

Q5 No. 1

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BITUMEN, ANTHRACITE & LIMESTONE  
KING ISLAND

27-038

Bitumen, anthracite and limestone, King Island.

by

L. B. Richards 19/9/27.

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Hawthorn,

19/9/27.

*C. B. Pritchard*

Messrs. W. S. Kimpton &amp; Co.,

Dear Sirs,

In accordance with your instructions I proceeded to King Island to investigate claims put forward by Mrs. Adams and Co.

The case put up was quite a good one, and -- referred to three main items, namely :-

1. the occurrence of fresh bitumen
2. the occurrence of anthracite
3. The occurrence of a richly fossiliferous polyzoal limestone

The relationship of these to one another was well worthy of -- investigation, for the occurrences seemed to suggest possibilities of great amount.

#### 1. The Bitumen.

In reference to the bitumen, there is no doubt about this material being a genuine petroleum bitumen, nor can there be any doubt about the freshness of the deposit. It has hardened off somewhat on the surface and has in consequence become somewhat brittle, breaking off almost conchoidally and showing a velvety-black lustrous surface, and it gives off a strong smell of crude petroleum. Testing the fresh fracture with a finger nail it is easy to detect a distinct stickiness even in the surface material. A little below the surface it is still quite plastic, and can be readily shaped between the fingers. It was found to be quite difficult to remove with a pick on account of this -- plasticity, but by dint of a little hard work some fine samples were obtained.

It is a true petroleum bitumen and readily -- yields light oil fractions on low temperature distillation, and by continuing the treatment at higher temperatures middle oil fractions lubricating oils, and paraffin can be obtained.

I saw three patches of bitumen on the West Coast, one large and two small, others I am told have been removed. The small patches were older and drier than the large patch.

The all important point then is the relationship existing between the bitumen and the rocks on which it rests.

This discovery was made on the coast near the mouth of the Pass River which flows westerly about nine miles north of the main town on the Island, Currie. The coast was carefully examined for some miles north and south of the Pass River .

The dominant rock of this coast is a porphyritic granite with a great development of the orthoclase feldspar almost to the exclusion of the quartz and mica, the feldspar crystals vary in size from half an inch to two inches in length. Quartz veins are common through this rock frequently in flat makes, also occasional veins of red granite and tourmaline granite.

The divisional planes or joints are a very noticeable feature in these rocks, and as they are very close and oblique, they have the appearance of schistose rocks from a distance in some exposures. The joints are in two sets, oblique to one another, giving rise to definite V shaped openings on the exposed surface.

The first sample of bitumen was found to be wedged into a joint, and it showed evidence of softness in its form, and by the presence of flow structure. It is now brittle and still pretty fresh as the smell of crude oil is given off when freshly broken. This specimen was about three feet six inches long and narrow and moulded into the joint opening. Another smaller patch was also observed under similar conditions.

The largest patch was further out and only approachable at low tide, it could not be examined on the first visit, but the next day gave the very best conditions and a careful examination could be made.

It proved to be seven feet long by a maximum width of one foot six inches, with an average of rather more than a foot width, and a depth of about ten to twelve inches, with a side arm in a higher joint about three feet long but of no great depth. In its position there it rested on the surface of a coarse -- porphyritic granite of a type absolutely precluding the possibility of it in any way belonging to that rock. It is definitely -- moulded into a V joint of granite rock, and shows clear evidence of flow after it had been stranded.

It is freely admitted by the discoverers that these rocks were free from bitumen at Easter time, and that it could not have been in its present position for more than eight or nine weeks at the date of examination.

2. The Anthracite.

In reference to the Anthracite the samples submitted were suggestive of a coal bearing series of rocks of some value provided the seams were thick enough. I was taken north from Currie about eighteen miles to the neighbourhood of Yellow Rock, and after a good look around Mr. Bonnie had to admit that he was at fault and could not again find the coal where he thought it was. Several waterworn pieces were however obtained and these on close examination and analysis proved to be without doubt -- Anthracite.

The sample of anthracite examined showed :-

Physical properties - A fine velvety-black colour, with a high lustre, brittle, with a tendency to conchoidal fracture, and does not soil the fingers.

Proximate analysis -

Moisture	4.5 %
Volatile Hydrocarbons	3.75%
Fixed carbon	81.55%
Ash	<u>10.2 %</u>
	<u>100.00</u>

The sample showed on strong heating without access of air, no luminous flame or deposit of soot, usual to the so-called bituminous or semi-bituminous coals. Very little gas was given off, and the residue was quite unchanged, there being no signs of coking. The residue on being ignited with free access of air burnt with only the slightest trace of flame, and the ash was of a greyish white colour.

The coal had associated with it in minute seams and cracks a deposit of an earthy nature, this would on the sample taken account for the high percentage of ash.

The coastal country here also was occupied by a similar general type of porphyritic granite which however is more heavily cut up by veins richly charged with Tourmaline crystals. This tourmaline is a velvety-black mineral and is very abundant in some places, but of no commercial value, though frequently suggestive of tin-bearing country.

It is just possible that this black mineral may have misled in the first instance, and been mistaken for Anthracite or something of that character.

The igneous rocks of this area are not at all suggestive of the occurrence of any coal bearing sedimentaries, and in the absence of any more definite evidence I am forced to the conclusion that the anthracite obtained is of drift origin without any hint as to its possible source.

The west coast of King Island where examined by me consisted of a low rugged granite coast rising only a few feet above sea-level and capped by dune limestones ranging from 50 to 150 feet above sea-level. The sand and sand dunes are mainly made up of shell fragments, hence when these accumulations are acted on by percolating rain water some of the lime of the shells is dissolved to be used later as a binding or cementing agent, this action can be seen going on all along the coast from coastal springs and seepages, hence the formation of the dune limestones of the coast.

Long dunes in the neighbourhood of the Pass River show a distinct east and west trend, and point clearly to the prevailing westerlies and easterlies to which the Island is subject.

### 3. The Polyzoal Limestone.

This rock is of exceptional interest as proving the existence on the Island of a good typical representative of our Older Tertiary Marine Series. The specimen first shown to me by Mrs. Adams was a very good sample of a Polyzoal Limestone made up entirely of organic remains and showing a small species of scallop or fan shell (Pecten). This rock has been called a "Blue -- Limestone", which it certainly is when fresh and wet, but when thoroughly dry it is of a grey color, and where it has been exposed at the surface to atmospheric action and oxidation it takes on a cream to yellow colour, exactly comparable to several of our mainland types.

The outcrop of this rock can be seen in the bed of a small tributary creek of the Sea-Elephant River on the property of Mrs. Adams. It is an extremely porous rock, and when first taken out is thoroughly saturated with water. It is for the most part covered with several feet of sandy and sandy clay soil, so that several holes had to be sunk to prove its presence and depth of overburden. Insufficient work has been done on this deposit to show clearly the area covered by it. I examined the valley of the Sea-Elephant River near by and found it occupied by defined slates and sandstones evidently belonging to the Palaeozoic series. This occurrence would seem to cut out the likelihood of the Tertiary limestone beds proving to be of any great thickness in this area. This locality is between seven and eight miles from Naracopa, the eastern port of the Island, and occupies some of the highest ground on the Island, probably upwards of 600 feet above sea-level. In this locality also some of the Older Basaltic lava is still to be seen as a small remnant. A similar limestone and basalt can be seen on some parts of the south coast of Victoria as at Flinders, Airey's Inlet, etc.

This limestone if properly burned would make an excellent lime, but the extent of the operations could only be predicted when more opening up work is done. Mrs. Adams informed me that she had an analysis made of this limestone, which proved it to be of excellent quality. This analysis also indicated that it contained organic matter, so I took a sample and tested it with Ether, and obtained a light yellow solution which on evaporation yielded a yellow brown oily residue, but the amount obtained was insufficient for a satisfactory test of whether the oil was of a vegetable or mineral character.

A second test was made on a sample taken by Mr. Bonnie from a new trench below creek level just below Mrs. Adams old house occupied by Mr. Bonnie.

This was received in a sealed tin, and when opened it gave off no recognisable smell other than dampness. This sample was very wet, it was carefully dried out in the air before testing, then treated with ether for 24 hours, and the yield was only a very faintly yellow solution which on evaporation gave a small amount of yellow-brown oil.

This though suggestive is I think negligible.

#### SUMMARY.

These three substances, the bitumen, the anthracite, and the "blue" limestone, as they occur on King Island are not in any way connected with one another, they are all independent of one another and do not originate from a common source.

The limestone is the only one that is in situ or in its natural position, the others are in my opinion sea-borne and of drift origin. and the difficulty is to locate their original source.

The freshness of the bitumen and the fact that it still holds a fair proportion of the light oils points to no distant origin, but the expression of an opinion as to that source must be received with a certain amount of caution, though probabilities are worth considering.

The limestone deposit could be worked for lime, no doubt at a profit with satisfactory handling, but at present the deposit is not sufficiently opened up or tested to be certain of its extent, by the proximity of the old Palaeozoic slates and sandstones. I am inclined to think that it is an isolated patch of no very great thickness possibly 15 feet or thereabouts, but a few hand cores could easily definitely settle that point.

Another point of commercial value is the highly felspathic granite, it has the characters and appearance of a material suitable for extraction of potash and for use in the tile and pottery industries for glazing purposes. There can be no question about quantity of this material for it outcrops along the coast for miles and it is quite close to a good road.

In regard to oil possibilities I much regret to state that there is no reasonable chance of carrying this matter any further forward. It seems a pity to damp so much energy and enthusiasm on the part of Mrs. Adams and Co. but there is no help for it. A map is attached for your further information.

I have the honour to be

(sd) G.B. PRITCHARD D.Sc., F.G.S.,

Member of the American Association of Petroleum Geologists, &c.