RB 58/75

DEPARTMENT OF MINES
SOUTH AUSTRALIA

BRACHINA LIMESTONE DEPOSITS

by

R.K. Johns
Senior Geologist

Introduction

Geology

The Limestone Deposits
(1) Sampling
(2) Grade

Conclusions

Appendix - partial chemical analyses.

Plan No.	Title	Scale
L64-70	Brachina Limestone Deposits	1 inch = 17 chains (approx.)

Rept. Bk. No. 58/75
G.S. 2824
D.M. 1738/63

23-3-1964.

Rept. Bk. No. 58/75
G.S. 2624
D.M. 1738/63

DEPARTMENT OF MINES
SOUTH AUSTRALIA

BRACHINA LIMESTONE DEPOSITS

INTRODUCTION.

High grade limestones which outcrop over a distance of some 13 miles along the front of the Flinders Ranges east of Brachina and Parachilna were sampled during the period 5th December, 1963 to 16th December, 1963 with the assistance of T. Antmanis, W.V. Preiss, S. Coxon and A. Corbett. The occurrence of these limestones was brought to notice during the course of regional mapping by Geologist R. Dalgarno when geochemical sampling, undertaken on a section south of Brachina Gorge, indicated the presence of a uniformly high grade bed almost 2000 feet in thickness.

Being situated only eight miles east of the four foot eight and a half inch rail connection between Leigh Creek Coalfield and Port Augusta, and less than 100 miles north east of Port Augusta, the deposit was considered to be worthy of further attention.

Access is readily gained via an unsealed road which connects the main northern road by way of Brachina Gorge to the Wilpena-Blinman road.

The bed of high grade limestone outcrops continuously along the front of the Flinders Ranges in rugged foothills, free of overburden over a distance of some 13 miles (see plates). The bed is dissected by a number of creeks which discharge on to the plains to the west and ultimately into Lake Torrens-the most important of these is Brachina Creek which has incised a deep gorge through limestones and the more resistant underlying quartzite beds which are the major ridge formers of the ranges and in which are carved the spectacular gorges of the region.

GEOLOGY

Mapping undertaken in this region (Parachilna 4-mile map, R. Dalgarno, unpublished) has established a lower Cambrian sequence above the Upper Proterozoic (Adelaide System) Pound Quartzite. It comprises a basal unit, the Parachilna Formation, which includes argillaceous worm burrow sandstones, dolomite, siltstones, shales and oolitic limestones ranging from 30 to 200 feet in thickness. These are succeeded by the Ajax Limestone equivalent (Wilkawillina Limestone) whose lowest member comprises thin bedded, oolitic dolomites with minor shale and sandstone and banded and mottled grey dolomite with occasional Archaeocyathus.

Massive, thick bedded, grey, buff and pink high grade limestones bearing Archaeocyathus comprise the upper member of the formation, almost 2,000 feet in thickness at Brachina Gorge with the topmost 200 feet being richly fossiliferous. Active fault movements during deposition are postulated to account for disappearance of the limestone to the south where there are thick developments of nodular dolomite and calcareous shale at this stratigraphic level. The limestone outcrops in rugged hills elevated 300 to 500 feet above the general level of the front of the foothills at the front of the range in this locality.

West of Brachina Gorge the succeeding Billy Creek Formation is exposed in subdued foothills to the main range and comprises red siltstones, shales, purple and green laminated shale and micaceous sandstone; these are succeeded by Middle Cambrian formations.

The strata in this area dip generally westerly at angles of 30° - 60°. Several major faults disrupt these rocks -the major dislocations being as shown on the accompanying geological plan. Those affecting the limestone are located at the southern extremity of the map area, a major fault being more or less coincident with Brachina Gorge.

THE LIMESTONE DEPOSITS

The upper member of the Ajax Limestone has been traced from a point three miles south of Brachina Gorge northerly for a distance of almost 13 miles. Access to the railway at Brachina is readily available and would involve a road haul of approximately eight miles from the mouth of the gorge.

Chip samples have been taken over 200 ft. widths across 24 sections to sample the limestone and underlying dolomitic members - the complete sample lines ranging up to 6000 feet in length. The sample lines were closely spaced in the Brachina Gorge vicinity and widening to almost one mile intervals to the north towards Parachilna Gorge.

The limestone has been proved to be of fairly uniformly high grade throughout its extent - the bed varies from 1000 to almost 2000 ft. in thickness. The stone is generally pale grey to offwhite or buff to pink in colour. It is a massive thickbedded, hard, dense, fine grained rock ideally situated topographically for quarrying.

(1) Sampling

Chip samples were taken at approximately 10 ft. intervals and bulked over outcrop widths of 200 feet. Below are recorded the widths of limestone and underlying dolomite and dolomitic limestones sampled in each section.

Sample Line	Width (ft.)	Lithology
A	0-1200 -2000	Light grey to pink and buff limestone. Dark grey and buff dolomite.
B	0-1000 -1600	Light grey to buff limestone. Dark grey and buff dolomite.
C	0-1600 3400	Light grey, buff and pink limestone. Dark grey laminated dolomite.
D	0-1200 2600	Light grey limestone. Dark grey dolomite.

Sample Line	Width (ft.)	Lithology
E	0-1600	Light grey to buff limestone.
	-2400	Dark grey dolomite.
	-3400	Light grey to buff limestone.
F	0-1000	Light grey to buff limestone.
	1400	Light grey dolomitic limestone.
	3600	Dark grey dolomite.
G	0-2600	Light grey to buff limestone.
	-3600	Light grey dolomitic limestone.
	-5200	Dark grey, pink and buff dolomite.
H	0-2200	Light grey to pink and buff limestone.
	-3800	Light grey dolomitic limestone.
	-6000	Dark grey dolomite.
I	0-2600	Light grey, offwhite to buff limestone.
	-3200	White, grey, pink and buff limestone.
	-3800	Light grey dolomitic limestone.
	-6000	Dark grey dolomite.
J	0-1400	Light grey, pink and buff limestone.
	-1500	Yellow brown dolomitic limestone.
K	0-1400	Red brown, pink and grey dolomitic limestone.
L	0-1400	Light grey, pink, buff, offwhite limestone.
	-1900	Grey dolomite.
M	0-1600	Light grey, pink and buff limestone.
	-2200	Light grey dolomitic limestone.
	-4000	Grey dolomite.
N	0-1400	Light grey, buff, pink limestone.
	-1600	Light grey dolomitic limestone.
	-3800	Light to dark grey, pink, red brown and buff dolomite.
O	0-1200	Light grey, buff, pink limestone.
	-1600	Light grey dolomitic limestone.
	-3200	Dark grey dolomite.

Sample Line	Width (ft.)	Lithology
P	0-2200	Grey, buff, pink, limestone.
	-2400	Light grey dolomitic limestone.
	-2600	Light grey limestone.
	-3200	Light to dark grey pink, buff dolomitic limestone.
Q	0-3000	Grey, buff and pink limestone.
	-3800	Grey, buff, dolomitic limestone.
	-5000	Dark grey dolomite.
R	0-2000	Light grey and buff limestone.
	-4000	Dark grey dolomite.
S	0-1200	Pink, buff dolomitic limestone.
	-2600	Dark grey dolomite.
T	0-2200	Grey, buff, pink limestone.
U	0-1600	Grey, buff, limestone.
	-2600	Grey dolomitic limestone.
V	0-1600	Dark grey dolomite.
	-1600	Quartzite.
W	0-2800	Grey dolomitic limestone.

2. Grade

Partial chemical analyses of the samples (bulked over widths of 200 feet) indicate that the upper limestone member is of generally high and uniform grade. There is some deterioration in quality northward.

The limestone in the vicinity of Brechina Gorge shows the following contents:-

$CaCO_3$ 92-99%, $MgCO_3$ 0.5-6.0% and SiO_2 0.10 to 3%, while the underlying dolomite is also fairly constant in composition.

Several sample lines returned results which are abnormal e.g. the dolomite in lines S (2400-3200 ft.) U (1200-1400ft.) and W (2200-2600 ft.) contains beds of high grade limestone which were not detected in the other lines. Similarly thin dolomitic lenses are present in the limestone

member and these were sampled in lines F,G,H,J,P,Q, and T. Line S proved dolomitic limestone throughout. Analyses of sample from line K were, contrary to expectation, dolomitic, this is an area of structural complication.

Partial chemical analyses for the various samples taken are tabled in the appendix (arranged in descending stratigraphic order in each case).

CONCLUSIONS

Large reserves of metallurgical grade limestone, of generally uniform composition and containing 95-99% $CaCO_3$ have been proven to extend over a distance of some 13 miles at the front of the Flinders Ranges between Brachina Gorge and Parachilna Gorge approximately eight miles from the railway. The stone is dense, fine grained, massive and occurs in a bed 1000-1500 ft. in thickness in a deposit ideally situated for quarrying.

R.E. JOHNS
SENIOR GEOLOGIST.

REJ:AWR
23-3-1964.

ANALYSIS(per cent.)

Sample Line	Sample & Mark	Sample Width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid Insolubles
A	A4101/63	0-200'	98.5	0.69	0.78
	A4102	-400'	98.7	0.66	0.79
	A4103	-600'	98.8	0.64	0.49
	A4104	-800'	98.5	0.75	0.79
	A4105	-1000'	98.1	0.79	1.32
	A4106	-1200'	97.4	0.57	1.88
	A4107	-1400'	54.3	42.1	1.97
	A4108	-1600'	66.7	29.4	2.59
	A4109	-1800'	54.4	38.7	4.80
	A4110	-2000'	55.0	42.5	1.02
D	A4111	0-200'	97.2	1.30	0.78
	A4112	-400'	97.8	0.81	0.94
	A4113	-600'	97.8	0.71	0.90
	A4114	-800'	92.9	4.55	1.52
	A4115	-1000'	86.5	10.2	2.34
	A4116	-1200'	57.2	38.1	2.38
	A4117	-1400'	78.2	17.4	3.59
	A4118	-1600'	87.1	9.1	2.75
C	A3450/62		81.9	3.7	
	A3451		96.0	4.0	
	A3452		99.2	nil	
	A3453		97.9	2.0	
	A3454		97.5	1.2	
	A3455		98.3	0.6	
	A3456		97.7	1.84	
	A3457		97.7	1.29	
	A3458		97.7	1.49	
	A3459		98.4	1.01	
	A3460		97.9	0.07	
	A3461		98.4	0.28	
	A3462		97.9	0.74	
	A3463		98.8	0.28	
	A3464		65.0	31.2	
	A3465		59.0	39.5	
	A3466		60.2	36.7	
	A3467		59.4	37.8	
	A3468		79.5	15.2	
	A3469		93.3	2.74	
	A3470		57.6	37.4	

Sample Line	Sample Mark	Sample width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid Insolubles
C	A3471/62		49.5	39.0	
	A3472		73.1	23.9	
	A3473		53.6	41.3	
	A3474		53.8	42.9	
	A3475		45.4	35.5	
	A3476		54.7	42.3	
	A3477		47.6	35.2	
	A3478		50.7	40.7	
	A3479		52.0	39.4	
	A3480		49.6	39.6	
	A3481		49.9	40.3	
	A3482		37.9	29.8	
D	A4119/63	0-200'	89.3	3.60	6.33
	A4120	-400'	95.6	2.90	1.07
	A4121	-600'	93.2	3.85	1.54
	A4122	-800'	86.8	4.15	8.95
	A4123	-1000'	90.9	3.80	5.35
	A4124	-1200'	94.2	2.75	2.45
	A4125	-1400'	81.6	15.0	2.50
	A4126	-1600'	60.4	35.7	2.15
	A4127	-1800'	69.9	26.8	2.35
	A4128	-2000'	67.7	28.0	3.15
	A4129	-2200'	49.1	40.7	8.15
	A4130	-2400'	48.2	39.0	10.9
	A4131	-2600'	46.3	37.9	14.1
E	A4132	0-200'	93.5	5.55	0.93
	A4133	-400'	94.4	4.20	0.92
	A4134	-600'	90.4	8.45	0.81
	A4135	-800'	93.9	4.35	0.82
	A4136	-1000'	92.9	6.30	0.73
	A4137	-1200'	95.9	2.60	0.76
	A4138	-1400'	97.3	0.66	1.28
	A4139/63	1400-1603'	88.4	5.60	4.80
	A4140	-1800'	62.7	32.3	2.10
	A4141	-2000'	69.9	25.3	3.65
	A4142	-2200'	69.6	23.5	5.30
	A4143	-2400'	50.9	39.5	6.70
	A4144	-2600'	90.8	8.05	0.65
	A4145	-2200'	93.7	4.75	1.14
	A4146	-3000'	94.7	2.10	2.65

Sample line	Sample mark	Sample width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid insolubles
E	A4147/63	-3200'	93.2	3.10	3.50
	A4148	-3400'	59.8	36.6	2.40
F	A4149	0-200'	60.0	36.4	2.35
	A4150	-400'	79.9	15.9	3.20
	A4151	-600'	90.2	8.00	1.65
	A4152	-800'	88.6	9.35	1.78
	A4153	-1000'	97.7	1.04	1.06
	A4154	-1200'	50.4	35.0	11.8
	A4155	-1400'	49.8	31.1	14.0
	A4156/63	-1600'	85.8	11.2	2.00
	A4157	-1800'	51.6	41.5	4.05
	A4158	-2000'	52.3	41.8	3.60
	A4159	-2200'	52.2	42.3	3.45
	A4160	-2400'	52.0	42.5	3.60
	A4161/63	2400-2600'	50.6	42.8	4.95
	A4162	-2800'	50.6	42.5	5.35
	A4163	-3000'	50.4	42.3	5.70
	A4164	-3200'	50.3	42.1	5.55
	A4165	-3400'	50.6	43.6	4.15
	A4166	-3600'	50.4	42.9	4.45
G	A4167	0-200'	93.0	1.65	2.10
	A4168	-400'	84.1	14.55	1.05
	A4169	-600'	96.9	1.25	1.22
	A4170	-800'	92.5	6.25	1.05
	A4171	-1000'	93.0	5.15	1.74
	A4172	-1200'	95.1	3.2	1.22
	A4173	-1400'	97.6	1.57	0.62
	A4174	-1600'	92.2	4.3	3.23
	A4175	-1800'	91.5	5.3	3.04
	A4176	-2000'	91.6	6.4	1.89
	A4177	-2200'	86.0	11.0	2.63
	A4178/63	-2400'	89.1	8.2	2.28
	A4179	-2600'	93.2	2.06	4.96
	A4180	-2800'	96.6	41.4	1.24
	A4181	-3000'	85.1	11.5	2.76
	A4182	-3200'	58.0	39.8	1.08
	A4183	-3400'	60.0	37.7	1.34
	A4184	-3600'	55.1	42.7	1.15

Sample line	Sample mark	Sample width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid insolubles
C	A4185/63	-3800'	55.4	43.6	0.38
	A4186	-4000'	54.3	42.5	2.16
	A4187	-4200'	83.5	14.3	1.94
	A4188	-4400'	92.5	6.7	0.70
	A4189	-4600'	72.1	23.0	3.75
	A4190	-4800'	59.0	41.3	3.90
	A4191	-5000'	52.3	41.5	4.37
	A4192	-5200'	50.6	42.9	4.55
K	A4193	0-200'	96.9	1.01	0.58
	A4194	-400'	96.7	1.60	0.48
	A4195	-600'	58.3	36.7	2.86
	A4196	-800'	76.5	17.9	3.35
	A4197	-1000'	74.2	21.3	2.18
	A4198	- 1200'	59.8	33.7	4.15
	A4199	-1400'	77.9	17.4	2.50
	A4200	-1600'	73.2	23.0	1.38
	A4201	-1800'	78.7	17.3	1.26
	A4202	-2000	96.9	1.12	0.58
	A4203/64	-2200'	97.9	0.75	0.56
	A4204	-2400	76.6	21.3	1.22
	A4205	-2600'	57.8	39.4	1.13
	A4206	-2800'	55.0	42.3	1.47
	A4207	-3000'	55.9	40.9	1.32
	A4208	-3200'	60.7	36.6	0.85
	A4209	-3400'	54.6	42.1	1.10
	A4210	-3600'	65.4	31.2	1.30
	A4211	-3800'	54.2	43.1	0.90
	A4212	-4000'	54.6	41.4	2.15
	A4213	-4200'	50.4	42.4	2.45
	A4214	-4400	52.8	42.5	2.50
	A4215	-4600'	57.8	37.8	2.05
	A4216	-4800'	53.3	42.3	2.60
	A4217	-5000'	52.8	41.2	3.90
	A4218	-5200'	54.1	42.9	1.60
	A4219	-5400'	526	41.2	3.60
	A4220	-5600'	54.3	41.1	2.80
	A4221	-5800'	52.8	41.4	3.20
	A4222	-6000'	48.4	38.8	10.40

Sample line	Sample mark	Sample width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid insolubles
I	A4223	0-200'	93.1	2.88	3.05
	A4224	-400'	97.1	1.65	1.09
	A4225	-600'	96.0	2.12	1.76
	A4226	-800'	94.4	4.65	0.75
	A4227	-1000'	95.3	3.00	1.48
	A4228	-1200'	96.2	2.10	1.36
	A4229	-1400'	98.4	0.75	0.37
	A4230	-1600'	96.9	1.55	1.40
	A4231	-1800'	97.1	0.90	0.82
	A4232	-2000'	98.0	1.30	0.31
	A4233	-2200'	97.5	1.50	0.36
	A4234	-2400'	97.1	2.28	0.27
	A4235	-2600'	99.2	0.63	0.10
	A4236	-2800'	99.1	0.54	0.30
	A4237	-3000'	90.2	8.5	0.63
	A4238	-3200'	95.3	3.85	0.77
	A4239/63	-3400'	74.0	23.5	1.46
	A4240	-3600'	60.0	37.4	0.93
	A4241	-3800'	56.1	40.9	1.2
	A4242	-4000'	55.6	42.6	0.43
	A4243	-4200'	55.3	42.4	1.06
	A4244	-4400'	62.8	33.2	2.16
	A4245	-4600'	60.2	35.3	1.61
	A4246	-4800'	55.9	41.7	1.09
	A4247	-5000'	64.2	33.4	1.13
	A4248	-5200'	54.8	42.0	2.08
	A4249	-5400'	55.1	41.8	2.10
	A4250	-5600'	51.3	40.6	6.78
	A4251	-5800'	51.6	38.2	8.70
	A4252	-6000'	49.4	39.6	9.13
J	A4253	0-200'	94.9	3.55	1.35
	A4254	-400'	94.6	4.30	0.88
	A4255	-600'	51.0	24.2	22.5
	A4256	-800'	88.6	8.05	1.70
	A4257	-1000'	95.8	2.34	0.95
	A4258	-1200'	92.0	6.15	0.97
	A4259	-1400'	96.9	0.97	1.27
	A4260	-1500'	79.9	18.3	1.24
K	A4261	0-200'	65.3	28.8	3.25
	A4262	-400'	58.3	37.8	1.57

Sample line	Sample mark	Sample width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid insolubles
M	A4263	-600'	58.5	37.2	1.87
	A4264	-800'	59.1	33.1	5.25
	A4265	-1000'	70.0	21.6	5.30
	A4266	-1200'	68.3	26.9	1.75
	A4267	-1400'	62.2	26.5	8.50
L	A4268	0-200'	97.4	1.41	0.50
	A4269	-400'	96.1	2.29	0.90
	A4270	-600'	95.0	2.48	1.17
	A4271	-800'	89.8	5.50	5.20
	A4272	-1000'	96.4	1.42	0.60
	A4273	-1200'	96.0	2.88	0.78
	A4274	-1400	84.5	13.3	1.05
	A4275	-1600'	54.8	43.4	1.74
	A4276	-1800'	54.1	44.2	1.47
	A4277	-1900'	54.3	44.0	1.61
M	A4278	0-200'	94.7	3.63	0.98
	A4279	-400'	92.1	6.25	0.70
	A4280	-600'	91.2	7.55	0.85
	A4281/63	600-800'	88.7	9.85	1.24
	A4282	-1000'	95.8	2.90	0.45
	A4283	-1200'	96.7	2.15	0.60
	A4284	-1400'	95.8	1.34	2.25
	A4285	-1600'	91.3	3.75	3.60
	A4286	-1800'	77.3	19.3	3.00
	A4287	-2000'	59.3	38.5	2.10
	A4288	-2200'	53.8	44.5	1.37
	A4289	-2400'	36.8	30.6	29.80
	A4290	-2600'	52.4	43.1	4.00
	A4291	-2800'	52.5	42.8	4.55
	A4292	-3000'	53.3	42.6	2.35
	A4293/63	-3200'	46.2	39.0	18.90
	A4294	-3400'	43.4	38.6	17.55
	A4295	-3600'	48.8	35.5	15.55
	A4296	-3800'	42.3	37.2	18.05
	A4297	-4000'	46.2	38.7	13.75
N	A4298	0-200'	95.6	1.84	0.97
	A4299	-400'	92.7	2.70	2.90
	A4300	-600'	92.4	4.55	4.80
	A4301	-800'	96.9	1.80	0.76
	A4302	-1000'	87.0	1.07	10.90

Sample line	Sample mark	Sample width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid insolubles
N	A4303	-1200'	97.6	0.79	1.31
	A4304	-1400'	84.8	0.61	13.00
	A4305	-1600'	76.3	21.2	1.24
	A4306	-1800'	59.5	38.7	1.32
	A4307	-2000'	56.9	41.6	1.30
	A4308	-2200'	51.2	37.7	10.8
	A4309	-2400'	94.6	3.7	1.25
	A4310/63	-2600'	82.3	8.30	8.60
	A4311	-2800'	71.7	12.7	14.6
	A4312	-3000'	92.4	1.48	5.2
	A4313	-3200	84.0	8.50	6.35
	A4314	-3400'	77.5	16.4	5.1
	A4315	-3600'	82.1	13.4	3.35
	A4316	-3800'	77.1	21.5	1.00
O	A4317	0-200'	82.9	13.4	3.20
	A4318	-400'	91.3	7.35	0.35
	A4319	-600'	92.0	6.35	0.54
	A4320	-800'	79.0	1.47	18.4
	A4321	-1000'	87.1	10.7	2.00
	A4322	-1200'	87.9	9.1	2.35
	A4323	-1400'	65.4	25.8	8.60
	A4324	-1600'	66.8	29.7	3.10
	A4325	-1800'	50.5	39.9	8.85
	A4326	-2000'	52.7	38.8	7.8
	A4327	-2200'	49.0	34.6	14.3
	A4328	-2400'	50.3	35.9	12.2
	A4329	-2600'	45.1	37.2	16.4
	A4330	-2800'	44.7	37.6	16.5
	A4331	-3000'	49.7	40.4	9.0
	A4332	-3200'	50.7	41.5	7.6
P	A4333	0-200'	86.3	5.4	6.75
	A4334	-400'	90.0	3.8	5.15
	A4335	-600'	78.2	15.9	4.75
	A4336	-800'	78.9	16.5	3.8
	A4337	-1000'	88.3	8.9	1.85
	A4338	-1200'	89.6	7.75	1.12
	A4339	-1400'	93.9	4.55	0.80
	A4340	-1600'	93.9	4.0	1.16
	A4341/63	-1800'	86.6	11.5	1.45

Sample line	Sample mark	Sample width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid insolubles
P	A4342/63	-2600'	96.2	2.47	0.43
	A4343	-2200'	95.4	1.70	1.60
	A4344	-2400'	50.3	40.7	8.45
	A4345	-2600'	96.4	0.94	1.78
	A4346	-2800'	78.7	15.0	5.03
	A4347	-3000'	64.8	30.9	3.58
	A4348	-3200'	59.2	44.4	1.95
	A4349	-3400'	54.8	42.9	2.10
	A4350	-3600'	52.0	43.5	4.16
	A4351	-3800'	56.4	41.3	1.81
Q	A4352	0-200'	85.3	8.0	5.25
	A4353	-400'	85.7	6.4	6.4
	A4354	- 600'	92.6	4.3	1.8
	A4355	-800'	92.6	4.5	1.75
	A4356	-1000'	94.5	3.0	1.50
	A4357	-1200'	82.4	6.5	10.15
	A4358	-1400'	94.3	2.9	1.24
	A4359	-1600'	93.1	4.05	1.60
	A4360/63	-1800'	96.4	1.55	0.78
	A4361	-2000'	91.3	5.3	2.10
	A4362	-2200'	80.1	6.15	12.65
	A4363	-2400'	96.8	0.88	1.52
	A4364	-2600'	85.2	3.7	10.25
	A4365	-2800'	93.0	3.35	2.45
	A4366	-3000'	88.9	7.35	2.85
	A4367	-3200'	74.6	19.3	5.85
	A4368	-3400'	64.9	31.9	2.55
	A4369	-3600'	60.4	37.6	1.60
	A4370	-3800'	54.3	33.6	11.20
	A4371	-4000'	48.7	31.1	19.55
	A4372	-4200'	52.8	32.1	11.80
	A4373	-4400'	47.7	36.8	11.95
	A4374	-4600'	73.9	18.7	5.15
	A4375	-4800'	76.0	17.9	4.15
	A4376	-5000'	53.6	33.8	11.10
R	A4377	0-200'	94.9	2.8	0.96
	A4378	-400'	91.6	5.85	1.30
	A4379	-600'	92.3	6.15	1.05
	A4380	-800	95.3	2.6	0.54
	A4381	-1000'	97.7	0.88	0.77

Sample line	Sample mark	Sample width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid insolubles
R	A4382	-1200'	94.3	3.4	1.20
	A4383	-1400'	90.3	7.50	1.86
	A4384	-1600'	89.4	6.45	2.90
	A4385	-1800'	87.5	9.25	2.07
	A4386	-2000'	84.4	13.2	1.60
	A4387	-2200'	66.2	28.5	4.60
	A4388	-2400'	53.4	40.2	5.82
	A4389	-2600'	70.2	26.4	2.70
	A4390	-2800'	57.4	38.0	3.60
	A4391	-3000'	58.0	34.6	3.20
	A4392	-3200'	58.2	32.6	7.23
	A4394	-3400'	50.5	40.3	7.25
	A4394	-3600'	48.3	38.2	11.20
	A4395	-3800'	51.6	38.2	8.05
	A4396	-4000'	47.7	38.4	11.75
S	A4397	0-200'	55.9	41.4	1.40
	A4398	-400'	55.0	42.6	1.10
	A4399	-600'	55.6	42.9	0.86
	A4400/63	-800'	56.3	41.8	0.86
	A4401	-1000'	56.5	39.4	2.10
	A4402	-1200	54.4	43.9	0.64
	A4403	-1400'	54.0	42.4	2.30
	A4404	-1600'	58.3	37.6	2.56
	A4405	-1800'	50.3	39.1	7.25
	A4406	-2000'	53.3	43.6	1.60
	A4407	-2200'	45.3	36.8	14.7
	A4408	-2400'	45.3	37.5	13.1
	A4409	-2600'	45.5	37.2	13.3
T	A4410	0-200'	87.0	10.8	13.5
	A4411	0-400'	87.9	8.20	2.80
	A4412	-600'	82.1	14.6	2.06
	A4413	-800'	93.7	3.73	1.70
	A4414	-1000'	75.7	21.2	1.70
	A4415	-1200'	68.0	27.1	3.60
	A4416	-1400'	86.0	11.2	1.67
	A4417	-1600'	95.5	3.0	0.70
	A4418	-1800'	93.4	5.10	1.34
	A4419	-2000'	94.2	3.75	1.15
	A4420	-2200'	92.9	4.65	1.36

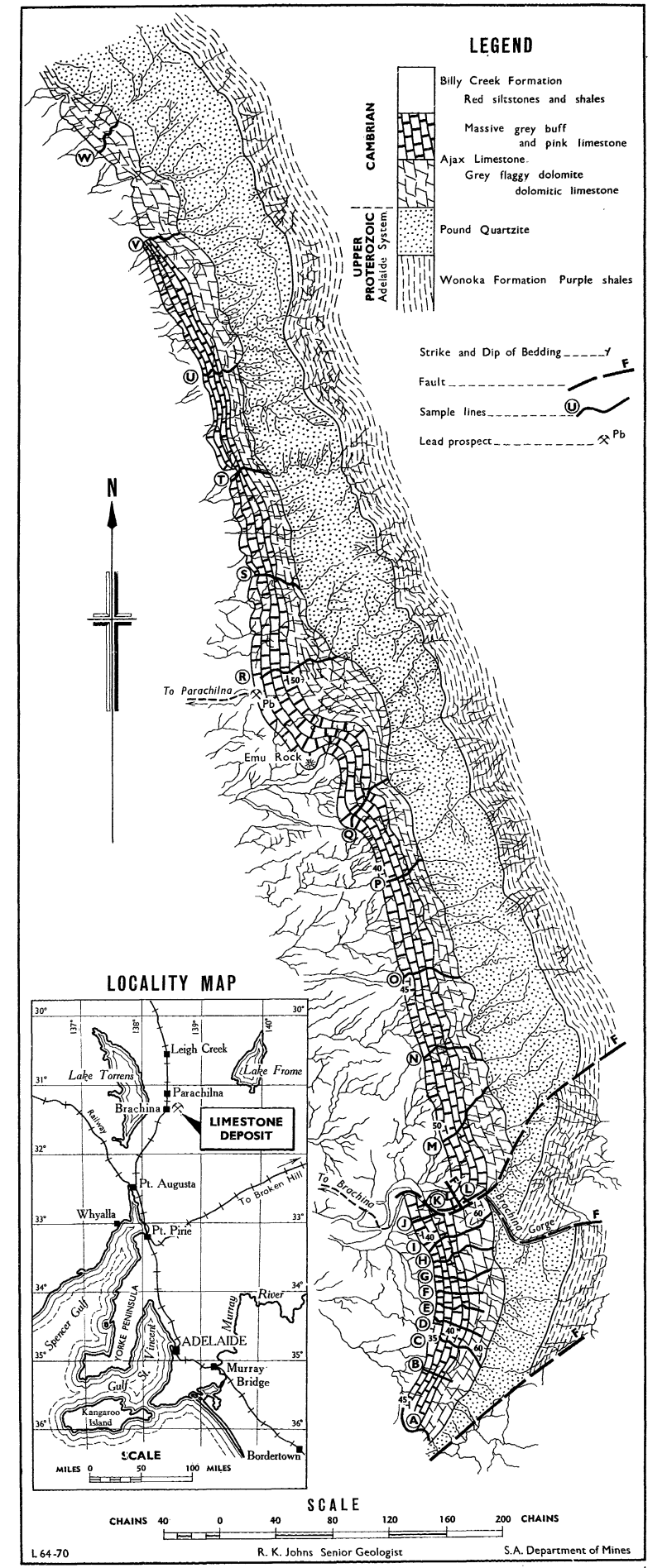
Sample line	Sample mark	Sample width	Calcium Carbonate $CaCO_3$	Magnesium Carbonate $MgCO_3$	Acid insolubles
U	A4421	0-200'	93.0	4.3	1.88
	A4422	-400'	92.9	5.3	1.31
	A4423	-600'	93.6	4.45	1.20
	A4424	-800'	93.1	4.3	1.89
	A4425/63	-1000'	87.5	7.3	3.84
	A4426	-1200'	95.7	0.78	2.42
	A4427	-1400'	86.2	10.6	2.14
	A4428	-1600'	90.4	5.65	2.74
	A4429	-1800'	53.9	38.4	4.38
	A4430	-2000'	48.7	37.0	11.5
	A4431	-2200'	53.9	41.2	3.03
	A4432	-2400'	83.6	12.9	2.6
	A4433	-2600'	54.6	41.7	1.8
V	A4434	0-200'	59.8	37.0	2.3
	A4435	-400'	59.2	41.2	1.8
	A4436	-600'	54.2	40.8	3.13
	A4437	-800'	51.3	41.5	4.6
	A4438	-1000'	52.5	41.3	4.23
	A4439	-1200'	51.6	28.9	13.90
	A4400	-1400'	42.9	34.6	16.00
W	A4441/63	0-200'	50.5	28.7	18.60
	A4442	-400'	84.5	13.3	0.47
	A4443	-600'	49.1	37.4	10.60
	A4444	-800'	54.2	37.3	5.30
	A4445	-1000'	53.8	40.9	2.43
	A4446	-1200'	55.0	38.58	2.80
	A4447	-1400'	51.3	80.3	5.45
	A4448	-1600'	45.8	47.6	4.37
	A4449	-1800'	44.6	46.6	5.86
	A4450	-2000'	47.1	39.1	9.93
	A4451	-2200'	52.2	45.0	1.02
	A4452	-2400'	41.3	34.5	17.94
	A4453	-2600'	45.9	36.3	13.85
	A4454	-2800'	50.7	41.0	5.70

A.M.D.L. Analysis by: D.L. James, R.B. Oliver, R.L. Bruce and S. Alexander.

Officer in Charge, Analytical Section: F.R. Frost.

Plate 1. Looking south-east from Brachina Creek. Limestone outcrops in main frontal range; ridges of Pound Quartzite in background.

Plate 2. High grade limestone in frontal range with ridges in background composed of Pound Quartzite. Photo looking N.N.E. from locality section line 'C'.



L 64-70

R. K. Johns Senior Geologist

S.A. Department of Mines