EXCURSION TO THE MALVERN HILLS

Director: W.G. Hardie — 5th - 7th May 1972

Friday evening. Approximately 40 members arrived in Great Malvern to the accompaniment of heavy and continuous rain. Headquarters were at the Montrose Hotel, and after dinner the Director gave an introductory talk, drawing particularly on the work of Groom (1910), Blyth (1952), Reading and Poole (1961), Butcher (1962), Brooks (1968) and Phipps and Reeve (1967, 1969).

Saturday. By morning the weather authorities had intervened, and, to the relief of all concerned, it was dry but dull when the party were introduced to the south Malverns. Cars were parked near to the first exposure (756368), which was the relatively new roadside cutting in Hollybush Sandstone (Middle Cambrian). Both the massive and micaceous flaggy beds of this horizon, as well as the Ordovician sheet intrusion of altered andesite, were examined. The director commented that, in his opinion (Hardie, 1969, p. 51) based on thin section observations, the greenish colour of this rock is due to abundant flakes of chlorite, and not to glauconite, as is usually maintained (Groom, 1910; Penn et al. 1971, p.10), although the latter mineral may be present in small amount.

With prior permission the party then walked southwards through the fields belonging to Fowlet Farm, thus avoiding the ankle-deep liquid mud in the old lane. On the way, a poor exposure of a north-westerly trending sheet of altered andesite was examined, and then a stop was made at the best of the rare exposures (758361) of the Upper Cambrian Whiteleaved Oak Shales (Black Shales). Chase End Hill, the most southerly part of the Malvern Hills, was then ascended, and reasons were given for regarding it as a thrust mass of Malvernian overlying Cambrian. A shallow excavation just south of the summit provided specimens of chlorite-schist, sometimes with a little sheared pegmatite. According to the recent work of Lambert and Holland (1971, p.329), the strongly sheared Malvernian rocks south of Hollybush are altered diorites.

A north-easterly track allowed the party to descend by a different route, and then, after passing a small roadside quarry of Hollybush Sandstone, Ragged Stone Hill was ascended. Further specimens of chlorite-schist, with occasional streaks of sheared pegmatite, were examined. The marked hollow, which runs the length of the hill and separates the twin peaks, has always been ascribed to down faulted Cambrian and Silurian rocks (Groom, 1910; Ziegler, Cocks and McKerrow, 1968; Phipps and Reeve (1969). A quick descent to Hollybush allowed the party to reach Gullet Quarry (762380) in time for lunch and a heavy shower.

The bottom level of this quarry provided a variety of Malvernian rocks, especially diorite showing varying degrees of shearing and intruded by conspicuous veins of pink pegmatite. Some members discovered small amounts of pyrite and possible chalcopyrite, while some hornblende-schist, chlorite-schist and a dyke of quartz-dolerite were also seen. The hornblende-schist is referred to as epidiorite by Lambert and Holland (1971, p. 340). Attention was then drawn to the complicated arrangement of thrusts and shear zones which dip steeply to the east. These are taken to indicate an upward and westerly movement of the rocks during both Taconian (late Ordovician) and Hercynian (late Carboniferous) times (Reading and Poole, 1961, p.298).

The party then climbed up the quarry road to the excellent exposure of westerly dipping Upper Llandovery Wych Beds.* These consist of fine grained sandstones, shales and occasional beds of partly decalcified limestone, together with a thin basal conglomerate containing pebbles and boulders of Malvernian. The latter was seen to rest against the Malvernian, and it was explained that most geologists agreed with Reading and Poole (1961) that the junction was an unconformity. Phipps and Reeve (1964, p.397) regarded it as a thrust contact, and still adopt this interpretation (1969, p.36).

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Once the high ground above the quarry was reached (see aerial photograph in Butcher 1962) the party proceeded northwards over Swinyard Hill with its diorites, granites and occasional pegmatites. The western end of the "Silurian Pass" of Groom (Blyth and Blackith, 1953, sketch-map, p. 443) was crossed, but that afternoon the downfaulted Silurian rocks seemed to be represented by liquid mud. The feature formed by the volcanic Warren House Series (Pre-Cambrian) was then ascended by means of a path, and a stop was made at Clutter's Cave (762394) to study the basalt (spilite) lava with its pillow structures. North-east of this were scattered exposures of slightly shattered greyish pink rhyolite, referred to by Lambert and Holland (1971, pp. 346-7) as quartz-keratophyre and dacite. The best specimens of this rock, however, were obtained from the disused quarry (766397) a short distance down the northerly facing hillside.

A walk to the west brought the party on to the southern side of Herefordshire Beacon, a hill of Malvernian interpreted by all geologists as a westward thrust mass resting on Silurian. The latter beds are inverted, presumably due to the thrusting, and an exposure of inverted shale (dips east) at about the horizon of the Woolhope Limestone, was seen in a narrow lane. North-west of this exposure, and only a short distance west of the Malvernian, a forestry track provided fragments of Wenlock Limestone.

The party then retraced its steps eastwards to Walms Well (761393) where a track approximately along the Silurian/Pre-Cambrian boundary was followed southwards. A stop was made at a small exposure (756381) due west of Gullet Quarry to collect fossils from brownish weathering decalcified sandy Wych Beds. Finally, in a small disused quarry (760380) just south of the track leading to Gullet Quarry, quartzite and conglomerate from the Lower Cambrian Malvern Quartzite was examined. Time did not permit an examination of the exposed unconformable contact of this quartzite with the Malvernian in Hollybush Quarry (Jones et al. 1969, pp. 461-3).

Sunday. The morning began with welcome sunshine when the party drove south, via The Wyche and British Camp, to examine and collect fossils from the extensive roadside exposure (747403) of Aymestry Limestone and Lower Ludlow siltstones and shales. The return journey to The Wyche was made via Colwall Stone, which lies on the relatively flat ground floored by Red Downtonian.

Stops were made at the two old quarries (now car parks) in the Malvernian on the east side of The Wyche. The most northerly of these (Lower Tollgate Quarry, 770441) provided an interesting variety of ultramafic hornblende and pyroxene-rich rocks (Lambert and Holland, 1971, p. 330). Contrasting with these rocks was the slightly streaky red alkali-granite found in the second quarry. After this, the cars were parked immediately west of The Wyche until the middle of the afternoon.

The party first climbed on to the granite ridge and made its way northwards, enjoying good views both east and west before rain intervened. Short of County Quarry, a descent was made to the road on the west, and, a little to the south, a stile gave access to a muddy westerly trending track across Silurian country. As the party slithered and squelched over unexposed Lower Silurian, the voice of a cuckoo wafted towards us. A short digression was then made to the line of old quarries in the Wenlock Limestone of Park Wood (764443), where lunch was eaten, fossils (also live snails) collected and scattered groups of *Orobanche* (broomrape) admired.

After this the westerly traverse was continued, with westerly dipping Lower Ludlow shales being seen in the banks of a stream. No exposures of the succeeding Aymestry Limestone, which formed the wooded ridge to the north and south, were found, so the party continued to the disused Brockhill quarry (757439). Here fossiliferous siltstones and occasional interbedded limestones belonging to the Upper Ludlow Beds were examined, followed by rather weathered Downton Castle Sandstone (Grey Downtonian). The bluff, dividing the quarry into two parts and carrying the thin horizon correlated with the Ludlow Bone Bed, was carefully examined by a few optimists in the hope of extracting phosphatic fragments.

A return was made to the cars, whereupon the party proceeded in welcome sunshine to a parking place due west of Worcestershire Beacon. From here the last two exposures were reached on foot. First to be visited was the classical exposure (764459) of Lower Llandovery, which includes "Miss Phillips' Conglomerate," i.e. the rock (breccia) discovered by the sister of John Philips, writer of the 1848 Memoir covering the Malvern and Abberley Hills. Here grey silty sandstones and a thin decalcified fossiliferous breccia are seen dipping steeply to the west off the Malvernian. These beds, which have been correlated on palaeontological grounds with the Wych Beds (Ziegler, Cocks and McKerrow, 1968, pp. 753-7), are believed by most geologists, including Reading and Poole, (1962, p. 378) and Butcher (1962, pp. 105-7) to rest unconformably on the Malvernian. Phipps and Reeve (1969, pp. 2-4), however, still uphold Groom's 1910 interpretation that the exposed contact marks the course of a powerful western boundary fault, which continues southwards to the Gullet Quarry. Finally, Dingle Quarry (765456) was entered (see Penn et al., 1971, Fig. 15), where further examples of Malvernian pegmatites, granites and diorites, as well as a thick sheet of dolerite, could be seen.

At this stage most members dispersed, but a few of the more indefatigable climbed Worcestershire Beacon for a little more geology and cups of tea in the summit café.

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* In this paper, and the preceding one by Bullard, the spelling of Wych Beds [as apposed to Wyche Beds] is spelt as recommended in Cocks, Holland, Rickards and Strachan, 1971, a correlation of Silurian Rocks of the British Isles *Special Report No. 1. Geol. Soc. London* - Editor.