
4 Capel Hermon

This is a circular route of about 10 km mainly on forest roads in the upper part of the Afon Wen valley and on the lowest slopes of Rhobell Fawr. It traverses the Rhobell Volcanic Group, the Ffestiniog Flags Formation, high level subvolcanic intrusions and the Coed-y-Brenin porphyry copper deposit. The walk takes about 5 hours. Variations are given for the walker who may wish to leave the main route and visit Llanfachreth. Capel Hermon may be approached from the north or south, in both cases on single track roads with tight bends that will not take large coaches. There is a small Forestry Commission car park [SH 748 256] near the start (Figure 15).

Locality 1 [SH 74836 25371] The porphyry copper deposit, proved by Riofinex Ltd in the early 1970s, but not worked, is situated mainly beneath thick boulder clay in the forested valley around Capel Hermon. Details of the deposit are given by Rice and Sharp (1976). The ore deposit consists of chalcopyrite and a little molybdenite both in veinlets and disseminated within a large laccolithic complex of microtonalite and in the roof rocks. The complex was emplaced within the Ffestiniog Flags Formation 0.5 to 1 km below the base of the co-magmatic Rhobell Fawr volcano in late Tremadoc times, and was mineralised in a phase of hydrothermal activity during that volcanic episode. In most porphyry copper deposits there is extensive hydrothermal alteration of the host and the surrounding rocks but the usual pattern of a potassic zone (potash feldspar and biotite) at the core with phyllic zone (mainly sericite) around it and a propylitic zone (chlorite and epidote mainly) on the outside is not developed fully here. The potassic zone has not been recognised with certainty, and the ore-body is associated with phyllic altered rocks.

One of the very few exposures of the ore-body occurs in a forest road cutting about 150 m S of the car park. The rock is intensely sericitised and fractured. Weathering has reduced the copper sulphides to malachite which stains the rock green. In the head deposit which overlies the solid rock, a basal green layer of strong copper enrichment demonstrates the mobility of copper in groundwater systems.

Near the junction of the forest road with the metalled road, about 70 m S of the car park, there are the remains of waste tips from one of the old Dol-frwynog mines in which chalcopyrite-pyrite-bearing quartz veins were tried for gold in the 19th century. Thrift (*Armenia maritima*) grows abundantly in the copper-rich soils here.

Locality 2 [SH 73899 25549] This is the site of the old Turf copper mine. In the early 19th century about 70 acres of copper-rich peat were dug, dried and burned to concentrate copper in the ash so that it could be smelted. Most of the peat has been removed, but copper-rich groundwater is still depositing copper minerals on the sides of drainage ditches. The old Dolfrwynog vein workings reflect some of the efforts the 19th century prospector put into his search for the 'mother lode' from which the copper in the peat was thought to be derived. Ramsay (1866, p. 45), however, had already concluded that the copper was probably finely dispersed through the rock. Riofinex Ltd proved him right over 100 years later.

Localities 3 [SH 74607 26093], 4 [SH 74885 26281] and 5 [SH 75172 26242] On the forest road near Buarthre Cottage there are several large road cuttings in the broad, pyrite-rich zone, commonly referred to as the pyrite halo. At Locality 3 there is abundant pyrite in both the altered microtonalite and the hard, baked siltstone of the Ffestiniog Flags Formation. It occurs disseminated and in veinlets, in addition to being in quartz veins. Following the forestry road (R132) there are more outcrops at Localities 4 and 5. At the latter, a trial level was excavated along a quartz vein in the intrusive microtonalite. About 35 m to the west, baked siltstone contains pyrite in a network fracture system which is typical of this alteration zone.

Locality 6 [SH 75658 26358] Here, concordant intrusions of grey microtonalite intrude steeply dipping siltstone of the Ffestiniog Flags Formation. The locality is outside the pyrite halo, although the intrusive rocks are altered.

Locality 7 [SH 75778 26549] The alternation of thin beds of grey silty mudstone and white, coarse quartzose siltstone or fine sandstone, which characterises the Ffestiniog Flags Formation, can be examined in an outcrop of steeply dipping beds with small-scale folding. Sedimentary structures include laterally impersistent and lens-shaped bedding, parallel- and cross-lamination, ripple marks, scour-and-fill structures and burrows. They indicate deposition in a shallow, probably

tidal, environment.

Locality 8 [SH 75803 26583] The Ffestiniog Flags Formation is well exposed in this quarry. The formation is not notably fossiliferous, but examples of the brachiopod *Lingulella davisii* can be found here (Figure 16). Like the present-day *Lingula*, this species may have lived in vertical burrows on the sea floor; the examples found here, however, are fragmented and have accumulated at the bases of coarse siltstone beds. An important feature in this quarry is the effect of hillcreep, distorting the true dip in the top 1 to 2 m of solid rock.

From the quarry the forest road more or less follows the strike of the Ffestiniog Flags Formation to the metalled road [SH 7600 2714]. Along this stretch outcrop is abundant and the dips are generally shallower.

Follow the metalled road north and take the rough path to the east, opposite the junction with R24, to join the forest road R212. Turn ESE, and make for the junction with R20 at the ruins of Hafody-hendre. Turn north on to R20.

Locality 9 [SH 76492 27354] A few metres north on R20, small outcrops of dark grey mudstone occur in the drainage ditch at the roadside. The mudstone is probably of the uppermost Ffestiniog Flags Formation; upwards it becomes darker and pyritic, and passes into the Cwmhesgen Formation.

Locality 10 [SH 76648 27423] The base of the Rhobell Volcanic Group is rarely exposed, but its unconformable character is evident from mapping. The group consists of a pile of basaltic lavas and blocky lava breccias erupted subaerially. The lower part of the pile is penetrated by many small intrusions, and it is difficult in places to distinguish in outcrop between the intrusive and extrusive components. In this small outcrop near the base of the pile, blocks of grey siltstones are enclosed in confused relationships within brecciated basalt.

Kokelaar (1979) suggested that the first eruption may have taken place in a shallow marine environment, but the volcano quickly became subaerial. Rhobell Fawr comprises the remains of part of the eastern flank of that volcano. Successively younger lava flows onlap eastwards. The lavas, which range from grey to green in colour consist of two main types: a dominantly grey variety with mostly feldspar and augite phenocrysts, and a darker, green variety with feldspar, large amphibole and less common diopside phenocrysts. In road cuttings immediately south of Locality 10 the main rock type is the feldspar-rich variety.

Localities 11 to 14 The first appearance of green amphibole-bearing basalt is at Locality 11 [SH 76855 27150]. Locally the rock contains abundant 1 cm pyrite cubes and intricate epidote veining. At Localities 12 [SH 76956 26969] and 14 [SH 76757 26254] the basalt is distinctive (Figure 17) with euhedral amphibole phenocrysts up to 2 cm long, and at Locality 13 [SH 76946 26504] the rock displays excellent autoclastic brecciation.

Localities 15 to 17 The feeder zone to the volcano is represented by the Moel y Llan and Cerniau intrusion complexes of mainly basaltic intrusions emplaced along a north–south fracture system. The complexes are distinguished from each other by the presence of entrapped slabs of Ffestiniog Flags Formation in the Moel y Llan. The Bwlch Goriwared Fault displaces the Cerniau complex against the lava pile, and at Locality 15 [SH 76144 25025], near the ruins of Ysgwydd-yglyn, the first of the intrusions in the Cerniau complex may be seen. Though the intrusions are concordant where seen adjacent to sedimentary rock, they are normal to the base of the volcanic pile and are, therefore, dyke-like. Rafts and slivers of baked, pyritised, vertically disposed siltstone of the Ffestiniog Flags Formation trapped between the dykes are exposed at Locality 16 [SH 75993 25050], which marks the eastern limit of the Moel y Llan complex; westwards the rafts are thicker and more common. West of Locality 17 sedimentary rocks are more abundant than intrusions. Most of the dykes are basaltic, but among them (e.g. at Locality 17 [SH 75955 25054] and, more commonly, westwards) there are some intrusions of microtonalite in the steeply dipping Ffestiniog Flags Formation.

From Locality 17 follow the forest road downhill past Peny-Bryn farm and onwards to rejoin the metalled road near Dolydd.

Two useful variations to this route may be followed. Near the ruins of Ysgwydd-y-glyn between Localities 15 and 17 two footpaths, one along Bwlch Goriwared and the other over Cerniau, lead to Llanfachreth. Either may be followed, ending the walk at the village, or a circular tour may be made returning to Ysgwydd-y-glyn and thence to Capel Hermon, adding

another 2 to 3 hours to the time. Geologically little new is added to the excursion by following these variations, but both of them enable a much more detailed examination to be made of the sub-volcanic Moel y Llan and Cerniau intrusion complexes.

Bwlch Goriwared About 30 m W of Ysgwydd-y-glyn (Figure 18) a narrow track, believed to be part of an old drover's road, leads south-eastwards from the main forest road. It leads out of the forest, and joins a well-made track which runs roughly southwards through Bwlch Goriwared. Llanfachreth is about 3.5 km away.

The bwlch is a strong linear feature, probably along a fault that separates lavas of the Rhobell Volcanic Group on the east from the Cerniau intrusion complex on the west. The lavas and some microtonalite intrusions are well exposed in crags beyond a wall on the east for about 1 km from the forest gate. The Cerniau complex, on the west of the wall, is difficult to resolve. It consists mostly of dolerite with some microtonalite forming an intersecting dyke complex. Some lava remains at the summit of Cerniau, which suggests that the complex is the uppermost part of the feeder dyke zone.

Localities 18 to 20 Grey dolerite with feldspar, pyroxene and amphibole phenocrysts, the latter with white pellicles, crops out in several places (e.g. at Locality 18) but, near the old partly blocked trial level at Locality 19, green porphyritic dolerite is prevalent. Contacts between these two rocks are present hereabouts, but hard to find. This trial working is one of three in this area. There is a large tip mostly of sparsely pyritised dolerite, but with a few small pieces of mostly crystalline quartz. Farther south, at Locality 20, porphyritic dolerite and microtonalite are found in adjacent outcrops.

Cerniau About 150 m W of Ysgwydd-y-glyn a white-topped post marks where a footpath crosses the main forest road. Southwards, the path winds uphill through the forest and emerges at a narrow wooden gate. From here the path to the south crosses craggy moorland. It is quite clear for about 200 m, but then becomes difficult to follow until about 200 m from the gate [SH 7557 2423]. It is advisable before crossing this tract of land to take a compass bearing on the gate.

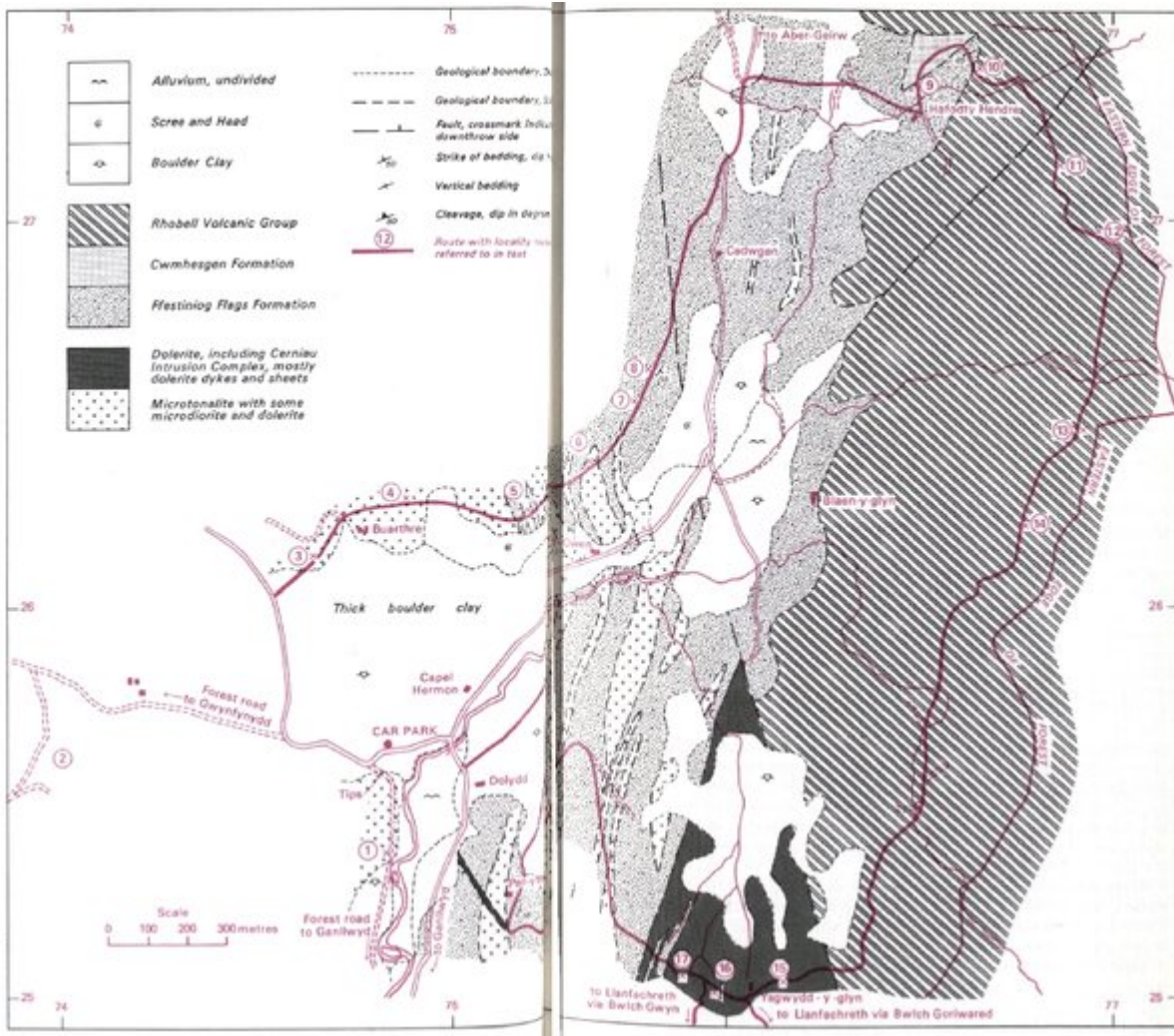
Locality 21 The Cerniau is arbitrarily separated from the Mod y Llan intrusion complex at the most eastward exposure of enclosed siltstone, but it is possible that the junction is a faulted one. The footpath follows the eastern margin of the Moel y Llan complex which, unlike the Cerniau, is composed of dyke-like intrusions within Ffestiniog Flags Formation. At this locality near the gate is a craggy outcrop of porphyritic dolerite. It is brecciated in parts, possibly by late hydrothermal activity, and a 60-cm thick dyke of dark green fine-grained dolerite cuts the breccia.

Locality 22 One of many outcrops of steeply dipping, vertical, or overturned baked and cleaved siltstone of the Ffestiniog Flags Formation occurs here.

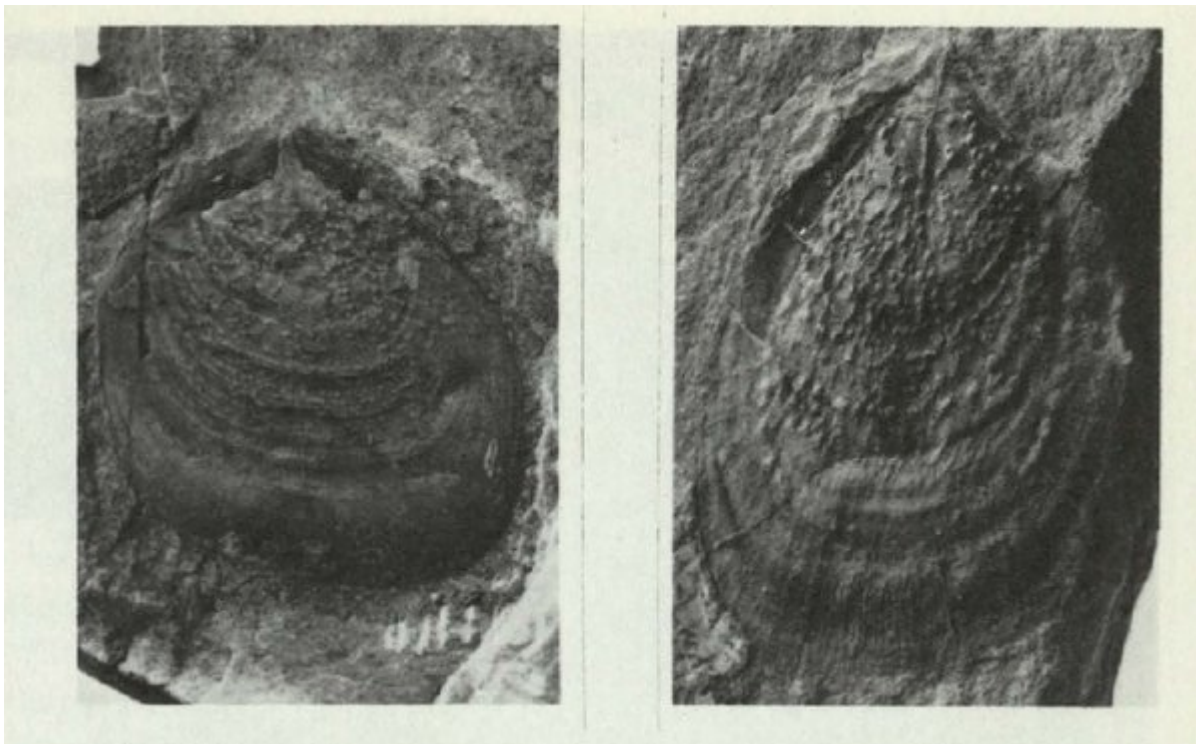
Locality 23 About 50 m N of the gate [SH 7557 2423] the path rises out of Bwlch Gwyn. The view from here encompasses Rhobell Fawr, the Rhinogs, Foel Offrwn and Cader Idris.

(Figure 52) Typical basal section of clinopyroxene crystal.

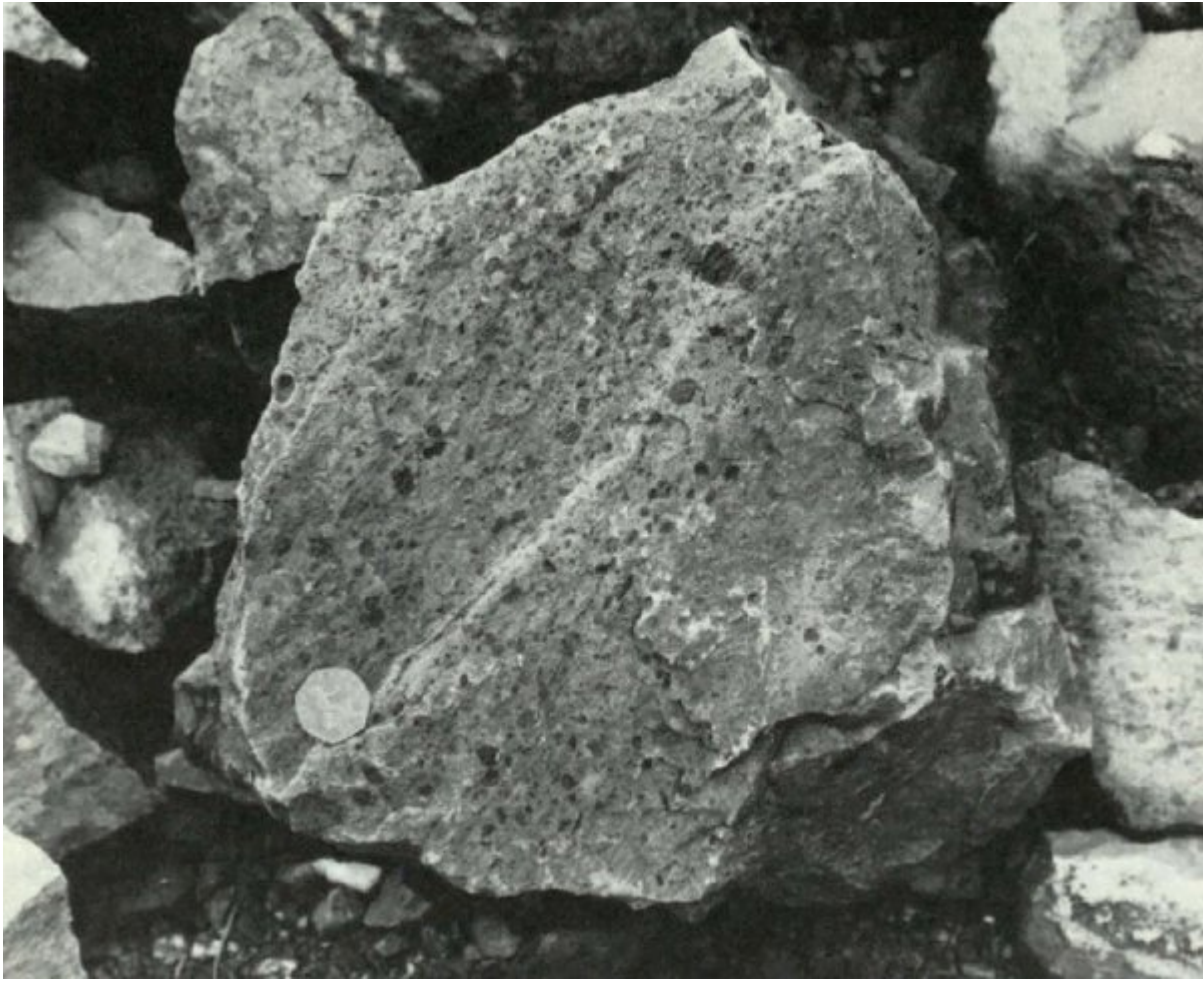
[References](#)



(Figure 15) Geology and excursion route No. 4 around Capel Hermon.



(Figure 16) *Lingulella daviss* (McCoy) from the Ffestiniog Flags Formation. Ventral valve (on left) and dorsal valve (on right), x3.



(Figure 17) Amphibole-bearing basalt.

(Figure 52) Typical basal section of clinopyroxene crystal.