

the Lyttelton end, the lava-streams, when first passed through, were so wet that the workmen could scarcely continue the work. In these streams all the cellular cavities were either lined with sphærosiderite or filled with calcite. Sixteen chains from the Lyttelton entrance, in the agglomerate bed No. 228, and from a fissure reaching from the roof of the tunnel, a copious spring flows which has a constant temperature of 65·20 degrees Fahrenheit, consequently 12·20 degrees above the mean temperature of Christchurch—about 53 degrees. Several eels have been caught near this spring in the drain which runs from here to the mouth of the tunnel. There being no connection with any other watercourse, these eels must have ascended by the spring; they belong to the species *Anguilla aucklandii*, Rich., and have properly developed eyes. During the construction of the tunnel it was frequently observed in the north, or Heathcote end, that the water rose in the floor before a south-west gale, and subsided before the gale lulled; no observations could be made to ascertain whether the state of the tide had anything to do with this. The height to which the water rose was somewhat under half an inch. After the earthquake of August 17, 1868, this spring in the tunnel increased to such an extent that it laid the rails slightly under water; after a few days it decreased again to its former volume.

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ART. LXXXV.—*Notes on a Salt Spring near Hokianga.* By J. A. POND.

[Read before the Auckland Institute, 9th September, 1878.]

IN looking over the Transactions of the New Zealand Institute, just to hand, I read with pleasure the paper by W. Skey, on the Mineral Waters of New Zealand, in which he gives the analyses and description of waters from all known springs in the Colony. As we might expect, the North Island, and particularly this district, has supplied the large majority of samples; but though much has been done in this respect there are very many springs containing mineral salts, and having medicinal properties, which still remain unexamined, and leave a rich field for those having the will and capacity to bring them to light, or rather to the Transactions.

Some months ago, Judge Monro first mentioned the existence of a salt spring to me, and on a later occasion kindly placed a few ounces of the water at my disposal, too small an amount to make a complete analysis of, but as its especial characteristic was its saline nature, I have made a partial quantitative analysis, which I give below.

The spring in question is situated in dense bush, on the dividing range between the Wangape and Waihou rivers, the latter of which runs into Hokianga Harbour. The distance from the sea in a direct line is about nine or ten miles, and is at a considerable elevation above sea level; hence the presence in large quantity of chloride of sodium is highly interesting, showing, as it does, that there must be in the locality a deposit of salt, probably some distance below the surface, which I should judge from the fact of its not being more highly impregnated. As will be seen by the analysis, this water contains about the same percentage of chloride of sodium as ordinary sea water, but differs therefrom in the absence of sulphates. The following gives the chief constituents, so far as the small quantity of the sample at my disposal would permit:—

The solid matter equals 2937·558 grains per gallon, composed of—

Organic matter	..	..	..	..	51·115
Soluble silica	..	..	..	..	49·562
Carbonate of Magnesia	..	..	..	..	18·710
Chloride of Potassium	..	..	..	..	1·9
,, Sodium	..	..	..	..	2797·4
Lime and Iron	..	..	..	..	traces
Sulphuric Acid	..	..	..	..	”
Loss	..	..	..	..	18·871

The sample was accompanied by a very large amount of fine sedimentary deposit, which proved to be silicate of alumina, with a trace of iron and lime. After standing some days the water was opalescent, acid reaction and strong saline taste. From the appearance of the deposit, and a few fragments of gravel brought separately, I should judge the locality from whence the water was taken to be of a clay-slate formation; but during the coming summer I hope to make an examination of the place in which this spring is situated, and a further one of the water. Spectroscopically I could not detect lithia. As I have already mentioned, this spring ranks higher than any other in this Colony, so far as records show, in regard to the amount of alkaline chlorides present.

While speaking with respect to springs not included in Mr. Skey's report, I will add some information respecting two other mineral waters from our district which have been analyzed. The first is located near Whangarei, and is highly charged with carbonic acid gas. The springs are surrounded with a vitreous-looking silica, and in places with large quantities of a very light porous rock, presumed by the residents at first to be meerschaum, but this I find on examination to be incorrect, the chemical tests showing it to be a silicate of alumina, and the microscope resolving it into an infusorial earth, well worthy the consideration of our

microscopists. Mr. Cheeseman, to whom I am indebted for the samples just alluded to, forwarded some of the water to Mr. Skey, of Wellington, whose report, just received, I will now read.

The other sample I have now to mention is a hot spring at Motuhora (Whale Island), in the Bay of Plenty. Here the water flows out of a valley in large quantities into the sea, the heat being so great as to cause volumes of steam to rise as the water flows over the sand. The temperature of this spring, where it rises from the ground, is 198° Fahr., the taste being extremely acid, and the water very clear. I am indebted to Mr. Tunny for the analysis, which is as follows:—

Sulphate of Soda .. ..	17·60 grains per gallon.
„ Lime .. ..	7·52 „ „
„ Magnesia .. ..	5·00 „ „
„ Alumina .. ..	48·48 „ „
„ Iron .. ..	9·38 „ „
Sulphuric Acid, free .. ..	138·32 „ „
Silica.. .. ..	24·00 „ „
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	250·30

ART. LXXXVI.—*Notes of a Traditional Change in the Coast line at Manukau Heads.* By S. PERCY SMITH.

[Read before the Auckland Institute, 18th November, 1878.]

SOME thirteen years ago, when encamped one night with a party of natives on the long beach which extends from Manukau to Waikato Heads, the conversation over the camp fire turned upon some old tribal boundaries, one of which ended at a place said by Aihepene Raihau, the narrator (who was then living at Waiuku, but who now, having married the Princess Sophia, resides in the King's country), to be now covered by the sea. Upon enquiring further of him as to this particular place, he informed me that many generations ago the coast-line extended much further seaward than it does at present, projecting in a curved line from Manukau Heads to the Waikato River. This point he described as a low, sandy country, with numerous sand-dunes, fresh-water lakes, with clumps of tall manuka trees scattered over its surface.

The lakes were much resorted to by the natives in those days, on account of the great number of eels found in them.

He further stated that it was a three days' journey at that time for a man following the beach from Manukau to Waikato Heads, whereas the present coast-line is a very nearly straight line, and the distance may be