Field trip to St Austell – April 2009

The journey to St Austell via the M3, A303 and A30 was good; especially the last part where the roundabouts on the A30 had been removed since I last travelled this way. We arrived at the Porth Avallen Hotel just after 2pm to find most of our party already there. Graham's choice of hotel was excellent, on a cliff overlooking the sea at Carlyon Bay.

We met in the conservatory at 4pm, where our leader Alan Bromley and his wife Lesley joined us. I understand that Alan has lead trips for Farnham before and was known to many of the group. Alan gave us a short introductory talk explaining that the top of St Austell granite was only now becoming uncovered and was therefore less eroded that the other Cornish granite plutons.

We then drove to the end of the road where there was beach access down 82 steps. (Fig 1) Here we looked at the sand, which, since it had only travelled a short distance from it's granite origins, still showed course grains of quartz, together with mica, tourmaline and some feldspar. There were also some very large outcrops of Lower Devonian Mudstone showing interesting fold patterns.

It was very cold and windy on the beach and we were glad to climb back up to the car park and head back to the hotel for dinner.

Fig 1: Lower Devonian mudstone on the beach.

Fig 2: Arriving in the quarry

Saturday morning we were up early and met up with John Howe from Imerys who was to take us into the Wheal Remfry China Clay Quarry. We were shuttled into the site by Land Rover over 1½ miles of white clay roads, some of which were rock hard but in other places were soft with large puddles (Fig 2). We stopped at an area of the workings where we could still see evidence of the final stages of the granite eruption and the hydrothermal breccia at the edge of the quarry workings (Fig 3). We spent a couple of hours looking for minerals and collecting specimens of the different rocks (Fig 4).

Fig 3: This is a sample of the Hydrothermal Breccia.

Fig 4: Altered feldspar crystals where a tourmaline / quartz vein had been in contact with the granite

Whilst sections of the granite to the east and west contain biotite mica the main body in Wheal Remfry contains lithium mica and a small section has some topaz. It is the absence of iron in the mica that gives the resulting clay its white colour, making it very suitable to use as china clay.

Fig 5: China clay quarry

Fig 6: High pressure hose

The china clay is formed by kaolinization as the feldspar and mica break down as water based fluids circulate through the granite leaving a mix of quartz sand and clay minerals. High-pressure hoses called Monitors (Fig 6), are used to turn the clay into slurry to be used in the next process extract the clay.

Fig 7: Large slurry tanks

Fig 8: Sheets of refined clay

After lunch at a local hostelry John took us to follow the progress of the slurry through the processing plant at the Melbur Refinery. The liquid was stirred in large tanks (Fig 7) before passing into the mass of machinery that removed the impurities, until it ended as sheets of refined clay (Fig 8) with the correct water content for the end products. The paper industry uses 70%, 21% is used for ceramics and the rest in paint, rubber, plastics and other small industrial processes.

Sunday we started with a visit to the Wheal Martyn Museum (Fig 9). This is on the site of a former processing plant, when water wheels were used as power to move the clay slurry.

Fig 9: Wheel Martyn Museum

Fig 10: Roche Rock

It was interesting to compare the old methods used in the Victorian clay works that were very labour intensive with the works of today. We spent the whole morning at the museum looking at the outdoor exhibits followed by lunch. In the afternoon we drove to Roche Rock (Fig 10), a most impressive lump of quartz/tourmaline granite, topped by a ruined Chapel that can be seen rising from the surrounding moorlands.

From here Alan took us to a tiny quarry in the Tresayes Geological Nature Reserve where we saw giant feldspar crystals, over 12" long. Final stop was a very small, disused quarry on the Trevalour Downs where we found examples of zinnwaldite mica. It is not known what the mica was used for and we think it must have been found in larger sheets than the examples found by us. Just to round off the weekend we spent Monday morning at the Eden Project before heading for home.

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