Student exercise at Portesham Quarry.

This exercise is based on Portesham Quarry, sometimes also known as Rocket Quarry and is located at G.R. SY 610860. There is an information board at the quarry, which will provide some useful information and can be looked at during your visit. Some follow up work is possible, especially on the properties of the rocks seen in the quarry. The rocks in the quarry are of upper Jurassic age, around 140 million years old and are called the Portland and Lower Purbeck Beds

Safety: remember quarries are dangerous, climbing around on the quarry face is hazardous, the work here can be done by looking (observing) and by working at the base of the quarry face. Be careful of dislodging loose rock and be careful of other people working near you.

Most of the rock seen in the quarry face is limestone and the rock has been used in the past for local buildings e.g. for the older buildings in the village of Portesham.

(1) Study the quarry face from a few metres away. What are the main features you can see? (layers, bedding, strata, layers of different thickness, approximately horizontal, colour)

(2) Moving closer, take a piece of loose rock and describe the colour and the feel of the rock. (white, pale grey, rough, chalky)

(3) The rock is made of small particles of mineral material, are these coarse, medium or fine, how easy is it to see individual grains? (fine grained)

(4) Draw a sketch of the quarry face with a scale and label any features you can see such as bedding planes, joints (cracks) massive (thick) beds, thin beds, fossil soil, chert nodules, soil, plants. You can add labelling to the sketch as your knowledge increases during your visit to the quarry.

(5) Measure or estimate the thickness of beds, measure the accessible ones, and estimate the ones that you can't reach.

(6) When close up to the quarry face, what shape is it? Flat, vertical, gentle, steep, indented, overhanging?

(7) Can you find the chert nodules in the lower part of the quarry face? What shape are they, how does their surface compare with the limestone?

(8) Are the chert nodules harder or softer than the limestone in which they occur? How can you tell?

(9) Chert is made of silica, which is similar to the mineral quartz. Limestone is mainly made of the mineral calcite. Hardness of minerals is measured on the Moh's scale of hardness. Using books or the internet can you find out the relative hardness of quartz and calcite. What conclusions can you draw about the chert and limestone?

(10) If you can obtain some **dilute** acid, for example hydrochloric acid, compare the reaction of the acid with the limestone and the chert. This acid test is a good one to identify rocks and minerals containing carbonate, e.g. calcium carbonate, which occurs in calcite and most limestone.

(11) How does the fresh limestone face compare with one that has been open to the air for some time? This shows the effect of weathering.

(12) What is the soil like at the top of the quarry face, What do you think the stones are made of and where do you think they came from?

(13) The rocks in the quarry were mainly formed in the sea, what has happened to the sea level since they were laid down?

(14) Dirt beds (fossil soil) occur in the sequence of rocks in the quarry. How did the conditions change to allow these to be formed.

(15) Thick (massive) beds formed during times when mud (sediment) was deposited without a break, thinner beds formed when there were gaps / breaks in the mud being laid down. Can you think how this would happen?

(16) If this area was sometimes land and sometimes sea when the rocks were formed, what was the environment / landscape like? Can you draw a sketch to illustrate the conditions? The preserved remains

of a large tree trunk can be seen nearby, this may help you to answer this question.

(17) When you get back to your classroom take a small piece of limestone, weigh it and then place it in a container of water. Can you see anything happening. Do the same with a piece of chert. Is there any difference? Leaving the pieces of rock in the water for 24 hours and then weight them again. Repeat this until there is no change in the weight (mass). What has happened, can you explain this?

For any further information / help contact DIGS through the website address