

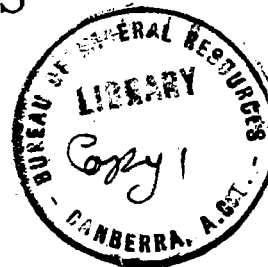
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BUREAU OF MINERAL RESOURCES  
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1953/~~7~~84

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~~SECRET~~

REPORT ON URANIUM PROSPECTING IN THE NORTHERN SECTION  
OF THE NORTHERN TERRITORY.

by

C. J. Sullivan.

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The period 17th June to 3rd July, 1953, was spent by the writer on the uranium fields. During this time an inspection was made of all work being carried out by the Bureau; in addition, the investigations by Territory Enterprise Limited at Rum Jungle were shown to the writer by W. Thomas, Resident Geologist.

RUM JUNGLE.

Exploration of the deposits to which attention had been drawn by the Bureau is being vigorously pursued by Territory Enterprises.

White's Deposit.

During 1951-52 signs of ore had been found by the Bureau 300 ft. south-west of the No. 4 Shaft. Driving on the 100 ft. level has picked up a continuation of the main Rum Jungle shoot which seems to be trending towards the indications of ore found by the Bureau. At the time of inspection the drive was in a full ~~fall~~ of ore. If this ore continues to the showings found by the Bureau, the tonnage per vertical foot known at the 100 ft. level, would be approximately doubled, making the total 1,000 to 1,200 tons per foot.

White's Extended.

Extensive bulldozing by T.E.P. has shown that the Bureau's scout drilling was not in the most favourable position and that the trends of the beds were slightly different than had been thought before the overburden was removed.

Autunite-bearing material of ore grade has now been exposed over widths up to 30 ft. in costeans several

hundred feet apart. This is a most important discovery and drilling was about to commence to test the persistence of ore in depth. The deposit is similar in type to Dyson's rather than to White's and very little is yet known concerning the variation of the grade of this type of deposit with depth. At Dyson's there is certainly some surface enrichment which contrasts strongly with the surface impoverishment occurring in the copper-rich and sulphide-rich ore at White's. Part of the White's Extended ore occurs in a talcy shale which could well have been originally a dolomitic shale. It reminds the author of the Todilto (Mesozoic) Limestone of New Mexico which carries large tonnages of ore with a very low sulphide content and contains disseminated uraninite. At the surface this material oxidizes to autunite. If the White's Extended showings maintain grade in the primary zone it would not be at all impossible to obtain from this deposit about 1,000 tons of ore per vertical foot.

#### Mt. Fitch.

Much of the investigation of the Bureau in this area was concentrated in or around iron-rich cappings over limestone. Liberal bulldozing has shown that these are underlain by soft leached limestone which does not look very interesting from the point of view of ore and detailed scintillometer surveys led T.E.P. to investigate the overlying black slate.

At the time of my visit material of near ore grade had just been exposed in a deep costean cut through these slates and this development looked very interesting.

#### Brown's Deposit.

Testing to date of this deposit has not revealed the presence of important shoots of uranium, but a small amount of drilling, including testing of the self-potential anomalies in laterite-covered areas to the west of the exposed deposit, revealed the presence of copper mineralization together with some lead over widths reported to be up to 100 ft. or more. The assays for this material were said

to be not yet available at the time of the writer's visit, but discussions with the geologists suggested that grades of 2 per cent. copper or better might be present over these widths. Since scout drilling has taken place over a length of about 2,000 ft. exclusive of the ore found in White's Deposit, it is not impossible that 20,000 tons per vertical foot of copper and lead ore, suitable for caving, occur in this section.

Summary.

Rum Jungle is responding extremely well to exploration and it has all the earmarks of an important field. If development continues to be favourable it is not all unlikely that deposits aggregating about 3,000 tons of uranium ore per vertical foot will be found, and eventually, it may be possible to expand production to 1,000 tons of ore per day. This would correspond to 700 to 1,000 tons of uranium oxide per annum.

Additionally, the possibilities of the area as a producer of copper and lead ore are by no means negligible; in addition to the copper and lead known to exist in the slates of the White's-Brown's line, the same formation is known to carry copper to the southward within the Hundreds of Goyder and Waterhouse.

These copper-lead deposits should be carefully investigated as they have the sort of dimensions which show possibilities of major production. Thus, deposits of the order of 20,000-30,000 tons, per vertical foot such as that indicated at Brown's could possibly yield 40,000 tons of copper per year which would double Australia's production. This scale of mining would make a very big contribution to the development of the Northern Territory. The figures indicated above represent possibilities only. They will be proved or disproved by the vigorous drilling being undertaken by T.E.P. It is reported that 12 machines should be in operation by the end of the year.

PROSPECTING BY THE BUREAU.

At the end of 1952 the important uranium prospects

which had been investigated by the Bureau up to that time were handed over to Territory Enterprises Limited for further prospecting and development. Thus, although the Bureau had carried out airborne scintillometer surveys in other areas during 1952, the significance of radioactive indications which had been found were unknown at the commencement of the 1953 field season in April.

The information gathered to date is thus of a preliminary nature, but already promising results have been obtained and there is every indication of a worthwhile outcome of the investigation.

Investigation of four main areas of interest have been commenced and results and opinions of these are recorded below:

1. Bredribb Area.

The airborne scintillometer survey carried out in 1952 detected first order scintillometer anomalies - one main line of which extends in an east-west direction over approximately five miles. The anomalies along this line are by no means continuous, but in a broad sense they can be regarded as forming a line. The writer recently inspected these areas. The highest radioactivity occurs in hematite- and limonite - bearing rock which in the writer's opinion represents surface accumulations of iron, probably derived from disseminated pyritic mineralization, and it is possible that not more than five per cent. pyrite is present. Geochemical work has shown that very little copper is present along this line. Iron-rich cappings are characteristically enriched in uranium and it is considered likely that the uranium content of the primary material is below economic grade. Three shallow holes have been drilled in the vicinity of these deposits, but it is not considered that the bed carrying the most radioactive material has yet been tested in the primary zone and a further hole will be required to do this. If this test is favourable an extensive drilling programme will be required in this area, but if, as anticipated by the writer, only very low-grade

mineralization is found, further drilling of this type of outcrop should be discontinued for the present.

This line of anomalies occurs to the west of the main road to Darwin and to the east of the road there is an area known as the "Frazer" where the airborne scintillometer detected a first order anomaly. On the ground this is an area of laterite. Laterite, by virtue of its origin, is normally enriched in uranium and commonly contains 2 to 3 times as much uranium as the underlying rock from which it is derived. Thus, many of the lateritic areas in this region give rise to airborne anomalies which probably do not represent economic mineralization. However, in the Frazer area there is a belt of laterite which in places gives radioactivity amounting to up to 10 x background. This belt of radioactivity appears to correspond in trend with that of beds in neighbouring bedrock and it is considered distinctly possible that this represents enrichment from primary uranium mineralization which should be investigated. This occurrence is quite different from the Brodribb type.

The first step should be costeaning with a bulldozer in order to reveal the extent of uranium enrichment in the ferruginous zone of the laterite and should be followed by self-potential geophysical survey to detect the possible presence of sulphides. This method has already proved effective in finding sulphides buried beneath laterite to the west of Brown's Deposit at Rum Jungle where drilling of such anomalies has proved the existence of copper and lead mineralization. Diamond drilling would depend on favourable results from the above.

## 2. Waterhouse Area.

Geological surveys have shown that the favourable beds which contain the ore at Rum Jungle extend southward into the Waterhouse area and copper mineralization as well as some radioactivity have been found within these favourable beds.

A deposit of copper-stained schists situated 5.5 miles south of Batchelor Siding and 200 yards west of the Railway Line

extends over a length of approximately 300 ft. and an average width of about 50 ft. Soil obscures possible extensions of this deposit to the east and north. The deposit contains areas of radioactivity and in general appearance and geological type is very similar to the original outcrop of White's Deposit at Rum Jungle. However, at White's Deposit some small stains of uranium ochres were found by pitting, but no such stains have yet been discovered at the new prospect. Nevertheless, in view of the deceptively poor appearance of White's Deposit at the surface, the new Waterhouse discovery warrants very careful investigation including a minimum of two drill holes to intersect the primary mineralization. The water table here is likely to be shallow and 500 ft. of drilling would probably cover the prospect in the first instance.

The bed containing the above prospect has been traced for some miles to the northward and a further radiometric anomaly as well as rather impressive copper mineralization is known to exist along it. The bed, therefore, warrants careful investigation and it is considered that there are very worthwhile chances of finding valuable mineralization along it.

The regional mapping of the area is not nearly completed but there are signs that the same favourable bed is repeated to the west of the line described above and signs of mineralization have again been noted in this area. Thus, the Waterhouse region warrants quite careful and detailed investigation which it will be possible to guide by means of the geological maps and the airborne surveys.

### 3. Edith River.

The Edith River deposits in general occupy small shears in granite and, of the numerous deposits seen by the present writer none is thought likely to yield important quantities of ore of economic grade. The radioactive lenses are mostly a few inches wide and 5 to 20 ft. in length. Thus, even if the grade, which is low at the surface, does improve in the primary zone where it has not been tested, the quantity of ore which would be available would be small.

This does not preclude the possibility that larger deposits will be discovered in this region.

It is reported that a company has been formed to test the present deposits and it is recommended that this company be allowed to carry out testing which will provide the Bureau with information as to the nature of the primary deposits.

4. Coronation Hill Area - South Alligator River.

This deposit is situated about 30 miles south of Goodparla Homestead. A local pastoralist, J. Callinan, holds a lease here over a copper deposit.

In May and June of this year E. P. Walpole, leader of a Bureau Geological Party, investigated this copper deposit for radioactivity and did not find any. On pursuing his investigation some hundreds of feet from the copper deposit he found important signs of radioactivity. Manual costeaning over a length of 400 ft. through surface detritus which obscured the deposit, has given encouraging results. In two costeans, 50 ft. apart, visible secondary uranium minerals, including autunite, were found and the width of mineralization indicated may be 20 to 30 ft. Costeaning has indicated that radioactivity exceeding 5 x background extends over a length of 500 ft. and a width of 200 ft. Thus, there is an area of radioactivity exceeding 100,000 square feet which compares favourably with the 1,400 square feet of greater than 4 x background originally found at White's Deposit, Rum Jungle. The large amount of radioactivity around this area and the successful results obtained so far from limited and necessarily rather random testing suggest that this deposit is important and warrants most careful investigation.

It is recommended that this investigation should take the form of testing the nature and extent of the primary mineralization and should, if possible, be carried out before September of this year when the onset of the wet season will make the area inaccessible.

Plans are in hand to carry out scout drilling of the deposit with a Sullivan H.D.22 machine now at Brodribb.

The deposit is situated on a line of faulting which is known to extend for about 40 miles to the north-west. Radioactive minerals have been reported from other localities along this line. If the Coronation deposit is in fact important this should be known during the present year so that adequate steps can be made to investigate the region as a whole during the 1954 field season, and so that the deposit itself, if of value, can be developed.

This discovery enlarges very considerably the known uranium province of the northern section of the Northern Territory.

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