

Possible sites for a Dam to hold water for a projected gravitational water supply for Devonport are being reported on by Mr. J. L. Fowler. Recently I accompanied him to inspect the proposed sites from a geological point of view.

The three sites are situated on the Don River; the first where the Spreyton - Sheffield Road crosses the river, the second at the entrance to Bott's Gorge, about three quarters of a mile below the crossing, and the third about a mile and a half above the crossing.

The Don River, in this locality has cut down about 400 feet into the general plateau level, but it is still from four to five hundred feet above sea-level and generally flowing with quite a strong velocity. Where the river has cut into hard conglomerates the banks are steep (generally 20° to 30° slopes) and close together but where it cuts into Permian Rocks and limestone the valley widens considerably and areas of alluvial flats occur.

A great variety of rock types occurs within a small compass here, varying in age from Cambrian to Tertiary.

In the south of the area, above the junction of Aitken's Creek with the Don, are outcrops of Cambrian slates and partly silicified tuffs. There is only a small area of these rocks, which outcrop in the river bed and to about a hundred feet above it, and they generally strike about 5° and dip to the west at fairly shallow angles.

Representatives of the Ordovician are the West Coast Range Conglomerates series and the Gordon River Limestones. The former are the more widely distributed and form prominent hills and ranges. Their weathering produces a valuable gravel and several pits have been opened up in this locality. Occasionally hard quartzite beds occur, but the series consists mainly of conglomerates containing quartzite and schisty pebbles. Small outcrops of limestone, remnants of once wide-spread beds, may be seen outcropping just above the bridge over the Don. This is the typical Gordon River limestone containing abundant calcite. All observed dips in the Ordovician rocks were to the west, the beds striking approximately north and south.

Permian rocks underlie much of the lower lying ground near the Don bridge but rarely outcrop. In road cuttings may be seen cream-coloured rocks varying from fine grained sandstones to siltstones. Holes sunk near the No. 1 site to depths of 12 to 13 feet show blue-gray sandstones containing marine fossils and occasional pebbles and boulders.

Jurassic dolerite has intruded the Permian rocks near their junction with the Ordovician limestones and conglomerates, while Tertiary basalt has been extruded in large sheets and occupies much of the higher country.

The relationships of the various rock types may be seen on the accompanying map. The structure of the older rocks is a little difficult to determine owing to the blanketing by more recent formations. In the general area of the Don appears to be a syncline plunging rather sharply to the north so that Cambrian rocks

outcrop to the south, then Ordovician and, in the vicinity of the bridge, limestone. A hidden fault near the bridge has apparently caused the upthrust of the Ordovician beds further north at Bott's Gorge. Much of the limestone had already been eroded before the deposition of the Permian which occurred on an erosion surface in hollows between conglomerate, and to a lesser extent, limestone hills. The Permian rocks are generally only gently tilted in more than one direction though slump bedding occasionally reveals dips of over 10° .

THE DAM SITES

The No. 1 site is situated at the present bridge over the Don. Holes sunk to 13 feet on either side of the river show that the rock on which a dam would be constructed here is a Permian Marine Sandstone. This appears to be a weak porous rock which, when exposed to the air, rapidly disintegrates. This same rock would underlie most of the basin behind this dam, except for a patch of limestone to the west of the basin. The limestone would also probably underlie the Permian sandstone. The thickness of the sandstone would vary considerably in different parts of the basin as this rock appears to have been laid down on an erosion surface of limestone. This site then should be discouraged for three reasons.

1. The Permian sandstone is a permeable rock and although the rate of loss of water from any dam may be small it must be considered.
2. Outcropping over portion of the surface and underlying the sandstone at no great depth in other places is Ordovician limestone. The limestone although itself impervious to water is a slowly soluble rock and may contain large underground spaces and caverns where water could be lost.
3. The Permian sandstone appears to be a very weak rock on which to construct a dam.

The No. 2 site appears to be ideal for the actual construction of a dam as it would be between two steep conglomerate walls and the conglomerate is a very hard and impervious rock. Smooth faces of rock in the Bott Gorge suggest a fault but the conglomerate appears to be solid enough across the stream bed.

However, some of the same objections to the basin might be made as in the No. 1 project as, although a little lower, much of the basin would be the same as No. 1.

From a geological point of view the proposed No. 3 site is by far the best. Here walls of conglomerate, having little soil cover, rise from either side of the Don River at slopes of about 25° . There is no alluvial plain here. The rocks underlying the basin are in the main conglomerates with a small patch of Cambrian rocks (themselves impervious) near the top of the basin to the south.

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While perhaps erring on the conservative side, I would not recommend the No. 1 site and of the other two I would favour the No. 3 site.

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