

ROCK TYPES AND STRUCTURE IN VICINITY

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UR 1954/19-21 OF RAILWAY BRIDGE OVER THE BLACK RIVER

An examination of the country in the vicinity of the proposed new Railway Bridge over the Black River was recently made on behalf of the Transport Department. The new bridge is to be constructed at the same position as the present one.

GEOLOGY:

In spite of a covering of river alluvium and blown sand over much of the area, there are sufficient outcrops to indicate the detailed structure of the rocks in the vicinity of the bridge. All these rocks in this area then belong to the Carbine Group, in age intermediate between the Upper Pre-Cambrian and Lower Cambrian, but many different facies are represented here and may be described from top to bottom of the group as follows:-

1. Dolomite: The once extensive beds of dolomite that formed the top layers of the Carbine Group have been eroded away until only a small patch remains. This can be seen outcropping on both sides of the Black River both east and west of the Railway and Road Bridges and it is the rock into which the bores to test the bridge's foundations will have to be put. The rock varies in texture and colour from place to place. In some beds it resembles the typical Smithton dolomite, that is light fawn in colour and of an even fine grain. In others, as at the bridge, it is a fine grained whitish rock, but seamed irregularly with coarser crystals, some of which in hand specimens have a darkish appearance. In places, the dolomite is intruded by veins and stringers of quartz, but these do not appear to be common in the beds near the bridge. The dolomite is well jointed and, on weathered surfaces, shearing is apparent.

A thin section of this rock was cut and examined by Geologist, G. Everard, who reports - "Pale grey rock with grey and white laminations and grey and white mottling. Under the microscope the rock is seen to consist entirely of carbonate. The laminations consist of alternative bands of extremely fine grained and less fine grained carbonate. The mottling is due to medium to coarse grained carbonate which has formed by solution and recrystallisation. The rock is a carbonate rock which has suffered some regional metamorphism".

2. Chert: Beneath the dolomite are thin beds (100 feet in thickness) of fine grained dark grey, cherty material. As these beds are so very narrow as well as being susceptible to erosion, their outcrop is not common. However they may be seen at low tide on the North bank of the River below the road bridge, where traces of the original slaty cleavage are apparent.

3. White Quartzite: Again these beds are narrow of the order of 150 feet. This quartzite is very hard, white and siliceous and sometimes shows marked shearing parallel to the fold axis. Beds of these rocks may be seen where the River narrows at the

site of the proposed new Road bridge downstream from the present bridge. Here they grade into -

4. White Conglomerate: This rock, because of its hard siliceous nature, freely outcrops and its surface expression is apparent in country slightly raised from that occupied by rocks above and below it. Although shearing is apparent it does not result in the elongation of the pebbles thus distinguishing this conglomerate from the West Coast Range Conglomerate on the one hand, and the Stretched-pebble Conglomerate of the older Pre-Cambrian on the other. The conglomerate beds are wider than those of the cherts or quartzites and average 250 feet but there is some local grading between the quartzites and conglomerates.

5. Slates and Quartzites: These, the lowest beds of this series, are far more extensive than any of the others and probably reach some thousands of feet in thickness extending beyond the area in question. They correspond to the grey-green quartzite beds described in the Smithton Bulletin and contain a whole variety of rock types, varying from a rather siliceous slate with plentiful mica to a true quartzite. They are grey-green in colour but weather to purple tints and may be seen outcropping freely near the mouth of the Black River, as well as at many points further east along the coast line.

STRUCTURE:

The sediments are folded about a synclinal axis which roughly follows the Black River at this point, that is it courses about 70° . However the folding is complicated by two factors. Firstly, the syncline is plunging to the west in the eastern portion and to the east in the western portion, thus taking the form of a narrow elliptical basin, with bands of successive rocks appearing on the surface from the upper beds of dolomite in the centre to the lower beds of slates etc. on the outer fringes. The axis of the fold swings more to the north in the eastern portion and to the south in the western. In the latter locality the eastern plunge becomes halted so that a long narrow band of conglomerate is included as a sort of outlier in the slates.

Secondly, the folding is rather overturned, this being indicated by the measured dips of several beds. Those to the north of the axis dip to the south at 25° - 30° , while those to the south dip in the same direction but at 70° . These two complications of the normal synclinal structure are illustrated in the accompanying sections.

Due to their greater incompetency, the slates have suffered a series of minor folds and bucklings in the neighbourhood of the hard massive conglomerates.

POSITION AT THE PROPOSED BRIDGE SITE:

The rock to be encountered at no great depth from the surface is the dolomite, a comparatively soft but tough rock consisting of a mass of crystals of calcium magnesium carbonate. This rock should have

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a depth of at least 200 feet before the chert is reached. Bedding is not well pronounced in the dolomite but the beds dip at shallow angles to the south on the northern side of the River and at steep angles to the south on the southern side. Jointing is well pronounced in the outcrop, but is in many directions and not regular. Shearing and incipient brecciation are apparent to a minor degree.

Overlying the dolomite beneath the bridge are small outcrops of recent semi-consolidated material containing pebbles and small boulders of dolomite and quartz. This is normal river wash and is not expected to be of any great thickness.

Sgd. Terence D. Hughes

GEOLOGIST

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