Abergwaun (Fishguard Old Harbour)

[SM 9600 3727]–[SM 9598 3735]

Introduction

Exposures in the cliffs on both shores of Fishguard Old Harbour contain graptolite faunas of Llanvirn age that constrain the age of both the base and the top of the Fishguard Volcanic Group, thereby affording correlation with successions elsewhere in South Wales. These are the only sections so far identified that have yielded identifiable faunas in association with the Fishguard volcanic rocks.

In the first detailed description of the geology of the Fishguard district, Reed (1895) included the volcanic rocks of the area within the 'Bala' and 'upper Llandeilo', whilst Cox (1930, p. 285) recognized that '*Didymograptus bifidus* Shales' occur below the volcanic rocks, and included all within the Llanvirn Series. Thomas and Thomas (1956) concentrated upon the mapping and petrography of Fishguard Volcanic Group but noted the presence of a graptolite fauna at the top of the volcanic succession (1956, p. 314), to which they ascribed a '*D. bifidus*' zonal age. Unpublished work by C.J. Jenkins has refined the biostratigraphical information, and diagnostic faunas have been recognized in shales at both the base and the top of the volcanic rocks in Fishguard Old Harbour.

Description

Graptolite faunas have been recovered from three points in the cliff exposures in Fishguard Old Harbour (Figure 8.14), two on the west side from below the Fishguard Volcanic Group and one on the east side above it.

At Aber Bach [SM 9600 3727], cleaved grey-black slates, where the cleavage (the orientation of which varies in this section) and bedding are coincident, contain *Acrograptus* cf. *nicholsoni* (Lapworth). About 15 m below the base of the volcanics south of Lampit Bach [SM 9598 3735], Jenkins reported well-preserved *Didymograptus artus* Elles and Wood in hornfelsed slates. Both these occurrences are referred to the lower Abereiddian *artus* Zone.

On the west side of the old harbour, about 100 m south of Castle Point, some 10 m of blue-black fissile shales with thin tuff bands crop out in a little inlet (see Thomas and Thomas, 1956, figs 6 and 7). These yielded a graptolite fauna that Thomas and Thomas (1956, p. 314) considered to indicate the topmost horizons of the *bifidus* (now *artus*) Zone. Jenkins' unpublished work, however, suggests that the fauna, in which he reported *Didymograptus murchisoni* (Beck) and *Diplograptus* cf. *caelatus* (Lapworth), instead indicates a level low in the upper Abereiddian, equating approximately with the Cyffredin Shale Member at Abereiddi (see site report). On the basis of these faunas, the extrusion of the Fishguard Volcanic Group can be dated as having taken place close to the lower-upper Abereiddian boundary.

Above the shales south of Castle Point there is a thickness of bedded rhyolitic tuffs. According to Thomas and Thomas (1956, fig. 6), these are in faulted contact with a succession of calcareous flags that crop out on Castle Point and on the west side of the harbour. Jenkins' unpublished work, however, suggests that the junction is an unconformity seen at [SM 9618 3778]. On the basis of lithology and fauna, he suggested comparison with the Castell Limestone at Abereiddi (see site report) and with the Ffairfâch Group and Llandeilo Flags at Llandeilo.

Interpretation

The Fishguard Volcanic Group represents an important volcanic event in the early Ordovician of south-west Wales, and the dating of the onset and termination of volcanism is critical in placing it in its wider palacogcographical context. The sediments above and below the igneous rocks tend to be poorly exposed, and even where they are exposed, unfavourable cleavage—bedding relationships make fossils difficult to find and commonly render them too badly preserved for identification. Therefore the three graptolite occurrences in the Old Harbour at Fishguard are important since they occur close to the base and summit of the volcanic sequence and, moreover, are sufficiently well preserved to

show that the Fishguard Volcanic Group was erupted above the lower part of the *artus* Zone and below the lower part of the *murchisoni* Zone. If Jenkins' interpretation of the correlation of the calcareous flags at the top of the succession is correct, then the equivalents of the Caerhys Shale Formation of Abereiddi are missing at Fishguard.

Conclusions

The fossil localities at Abergwaun (Fishguard Old Harbour) are important because they provide the only reliable biostratigraphical evidence that constrains the age of the Fishguard Volcanic Group to a mid-Abereiddian age.

References

(Figure 8.14) Abergwaun, immediately east of Fishguard, looking north. The Afon Gwaun provides a dip-section across the southern limb of the Goodwick Syncline. The foreground is underlain by Abereiddian slates. The acidic and basic lavas of the Fishguard Volcanic Group form bluffs at the mouth of the inlet. In the distance the cliffs are of acid tuffs on the northern limb of the Goodwick Syncline. (Photo: British Geological Survey photographic collection, A6129.)