

THE STRATIGRAPHY OF THE STEEP ROCK GROUP, N.W. ONTARIO, WITH EVIDENCE OF A MAJOR UNCONFORMITY

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The Steep Rock Group is exposed 6 km north of Atikokan, 200 km west of Thunder Bay. It is situated on the southern margin of the Wabigoon Belt of the Archaean Superior Province, N. W. Ontario. Reinvestigation of the geology of the Group has shown that the Group lies unconformably on the Tonalite Complex to the east.

This unconformity has been previously suspected, from regional and mine mapping but no conclusive outcrop evidence for its existence has as yet been published.

The strike of the Group, comprised of Basal Conglomerate, Carbonate Member, Ore Zone and Ashrock is generally north-northwest dipping steeply to the southwest. Of the 7 contacts between the Steep Rock Group and the Tonalite Complex, 3 expose the unconformity (The Headland, S. Roberts Pit, Trueman Point), and 4 are faulted.

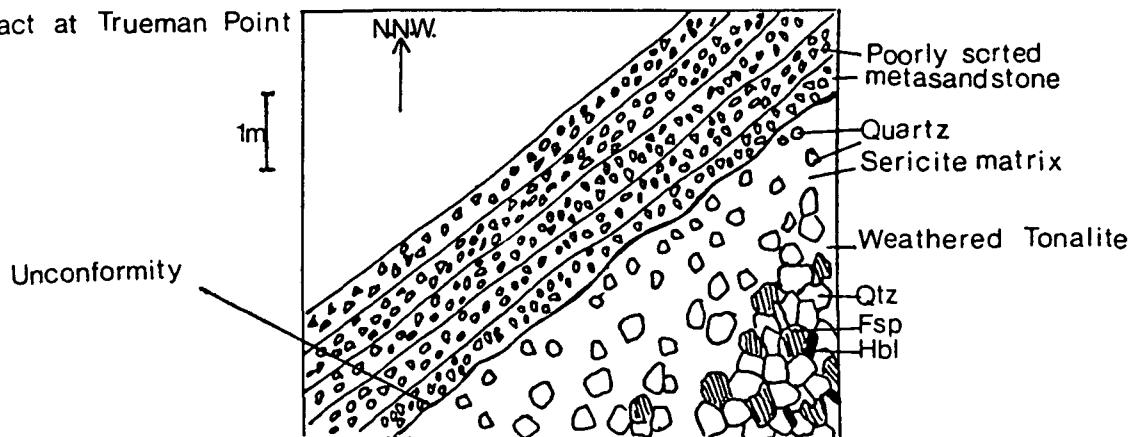
At the Headland poorly sorted metaconglomerate with angular clasts of quartz, tonalite and fine grained mafic material (dykes and remnant xenoliths) overlies mafic tonalite, with no evidence for a fault or an intrusive contact.

At the S. Roberts Pit, poorly sorted metasandstones dip steeply to the west overlying pale greenish white weathered mafic tonalite. The metasandstones pass upwards within 20 cm to massive dark grey carbonate.

At Trueman Point, in an exposure similar to the S. Roberts Pit, coarse angular metasandstone overlies tonalite. However, the contact here is more diffuse with the top metre of the tonalite breaking down to form a regolith of angular quartz grains (1-4mm) in a sericite matrix. This matrix is similar to the overlying metasandstone.

These three outcrops demonstrate unequivocally that the Steep Rock Group was laid down unconformably on the underlying Tonalite Complex, which is circa 3 Ga old (Davis, pers. comm.).

Contact at Trueman Point



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Overlying the Basal Conglomerate (0-150m) is the Carbonate Member (0-500m) throughout which stromatolites extensively occur.

The carbonate is a laminated dark bluish-grey massive rock with major zones of breccia developed close to fault zones and dykes, which are thought to be feeders for the overlying volcanics.

From a study of 11 good stromatolitic outcrops a crude stratigraphy of the carbonate can be set up. Small scale stromatolites occur throughout the unit, but are best developed near the base. Here simple Stratifera-like stratiform structures having flat to undulatory laminae develop into pseudocolumnar laterally-linked structures. These Irregularia-like structures pass upwards into hemispherical laterally linked stromatolites. Laminae are wavy .5-3.5mm, and the structures are 5-15 cm high and in basal diameter. In places branching walled and unwalled columnar forms occur, with height up to 20 cm.

In the upper part of the Carbonate giant domal stromatolites occur. These range from domed structures typically about 3m in diameter to tabular bodies up to 5m or more long and .75m in stratigraphic height.

Near the top of the unit, small mamillose stromatolites form an egg box fabric with diameters up to 4cm and heights of 1.5cm. Overlying the Carbonate Member is the Ore Zone which Jolliffe<sup>1</sup> divided into a lower Mn Paint Rock and an upper Goethite Member.

The Mn Paint Rock (3%-18% Mn) is an earthy material with a rude varicoloured banding, made up of lumps of goethite, hematite, quartz and chert in a groundmass of the same minerals with calcite, kaolinite, pyrolusite and gibbsite. The contact with the underlying carbonate is extremely irregular, with pinnacles of carbonate protruding into the Paint Rock. This contact has been interpreted as an ancient karst surface by Jolliffe<sup>1</sup>.

The Mn Paint passes sharply upwards into the Goethite Member (Mn < .3%) which is predominantly brecciated lump ore of goethite (67%) and haematite (21%) with quartz and kaolinite.

Within the Ore Zone thin layers of Buckshot Ore occur. These layers comprise haematitic pisolites and fragments of haematite set in a lighter aluminous matrix of kaolinite and gibbsite. This material resembles a ferruginous bauxite in both outward appearance and chemical and mineral content.

Overlying the Ore Zone is the Ashrock. The name refers to an ultramafic pyroclastic rock (22% MgO) which makes up to 90% of the unit. Interbedded within this are thin komatiitic basalt (15% MgO) spinifex-textured lava flows.

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Within the Goethite Member and Ashrock, pyrite lenses occur. These form discontinuous elongate bodies of massive pyrite closely associated with cherty and carbonaceous beds.

The Ashrock delineates the upper member of the Steep Rock Group.

References:

- <sup>1</sup> Jolliffe, A.W. (1955) in *Econ. Geol.*, vol.50, p. 373-398.