

"Samples of water were taken from two springs at Yandanooka; an analysis of one of these has been made in the Survey Laboratory and is attached, the other sample will have to await the exigencies of the Departmental work."

Analysis of Water, by E. S. Simpson.

Locality—Yandanooka North Spring.

Geological Survey Laboratory No.—1839B.

—		%	grs. per gall.
Sodium Chloride ...	Na Cl	.1293	90.51
Potassium Chloride ...	K Cl	.0015	1.05
Magnesium Chloride ...	Mg Cl ₂	.0078	5.46
" Sulphate ...	Mg S O ₄	.0086	6.02
" Carbonate ...	Mg C O ₃	.0013	.91
Calcium Carbonate ...	Ca C O ₃	.0011	.77
Sodium Nitrate ...	Na N O ₃	.0011	.77
Silicate ...	Si O ₂	.0097	6.79
Alumina ...	Al ₂ O ₃	.0001	.07
Iron Peroxide ...	Fe ₂ O ₃	.0001	.07
Organic matter ...	...	strong trace	strong trace
Hardness ...		.1606	112.42
		...	11.7

CLAY DEPOSITS OF THE CLACKLINE DISTRICT.

In July the following report was submitted by Mr. Campbell:—

"The country around Clackline examined for the purpose of this report is included in a radius of about 1½ miles around the townsite. The country is hilly and is traversed in a general east and west direction by the Clackline Gully, which junctions with the north and south valley of the Nanamullen Brook a little to the east of the townsite.

"Granite and gneiss are the prevailing types of rock in this district, and these are traversed in various directions by dykes of diorite, which mostly outcrop along the tops of the ridges and spurs, having resisted the surface decomposition in a greater degree than the surrounding rock. There are also various outcrops of quartz of a 'glassy' character which appear to have been subjected to the same foliating action as the gneiss, for they have sometimes a fluted jointing and a straight cleavage and almost fibrous in texture, quite unlike the normal condition of quartz reefs.

"Some prospecting for gold was carried out some years ago by a miner named Ford near where are now the fire-brick works, a small specimen of gold having been said to have been found by George Bardon, a settler, and some pits were put down from 10 to 50 feet deep; a sample of stone from one of these is stated to have yielded on assay about 2 dwts. of gold per ton. Two of these shafts however proved the existence of fireclay to, it is said, 50 feet, this led eventually to the starting of fire-brick works there. These are situated in Loc. 19 about one mile west of the townsite. There is here a broad band of mica schist, crossing the valley of the Clackline Brook in a direction of about 155 de-

grees. On the north slope of this valley the schist has a width of about eight chains with ferruginous walls composed of laminated ironstone; between these walls the schist has been kaolinized into a grey and white clay, varying from pipeclay to hard kaolin, from which the fire-bricks are being made. The clay pit is 30 feet deep, but there is no sign of the clay being limited to that depth, nor is there any deterioration with depth. The kaolinization of the schist can be seen to extend for ¼ mile at least to the northward. In a southerly direction, the ironstone walls do not cross the brook, and the schist appears to widen out to about one-third of a mile, but as far as can be seen in three small wells there, it is not so completely kaolinized. Attached to this report is the result of an analysis by Mr. E. S. Simpson of a sample from a hard seam of clay in the pit, and also a test of the fire-brick produced at these works.

"Most of the dykes are formed of coarsely crystalline quartzose hornblende with occasional finely crystalline portions, as may be seen in the main dyke to the south-east of the town boundary, and in the bed of the Clackline Brook, within the school-ground. In the latter instance the dyke has evidently been intruded while the adjacent gneiss was in a semi-plastic state, for spurs and seraps of diorite occur in the gneiss and small streaks of gneiss occur within the diorite, as shown in the attached sketch.

"The gneiss in the district is almost uniformly very white and quartzose, but adjacent to this dyke it has dark hornblende bands as if produced by an admixture of the same magma that produced the dyke. It is probable that the course of the brook is along a line of fracture in the rocks, with also probably a throw of the southern portion to the eastward. Mineral specimen (6709) is from a bulge-like protrusion from the east side of the dyke on the ridge about seven (7) chains south of the south end of Dwyer Street; here there are several feet thickness of hornblende-mica schist. Several instances of a partial alteration of the diorite towards an epidote rock are to be seen in the neighbourhood.

"The Clackline Brook water has not been found to be suitable for boiler purposes. A small well near the brook was first used for the engine at the fire-brick works, but that source was abandoned in favour of the Coolgardie Water Supply, the pipes of which pass close to the railway there, as the former was found to contain a large proportion of salts of lime and magnesia, as shown by the following analysis made in January last by Mr. S. S. Dougall, F.I.C.:—

	Grains	
	No. 1.	No. 2.
Salt ...	199.0	249.4
Magnesium chloride ...	46.1	77.2
Calcium sulphate ...	11.2	16.6
Do. carbonate ...	23.7	2.0
Phosphoric acid ...	2.5	4.4
Soluble silica ...	1.0	3.0
Organic matter and water or hydration	103.8	94.0
	387.3	446.6

"The dam in the brook opposite the railway station, made for the use of the locomotive engines,

has also been abandoned in favour of the Coolgardie Water Supply."

Analysis of and report upon a hard seam of Clackline fireclay, by E. S. Simpson, Mineralogist and Assayer.

Geological Museum, No. 6256
Do. Laboratory, No. 1896

Silica SiO_2	51.55
Titanic Oxide TiO_2	2.19
Combined Water H_2O	10.41
Soda Na_2O} ... ..	.31
Potash K_2O} ... ..	.11
Magnesia MgO} ... ..	.40
Lime CaO} ... ..	.09
Iron peroxide Fe_2O_3 ... ..	.43
Alumina Al_2O_3	33.25
Hygrosopic Water H_2O} ... ..	.90
	99.64

From the analysis it would appear to be of excellent quality.

"I have examined the samples of Clackline firebricks submitted (by the State Mining Engineer), testing them against the well-known Garterraig bricks from Scotland, which so far as I know are the best obtainable in the local market. The following are the outlines of the test, which is as severe as it can be. The bricks as received were examined for cracks, for fused spots, and for grain. A test was made of their toughness and porosity, and the percentage of silica present was determined. They were then put cold into a red-hot fire packed round with coarse coke and brought to a white heat; after being in the fire for an hour, they were taken out, and whilst still bright red, tested for toughness and plunged into cold water, where they were left till cold. They were then again examined for cracks and signs of fusion, and tested for toughness. The results obtained were as follows:—

	Garterraig.	Clackline.
<i>As received—</i>		
Silica percentage	60.1	65.6
Large cracks	none	none
Small surface cracks	very few	numerous
Fused iron spots	few	medium
Toughness	very high	high
Grain, coarsest fragments	$\frac{1}{4}$ inch	$\frac{1}{2}$ inch
Density, weight of 1 cub. in.	.068	.068
Water absorbed	12.9 per cent.	20.4 per cent.
<i>When red hot—</i>		
Toughness	very high	high
<i>After quenching—</i>		
Signs of fusion	none	none
Cracks	very few	few
Toughness	moderate	moderate."

BEVERLEY DISTRICT.

In March, Mr. Campbell submitted the following report on the results of a geological examination of the Beverley District:—

"In accordance with your instructions of the 7th December last, I made a visit to the Beverley district from 24th January to 19th February, taking first the easterly portion on the Mount Caroling Road and the neighbourhood of County Peak, 12 miles south from that road, and returned to Beverley *via* Bally Bally and Mount Kokeby on the 1st February.

"On the 5th February I left Beverley for Dale River westerly and examined the neighbourhood of Bechtel's station, and crossed the head of the Dale Valley westward to the Canning watershed, and thence in a south-west direction to the 47 mile post on the Albany Road on 13th February, returning to Perth on the 19th February.

"At Ford's location 3886, about two miles north of the Caroling Road and 14 from Beverley, there is a large ferruginously laminated quartz reef, strike about north and south, underlying easterly about 63 degrees; it is apparently about 30 feet wide (6609.) At a large outcrop of this reef about 10 chains south of Ford's north boundary several potholes were made many years ago, and some fair prospects are said to have been obtained. The samples collected by myself from both here and from the same reef about four chains north of the north boundary of Loc. 3886 have been tested in the laboratory, but have yielded only minute traces of gold. The reef is flanked on its western side by ferruginous schist (6610). The reef is considerably brecciated, showing that movement of the rocks has taken place. About ten chains north of the same boundary there is an east and west reef, much faulted, and both it and the adjacent gneiss rock are greatly contorted (6608); about a mile north from here there is a porphyry dyke (6607). There are numerous flat-topped hills about here with a capping of laterite, or ironstone conglomerate.

"The next locality visited was the small watercourse on the south boundary of Loc. 6043 about 21 miles from Beverley, where a small nugget of gold was found lately by Mr. C. Hine, Government Land Guide.

"Three samples of the wash in this watercourse were obtained from 6 to 15 inches depth, and also some samples of a rose-coloured quartz that lay scattered about on the north-east bank, and from some small quartz veins in the south-west bank; these samples and also some collected by Mr. Hine have been tested in the laboratory, minute traces of gold being found in the quartz samples only. The country rock is hornblende gneiss. There is a large white quartz reef about $\frac{1}{4}$ of a mile west of the watercourse having a north and south direction, and which has an unpromising appearance. The watercourse extends only about 12 chains from the road northwards, there being no outcrop of the quartz at this spot. I was not able to form any opinion in regard to it.

"I then proceeded to County Peak and inspected the large quartz reef on which a shaft has been sunk at the north corner of Loc. 2587; this shaft was made by one Jenkins, and is said to be 40 feet deep with a crosscut to the east and a winze. It is said that some prospects of 13 dwts value were obtained here. This reef is over 30 feet wide, and it outcrops very conspicuously for half a mile to the north and south; beyond this distance northward it seems to disappear, but it can be traced at intervals for 3 miles to the south, outcropping very distinctly on the north boundary of Loc. 3705. The quartz throughout is mostly very white with rose-coloured patches, more particularly where cross-jointing occurs.