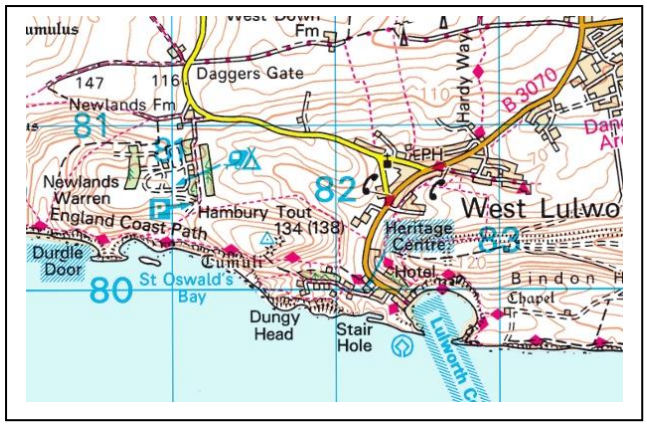
Jurassic Coast Field Trip - Day 3 (3rd September 2018)

The plan on Day 3 was to first visit Stair Hole and Lulworth Cove followed by a walk over the headland to Durdle Door. We would then drive to Kimmeridge for lunch and a visit to the Etches Collection.



We started at Stair Hole which is alongside Lulworth Cove. Alan began by explaining that this was one of the relatively few access points to the coastline and Lulworth Cove received over 0.5million visitors a year! He then explained the rock sequences here and how the coastal erosion features were produced. This region sits on the northern limb of the Purbeck anticline which has an E-W axis running through Weymouth. The folding in this area is a result of the Alpine Orogeny 30 – 40 Ma.

The rock succession here is shown below:

Series	Succession
Upper Cretaceous	Chalk
Lower Cretaceous	Upper Greensand
	Lower Greensand
	Wealden Series
	Purbeck series
Upper Jurassic	Portland stone

At the coast, the rocks are dipping at about 45° to the north. In this first stage of coastal erosion the sea has broken through the hard Portland limestone into the softer rocks behind. This has created a narrow inlet and 2 arches. The softer Purbeck beds and Wealden series are eroded more easily creating the beginnings of a cove behind. At the western side of Stair Hole, the folding of the rocks clearly shows the rocks dipping from about 45° North to vertical with small scale folding turning over. On the eastern side, the complicated folding in the Purbeck series is known as the Lulworth crumple.

Stair Hole (West)

Stair Hole (East) – Lulworth Crumple

Stair Hole is a fine example of the first stage of coastal erosion in this region. From this point we could clearly see the Isle of Portland in the distance with the clear dip to the east.

Looking down on Lulworth Cove it was clear that a similar erosional history was involved here. Originally it was thought that Lulworth Cove showed the second stage of coastal erosion. However, it is now felt that the cove arose initially from erosion by the Lulworth River flowing into it. It was the river that cut through the harder Portland stone to allow the sea to get into the softer rocks behind. Currently the effect of wave refraction within the cove, due to its shape, means that there is little marine erosion taking place. Most erosion is the result of weathering of the soft chalk at the back of the cove.

Ian West © 2012

We were only able to view the western side and back of the Cove. Due to the dip towards the east, the rocks exposed at the side and rear of the cove go from the top of the Purbeck series (Unio beds) through the Wealden, the Upper Greensand (Lower Greensand missing) and into the chalk. The Wealden is generally soft and crumbly and we found some fossil wood (lignite) in it. The green colour of the Greensand is produced by the presence of the iron silicate mineral glauconite. The cliffs at the back of the Cove are in the chalk which is hard and brittle. Here we were confronted with a puzzle. The strata at sea level is dipping clearly to the north whilst high up on the cliff the strata has overturned. Looking at the 2, there doesn't seem to be enough space to contain the folds necessary although there is a large fault running across the face of the cliffs which may explain this seeming anomaly.

Unfortunately, we ran out of time and couldn't make the trip to Durdle Door.

We then made our way by bus to the village of Kimmeridge where we had a fine lunch at Clavell's Café. After lunch we visited the now famous Etches Collection built around the fossil collection of once amateur fossil hunter Steve Etches. We very fortunate to be shown around by Steve who gave us many insights into the finding and gathering of this amazing and world leading fossil collection. Steve continues collecting and preparing for display and scientific study this amazing treasure trove.