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REPORT ON THE OCCURRENCE OF RADIO-ACTIVE MINERALS
IN THE VICINITY OF RUM JUNGLE RAILWAY SIDING
NORTHERN TERRITORY.

by

H.J. Ward.

CANBERRA. A.C.T.

27th April, 1950

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MAPS.

1. Geological Map of Torbernite-Carnotite Deposit on Finniss River (East Branch) Situated approx. $2\frac{1}{2}$ miles North 30° East of Rum Jungle Railway Siding Northern Territory. Scale 100 ft. = 1 inch.
2. Map showing distribution of granite in the vicinity of Rum Jungle, Northern Territory. Scale 1 miles = 1 inch

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INTRODUCTION.

The discovery of the radioactive minerals carnotite and torbernite, in the vicinity of Rum jungle, was reported by Mr. Jack White on the 7th September 1949 in a letter to the Director of Mines, Alice Springs. Mr. White recognised the minerals as similar to those described in the Bureau of Mineral Resources Pamphlet No.3 "Radio-Active Mineral Deposits". Officers of the Department of Mines, Alice Springs confirmed his conclusions.

The area was visited by J. Daly (Geophysicist), J.F. Ivanac (Geologist) of the Bureau of Mineral Resources, and M. Sneddon of the Mines Department, Alice Springs late in September. They suggested that detailed geophysical and geological work should be carried out. H.J. Ward and G.F. Joklik made a detailed geological investigation in October and prepared a map (Plate 1) which covers an area of approximately half a mile by a quarter of a mile. A general reconnaissance of the country in the vicinity of Rum Jungle was also carried out.

In conjunction with the geological work D.F. Dyson, of the Geophysical Section of the Bureau, made a Geiger-Muller survey of the torbernite-carnotite deposit.

LOCATION AND ACCESS.

Rum Jungle Railway Siding is situated 56 miles south of Darwin and approximately 5 miles northwest of Batchelor Railway siding on the Darwin-Birdum Railway line.

Rum Jungle can be reached by taking the turn off to Batchelor Airfield 54 miles from Darwin on the Stuart Highway. The torbernite-carnotite deposit is situated on the northern bank of the East Finnis River about two and a half miles northeast of Rum Jungle Siding, and is reached by a bush track from the Siding. A radio-active leached outcrop about $5\frac{1}{2}$ miles N30°W of Rum Jungle Siding can be reached by a bush track which crosses the northern flank of Mt. Fitch.

TIMBER AND WATER SUPPLIES.

Supplies of timber which can be used in mining are readily available.

Water suitable for both domestic and mining purposes can be obtained from large pools in the East Finnis River.

TENURE.

Mr. White has pegged out about 24 acres on Block 1090, Division of Goyder, County of Palmerston which is freehold land owned by Mr. E.V.V. Brown of Glenelg, South Australia. Mr. White is awaiting the decision of the Department of Mines concerning his right to work the mineral deposit.

PREVIOUS WORK.

Reports by Tenison Woods (1886), H.Y.L. Brown (1895, 1906), J.V. Parkes (1892), C.J. Sullivan (1946) and L.C. Noakes (1947) include references to the geology of the area.

ACKNOWLEDGEMENTS.

The writer wishes to acknowledge the help of the Department of Mines, Alice Springs, Mr. J. Smith, Mining Registrar, Darwin, and Mr. Jack White who discovered the deposit. The company and co-operation of D.F. Dyson, Geophysicist, was appreciated.

WORKINGS.

When the geological party arrived at Rum Jungle, the uranium-bearing minerals torbernite and carnotite were exposed in two small costeans, 8 feet and 10 feet long, and 2 feet deep, on the northern bank of the East Finmiss River. As a result of an extremely high geiger-muller reading obtained over another small area (2 feet by 4 feet) about six inches of soil were removed and both torbernite and carnotite were found.

Other workings in the area mapped are less than 100 feet west of the above costeans. They consist of two costeans and two shallow pits, one of which is probably an old shaft now only 5 feet deep.

GENERAL GEOLOGY.

The rocks of the area consist of interbedded quartzite, conglomerate, haematite quartzite, quartzite breccia, limestone, carbonaceous slate and graphitic schist, all of which have been intruded by granite.

The sedimentary rocks are regarded as part of the Brocks Creek Group (Noakes, 1947), which is considered to be of early Proterozoic Age.

In the immediate vicinity of the torbernite-carnotite deposit there are two principal rock types, namely, quartzite breccia and carbonaceous slate. The trend of the rocks is in an easterly direction but variations in strike show that the rocks have been folded. The dip varies from 70 degrees south to vertical.

The carbonaceous slate which outcrops in the central portion of the area mapped contains thin bands of felspathic quartzite, graphitic schist and ferruginous slate.

The quartzite breccia is predominantly a red rock consisting of irregular pieces of milky white quartzite to translucent quartzite set in a fine grained matrix of quartz and haematite. The rock is considered to be of detrital origin.

Granite outcrops about half a mile to the north, east and south of the mineral deposit. The most common type of granite is a medium grained biotite-hornblende granite; coarse grained varieties have been observed in the vicinity of Giants Reef, about half a mile to the east.

The contact of the granite with the metamorphosed sediments is generally sharp. In some places, however, it assumes a brecciated appearance over a width of up to 6 feet; in this brecciated zone abundant angular fragments of country rock are embedded in a ramifying matrix of granite.

In the area mapped in detail, small quartz reefs out-cropped in two places but no such reefs were found in the immediate vicinity of the mineral deposit. On the dump of the old shaft, vein quartz containing malachite was found.

About half a mile due east of the carnotite-torbernite deposit a barren quartz reef ("Giant's Reef") extends in a north-easterly direction for five miles and outcrops intermittently for about a mile to the south-west. This reef, in some places 70 feet wide, is near the junction of the granite and metamorphosed sediments but where observed has been confined to the granite.

ECONOMIC GEOLOGY.

RADIO-ACTIVE MINERAL OCCURRENCES.

North Branch of East Finmiss River.

The radio-active minerals carnotite and torbernite are found disseminated along joint and bedding planes in carbonaceous slate and graphitic schist. Geiger-Muller readings of more than 100 counts per minute above background show that radio-active minerals occur over approximately 17,000 square feet.

In the costeans the two minerals, of which carnotite is predominant, are associated with malachite and an unidentified black mineral in two seams, one of which is 6 inches and the other 12 inches wide. The seams have an approximate N60°E strike and a dip of 80°S. They have not been exposed along their strike. Radiometric analyses of five samples from these seams showed that approximately one per cent of U₃O₈ is present.

Vicinity of Mt. Fitch.

A gossanous outcrop at least 600 feet long and 70 feet wide is situated 5½ miles on a true bearing of 330 degrees from Rum Jungle Railway Siding, approximately three quarters of a mile south of what is known as Tamblyns Copper workings.

No radio-active minerals were observed in the gossan, but the Geiger-Muller counter gave activity readings of 100 counts per minute (twice background) in several places. This deposit remains to be further investigated.

GENESIS.

Examination under the binocular microscope of specimens from the main deposit show that carnotite and torbernite are associated with malachite and quartz; this, together with the radio-activity recorded in the gossanous outcrop near Mt. Fitch, suggests that the uranium minerals found to date result from the oxidation in situ of primary uranium minerals occurring at depth.

RECOMMENDATIONS.

Radio-active minerals are exposed over a small area only in the vicinity of Rum Jungle, but it seems likely, from the results of the Geiger-Muller Survey, that further deposits may occur under the widespread soil cover. Account has to be taken also of the well-known fact that uranium-bearing minerals are commonly leached from the surface.

This prospect compares favourably with other known prospects in Australia; at Mt. Painter, the No.6 workings were developed on a vein, an inch wide at the surface, which opened up to 25 feet in width at the 50 ft. level. This, together with the knowledge that elsewhere in the world all discoveries of

radio-active minerals are thoroughly tested before abandonment, justifies exhaustive testing of both prospects described above.

It is recommended that the mineral-bearing rocks on the north bank of the East Winness River be costeamed and that a shaft be sunk on the prospect to test the nature of the mineralisation at depth. The position of the proposed shaft and costeams are shown on Plate 1.

The gossanous outcrop north of Mt. Fitch should be systematically mapped and studied for distribution of radio-activity. The part of the outcrop with the highest radio-activity should be tested either by shaft sinking or by diamond drilling.

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MAP SHOWING DISTRIBUTION OF GRANITE IN THE VICINITY OF RUM JUNGLE N.T.



LEGEND

- + + Granite.
- Metasediments.
- Probable Geological Boundary.
- Inferred Geological Boundary.
- Dip & Strike of Bedding.

