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REPORT ON THE LAWRENNY-LANGLOH COAL FIELD.

Geological Surveyor's Office, Launceston, 10th May, 1894.

SIR,

ON the 14th of April, 1892, I had the honor to send you a preliminary Report on the coal-bearing ground at Langloh Park near Hamilton, portion of Mr. Joseph Clarke's Lawrenny estate. During the latter half of 1892 four bores were put down in different parts of the field with No. 2 Diamond Drill, and much new information was gained. On the 11th of April last I again visited the locality for the purpose of ascertaining by survey the exact positions of the bores, and levelling sections between them, and I have now the honor to forward to you the present Report, which embodies that previously sent in, with such small alterations as the further information now available renders necessary, and contains in addition much new matter. Two sheets of drawings are also forwarded, the first showing a plan of the field, and the second sections between the various bores and of the strata cut through by each.

The locality shown in the plan is about two miles from the township of Hamilton, County of Cumberland, along the road to the Ouse. In sinking a well close to the Langloh Park homestead many years ago coal was discovered, and in 1891 the well was enlarged and made into a small mining shaft (marked "shaft" on plan) and a quantity of coal was raised, and tried by analysis and practical tests. Some of the results of these tests kindly supplied to me by Mr. F. Milne, of Macquarie Plains, are now quoted, but in addition to these he has shown me twenty-five certificates from various practical users of coal, which all speak highly of the Langloh product for steam-raising, bakehouse and blacksmithing purposes.

ANALYSIS OF LANGLOH COAL (FROM SHAFT).

By Mr. F. Danvers Power, of Melbourne.

	Per cent.
Moisture	3·02
Volatile Hydrocarbons	24·02
Fixed Carbon	63·40
Ash (grey, pulverulent)	9·53
Coke (soft)	72·96
Sulphur (hurtful)	0·01696
Sulphur (harmless)	0·5994
Total Sulphur	0·61636

ANALYSIS OF LANGLOH COAL (FROM SHAFT).

By Mr. W. F. Ward, Government Analyst, Hobart, 9th March, 1891.

	Per cent.
Fixed Carbon (by difference)	66·3
Matter volatile at red heat	23·5
Mineral Matter (ash)	6·2
Moisture lost at 212° F.	4·0

When the powdered coal is heated in a covered vessel, the gases driven off burn with a bright flame, and the residue is slightly coherent, but is not a true coke.

COPY of Letter reporting comparative Trial of Langloh and Fingal Coals on the Government Railways.

T.G.R., Locomotive Department,
Hobart, 6th June, 1891.

To the Locomotive Superintendent.

In compliance with your instructions I have made comparative working tests of Langloh and Fingal coals. The trials were conducted on engine G1 working the suburban trains on the 4th inst. with Langloh, and on the 5th inst. with Fingal, *i.e.,* Mount Nicholas and Cornwall mixed, as supplied to all our engines. Total mileage each day, 160.

The general characteristics of the coals tested are strikingly alike. Appended find tabulated results :—

LANGLOH.

No. of Miles.	Coal consumed.	Residue.	Per cent. of Residue.	Coal consumed per Train Mile.
160	5060 lbs.	547 lbs.	11·03	31·62 lbs.
FINGAL.				
160	5235 lbs.	541 lbs.	10·34	32·71 lbs.

The loads hauled on both days were approximately the same. See engineman's returns attached.

(Sd.) WILLIAM R. DEEBLE.

COPY of Letter re *Comparative Trial on Express Train.*

Tasmanian Government Railways,
Locomotive Superintendent's Office, Launceston, 3rd July, 1891.

Memo. for the General Manager, Hobart.

Subject—Trial of Langloh Coal.

I arranged for a trial of this coal on the express from Hobart to Launceston on the 24th ultimo: it was a light train. The coal kept steam very well all through the journey, with a consumption somewhat less than the coal from the Fingal district; we had not time to weigh it all, and consequently cannot speak with exactness. On the whole it is equal to that from the Fingal mines.

(Sd.) W. E. BATCHELOR, *Locomotive Superintendent.*

Abridged particulars of Comparative Trial of Langloh and Fingal Coals on Express Train from Hobart to Launceston, from data kept by Mr. F. Milne, who saw both trials.

	Langloh.	*Fingal.*
Date of trial	24th June, 1891	26th June, 1891.
Coal consumed	3478 lbs.	4536 lbs.
Distance travelled	133 miles	133 miles.
Coal consumed per train mile	26 lbs. 3 ozs.	34 lbs.

The same engine was used for both trials and the same number of carriages.

Abridged particulars of Test of Langloh Coal for Quantity and Quality of Gas, by Mr. T. S. Cleminshaw, Engineer of the Launceston Gasworks, 4th December, 1891.

Quantity per ton (average of three tests)	10,400 cubic feet.
Illuminating power, corrected (average of three tests)	11·06 candles.

The residue of coal from the retort showed just the slightest approach to cokeing, and weighed 75·91 per cent. of the total. Ordinary Newcastle coal gives from 9500 to 10,000 cubic feet of gas per ton of a quality from 16 to 18 candles.

The above tests all show that the Langloh coal is of good marketable quality, able to compete in our local markets with the Tasmanian coals now occupying them. The low illuminating power of the gas obtained in Mr. Cleminshaw's tests shows that it would not be of value for gas-making, but at the same time the quantity of gas produced indicates that the coal would burn with much flame, a character useful for many domestic purposes and for steam-raising. When I saw the heap of coal at the shaft in 1892 it had been exposed to the weather for nearly a year, but had resisted the crumbling action of air and rain very well; on my last visit, this year, however, some of the large blocks were a good deal split and beginning to crumble a little. On the whole we may say it resists weathering fairly well. It is a strong coal, clean to handle, of a somewhat dull colour, but with occasional bright streaks, and is pretty free from visible stony interlaminations; a little pyrites is seen now and then in it, as in most coals. The mine being full of water I could not examine the seam; Mr. Milne informs me that it is about five feet in thickness, with only one clayey parting one half inch thick, about one foot from the top. It was struck at a depth of 40 feet from the surface; at 45 feet the coal was passed through and a bed of fire-clay was met with, into which the shaft was sunk five feet without getting through it. From the knowledge now obtained from the diamond-drill borings to be below described, especially the No. 2 bore, as it is nearest the shaft, it is pretty clear that the bottom of the shaft must be only a very short distance above a second seam of coal.

When boring with the diamond drill was begun it was believed that the coal was dipping about 1 in 20 to N. 10° W.; this has been since proved to be entirely wrong, the dip being a few degrees to the south of west. The first bore was therefore put down 15 chains N.E. from the shaft, and as shown by the sections must have gone down just outside the outcrop of the seam. The following section was obtained :—

* BORE No. 1.—Commenced 26th April, 1892 ; finished, 16th May, 1892.

Strata.	Thickness.		Total Depth.	
	ft.	in.	ft.	in.
Surface soil and clay	16	0	16	0
Brown tufaceous sandstone, hard, brittle, and full of fractures	34	8	50	8
Grey tufaceous sandstone	2	0	52	8
Very black clod	0	10	53	6
COAL with ¼-inch band of clod at 54 feet 6 inches	1	1	54	7
Dark fireclay	2	6	57	1
Grey tufaceous sandstones, with occasional coal markings, getting harder with depth, very hard at 98 feet and downwards	58	5	115	6
Diabase greenstone	5	2	120	8

* Compiled from Diamond Drill Foreman's weekly reports.

As it was suspected from this bore that the main seam must be dipping more westerly than had been at first assumed, a second bore was then put down about 10 chains N.W from the shaft ; this passed through seven seams of coal.

BORE No. 2.—Commenced 23rd May, 1892 ; finished 2nd July, 1892.

Strata.	Thickness.		Total Depth.	
	ft.	in.	ft.	in.
Surface soil	4	0	4	0
Hard brown tufaceous sandstone	22	0	26	0
Gray tufaceous sandstone, with occasional hard bars	39	5	65	5
Greenish-coloured shale	4	7	70	0
Mixed shale and tufaceous sandstone	26	0	96	0
Clean tufaceous sandstone	12	6	108	6
Fireclay	0	5½	108	11½
COAL	0	1½	109	1
Fireclay	0	3½	109	4½
COAL	2	8	112	0½
band — No. 1 seam : 7 feet workable coal	0	2	112	2½
COAL	1	3	113	5½
Fireclay band	0	6½	114	0
COAL	3	1	117	1
Fireclay	3	10½	120	11½
COAL	1	3	122	2½
band	0	1¼	122	3¾
COAL	0	5	122	8¾
band — No. 2 seam : 4 feet workable coal	0	0½	122	9¼
COAL	1	7½	124	4¾
band, black clod	0	4½	124	9¼
COAL	0	10	125	7¼
Fireclay	5	11¼	131	6½
COAL	0	6½	132	1
band — No. 3 seam : 2 feet workable coal	0	0½	132	1½
COAL	1	7	133	8½
Dark shale, with plant impressions	1	3	134	11½
Fine-grained tufaceous sandstone	5	0½	140	0
Blue shale, with fern impressions	5	6	145	6
Gray tufaceous sandstone, with occasional coal markings	36	2	181	8
Tufaceous sandstone, with streaks of coal	1	4	183	0
Mixed shale and tufaceous sandstone	0	11	183	11
Dark shale	0	2½	184	1½
COAL—No. 4 seam : too thin for working	1	3½	185	5
Light and dark shales	1	6	186	11
Gray tufaceous sandstone	21	7	208	6
Sandstone full of coaly matter	2	0	210	6
Dark tufaceous sandstone	3	0	213	6
Grey tufaceous sandstone, with hard bars 250 and 258 feet	54	0	267	6
Mixed shale and tufaceous sandstone, with streaks of coal	1	0	268	6
Clod, with streaks of coal	0	10	269	4

BORE No. 2.—*continued.*

Strata.	Thickness.	Total depth.
	ft. in.	ft. in.
COAL ...... } No. 5 Seam, 3⅓ ft. workable coal	1 5	270 9
dark band } No. 5 Seam, 3⅓ ft. workable coal	0 8½	271 5½
COAL ...... } No. 5 Seam, 3⅓ ft. workable coal	1 11	273 4½
Hard clod	0 2½	273 7
Hard dark fireclay	6 6	280 1
Dark tufaceous sandstone, with coal streaks	17 11	298 0
Black clod, with fern impressions	9 0	307 0
COAL—No. 6 seam : of no importance	0 1½	307 1½
Black clod	1 10½	309 0
Mixed shale and tufaceous sandstone	9 3	318 3
COAL—No. 7 seam : of no importance	0 5	318 8
Hard black shale, with fern impressions	4 9	323 5
Dark sandstone, with white veins	14 7	338 0
Hard altered sandstone	1 5	339 5
Hard diabase greenstone	2 0	341 5

ANALYSIS OF COAL FROM No. 2 BORE.

By Mr. W. F. Ward, Government Analyst.

	No. 1 Seam.	No. 2 Seam.	No. 3 Seam.	No. 5 Seam.
Fixed carbon	55·9	62·4	42·5	52·6
Matter, volatile at red heat	18·0	20·5	21·2	9·9
Mineral matter (ash)	21·4	13·0	31·0	34·0
Moisture lost at 212° F.	4·7	4·1	5·3	3·5
	100·0	100·0	100·0	100·0

The samples of coal analysed were taken by breaking pieces from all the pieces of core saved, and should fairly represent the average value of the stuff as it would go to market. No doubt more favourable results would have been obtained if only picked pieces of the best coal had been analysed, and, in comparing the above analyses with those published of coal from other localities it should be borne in mind that it is a very common practice to send picked samples to be tested, and only very rarely is any trouble taken to get true samples of the average product as it goes to market. Analyses of coal, to be of the greatest practical value, should be made in exactly the same way as parcels of metallic ores are tested on a large scale before purchase by smelters, by taking thoroughly representative average samples from large stacks of the coal.

No. 3 Bore was next put down on the line of the shaft and No. 2, nearly 22½ chains N.W. of the latter, and proved that the dip of the seam continued at the same angle. The seams, however, were further apart than in No. 2, as will be seen from the section.

BORE No. 3.—Commenced 11th July, 1892 ; finished 24th August, 1892.

Strata.	Thickness.	Total depth.
	ft. in.	ft. in.
Surface soil	9 0	9 0
Firm brown tufaceous sandstone	33 6	42 6
Grey tufaceous sandstone	11 10	54 4
Black clod	0 1	54 5
Very hard grey sandstone	0 7	55 0
Grey tufaceous sandstone	10 6	65 6
Hard sandy shale	1 3	66 9
Tufaceous sandstone	32 2	98 11
Clod	0 7	99 6
COAL—No. 1 seam : not workable	0 9½	100 3½
Fireclay	2 0	102 3½
Fine-grained sandstone	1 7	103 10½
Sandy shale	1 3	105 1½
Tufaceous sandstone	45 10½	151 0
Very hard sandstone	0 9	151 9

BORE No. 3.—*continued.*

Strata.	Thickness.	Total depth.
	ft. in.	ft. in.
Tufaceous sandstone	12 0½	163 9½
Hard clod	0 2	163 11½
Tufaceous sandstone	0 11	164 10½
Greenish mudstone, full of pyrites	0 7½	165 6
Sandstone	1 7	167 1
Mixed shale and sandstone	10 6	177 7
Tufaceous sandstone with veins of calcite and pyrites	27 0	204 7
Mixed shale and sandstone	0 6	205 1
Tufaceous sandstone	3 11	209 0
Mixed shale and sandstone	3 3	212 3
Hard dark shale	0 9	213 0
Sandstone	0 8	213 8
COAL } No. 2 Seam: 4 ft. 7½ in. workable coal	3 5½	217 1½
band	0 1½	217 3
COAL	1 2	218 5
Fireclay	2 3	220 8
COAL—No. 3 Seam: 3 ft. 4 in. workable coal	3 4	224 0
Sandy shale and sandstone	2 7	226 7
Fine-grained tufaceous sandstone	8 6	235 1
Hard black clod	1 6	236 7
Greenish sandy shale	3 5	240 0
COAL } No. 4 Seam: 3 ft. 6 in. workable coal	0 11½	240 11½
band	0 2	241 1½
COAL	0 5	241 6½
band	0 1	241 7½
COAL	1 5	243 0½
Coal and band	0 5	243 5½
COAL	0 8½	244 2
Tufaceous sandstone	0 5	244 7
Shale	1 0	245 7
Soft fine tufaceous sandstone	0 9	246 4
COAL } No. 5 Seam, too small for working	1 0	247 4
band	0 1½	247 5½
COAL	0 2¾	247 8¼
band	0 2¼	247 10½
COAL	0 3½	248 2
Shale	3 0	251 2
Tufaceous sandstone	48 10	300 0
Clod	0 10	300 10
COAL, No. 6 Seam, too small for working	0 8	301 6
Hard dark shale	10 7	312 1
Sandstone with viens of calcite	20 0	332 1
Sandstone, last 18 inches altered and hard	53 3	385 4
Diabase greenstone	2 6	387 10

No. 1 seam in No. 3 Bore is not cut in No. 2, which, as shown in the sections, begins below its outcrop. The No. 1 seam of No. 2 Bore has now divided into two, the 6½ inch fireclay layer having increased in size to 2 ft. 3 inches; Nos. 2 and 3 seams of No. 3 Bore are therefore the same as No. 1 seam of No. 2 Bore, and the quantity of workable coal has increased from seven to eight feet. The fireclay band between Nos. 1 and 2 seams in No. 2 Bore has increased in size from 3ft. 10½ in. to 16 ft., and has changed to sandstone and shale. The No. 2 seam of No. 2 Bore corresponds very closely in its number and size of layers of coal and bands with No. 4 of No. 3 Bore, but the latter has six inches less coal. The fireclay below this seam in No. 2 has got thinner, and changed to shale and sandstone in No. 3, and the next seam has also become smaller, and unfit for working. The No. 4 seam of No. 2 Bore, or No. 6 of No. 3 Bore, has likewise become smaller. Nos. 5, 6, and 7 seams of No. 2 Bore are not seen at all in No. 3, the intrusive greenstone having risen further into the coal measures at this point and cut them out.

The No. 4 Bore is nearly 76 chains S.W. from the shaft, and 79 chains S.S.W. from No. 3 Bore; it is in a small gully near the old Kimbolton homestead, now pulled down. The No. 1 seam of No. 3 Bore was not cut in this one, but in an old well beside the Kimbolton house a small coal seam was cut which was no doubt this one. This well is on a ridge, the top of which is 80 feet above the gully in which No. 4 Bore is situated, and the section shows that No. 1 seam of No. 3 Bore should strike into this ridge. The well is 50 feet deep, but has become much filled with rubbish, and has probably been much deeper; there is no record of the depth at which the coal was cut in it.

BORE No. 4.—Commenced 4th September, 1892; finished 11th October, 1892.

Strata.	Thickness.		Total depth.	
	ft.	in.	ft.	in.
Surface soil	12	0	12	0
Jointy brown tufaceous sandstone	6	0	18	0
Hard brown shale	8	3	26	3
COAL } No. 1 seam: 2 ft. 1½ in. workable coal	1	4½	27	7½
band } No. 1 seam: 2 ft. 1½ in. workable coal	0	0½	27	8
COAL } No. 1 seam: 2 ft. 1½ in. workable coal	0	9	28	5
Soft clay	0	6	28	11
Fine-grained sandstone	8	2	37	1
Sandy shale	3	8	40	9
COAL } No. 2 seam: 2 ft. 6 in. workable coal	0	10	41	7
band } No. 2 seam: 2 ft. 6 in. workable coal	0	0½	41	7½
COAL } No. 2 seam: 2 ft. 6 in. workable coal	1	8	43	3½
Shale	2	6	45	9½
Tufaceous sandstone	3	3	49	0½
Shale	1	9	50	9½
Tufaceous sandstone	2	0	52	9½
Blue sandy shale	10	4	63	1½
COAL.—No 3 seam: rather too small to work	1	7½	64	9
Shale	4	5½	69	2½
COAL—No. 4 seam: not workable	0	6	69	8½
Tufaceous sandstone	3	0	72	8½
Shale	1	4	74	0½
Hard gray tufaceous sandstone	1	4	75	4½
Tufaceous sandstone	9	5	84	9½
Shale	2	5	87	2½
Clod	0	10	88	0½
COAL—No. 5 seam: 2 ft. 8 in. workable coal	2	8	90	8½
Brown shale	0	6	91	2½
Shale and sandstone in layers	19	7	110	9½
Gray tufaceous sandstone, coal stained	29	2	139	11½
Shale	0	9	140	8½
COAL—No. 6 seam: too thin to work	0	9	141	5½
Tufaceous sandstone	6	5	147	10½
Shale	1	6	149	4½
Tufaceous sandstone, coal stained	38	7	187	11½
Gray and dark shale	4	6	192	5½
Dark and gray tufaceous sandstone	2	6	194	11½
COAL—No. 7 seam: not workable	0	4	195	3½
Gray tufaceous sandstone	8	5	203	8½
Gray sandy shale	13	10	217	5½
Black clod	3	3	220	8½
Dark tufaceous sandstone	4	6	225	2½
Gray sandstone, coal stained	4	9	229	11½
Fine-grained sandstone	3	11	233	10½
Dark shale	4	5	238	3½
Dark sandstone	5	5	243	8½
Gray sandstone, with thin layers of black shale	6	0	249	8½
Gray sandstone	9	11½	259	8
COAL	0	0½	259	8½
Sandstone	2	3	261	11½
COAL—No. 8 seam: not workable	0	7	262	6½
Sandstone, with layers of shale	6	6	269	0½
Dark sandy shale	1	2	270	2½
Grey sandstone	3	6	273	8½
Close-grained dark sandstone	2	7	276	3½
Blue sandy shale	5	2	281	5½
Sandstone	0	10	282	3½
COAL } No. 9 Seam: not workable	0	0½	282	4
Black clod } No. 9 Seam: not workable	0	2½	282	6½
COAL } No. 9 Seam: not workable	0	4	282	10½
Clod	0	3	283	1½
Blue sandy shale	2	0	285	1½
Fine grained sandstone	3	11	289	0½
Sandy shale and sandstone	15	0	304	0½
Hard grey sandstone	0	6	304	6½
Dark shale	3	0	307	6½
Sandstone	2	2	309	8½
Blue and black shale	5	4	315	0½
Dark sandstone	1	5	316	5½

BORE No. 4.—*continued.*

Strata.	Thickness.	Total depth.
	ft. in.	ft. in.
Black clod and sandstone	7 0	323 5½
Grey sandstone	18 3	341 8½
Sandstone with mud pebbles	0 6	342 2½
Grey sandstone	7 11	350 1½
Firm dark shale	7 7	357 8½
Firm dark sandstone	10 7	368 3½
Very close grained grey sandstone	7 0	375 3½
Very hard white sandy shale	5 11	381 2½
Hard white sandstone	1 0	382 2½
White shale	10 4	392 6½
Hard white silicious sandstone	4 6	397 0½
Hard altered shale	0 8	397 8½
Altered sandstone	1 5	399 1½
Diabase greenstone	0 4	399 5½

[Compiled from the Diamond Drill Foreman's weekly reports.]

Comparing the strata met with in this bore with those cut through in No. 3, we find that the coal seams have generally become smaller, and are separated by thicker layers of shale and sandstone. Samples from seams Nos. 1, 2, 3, and 5 were analysed by the Government Analyst, Mr. W. F. Ward, with the following results :—

	No. 1 Seam.	No. 2 Seam.	No. 3 Seam.	No. 5 Seam.
	Per cent.	Per cent.	Per cent.	Per cent.
Ash	15·80	14·20	15·6	16·40
Moisture	6·40	5·30	5·4	6·20
Sulphur	0·58	1·03	0·7	0·85
Loss at red heat	24·27	25·60	21·2	23·65
Fixed carbon	52·95	53·87	57·1	52·90
	100·00	100·00	100·0	100·00

None of these coals form a true coke.

The following tabular statement shows the thickness of coal in each seam at the various points where they have been cut, and also shows which seams in each bore are identical with those in the other bores.

Seam.	No. 4 Bore.	No. 3 Bore.	No. 2 Bore.	No. 1 Bore.	Shaft.
	Seam Thickness ft. in.	Seam Thickness ft. in.	Seam Thickness ft. in.	Seam Thickness ft. in.	Seam Thickness ft. in.
A.	Not seen	No. 1 : 0 9½	Not seen	Not seen	Not seen
B.	No. 1 : 2 1½	No. 2 : 4 7½	No. 1 : 4 0	ditto	No. 1 : 5 0
C.	No. 2 : 2 6	No. 3 : 3 4	No. 1 : 3 1	ditto	
D.	No. 3 : 1 7½	No. 4 : 3 6	No. 2 : 4 0	ditto	Not seen
E.	No. 4 : 0 6			ditto	ditto
F.	No. 5 : 2 8	No. 5 : 1 6	No. 3 : 2 1½	ditto	ditto
G.	No. 6 : 0 9	No. 6 : 0 8	No. 4 : 1 3½	No. 1 : 1 1	ditto
H.	No. 7 : 0 4	Not seen	No. 5 : 3 4	Not seen	ditto
K.	No. 8 : 0 7	ditto	No. 6 : 0 1½	ditto	ditto
L.	No. 9 : 0 4	ditto	No. 7 : 0 5	ditto	ditto

In bore No. 4 the thickness of workable coal in seams B, C, and F, leaving D and E out of account as not being of workable size, is 7 ft. 3½ in. ; in Bore No. 5, in seams B, C, and D, we have 11 ft. 5½ in. workable coal ; and in Bore No. 2, in B, C, D, and F, there are 13 ft. 2½ in. Seam H., in No. 2 Bore, is not counted, as it is of no value on account of the very high percentage of ash (34 per cent.) in it. The mean thickness of workable coal in Bores Nos. 4, 3, and 2 is therefore 10 ft 8 in., and I think it would be fair to estimate it throughout the proved portion of the field at 10 feet. Taking the quantity of coal in an acre at 1600 tons for every foot in thickness, 10 feet of coal would give us 16,000 tons per acre. In the triangle enclosed by lines from No. 4 Bore to No. 3, from No. 3 to the shaft, and from the latter back to No. 4, there are 122 acres, but we might fairly assume that there are 250 acres proved by the borings; this area would contain 4,000,000 tons of coal. But the probable area over which the coal extends is much larger, being at a safe estimate about 900 acres, without counting on the probable extension of the field under the basalt hills to the northwards; this would contain 14,400,000 tons. Deducting 40 per cent. for losses in working, there would still remain 8,640,000, or roundly, 8½ million tons available. The present annual consumption of the Colony of both local and imported coal being about 85,000 tons per annum, it is seen that this field could supply the whole of the island at the present demand for 100 years.

As is clearly shown by the sections, the seams get smaller and further apart going from the shaft towards No. 4 and No. 3 Bores: this may indicate that the edge of the original coal basin lay to the westward, and that the seams will thin out as they are followed in that direction. Two more bores at points marked A. and B. on the plan would be useful in determining if the apparent divergence and thinning of the seams get any worse, and at the same time would prove a large area of ground. Should the seams not get too thin it would be, of course, advisable to have the main working shaft of the colliery near the road on the edge of the flat ground, so that it could be easily connected by a siding with the proposed Derwent Valley Railway Extension. There would not be any difficulty in bringing the railway itself about half a mile further to the north than its present surveyed line so as to pass quite close to the mine. Should bores B and A, however, show that the seams continue to thin out, the best site for a main working shaft would be in the gully in which No. 4 Bore is situated, but ten chains or so higher up it. A tramway about a mile and a quarter in length with a good grade could be thence easily constructed to connect with the railway. The seams would be cut at a shallow depth, so that the expenses of winding need not be great, and all the portion of the field lying between the gully and Langloh homestead could be worked to the rise of the coal. It is very unlikely that there will be much water to pump out of the mine. The facilities for working are therefore very fair; and if the Derwent Valley Railway were extended to here the coal could be put into Hobart much cheaper than that from the Fingal mines, the distances of railway carriage being respectively 53 and 141 miles, a handicap in favour of Langloh coal of 88 miles, or 5*s.* 6*d.* a ton at ¾*d.* mile for freight.

The fireclay lying under some of the seams may be useful for making pottery of a rough sort, but is too fusible for the manufacture of good fire-bricks for smelting purposes. An analysis of the clay under the seam in the shaft, made by Mr. Danvers Power, has been given to me by Mr. Milne, as follows:—

	Per cent.
Silica	71·35
Alumina	17·60
Iron	2·89
Lime	2·67
Moisture	2·61
Loss (alkalies, magnesia, &c.)	2·88
	100·00

Several samples of the clay tested by Mr. W. F. Ward were all found to be fusible at a high temperature, and consequently of poor quality as fireclay. Blowpipe tests of my own also showed that the clay could be melted without much trouble, thin splinters being very easily rounded on the edges in the flame. Bricks good enough for many purposes requiring a better class of goods than the ordinary red brick could nevertheless be made from the clay, and so it may turn out out to be of some value.

Taking the group of seams B, C, D, E, F in Bores Nos. 4, 3, and 2, the mean depths from surface are respectively 58 ft. 6 in., 230 ft. 11 in., and 121 ft. 4 in.; the heights above sea level of the tops of the bores being 467 ft. 6 in., 754 ft. 10 in., and 694 ft. 2 in. From No. 2 to No. 3 the dip is 48·96 feet in 1481·4 feet, or 1 in 30·26, equal to an angle of 1° 53½′. From No. 2 to No. 4 there is a dip of 163·8 feet in a distance of 4963·7 feet, or 1 in 30·30, also equal to practically the same angle as before. Taking the seams in the shaft as of the same thickness as in No. 2 bore, the mean depth of the group would be 52 ft. 4½ in., and the height of the top of the shaft is 647 ft. 2 in. above sea level. The dip from the shaft to No. 3 bore would then be 70·9 feet in 2150·3 feet, or 1 in 30·32 (= 1° 53½′), and to No. 4 bore 185·8 feet in 4983·5 feet, or 1 in 26·82 (= 2° 8′) The angle contained between lines joining the shaft with bores Nos. 3 and 4 is 84° 9′. From these data the true dip is calculated to be 1 in 21·08 (= 2ft. 43 in.) towards S. 86° 35′ W.

Taking seam G in the same way, and calculating from bores Nos. 1, 3, and 4, the dip is found to be 1 in 18·78 (= 3° 3′) towards S. 86° 57′ W. The mean of the two determinations should be very nearly correct, and we may therefore take the mean angle of dip as 2° 53′, or 1 in 19·93, and the direction of the line of dip as S. 86° 46′ W. For all practical purposes the strike of the seam is north and south, and the dip due west.

The close correspondence of the angles of dip as calculated from triangles having the line from No. 4 to No. 3 bore as base and apices at No. 3 and No. 1 bores and the shaft makes it very unlikely that there are any serious faults in the seams inside the area proved.

As the coal rises to the eastward the outcrop of the main seams should be found easily by trenching and sinking small pits round the eastern slope of the hill between Langloh and No. 4 Bore, and it seems likely that an adit could be driven from a point in the gully about fourteen chains south-east from No. 4 Bore northwards into the hill, which would command enough ground to make a shaft and artificial drainage unnecessary for a very long time to come. This adit would run along the line of strike of the coal $3\frac{1}{2}°$ to the west of north, and a glance at the plan will show that it would go well to the westward of even Bore No. 3. It is therefore of very great importance to find the outcrops of the main group of seams in the low ground south-east of No. 4 Bore, so as to ascertain the lowest point from which a main adit could be started. A little coal might also be won from the spur south of No. 4 Bore by an adit going into it from the slope to the main road.

As the analyses of the cores brought up by the diamond drill show a much larger percentage of ash than appears to have been met with by the practical users of the fuel from the shaft, it would be very desirable now to get out a few tons from various places for further bulk tests. As the coal lies near the surface at No. 4 Bore, and it is, as above mentioned, at the same time very desirable to find the outcrop of the seams in this locality, I should recommend that a shaft be sunk, say 8 chains down the gully south-east from No. 4 Bore, to cut seams B and C, and that these seams be prospected by driving north on them some little distance. The coal won should be carefully tested by practical tests and bulk analyses. The cost of this work would be quite light. In prospecting for the outcrop of the seam round the slope of the hill from here to Langloh, other parcels of several tons of coal could no doubt be obtained for testing purposes. The analyses tell strongly against the coal as the matter stands at present, and the test of actual use must now be applied before it can hope to succeed in the market. Should these further trials prove the stuff to be good enough for general use, there can be little doubt that as soon as it was connected by rail with Hobart it would be able to compete successfully with the Fingal coal. The establishment of a successful colliery at Langloh would go far to assist the Derwent Valley Railway to become profitable, and the railway extension, besides making working of the coal possible, would probably have the effect of causing large areas of land now used only for pastoral purposes to be put under crops.

The area of coal-bearing land now proved is large enough to maintain a big output for many years, but if it were desired to prove a still larger area it would be well to have more boring done in the flat ground towards Lawrenny homestead. At surface there is much deep alluvial drift in this direction, and the coal measures are not exposed, but there is much probability of their being found below these later deposits.

The geological features of this coal-field are very similar to those of most of our other Tasmanian deposits belonging to the Upper Coal Measures. The principal rock is a soft tufaceous sandstone, mainly composed of felspathic particles, often much decomposed, and containing very little free quartz; this alternates with soft shaly bands often rich in impressions of ferns characteristic of our Mesozoic Coal-beds. Blocks of silicified wood, often of large size, are frequently found on surface, having been liberated by the wearing away of their softer enclosing matrix. The soft tufaceous sandstones seem all through the country to indicate the horizon of the measures in which coal-beds may be looked for; at a lower horizon we come upon a silicious or quartzose sandstones, composed almost entirely of quartz sand, with often a little mica. These sandstones are the well-known building freestones quarried at Knocklofty near Hobart, Ross, Oatlands, and elsewhere. I am not aware of any coal having yet been found below these beds except the seams belonging to the Lower or Permo-Carboniferous Coal measures. Round Hamilton township these silicious sandstones are common, and they are also seen in the small hill shown on the plan 27 chains south of Kimbolton on the south side of the main road. In the bottom of No. 4 Bore it appears that the horizon of the quartzose sandstones was being reached, but in the higher portions they were not seen at all. As seen by the section from No. 4 Bore to the railway, the beds in the small hill, if the strata had been undisturbed, would have corresponded with those between seams A. and B.; it is evident therefore that a fault exists somewhere near the road, the lower quartzose strata being thrown up on the south side of it. In searching for further coal areas this fault should be borne in mind, and prospecting confined to the localities where the soft tufaceous sandstone occurs.

As shown on the plan the coal-field is almost surrounded by igneous rocks, diabase greenstone forming the hills to the north-east, east, and south, and basalt to the north-west. The greenstone is the usual intrusive rock found associated with nearly all our coalfields, which has burst through the sedimentary strata and in places covered them. At Langloh all the bores bottomed on this rock, and as shown in the sections, it rose to different heights in the strata, cutting out seams H, K, and L entirely in bores Nos. 1 and 3. It is possible that deeper boring might have proved this greenstone to be in the form of intrusive sheets, with sedimentary strata again under them, but it seems more likely to be portion of the main mass of igneous matter of which the greenstone hills are part also. As this intrusive rock is of younger age than the coal seams, it is possible that these may be in places penetrated and destroyed by intrusions not detected at surface, but the regularity of dip shown by the bores is very reassuring as to there having been no serious disturbance.

The basalt on the north-west side of the field is of Tertiary age, belonging to the series of outflows found at intervals up the valley of the Derwent from Hobart to the Ouse, and particularly well seen in the neighbourhood of the Macquarie Plains Railway Station: it is often vesicular, and even scoriaceous. It probably is only a superficial capping lying upon the coal measures and older greenstones, and there is great likelihood that the coal seams will extend beneath it, but at the same time dykes of basalt cutting through the underlying beds will be liable to be encountered. Boulders of quartzite found on the ridge to the north of Parker's old house, almost at the contact of the basalt with the sandstones, point to alteration of the latter by dykes of the igneous rocks.

In the low ground south of the main road there is a good deal of sand, probably part of the Tertiary deposits found more or less all the way up the Derwent Valley, and which are frequently overlaid by the basalts. At the Ouse there is said to be a large bed of lignite in this formation. These Tertiary deposits may be troublesome at times in pursuing the search for the Coal Measures by concealing them under considerable depths of sand and ferruginous clay. They do not seem, however, to be very extensive, and are mainly confined to the low ground.

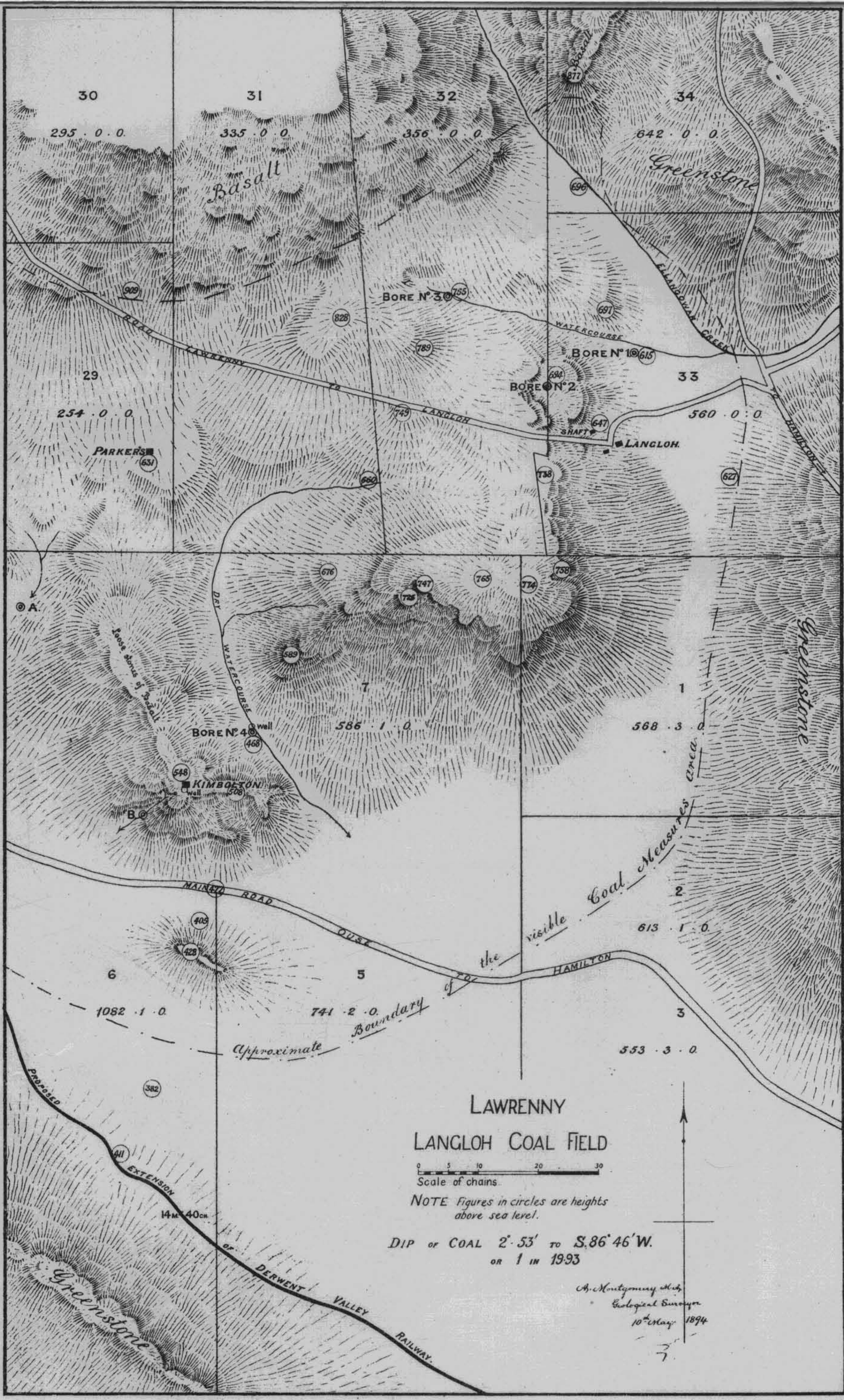
I have the honor to be,
Sir,
Your obedient Servant,

A. MONTGOMERY, *M.A., Geological Surveyor.*

The Secretary for Mines, Hobart.

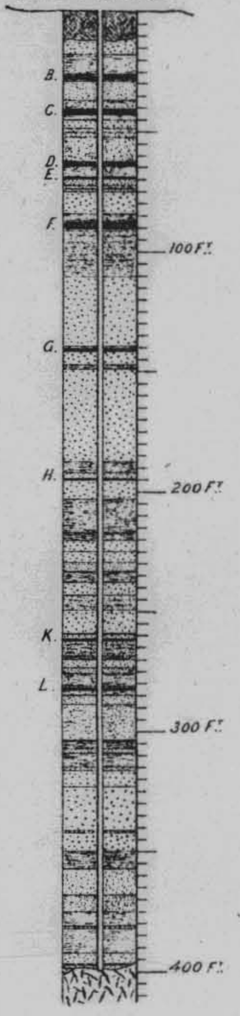
(11)

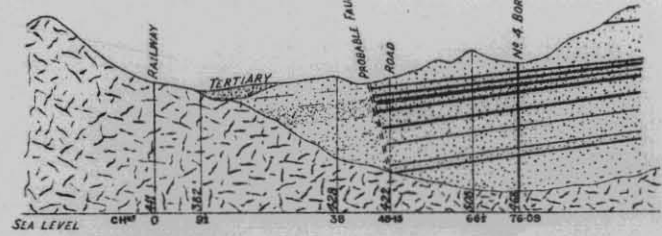
11/12


30
295 . 0 . 0.
31
335 . 0 . 0.
32
356 . 0 . 0.
34
642 . 0 . 0.
Basalt
Greenstone
29
254 . 0 . 0.
PARKERS
ROAD LAWRENNY TO LANGLOH
BORE No 3
BORE No 1
BORE No 2
WATERCOURSE
ELLANGOWAN CREEK
33
560 . 0 . 0
SHAFT
LANGLOH
TO HAMILTON
DRY WATERCOURSE
A
Loose stones of Basalt
BORE No 4
well
KIMBOLTON
B
7
586 . 1 . 0.
1
568 . 3 . 0
Greenstone
MAIN ROAD OUSE TO HAMILTON
2
613 . 1 . 0.
6
1082 . 1 . 0.
5
741 . 2 . 0.
3
553 . 3 . 0.
Approximate Boundary of the visible Coal Measures Area
PROPOSED EXTENSION OF DERWENT VALLEY RAILWAY.
14m 40ch.
Greenstone
LAWRENNY
LANGLOH COAL FIELD
0 5 10 20 30
Scale of chains.
NOTE Figures in circles are heights above sea level.
DIP OF COAL 2° 53′ TO S. 86° 46′ W. OR 1 IN 19.93
A. Montgomery M.A.
Geological Surveyor
10th May 1894
5 cm

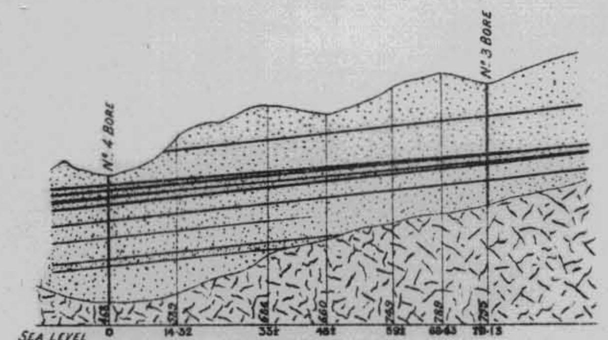
LAWRENNY — LANGLOH COAL FIELD
SECTIONS

N.o 4 Bore

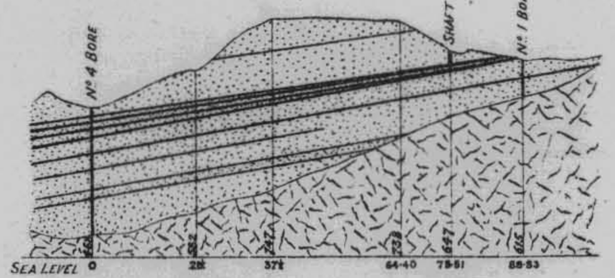




FROM RAILWAY AT 14 M. 51 C.HS TO N.o 4 BORE

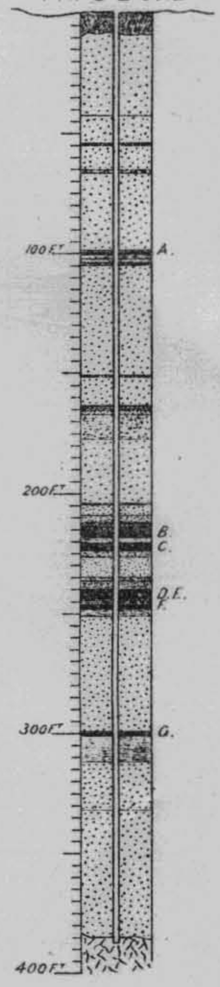


FROM N.o 4 TO N.o 3 BORE

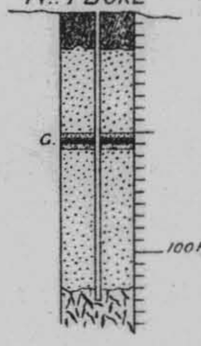


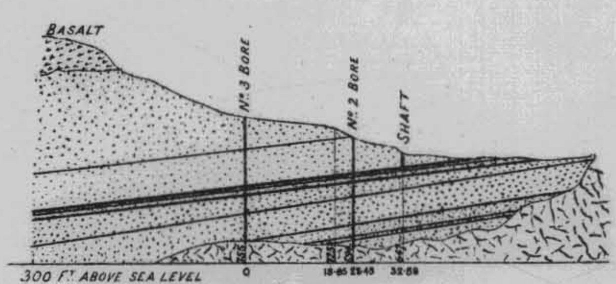
FROM N.o 4 BORE TO SHAFT AND N.o 1 BORE

N.o 3 Bore



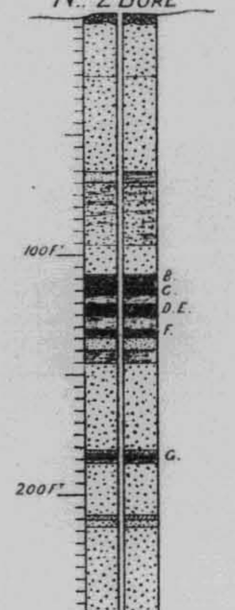
N.o 1 Bore





FROM N.o 3 BORE TO SHAFT

N.o 2 Bore



Horizontal scale

Vertical scale

A. Montgomery, M.A.
Geological Surveyor
May 10th 1894

FROM N.o 2 BORE TO N.o 1.