Coed Cochion

[SN 3335 1465]

J.C.W. Cope

Introduction

The site takes its name from the former house shown on the 6 inches to 1 mile Ordnance Survey map at [SN 3332 1467]; no trace of the house now remains and Coed Cochion does not appear on the 1:10 000 Ordnance Survey map. Its location is shown on the map of the Llangynog site, featured in Chapter 5 of this volume (Figure 5.22). The site was originally an insignificant, overgrown quarry exposing some three metres of siltstones. Following the discovery of Tremadoc rocks in the area to the north (Cope *et al.,*1978), a revision of the local geology commenced. It became clear that the rhyolites making up the high ground of Castell Cogan to the south of Llangynog were unlikely to be of basal Arenig age as originally suggested by the Geological Survey (Strahan *et al.,* 1909). They lay stratigraphically beneath the Tremadoc rocks, and as few igneous rocks are known from the Anglo-Welsh Cambrian successions a Precambrian age seemed more likely. The quarry at Coed Cochion was then investigated as it lay nearer the Tremadoc outcrop than the rhyolites of Castell Cogan in a situation which, it was hoped, would enable those rhyolites to be dated more firmly. Initially, it was anticipated that this well-bedded sequence of rocks would prove to be Cambrian in age; however, following some excavation and prolonged collecting, one horizon yielded an Ediacaran fauna (Cope, 1977). It was only subsequently that Cambrian rocks and fossils were found in the vicinity (Cope, 1980; Cope and Rushton, 1992; Cope and McIlroy, 1998) and the surrounding area named as the Llangynog Inlier (Cope, 1982).

Description

Since 1979, and with help from the then Nature Conservancy Council, the Coed Cochion quarry has been enlarged and deepened. The slope immediately to its east was cleared of vegetation and soil at the same time, but has never yielded fossil material. The fossil-bearing horizons seem to be largely restricted to lower levels in the main quarry and a considerable apron of scree that has been allowed to build up now protects these.

A large amount of fossil material was collected from the excavated rock and this has been deposited in the National Museum of Wales, under the accession number NMW 79. 16G. It largely awaits description, although some has been figured by Cope (1977, 1983, 1989) and Cope and Bevins (1993).

Cope and Bevins (1993) have investigated the geology of the area in some detail, and this work has been favoured by the cutting of a new set of roadways through woodlands occupying the Precambrian area of the Llangynog Inlier. The result of this was that many of the long-lost localities of Cantrill and Thomas (1906) once again became available. In addition, new exposures were available that enabled Cope and Bevins (1993) to establish the succession and structure of the area. This work showed that the rhyolites of Castell Cogan, to the south, were the oldest rocks and have been referred to the Castell Cogan Member of the Coomb Volcanic Formation (see the Llangynog site report, Chapter 5). To the north, but everywhere in faulted contact, the rhyolites were succeeded by a dominantly volcaniclastic sedimentary succession that also included basalts, and with further rhyolitic lavas that showed affinity with the Castell Cogan lavas beneath. These rocks, named the Coed Cochion Member (Cope and Bevins, 1993), include the horizons that have yielded the Ediacaran fauna. The map of (Figure 5.22) shows the member to crop out on both sides of the steep valley that runs southwards from the Wern Inn, Llangynog. The faunal impressions discussed below have been found at several horizons, but occur most commonly at the Coed Cochion quarry site; even here they are rare and prolonged collecting at the correct horizons is needed.

The sedimentary strata hosting the fossils dip everywhere at approximately 50° northwards; they are very finely laminated, in some cases with several laminae to the millimetre, but coarser layers of silt or sand grade make up thicker laminae which sometimes display internal fining upwards grading. This coarser material is most frequently quartz, usually

angular, emphasizing the immaturity of the sediment. Occasional silt-and sand-grade laminae consist virtually entirely of broken feldspar laths, clearly winnowed from a nearby ash fall. Other minerals included chlorite (responsible for the pervasive greenish hue of the freshly exposed rock surfaces), sporadic celadonite aggregates and rarer white mica. The strata show sedimentary structures in places, including climbing ripple lamination and flaser bedding, and these are undisturbed by bioturbation. Mud laminae are common and generally very thin; they appear to be invariably stained black by manganese dioxide, as are the closely spaced joint sets that are at approximately right angles to each other and the bedding planes. The rock inevitably splits along the mud laminae, and upon these the fossils are preserved as hyporeliefs (i.e. the 'positive' impression is to be found facing downwards on the upper of the surfaces along which the rock parts).

The fossils that are found at the Coed Cochion site are typical of those known from other Ediacaran localities. They include the medusoid genera *Ediacaria* (Figure 8.10)f, *Cyclomedusa* (Figure 8.10)b, *Medusinites* (Figure 8.10)d,g and *Hiemalora* (Figure 8.10)h, although there may be one undescribed genus of medusoid. The trace fossils include shallow branching burrows (Figure 8.10)a together with *Cochlichnus* and *Palaeopaschichnus* (Figure 8.10) c,e.

Interpretation

In the Coed Cochion Member sedimentary structures such as ripple cross-lamination and flaser bedding are indicative of shallow water (i.e. above storm wave-base) environments of accumulation. The chloritic material in some beds was undoubtedly derived from a primary mafic mineral in the original sediment, whereas the graded layers may represent pyroclastic ash falls directly into the water. The sedimentary material is thus regarded as consisting largely of reworked volcanic ash. Significantly, the sedimentary laminae are never disturbed; i.e. there was no bioturbation, and this factor is one that seems to unite Ediacaran fossil assemblages. Trace fossils may occur, but they are always surface traces and do not penetrate the sediment; this may explain why these soft-bodied organisms are preserved with such regularity (Cope, 1985). By early Cambrian times organisms had evolved that were able to penetrate the sediment and bioturbation is the norm.

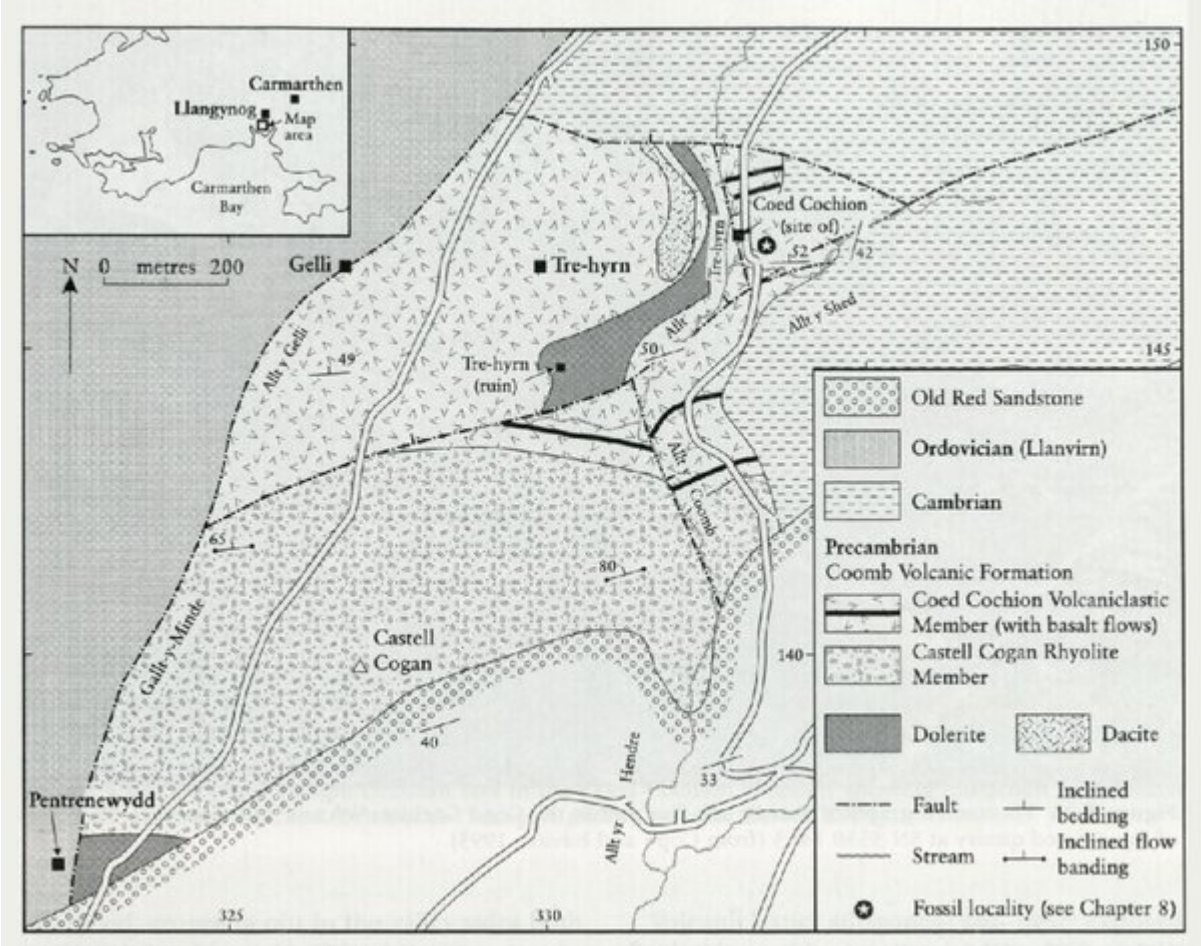
Opinion is divided on the affinities of fossils such as those found at Coed Cochion. It may be that the disc-shaped ones are indeed medusoids, related to modern-day jelly-fish, but an alternative hypothesis interprets many of these as anchorage discs or floats of pennatulaceans, such as *Charniodiscus,* a genus that has a frond-like body attached to a basal annulated disc (e.g. (Figure 8.8)). However, the Coed Cochion fauna represents a very shallow-water assemblage, that has hitherto yielded no *Charnia*-like fossils, and thus differs markedly from the deeper-water assemblages reported in this volume from the various Charnwood Forest GCR sites.

In the case of the Coed Cochion fauna it seems to be the frequent mud laminae that have cast impressions of the Ediacaran medusoids and trace fossils so well, although most of the laminae are devoid of fossils. In some cases the mud is present as a blanketing film over an irregular surface, such as a rippled bedding plane. In one case, a medusoid impression is draped over a ripple-crest suggesting stranding of the organism in exceptionally shallow water, as perhaps by a receding tide. In other cases the whole mud surface is apparently covered by a muslin-like texture. This was originally thought to be tectonic, but as it only affects a few bedding planes, this is believed unlikely. More recent ideas, supported by the fact that fossils on these surfaces always appear blurred on photographs — the photographs seem to be out of focus — suggest that such surfaces were covered with an organic film, such as a bacterial mat, that stabilized the surface and grew over macroscopic organisms on that surface.

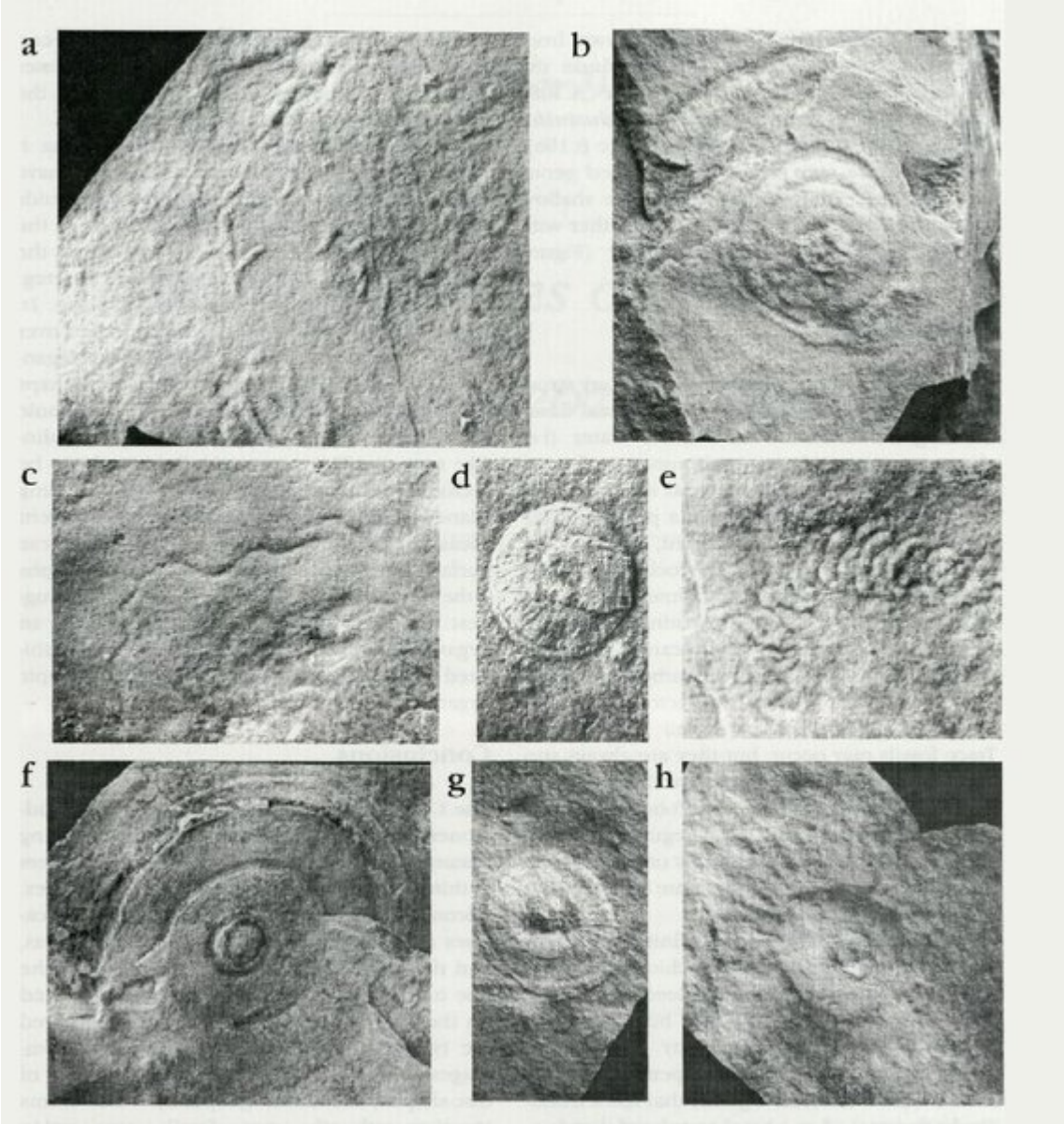
Conclusions

The Coed Cochion site displays laminated mudstones, siltstones and sandstones representing material that accumulated in shallow waters within a sea that surrounded volcanic edifices. Aprons of sediment built up around the volcanoes as erosion reworked the ashes and lavas, and the marine life of the area was cast by the fine mud laminae that periodically accumulated on the sea floor. The fossils that are preserved are typical of Ediacaran shallow-water assemblages worldwide. Here they mainly consist of disc-shaped, medusoid (jellyfish) — like forms together with other trace fossils representing shallow-burrowing organisms.

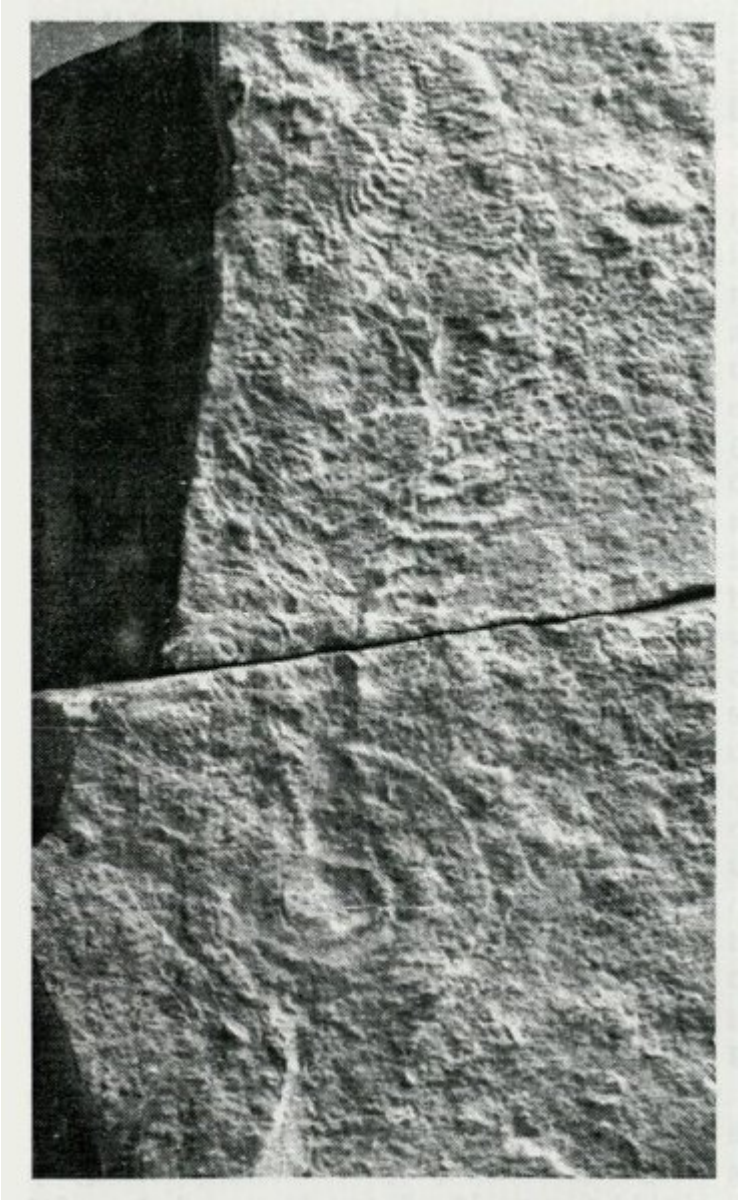
References



(Figure 5.22) Geological map of the Llangynog inlier, including the Coed Cochion palaeontological site. This diagram is reproduced with the permission of the Geological Magazine, Cambridge University Press (modified from Cope and Bevins, 1983).



(Figure 8.10) Fossils from Coed Cochion. (a) Shallow branching burrows x 2. (b) Cyclomedusa sp. x 1.5. (c) Cochlichnus sp. X 1.5. (d) Medusinites sp. x 1.5. (e) Palaeopaschichnus sp. a meandering feeding trail or spiral alga x 2. (f) Ediacara sp. x 1. (g) Medusinites sp. x 1.5. (h) Hiemalora sp. a medusoid with ?tentacular impressions x 1.5. (Photos: J.C.W. Cope.)



(Figure 8.8) Charniodiscus concentricus from North Quarry. It shows a frond attached to a basal disc, which may either be a `holdfast' or a float. This specimen is 250 mm long and the disc is 64 mm in diameter. (Photo: T.D. Ford.)