

LOCATION.

The road from Hobart to Collins Vale branches off from the main Hobart to Launceston road near the Berriedale railway station and runs in a general westerly direction towards Collins Vale. At a point about 5½ miles along the road from Berriedale, the road runs in a general southerly direction up the eastern side of a steep gully which forms one of the heads of Faulkner's Rivulet. It then crosses the gully and runs along the western side in a general northerly direction for several hundred yards. It is about midway along this northerly piece of road, that a large fall of rock, soil etc. blocked the road several months ago.

GEOLOGY.

The country is formed of horizontally bedded strata belonging to the Permo-Carboniferous System. The road cutting near the fall expose the typical thinly bedded mudstones of this system. At an elevation of 60 to 80 feet above the road a quarry has been opened out in a bed of limestone interbedded with the mudstones, the limestone being "burnt" to reduce quicklime.

QUARRY DUMP.

The overburden of soil, sub-soil, mudstones etc. from the quarry was tipped over the eastern side of the ridge, and a waste dump was thus formed below the quarry on the summit of the ridge. The road was constructed 60 to 80 feet below the quarry.

MATERIAL INVOLVED IN THE SLIP.

An examination of the material blocking the road showed it to consist chiefly of large pieces of limestone, mixed with finer material such as soil subsoil etc. Further it is in every respect identical with the material forming the remaining portions of the dump. An investigation of the locality from which the greatest depth of material is removed by the slip reveals only clayey matter representing either soil etc. from the dump or portion of the old surface of the hillside. The mudstones have not been exposed and it is certain that the slip did not extend to the bedrock of the hillside. The slip was confined almost entirely to the material of the dump except possibly for a few feet of surface soil and sub-soil which may have been involved due to the movement of the overlying material of the dump.

LIMESTONE NOT THE CAUSE OF THE SLIP.

It is generally thought that the slip was brought about by the presence of limestone which under certain circumstances is responsible for hillslips. Limestone causes landslips because it is dissolved by ground water containing carbon dioxide in solution thus producing openings, cavities, caves etc. Support is thus removed from below overlying rocks etc. which therefore fall under the action of gravity when the surface below has a sufficiently steep slope. Limestone can therefore only produce falls of overlying rocks etc., and as the fall at Collins Vale is below the limestone bed, the above conception of limestone being the cause, is erroneous.

## CAUSE OF THE SLIP.

The material involved in the slip has been shown to be almost entirely that of the dump. Examinations of portions of the slip show that the bottom on which the slip occurred (now exposed as the surface) consists of clayey material which has undoubtedly been affected by the action of water. The series of actions which have caused this and also the slip are as follows:-

The dump was formed on the hillside which had a steep slope to the east. A low wall of rock was built to retain and hold the "toe" of the dump. The material behind this wall consisted chiefly of broken pieces of limestone, with pieces of mudstone, soil, sub-soil etc. mixed with it. The rain water which had fallen on the dump since its formation had been gradually washing all the finer material of the soil, sub-soil, decomposed mudstones, and that attached to the pieces of limestone and mudstones, down towards the lower portions of the dump against the original surface and also to the toe of the dump.

As time went on therefore the finer material accumulated against the original surface of the hillside and against the toe of the dump. This material contains a considerable proportion of clay, particularly that portion of it which originally arose from the decomposition of limestone. The upper part of the dump became comparatively open and porous as a result of the above processes and rain water could more readily penetrate to the bottom and toe of the dump. The clayey material would become wet and saturated after each rain and this process may possibly have extended into the upper part of the soil on which this clay rested. There would be thus formed a very slippery bottom on which the dump would readily move and one likely to cause movement of the dump.

Further the accumulation of clayey material at the toe of the dump would tend to form a temporary inefficient dam which might during periods of heavy rainfall temporarily hold back appreciable quantities of water behind it. Another force would then be operative on the low wall holding the toe of the dump and the pressure due to it would act at right angles to the wall retaining it and would be largest at the greatest depth. Such a pressure is much more of a destructive agent than that due to the dump itself. It is certain that after several successive periods of heavy rainfall one or both of the above conditions were produced and resulted in the destruction of probably a small part of the toe of the dump. This would upset the equilibrium of the dump and large portions would immediately become unstable and move down the hillside.

## FUTURE MOVEMENTS.

The remaining parts of the dump above the road have been left in a state of more or less unstable equilibrium. Rainwater will act on them as it did on the whole of the dump, and will cause movement much more quickly as the portions are already unstable.

## RECOMMENDATIONS.

There is of course only one procedure possible to re-open the road for traffic and that is to remove the obstruction. At the same time it would be advisable to dislodge as far as possible the largest at least of the remaining portions of the dump on the hillside as these will certainly tend to fall and block the road again.

Landslips of the original surface of the hill are not likely to occur, although now that the surface has been damaged by the above fall, there is more likelihood of such occurrence.

CONCLUSIONS AND REMARKS.

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This incident which has been reported on above has been shown to be nothing more than the collapse of an old dump from a quarry which has partly destroyed, and blocked the remainder of, a road. The position of a dump on such a steep hillside and immediately above a road must have eventually resulted in a happening such as that which has already taken place. It naturally raises the question of whether dumps should be constructed in positions where they may damage public facilities such as roads, railways, etc. or interfere with natural features such as streams and drainages, channels etc. Some degree of supervision should certainly be exercised upon the formation of dumps in order to prevent happenings such as the above. This might advantageously be performed by the Inspectors of Mines who visit most of the quarries in the course of their inspectorial duties.

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