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27. Investigation of Lilydale water supply.

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At the request of the Lilydale Council a geological investigation was undertaken of a tributary of McGowans Creek. The township's water supply, part of which is taken from this stream, is badly discoloured and contains a high percentage of sediment which is deposited as a fine mud in receptacles such as baths. This discoloration increases noticeably during winter and after periods of heavy rain.

GEOLOGY

During a brief inspection of the intake area [EQ210330] with members of the local water supply committee, the writer noticed that the intake, a small concrete weir, was situated in a massive, fine-grained dark grey mudstone. The outcrops of the mudstone on both banks at the weir have fretted and weathered very extensively to a light grey and fawn rubble which breaks down to a light fawn and brown clay. It was also observed that a series of small landslips were present along the valley sides of McGowans Creek and its tributaries. These slips appeared to be at approximately the same level within the mudstone horizon and below what was indicated by the committee members as sandstone benches.

It appeared very likely that the Lower Permian mudstone is the source of the sediment in the town water supply, particularly as the creek is fast flowing and is actively down-cutting and eroding a narrow steep-sided valley in the steep slopes below the sandstone benches. Slips on the valley sides and heavy rainfall in the catchment area would further add to the sediment that the stream was carrying.

Large boulders of relatively unweathered dolerite occur along the eastern bank of the tributary from the Patersonia road [EQ205332] to the intake area. From the size and number of these dolerite boulders it appeared possible that a dolerite contact may not be far away from the intake area. The boulders have been mapped as a patch of dolerite talus and a mudstone sequence of Early Permian age has been shown to be overlain by a sequence of sandstone and conglomeratic sandstone (Longman *et al.*, 1964). The sandstone is in turn overlain by thick deposits of dolerite talus on the lower slopes of Mt Arthur.

A traverse was made up the tributary from the intake, where massive and poorly bedded mudstone is exposed in the narrow valley. In the stream bed and the banks near the water level the mudstone outcrops are fresh and unweathered, but the banks are fretting even under the forest cover and are often weathered to soft mudstone and clay. During times of heavy rain the run-off from the banks must contribute a high percentage of the sediment apart from that provided by the downward erosion of the bed of this vigorous stream.

The dips in the mudstone are irregular and frequently dip downstream, even though it is obvious that by ascending upstream a higher position in the Permian sequence is obtained. The poorly bedded mudstone is exposed almost continuously to an elevation of about 200 m above the intake. Further upstream the beds become noticeably more sandy. At an elevation of about 180 m above the intake a conglomerate bed, one metre thick, occurs within the mudstone. This bed is 1.2-1.5 m in thickness and dips gently to the south.

A poorly sorted sandstone and conglomeratic sandstone bed crops out at an elevation of about 200 m above the intake. This bed is 1.2-1.5 m in thickness and is a mixture of coarse sandstone, grit and fine conglomerate showing

a mottled texture characteristic of Permian rocks and due to the reworking of the sediment by 'worms'. Outcrops of sandstone continue to an elevation of about 240 m above the intake. The lithology of the sandstone changes rapidly and at an elevation of about 240 m above the intake it is fine-grained, light grey in colour and well bedded. The presence of a brown clay soil suggests that some mudstone may occur within the sandstone sequence, although no definite outcrops could be found.

The top of the sandstone is marked by a change in relief. Within the mudstone the stream is situated in a deep narrow valley whereas on the sandstone bench it lies in an open valley. At an elevation of about 245 m above the intake dolerite talus or possibly an outcrop of dolerite occurs. This talus continues upstream to the track from the wireless masts to the Mt Arthur road [EQ216320] at which point the traverse finished.

Near the intake dolerite along the eastern bank of the stream forms a low bench on which the Lilydale Poultry Farm and 'Craigellachie' are situated. These dolerite blocks or boulders occur along the stream from the Patersonia road to an elevation of about 90 m above the intake on the eastern bank of the stream. No dolerite boulders were seen from this level until 245 m above the intake level. The low bench may be a residual talus remanent but it appears more likely to have been formed by slumping from the higher level talus.

Large scale slumping has occurred in the mudstone beds as indicated by the random dip reversals in the outcrops upstream.

GEOHYDROLOGY

The traverse up the tributary of McGowans Creek was undertaken on 4 May after heavy rain had fallen during the previous day and night. The water in the stream was badly discoloured (grey-brown) at the intake area. This discoloration continued to an elevation of 245 m above the intake (*i.e.* above the sandstone) where the stream is joined by its first major tributary. When the dolerite talus was crossed there was no discoloration present, in the water of either the main stream or its tributary. The change in the colour of the water was rapid and dramatic.

CONCLUSIONS

There appears little doubt that the sediment which colours the water of the town's supply is due to the erosion of the Lower Permian mudstone. Unfortunately no improvement can be expected unless the intake is raised to about 245 m above its present level (*i.e.* within the upper dolerite talus). This appears to be a major engineering task if the pipeline is to follow the line of the stream. A more suitable route either for a diversionary concrete flume or pipeline may be possible down the spur east of the stream, leading to the Lilydale Poultry Farm.

RECOMMENDATIONS

The source of the sediment in the town's supply should be confirmed by collecting samples from the headwaters of the stream, from the track to the wireless masts, and from the intake at various times during the coming winter.

A feasibility study could be made for a diversionary flume or pipeline.

REFERENCE

LONGMAN, M.J.; MATTHEWS, W.L.; ROWE, S.M. 1964. Geological atlas 1 mile series. Zone 7 sheet 39 (8315S). Launceston. *Department of Mines, Tasmania.*

[4 June 1975]