

## EXCURSION TO ANGLESEY

Leader: A.M. Evans

Saturday and Sunday, 16 & 17 May, 1981

The object of the excursion was to examine some of the interesting and very varied geology that can be seen on the island. With only two days available the choice of exposures to be visited had to be very selective and only a few aspects of Anglesey could be inspected.

Most of the party assembled at the Holborn Hotel in Holyhead on the Friday evening when the leader gave a brief résumé of the geology of Anglesey and some details of the localities that would be visited.

### SATURDAY, 16 MAY

#### Rhoscolyn and South Stack

The party proceeded to Rhoscolyn Church, on Holy Island, (SH 268.757) where other members of the Society were waiting. A short walk took us to the coast at 268.747 where some of the lowest exposed beds in the Monian Supergroup were examined. These are exposed in the large Rhoscolyn Anticline, an asymmetric fold having a south-easterly vergence and a north-easterly plunge. It is now believed to be an  $F_2$  structure which appears to be complex owing to the presence of locally intense mesoscopic parasitic folding and later superposed deformations. The cleavage, which grades in places into a schistosity, is axial planar and fans across the fold with an average north-westerly dip of about  $60^\circ$ .

The first outcrops examined belong to the Rhoscolyn Formation. They are schistose quartzofeldspathic turbidites with some intercalated quartzites. Graded-bedding shows that the majority of the minor folds face upwards and that the beds as a whole, which are steeply dipping to overturned, young south-eastwards. This evidence supports the above structural interpretation due to Shackleton (1969) and disproves Greenly's (1919) hypothesis of major recumbent folding. Quartz veins are developed parallel to the cleavage and these and the cleavage are deformed by a later phase of folding.

Proceeding north-westwards the party came to a low rock face, the top of the Holyhead Quartzite. This is a very pure rock in which bedding cannot usually be discerned. Shackleton has suggested that it might be a submarine sand flow deposit. A well developed pressure solution cleavage pervades the rock. After rounding two deep fault-located inlets the party walked on to the South Stack Formation in the core of the major anticline. Here the strata are shallow dipping to horizontal and the small scale fold symmetry could be seen to change its attitude across the hinge zone of the anticline.

The party returned to the coastal path near St. Gwenfaen's Well where the Holyhead Quartzite in the north-western limb of the fold could be seen resting conformably on the South Stack Formation. Continuing along the coastal path the party crossed the Quartzite and were once more on the Rhoscolyn Formation. Fine erosional features were seen along this part of the traverse including a blowhole and sea arches. In a cave in Bwa Gwyn Cove possible giant flute casts in a quartzite band were inspected. Above the quartzite more outcrops of schistose greywackes of the Rhoscolyn Formation were crossed until Bwa Du (260.763) was reached. Here schists of the overlying New Harbour Group are faulted against the Rhoscolyn Formation. After examining structural features in schists the party returned to the vehicles and drove to 268.772.

At this inland locality serpentinites can be seen emplaced in the New Harbour Group. These have been suggested by some workers to be slices of ocean floor tectonically emplaced in their present position. Recently Maltman (1975) has argued that they were magmatically emplaced, his principal evidence being the partial existence of a thermal aureole. A small quarry in highly sheared dark green serpentinite was first examined and then a prominent mound of altered gabbro.

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1982, pp. 305-307.

A drive via Trearddur brought the party to the South Stack where members descended the many steps to the bridge across to the lighthouse. From just across the bridge a fine view of the folded greywackes of the South Stack Formation was much appreciated by the party who also took time off on the ascent to view the spectacular large scale folds in vertical cliff faces to the right of the path. The party then proceeded via Holyhead and the Embankment to Valley cross-roads turning on to the Amlwch road. A short stop was made here to view the drumlins before proceeding to Tre-Fadog.

#### Tre-Fadog (292.862)

The cars were parked by the foreshore and the party walked across to reefs at the northern end of the bay. Here rocks of the Church Bay Tuffs (the upper formation of the Skerries Group) were examined. These fine-grained acidic volcanics appear to be tuffs; as they lack stratification they may be ignimbrites. From this point there was a fine view of Holy Island including New Harbour and the aluminium smelter. The party then returned by car to the A5 and followed it south-eastwards to the turning for Rhosneigr.

#### Rhosneigr (319.732)

After parking in the main town car park the party walked to the foreshore where Ordovician rocks are exposed. They consist mainly of black slates with thin beds of sandstones. The sandstone layers reveal that the rocks are folded about north-easterly plunging axes. The folds are asymmetrical with a south-easterly vergence. Cleavage in the slates is axial planar to these folds. Crossing the sand to the nearby reefs enabled the party to examine the coarse basal conglomerates of Arenig age. A variety of clasts were identified all of which could be correlated with rock types in The Monian Supergroup. The party then returned to Holyhead.

SUNDAY, 17 MAY

#### Cemaes Bay area (SH374.937)

The party drove to the car park at the eastern side of the bay and walked on to the foreshore to examine the rock exposures in the low cliffs. These outcrops are in the Gwna Mélange Formation of the Gwna Group and consist of large blocks of limestone and other rock types in a fine-grained matrix. Greenly (1919) interpreted these deposits as an autoclastic mélange formed by tectonic deformation of a normal sedimentary sequence to form large scale boudinage structures. Shackleton in 1969 suggested that the mélange represents an olistostrome, a sedimentary deposit formed by large scale submarine mass sliding of part of the Gwna Group succession.

The excursion then followed the cliff top path to the limestone quarry at 372.942 to examine the exposures where the stromatolites described by Wood & Nicholls (1973) were collected. After a vain search for oncolites in the quarry the party moved to the coastal exposures where banded and mound-shaped stromatolites were examined. Moving down dip the party inspected the contact between the limestone and the Gwna Mélange. The party then proceeded to Parys Mountain.

#### Parys Mountain (442.903)

In the early nineteenth century Parys Mountain was Europe's principal copper producer. During that century its importance slowly declined and mining ceased before the First World War. The vehicles were parked at 438.907 and the party walked in to the edge of the Great or Western Opencast. From this vantage point the director pointed out the main items of geological interest and explained the general synclinal structure of the locality. The party then walked round to the south side of the pit to examine the rhyolitic volcanics before descending into the opencast. Here a quartz-pyrite stockwork in silicified slates was examined and specimens of galena, sphalerite and chalcopyrite were collected from nearby exposures. Some of the party made a quick but unsuccessful search for monograptids in the Silurian slates. The party then moved on to examine the Devonian.

#### The Old Red Sandstone

A stop was made to examine the basal Old Red Sandstone conglomerates (Bodafon Formation)

at Mynydd Bodafon (476.855). These deposits occur in roadside outcrops apparently stacked against a fossil hill of Precambrian quartzite. The party then moved on to Lligwy Bay and traversed northwards down the Old Red Sandstone succession noting the facies, cleavage and slight folding. First to be encountered were the probable lacustrine rocks of the Traeth Lligwy Formation. These consist of alternations of fine-grained red sandstones and sandy siltstones but without carbonates. Trace fossils occur in places and occasional mud cracks are present.

Beneath this formation the more varied rocks of the Porth y Mor Formation occur. Allen (1965) considered these rocks to have been laid down in a complex braided river system. They consist of a cyclical succession of purple cross-bedded sandstones, red concretionary siltstones and concretionary limestones and dolomites (calcretes). A typical cycle commences with an intraformational conglomerate which is followed by cross-bedded sandstone deposited in a stream course. In places the sandstones grade upwards into siltstones with calcrete limestone and dolomite. These have been interpreted as overbank deposits with the carbonates forming during periods of prolonged exposure. After a quick inspection of these beds the party returned to the vehicles.

#### Llandysilio (539.736)

At the request of the President a special stop was made here to visit outcrops of glaucophane-schists. These blue schists have been shown by Thorpe (1972) to be metamorphosed ocean floor basalts. They were the most highly metamorphosed rocks to be examined during the weekend and members of the party were interested in the various schistositys and lineations which could be identified in the exposures.

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#### References

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