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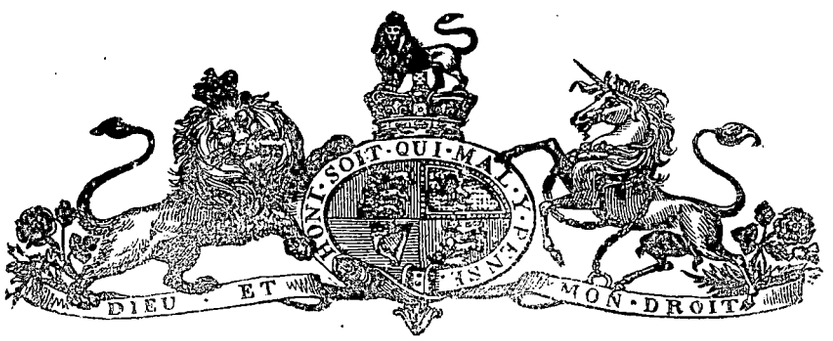
LEGISLATIVE COUNCIL.

MERSEY COAL DEPOSITS:

REPORT BY G. THUREAU, F.G.S.

Laid upon the Table by Mr. Moore, and ordered by the Council to be printed, July 24, 1883.



REPORT ON THE MERSEY COAL DEPOSITS.

THE existence of Coal in the vicinity of the Mersey and Don Rivers has been known for years, and these deposits have given rise to mining operations on a seam which was easily reached by means of adits and shallow shafts, the latter not exceeding 75 feet in depth.

It is rather a difficult matter to arrive at a correct estimate of the total quantity of Coal raised for local consumption and for export during a period of 18 years; but as in that time the Don Coal Mining Company have raised about 25,000 tons, it may be calculated that the aggregate output from the Mersey district would not have exceeded 60,000 tons more.

It is not intended in this report to refer any further to what has been done in the past in these Coal mines, several of which are altogether abandoned, but to confine my remarks to the *present* state of the deposits *in sitú*, and to the important question of the probable, or otherwise, occurrence of other coal deposits at greater depths.

In the first place, it was deemed very necessary to remove all doubts, if possible, relating to the occurrence of the Coal wrought hitherto, so far as the solving of the question was concerned whether this Coal, proved to exist in several parts of the district, but at considerable distances apart, belonged to the one seam only, or to several different seams in the Coal measures. A flying survey, —the results of which are appended to this paper,—was authorised to be made by the Hon. Minister of Lands, in which the levels of the principal Coal deposits were taken above the Mersey River; and these, on being connected, proved that, so far, but *one seam* occurs in the district, not including a very thin and irregular seam of Coal which overlies the former. This fact is confirmed by the position and the lithological and mineralogical character of the larger seam wherever examined in the several mines.

It is very clear that the Coal measures enclosing the seam in question extend for a considerable distance,—on the one hand, from near the mouths of both the Mersey and Don Rivers for a great part towards Deloraine, and from east of Latrobe to the lower part of Red Water Creek, on the road to Sheffield.

As a matter of fact, there are *two distinct basins* containing Coal,—viz., the Mersey and Don Districts and the Dulverton,—which appear to be severed by bands of metamorphic schists and limestones protruding and underlying the carboniferous beds: these altered rocks thus form a narrow isthmus, as it were, which traverses from near the Don River to the south east, where, at Langmaid's lime-kilns, they rest on the Silurian (*see* geological sketch maps); about half way between these points the carboniferous rocks occur, either belonging to the Mersey or the Dulverton Coal deposits, which latter, it may be stated in passing, is located about 700 feet above the former.

The following rocks have, in regular succession and geological age, been observed from the surface :—

1. *Alluvial Gravels and Soils* (banks of Mersey and at Northdown.)

2. *Tertiaries.*—Raised sea beaches (Mersey River and coast.)

3. *Basalt,* of columnar structure, highly vesicular, with the cavities encrusted with crystallised *Zeolites*; frequently decomposed (near Sheffield.)

4. *Greenstones,* in more or less distinct schistose and semi-columnar forms, sometimes vesicular, the cavities rarely encrusted with mamillary coatings of chalcedony. These eruptive groups of

rocks were doubtless of an age subsequent to the then already deposited underlying carboniferous beds, and the basalts appear to be the most recent volcanic formation.

5. *Carbonaceous Group.*[a]—*Marine Beds* (Palæozoic.)—These consist of very regularly
Plate I. deposited beds of fine and coarse, hard and friable sandstones and shales. (Plate I., showing shaft of Alfred Colliery.) These are grey to blackish in colour, and are characterised by frequent markings of leaves, stems, and fragments of carbonised wood, the former not very distinct, and the whole of which form dark, wavelike lines in the beds. In the lower series alumniferous shales occur, which cause a considerable efflorescence on exposure to the atmosphere, and the Dysodyle or Tasmanite beds are there in close contiguity to or immediately, in some places, above the Coal. These higher beds referred to above exhibit here and there fossils, *i.e.*, *Producta*, *Spirifers*, *Strophomenas*, *Fenestellas*, and *Turbos*, in well-preserved and easily recognisable forms. At the head of Marine Creek, or about 200 feet above the Coal hitherto worked, the following mode of occurrence was observed, beneath a capping of greenstone; viz.—Fossiliferous sandstone with *Pecten*; non-fossiliferous fine and indurated sandstone; conglomerates with *Spirifers*, *Fenestellas*, and *Turbos*, the latter more frequent. In the bed of the Mersey, less than a mile above its junction with Caroline Creek, *Producta* are of frequent occurrence, whilst still higher up the stream, those very interesting Dysodyle beds contain a number of allied petrifactions not yet sufficiently defined for place.

Plate II. There appears to be no doubt but what the bed immediately overlying the Coal cropping out at the banks of the creek in the Mersey Coal Mining Company's 100-acre section, situate about half a mile west from Latrobe, furnishes strong proof of the carbonaceous and carboniferous strata there *in sitú*, whilst also evidencing the very large amount of denudation by which the major part of the superincumbent marine beds was removed, here probably over 200 feet thick, in that part of the Latrobe basin. The Coal cropping to the surface at the place referred to above is overlaid partly by a bed of shale, containing an abundance of that characteristic fossil plant "*Glossopteris Browniana*," always present with true Coal measures, and which establishes the Palæozoic age of the formation to a degree not to be mistaken. The *G. Browniana* in question occurs in a dark shale in such abundance as to present a compacted mass of oblong and beautiful markings of leaves lying in all directions, and they are so excellently preserved as to admit of no doubt of their classification. As already stated, this *G. Browniana* bed had been partly removed by denudation (Fig. II.) so as to leave the eastern extension of the underlying Coal bare; a more recent ferruginous sandstone had now taken the place of the older shales, thus presenting a feature not frequently met with, as at first sight the appearances are as if a fault had taken place, but as the Coal still continues, the above explanation is the only one possible under the circumstances. It may be stated that this *Glossopteris*
Plate III. bed occurs above the Coal both in the Mersey and in the Dulverton basins, but more southerly, and at the latter it seems to be here and there converted into an inferior Coal, or an impure but highly bituminiferous shale, which burns freely, and occasionally only exhibits the *G. Browniana*, and very rarely a *Sagenopteris*, which differs from the former in this manner, viz., that it partakes of a palm-like structure in which—as in this case—three fronds spring from the end of a central stem, besides showing the regular *costa* and the net-like veins so readily recognisable.

At the Marine Creek already mentioned there are a few rapids and small waterfalls; the latter have in one place removed, by their back splash of water, the softer strata beneath a harder bed above. In the so-formed cavity stalactites are found to be forming, evidently the result of decomposition of the shells occurring in some of the still higher marine beds.

6. *Carboniferous Group.*[b]—*Coal Measures* (Palæozoic).—The seam of coal occurs, as already stated, underlying a bed of shale remarkable for its abundance in *Glossopteris Browniana* and the much less frequent *Sagenopteris*, where the bed has been transmuted into highly bituminiferous shale or inferior Coal. The main seam does not appear to exceed two feet in thickness in any part of the two basins, and 20 inches would be about the average height of the Coal throughout. Except near the Don River, where it dips one foot in five, a far less inclination to the horizon has been observed, and the sections, drawn by Mr. Surveyor Dooley from actual survey, show that the seam follows in gradual and undulating lines the bedding planes of the over and underlying strata. The mineral character and composition of that Coal is very similar, with a few unimportant exceptions due to local peculiarities and obstructions, everywhere in the district; it is rather heavier in bulk than that from Newcastle, N.S.W.; it is a hard coal, staining the hands; the laminations and partings, when mining or burning same, are parallel to the bedding, and frequently bright conchoidal fractures occur; its highly bituminous character is proved by its facile ignition, and burning with large yellow flame, yielding a large quantity of illuminating gas. As far back as 1872, Mr. George Whitcomb tested two samples of coal from Newcastle and the Mersey, with these results; viz.—

"Newcastle Coal, 14 lbs. weight, yielded 67 cubic feet of gas, with an illuminating power equal to $11\frac{3}{10}$ candles.

"Mersey Coal, of equal weight, yielded 65 cubic feet of gas, with an illuminating power equal to $16\frac{3}{10}$ candles."

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[a] Not containing seams of Coal.

[b] Contains a true bed of bituminiferous Coal.

In order to test this Dulverton Coal, I found that 20 lbs., burnt in an open hearth fire, left only a residue of ashes and non-consumed coal weighing 2 lbs. 3 ozs.

As a Coal for purely domestic purposes it is probably the best that can be procured; and the following statement, forwarded at my request by Mr. A. Field, part owner of the Dulverton Coal Mine, shows that it could be delivered at Launceston at a reasonable rate; viz.—

	Per Ton. £	*s.*	*d.*
Mining and winning	0	4	0
Sacking[a]	0	0	6
Carting[b]	0	9	0
Freight[b]	0	7	0
Rent, sacks, &c.	0	0	6
Commission	0	1	0
Total	£1	2	0

Excepting the extensive use of this Coal for gas and domestic purposes, it has failed to give satisfaction; for instance, as a "steam" coal, owing to the great per-centage of sulphurets of iron it contains,—which occur as plant-markings, veins, and patches in the body of the seam,—that deleterious substance causes "clinking" upon the fire-bars in the boilers whilst burning the coal, and eventually stopping all entrances for draughts of air, so necessary for rapid combustion, thereby rendering the maintenance of regular and continuous steam pressure very difficult, if not altogether impossible. At the same time the sulphuret attacks the fire-bars, necessitating their constant repair and replacement, thus adding considerably to working expenses.

It has been observed, however, that all Coal seams near the surface partake more or less of these drawbacks, and that deeper seams are purer and more free from deleterious substances as they occur in this shallow deposit of Coal.

There appears to be an impression as if, owing to the want of public appreciation or knowledge of the excellent properties of this domestic Coal, the present output raised by a few parties would suffice; on the other hand also, that if ALL the shallow Coal deposits were worked to their fullest capacity, a reduction in price to consumers would follow (below 18*s*. per ton at Latrobe), and consequently would render Coal mining as now carried on unremunerative. Without cheaper and more rapid transport it is not likely, however, that consumption will much increase; but with reduced freight and other incidental charges it would, for certain purposes, be preferred to Newcastle Coal.

Of the Coal measures underlying that seam of Coal but little is positively known, except what has been disclosed in the many bore-holes put down for years past by Mr. Thos. Hainsworth and some other skilful and experienced coal miners in the ordinary way by means of jumping drills geared with "spring beams," whereby of course all traces of petrifactions were destroyed, and changes of strata could only be observed through the varying hues of the mud brought to the surface. Of all these numerous attempts to prove the deeper ground, it may be stated that a shaft sunk by Mr. R. P. Crompton, near Tarleton, in 1853–54, had reached a total depth of 302 feet from the surface. The particulars of the sections supplied to me do not confirm the opinion expressed,—that this shaft was sunk in strata underlying the existing Coal seam. The blue marls, 187′ 6″ thick, were fossiliferous, and the bed, 14 feet thick, composed principally of an aggregation of shells, occurred as greatly preponderating over the marls in which they were embedded. Other surrounding circumstances prove that, as the shells in question were of palæozoic age, the strata in question belong to the regular marine beds. It is owing principally to the want of proper information upon the age and geological structure of these localities, that if bores missed, or cut no Coal, it was at once assumed that the Coal measures had disappeared, or if *in sitú*, that they contained no other seams below the one so well known. That, in my opinion, is rather a hasty and erroneous view to take under the circumstances; because, so far as my careful observations and investigations, extending over a large area of Coal country, could prove, but *very few feet* have actually been *sunk*

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[a] Sacking would be dispensed with if a branch railway were made towards Sheffield.

[b] Carting and freight would, thereupon, be reduced railway carriage only, or probably to 9*s*. per ton; so that Coal could be delivered at about 15*s*. per ton. It must be borne in mind, however, that the retail price at Launceston at present is £1 14*s*. 6*d*. per ton,—an exorbitant rate. Then, again, as to the mining and winning this coal, the system pursued now is of the most primitive description, owing, it is averred, to the numerous "faults" and "throws" the seam is subjected to; and as each small block, bounded by these interruptions, now requires its own shaft, the waste of time and money is very considerable. One or two good main shafts would ventilate the mine, and main levels driven *under* the Coal, having "rises" from cross-drives into the Coal above, would be far more economical and speedy.

in shafts below that seam of Coal, and the only bore-hole that has pierced the Coal measures to a greater depth was put down to a depth of 300 feet and 1½ inches, by Mr. Bauld, senior, of the Alfred Colliery, in 1858. This passed through the marine beds and Coal at a depth of 53 feet and 6 inches, and thence to a further depth of 246 feet 7½ inches.

Although I am in possession, by the courtesy of Mr. Bauld, jun., of the full particulars as to the strata passed through beneath the Coal, I am precluded from making as full use of the same as the importance of the question at issue would warrant, owing to the prohibition of the gentleman superintending that work. At the same time I would submit that the general facts available will enable me to arrive at a fair deduction on the matter under view without violating the conditions imposed.

Reviewing, at this part of my Report, all the facts governing the deposition and formation of these sedimentary series of rocks, their general structure, the evidence afforded by their petrifactions,—which *inter alia* differ materially, and in most respects from those observed in Victoria, and which are very similar to or in accord with those of parts of New South Wales Coal-fields and elsewhere,—and the fact of *one* seam of Coal existing which yields that combustible so similar to that of other recognised basins in the Coal measures, it will be but necessary for me now to describe those rocks upon which, to all appearance, these carboniferous beds rest, in order to arrive at a conclusion supported by facts and data collected for the purposes of this Report.

Plate IV. 7. *The Limestones* of the district form, as will be seen by the Geological Sketch Map herewith presented for inspection, a band of considerable length and width, from the Don River in the north-west to near the Mersey River in the south east. The trend of this crystalline rock is very clearly indicated by the numerous massive outcrops[a] on the surface, and it actually forms the divisional line of demarcation between the Mersey and Dulverton Coal basins. Some depressions in the surface upon its course north from Langmaid's limekilns may be ascribed as due to the collapse of caves, which in some parts are yet found to exist. This rock is of a dull grey and blue colour, schistose in part, very dense and hard. Sometimes it is traversed by pure crystalline *Calcites*, and on the whole furnishes, after burning, a very good lime for building purposes. The quarries in which it is exposed to view at the Don River exhibit these metamorphic limestones to great advantage, and there very faint traces of organisms are discernible only, the same as in some other of these outcrops. At those quarries it is overlaid by metamorphic shales, which, on their decomposition, filled, through infiltration, the crevices and fissures in the underlying limestone, forming nearly vertical bands from dark blue to reddish brown in colour, sometimes conglomeratic and laminated the same as slates, but subjected to very considerable foldings, bendings, and contortions in conformity with the description of the cavities they now occupy.

From all appearances the Coal measures rest on this limestone in parts, or, where it is wanting, on the still older Silurian and Metamorphic schists.

8. *The Silurian* formation is represented at the east side of the Mersey basin, in close contiguity to the limestone cropping out on Langmaid's 50-acre section, where limekilns are being periodically worked; they strike north-west towards Latrobe, in which direction they disappear either beneath the carboniferous, alluvial, or greenstone formations. Near the second crossing by the Mersey railway of the Caroline Creek (see plan), four miles from Latrobe, these Silurian beds consist of hard bands of sandstone and shaly mudstones, dipping north north-east; the former are remarkable for the abundance of the organisms they enclose. The whole series is rich in *Trilobites* (*Asaphus Canadensis?*) with cotemporary forms, and their fragments; especially noteworthy are the "*spines*" which bear the eyes of the Trilobites, long or short according to age or development.

Near the Mersey River several quartz veins traverse the Silurian; one or two are well-defined and extend for some distance, but all efforts to prove them auriferous have hitherto failed.

9. *The Metamorphic Schists* are the lowest and oldest in the series, and they form the outer westerly margin to both the Mersey basin near the Don River and the Dulverton basin north of Sheffield. They appear in the vicinity of the latter as a high precipitous range of hills with abrupt escarpments. The series includes altered schistose, fine grained conglomeratic and quartziferous beds of great density and hardness, greatly contorted and foliated.

The other characteristic mineral deposits comprise, rarely, an impure fire-clay, sometimes underlying the Coal; iron ore, which is nearly always found in the vicinity of Coal. There are two localities where that ore has been found, viz., north of Langmaid's limekilns and at Red Water Creek, near Dick Low's Bridge, at the upper end of the Dulverton basin. The first-mentioned occurs first near that narrow outlier of greenstone which traverses the carboniferous strata east of Bonney's Tier, crosses the railway obliquely to the north-east, eventually also crossing the Mersey. This ironstone occurs in concretionary forms, and being of a very argillaceous nature is of but little value for commercial purposes.

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[a] The outcrops are coloured a deeper shade of blue than where the soil covers this limestone rock.

The Red Water Creek ironstone is more regular and massive in its occurrence; it is also of a considerably better description. It would be both interesting and useful to try this ore with the limestone as a *flux* for the reduction of the Mount Claude argentiferous lead ores, with the Dulverton coal as a combustible medium. If the latter would not answer in producing a free-running slag and "*Matte*," a judicious addition of charcoal, and a well regulated *blast*, hot or cold, would probably lead to the desired results; viz., a less bulky or weighty, but much more valuable product for export than raw-dressed silver-lead ores.

Dysodyle or *Tasmanite*.—This interesting rock, for it occupies a place in the Upper Marine (Palæozoic) beds, occurs at and near the "Great Bend" on the Mersey. (Several other localities have been, it appears, reserved for this mineral, but, so far, I was not successful in finding any but those above-mentioned.) It evidently belongs to the bituminiferous schists (pyro-schists of Hunt), and, so far, it does not appear to have any special value at present. As it belongs more probably to the *petroleum* deposits than any other, and because its origin is shrouded in mystery, the following extract, from a Paper recently read by Mr. Max. Livingstone before the Western Society of Engineers, U.S.A., may prove of interest:— Plate V.

"I shall but briefly refer to a few plausible theories. According to one the oil is indigenous to the sandrock, and is supposed to have been elaborated by nature from organic matter, which, during the Palæozoic ages, when submarine plants and primordial animals flourished in abundance, were deposited simultaneously with and in the sands. But when and by what means these hydrates and molluscs could have been converted into oil . . . . . and could have been preserved, is beyond our comprehension. Diametrically opposed to this hypothesis is the theory that this oil is a product of condensed gas, distilled, so to speak, at a great depth where the temperature is sufficiently high, from organic deposits in the beds of the Silurian formation. The gas thus generated is forced to the upper and cooler strata, where it is absorbed, etc."

From the above concise description of the principal rock formations and other deposits prevailing in this district, it will be perceived that most of the conditions, stratigraphical and palæontological, are present which are observed to occur with other well-recognised Coal basins. To this must be added the fact of the remarkable regularity, without interruptions, and uniformity in their deposition, together with the certainty that they extend over much larger areas than perhaps at present known. For instance, I have found similar marine beds to those described as overlying the Coal in the Mersey District on the western side of the Tamar near Beaconsfield. I am also informed by Mr. Dooley, M.H.A., of its having been reported to him that a seam of Coal had been found under the Western Mountains or Tiers about thirteen miles from Deloraine.

Confining myself in the following to those localities I have personally examined, and after carefully weighing the evidence thus obtained, I have come to the conclusion that the Coal measures proper will continue to considerable depths, and that with same it is probable that other Coal deposits will occur at those depths. In connection with this it may be stated, with regard to the fact of no other seam having been met with in Mr. Bauld's deepest bore, that in other Coal-mining countries frequently much greater thicknesses of non-coalbearing strata overlie the deeper seam or seams, as the case may be.[a]

And I cannot now omit, whilst concluding this Report, recommending persons interested in the localities named to consider the question of at once testing the deep-lying Coal measures for any Coal they may contain. The expenditure to be incurred for settling the question at issue for all time would not be very great, if the rapidly working No. 1 Diamond Drill was hired from the Government under the present very liberal conditions of the Mining Department. On the Geological Sketch Maps I have, after very mature consideration, fixed upon five or six sites as most favourably situated for the operations of the Diamond Drill, which I hope to see employed in prospecting for a deeper Coal, at any rate at the Mersey basin.

G. THUREAU, *F.G.S., Geological Surveyor.*

Launceston, May, 1883.

NOTE.—Herewith one Geological Sketch Map and five Sections; one Plan, five Cross Sections, and one Longitudinal Section by Mr. Dooley.

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[a] In the Cumberland Coal-field, near Whitehaven, the principal seams and *intervening strata* are as follows:—Bannock band (Coal), 6 to 10 feet; strata, 20 fathoms; main band (Coal), 10 feet; strata, 20 fathoms; Coal, 4 feet. The Midlothian Coal-field:—Upper Coal measures with seams of Coal; then follows 340 *feet millstone grit*, under which seventeen seams of Coal. The Lanarkshire Coal-fields:—1. True Coal measures, 840 feet with Coal seams. 2. The millstone grit, 960 *feet* without Coal. 3. The *Limestone* series, 2200 feet, with three beds of black band ironstone and several seams of good coal.

APPENDIX.

Government Laboratory, Hobart, 4th June, 1883.

SIR,

I HAVE the honor to report that the sample of Coal from the Mersey forwarded by the Inspector of Mines, has been examined with the following results:—

	Per cent.
Coke—fixed Carbon, 41·33; Ash, 5·0	46·33
Substances volatile at red heat.....	41·47
Water lost at 212° F.....	12·20
	100·00

The coke formed is coherent and tolerably firm; the gases evolved on heating burn with a very smoky, yellow flame. The colour of the ash is red.

I have the honor to be,
Sir,
Your obedient Servant,
W. F. WARD.

The Hon. the Minister of Lands and Works.

WILLIAM THOMAS STRUTT,
GOVERNMENT PRINTER, TASMANIA.

GEOLOGICAL SKETCH PLAN
OF THE
MERSEY COAL DEPOSITS

REFERENCE

- Alluvial
- (Metamorphic) Limestone
- Silurian
- (Metamorphic) Schists
- "Coal Measures"
- Marine Tertiaries
- Ferruginous Concretions
- Greenstone a, Schistose b, semi Columnar (Aphanite)
- Dysodile (Tasmannite)
- Coal Worked
- Dip of Coal Seams
- Conglomerates
- Bore holes ⊙ Outcrop of Coal
- Proposed Sites for the "Diamond Drill"
- Faults
- Basalt

- Dip of Don M. Co's Coal ..... A.
- Dip of Don Limestone ..... B.
- Strike - do ..... N.
- Dip of Metamorphic Sch[illegible] ..... K.
- North Western G. Min[g] Co ..... H & K.
- Dulverton do ..... G.
- Outcrops of Limestone ..... OO.
- Riley's Coal Mine ..... P.
- Alfred Colliery, (Davies) ..... F.
- Faults ..... E E.
- Mersey Gold Mining Co ..... I.
- "Trilobite" Beds ..... XX.
- Tasmannite Beds ..... LLL.
- Coal worked out ..... M.
- Sandstone Quarry ..... D.

BASS STRAIT

POINT SORELL

ISLAND

ISLAND

BURGESS

RIVER DON

Mersey Bluff

PORT FREDERICK

FORMBY

Aphanite

TORQUAY

DARLINGTON

D'LATROBE

TARLETON

EASTWOOD

WESTWOOD

SHEFFIELD

KENTISH

Granted to John Ward Gleadow and Robert Pitcairn 1000 ac.

Granted to John Ward Gleadow and Wm Hardy 1006 ac.

Granted to John Ward Gleadow and Robert Pitcairn

Granted to D. Morcom's FROGMORE Sn.

Granted to The Mersey Deloraine Tramway Company Limited 1,219 ac.

Granted to Daniel Wescombe

Granted to Philip Nicholas.

Granted to The M[e] D. Tram[y] Co (Limited)

Granted to the Mersey and Deloraine Tramway Company (Limited)

Reserved for Dysodile

Quartz Veins

Lessees Reserved for Dysodile

Lessees

NEW GROUND

NATIVE PLAIN

PARAMATTA DEEP CREEK

SASSAFRAS CREEK

MARINE CREEK

CAROLINE CREEK

RIVER FORTH

RIVER LEVEN

MERSEY RIVER

RIVER DASHER

MINNOW RIVER

DELORAINE TRAMWAY

COLLIERY

Part of Grant to The M[e] D. Tram[y] Co (Limited)

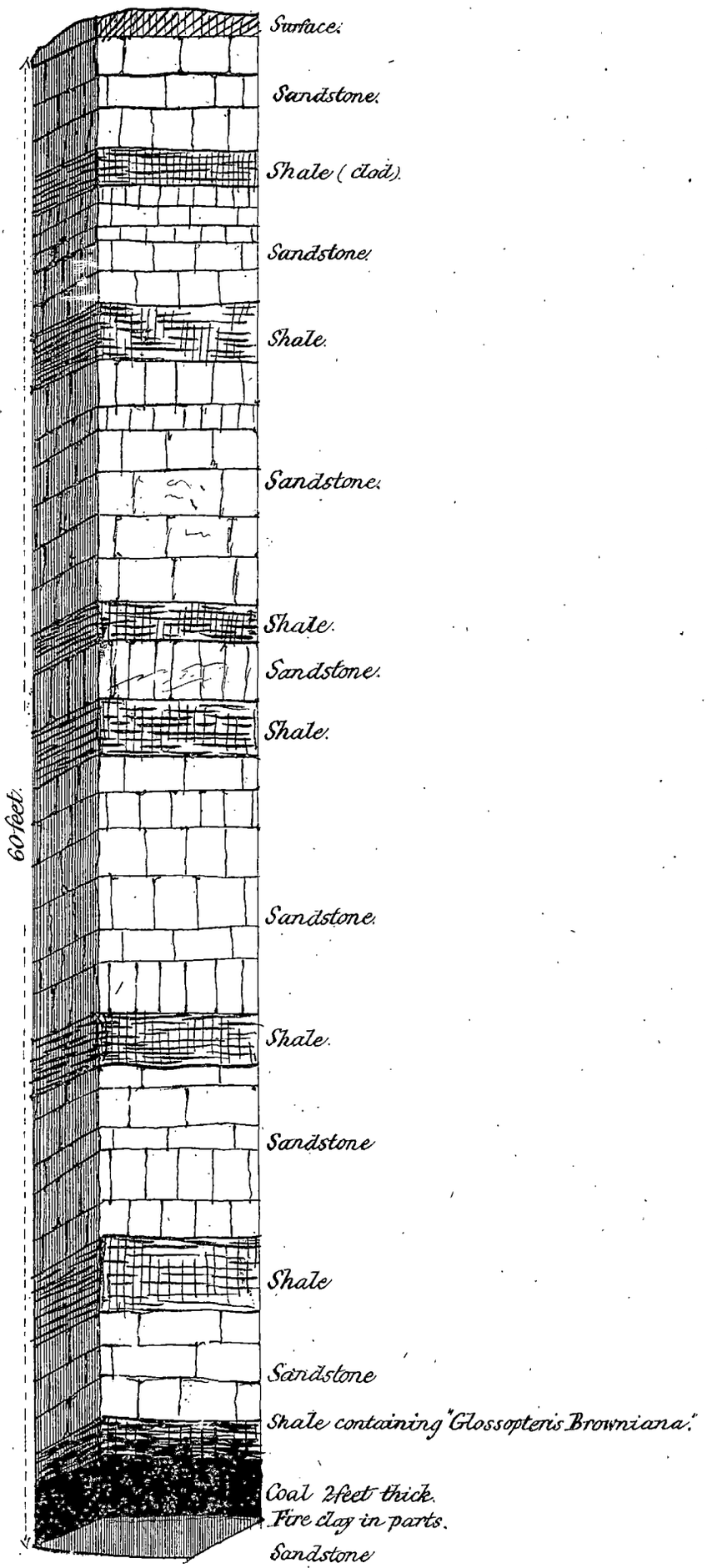
Grant to The Mersey and Deloraine Tramway Company (Limited)

15,514 acres.

Lands Office. July 1883.

G. Thureau. F.G.S.
Geological Surveyor

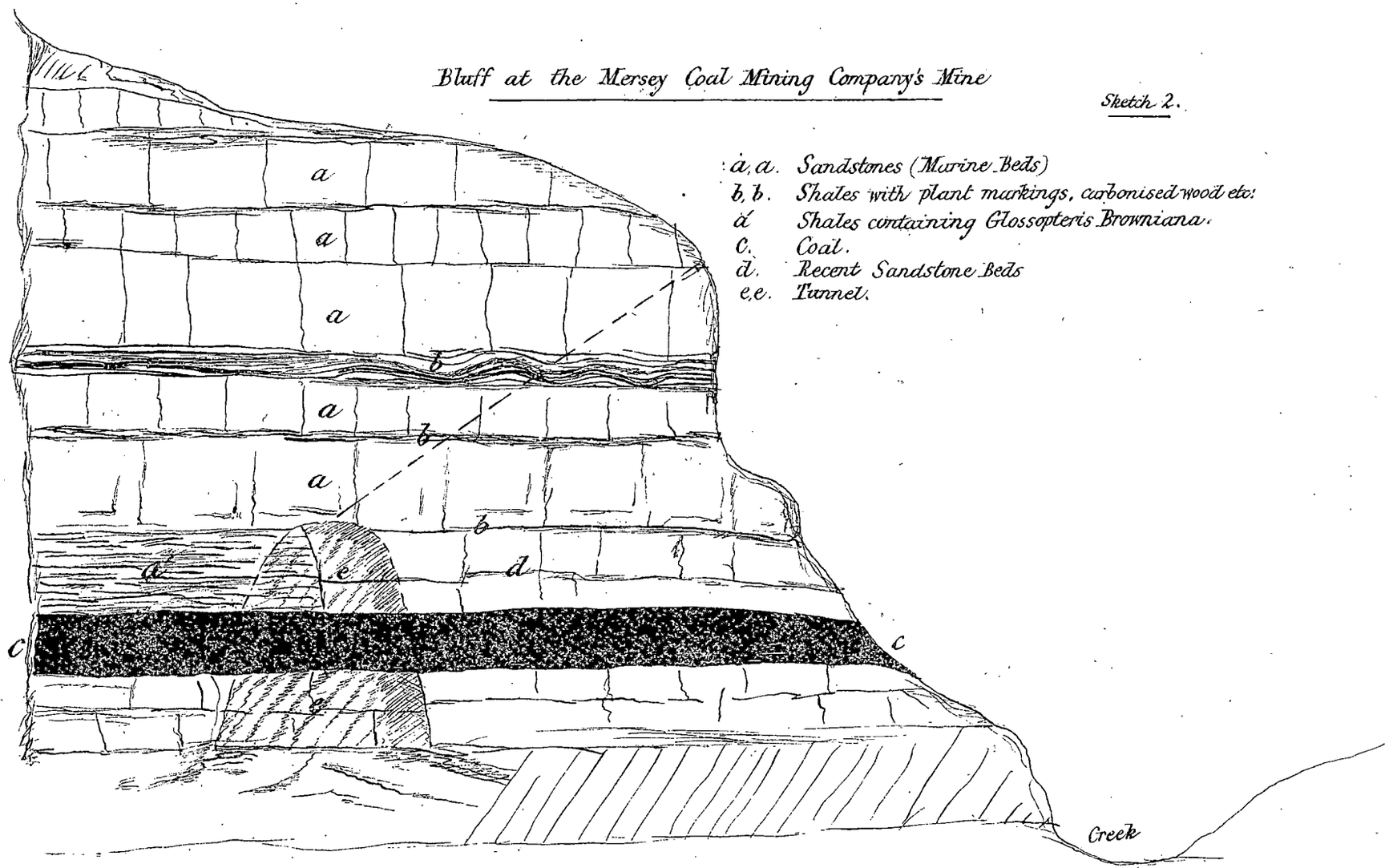
Sketch. 1.



Section of Shaft "Alfred Colliery", near Sherwood.

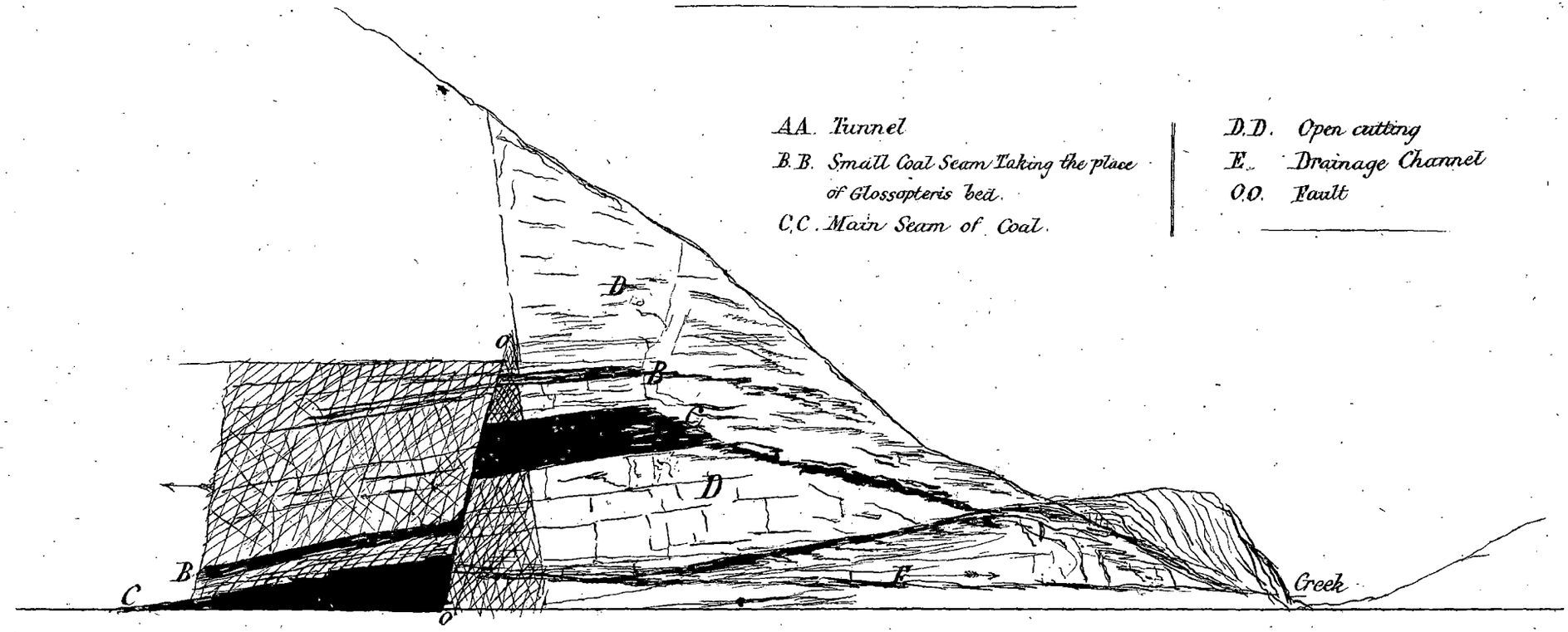
Bluff at the Mersey Coal Mining Company's Mine

Sketch 2.



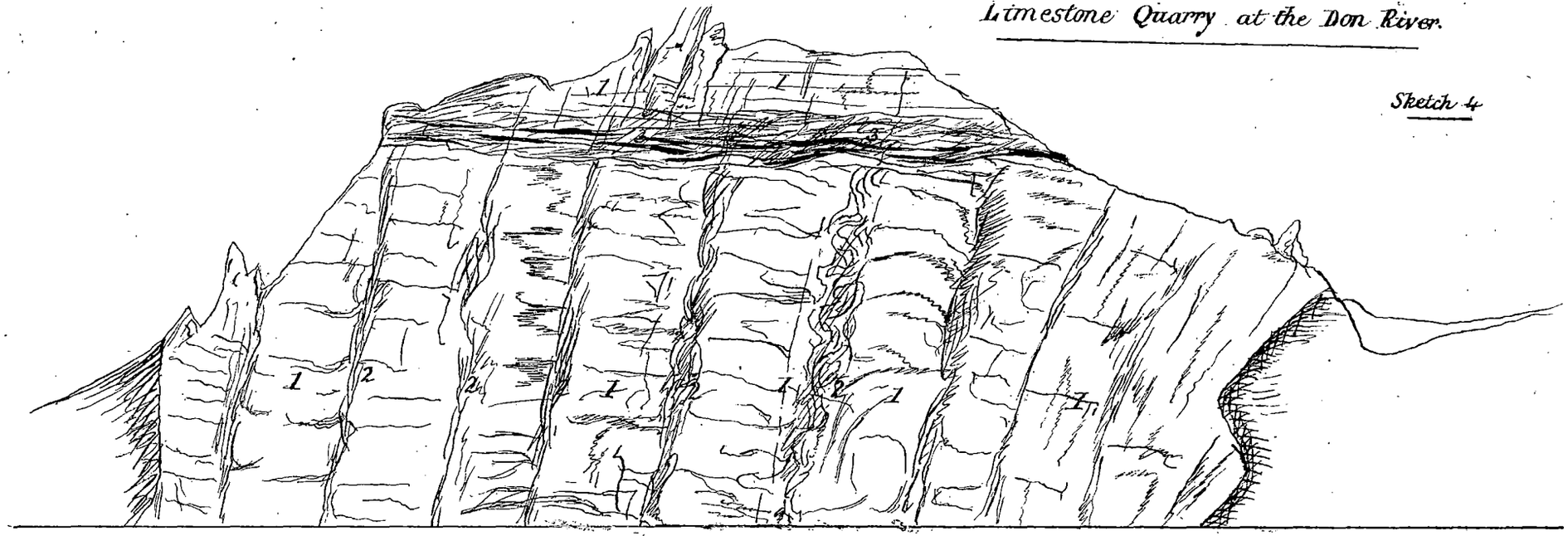
The Dalverton Coal Mining Company's Tunnel

Sketch 3.



Limestone Quarry at the Don River.

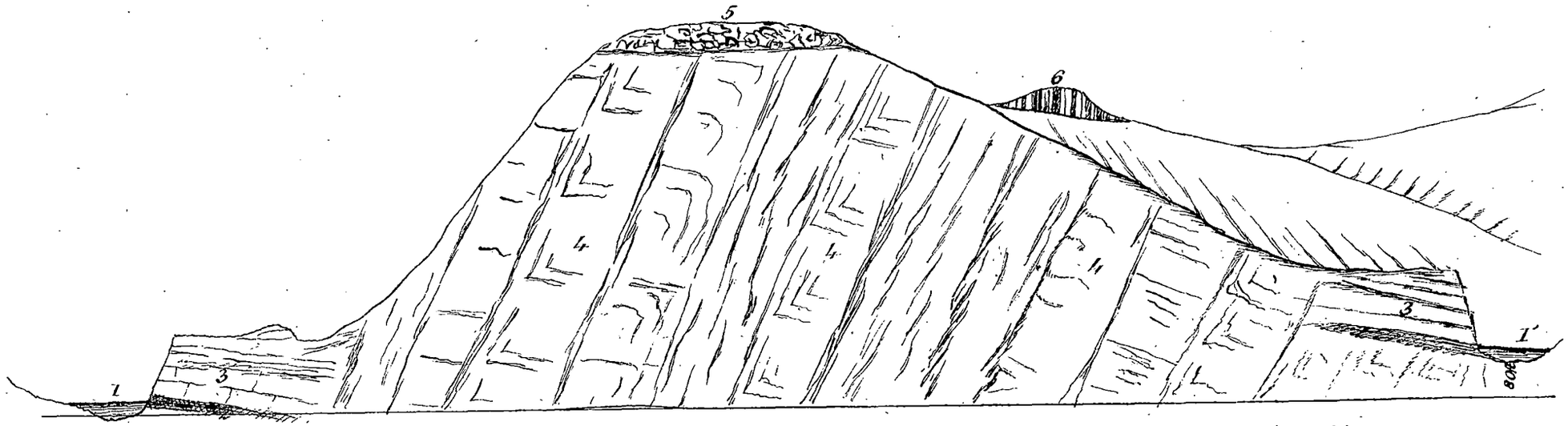
Sketch 4



11. Limestone (metamorphic). 22. Vertical bands of Shales deposited by infiltration. 33. Metamorphic Shales indistinctly visible

The Dysodile (Tasmannite) Beds at the Great Bend of the Mersey River.

Sketch 5.



1,1. Mersey River.
2,2. Dysodile Beds.

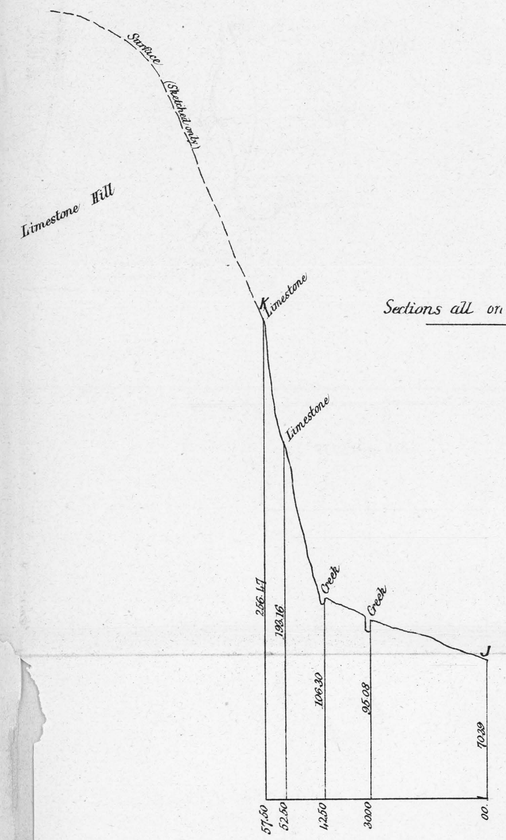
3,3. Marine Beds.
4,4,4. Silurian.

5. Capping of Conglomerates
6. Outlier of Greenstone.

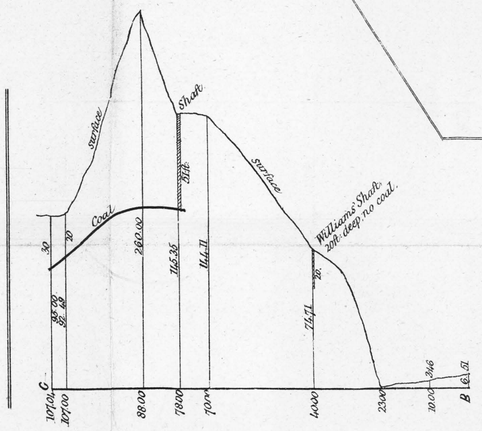
7 1' Mersey River
(80ft. above Datum Line.)

PLAN.

Sections all on same Scale



SECTION No2.



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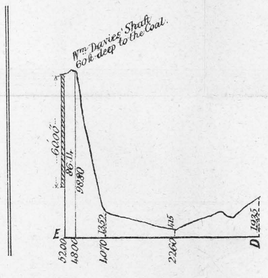

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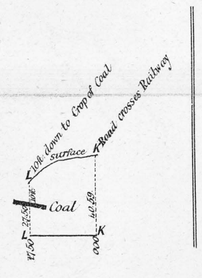

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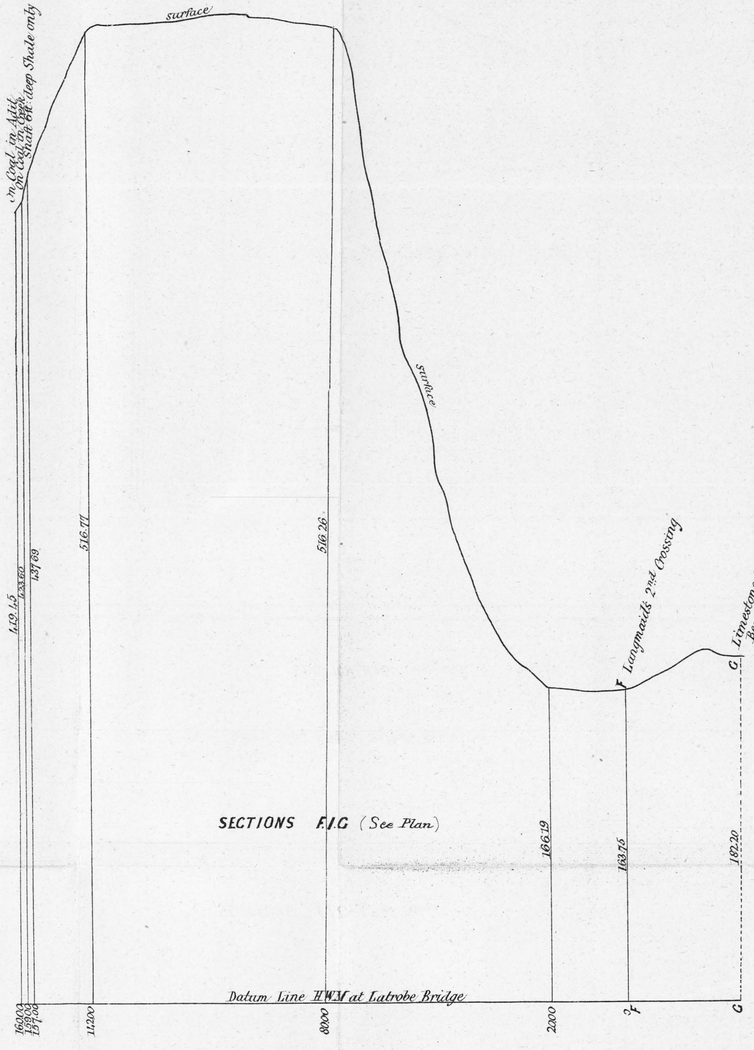

SECTIONS F.I.G (See Plan)

SECTION No6.

Sections A B D K J F H
Do F I G
{Horizontal Scale 3 Inches to a Mile
Vertical Scale 160 feet to a Mile.} No1 & 6.