the different river-valleys from Taupo Township to the Tauranga River, and especially on each side of the Hinemaia River to the first branch going to the south-east. Above the forks of the Hinemaia these gravels and great part of the underlying pumiceous sands have been removed, pulled down, and reassorted by the action of the streams in cutting down their valleys, and owing to the proximity of such streams (the Hinemaia and its tributaries) the whole country has been worked over, and nothing more remains of the high-level breccias in this part of the district. The product of reassortment, however, is found in the shape of rhyolitic gravel along the beds and banks of the different streams, and forming the upper surface of the different terraces formed by the principal river or lesser streams. Grinding, removal, and concentration of the denser material has thus been carried on, and, as a result, here and there a fine colour of gold is sometimes to be found in the concentrates over the lower grounds and terraces. To this breccia of volcanic rocks and the concentrates of the same I refer the gold found in the Hinemaia, rather than to the rocks of the Kaimanawa Range, which, though reaching into this watershed, are yet but feebly represented in the gravels of the streams discharging by the Hinemaia into Lake Taupo. The whence of this great body of rhyolitic breccia has not been ascertained. It is distant from where it is now found north or south of the lower Hinemaia River, and probably lies in the wooded mountainous country to the eastward, in the direction of the north-east sources of the river. The grey quartz trachyte, as distinguished from this dark fluidal rhyolite and pitchstone, forms the fundamental rock of the district examined, and seems to be largely developed in the upper valley of the Hinemaia, before the river begins to trend to the south, into the higher part of the Kaimanawa Range. If this be the source of these breccias—and there seems to be none other—from this direction also the gold must have come; but only further prospecting and careful intelligent search will make this clear.

28th July, 1899. ALEX. MCKAY.

REPORT ON THE SUPPOSED GEM-BEARING FORMATION NEAR RIVERHEAD, AUCKLAND.

BY ALEXANDER MCKAY, F.G.S., Government Geologist.

SIR,— 28th March, 1899.

Between the 25th and 28th of February last I visited Riverhead, one of the upper reaches of Waitemata Harbour, for the purpose of examining the beds from which it has been reported gem-stones of various species have been obtained. Originally Henderson was prospected for precious stones, and it was claimed that diamonds had been discovered in that locality. Samples of the stones obtained were submitted to Mr. Pond, analytical chemist, Auckland; but that gentleman informs me that he was unable to determine the presence of diamonds or gem-stones of any value in the material submitted to him, and that the stones submitted to him were altogether too small to be of value.

Subsequent to my going to Riverhead I met, in Auckland, the prospectors who are engaged in the search at Riverhead. They informed me that they had commenced at Henderson, but soon satisfied themselves that what they sought was not likely to be found in that locality; but, tracing indications, they were gradually led eastward, towards Riverhead, where for some time they have been located, and where they believe they have good prospects of finding what they seek for. The prospectors at Riverhead have applied for, and been granted, a prospecting license for minerals (other than gold and silver) and precious stones, and have done a fair amount of work in the shape of sinking and driving at various points on the south-east face of the plateau that lies to the north-west of Riverhead. These varied works I examined, and though none of them were of an extensive character, they were sufficient to show the nature of the material being excavated and to indicate the formation being prospected. I also had some of the concentrates supposed to contain stones of a valuable kind submitted to me for inspection. The stones were all very small, all of them under a tenth of an inch in diameter, and most of them I could determine as quartz, in part the detritus of quartz trachytes, or a rhyolite formation, of which there were evidences to be obtained in the beds of coarser grain, and breccia conglomerates interstratified with the sands of finer grain constituting the great bulk of the formation. I pointed out the improbability of getting stones of any considerable size in the beds of finer grain, and indicated some conglomerates in the vicinity as more likely to yield what was sought for. This advice was followed, and in one of the conglomerate-bands referred to transparent stones of larger size were found. A parcel of these has been forwarded to the department, and the Government Analyst's report is to the effect that all the stones tested proved to be quartz.

The formation thus prospected is the same as seen on the shores of the Waitemata Harbour from Auckland to Riverhead; at Devonport, and thence along the west shores of the Hauraki Gulf to the mouth of the Okura River, beyond which it recedes inland, the boundary-line between this and the cretaceous rocks of the Wade, passing across Dairy Flat in a north-west direction. West and south from Dairy Flat they form the country on the north side of the upper part of Manukau Harbour, and across Lucas Creek past Riverhead to the western base and slopes of the Hunua Range. The beds, as developed near Auckland, have been often described, and a great diversity of opinion as to their geological age has been expressed.

I have dealt with the question of the age and relations of these beds in the reports of the Geological Survey for the year 1883–84, page 101, and I clearly point to unconformity between the beds over and underlying the Parnell grit. The higher beds are those that concern us at the present time. In the report above referred to, the age of the trachyte sands is stated to be Miocene. They are certainly not older than the Younger Miocene, and might be considered as of Pliocene date. The fossil evidence is nowhere of a decisive character, and it is abundantly clear that the first outburst of acidic volcanic rocks of late Tertiary date had begun before the lowest of the sedi-