

Stratigraphical note

Revised stratigraphical nomenclature for the Permo-Triassic Flagstone Bench Formation, northern Prince Charles Mountains, East Antarctica

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Amery Group

The East Antarctic Craton contains only one substantial outcrop of Palaeozoic–Mesozoic strata between 0° and 150°E; this lies in Mac. Robertson Land, on the eastern margin of the northern Prince Charles Mountains. These rocks are known as the Amery Group (Mond 1972, McKelvey & Stephenson 1990) and comprise dominantly fluvialite sandstones, with subordinate shales, coals and conglomerates. The lower formations of the Amery Group, the Radok Conglomerate and Bainmedart Coal Measures, contain a diverse Stage 5 palynomorph assemblage indicating a Baigendzhinian–Tatarian age (late Early–Late Permian, hereafter abbreviated as mid–Late Permian; Dibner 1978).

The uppermost formation within the Amery Group, the Flagstone Bench Formation, was studied in detail by Webb & Fielding (1993), who revised the stratigraphy and defined a new member, the Jetty Member. They described for the first time a Triassic megaflora from this unit, considerably extending the time range for the Amery Group, which was previously regarded as entirely mid to Late Permian in age.

Flagstone Bench Formation

The Flagstone Bench Formation crops out extensively on Flagstone Bench and Jetty Peninsula, along the southern and south-eastern shores of Beaver Lake (Fig. 1), and probably extends northwards beneath Prydz Bay, where lithologically similar (but undated) sediments were intersected in an ODP drillhole (Turner 1991).

The formation contains a distinctive member, the Jetty Member, which consists of interbedded sandstones and siltstones with abundant red-purple and olive palaeosols showing large desiccation mudcracks. Above and below the Jetty Member are sequences dominated by coarse-grained, light yellow brown sandstones; these units do not warrant formal member status at this time.

The sandstone sequence underlying the Jetty Member crops out only on Flagstone Bench (Fig. 1a), and is at least 400 m thick (top not exposed). It probably conformably overlies the Bainmedart Coal Measures, although the boundary between the two units is obscured by moraine. The sandstones, which have

abundant ferruginous patches and layers, are subarkoses (occasionally feldspathic greywackes; terminology used is that of Folk 1974), and contain abundant metamorphic quartz and sericitized K-feldspar, predominantly perthitic orthoclase, with

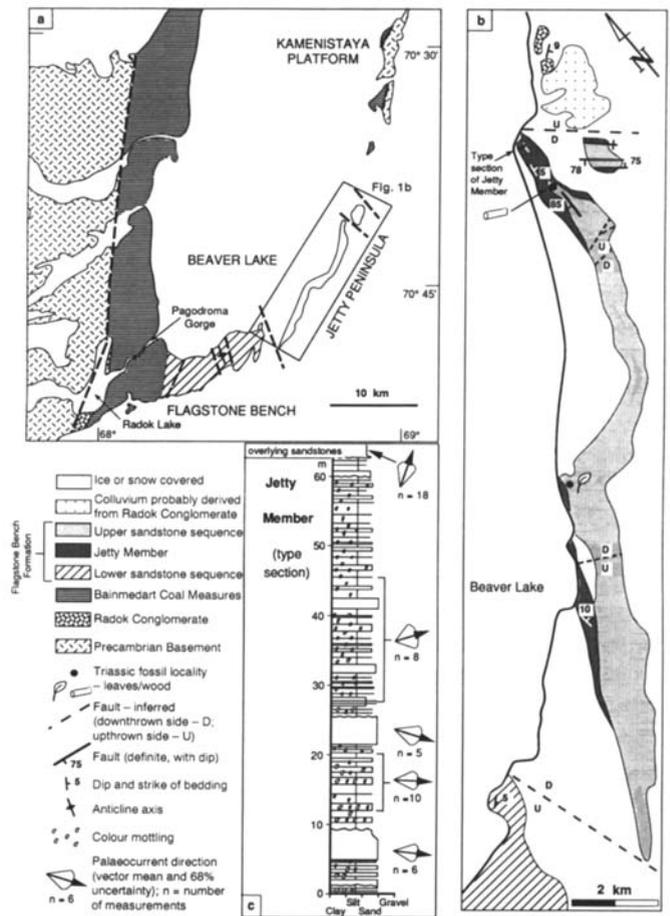


Fig. 1. Distribution and stratigraphy of the Flagstone Bench Formation. **a.** Geological map of the Beaver Lake area, northern Prince Charles Mountains, showing outcrop areas of all three formations of the Amery Group, **b.** Detailed geological map of Jetty Peninsula (see Fig. 1a for location), **c.** Type section of the Jetty Member (see Fig. 1b for location).

a small amount of kaolinitic matrix. There is also much biotite; this has largely altered to colourless chlorite, releasing iron oxide to form patches of ferruginous cement. The sandstones are dominated internally by trough cross-bedding and amalgamated into multistorey bodies 10–30 m thick; there are only minor siltstone partings between beds. Dibner (1978) recovered a mid–Late Permian (Stage 5) palynoflora from one of these siltstone horizons. Palaeocurrent directions from the sandstones are predominantly towards the NNE and NE. Deposition probably occurred in a major, low sinuosity braided river system, flowing axially northwards down the large structural valley (Lambert Graben) which occupied the area at the time (Webb & Fielding 1993).

The Jetty Member was originally proposed by Traube (1991) as the Jetty Formation, and was redefined by Webb & Fielding (1993). This unit comprises at least 60 m of interbedded sandstones and siltstones (Fig. 1c), and crops out only on Jetty Peninsula (Fig. 1b). The boundary between the Jetty Member and the underlying sandstone sequence is not exposed, as the two sequences are separated by a fault; similarity in dip indicates that the boundary is conformable or perhaps disconformable. The sandstones of the Jetty Member are pale olive arkoses to feldspathic greywackes, and lack biotite; individual beds are generally less than 2 m thick. Palaeocurrent directions from the trough cross-bedding indicate predominantly E-directed flow. Pale red-purple siltstones are very common and show abundant, well-preserved polygonal desiccation cracks and rare, poorly-preserved root channels. Compared to the underlying sequence of light yellow-brown sandstones, deposition of the Jetty Member probably occurred in less swiftly flowing, shallower, braided channels, that could have formed the distal portion of an alluvial fan originating on the western margin of the Lambert Graben. The Jetty Member is conformably overlain by light yellow-brown sandstones which contain a Late Triassic mega- and microflora (see below). Thus the Jetty Member is probably Late Triassic in age. The base of this unit could be as old as Middle Triassic; the easterly palaeocurrent directions of the Jetty Member most likely resulted from regional uplift due to tectonic activity, which was widespread throughout Gondwana in the mid-Triassic (Veevers 1993).

The sequence of light yellow-brown sandstones and very rare siltstones which overlies the Jetty Member crops out only on Jetty Peninsula (Fig. 1b). It is at least 70 m thick (top not exposed), and very similar to the sandstones underlying the Jetty

Member, except that the sandstones of the upper sequence have less biotite (and are therefore less ferruginous) but do contain occasional pieces of silicified gymnospermous wood. The NNE and NE palaeocurrents (from the trough cross-bedding) indicate that the major braided river system running axially down the Lambert Graben had re-established itself in this area. Towards the base of the upper sandstone sequence there is a thin, discontinuous dark grey siltstone bed. This contains a well preserved megafloora dominated by *Dicroidium zuberi* and an undescribed conifer; *Dicroidium crassinervis* forma *stelnzerianum*, *Pteruchus* cf. *barrealensis* and an unidentified cycad are also present. The associated microflora is of Late Triassic age (C. Foster, personal communication, 1992), indicating that the upper part of the Flagstone Bench Formation is a time equivalent of the Falla Formation (Beacon Supergroup) of the Transantarctic Mountains. The Falla Formation contains a Late Triassic microflora (Farabee *et al.* 1989) and has a very similar megafloora to the Jetty Member (Webb & Fielding 1993).

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