

The Hincaster Trailway Limestones

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When you walk along the Trailway, take a close look at the 350 million year old limestones. These limestones were laid down in shallow, warm tropical seas. How did this come about and when and where did it happen? To answer these questions we must go back in time, before the limestones were deposited, to about 400 million years ago, at the start of the Devonian Period. At this time a mountain building episode known as the Caledonian Orogeny was taking place, when two continents collided and formed a new super-continent called Laurasia (today's North America, Europe and Asia) and to the south was Gondwanaland (South America, Africa, Antarctica, Australia and India). Over the next 40 million years, the Caledonian Mountains were subjected to rapid erosion in a semiarid climate. The sediments from these mountains were deposited in basins to the south. The Laurasian continent drifted northwards and as the Carboniferous Period started about 355 million years ago, the northern England area was located about 10 degrees south of the equator.

At the start of the Carboniferous period sea levels rose, this is when the south Cumbrian limestones began to be deposited. This period in time is called the 'Dinantian' (from Dinant in Belgium). The northern England area became a shallow sea, no deeper than 100m, with land to the north and south. The climate was tropical but semiarid with seasonal monsoonal rainfall.

During the Dinantian there was a subduction zone to the south on the Armorican plate boundary causing a crustal stress regime in the region which formed blocks-and-basins. These blocks or highs were bounded by faults and as the forces from the subduction zone changed, the blocks moved up and down. This caused sea-levels to vary. At times the sea retreated and for a short period, perhaps tens of thousands of years, a land surface occurred, allowing the growth of trees. At one location near Grange-over-Sands the limestone surface contains pits, these were tree roots that grew in a soft limy sediment.

During each rise in sea-level, a different limestone formation was deposited on the platform. The first formation laid down was Martin Limestone, and it was deposited in a tidal-flat lagoon environment. Meathop Quarry near Lindale has a superb exposure of this limestone. Near the top of Meathop Quarry there is the second limestone formation called Red Hill Limestone. This has a coarse-grained structure and was laid down in an open-marine high-energy environment with tidal currents breaking up and rolling around the shell fragments and faecal pellets.

At the end of Red Hill times the sea-level rose and in the deeper water the third limestone formation was deposited. This is the Dalton Limestone Formation and this is the limestone that is exposed in the superb cutting in the Hincaster Trailway. The limestone here is in the middle part of the sequence where the sea floor was well below wave base. At times there was an input of muddy material and this can be seen in the cutting as shale partings. Dalton Limestone generally is a grey well-bedded limestone that in places is very fossiliferous.



Hincaster Trailway Dalton Limestone



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