

- Keratophyric lithic tuff (base not seen)
- Grampian Formation (top faulted in part by Flaxmore Fault)
  - Grey and black calcareous tuff;
  - impure limestone with interbedded spilite;
  - keratophyre and tuff (gradational base)
- Kaka Formation
  - Spilitic breccia, altered basalt tuff, and basalt (gradational base)
- Groom Creek Formation
  - Fine grained keratophyric crystalline tuff (base faulted by Waimea Fault).

Order of superposition was determined only in the Grampian Formation, where contacts between spilite and tuffs indicate a westerly direction of younging. For convenience of description this direction of younging is assumed to be true for the whole width of the Brook Street belt, and if correct the rocks are mostly overturned.

#### *Groom Creek Formation (EB<sub>1</sub>)*

The Groom Creek Formation forms the eastern part of the Brook Street Volcanic Group and is considered to be the lowest formation in Nelson City area. It crops out near Groom Creek, along Maitai Valley road, half a mile north of Maitai Reserve, and in Packer Creek (Fig. 2). The best exposure and type locality is in Groom Creek (669275)\*, a quarter of a mile above its junction with Maitai River. The formation is faulted against Maitai Group along what is considered the northern continuation of Waimea Fault. The contact with Kaka Formation, exposed in Groom and Packer Creeks, is gradational.

In hand specimen the rock is a light-green fine-grained tuff, showing quartz veins and scattered pyrite crystals.

In section (10236)† veins of quartz, 0.05 mm to 0.5 mm thick lace the rock. Rare phenocrysts of feldspar, pyroxene, and iron ore occur in a cryptocrystalline tuffaceous matrix rich in apatite, prehnite, and occasional recognisable feldspars (mostly oligoclase). A specimen from Packer Creek (10237) contains spherical cavities, approximately 0.1 mm in diameter, filled with quartz, and rare epidote and apatite crystals.

A sample collected from near the contact with the Maitai Group, near Maitai Reserve (10238), is coarser, with fewer but thicker quartz veins. Abundant crystals (0.5 mm) of slightly saussuritised oligoclase feldspar, and epidote, with rare quartz, pyroxene, and prehnite, occur in a groundmass similar to that of the fine tuffs. Chlorite, abundant in all sections, fills minor veins and interstitial spaces. The rock appears to be crystalline keratophyric tuff.

#### *Kaka Formation (EB<sub>2</sub>)*

The Kaka Formation adjoins the Groom Creek Formation, and is exposed at Kaka Hill, at most of the hills between Maitai River and Brook Street Quarry, and at Sugar Loaf, in Brook Valley. The rocks are deeply weathered and poorly exposed, good outcrops being restricted to the type locality at Brook Street Quarry, a few road cuttings, and a few hill outcrops. From Groom Creek south to the Tertiary block near Brook Street Reservoir, Kaka Formation is faulted against Maitai Group along Waimea Fault. The upper contact, taken at the gradual change to the calcareous tuffs of the Grampian Formation, was seen only near Blitz Creek and Black Hole.

The bulk of the formation consists of dark green amygdaloidal spilitic breccia and altered basalt tuff containing conspicuous large pyroxene phenocrysts and

\* Grid reference in terms of the National thousand-yard grid on S14 or S20.

† Numbers "10236" etc. refer to slides and representative specimens lodged in the Geology Department, Victoria University of Wellington.