The Hodgkinson Formation, North Queensland: former accretionary prism. B. L. Wood, School of Applied Geology, University of New South Wales, P.O. Box 1, Kensington, New South Wales, Australia, 2033.

The widespread Hodgkinson Formation of northern Queensland comprises a thick greywacke–shale–chert sequence of indeterminable thickness, with minor tholeiitic basalt, spilite, conglomerate and limestone, of Early to Late Devonian age.

The strata dip steeply in coherent packets 1–2 km wide, separated by zones of strongly cataclastic mélange, 2–300 m wide. Within the packets a sequence of deformation can be recognized, from early soft-sediment folding and shearing, through slaty cleavage with intense local folding, mélange development and finally large and small kink folding. The sequence appears to be a result of tectonic dewatering and increasing embrittlement of a stack of wedges comprising an accretionary prism.

Details of sedimentological and structural features from an area mapped in the centre of the terrain demonstrate the sequence of deformation and suggest remarkably rapid recycling of sediments in a tectonically active lower trench-wall environment.

Although the Hodgkinson Formation resembles other accretionary terrains in many respects, it is of lower-greenschist facies and seems from the present limited information, to lack higher-pressure assemblages or ultramafic components.

Structures in the Fort Loudon, Pennsylvania locality of the Ordovician Reedsville Formation. T. O. Wright, Earth Sciences Division, National Science Foundation, Washington, D.C. 20550, U.S.A., and D. R. Gray, Department of Geological Sciences, Virginia Polytechnic and State University, Blacksburg, Virginia 24061, U.S.A. [present address: Department of Earth Sciences, Monash University, Clayton, Victoria, Australia, 3168].

The Middle Ordovician Reedsville Formation is a shale and distal turbidite sequence exposed in the Central Appalachians. It was deposited on a depressed carbonate shelf during the Taconic Orogeny, and was subsequently deformed into W-verging folds with a strongly developed near axial-plane cleavage, but at very low metamorphic grade. The cleavage has been shown to be primarily caused by pressure-solution removal of large volumes of the rock. The Fort Loudon outcrop is just above the base of the formation and near the hinge of a fold of several kilometres wavelength. Graptolites in shaly units indicate a 46% shortening in the bedding plane with little extension along the bedding-cleavage lineation. Pre-cleavage calcite and quartz veins arranged in both left- and right-stepping en échelon fractures in limestone beds indicate the orientation of the σ_1 axis at the onset of cleavage development. Tips of individual extension cracks have been removed by pressure solution, resulting in a curious pattern of diamond-shaped vein fragments across the bedding surface. Thick cleavage selvages in the limestone bed are spaced at 1–3 cm intervals, and truncate the large extension veins, but many smaller selvages between these are seen in thin section. Thus, the strain in the limestone is of the same amount as in the underlying slate over tens of centimetres, but is inhomogeneous on scales of millimetres. One en échelon zone of extension cracks continued to form after cleavage development, for the cleavage is deflected by the zone. Fluid inclusions in these pre- and post-cleavage veins provide some constraints on physical conditions during cleavage formation. A late set of fibrous calcite veins occurs within many of the thick cleavage selvages. These are discontinuous sheets of calcite that are parallel to cleavage, with fibres showing extension of a few percent normal to cleavage, although some fibres show pronounced local shear as well as pull-apart.

This set of microstructures in one outcrop provides an unusual opportunity to develop a kinematic history of multiple deformation in very low-grade sedimentary rocks.

Development of foliations in the Wyangala Gneiss, Central New South Wales, Australia. R. Y. S. Zee, C. Teyssier, B. E. Hobbs, A. Ord, Department of Earth Sciences, Monash University, Clayton, Victoria, Australia, 3168, and G. Price, Division of Applied Geomechanics, C.S.I.R.O., Syndal, Victoria, Australia, 3149.

Two well-developed foliations in the mylonites and augen-gneisses of the Wyangala Batholith have been mapped over a large area and described at the meso- and micro-scales in order to establish their age relationships and the angular variations between them. A steep W-dipping foliation (S_1) is overprinted by a second W-dipping foliation (S_2) which is associated with the development of mylonite zones containing sheath folds, folds in the mylonitic foliation and a stretching lineation. With strain increasing locally, the acute angle between S_1 and S_2 decreases and at the boundaries of the planar shear zones, the surfaces are subparallel. The planar shear zones lie parallel to S_2.

The finite strain at all states of deformation was determined by using axial ratios of xenoliths flattened parallel to S_1 and a modified Fry method employing reconstructed positions of feldspar porphyroclasts. A general flattening for the development of S_1 and a plane-strain mechanism for S_2 are inferred from this study. These strains are unlike those to be expected from *S*- and *C*-planes.

Crystallographic preferred orientations of quartz *c*-axes indicate a non-coaxial deformation. These results, together with the magnitude of flow stress inferred from recrystallized grain size, have been mapped. Field observations of the angular relationships between S_1 and S_2 and consistent sigmoidal pressure shadows around the porphyroclasts give a sense of shear towards the east.