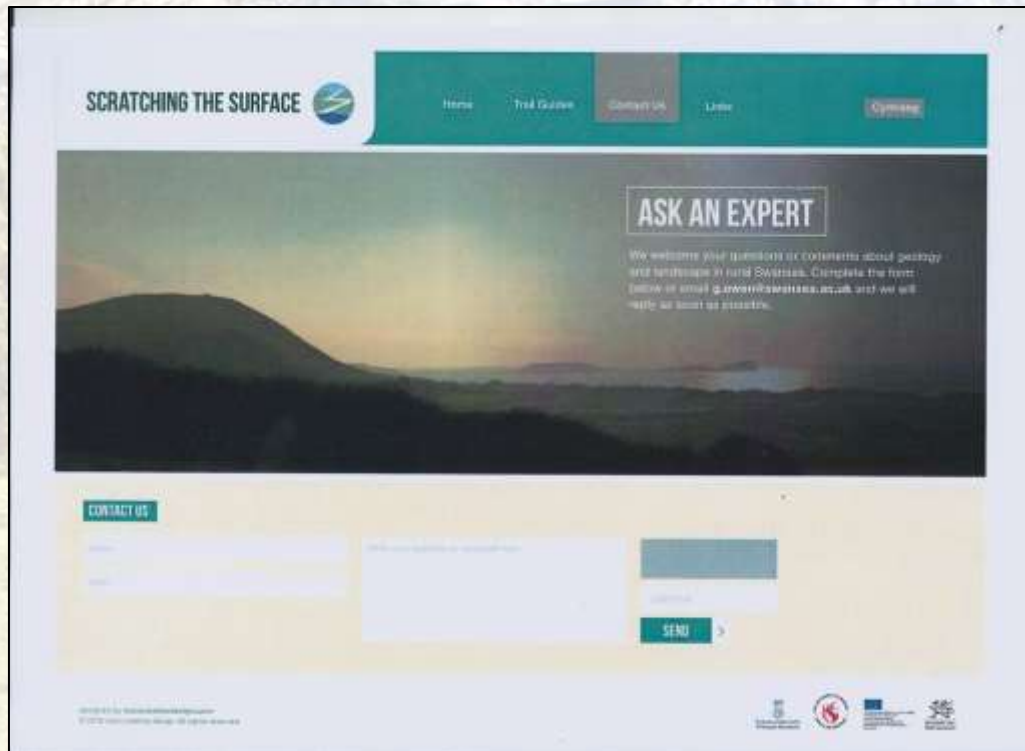
Don't dumb down



Keep things simple



- Encourage interaction
- Offer support



START GRID REF.
SS 53 123 88789

near Penmaen church where there is parking (National Trust). Penmaen is served by bus.

PATH CONDITIONS

The trail follows marked paths. There is a steep descent into Three Cliffs Bay, which may be inaccessible at very high tides.

MAPS

Ordnance Survey 1:50,000 map 159 (Swansea & Gower)
1:25,000 Explorer map 164 (Gower)
Geological Survey 1:50,000 Sheet 247 (Swansea)

REFRESHMENTS

Parkmill

SAFETY

Take care crossing and walking along roads. Be aware of the tide in Three Cliffs Bay. The stepping stones between E and F may be slippery and are submerged at some stages of the tide. Cold 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.bgi.ac.uk
Gower Society www.thegowersociety.org.uk
National Trust www.nationaltrust.org.uk
Archaeology www.pgat.org.uk
Caves www.swoc.org.uk

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

A Guide to Gower edited by Don Strawbridge and Peter J. Thomas (Gower Society, 1990)

Text and images: Geraint Owen, Siwan Davies (Swansea University)
Welsh translation: Dyfed Elis-Gruffydd
Design: iconorativdesign.com

Have a good
script –
practice
makes
perfect!

Look smart!

Walk inland across the beach towards Pennard Castle. At Pennard Pill turn left to the stepping stones. You may have to detour around a pool where a stream joins Pennard Pill. The trail continues up the east (far) side of Pennard Pill. If you are unable to cross the stepping stones, you can return to B along a direct path from here, or follow a path up the west side of the valley to the main road, which you cross to the Heritage Centre and resume the trail towards H. To reach F and G, cross the stepping stones carefully and walk to the far end of the gravel ridge. [2.3 km; SS 53957 88172]

F The gravel ridge is a storm beach. Rocks eroded from the cliffs are washed to the head of the bay by storms. In very high tides the sea overtops the ridge and floods the valley, where a salt marsh has developed. On the seaward side, a clay-rich layer is being uncovered from beneath the gravel ridge and broken up by waves. This deposit is several thousand years old and has formed since the last ice age as sea level has risen. Similar deposits elsewhere in South Wales contain tree stumps and deer antlers.



Storm beach

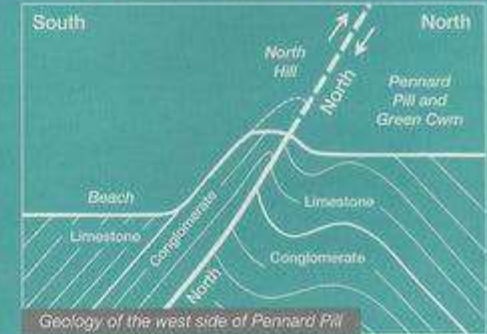


Clay deposit

Look back towards the stepping stones. The steep slope beyond marks the boundary between conglomerate forming the ridge and more easily eroded limestone in the bay.

Turn left along a path up the valley to rocks on the right just before a wooden boardwalk. [2.6 km; SS 54155 88300]

G The rock is limestone – look for fossils. Looking across the river, you have passed the boundary between conglomerate and limestone, but you have not yet reached it on this side. This is the effect of the fault that runs through the bay; the valley of Pennard Pill has been eroded along it. At the foot of the slope across the river are beds of limestone, so there is limestone both south and north of the conglomerate ridge. The conglomerate is the core of an anticline, like you saw at E but much larger, formed in the Variscan Orogeny. The landscape has since been worn down, slicing through the fold. But the rocks vary in their resistance to erosion, so Old Red Sandstone forms the high ground of Cefn Bryn. The compression and folding were so severe that the rocks also broke along a steep fault. And remember that this faulted fold is offset across the valley by another fault. Geological structures beneath the surface can be very complex!



Take care on the boardwalk; it may be slippery. Follow the path along the valley for 1 km. Cross the river at a bridge to reach the main road at Parkmill. Cross with care and turn left along the lane past Shepherds store to the Gower Heritage Centre. Cross the stream and turn right on the road. In 1 km, turn right through a gate into a wide grassy valley and an area of stonework 400 metres ahead on the left. [6.2 km; SS 53746 89838]

H Parc Le Breos burial chamber, also known as Giant's Grave or Long Cairn, is a chambered tomb over 5,000 years old. The stone structure across the valley is a limekiln, with an old quarry behind it. Limestone (calcium carbonate) was burnt to make quicklime (calcium oxide), used for mortar, plaster, limewash and as a soil improver.



Green Cwm

Know when to stop!

[2.3 km; SS 53957 86172]

F The gravel ridge is a storm beach. Rocks eroded from the cliffs are washed to the head of the bay by storms. In very high tides the sea overtops the ridge and floods the valley, where a salt marsh has developed. On the seaward side, a clay-rich layer is being uncovered from beneath the gravel ridge and broken up by waves. This deposit is several thousand years old and has formed since the last ice age as sea level had risen. Similar deposits elsewhere in South Wales contain tree stumps and deer antlers.



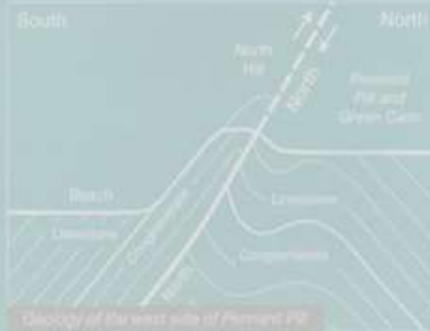
Storm beach



Cliff erosion

Look back towards the steeping stones. The steep slope beyond marks the boundary between conglomerate forming the ridge and more easily eroded limestone in the bay.

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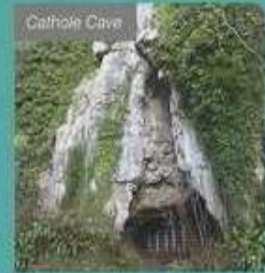
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H Pilec Le Brics burial chamber, also known as Gair's Grave or Long Cwm, is a chambered tomb over 5,000 years old. The stone structure across the valley is a limekiln, with an old quarry behind it. Limestone (calcium carbonate) was burnt to make quicklime (calcium oxide) used for mortar, plaster, lime-wash and as a soil improver.



Gower Cwm

I Caves are also formed by limestone dissolution. Cathole Cave is now above the groundwater level and formed long ago. Excavations suggest that people used Cathole Cave for shelter over 20,000 years ago. Bones from Gower caves show that they would have hunted animals like mammoths, reindeer and woolly rhinoceros!



Cathole Cave

Continue along the track up Green Cwm. Turn left at a crossroads onto a woodland track, climbing gently onto the Old Red Sandstone of Cefn Bryn. After 2 km, at a kissing gate, turn left on a track, crossing the shoulder of Cefn Bryn. Just beyond the crest, at a Gower Way marker stone, Three Cliffs Bay comes into view. [8.7 km; SS 52679 88882]

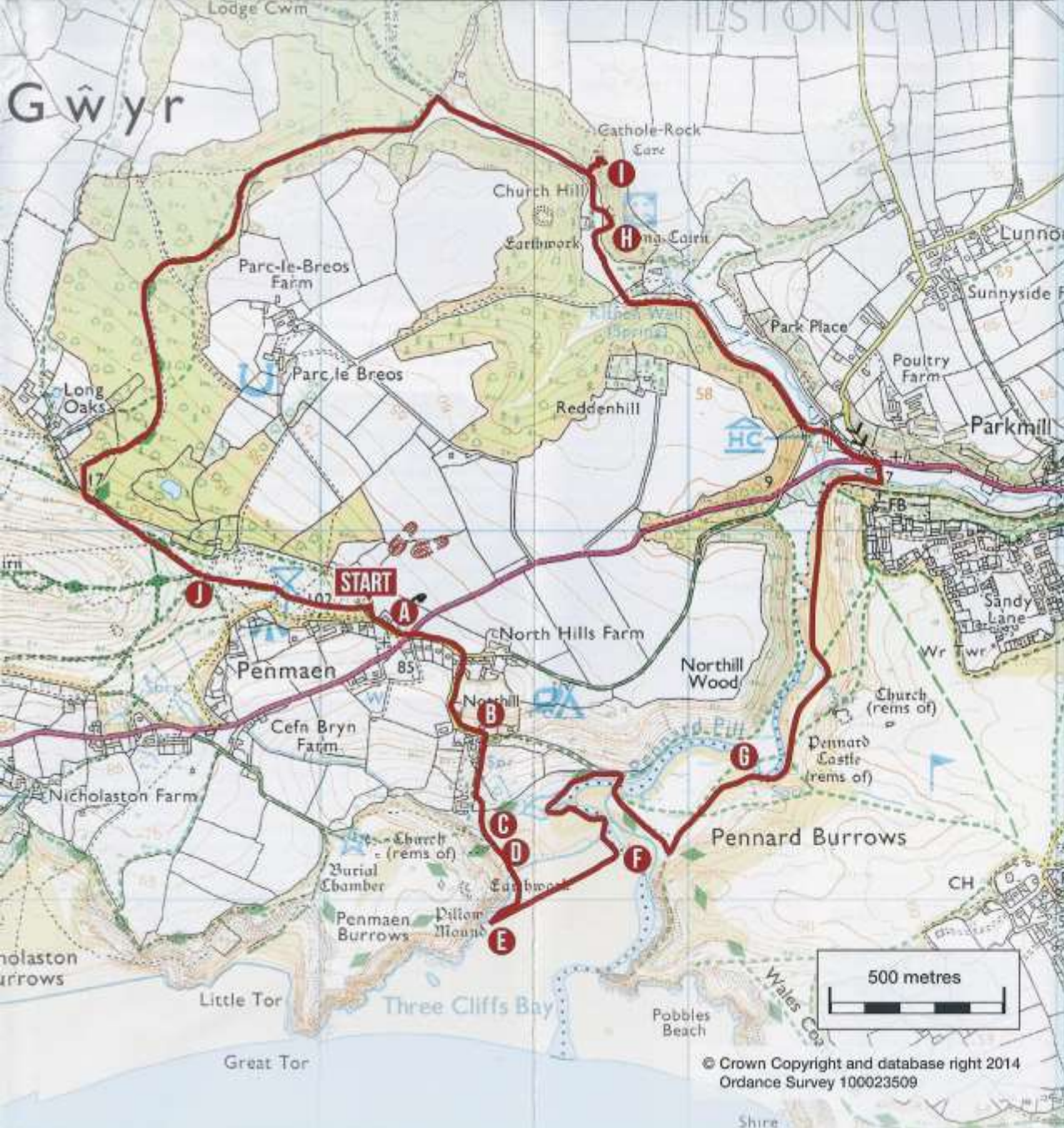
J Enjoy the wonderful view of Three Cliffs Bay and reflect on the contrast between the coastal and inland landscapes of Gower and how geology has shaped them.



Three Cliffs Bay from J

You can turn right here and follow paths to the top of Cefn Bryn for a panoramic view of Gower, north Devon and the Brecon Beacons. Otherwise, follow the main track back to the starting point and consider following a *Scratching the Surface* trail at Llanmadoc or Landimore for a similar view.

FINISH



Turn left from the parking area, cross the cattle grid and go down the lane to the rocks behind the bus shelter before the main road. [0.2 km; SS 53217 88717]

A This rock is conglomerate, made of pebbles cemented together. It is part of the Old Red Sandstone. The pebbles were carried here by rivers 370 million years ago, in the Devonian period. The landscape then was a featureless gravel plain with sparse covering of primitive plants. The sea was far away. Over tens of millions of years, at least 4 km thickness of sediments built up and were compressed and cemented into solid rock. Layering is visible as bands of coarser and finer pebbles. These beds were originally horizontal, but were steeply tilted 300 million years ago in a mountain-building event, the Variscan Orogeny. Overlying rocks have been worn away by erosion. The white mineral is quartz. On some surfaces there are closely spaced parallel striations, called slickensides. They are quartz crystals that grew as long thin fibres while rocks were sliding along a fault and show the direction of sliding.



Conglomerate

Cross the road carefully. Walk along the lane opposite for 150 metres. Turn right at a junction and in 200 metres go through a gate into Nott Hill (National Trust). Pass houses on the right for a view of the bay. [0.6 km; SS 53452 88442]



Slickensides

B Three Cliffs Bay is named for the steeply dipping rib of rock on the left (east) of the stream, Pennard Pill. The ridge behind you is made of Old Red Sandstone conglomerates. To the west, this rises to become the long hill of Cefn Bryn, dominating this part of Gower.

Scratching the Surface

