QUARTERLY NOTE

Rept.Bk.No.72/210
G.S.No.4974
D.M.No.1480/59

THE MANGATITJA LIMESTONE

This is a new name and applies to a Tertiary - Quaternary chalcedonic limestone and conformably underlying clastics found in the North West Province of South Australia.

Type Area:

On Mann (Johnson and Mirams, 1962), 16 kilometres southeast of Lake Wilson, 0.4 kilometres north of the road between Amata and Mount Davies, at Lat. S.26° 8'9", Long. E.129° 42'16" (See Fig.1). "Mangatitja" is the aboriginal name for the Lake Wilson area. The type section is a borehole, 37 metres deep which was drilled through an outcrop of Mangatitja Limestone and down to crystalline basement, (Miller, 1965). The rock here is dolomite and not limestone as it is most commonly elsewhere. Elsewhere, however, sections are generally poorly exposed and not suitable for detailed description. Reference sections at Lake Wilson, on Mann and on Champ de Mars (fig. 3) on Davies (Thomson et al., 1964) are described by Major (1972).

Map letter symbol: T-Q.

Field Description:

(1) Thickness: varies from 5.5 metres in the type section down to less than 1 metre elsewhere. Usually the outcrops are low mounds from which it is impossible to estimate thicknesses. Where seen it is always flat lying.

(2) Lithology: it is a hard cream coloured limestone which is often dolomitic, sometimes fossiliferous or oolitic and often capped by white chalcedony which may be up to 10 centimetres thick. Fossils can be seen in hand specimens at the type area and occasionally elsewhere. The limestone It may contain grains of detrital quartz. Mangatitja Limestone includes clastic deposits (red brown sandy clay etc) conformably beneath the limestone (see Stratigraphic Relationships)

(3) Fossils: Ludbrook (1965) reports that the rock from the type area is rich in

"oogonia and jointed stems of characeae (stoneworts) with a few ostracodes and gastropods allied to Coxiella gilesi ----. All the forms are tolerant, inhabiting either fresh or brackish water lakes ---. The weight of evidence favours a Quaternary age for these lacustrine sediments" (see Major, 1972).

Thin Section Description:

(from various Amdel Reports and examinations by R.B. Major)

The Mangatitja Limestone consists of cryptocrystalline to microcrystalline calcite and dolomite grains, cemented by dolomite or silica. It may be limestone, dolomitic limestone or dolomite. The silica cement is commonly fibrous chalcedony with some lussatite-opal (cristobalite). Oolites are composed of calcite or dolomite around nuclei of carbonate or detrital grains include quartz, plagioclase (oligoclase-andesine), microcline, zircon, pyroxene, epidote, garnet and tourmaline. Outlines of fossils are seen from some specimens.

Most of the fibrous chalcedony is length fast i.e. normal chalcedony but length slow chalcedony is seen in two specimens suggesting, perhaps, the influence of evaporitic conditions (see Folk and Pittman, 1971).

Distribution in the North West Province:

The most prominent outcrops of the Mangatitja Limestone are confined mainly to areas underlain by crystalline basement rocks of the Musgrave Block but some are found on areas underlain by Precambrian to Mesozoic sedimentary rocks on BIRKSGATE (Major et. al. 1971).

Stratigraphic Relationships:

The Limestone may be variously underlain, by red-brown calcareous sandy clay, hard calcareous gritty sandstone, kaolinitic arkosic granule conglomerate, red and green mottled clay, Red-brown ferruginous pisolite and silcrete (pers. comm, H. Wopfner, S.A.D.M., 1972), lateritic material and kaolinized acid crystalline basement rock. It is overlain by a red sandy soil (pers. comm. L.C. Barnes, S.A.D.M. 1972), sand dunes and sand spreads.

Origin of the Limestone:

The evidence of the stratigraphic relationships, fossils and lithology suggests sedimentary deposition in fresh or brackish water lakes which may have been evaporitic in some areas. The origin of the chalcedony is not known. It may have come from siliceous organisms (of which no traces have been seen) or from silica, either detrital or in solution, from land adjacent to the lakes or by a process of secondary silicification. The conditions in the Coorong (see Fig.1) may approximate to those which operated during the deposition of the Mangatitja Limestone. Peterson and von der Borch (1965) report that in the Coorong, dolomite, magnesite and magnesian calcite are being deposited together with chert.

Age of the Limestone:

The stratigraphic relationships and the fossils date the Mangatitja Limestone no more accurately than Late Tertiary to Pleistocene. It may be Miocene to Pliocene (see next section).

Probable correlatives in Northern South Australia

The following formations are probably correlatives of the Mangatitja Limestone

(1) the Mount Willoughby Limestone (Nichol, 1971) on WINTINNA.

(2) the Alberga Limestone (Freytag et. al., 1967) on OODNADATTA

(3) the limestones near Cadelga and Mount Crispe (pers. comm., H. Wopfner, S.A.D.M. 1972) on CORDILLO and DALHOUSIE respectively.

Limestones, with similar descriptions to that of the Mangatitja Limestone, are widespread in parts of Western Australia, Northern Territory and Queensland (see Major 1972 for details).

The Alberga Limestone is correlated with the upper (dolomitic) part of the Etadunna Formation (pers. comm. H. Wopfner, S.A.D.M. 1972 see Stirton et al. 1961) which is thought to be of Miocene to Pliocene age (Wopfner and Twidale, 1967 Table 1).

This correlation together with that of the Alberga and Mangatitja Limestones would suggest a similar age for the latter.

REFERENCES

Folk, R.L. and Pittman, J.S., 1971. Length-slow chalcedony: a new testament for vanished evaporites. J. Sed. Pet., 41(4): 1045-1058.

Freytag, I.B., Heath, G.R. and Wopfner, H., 1967. OODNADATTA map sheet, Geological Atlas of South Australia, 1:250 000 series, Geol. Surv. S.Aust.

Johnson, J.E. and Mirams, R.C., 1962. Mann map sheet, Geological Atlas of South Australia, 1:63 360 series. Geol. Surv. S.Aust.

Ludbrook, N.H., 1965. S.Aust. Dept. Mines Pal. Rept. F67/65 (unpublished)

Major, R.B., 1972. The Mangatitja Limestone. S.Aust. Dept. Mines RB. 72/205 (unpublished)

Major, R.B., Johnson, J.E. and Teluk, J.A., 1971. BIRKSGATE map sheet, Geological Atlas of South Australia, 1:250 000 series, Geol. Surv. S.Aust.

Miller, P.G., 1965. Borehole log MANN 4-mile, 39 miles west of Piltardi (DM.260/66) (unpublished).

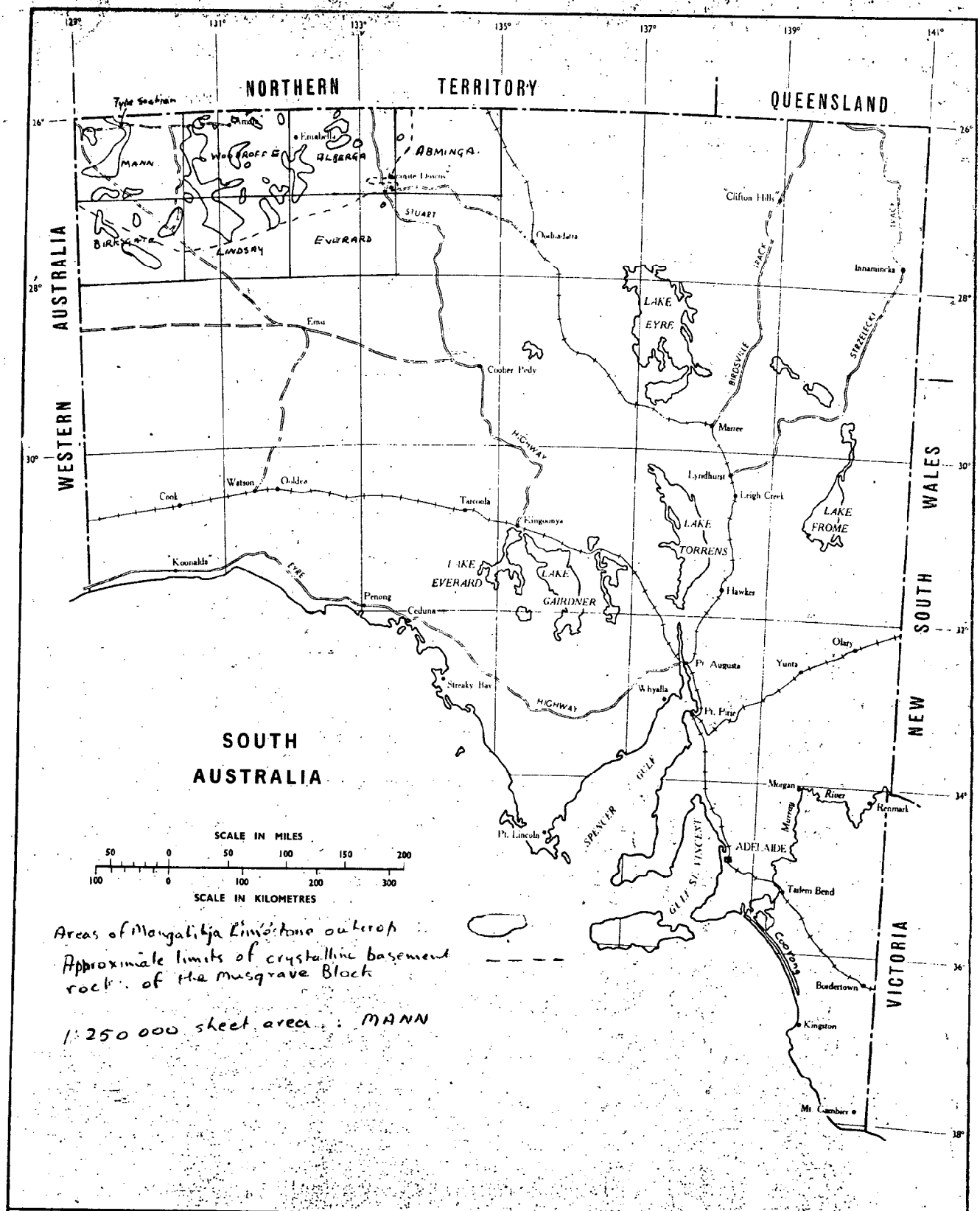
Nichol, D., 1971. The Mount Willoughby Limestone. Quart. Geol. Notes, Geol. Surv. S. Aust. No.39: 1-2

Peterson, M.N.A. and von der Borch, C.C., 1965. Chert: modern inorganic deposition in a carbonate precipitating locality. Science, 149: 1501-1503

Stirton, R.A., Tedford, R.H. and Miller, A.H. 1961. Cenozoic stratigraphy and vertebrate paleontology of the Tirari Desert, South Australia. Rec. S.Aust. Museum, 14 (1): 19-61.

Thomson, B.P. and Southwestern Mining Ltd., 1964. Davies map sheet, Geological Atlas of South Australia, 1:63 360 series, Geol. Surv. S. Aust.

Wopfner, H. and Twidale, C.R., 1967. Geomorphological History of the Lake Eyre Basin In: J.N. Jennings and J.A. Mabbutt (Ed.) Landform Studies from Australia and New Guinea. A.N.U. Press, Canberra, pp.118-143.



Areas of Mangalikja Limestone outcrop

Approximate limits of crystalline basement rocks of the Musgrave Block

1:250 000 sheet areas : MANN

DEPARTMENT OF MINES — SOUTH AUSTRALIA

Compiled. RBM	Outcrops of the Mangalikja Limestone North-West Province	Date:
Drn. / Ckd.		Drg. No.
	Fig 1	

P.F. No. 55850 994.2