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REPORT ON VISITS TO RADIOACTIVE OCCURRENCES, N.S.W.

by

J. Taylor

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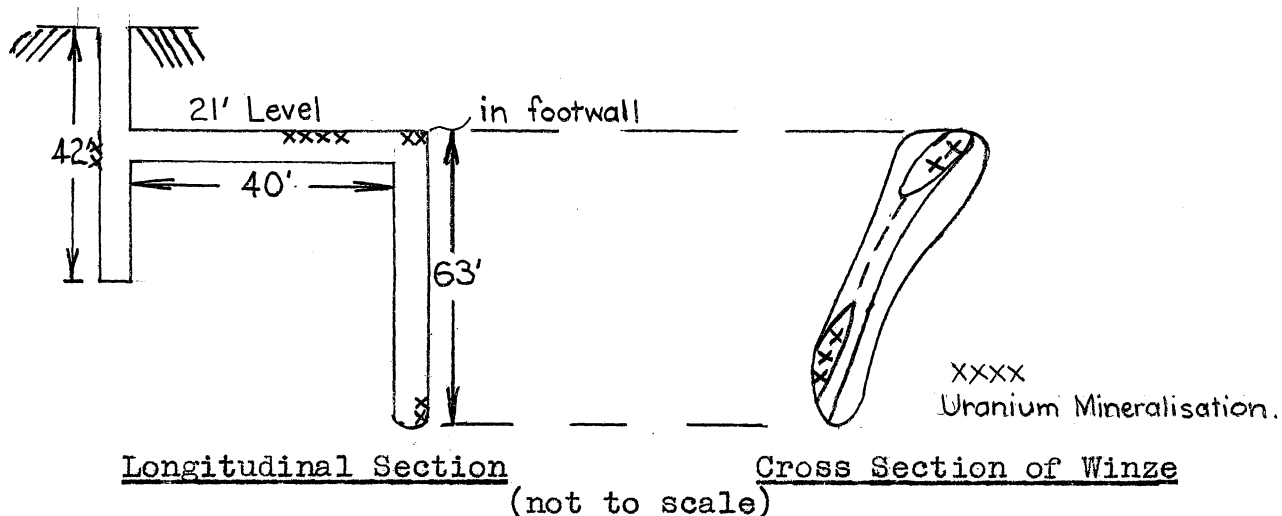
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BLACKFELLOW'S MINE, CONDOBOLIN.

Blackfellow's mine is an abandoned copper mine situated some 35 miles north-west of Condobolin in a post-Silurian granite which invades Lower Palaeozoic metasediments. Uranium mineralization is associated with the copper - both occurring in a north-south trending line of movement and alteration of the country rock. The uranium show is located near the southern end of this zone in the workings referred to above. A shaft has been sunk to 42' with a drive stretching north some 40' on the 21' level. At the north end of the drive a winze has been sunk to 63'. The mine has been dewatered and cleared out by the discoverers.



In the workings, low grade uranium mineralization is present in the clearly defined footwall in and adjacent to the top of the winze, and at the southern end of the drive. It is associated with ferruginous and manganiferous material. The strongest anomaly is at the foot of the winze. No primary uranium mineral has yet been found, but autunite, curite and torbernite have been identified, and an intimate association of the radioactive agent is suspected with the iron and manganese.

At the foot of the winze, the uranium mineral is concentrated over a 10 inch thick section of the lode and secondary minerals have been observed in situ. Radiometric assay gives an equivalent uranium content of some 1 to 2 percent. over 10 inches. The uranium mineralization cuts out over the "roll" in the fissure and appears again at the top of the winze.

On the line of the lode, about $\frac{1}{2}$ mile north of the mine, an altered phase of the granite, (about 40' long and 10' wide), grey in colour and showing a sparse dissemination of sulphides, gives counts of up to six or seven times normal background encountered over the granite. No uranium mineral has been observed. The general appearance of the alteration is similar to the "greisen" seen at Hughes Prospect, Storey's Creek, Tasmania, except that sulphide is lacking. A similar environment for slight anomalous radioactivity is seen about 100 yards to the south of the mine.

Uranium mineralization is controlled broadly by the north-south structure and locally by changes in the inclination of the lode. The occurrence of radioactivity in conjunction with manganese and iron is probably a secondary phenomenon.

Further work which might be done could include a detailed radiometric grid of the surface, covering the longitudinal extent of the structure and its immediate neighbourhood. The workings of the mine are in poor condition and this will limit further underground development unless the necessary repair work is undertaken.

DAVIDITE CLAIMS, BROKEN HILL.

A belt of intrusive pegmatites, occurring in the Archaean schists and gneisses, sixteen miles west of Broken Hill, to the north of the main highway to Adelaide, shows small concentrations of davidite. Thorite and absite in trace amounts have been identified from two localities on these claims.

The pegmatites run in an east-west direction, which contrasts strongly with the north-south trend of the metamorphics. They are quartz-felspathic in composition, and in addition to davidite, they may contain small quantities of rutile, ilmenite and biotite.

The salient features of these deposits are:

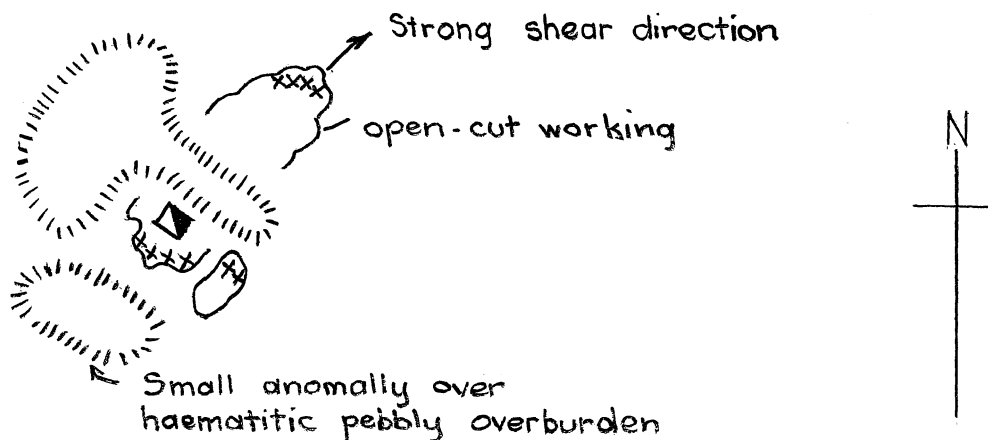
- (1) Sporadic distribution of davidite concentrations.
- (2) Low uranium content of these pockets - rarely exceeding 0.2% eU_3O_8 .
- (3) Individual concentrations of davidite are large.
- (4) Lack of definite criteria to aid prediction of further deposits, i.e. there are usually no apparent structural or stratigraphical controls, to which deposits can be referred.
- (5) Mineral associations - the davidite is intimately associated with rutile (crystals up to several inches in length) ilmenite and biotite. Davidite is often enclosed in felspar, giving red alteration halo, and is seen to occur in close association with bluish quartz.
- (6) Origin: The davidite appears to be a high temperature, hydrothermal replacement deposit, in that individual crystals are seen to cut across pre-existing crystal boundaries of the host minerals and across lineation produced by shearing in some of the pegmatites, e.g. at the locality (Baker's Claim?) east of the dam on the westerly claims.

Kenny's Claims show an interesting replacement of davidite (crystals up to one inch in length) in a fine-grained microgranite. Controlling factors in this occurrence seem to be an amphibolitic band on the hanging wall of the deposit, which has been opened to 8 feet in depth and over a similar length, and a silicified zone on the footwall. Uranium concentration appears to be about 0.1% equivalent U_3O_8 . Lateral extent of the deposit is small: trenches have been dug along the strike and show no continuity of mineralization.

On Fyfe's claims, on the easterly extension of the mineralized zone, a weak, indefinite structure, about 70' long, and one or two feet wide, shows occasional cobs of davidite associated with bluish quartz. Grade is again low, but this particular deposit, in that some structure is present, shows more promise than the others.

COPPER BLOW.

"Copper Blow" is a deserted copper mine situated south of Broken Hill near the western extremity of a mile-long lode mineralized with iron and a minor amount of copper. The deposit has been opened up by open-cut working and by a shaft which is still in good condition but is flooded.



xxx Uranium Mineralisation.

Uranium mineralization apparently follows a wide strong zone of shearing which runs at 220° through the schists. Radiometric anomalies are observed in the sheared zone over a width of ten to twelve feet, and, where exposed, a length of eighty feet. In the open-cut working, fifteen feet of vertical mineralization has been exposed. Readings over the N.E. wall of the open cut show an overall equivalent uranium content of about 0.10%, but other exposures contain less. Small sulphide dumps would appear to contain about 0.04 percent. by rough radiometric estimation.

In the open-cut working, only small fine-grained accumulations of secondary minerals in fractures and fissures can be seen. It is not sufficient in quantity to account for the total anomaly. The radioactive agent must therefore be identified.

Two diamond drill holes have been bored by Zinc Corporation to intersect the mineralized zone, but results were disappointing, in that ore grade was lower than that on the surface. However, these samples from the drill bores may not have been sufficiently representative.

Any economic significance possessed by this show must depend on an increase in grade at depth. The sulphide dumps demonstrate that the uranium is sympathetic in occurrence with the copper but gives little indication of true grade, as the effects of weathering must be appreciated, both on the surface outcrops and on the dumps. It might be expected that, with the presence of sulphide, an acid environment would result, and that uranium would be removed in solution. The persistence of radioactivity, unconnected with secondary minerals, indicates that leaching may not have affected the grade of the surface deposits.

ELDEE CREEK.

Eldee Creek is situated in the Barrier Range about 35 miles north-west of Broken Hill. The country rock is an extensive belt of pegmatite which intrudes the Archaean gneisses and schists. Parallel to the longitudinal axis

of the pegmatite outcrop, there runs a narrow band of quartz-biotite schist which persists through into the schists. At two points in this sheared quartz-biotite schist outcrop, there are small radiometric anomalies, both restricted in extent.

The easterly anomaly is caused by the presence of fine autunite crystals on the shear planes, cracks, and fissures in the schist. Length and width of the radioactive area are about 30' and 5'. Overall grade is less than 0.0% eU_3O_8 .

The westerly anomaly ($1\frac{1}{2}$ miles from the other) is smaller and has been opened up by bulldozed costean but is smaller and has about the same equivalent uranium content.

The uranium may have been leached from the pegmatites, which, incidentally, have a very low background, or may have been an indigenous component of the schist.