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# Hope Valley

[SJ 3390 0128]–[SJ 3550 0209]

## Introduction

This is the type area for the 'Hope Shale Formation', a term introduced by Lapworth and Watts (1894, p. 316) as the 'Hope Shales' or 'Hope Shale Group'. Strictly speaking, the term 'Hope Shale Formation' related to the mudstone formation lying below the Stapeley Volcanic rocks, but in current usage (British Geological Survey, 1991) it encompasses both the Stapeley Volcanic rocks (as a 'Member') and the overlying Stapeley Shales, the type localities for which are respectively Stapeley Hill, west of Shelve, and Holywell Brook, near Rorrington.

The Hope Shale Formation as developed in the Hope Valley (Figure 10.4) is referred to the *Didymograptus artus* Zone, in the lower part of the Abereiddian Stage of the Llanvirn Series. The site is on the western flank of the Shelve Anticline. Although they have the largest area of outcrop of any of the Ordovician formations in the Shelve area, the shales tend to be poorly exposed because they weather regressively. Old quarries and discontinuous stream sections along 1.8 km of the Hope Valley afford exposures of significant parts of the sequence and yield representatives of the mixed trilobite–graptolite fauna that have been described respectively by Whittard (1955–1967) and Strachan (1986). Williams (1974) described the brachiopods and Jenkins (1967) the chitinozoans. The stratigraphy was revised and updated by Whittard (1979), who gave a large-scale map of the site (fig. 15). Modifications to Whittard's map were given on the British Geological Survey (1991) 1:25 000 Shelve sheet and refinements to the nomenclature, adopted here, on that sheet and on the 1:50 000 Montgomery Sheet (British Geological Survey, 1994b).

## Description

The Hope Shales below the Stapeley Volcanic Member are, on Whittard's (1931, p. 327) estimate, nearly 245 m thick and consists of a monotonous sequence of blue-black, rusty-weathering shales. It includes beds of acid vitro-clastic tuffs, the so-called 'Chinastone Ash' of earlier publications, now referred to as the 'Hyssington Volcanic Member' (Figure 10.5), and, away from the Hope Valley (e.g. around the Llan Syncline, on the south-east flank of the Shelve anticline), also includes volcanoclastic sandstones and wackes. Formerly the tuff bands were used to subdivide the Hope Shales, but they are now known to be laterally impersistent.

There are two major tuff bands in the vicinity of Hope hamlet, around the NE-plunging nose of the Shelve Anticline. Some of the youngest Hope Shales locally, above the upper tuff band, are exposed in the stream [SJ 3390 0128]–[SJ 3399 0135] (Whittard's localities 834L, M and N) and have yielded occasional trilobites including *Barrandia* and graptolites including *Acrograptus* cf. *acutidens* (Elles and Wood) (Strachan 1986, p. 55). The upper tuff band is exposed in the 'Contorted Ash Quarry' [SJ 3425 0147] adjacent to Ash Cottage (Whittard, 1979, p. 26). Here the rocks are predominantly bluish-grey, very fine-grained flinty tuffs, with occasional subsidiary shale bands. The ash is folded and fractured, a feature of thin-bedded competent rocks when contained in easily deformed beds such as shales (Whittard, 1979, p. 27).

In the stream south of the quarry, shales below the upper tuff band crop out in a fairly long section [SJ 3426 0143] to [SJ 3443 0141] (Whittard localities 834E, G, H and I, where he recorded the trilobites *Ectillaenus perovalis* (Murchison), *Pricyclopyge binodosa* (Salter) and *Placoparia cambriensis* Hicks). The oldest Hope Shales in this outcrop, below the lower tuff and close to the axis of the Shelve Anticline [SJ 3438 0143], are exposed in the stream behind Hope Cottage (Whittard locality 142). These have yielded a rich trilobite fauna, including *E. perovalis*, *P. binodosa*, *Barrandia homfrayi* Hicks, *Microparia* cf. *princeps* (Barrande), *Gastropolus obtusicaudatus* (Hicks) and '*Neseuretus*' *bullatus* Whittard (type locality), together with the brachiopod *Paterula* cf. *bohémica* Barrande and pendent didymograptids. Jenkins (1967) reported chitinozoans including *Sphaerochitina vulgaris* Jenkins, *Siphonochitina robusta* Jenkins, *S. tenuicollis* Jenkins, *Rhabdochitina usitata* Jenkins, *R. turgida* Jenkins, *Cyathochitina campanulaeformis* (Eisenack), *C. calix* (Eisenack) and *Conochitina chydaea* Jenkins; this is the type locality for all of Jenkins' species.

Shales above the upper tuff, at a similar horizon to those seen at Whittard's localities 834 L–N at Hope (see above), are exposed in Hope Brook [SJ 3494 0104]; this well-known collecting locality has yielded *Ectillaenus perovalis* and other trilobites, hyolithids and a specimen of the starfish *Palaeura* (Whittard, 1931b, p. 340). Similar shales are exposed a short distance downstream, near Fox Inn, where they have yielded the trilobite *Ellipsotaphrus monophthalmus* (Kloudek).

Hope Quarry, at the northern end of the site [SJ 3550 0209], is renowned for the unconformity between the Hope Shales and overlying Silurian sandstones of the Venusbank Formation (Llandovery, Aeronian Stage), seen in the lower part of the quarry:

## Interpretation

The Hope Valley is important in showing to greatest advantage the lower part of the Hope Shale Formation, which underlies the Stapeley Volcanic Member. Whittard (1931, p. 323) and Dean (in Whittard, 1955–1967, p. 312) remarked on the similarity between the faunas of the Hope Shales and the approximately coeval faunas of Bohemia, for example in the Barka Formation. The trilobite fauna of the Hope Shales includes cyclopygid taxa indicative of the Cyclopygid Biofacies of Fortey and Owens (1987), together with other trilobites that are small-eyed or blind, together constituting a typical atheloptic assemblage (Fortey and Owens, 1987, p. 105); this association is consistent with a deep-water facies. The genera (and in many cases species) are common to those of the late Arenig Pontyfenni Formation (see Pontyfenni site), which was deposited under very similar conditions, but the difference in age is reflected in different subspecies of *Pricyclopyge binodosa* and in particular in the graptolite fauna, which includes abundant pendent didymograptids; these indicate the presence of the *artus* Zone of the Abereiddian Stage. Coeval strata in southwest Wales (e.g. at Llanfallteg and Abereiddi see site reports) have similar faunas but were probably deposited in slightly shallower conditions, having fewer cyclopygid trilobites. This contrast implies major subsidence on the Linley-Pontesford Fault at the margin of the Welsh Basin (cf. Prigmore *et al.*, 1997).

Many of the chitinozoans have long ranges extending up to the Llandeilian or into the Caradoc (see Jenkins, 1967, table 1), but some species, for example *Cyathochitina calix* (Eisenack), appear to be shorter-ranging and are common to the approximately coeval *expansus* Limestone of Sweden and 'Glaukonitkalk' of Estonia.

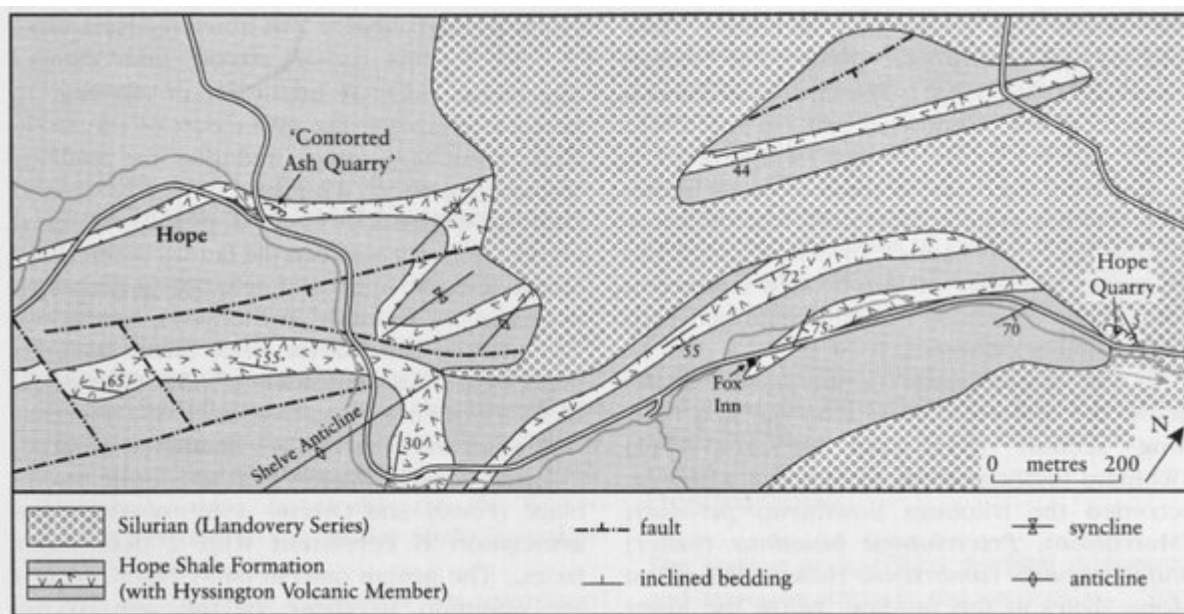
## Conclusions

The Hope Shales Formation exposed at this site represents typical background deep-water deposition of the early Llanvirn and contains a particularly varied and well-preserved trilobite fauna associated with graptolites of zonal significance. This is valuable nationally and internationally because it contributes to the correlation of the graptolitic successions in west Wales and northern England with the trilobitic succession in North and South Wales and abroad (in Bohemia).

## [References](#)



(Figure 10.4) Scarp of the Mytton Flags Formation on the east side of Hope Valley, looking north-east. The lower ground is occupied by the Hope Shale Formation, the road following the Mytton–Hope boundary quite closely. The white tip-heap is spoil from Snailbeach Mine. The next nearer cleft is Crowsnest Dingle. (Photo: Cambridge University Collection of Air Photographs, BM 8: copyright reserved.)



(Figure 10.5) Geological map of the type area of the Hope Shale Formation in the Hope Valley, from the British Geological Survey (1991).