LIMESTONE DEPOSITS OF MAYDENA AREA

Although vast quantities of limestone, some of high grade, exist within a few miles of the rail head at Maydena, no attempt has been made in the past to utilise these deposits for their lime content. One quarry near the Maydena Station and another larger one near the 3½ Mile Peg on the Newsprint Company's Road have been opened to extract the rock for road-making purposes. Recently, however, the Newsprint Company has become interested in the deposits as a source of high grade limestone and is investigating certain of the beds.

This report deals with the examination of the limestones and their associated beds in an area extending from the vicinity of the Maydena Station to the Gap, between Tim Shea and Wherritt's Lookout, traversed by the new Florentine Road.

LOCATION AND ACCESS.

Maydena is the logging centre for the Australian Newsprint Mills and in recent years a new town has sprung up, just beyond the old township of Fitzgerald, distant 55 miles from Hobart. The railway line now terminates at the Depot Site of the Company, 1½ miles beyond Maydena. A new road with several spur roads has been constructed by the Company from the depot to the Florentine Valley. South of the Depot, the Company's new roads include the Burma, Risby's Basin and Roberts. A new Forestry Commission Road runs south and west from Maydena to connect with the end of Risby's Basin Road. Numerous walking tracks shown on the attached plan have also been constructed and recently re-cleared by the Forestry Commission. The Junee Road runs for three miles north-east from Maydena past the Junee Caves. From the end of this, the old Adamsfield pack track more or less parallels the Florentine Road in the area investigated.

GEOMORPHOLOGY.

The Maydena area includes the upper part of the Tyenna Valley. This valley is enclosed on its northern side by the Mount Field plateau rising to over 4000 feet and on its southern side by the divide, between the Styx and Tyenna Rivers, which rises to over 3,000 feet. At its mouth the valley is a narrow gorge debouching somewhat abruptly at Westerway into the more open country drained by the Derwent, but it widens out progressively towards its head.

Just before reaching Westerway, the Tyenna River is a swift flowing stream with rapids, in a juvenile V-shaped valley with overlapping spurs. A little further up the valley it displays a narrow flood plain, which broadens out in the Maydena area, where the stream meanders smoothly across it with the characteristics of late maturity. The Tyenna and other streams in the area do not, as a rule, have their sources in the most elevated places such as the Mount Field Plateau, but at much lower altitudes in relatively open county, and apparently constitute a drainage system imposed from an earlier erosional epoch. The evidence

suggests that the Tyenna dates from a period prior to the great Tertiary faulting and epeirogenic movements. Since these tectonic disturbances resulted in the formation of the Derwent, the Tyenna may have been beheaded and finally reversed in flow, by a subsequent tributary of the Derwent cutting back through the dolerite at the present mouth, formerly the head, of the Tyenna Valley.

The Maydena area, including the present headwaters and tributaries of the Tyenna River is open country with button grass plains, and the remains of previous belts of heavy timber. Foothills, chiefly of quartzite and limestone, the elevation of which is due to the effects of great hardness and underground drainage, respectively, lead up to higher country consisting of mudstone capped by great thicknesses of dolerite. Various thicknesses of detritus from the igneous rock may cover the sedimentary formations.

GEOLOGY.

The Maydena area is an irregular basin in which the youngest deposits are the Recent alluvium brought down by the present streams. The north-eastern and south-eastern portions of the rim consist of dolerite overlying Permian strata through which it has been intruded. The Permian beds consist partly of fossiliferous yellow mudstones of a common type, and partly of coarse yellow-brown sandstones and grits, sometimes with dark bands of especially well-consolidated material.

In the lower part of the basin and along its western rim Ordovician rocks belonging to the Junee Group are exposed. Quartzites are exposed west of Frodsham's Gap, at Pine Hill and on Nichols Spur. These quartzites are white in colour on exposure, and contain beds of intraformational conglomerate. They may be an off shore facies of the West Coast Range conglomerate.

Shales, sheared and metamorphosed, in places to phyllite stage, overlie the quartzites. Minor quartzite bands occur in the shales which are usually chocolate in colour and weather to a light green. Some of these shales, however, may be relatively unsheared and incline to a mudstone type, yellow in colour. Fossils are often plentiful and consist of trilobites, gastropods and brachiopods.

The shales become calcareous and grade into limestones in a short distance. Bands of intraformational calcareous breccia indicate minor time breaks and oscillations. Siliceous bands are common. The limestone becomes more massive, although often siliceous, but finally a well bedded, high grade, fossiliferous limestone appears towards the top of the series, containing numerous trilobites, brachiopods and gastropods.

At this point a major unconformity occurs and, the fossiliferous mudstones, sandstones and grits previously referred to are superimposed on the old erosional surface. Conglomerates with quartzite boulders up to two feet across occur near the base of the Permian.

STRUCTURAL FEATURES

Folding

Striking evidence of folding is afforded by the formation in this area of small ridges due to the differential rate of erosion of the quartzite compared with the softer mudstones and limestones. Small quartzite ridges such as Pine Ridge, Sunshine Ridge and Junee Ridge are expressions of anticlines. These anticlines, which have axes of 300 to 340° are not parallel but arranged rather like out-stretched fingers from a hand so that they diverge to the north-west. Moreover, they plunge to the north-west so that in that direction they become cut off due to the greater effect of erosion on the mudstones which overlie the quartzites; Sunshine spur is a good example of this and round its north-western limits strikes may be observed at nearly right angles to the general direction. The major fold axes are about 60 chains apart, but minor folding does occur between them and a splendid example of an anticlinal fold may be observed in a railway cutting between Maydena Station and the Depot.

Faulting

Nowhere in this area was it possible to observe the Upper and Lower Palaeozoic beds in actual contact so that it is not possible to decide whether the Permian beds are in faulted relationship to the Ordovician or whether they have been laid down on an erosion surface of the limestone. Certainly the tremendous Tertiary block faulting has probably shown some activity in this area but no definite fault line round the edges of the Ordovician can be detected. However, faults are probably present within the area. Near the Newsprint Depot a triangular wedge of Permian strata juts into the Ordovician strata as the possible result of two faults intersecting at this locality. One follows generally the course of the Tyenna River and the other the ridge of Roberts Hill. The lower limestone beds, exposed on the quarry near the Maydena Station appear to have been displaced a few hundred feet to the west by faulting.

THE LIMESTONES

Quantity

Such vast deposits of limestones exist in this area that no attempt has been made to estimate in tons quantities available. On the geological map areas of limestone are shown in blue. Where limestones actually outcrop the areas have been coloured dark blue and where these rocks are covered by dolerite boulders, soils etc., they are coloured light blue.

Quality

The grade of limestone here differs enormously according to the position of the beds within the series. At the base of the limestones there is a transitional breccia bed containing some calcareous material. Above this are dark blue massive limestones showing little bedding. These beds are exposed in the big road quarry north of Sunshine Spur and towards the Gap on the Florentine Road. These limestones are not high grade and a grab sample taken from the quarry showed 79% $CaCO_3$ and 18% acid insoluble, while a sample from similar beds along the road showed 57% $CaCO_3$ and 40% acid insoluble. Succeeding

these massive beds on the outcrop the chert can be seen as well developed angular pieces in the limestones and often constituting fifty percent of the rock. When the rock weathers the chert remains after the limestone becomes dissolved and forms gravel beds. In places this residue has been quarried and such pits may be seen above the Junee road near the caves and again near the 6 mile peg on the Florentine Road. A sample taken across a few feet of these beds showed 50% $CaCO_3$ and 47.5% Acid Insoluble.

The upper beds of the limestone series, which are the greatest in extent and possibly are nearly a thousand feet in thickness consist of high grade grey limestones, sometimes of remarkably fine grain, containing in places abundant calcite. They are well bedded and sometimes individual beds are only a few inches in thickness and are in places rich in fossil fragments. Samples of these beds were taken at various localities and showed an average $CaCO_3$ content of 91% while the acid insoluble was under 6%. The MgO content varies between 2.4% and 0.4% and averages 1%. Iron and alumina together are less than 1% and there are traces of sulphur and phosphorus present.

ACCESS AND QUARRY SITES

With such large deposits of high grade limestone as are contained in the upper beds of this series the choice of a quarry site depends largely on topographical features and closeness to existing roads. Two areas immediately suggest themselves, namely north-west of the Caves Reserve and south-east of the Maydena Depot. In the northern area, steep sided hill slopes and large sink holes on either side of a synclinal axis make for ease of quarrying in practically any direction. This area lies within a mile of the Junee Road. Chip samples were taken across several hundred feet of these beds on both sides of the synclinal axis and showed a $CaCO_3$ content of just on 90%, a MgO content of 3% and an acid insoluble amount of 6%. In this area limestone outcrops generally right to the surface and apart from a little soil and clay, overburden should be negligible.

Even more accessible are the limestone beds to the south of the Depot. A sample taken from the hill which abuts the main road showed a calcium carbonate content of 91% while on the same hillside near the end of Roberts Road a sample taken over about 30 feet averaged over 93% $CaCO_3$. However, the limestone is not outcropping so freely in these localities and there may be a lot of rubbish mixed with the limestone. Just beyond the end of Risby's Basin Road is a splendid face of high grade limestone rising 70 feet from a large sink hole. In this rock calcite is very abundant and an analysis showed the beds contain 91% $CaCO_3$. No attempt was made to channel sample this face but samples were taken across several beds and the result should be fairly representative. In only one place a few feet of poorer material was noticed.

In this area the cherty limestones outcrop along Pillingers Creek where it bends to the north but after a hundred feet or so they are succeeded to the east by the better grade beds. The lowest members of the series, the dark blue massive limestones,

are not visible in this area nor is the eastern leg of the syncline.

Near the Maydena Railway Station a small quarry has been opened on land owned by the Commonwealth Carbide Company. A grab sample taken from here showed the limestone to have a 91% $CaCO_3$ content. However, there is a lot of soil and clay associated with these beds and just west of the quarry the cherty beds occur so that it is not expected that any large quantities of high grade stone could be obtained from this spot.

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GEOLOGISTS

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The results of sampling are shown as follows:-

Locality	Reg. No.	Insol.	CaO	MgO	Ig.Loss	Fe_2O_3	Al_2O_3	S.	P_2O_5	CaO calc to $CaCO_3$
1 On Forestry Track. F.D.9.	941/52	2.4	53.8	0.4	42.3	0.2	0.6	Tr.	Tr.	96.0
2 Up hillside on N. dipping Beds, N.W. of Junee Caves	942	5.4	51.1	1.4	41.2	0.3	0.7	Tr.	Tr.	91.2
3 do.	951	6.1	51.0	0.9	40.8	0.4	0.5	Tr.	Tr.	91.0
11 Same beds on opposite side of Syncline (near Newsprint Co.sampling)	943	7.6	48.3	2.4	40.6	0.5	0.7	Tr.	Tr.	86.2
4 Rock Face near end of Risbys Basin Road	944	6.9	50.7	0.6	40.8	0.3	0.7	Tr.	Tr.	90.5
5 Big Quarry	945	18.2	44.2	0.8	35.1	0.4	0.8	0.22	Tr.	78.9
6 Hill near Depot	946	6.7	50.7	0.7	40.8	0.3	0.7	0.14	Tr.	90.5
7 End of Roberts Rd.	947	5.0	52.3	0.6	41.5	0.2	0.4	Tr.	Tr.	93.3
8 Above Gravel Quarry Junee Rd.	948	47.5	27.9	0.5	22.0	1.7	0.3	Tr.	Tr.	49.8
9 Lower Beds - Florentine Rd.	949	40.3	31.8	0.6	25.6	1.2	0.7	0.1	Tr.	56.7
10 Quarry near Maydena Stn.	950	6.8	49.6	1.7	40.9	0.5	0.5	0.11	Tr.	88.5