STRUCTURAL GEOLOGY

Folding in the Que-Hellyer area

Stereonet plots of poles to cleavage and bedding in the area are given in Figures 13 and 14. Devonian folding is evident as broad, NE-trending folds which decrease in wavelength from about 2 km to about 500 m approaching the Henty Fault. Cleavage associated with these folds is poorly developed west of the Murchison Highway, but is prominent and axial planar to the folds east of the highway (fig. 13). In the Hellyer mine area, the major NE-plunging anticlinal structure is clearly outlined by the Que River Shale and by units within the Que-Hellyer Volcanics. Poles to bedding plots of the Hellyer mine area (fig. 14f) indicate an axial trace of 040° and plunge of 30°.

The presence or not of a synclinal axis through the Que River Mine area has been the subject of some debate (Young, 1980). Regionally, a syncline is clearly evident in sedimentary rocks to the south of Mt Charter (McNeill, 1986), and also to the north-east of Que River mine. Rocks of the mixed sequence clearly define a fold axis enclosing the Que River mine, and tight parasitic folding is evident in the felsic lavas and massive sulphide lenses of this sequence. Large and McGoldrick (1988) interpreted the PQ sulphide lens as being complexely folded and thickened in a synclinal fold axis about a major dacite wedge. This was supported by metal zonation within the sulphide lens and by the presence of footwall stringer style mineralisation to the east and west of the syncline.

Synclinal folding at Que River mine is also indicated by flow banding within the felsic lavas of the mixed sequence. A plot of poles to flow banding (fig. 15) clearly delineates eastern and western limbs dipping at 70-80° above a fold axis trending 010-023° with a northerly plunge of 0-20°.

The NE-trending folds have been overprinted by smaller wavelength (less than 400 m) NW-trending folds which have a strongly developed axial planar cleavage. The interaction of the two fold phases has resulted in small dome and basin structures in some areas, e.g. the basalt 'window' 2 km west of Hellyer Mine.

A third cleavage of north to NNE trend related to the Henty Fault Zone, and cross-cutting the NE-trending folds, is discussed later.

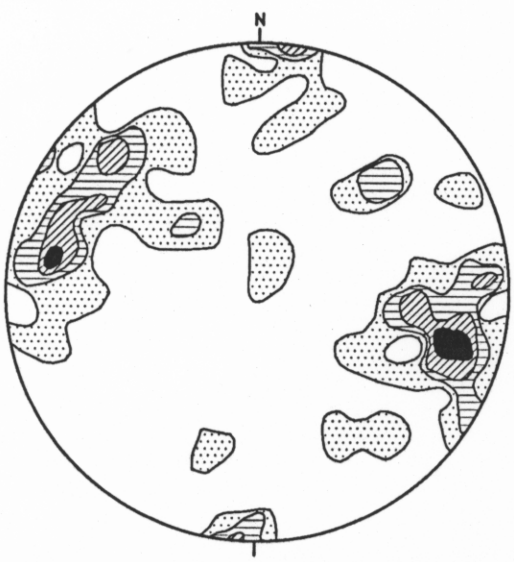

Figure 15. Stereoplot of poles to flow banding in lava, Sub-area G. Contours at 1, 3, 5, 7%; 61 points.

Henty Fault Zone (HFZ)

This major fault zone trends generally NNE, and consists of a zone 100-300 m wide of highly cleaved, lineated sediments and volcanic rocks. Deformation and alteration appear to be considerably greater to the south of the E-W trending Mt Cripps Fault (i.e. around the Sharks Fin and south thereof), and work subsequent to the original mapping suggests that the fault zone shown extending through the Hellyer Portal area may be a splay structure, with the major movement being deflected along the Mt Cripps Fault.

In the Sharks Fin area, the fault zone rocks are strongly sericitised and locally silicified. Hematite-magnetite veins and pervasive hematite alteration within a quartz porphyry body one kilometre north of the Sharks Fin are also associated with the Henty Fault. To the north of the area of intersection with the Mt Cripps Fault, the rocks within the fault zone are generally strongly cleaved but relatively unaltered. Minor sericite-fuchsite(?) alteration of felsic tuff was noted in preliminary excavations on the Cradle Mountain Link Road, and the fault zone was extrapolated to this point.

Slickensides on fault surfaces within the fault zone indicate a number of movement directions, with strike-slip and reverse movement being most common. Folds are common within the fault zone, and are generally tight and variably plunging, with variable axial planes. Bedding within the fault zone, although generally parallel to the fault trend, may diverge at moderate angles. Dips are steep and commonly overturned. Plots of poles to bedding within the fault zone give concentrations at 170/82 and 190/80 (fig. 14*h*).

Schistosity in the fault zone is generally sub-vertical, and mostly ranges from 170 to 190° AMG in strike, sub-parallel to bedding (fig. 13*f*). Cleavage development on this trend is strongly evident up to one kilometre distance from the fault zone on either side (fig. 13*a, g, h*), becoming more intense as the fault zone is approached. This cleavage cross-cuts the NE-trending fold structures, but its relationship to the NW-trending structures is not known.

Minor faulting associated with the Henty Fault is also strongly developed up to one kilometre on either side of the main fault. Three major trends are apparent (fig. 16), partially corresponding to the cleavage trends in the fault zone.

The latest movement on the Henty Fault is clearly post-Cambro-Ordovician and later than NE-trending fold structures which are probably Devonian in age. The Henty Fault is a fundamental structure in the Mt Read Volcanics belt. Corbett and Lees (1987) have suggested that the localisation of basaltic and gabbroic dykes along the North Henty Fault and southern part of the Henty Fault (Mt Read area) indicates that the fault was active during the Cambrian.

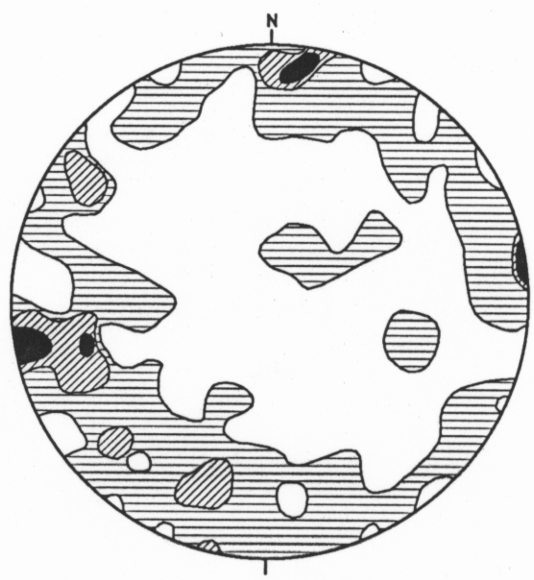

Figure 16. Stereoplot of poles to fault planes, whole area. Contours at 1, 3, 5%; 80 points.