

1982/29. A diamond drill hole at Mt Nassau, near Granton

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Abstract

A fully cored drill hole at Mt Nassau [EN51562665], near Granton has proved an unusually thick sequence of Lower Parmeener Super-Group strata. The succession is as follows: Malbina Formation, Member A (32 m); Berriedale Limestone (60.30 m) and Nassau Formation (30.30 m), the two units together comprising the Cascades Group (90.60 m); Rayner Sandstone (2.55 m); Faulkner Group (36.60 m); Bundella Formation (117.50 m); and Woody Island Formation (254.50 m). Three minor dolerite bodies were encountered in the Bundella and Woody Island Formations, and the hole terminated at a depth of 563 metres in coarse- to very coarse-grained layered dolerite which is thought to represent the upper portion of a very substantial sill-like body.

INTRODUCTION

The Mt Nassau area has long been known for its excellent development of Lower Parmeener Super-Group rocks, and it has served as the standard reference section for the Hobart region for many of the individual stratigraphic units* (Banks and Hale, 1957). The sequence recognised by Banks and Hale was:

| | |
|--------------------------|----------------------|
| Ferntree Group | |
| * Malbina Formation | |
| |) |
| * Cascades Group |) |
| |) |
| | Grange Mudstone |
| | Berriedale Limestone |
| | Nassau Siltstone |
| * Rayner Sandstone | |
| * Faulkner Group | |
| Bundella Formation | |
| [Woody Island Formation] | |

Like most natural sections, however, exposure is far from complete, and doubts exist concerning the detailed character of parts of the sequence, principally the Cascades Group and the Bundella Formation. The Woody Island Formation was proved to be abnormally thick and the basal tillite absent in the Chapel Street, Glenorchy drill hole.

The Cascades Group is now proved in its type section to consist only of two distinct units, the Nassau Siltstone and the Berriedale Limestone. Rather surprisingly there is no basis for the recognition of a third unit, the 'Grange Mudstone'. The details of the southward facies change of the Berriedale Limestone and the 'Grange Mudstone' between Granton and Margate remain to be elucidated. The Nassau Formation maintains its essential characters as the Hickman Formation in the Margate area (Farmer, 1981). The Bundella Formation is now known in its entirety for the first time in the Hobart area, but differs little from other developments in south-eastern Tasmania. The Woody Island Formation continues its northerly thickening and reaches its greatest known thickness of 254.50 m (with base unseen).

In the light of the Mt Nassau and Chapel Street drill holes, future attempts to drill to pre-Parmeener Super-Group basement rocks in the Hobart

area will have to allow for the almost certain intersection of substantial thicknesses of dolerite close to the unconformity.

Details analyses of petrography, sedimentary structures, macro-palaeontology and palynology (by Dr E.M. Truswell, B.M.R., Canberra) will continue.

GEOLOGICAL LOG OF GRANTON NO. 1 (MT NASSAU) DIAMOND DRILL HOLE

Collar height 190.45 m A.S.L. Located on a spur south-east of Rathbones Quarry, west of Granton, Hobart Quadrangle. Hole drilled vertically and fully cored. Dips are negligible. All thicknesses are down-hole depths in metres.

Malbina Formation 32 m

- 0 -17.5 Coarse sandstone and calcareous sandstone with much shelly debris and erratics. Spiriferids predominate but *Stenopora*, *Wyndhamia dalwoodensis* and *Ptychompalina* also occur. Some very coarse patches until 10.5 m; thin, more silty, fenestellid-rich at 16.0 m.
- 17.5-26.0 Deeply weathered sandy bryozoal siltstone with erratics.
- 26.0-32.0 Sandstone and siltstone with many small erratics.

Cascades Group 90.60 m

Berriedale Limestone 60.30 m

- 32.0-35.0 Highly calcareous sandstone and sandy limestone with abundant erratics. Calcite veins along joints. Richly fossiliferous.
- 35.0-49.7 Interbedded light-grey, fine-grained argillaceous limestone and subordinate siltstone and sandstone. Erratics common, richly fossiliferous.
- 49.7-72.8 Massive-bedded alternations of pale-grey argillaceous and bioclastic limestone with occasional more silty bands. Strophalosiids in growth position. Erratics rare. Fifty centimetres of dark-grey siltstone at 63.0 m.
- 72.8-86.3 Dark-grey calcareous siltstone with some minor limestone beds. Fossiliferous throughout; both as more or less complete shells, and comminuted debris. Erratics rare.
- 86.3-92.3 Light-grey argillaceous limestone with very minor dark-grey shale. Richly fossiliferous.

Nassau Formation 30.30 m

- 92.3-122.6 Richly fossiliferous, dark-grey, calcareous, bryozoal and productid siltstone. Fossils mostly complete and in undisturbed growth position, but some shell debris. Erratics rare, but bioturbation conspicuous throughout. *Deltopecten* and spiriferids present. The last metre darkens downwards and has rare scattered fossils and shell debris.

Rayner Sandstone 2.55 m

122.6-125.15 Massive-bedded, coarse-grained, light-grey, highly-bioturbated sandstone and granule conglomerate with wispy-bedded inclusions of dark shale. Much shell debris, but only a few larger shells. Base has many pebbles but transitional.

Faulkner Group 36.60 m

125.15-134.50 Dark-grey to black micaceous siltstone with thin granule patches. Small scale bioturbation abundant.

134.50-134.85 Highly bioturbated granule conglomerate with sharp but irregular base.

134.85-137.10 Dark-grey, highly bioturbated siltstone with dispersed granules throughout. Irregular bedding due to bioturbation. Ten centimetres of sand and siltstone with pebbles at base.

137.10-143.10 Dark-grey carbonaceous, and lighter-coloured, more quartzose siltstone with irregular zones of hydroplastic structures deforming bedding. Ten centimetres of granule conglomerate at 142.00 m.

143.10-143.30 Highly bioturbated, irregularly-bedded granule conglomerate with irregular wispy siltstone layers near top. Pebbles at base larger than average. Base abrupt and irregular.

143.30-151.00 Dark-grey, heavily-bioturbated siltstone with granule patches. Granule patches commoner below 148.50 m. Rolled umbonal fragment of *Eurydesma* at 148.60 m with other shelly debris. Base sharp and irregular.

151.00-161.75 Light- and dark-grey, flaser-bedded carbonaceous and micaceous quartzose siltstone and sandstone. Some worm burrows and hydroplastic structures. Small-scale cross-bedding in more quartzose layers and pods. Some disseminated pyrite. Darker carbonaceous siltstone becomes more predominant below 158.00 m. Thin coal streak at 158.20 m.

Bundella Formation 117.50 m

161.75-162.00 Granule conglomerate with siltstone matrix coarsening upwards and with large pebbles (4 cm) at top. Top abrupt.

162.00-172.90 Medium- to dark-grey, heavily bioturbated siltstone with granule patches. A few scattered fossils and some shelly debris.

172.90-267.00 Medium-grey, bioturbated siltstone with some granule patches with fine laminations. Macrofossils increasingly abundant. Erratics and disseminated pyrite abundant. Richly fossiliferous below 205.00 m *Stenopora*, *Trigonetreta stokesi*, *Eurydesma*, *Deltopecten illawarensis*, *Ambikella*, *Strophalosia*. Rather less shelly below

245.00 and fossils more comminuted. Fifteen centimetres of bioclastic limestone at 251.00 m. Erratics common. *Stenopora* and some crinoid debris predominate. Pyrite disseminated throughout. Five centimetres of bioclastic limestone at 254.05 m. Less fossiliferous and highly baked below 262.00 m.

[267.00-275.83] Fine-grained dolerite, both contacts diffuse and somewhat irregular, but essentially flat.

275.83-279.25 Pale-grey and glassy and substantial pyrrhotite for about 2 m below contact, then dark-grey fossiliferous siltstone and some erratics.

Woody Island Formation 254.50 m

279.25-393.00 Dark-grey, finely bioturbated siltstone with very rare erratics. Pyrite and pyrrhotite lessening downwards. Rare patches of fossil debris between 287-292 m. Not obviously baked below 294 m. Flat lenticular sedimentary structures outlined by darker colour. First glendonite at 296 m, increasingly common and some in rosettes. Erratics very rare, one at 330 m. Glendonites less common below 341 m. A few strophalosiids and *Ambikella* at 359.50 m. Metamorphism increasingly marked. Glendonites disappear at 382 m. Pyrrhotite becoming more common. Last two metres increasingly flinty.

[393.00-397.00] Fine-grained, mottled, much-brecciated dolerite with calcite and chlorite. Both contacts dip at 45-50°.

397.00-463.50 Dark pyritic siltstone with rare glendonites and some calcite veining; moderately baked throughout. Glendonites commoner below 430.00 m; more pyritic and more baked. Glendonites disappear below 443.00 m.

[463.50-469.50] Fine-grained, massive dolerite. Both contacts sharp and irregular, essentially horizontal.

469.50-542.50 Dark pyritic siltstone with 4 cm erratic at 473.30 m. Pyrite abundant, increasingly baked and spotted downwards. From 538.00 m highly baked, much pyrite and pyrrhotite; pebbles becoming common.

[542.50-563.00] Dolerite; contact sharp and flat. Very fine-grained at first, but coarsens from 548.00 m. Thereafter layered coarse- and very coarse-grained dolerite, with all layering essentially flat.

END OF HOLE

REFERENCES

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