THE UNIVERSITY OF ADELAIDE

DEPARTMENT OF GEOLOGY AND MINERALOGY

GEOLOGY OF THE MT. CHAMBERS GORGE REGION, FLINDERS RANGES, SOUTH AUSTRALIA

Report on Geological Investigations
Submitted in Partial Fulfilment of the
Course Requirements of
Honours Geology

by

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October, 1970


MT CHAMBERS GORGE
GEOLOGICAL MAPPING
JUNE 1970
1
2

Note by Dr Trev. J. Mount on his Honours Thesis on the Geology of the Mt. Chambers Gorge Region, Flinders Ranges, South Australia.

The work was completed in 1970 at the School of Geology, Adelaide University., South Australia.

The thesis was presented, late 1970, to the school in three parts: (i) the report, with plates and field notes etc, in a black Fortis three-ring folder (this volume), *together with* (ii) a large (A2 to A1 size?) folder bound in 'mission brown' cloth with a name plate in gold lettering ('Geology of the Mt Chambers Gorge Region' ?), that held the original hand-coloured geological map, other diagrams (such as a 3D representation of the mega-breccia channel), and coloured stratigraphic sections (including the measured Type Section of the Moorowie Formation) etc., and (iii) a tray of rock specimens from the map area.

In August 2011, the University was unable to locate either the thesis text or the map folder, but did find the rock specimens in the geology department's basement.

Although the original thesis appears to be lost, the geology school says they will retain the specimen tray (Aug. 2011).

However, the author had retained a personal copy of the thesis, until about 1996 when the large map folder (above) was passed to Alan Tasker (02 9273 1429 in Aug. 2011), Field Officer for the Original Materials Section of the Mitchell Library, State Library of NSW, for evaluation.

It had been assumed that the SLNSW had retained the map folder, until in August 2011 a possible reference to it was found in the National Library's Trove database which pointed to item "PRG 1429/5, Geology of Mount Chamber Gorge region, tracings and maps", as held at the State Library of *South Australia* (SLSA).

In August 2011, Tonia Eldridge at the SLSA archive (eldridge.tonia@slsa.sa.gov.au 08 8207 7260) was asked to 'confirm that the library holds a copy of the missing map folder'.

If the archive confirms it holds the map folder, then the 'black folder' bearing this note will be sent to Adelaide for permanent storage under (?) PRG 1429/5.

Sydney,
25 August, 2011
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June 11, 1982

Dr. Colin H.H. Conor,
Programme Secretary
Geological Society of Australia
Seltrust Mining Corp. Pty. Ltd.
P.O. Box 219,
EASTWOOD, S.A. 5063

Dear Colin,

GSA Meeting, July 15th 1982

Following our lunchtime meeting I can now provide details on my contributions to the presentation 'Reefs through the Ages'. In 1970 while mapping the geology of the Moorowie area at the eastern end of Mt. Chambers Gorge, Flinders Ranges, some unusual lithologies were found in the Early Cambrian Hawker Group that recalled certain features of modern reef complexes.

Apart from an abundance of massive archaeocyathid-algal limestone there were found spectacular mega-breccias and slump brecciolas suggestive of fore-reef talus environments, as well as ôôlites and thick clastic carbonate banks such as occur around modern reefs. The archaeocyathid limestones seem to be localized in a band along the upthrown edge of a major fault-scarp. On the downthrown block were deposited dark hemi-pelagic 'Parara'-type limestones with the talus mega breccias while on the upthrown shelf were found carbonate facies such as birdseye limestones and ôôlites formed in a shallow hypersaline backreef to sabkka environment.

The Moorowie area is structurally and stratigraphically complex and exposures of big facies very limited. The existence of an Early Cambrian Arch-algal reef is not proven but a series of 35 mm slides will be shown that show some intriguing parallels with later Palaeozoic 'reefs' and modern complexes.

As for lithographic information:-

- BSc Hons (Adel) Geology of the Mt. Chambers Gorge Region with emphasis on Cambrian carbonates and 'diapirs'
- PhD (Adel.) Diapirism in the Adelaide "Geosyncline'
- now at Delhi Petroleum (Adel.) - looking for hydrocarbons in the Arrowie and Eromanga Basins

Yours very truly,

Dr. Trev H. Mount

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REFERENCES (Including Secondary Sources)

APPENDIX I : Description of Measured Stratigraphic Sections with a List of Relevant Rock Specimens and including some Palaeontological Data and Photographic Plates (A to E)

APPENDIX IIa : Descriptions and List of Rock Specimens not included in Appendix I, but presented in the same tray

APPENDIX IIb : Brief Descriptions of Thin Sections of Important Rocks from Appendix I and Appendix IIa. Sections are presented with Rock Specimens

NOTE: FOLDER, 22 by 30 inches, is presented separately to the thesis and contains:

1. Geological Map, Mt. Chambers Gorge Region (1,2)
2. Geological Map, Mt. John Syncline (3)
3. Overlay 1, showing
   a) Mineralization
   b) Dolerites
   c) Diapirs
   d) Faults, including Fault Rose
   e) Main Folds
4. Overlay 2, with
   a) Stratigraphic section Lines
   b) Key Trilobite Localities
   c) Reference Stations
   d) Suggested Place Names
5. Combined fence diagram and stratigraphic column giving an interpretation of vertical and lateral variation in Cambrian sediments as inferred from measured stratigraphic sections. Includes suggested stratigraphic nomenclature and gives average thicknesses of all Cambrian units
6,7,8 Graphic stratigraphic columns compiled from measured sections (A to Z) and coloured to approximate fresh rock. 10,000 feet represented, plotted at 100' to inch vertical scale.
9. PLATE 6: Panoramic photographs, retouched, to show nature and extent of Cambrian outcrop in Map Areas 1 & 2 (Mt. Chambers Gorge) presented in accompanying folder under 'Cambrian outcrop'.

ABSTRACT

Mapping and section measuring South of Mt. Chambers Gorge has detailed 2,900 feet of Lower Cambrian carbonates, ranging from the massive carbonates of the Wilkawillina Limestone to the purple shales of the Billy Creek Formation. Carbonates include thinly laminated, oolitic and pelletal limestones and previously unreported mega-breccias. An autochthonous sedimentary pattern, typical of deposition in epeiric seas has been imprinted on the vertical sequence by a marine regression. This tends to be masked by allochthonous sediments, dominantly silts, clay and a coarse quartz sand, possibly eroded from diapirs. Brecciolas (slumps) with archaeocyathid limestone megaclasts (to 70ft.) occur locally in the upper beds of the Parara Formation and may help to date diapiric movements. Late phase dolerites intrude diapirs and cut related faults; mineralization is also diapir associated and includes copper and lead sulphides.