

REPORT ON CAUDRY OSMIRIDIUM MINE,
BALD HILL.

Location and Access

This mine is situated on the north-western fall of Bald Hill to Nineteen Mile Creek and about 70 chains from the junction of the latter stream with Savage River. The only means of access is by a good motor road from Waratah as far as the 19-mile peg. A sledge track of 60 or 70 chains in length connects the mine with this road.

Leases

Caudry's Osmiridium Mining Co. N.L. holds the following mineral leases:- 6251/M of 40 acres, 9538/M of 10 acres and 9539/M of 10 acres and a machinery site (9540/M) of 10 acres.

The mine workings are situated on the north-western part of 6251/M and the treatment plant on the central part of 9540/M.

Geology

The country in the vicinity of the mine workings consists almost entirely of serpentine. On the surface the weathered serpentine assumes all colours from nearly white to dark green, but in depth the characteristic colour is dark green. The serpentine is generally dense and massive with irregularly spaced and distributed joint planes, but the lighter-coloured, well-jointed and foliated type also occurs. The latter type is particularly abundant in parts of the mine workings, and in places appears to have formed a large proportion of the material mined. As to the original nature of the rock from which the serpentine was derived, Mr. A McIntosh Reid states: "Microscopical examination of this rock shows it to have been a typical peridotite consisting essentially of olivine and bronzite or enstatite. It is almost completely serpentinitised, but the rock section shows here and there, small particles of bronzite, chromite, and chrysotile, with secondary magnetite."

Veins of coarsely crystalline bronzite or enstatite occur in association with the serpentine to the south and west of the workings. These represent either portions of the original rock or what is more likely, unaltered veins of enstatite in the original peridotite.

Blebs of chromite are visible in the serpentine and enstatite. In addition, abundant magnetite with lesser amounts of ilmenite, is obtained from the concentrates, and the magnetite at least must be derived from the serpentine.

History and Past Workings

The McGintie Creek flows in a general north-westerly direction across the south-western part of Section 6251/M to join the Nineteen Mile Creek. Alluvial deposits containing osmiridium were followed and worked up McGintie Creek to the vicinity of the western boundary of the above section. It was found that the osmiridium did not extend beyond a certain point in the creek, but that it was to be found on the hillside to the east of this creek and north of this point. Further prospecting showed that the osmiridium in the detrital material on the

hillside did not persist beyond a certain line, and it was concluded that the osmiridium was being shed from a formation with the direction of the above mentioned line.

Excavations were made along the course of this line and it is stated that several ounces of osmiridium were obtained from the first workings. Working progressed and eventually produced an open-cut about 200 feet long, 4 to 6 feet wide, and 10 to 15 feet deep. The material appears to have been treated in a small hand-operated Berdan pan erected near the open-cut, the crushed material apparently being treated in prospecting dishes. Later a small five-head battery was erected and still later a plant consisting of two crushing pans and a jig was erected on the hillside north of the open cut, but only a small amount of serpentine appears to have been treated in the latter.

The workings of the Present Company

The Caudry's Osmiridium Mining Co. N.L. was formed in 1925. A new treatment plant was erected to the WNW of the mine, and a haulage constructed to it. Mining commenced at the south end of the workings, the older workings being deepened and a truck road cut into it. The returns were low and work at this end was stopped. An adit was started to intersect any downward continuation of rich stone in a winze sunk by Mr. Caudry, but did not reach its objective.

Work was begun at the northern end and a level was carried through the bottom of the former workings at a greater depth of 6 to 8 feet and for a length of 100 feet. The serpentine was payable for a length of 26 feet, but from 26 to 101 feet it was unpayable.

Work was then commenced again in the payable rock at the north end, and a deeper excavation was made in the floor of the levels. To provide proper working facilities, a short adit is driven to connect with this deeper working.

The Ore Shoots - Lease 6251/M

It is reported that in the earlier workings osmiridium was obtained chiefly from three points along the workings, but the exact location of these points is not known.

At the northern end a winze sunk by Caudry is stated to contain payable rock. The floor of the cut has been sampled by the manager for a distance of 15 to 20 feet south, and has found to be payable. The recent workings have proved the rock to be payable for the greater part of a length of 26 feet. The first ten feet of this was the richest, and the most recent work has consisted of underhand stoping of this part to a depth of 6 feet. From a recent crushing of 28½ tons, 16 ounces were obtained. Sampling of the sides and floor of this excavation by the mine manager has been made and results up to 4 dwt. per ton have been obtained. From samples taken by the writer the mine manager obtained the following results:-

	<u>Width</u>	<u>Approx. Weight.</u>	<u>Osmiridium Obtained</u>	<u>Calculated Content per ton</u>
South Face	5'9"	30 lbs.	0.75 grs.	2 dwts. 19 grs.
West Face	12'2"	35 "	1.25 "	4 " 8 "
East Face	10'2"	32 "	0.5 "	1 " 21 "

Portions (weighing 7 to 10 lbs.) of the samples were taken by the writer, but gave nil results. This is probably accounted for by the erratic distribution of the osmiridium in the rock, large samples being much more satisfactory than small ones for testing purposes.

The level driven recently to 101 feet was practically non-osmiridium-bearing from about 26 feet to the face where work ceased.

About 36 feet further south from this face, is another winze sunk by Caudry from and near which he is supposed to have obtained 14 ounces of osmiridium.

The workings continue 75 feet south from this winze. The first working of the present company was carried out at the extreme south where the cut was deepened to 15 feet along a length of 35 or 40 feet. Only one good crushing was obtained but its exact location is not certain, and work was later abandoned at this end, as the greater part of the rock was unpayable; only 14 ounces being obtained from the total work.

It would appear therefore that though osmiridium occurs in some quantity at three points, the shoot at the northern end is the most important so far proved.

Section 9540/M

In putting through some serpentine from behind the battery, as a blank test, the mine manager found that he obtained an appreciable amount of osmiridium. Further tests by him confirmed the above. The writer took a sample across 2½ feet of foliated serpentine. The band of this rock appears to have a strike of 122 degrees to 135 degrees with a dip to the south.

The test of the writers sample (about 8 lbs) gave no result in Launceston, but the manager's test of the remainder (25 lbs.) gave about ¾ grain of osmiridium which is equivalent to 2 dwts. 19 grs. per ton.

This occurrence has no connection with that on section 6251/M as it is situated some 10 chains to the west thereof and is not on the same line of strike. If however, it continues on the above bearing, it might junction with the occurrence on 6251/M at or to the south of the southern end of the workings on the latter. It cannot however, be traced on the surface in that direction, although this may be due to lack of suitable exposures.

The occurrence is well worthy of further prospecting and development.

Economic Geology

The open-cut produced as the result of past workings has a general bearing from south-south-east to north-north west, and with generally vertical sides. The sides are generally determined by planes in the serpentine which are irregular both in strike and dip, although generally these planes have a bearing of SSE to NNW. The effect of the cut is to suggest a more or less defined formation with a strike of NNW and dipping vertically. The material removed from the upper part of this excavation is reported by Mr. A.M. Reid to consist of soft, crushed, slickensided, white to yellowish-green serpentine.

The workings of the present company have been devoted to deepening the former workings. The planes which appeared to determine the osmiridium-bearing rock near the surface do not occur very prominently at depth. Further the foliated serpentine does not seem so abundant as it must have been if it filled the space between the walls near the surface, and the serpentine at depth assumes the dense, dark green (practically black) form with roughly rectangular jointing.

This dense type has been found to contain coarse grains of osmiridium easily visible to the naked eye. In specimens of this "ore" available for inspection, the osmiridium occurs at irregular intervals along a plane traversing the specimen in a manner identical with that of the occurrence of the coarse chromite in the serpentine. In addition the treatment of similar material has proved the existence of finer osmiridium (which cannot be detected by eye) in it. It is therefore evident that the osmiridium is not by any means restricted to the foliated variety of serpentine.

At the north end, in particular, the osmiridium-bearing serpentine extends over a greater width than that represented by the upper part of the workings. This has been proved by actual crushings put through the battery.

From the foregoing it would appear, therefore, that the NNW-SSE walls have lost some of definiteness in depth and that they do not actually limit the occurrence of the osmiridium. Further, the osmiridium is not restricted to one style of serpentine but occurs in both the foliated and massive types.

It has been suggested that the osmiridium-bearing serpentine occurs at one or more points in zones which have an easterly bearing from the NNW-SSE walls. While there are a few walls with an EW strike in the osmiridium-bearing serpentine at the northern end, these do not appear in any way to differ from the irregular jointing found everywhere in the serpentine. Further, the osmiridium has been proved by the mine manager's sampling to extend beyond the most prominent of these walls.

It may yet be found such EW zones actually occur but at present the evidence is not sufficient to justify such a conclusion. At the southern end there is certainly not sufficient evidence to justify such an assumption.

Methods of Locating Ore Shoots

In view of the above discussions, the question naturally arises as to whether it is possible to determine the manner of occurrence of the osmiridium in the serpentine. The type of serpentine seems to have no effect on the osmiridium content. The walls bounding the upper part of the cut do not appear to have the significance or limitation to "ore" at depth that they had at the surface. Nevertheless payable osmiridium-bearing rock has been found at the northern end; in smaller quantity at the southern end; and apparently also at shallow depth within the central part of the workings. The walls which determined the shape, size, and direction of the workings thus have some influence on the osmiridium content. The whole of the serpentine along the course of the NNW-SSE walls does not contain payable osmiridium, but payable rock occurs at certain points along it, with "blanks" in between. There is at present no means of distinguishing payable and unpayable serpentine except

systematic sampling and consideration of the returns from the treatment plant.

Treatment

The serpentine as mined is delivered to the mine bin from which it is transported by inclined haulage and ground tramway to the battery bin. It is broken by hand on the battery-feed floor to pieces (largest 4 to 6 inches) suitable for feeding the battery. The rock is crushed in five-head Fraser and Chalmers stamp battery with 1,000 lb. stamps. The battery is fitted at present with 12-mesh screens and the stamps are given 70 to 80 drops per minute. The through-put is approximately one ton per hour. The crushed material passes over a blanket table 4 ft. 6 ins. wide and 3 ft. 6 ins. long, and then drops on to another of the same width as the first (but divided longitudinally into four sections) and 10 to 12 feet long. The material then passes direct to a Wilfley table which, however, is not used as such, portion being used as a blanket table, the flow being across the table. During the writers visit a hydraulic classifier was ready to be installed between the blanket and the Wilfley tables. This should enable better work to be done by the Wilfley table.

The greater part of the osmiridium is obtained from the battery box, the remainder being obtained from the first two blanket tables. As regards the tailings the classification of these and the treatment of the finer portion on the Wilfley or a blanket table should tend to recover all available osmiridium in this portion. It will probably be found that the coarser portion from the classifier contains an appreciable content of osmiridium and will need finer crushing to enable it to be extracted. A rough test of recent tailings rather pointed to this fact and further ones should be carried out to determine the osmiridium content of the coarse tailings and to ascertain if it is economical to crush and retreat them.

Production

The production during the working carried out by Mr. Caudry is not known with any degree of certainty, but it is stated that 200 ounces were obtained from 75 tons of finely crushed serpentine derived from 400 tons put through a rock breaker. The present company started crushing in February. From 7th February till 12th June, it is reported that 26 ozs. 5 dwts. were sold for a return of £719-15-8. From 26th June till 4th September 30 ozs. 6 dwts. 2.5 grains have been forwarded from the mine. This will be finally cleaned in Melbourne and the total may be somewhat less.

Conclusions and Recommendations

The conclusions regarding the method of occurrence of the osmiridium-bearing serpentine have been discussed above. It need only be repeated that the general direction of the open cut seems to be the best method of locating shoots of ore; that the character of the serpentine has apparently little effect of the osmiridium content; and that when payable osmiridium has been located it should be followed in every direction by systematic sampling and close co-operation between the workings of the mine and battery. Such procedure may prove the shoots to have some definite mode of occurrence in relation to the open-cut but until such is established the above system is recommended.

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GOVT. GEOLOGIST.

Hobart,
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