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**PERMIAN ROCKS OF CRADLE MOUNTAIN**

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**INTRODUCTION**

In connection with regional mapping of Middlesex and Du Cane Quadrangles, a reconnaissance survey has been made of Permian rocks exposed in the area between Barn Bluff and Cradle Mountain. Altitudes are based on adjusted barometer heights, and 250 feet form lines on the map "Northern Section, Cradle Mt.-Lake St. Clair National Park", Department of Lands and Surveys, 1950. Co-ordinates given below are also based on this map.

*Locality 1.— South side of the Little Horn, Cradle Mountain.—* This traverse was up the cliffs at the south-east corner of the Horn, at 3965E/8676N.

Here the Permian rests directly on Precambrian quartzite, the unconformity dipping 17 degrees east, and being exposed between 3480 and 3545 feet above sea level. At the eastern end, the Permian consists of angular to subangular, equant boulders of quartzite up to two feet diameter (average four inches), and subangular, non-spherical pebbles of mica-schist up to four inches diameter (average two inches). Boulders and pebbles of this nature form over 80% of the rock. Subangular, spherical pebbles of quartzite averaging two inches diameter form 10% of the rock. The matrix of tabular mica schist and quartz grains, averaging half an inch in length, and with a small amount of interstitial rock fragments, forms the remaining 10%. About the centre of the section, the basal beds have angular pebbles of quartz-mica-schist up to three inches diameter, also quartzite, chlorite schist, and mica schist. Bedding

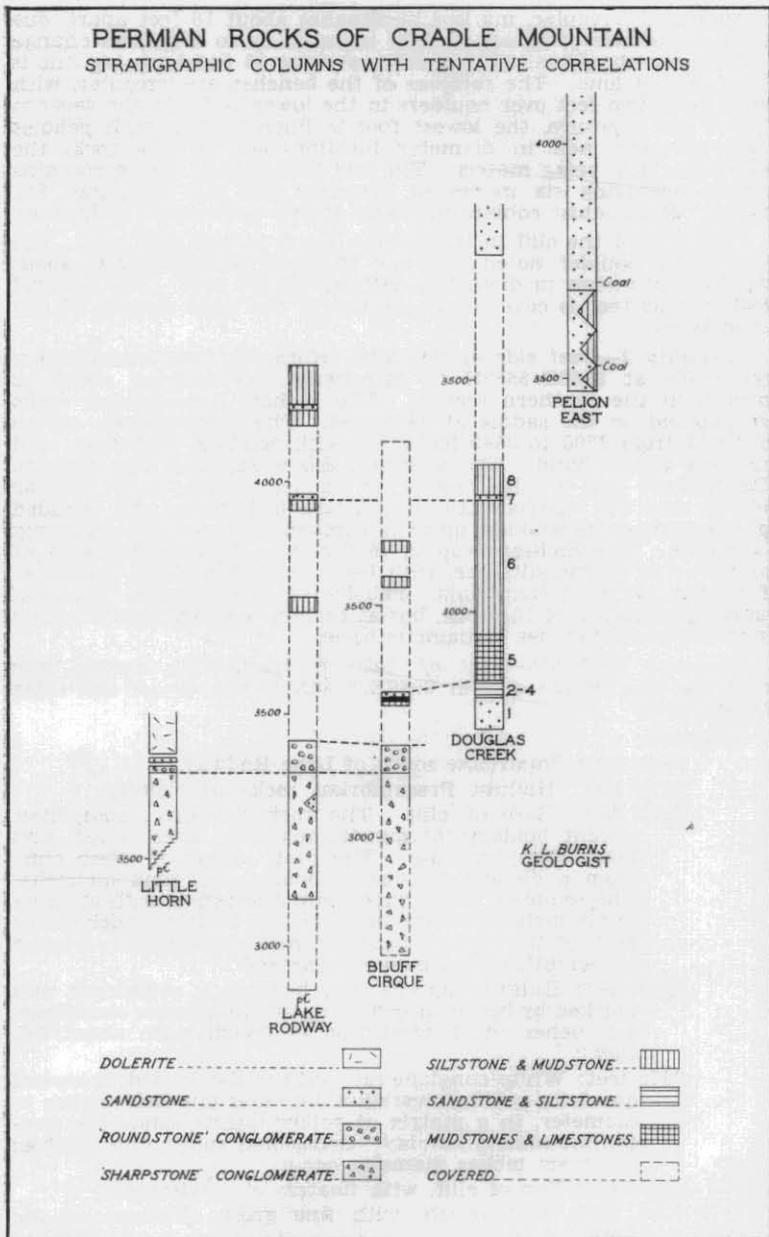
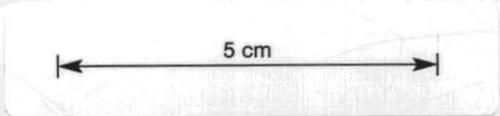


FIGURE 3.



is crude and irregular, marked by benches about 10 feet apart, due to the occurrence of lenses of finer material or to a sudden change in the size of boulders. The benches average 15 feet long, but one is about 50 feet long. The surfaces of the benches are irregular, with relief up to two feet over boulders in the lower bed. At the western end of the exposure, the lowest foot is finer-grained with pebbles averaging one inch in diameter forming 80% of the rock, the remaining 20% being matrix. The bed immediately above contains cobbles averaging six inches in diameter and has less than 5% matrix. Mica schist cobbles in places shown horizontal orientation.

The top of the cliff in this coarse bed is at 3690 feet a.s.l. The only exotic boulder noted was one of Owen Conglomerate, about two feet six inches in diameter, halfway up the cliff. The interval 3690 to 3730 feet is covered; above this is the solid dolerite of the Little Horn.

*Locality 2—East side of the Little Horn.*—A brief examination was made at 3968E/8682N to investigate the interval which is covered in the southern section. The highest Precambrian rocks are exposed on the saddle at 3440 feet. The conglomerate occurs in a cliff from 3600 to 3640 feet a.s.l., with bedding prominent, and one very coarse band. The apparent dip is south at five degrees. The highest bed of the breccia is six feet thick, with angular pebbles and 5% matrix. Above this are beds with well rounded spherical quartzite boulders up to two feet in diameter and averaging six inches. The highest exposed section is a 10 foot thickness of sandstone or coarse siltstone, with beds six inches thick, composed of quartz and rock fragments. Pebbles of well-rounded, spherical quartzite form 5% of the rock, but at certain horizons rare boulders up to two feet six inches in diameter occur.

*Locality 3—South-West of Lake Rodway.*—This section was from the base of the cliff at 3967E/9648N to the top of the ridge at 3965/8646.

Altitude:

- 2775 feet: Small lake south of Lake Rodway.
- 2910 feet: Highest Precambrian rocks in vicinity.
- 3100 feet: Base of cliff. The rock contains subangular, equant boulders of quartz, quartzite, mica schist, and Owen Conglomerate. The pink colour of these cliffs from a distance is due to boulders of pink quartzite. The sediment has a wide grain size range, with maxima at six inches and one inch and the matrix, which forms 10% of the rock, consists of rock fragments averaging one-eighth of an inch in diameter.
- 3305 feet: Halfway up the cliff, bedding is prominent and marked by bands of coherent, tough, massive sandstone, six inches thick, consisting of quartz with about 5% clay.
- 3375 feet: White conglomerate with well-rounded, spherical quartzite pebbles averaging one and one-half inches in diameter, in a matrix of yellow quartz sandstone containing almost no clay. Occasional subrounded cobbles up to six inches diameter occur.
- 3445 feet: Top of cliff, with floaters of sandstone.
- 3750 feet: Flat bench, with fine green siltstone on the slope.

3960 feet: 12 inches of blue fissile mudstone loaded with bryozoans. This is overlain by five feet of fine, green sandstone, with angular to subangular quartzite and mica schist pebbles averaging two inches in diameter and forming 5% of the rock. The matrix is highly felspathic. This sandstone contains an eight inches thick band of spiriferids, with both valves preserved in original calcite. The matrix contains mica flakes, and one angular granite erratic six inches in diameter was found.

4160 feet: Bench formed by a three foot conglomeratic sandstone, with rounded quartzite pebbles averaging one inch in diameter, but up to two inches. The rocks above and below are siltstone.

4250 feet: Top of hill. Erratics of fossiliferous Permian limestone occur in the saddle to the west, at 3790 feet, and these are identical with the limestone occurring in Douglas Creek to the south.

*Locality 4—North Wall of the Bluff Cirque.*—This section was up the face of the cirque at 3945/8637.

Altitude:

3060 feet: Foot of slope.

3140 feet: Top of first bench.

3200 feet: Top of second bench. This is in "roundstone" conglomerate.

3620 feet: 20 feet of coarse green siltstone, with occasional pebbles, and bedding marked by fissile bands. Matrix is subangular quartz up to one-tenth of an inch, frequently felspathic.

3750 feet: Top of cirque at 3945/8633.

*Locality 5—Overland Track, Bluff Cirque.*—This traverse was from Waterfall Valley Creek at 3950/8630 to the Five-Mile Peg at 3952/8648.

Altitude:

2750 feet: Approximate height of unconformity.

3040 feet: Waterfall Valley Creek. The boulder bed here consists of subrounded boulders averaging four inches in diameter.

3200 feet: Top of "roundstone" conglomerate.

3300 feet: Pebbly quartz sandstone. Pebbles are of rounded white quartzite averaging one inch in diameter, and form 5% of the rock. The sandstone is crossbedded in 16 inch sets, which indicate a current moving from the west. Immediately beneath this is an 18 inch seam of black coal but this was not exposed at the time of the traverse.

3560 feet: Spiriferid fossils in green siltstone.

3850 feet: Five-Mile Post.

## DISCUSSION

The sections obtained are only fragmentary, but provide a consistent picture if correlated at the top of the basal conglomerates.

The bases of the sections are angular boulder beds, at least 270 feet thick at Lake Rodway, and probably thicker at Bluff Cirque, and from 210 to 140 feet at Little Horn.

Above this is about 60 feet of roundstone conglomerate at Bluff Cirque and Lake Rodway, apparently passing into conglomeratic sandstone at the Little Horn.

The Kansas Creek Beds (of Middlesex Sheet) are about 100 feet thick, with the sandstone of the Liffey Group represented by a thin sandstone band overlying a coal seam. The coal worked at Lake Holmes is at the same altitude as that exposed on the Bluff Cirque, and is probably the same horizon.

The bryozoan mudstone and felspathic, spiriferid sandstone at 3960 feet at Lake Rodway possibly belongs to the Woodbridge Group, while the conglomeratic sandstone at 4160 feet could be the Palmer Sandstone. This would put the Woodbridge Group at about 400 feet thick, and the Ferntree Group at 280 feet plus. These figures agree generally with those obtained at Douglas Creek, as indicated by the diagram.

Apart from the basal conglomerates, there are no well-exposed sections through the Permian in the Cradle Mountain-Barn Bluff area, except perhaps immediately south-east of Barn Bluff at the head of the cirque.

#### GENERAL DISTRIBUTION OF THE PERMIAN

At Cradle Mountain, the Permian is quite thick under the Little Horn, and best exposed on the north face. There is none across the saddle to the east. To the west the unconformity rises steeply, so that there is a thin layer of Permian under Weindorfer's Tower and around the north face to the head of the Fury Gorge. On the east face, immediately below the summit, dolerite rests on Precambrian with the Permian thin or absent.

An easterly trending fault, presumably Jurassic, down-throws the Permian at the south end of Cradle Mountain, so that almost a full sequence is exposed under the dolerite of Barn Bluff. Between Barn Bluff and Mt. Emmett, the unconformity rises east, with the Permian apparently overlapping onto the Precambrian and cutting out just east of Mt. Emmett. This eastern boundary runs roughly south to near Lake McRae.

It appears, therefore, that the Permian occupies a basin elongated in a northerly direction with the Little Horn at the northern end. The basin is faulted, and the dolerite has been intruded subhorizontally to transect the stratigraphy very rapidly.