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MIN/OIL/1#3

C.S.

Scientific
(Geological)
Minerals.

No. 511/21

Dr H A Baker.

SUBJECT.

1921

11th July

Previous Paper.

Report by Dr H A Baker.

On the Possibility of the Occurrence
of Liquid Petroleum in the Balkland Co.

MINUTES.

Report by Dr. Baker dated 31st May 1921 Encl⁽¹⁾
H.E. the Governor,

Submitted.

2. The duplicate copy was submitted as soon as received.

B. Thompson.

A. C. S. 11/7/21.

^{to S. of S.}
Despatch ^{N^o 56} of 12th July 1921 - - - Encl⁽²⁾

Subsequent Paper.

FALKLAND ISLANDS.

No. 56.

GOVERNMENT HOUSE,

STANLEY,

12th July, 1921.

Sir,

With reference to my despatch, No. 47,
of the 20th of June, I have the honour to
transmit herewith a report by Dr. H. A.
Baker on the possibility of the occurrence
of Liquid Petroleum in the Falkland Islands.

In duplicate.

I have the honour to be,

Sir,

Your most obedient,

humble servant,

J. Middleton.

THE RIGHT HONOURABLE

W. L. S. CHURCHILL, M.P.,

SECRETARY OF STATE FOR THE COLONIES.

C.S. 5-11/20

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PROGRESS REPORT ON THE POSSIBILITY
OF THE OCCURRENCE OF LIQUID
PETROLEUM IN THE FALKLAND ISLANDS.

Stanley,

Falkland Islands,

31st, May, 1921.

PROGRESS REPORT ON THE POSSIBILITY OF THE OCCURRENCE OF
LIQUID PETROLEUM IN THE FALKLAND ISLANDS.

Sir,

I have the honour to submit herewith a progress report on the results of my investigations concerning the possibility of the occurrence of liquid petroleum in the Falkland Islands.

In the prosecution of this enquiry attention is being specially directed to the following points:-

1. Evidence at the surface suggestive of the existence of liquid petroleum below.
2. The geological age and character of the possible oil-bearing rocks.
3. The tectonic features and general disposition of the strata.

In connection with (1) above, I am seeking especially:-

(a) Surface oil-seepages, (b) Bituminous material filling cracks and fissures. I regret to state that, so far, both these lines of enquiry have produced no substantial result. I have examined many alleged "oil-seepages", and have found in every case that the seeming appearance of oil was due to the presence of iron-oxide in peaty water. One case only perhaps, of an alleged oil-seepage is worthy of record. An old inhabitant told me that many years ago he came upon an unmistakable "paraffin spring" at Bold Cove (the creek running in a N.N.E. direction between Bold Point, West Falkland, and the entrance to Port Howard). He was very positive upon the point and assured me that he could not be mistaken as he supposed the liquid to be water and attempted to drink it. He informed me that he had tried on many subsequent occasions to

rediscover

deposited in water of no very great depth but of sufficient depth
strata are (very frequently) rocks of marine origin which were
expected to find it. It is generally accepted now that oil-bearing
the Devonian-Carboniferous rocks and not the Cornubian Beds that I should
Nevertheless, if oil occurs in the Falkland Islands, it is in

been known to yield oil.

Beds of South Africa, and these beds have, unfortunately, never
be correlated, at least in part, with the Bokkeveld and Witteberg
the case in younger strata. The Devonian-Carboniferous rocks can
much more opportunity for the escape of the oil than would have been
rocks to have been at one time oil-bearing there must have been
It should be borne in mind, therefore, that, even assuming these
Alsatians since the very remote period of their deposition.
Palaeozoic age and which have, consequently, passed through many
Falklands, with a sequence of rocks, the whole of which are of
With regard to consideration (2) above, we are dealing, in the

in the Devonian-Carboniferous rocks (upper part).
Bedded black shales, some apparently slightly bituminous, occur
no bituminous substances whatsoever from the Isolation Beds.
Port Sussex, (which is a distinctly bedded material) I have seen
folding cracks and fissures. Apart from the bituminous shale of
I have, so far, seen no signs whatever of bituminous material

possible that there may be something in the tale.
is a likely area to examine for oil-seeps, hence I think it
geological formations, especially in the neighbourhood of faults,
certainly, associated with faulting. The junction-plane of two
the Isolation tilite - an occurrence which is probably, but not
the present report is that in this area I discovered an outlier of
oil-seepage. My only reason for incorporating this statement in
examined the same neighbourhood but could find no signs of any
opportunity of late years of revisiting the spot. I also
was moved to another part of the Falklands and had had no
rediscover the spring but had failed to find it. Afterwards he

to exclude air. Whilst the uppermost Devono-Carboniferous rocks are very probably of fresh water character, judging from their plant remains, yet at no great depth below them occur shallow-water marine beds with abundant shell-fish remains.

The Goniwana Beds of the Falklands, on the other hand, are, very clearly, strata accumulated under terrestrial conditions, as may be seen from the facts that their lowest beds are glacial accumulations whilst the succeeding beds contain the *Glossopteris* flora. Strata of this character are now generally regarded as a more hopeful source of coal rather than oil. In this connection it is of interest to note that the Lower Goniwana Beds of the Southern Karroo were recently examined for liquid petroleum by the officers of the Geological Survey of that area, and their report was adverse.

In view of the great age of the Devono-Carboniferous sediments I consider (in the absence of definite surface indications) that there are no special grounds for any hope of finding liquid petroleum in areas where these rocks are now exposed at the surface and unprotected by any cap-rock to serve as a sealage. I do not look, therefore, with any special ^{hope} to East Falkland, since its surface is composed almost entirely of Devono-Carboniferous strata. The most hopeful area is Lafonia (the southern part of East Falkland) where the Devono-Carboniferous rocks are overlain by the Goniwana or Lafonian Beds. —

In regard to consideration (3) above, the structure of the Falkland Islands is that of a syncline, the Goniwana or Lafonian Beds resting in a great hollow or sag in the Devono-Carboniferous rocks. This structure is the result of earth-movements which took place some time after the deposition of the Lafonian rocks. Two sets of folding-movements combined to bring about this result. One set of movements operated about ^e ~~NE~~ oriented slightly north of west and south of east, although swerving somewhat in their courses. The effects of this set of folding-movements are very clearly

clearly seen in the northern, Devonian-Carboniferous area of East Falkland, and are still to be traced to some extent in the northern part of West Falkland. The other set of folding-movements operated about axes of N.W.E.-S.E.W. orientation and the area chiefly affected by them is that lying near to the east coast of West Falkland. Both sets of movements died out towards the south, so that Lafonia and the southern part of West Falkland are comparatively undisturbed.

Both sets of movements gave rise to the production of parallel ridges and troughs. The folding affected the border of the main area of Lafonian rocks but does not appear to have extended very far into the region occupied by them. I have seen, both in East and West Falkland, isolated outliers of the Lafonian tillite preserved in the troughs or valleys between neighbouring fold-ridges of the Devonian-Carboniferous quartzite. As a result, the junction everywhere between the Devonian-Carboniferous and the Lafonian is marked by a very high dip which rapidly flattens out as the main area of deposition of the Lafonian rocks is approached.

Only the northerly and westerly terminations of the synclinal area are known. I have no knowledge of the position of the termination of the basin of Lafonian rocks on the south and east. Over the greater part of Lafonia the rocks dip very gently indeed and are practically horizontal over wide stretches of country. I have, so far, seen no signs in the south and east of the complementary upturn of the rocks which indicates proximity to the remaining portion of the boundary of the syncline.

In the absence of surface-indications of its presence, the occurrence of oil in a set of strata can only be determined by exploratory boring. If it were proposed, at any time, to bore for oil in Lafonia the following considerations should be borne in mind. A depth of something between 3,000 and 4,000 feet is usually not exceeded in boring operations. If the Devonian-Carboniferous rocks beneath Lafonia were being explored for oil it would be necessary to bore fairly near the exposed junction of these
rocks

rocks with the Lafonian. The Lafonian tillite and succeeding Lafonian Sandstone alone make up a thickness exceeding 3,000 feet. In those portions of Lafonia remote from the Lafonian boundary the total thickness of strata above the concealed Devonian-Carboniferous rocks must be well over 3,000 feet, consequently a boring of the usual depth would not succeed in reaching the latter rocks. Furthermore the probable horizontality of these strata here renders this area not the best for oil-seeking operations. Some site on the ~~the~~ outcrop of the Lafonian tillite would probably be the best for any such exploration.

In that case only the tillite itself would have to be passed through before reaching the underlying Devonian-Carboniferous rocks, and that not at its full thickness. Moreover the dip of the strata in the neighbourhood of the exposed junction of the two formations is sharper, and this is an important factor favouring the separation of gas and oil in the strata from water.

To sum up in conclusion:-

1. The rocks in other parts of the world corresponding to the Devonian-Carboniferous of the Falkland Islands have never been known (so far as I am aware) to yield oil.
2. The rocks in other parts of the world corresponding to the Lafonian Beds of the Falkland Islands have been examined for oil and have been reported adversely upon.
3. I have, so far, seen no surface-indications of the existence of oil in the Falkland Islands.

In view of these considerations, whilst I feel that there are certain theoretical grounds on which oil might be expected to occur beneath Lafonia, I am not, at present, prepared to state that exploratory boring-operations in that area would be likely to meet with success.

I have the honour to be,

Sir,

Your obedient servant,

Herbert A. Baker

D.Sc., M.Sc., D.I.C.,
F.G.S.
Government Geologist.