As to the action of these remedial measures, a few words may be added.

The aim of the porous layer under the impermeable lining of the headrace is twofold: it serves as a means of preserving the natural moisture of the ground, and at the same time to give warning should a rupture in this lining occur. As, in my mind, a rupture is possible only in case of an earthquake or a tectonic movement due to other causes, the first sign of it should immediately call for emptying the lake through the diversion-tunnel. I would, therefore, in order to prevent any future disaster, propose that a device be installed signalling instantly any exceptional increase of water in the drainage-tunnel north of the power-house.

The more importance I give to the aforesaid porous layer, the more strongly I recommend that it be arranged with proper care and with the use of proper materials. There is a theoretical possibility that it might partly clog on account of weathering of the underlying rhyolite rock. I feel, nevertheless, convinced that it will serve its aims if carried out properly.

I finally draw attention to one circumstance—the lining will greatly add to the stability of the spillway.

For reasons partly akin to the reasons calling for a lining above the spillway, I recommend that a watertight concrete lining be provided immediately on top of the rock below the spillway extension.

REPLY TO THE ORDER OF REFERENCE GIVEN BY THE MINISTER OF PUBLIC WORKS.

(1)–(1*c*).

(1) Are the general surroundings, the class of country, and the power-development possibilities such that the locality was suitable for the economic generation of hydraulic power?

> The general surroundings, and the power-development possibilities at Arapuni are such that the locality is very suitable for the economic development of hydro-electric power. Concerning the class of country, it may be said that it by no means excludes the possibility of creating a successful water-power station on this site.

Also under this heading replies to the following:—

(*a*) Whether it is likely that the country supporting the lake is capable of continuing to retain the weight of water, having special reference to the part known as Acacia Gully; if it is not capable of continuing to retain the weight of water, what steps, if any, are recommended to create adequate strength; and an estimate of the cost of carrying out such strengthening work?

> I have no doubt but that the country supporting the lake is capable of continuing to retain the weight of water. According to information obtained, the special reference to Acacia Gully has been raised mainly because the water-level in the Acacia Gully has shown a certain correspondence with the water-level in the lake. However, this correspondence does not necessarily imply that there has been an underground stream of water running from the lake to the Acacia Gully. When the water-level in the lake is raised, the ground-water in the plain between the lake and the Acacia Gully is also raised, and thus an increased quantity of water from the plain itself is drained towards the Acacia Gully. No water, however, can run from the lake into the Acacia Gully as long as the ground-water level in the plain is higher than the water-level in the lake.
>
> Thus the only way to ascertain whether there is a ground-water stream running from the lake to the Acacia Gully is to find out, by means of borings, the ground-water level in the plain. Such borings should be made, and the ground-water level in them should be subjected to investigations, especially during dry seasons. In view of the comparatively small average gradient between the water-levels in the lake and in the Acacia Gully, and considering the nature of the ground, I feel inclined to believe, however, that there is no likelihood of a ground-water current creating a breach in the Acacia Gully.