Eglwys St. Cristiolus Church Llangristiolus Edward & Annie Greenly Geodiversity walking through the past

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Fully illustrated PDF

What is a UNESCO Geopark?

A UNESCO Geopark is dedicated to promoting interest in the landscape, geology, soils and all those activities which benefit from the Geoheritage, including geotourism, farming, local crafts. Geoparks work to promote geotourism in order to help sustainability.

Beth yw Mae Geoparc UNESCO?

Mae Geoparc UNESCO yw hyrwyddo diddordeb yn y tirlun, daeareg, priddoedd a'r holl weithgareddau hynny fyddal'n elwa o dreftadaeth daear, gan gynnwys, twistliaeth, ffermio, crefftau lleol ac ati. Mae parclau daear yn gweithio er mwyn hyrwyddo daeardwristlaeth er mwyn helpu datblygu cynaliadwy

What is Geoconservation?

Geoconservation recognises the need for the identification and conservation of important geodiversity sites that show how the various processes have influenced the shaping of the Earth we see today. It helps to promote education and an understanding of a wider geology to the public.

Beth yw Geoconservation?

Mae Geoconservation yn cydnabod yr angen i nodi a chadwraeth saffeoedd geoamrywiaeth pwysig sy'n dangos sut mae'r gwahanol brosesau wedi dylanwadu ar siapio'r Ddaear a welwn heddiw. Mae'n helpu i hyrwyddo addysg a dealltwriaeth o ddaeareg ehangach i'r cyhoedd

The rocks you see around St. Cristiolus church

Igneous rocks

These rocks are crystallised when hot magma rises near or onto the Earth's surface. The varied cooling rates and chemical composition of the magma determines the size and colour of the crystals different igneous rocks.

Sedimentary rocks

Sedimentary rocks are made of sand, silt, mud, pebbles and fragments of plants and animals. These were deposited in seas, rivers or dunes in a desert and eventually after burial beneath other rocks are compressed and cemented into the rocks we see today.

Metamorphic rocks

These rocks have been altered by heat and/or pressure to form a new much harder rock with the same chemical composition. They have not melted and the minerals have been changed in their solid state. E.g. limestone becomes marble and mudstone becomes slate.

‘Man-made rocks’

These include clays which have been baked to form bricks, as well as tarmac and concrete. The road leading to the church and car park is made of tarmac. The path leading to the new part of the cemetery is made of concrete.

Y creigiau y byddwch chi’n eu gweid o gwmpas eglwys St Cristiolus

Creigiau igneaidd

Ffur r y rhain wrth I graig dawdd (magma) grisialu. Cai magma ei withio ar hyd gwendida;u yng nghramen y ddaear, gan dded I’r wyneb weithian yn ysted echdoriardau folcanig.

Creigiau gwaddod

Mae’r rhain wedi eu gwneud o dywod, silt, llaid, cerigos a gweddillion planhigion ac anifeiliaid. Fe’u dyddodwyd ar welyau moroedd ac afonydd neu ar ffurf twyni mewn di eithdiroedd ac, ymhen hir a hwyr, wedi iddynt gael eu claddu dan bentwr o greigiau eraill, cawsant eu cywasgu a’u smentio gan greu’r creigiau gwaddod a welir heddiw.

Creigiau metamrffig

Mae’r rhain yn greigiau ignedidd neu waddod sydd wedi cael eu newid gan wres a/neu wasgedd. Er enghraifft, gall carreg laid newid I fod yn llachfaen, a chalchfaen yn farmor.

Creigiau gwneud

Mae’r rhain yn cynnwys briciau a gynhyrchir drwy bobi clai, ‘Tarmac’ a hefyd goncit.

Edward & Annie Greenly with the Geological map of Anglesey

Edward Greenly (3rd December 1861–4th March 1951) was born in Bristol and educated at Clifton College and University College, London. He joined the Geological Survey of Great Britain in 1889. Greenly initially went to the North-west Highlands of Scotland where he worked closely with Ben Peach to unravel the complex geology of Scotland. Edward met and married his wife Ann Bernard in 1891. She was interested in Edward’s work learning informally about geology from him and eventually editing his work. After he left the Geological Survey, Edward began his work on Anglesey and started to survey and map the rocks of the island. He was greatly assisted in this work by his wife Annie (8th June 1852–1st March 1927) who worked as his eld assistant as well as being instrumental in Edward’s writing. Annie constantly stressed that she was not a scholar. Annie was credited with creating the index to Edward’s map. The Geology of Anglesey was rst published in 1919 in 2 volumes and the map in 1920. In his memoirs Edward freely acknowledges the help his wife gave him. Edward continued his work after Annie’s death, receiving many prestigious awards and medals for the work on Anglesey. He died in Bangor and Edward and Annie are buried together in the churchyard.

Eglwys St Cristiolus, Llangristiolus and environs

Eglwys St Cristiolus is built from local Carboniferous limestone, gritstones and conglomerates as well as rubble masonry. The present building dates back to the 12/13th century and is a Grade II listed building. The church is located away from the centre of the village of Llangristiolus on higher ground above the edge of the estuary and ood plain of the River Cefn. St. Cristiolus was a 7th century saint and is said to have founded the church at Eglwyswrw in Pembrokeshire. The church is on the site of an ancient Celtic church and has been subject to several rebuilds. The church that you can see dates from 1829 with some extension work in the 20th century at the western end where the large Rose window can be seen while the large window at the east end of the church, was added in the 16th century. The view from the church car park over the Cefn river and marshlands is magnificent and shows the influence of the rocks on the landscape. Over the

eastern side of the flats, rise much older, harder, micaceous and granitoid gneisses and basic gneiss of the Mona Complex. These rocks are Precambrian in age. The flat marshes are covered in recent marine alluvium, an indication of a higher sea level.

1 Outside church iron gates To the left of the entrance gate in the wall are Carboniferous limestones, a sedimentary rock lain down in a warm shallow sea, about 350 million years ago. It contains large fossil brachiopod shells. They are made of calcium carbonate ($CaCO_3$). These two-shelled marine creatures were at their peak during this period. Today they exist but are rare. On your left facing the gate, the house has a slate roof as does the church and its porch. This is a metamorphic rock which was originally mudstone but has been changed by pressure to form a much stronger impervious rock which splits easily. The difference in the slate size shows that the house roof is older as the slates are graded in size towards the ridge line while the porch ones are all the same size. It is labour intensive to make different sizes as opposed to machine made slates. The sign for the Church is also made of slate. It will withstand the ravages of time. Go through the gates and look towards the junction of the two paths.

2 War memorial This is made of a light-coloured igneous rock with black mica, white feldspar and colourless quartz minerals. It is a granite formed deep within the Earth's crust allowing large crystals to grow slowly as the magma cooled. The war memorial has a slate base. If you look around you, most of the graves are slate which shows the bedrock. This is the oldest part of the graveyard and uses local stone for headstones as transportation was expensive. Later more exotic modern headstones from further afield were used.

3 Outside St Cristiolus church The church is made of a mixture of limestones, gritstones and conglomerates. The windows are framed in sandstone. The mortar is very course sand with pebbles or quartz. Walk past the west end of the church and pass two trees. In front of you there is a bench on the righthand side turn down this small tarmacked path.

4 Edward and Annie Greenly's grave This is a double at grave with an open book. It is made of red granite commonly called Balmoral from Finland. It contains the same minerals as the previous granite but here the feldspars are predominantly red — a variety called Orthoclase. It formed at a slightly lower temperature than the white granite. It is interesting that Edward Greenly has his credentials on the book stating his FGS (Fellow of the Geological Society) and his DSc. Rejoin the main path and look at the boundary wall of the churchyard.

5 Boundary wall The wall is made of mostly carboniferous limestone re ecting the underlying geology, but there are also gritstones. In the wall you can see fossil corals, crinoids and brachiopods all indicative of a warm, shallow, sea rich in nutrients and biodiverse. Go back to the right-angled bend in the path. Turn left. With your back to the church carry on down a grassy track The general view from here across the graveyard to the east is mostly slate graves while to the west it is mostly igneous. Granites and gabbros are course grained rocks but with a different chemistry. Predominantly one is white and the other dark because of the presence of iron and magnesium rich minerals.

6 Dora Robert Headstone Dora Roberts's grave on your right about 3/4 way to the end wall is made of sugary marble. This is a metamorphic rock which was originally a limestone but was heated and changed in the solid state. Carry on toward the end of the track. Turn right at the wall. Carry along until you reach the red Celtic cross.

7 Celtic Cross This cross is made of granite with red orthoclase and white plagioclase feldspars. It still contains quartz and mica though. Walk towards the 4 Celtic Crosses in a line.

8 Military grave The grave of Corp. R.J. Jones aged 23 from the 2nd Derbyshire Yeomanry Royal Armoury Corp is dated 1st October 1941. This is a traditional war grave where there is no distinction between rank, age, gender or religion. All British service military personnel killed in the line of duty are given the same headstone. Military graves from the First World War onwards are all made of the same material, Portland limestone. When headstones were first chosen after WWI (Feb. 1918), 'Equality' was the underlying principle behind the design. All graves have curved tops and only have a national emblem or regimental badge with rank, name, unit, date of death and age of each casualty above an appropriate religious symbol. A small more personal dedication chosen by relatives is also allowed. A key requirement was to choose a stone that was easy to carve and maintain. Portland Stone is a durable, affordable, fine, oolitic Jurassic limestone from Dorset. An oolith is a small round grain formed in shallow tropical seas as layers of calcium carbonate are

deposited around a shell fragment or sand grain. On the surface, you can see ooliths as well as fossils. Retrace your steps back along the top of the wall towards the end wall and the road beyond. When you reach the tarmacked path turn right along the boundary wall. On the left-hand side you will see location 9.

9 Helen Mair Pritchard headstone This headstone is made of gneiss. It is a high temperature metamorphic rock. You can see the swirls of minerals and it gives the impression of owing. This rock is from elsewhere as there are no rocks like this locally. On the other side of the path is location 10.

10 Headstone Maldwyn Jones This attractive igneous rock (unique to Larvik in Norway) is often polished for modern headstones. The large phenocrysts are iridescent and change colour between blue and silver when looked at from different angles. This is the Schiller e ect. The blue shimmer on the crystals is due to microscopic changes in the unstable crystal structure due to pressure changes as it was pushed to the surface. The rock formed 30km underground from cooling magma during the breakup of the Pangea supercontinent (295 million years) in the Permian/Carboniferous periods.

11 Boundary wall The boundary wall is made of limestone. You can see fossils especially crinoid stems. Retrace your steps to the wrought iron gate by the small car park and go through the gates.

12 New cemetery plaque This plaque is made of slate and to the left is calcite veining. Turn left and carefully walk up the road back to the car park. This is the end of the guided trail. Explore further and see other headstones showing the described features. We hope you enjoyed your guide to the final resting place of Edward and Annie Greenly.

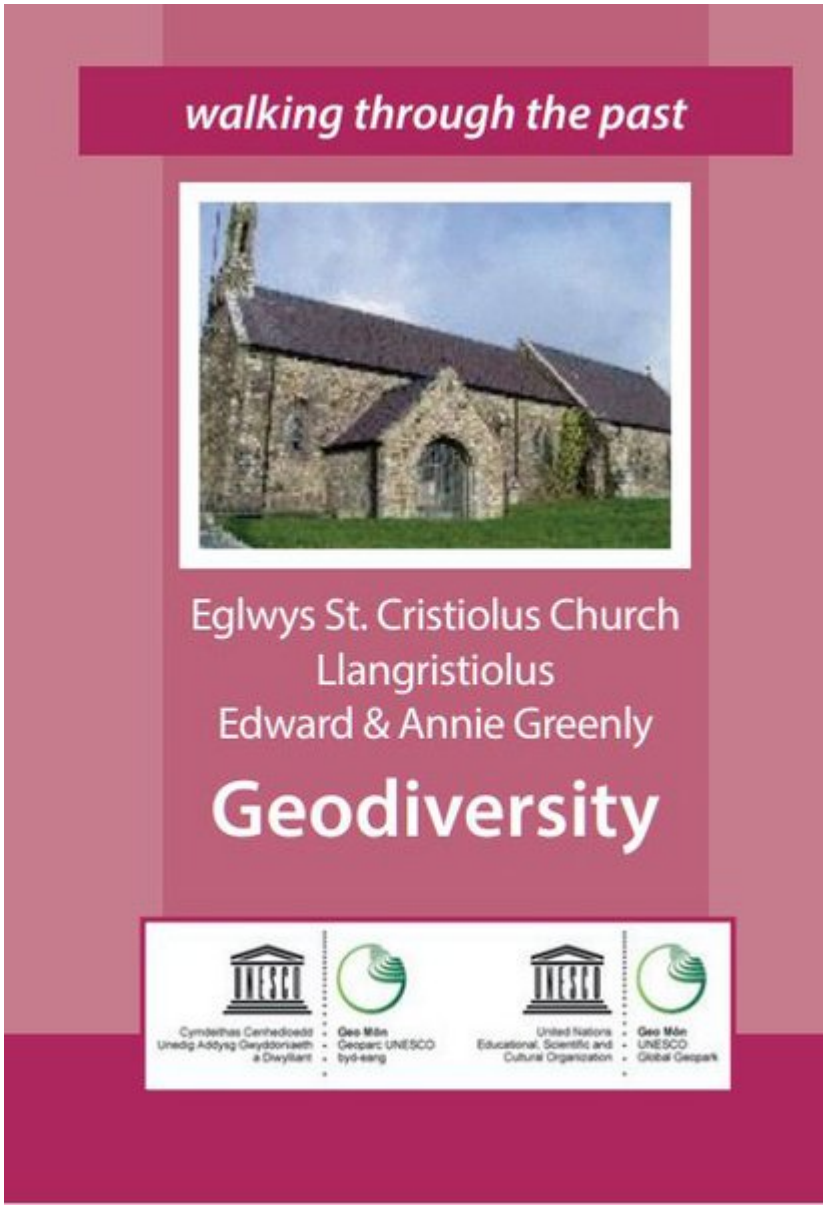
Figures

See PDF

Cover of trail leaflet. Eglwys St. Cristiolus Church Llangristiolus Edward & Annie Greenly Geodiversity walking through the past.

Edward & Annie Greenly with the Geological map of Anglesey.

Route map. Eglwys St. Cristiolus Church Llangristiolus.



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