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REPORT ON OCCURRENCE OF ASPHALTUM AT KING ISLAND.

PRELIMINARY STATEMENT

In many places along the south-west and west coasts of Tasmania, on the south coast of Australia and on the shores of Bass Straits islands fragments of asphaltum have been reported from time to time.

Mr. L. K. Ward in Geological Survey Bulletin, South Australia No. 2 records occurrences on the shores of Kangaroo Island and Eyres Peninsular.

Mr. Loftus Hills in Tasmanian Geological Survey Bulletin No. 18 reports on asphaltum fragments distributed along the sea coast of Tasmania between Albina and Point Hibbs.

W. H. Twelvetrees mentions pieces of asphaltum having been found on hummock Island, Cape Barren Island, on the west coast of King Island, on the beaches north of Port Davey, in Port Davey, and then eastward along the south coast in a bay east of Cox Bight, on the beach at the mouth of New River, in Rocky Boat Harbour, on Surprise River beach, and on the beach in South Cape Bay. (Tas. Geo. Survey Bulletin No. 24).

In each case these writers lean to the opinion that the bituminous material has been washed up by tides and ocean currents from some place or places unknown.

LOCATION AND ACCESS.

The occurrence under examination is situated south of Pass River on the west coast of King Island in Bass Straits. Access is gained by means of North Road from Currie for 10 miles, thence in a general westerly direction for 1¾ miles over a cart track to the coast line, and from this point the beach is traversed northerly for about one quarter of a mile to the deposit. A Tasmanian Government steamer calls into Currie, the chief settlement of the island, at intervals on its passage between Launceston and Melbourne.

TOPOGRAPHY.

The topography of the area is generally of low relief although a short rise of about 100 feet is in evidence from the beach line to the general level of the island at this point. The beach as a whole is a somewhat rocky one giving place above high water mark to high sand dumes which extend for some distance inland. Pass River, a stream of no great size or length, is the chief drainage system in the vicinity and this watercourse is in a youthful stage of erosion near its junction with the sea.

GEOLOGY.

Even grained to porphyritic granite outcrops along the shore line showing in places a gneissic structure. The granite is of a grey colour having much plagioclase felspar in comparison with the amount of quartz. Biotite mica is subordinate to muscovite. The age of the granite could not be definitely determined but owing to its broken nature and gneissic form it is considered to be older than the Devonian granites of Tasmania and is probably from Proterozoic to Cambro-Ordovician in age.

Directly overlying this old granite, behind the foreshore, is a series of Upper Tertiary to Recent sediments of well bedded, calcareous, and loosely aggregated sandstones containing comminuted shell fragments, which is closely interstratified with a cream coloured limestone, the whole having a thickness of 75 to 100 feet. The bedding planes are generally level but cross bedding also occurs. Concretionary forms like replaced roots traverse the upper portion of the formation and in places stand out in relief on cliff faces through removal by weathering of the loose sandstone in which they are found.

On the undulating surface above the series loose sea sand of various depths is in evidence.

THE ASPHALTUM DEPOSIT.

A strip of Crown reservation east of high water mark and extending from Porky Creek in the south to a little more than a mile north east of Yellow Rock River has been applied for under No. 10103/M of 588 acres in the name of A.J. Adams as a reward claim for oil. A deposit of asphaltum situated west of this section between high and low water mark and about 10 chains south of Pass River mouth has been taken by the applicant as an indication of the presence in the immediate vicinity of natural petroleum.

A sample of the asphaltum was forwarded to the Chief Government Chemist and Assayer who reported that the material appeared to be a natural asphaltum and that it was similar to the sample described in Tasmanian Geological Survey Bulletin No. 24 Page 24 which reads:- "The asphaltum readily dissolved in carbon "Bisulphide and benzine. It was insoluble in alcohol and hydrochloric acid. It was acted on to a slight extent by hot "sulphuric acid. It burned with a smoky flame and gave off an "odour similar to that given by kerosene. Its specific gravity "was found to be 1.0313."

Under examination the main portion of the asphaltum proved to be about four feet in length by approximately 1'6" at the widest point on its surface and in the vicinity of 1 foot at the greatest depth. It is stated to have been found two years ago and at that time is said to have been 9 feet long by 2 feet wide and to have been very plastic throughout. At this point the rock type is an old gneissic granite outcropping on the foreshore. The granite has been broken by two main sets of vertical structure planes at approximately right angles and one set has developed in a more or less east and west direction. The latter have been weathered and widened at surface by the action of the sea into V shaped crevices, and it is in one of these that the asphaltum was seen to adhere. Similar crevices have apparently at a late period been filled or partly so by bituminous matter, for small pieces may be observed to be clinging to the sides of such.

The asphaltum is of a jet black colour and pitch like lustre, the external portion being of a brittle-solid nature and having a conchoidal fracture, while the more centrally situated part is quite soft and plastic. The surface shows an apparent flow structure and is traversed by irregular cracks due to contraction resulting from loss of the more volatile components. The material appears to be quite pure and is not contaminated by sand or other extraneous matter.

Herbert Abraham in his work entitled "Asphalts and Allied Substances" describes asphalt as "A term applied to a species of bitumen, also to certain pyrogenous substances of dark color, variable hardness, comparatively non volatile; composed of hydrocarbons, substantially free from oxygenated bodies, containing relatively little to no crystallizable parafines; sometimes associated with mineral matter, the non-mineral constituents being fusible, and largely soluble in carbon disulphide; and whose distillate fractioned between 300 and 350°C., yields considerable sulphonation residue.

Sir boverton Redwood (Petroleum and its products) states that "Asphalt, or asphaltum, and asphalt rock are widely distributed, and occur in some localities in immense quantities. Although certain deposits, such as that forming the Pitch Lake of Trinidad have been by some considered the primary product of the decomposition of vegetable or other matter, asphalt is usually regarded as having resulted from the combined actions of evaporation and atmospheric oxidation upon liquid petroleum as it issues from outcropping strata".

OIL POSSIBILITIES.

All possibility of the bitumen found on King Island, having extruded from the granite in the area may be excluded since it is recognised that mineral oil in commercial quantities does not form in igneous rocks. The sandstone interbedded with limestone beneath the coastal sand dunes is made up of aggregates of sand and shell fragments, and the limestone of an impure calcareous material. Organic matter either animal or vegetable suitable for the creation of petroleum appears to be lacking in this series and the thickness of the beds as a whole is not considered great enough for oil formation since pressure is a requisite factor and this can only be obtained by the required weight of sediment. The rocks which are lying in approximately horizontal beds have no impervious cover rocks suitable for the retention of oil and although the texture is porous enough to contain fluid oil in the interspaces between the grains of the rocks themselves, the fluid, when formed would tend to seep at surface or along the bedding planes which have a free outlet to the sea.

Further inland towards the middle of the island on a section of 47 ac. 3 r. 8 per. purchased from the Crown by H. W. Missen early Tertiary Limestone built up of marine organisms is visible but here again no rocks are apparent covering the series, suitable for retaining oil although conditions appear suitable for its creation. Again the formation at this point has no great thickness as Palaeozoic quartzites outcrop in Sea Elephant River some 20 feet lower in the immediate vicinity to the west.

However, further east at Blow-hole on the shore of Sea Elephant Bay similar limestones horizontally bedded are again exposed and it is possible that they here extend to a greater depth but the visible structure holds out little hope for petroleum storage.

CONCLUSION

It has been indicated that the asphaltum in the case under review could not have been formed in place and that the rock types examined on King Island appear to be generally unsuited for the formation and retention of petroleum oil.

Owing to the position between high and low water mark in which the asphaltum has been found, it appears conclusive that it has been lodged there by sea action probably in a semi-liquid state before losing the more volatile constituents when the material would have a lower specific gravity than sea water, This explanation would explain the flow structure and the adherence of the material to the rock in which it was discovered.

Like the many other occurrences of its kind on the shores of Australia and Tasmania the actual source is a matter for conjecture except that there is very little doubt that it has been brought by ocean currents from the west, one of which passes easterly through Bass Straits.

F. Blake
ASSISTANT GOVERNMENT GEOLOGIST.

Mines Department,
Hobart.

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