IN

Quarry Tales: Clitheroe

an Oral History Project delivered by
www.quarryarts.org.uk

INFORMATION
ABOUT
SALTHILL QUARRY

Edited by Quarry Arts 2016

Lancashire Wildlife Trust

LWT is responsible for Salthill Quarry,

Earlier this year Quarry Arts arranged an event in collaboration with the WLT as part of the Quarry Tales: Clitheroe Project.

http://www.lancswt.org.uk/events/2016/01/20/salthill-quarry-geology-trail-fun-day

Event details

Sat, 23/01/2016 - 11:00am - 3:00pm

Get down to Salthill Quarry in Clitheroe for a FREE fun day including a guided geology trail of the reserve.

Salthill Quarry has a rich history and this promises to be a fascinating few hours.

In addition to the guided quarry trail, this family fun day will include art & craft activities, the chance to see fossils and speak to experts... and much more!

Click here to view an information flier about the day, or call 07981 029293/email **office@quarryarts.org.uk**.

If you wish to have an event at the quarry tailored to your needs please contact office@quarryarts.org.uk

PUBLICATIONS

1. Salthill Geology Trail leaflet

If you want a copy of the Salthill Geology Trail leaflets can be downloaded from:
www.academia.edu/710382/Salthill_Quarry_geology_trail

2. **Salthill Quarry Geology Trail by A Bowden, M Webster & T Mitcham 1997**

This book may be obtained from the Geological Society, but it is currently out of stock.
Salthill Quarry Geology Trail
Product Code:
GA058
Series:
GA Guides
Author/Editor:
A Bowden, M Webster & T Mitcham
Publication Date:
01 January 1997
Add a review

Description
This guide is an updated Version of that written by Robin Grayson in I 981. It is aimed at A-level and undergraduate level, as well as amateur geologists. More general members of the public may also gain some enjoyment and interest from the guide. There is a glossary at the rear of the booklet which will be of particular interest to those with little knowledge.

Salthill Quarry

Salthill Quarry is designated an SSSI by virtue of its geological formations.
Salthill Quarry is designated a SSSI by virtue of its geological formations. It also has great botanical interest as it displays a mixture of vegetation from the earliest stages of soil development on limestone, from limestone grassland, which is rare in Lancashire, through to woodland.

Follow the Geology Trail round the site. This is a circular walk which takes you to the best 10 featured places around the reserve. At each place there is a numbered post which links in with a leaflet for the site available from Tourist Information. Alternatively you can use an ipad or Smart Phone to scan the QR codes on each of the posts to get an alternative set of information.

Bee Orchid, Carline Thistle and Milkwort can be seen growing on the thin soils below Post 6 in June. You can see Autumn Gentian (or Felwort) flowering later in the year in August and September. On the more established soils near Post 2 you will be able to see Cowslips in the spring. The summer sees a colourful display of plants such as Bird's-foot-trefoil, Wild Strawberry, Common Knapweed, Lady's Bedstraw, Scabious and Agrimony. You may also see the delicate blue flowers of Harebell growing on the shallower soils and edges of exposed rocks.

The meadow above Post 5 is at its best in July when it is dominated by the purple flowers of Betony, augmented by Meadow Sweet and the yellow Rough Hawkbit. Grassland is not the only habitat you can see on the reserve. Ash and Hawthorn trees dominate the woodland. At the edge of the wood and invading the grassland are numerous wild roses; Dog-rose, Field-rose and Sweet-briar. Robin's Pin-cushion Galls caused by a Gall Wasp on wild rose are most apparent in September.

Among the butterflies, unmistakable is the Common Blue, which is usually seen flying on hot summer days, Orange Tip is also a regular occurrence in early summer. Other insects to look out for in are Common Green and Field Grasshoppers and the distinctive red and black Six-spot Burnet Moth.

If you are keen to see birds you can easily recognise Blue Tits and Great Tits, but there are also Goldfinches and Bullfinches. The summer migrants can include Blackcap, Willow Warbler, Garden Warbler, Chiffchaff and the occasional Lesser Whitethroat.

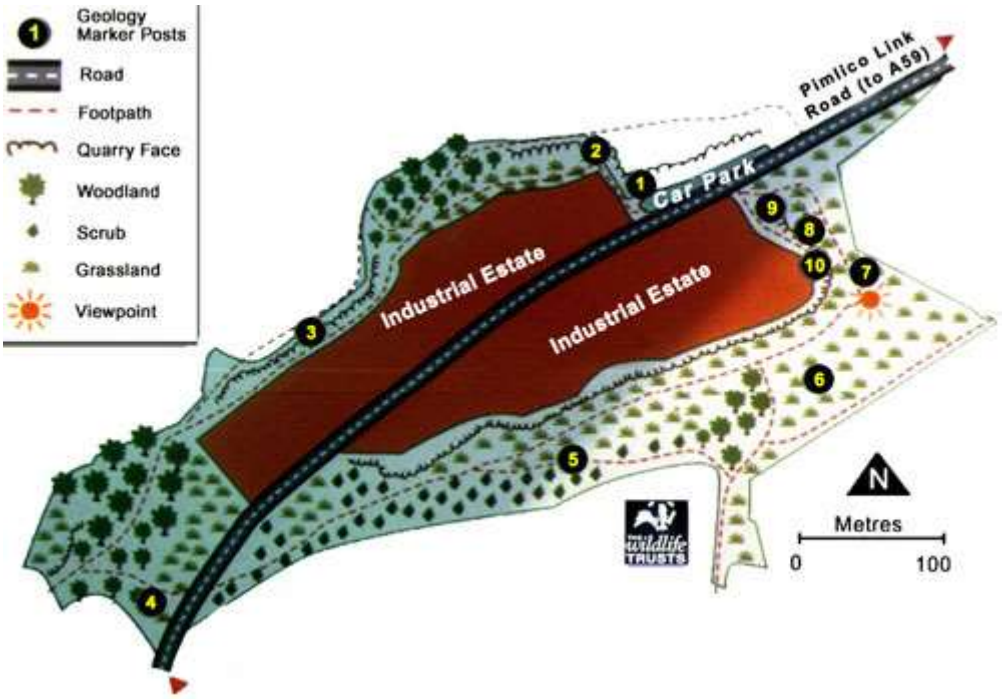
Fossilized rocks are abundant in several areas of the reserve. The fossilised tubes that look like stacks of polo mints are parts of Crinoids (sea lillies) and are understood to be 340 million years old. Those lying loose on the ground may be collected but hammering rock faces or removing large pieces of rock is STRICTLY FORBIDDEN without written permission from the Trust.

With a view across to Pendle Hill, a special stone seat has been installed on the site just next to Post 6. The 'Crinoid Seat' was designed by Fiona Bowley and includes her carved panels depicting the crinoids as they would have lived under the sea. The actual construction of the seat is the work of local craftsman, Jon Fenton.

Salthill Quarry Trail http://www.cpgs.org.uk/

Salthill Quarry Trail: GR [75504265] © Craven & Pendle Geological Society

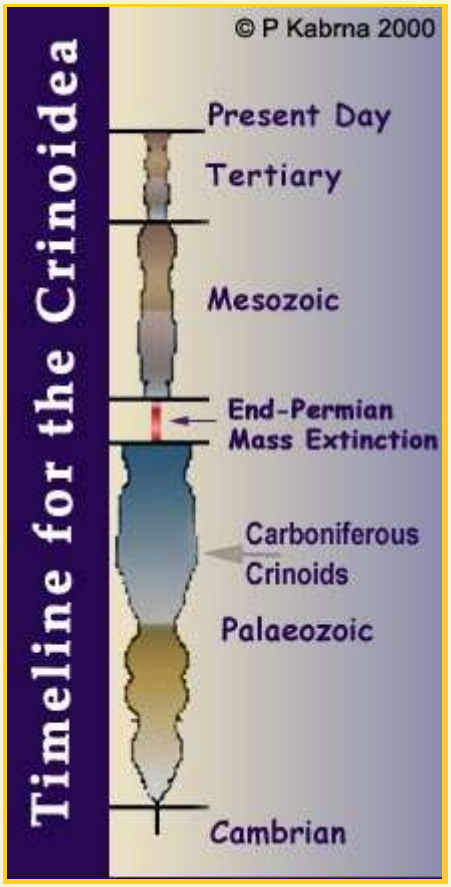
Salthill Quarry is an internationally important site for the study of Waulsortian Mud Mounds and Crinoids. In addition there are rare limestone flora to be noted on your way round so come prepared! Visitors to the Quarry should observe the "Code of Geological Fieldwork". A good reference for the visitor is the **Salthill Quarry Geology Trail** GA Guide N0.58 (1997) by A.Bowden, M.Webster and T.Mitchum



1	**Section through a Waulsortian Mud-Mound**	6	**Biosparite gravel scree**
2	**Section through a Waulsortian Mud-Mound**	7	**Viewpoint**
3	**Flank deposits and fossil geopetals**	8	**Roche Moutonnees**
4	**Bedding plane of Flank rocks**	9	**Lateral Associations**
5	**Weathering of Crinoidal limestone**	10	**Waulsortian Mudmound**

Paul Kabrna pointing out a compound coral *Michelina cf megastoma*
Photo: © John Singleton (Loc. 1., Salthill Quarry, 22 May 2010)

Introduction: Crinoids are a special group of fossils that have attracted much local interest. Although they are the least understood of living echinoderms, their skeletal remains are among the most abundant and important of fossils. In Clitheroe they are exclusively Carboniferous in age, although they appeared during the Lower Ordovician and underwent several major radiations during the Paleozoic Era.



Coplow (45 nominal species), Salthill (34 nominal species) and Bellman Quarry (15 nominal species) are particularly well known local quarries where crinoids have been collected. Crinoids are curious in the sense that they have a 'plant-like' morphology but are without doubt animal. For this reason crinoids became known as 'Sea Lilies'. Many became extinct although one group managed to survive to the present day and indeed flourish.

Closely related to the crinoids were the **Blastoids** who arrived on the scene in the Lower Ordovician and became extinct in the Permian. They were fairly abundant with two species being particularly prolific.

Actual fossil crinoids look very attractive especially when the stem, calyx (head or cup) and arms are preserved intact. Here in the Clitheroe area this is seldom the case. The limestones are crowded with fragmented crinoids and one is very fortunate today if a whole calyx is found. Over the years the limestone quarries of Clitheroe have yielded an amazing variety of genera and species. There is nowhere else in England that can compare to Clitheroe's rather unique assemblage.

Today crinoids can be found in both shallow and deep water, from Tropical to Polar seas. Nevertheless as you move towards the Equator their numbers and diversity increase. They are most abundant in the south-west Pacific, along the northern part of the Great Barrier Reef in Australia, in Papua New Guinea and Indonesia.

Publications

Donovan, S.K. 1992. *A field guide to the fossil echinoderms of Coplow, Bellman and Salthill Quarries, Clitheroe, Lancashire*. North West Geologist, **2**, 33-54.

Donovan, S. K., Lewis, D. N. and Kabrna, P. (2006). A Dense Epizoobiontic Infestation of a Lower Carboniferous crinoid (*Amphoracrinus gilbertsoni* PHILLIPS) by *Oichnus paraboloides* Bromley. Ichnos **13**: 1 - 3

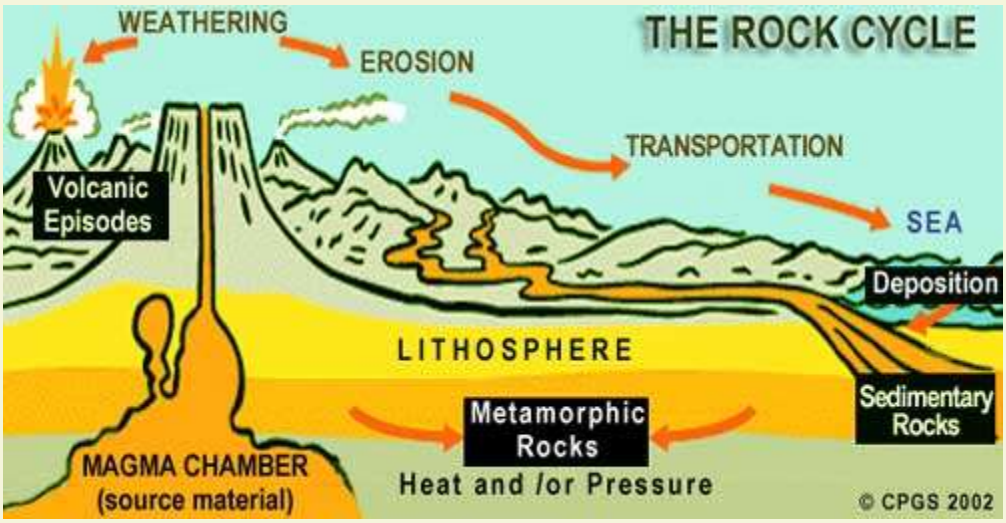
Donovan, S. K., Lewis, D. N. and Kabrna, P. (2005). An unusual crinoid-coral association from the Lower Carboniferous of Clitheroe, Lancashire. *Proceedings of the Yorkshire Geological Society*, **55**, Part 4, 301-304

Also acknowledged: Stanley Westhead for his amazing contribution to the understanding of the Crinoids of Clitheroe District. NELGGA Vol.2., Part 9., 1978.

Geologists' work with three types of rock - Igneous, Sedimentary and Metamorphic. Lets take them one at a time beginning with igneous rocks.

Igneous Rocks:
As hot magma rises to the surface and cools, the chemical elements within it combine to make-up the minerals which in turn begin to crystallise. As cooling continues crystals grow. The slower the rate of cooling the larger the crystals e.g. **granite** and **gabbro**. Conversely the faster the cooling the smaller the crystals (so small that frequently a powerful microscope is needed) e.g. **basalt** and **rhyolite**.

Field geologists differentiate between igneous rocks formed above and below the surface of the earth. The rocks formed below ground are commonly referred to as intrusive or plutonic rocks (coarse grained). The rocks formed at the earth's surface are known as volcanic or extrusive rocks (fine grained lavas).



Sedimentary Rocks:
Sedimentary rocks are formed at the earth's surface by the action of weathering and erosion on pre-existing rocks. A variety of methods from physical to chemical are used to break down rocks.

Particles vary in size from boulders through gravel, sand, silt and mud. These particles are frequently subject to transportation and deposition into new environments where they may be compacted to form sedimentary rocks. Because sedimentary rocks are formed by the accumulation of layers of deposited material, they frequently have a layered appearance. They are excellent rocks for preserving structures such as ripples and animal / plant remains (fossils).

- **Metamorphic Rocks:**
  These kinds of rocks form when pre-existing rocks are subjected to increases in pressure and/or temperature. The original rock could be igneous or sedimentary. The kind of changes that take place are as follows:

- a) Re-crystallisation to form a coarser grained rock e.g. **gneiss**

  b) New minerals form overgrowths on the original minerals e.g. **slate**

  c) Foliation or strong banding develops along which the rock splits into sheets, bands or flakes. Foliation is caused by the orientation of flattish or elongate minerals on a planar surface e.g. **schist**.

Types of metamorphism
a) Regional metamorphism covers large areas and is related to major tectonic adjustment of the crust characteristic of many mountain chains.

b) Contact or thermal metamorphism is the metamorphism that results from the rise in temperature in the surrounding country rocks near to igneous intrusions.

c) Dynamic metamorphism is local in extent and concentrated along major dislocations of the crust, faults and shear zones.

d) Low pressure / temperature burial metamorphism occurs in the depths of sedimentary basins.

e) Hydrothermal metamorphism involves chemical change as an integral part of the process and is the result of the circulation of hot water through a body of rock along fissures and cracks.

AN ALTERNATIVE VIEW OF SALTHILL QUARRY NATURE RESERVE

http://www.lancswt.org.uk/reserves/salthill-quarry-local-nature-reserve

AN ALTERNATIVE VIEW OF SALTHILL QUARRY NATURE RESERVE A tour round the Geology Trail at Salthill Quarry as described by pupils from Pendle Primary School, Clitheroe:

Post 1
This is where most of you will have come into Salthill Nature Reserve. The large rock in front of you is a perfect example of a Waulsortian Mudmound. These were first discovered in Waulsort in Belgium and are formed over millions of years by bacteria dying on the bottom of the sea and sediment collecting on top of it. This cycle carries on and a mudmound is created. The reason there are no crinoids in them is because where the bacteria is in the sea there is no oxygen so the crinoids can't live there. This mudmound must be special because geologists from all over Europe come to see it!
Millie

Post 2
Here an amphitheatre of naturally curved rock greets you. You can see different colours and layers in the rock, 16 - 20 metres high. On the field next to the amphitheatre rock you can see lots of cowslips in spring. If you look closely you will see what looks like bird boxes without the hole in it, but these are bat boxes made by Pendle Primary students.
Ben

Post 3
As you look up from this post you will see an amazing limestone feature. This is the only rock face you may touch as the other rock faces can be quite unstable. You can see thin vertical lines (if you look closely) which is where, many years ago, quarry men have put explosives in the rocks to blow them up and to enable you to see this marvellous feature. Just a short walk from this (20m) you'll see another great feature, which are steps leading to a small grotto covered in ivy.
Cara

Post 4
From here you have a beautiful view of Pendle Hill, just right above the factories and buzz of Clitheroe. Looking over the bar on the steps you will see a display of limestone rocks. Seems boring? No these rocks have been formed millions of years ago. Recent research proves that the rocks were laid down horizontally in the first place, but weather conditions left them at a 25 degree angle, facing downwards. In spring, the lovely sound of trees rustling and birds singing very nearly blocks out the sounds of traffic!
Tessa

Post 5
Here is a notice board that has information about wildflowers and some creatures that may be around somewhere. There is a rocky hill that's made from limestone. There are also little crinoids all over the hill and you may see some and see how small they are. You can also see Pendle Hill, which is a nice view.
Saskia

Post 6
When you get to Post 6 you'll see loads and loads of fossils, little stones and different things. You can find all these things if you walk straight ahead from the post. As you are walking forward from the post you will see a wall which is actually a bench when you stand in front of it. Also you will see that there are some patterns on the bench. As you walk on down the rocky slopes, look down and you will see millions and millions of fossils everywhere. But when you go near the slopes there may be taped areas that you must not step inside. They are to protect the bee orchids that grow there. Did you know that the bench at the top incorporates crinoid sculptures within its design? Post 6 was my favourite out of all of the posts!
Humyra

Post 7
From this post you can see the industries and there is a beautiful and clear view of Pendle Hill which has legends about witches up there. There is also Dugdale's factory in sight. This part of Salthill has lots of snails.
Seona

Post 8
The rocks just beyond the fence may look strange and man-made because they are so smooth. The reason they are like this is because thousands of years ago they were smoothed over by a glacier. In the distance to the left you can see the top of Pendle Hill and slightly right the steeple of St. Mary's church sticking out like a sore thumb.
Millie

Post 9
There is a huge amount of rock which leads round quite far into the distance. If you look back the way you came, you can see a previous post at the towering mudmound. Also the ground you are standing on is quite sinky and soft. Wouldn't you agree? It is a nice place for a family to pack up a little picnic and enjoy the view whilst resting on the available rocks. It is also home to lots of different animals.
Daniel

Post 10
Here is a very good place to sit and have a rest or have some lunch. You can see the amazing limestone and there's ash saplings. To the right of the big limestone you will see lots of sticks and twigs, these are the habitats of lots of creatures such as spiders and/or hedgehogs.
Tom