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NOTES ON ALLUVIAL CHROMITE DEPOSITS NEAR MONTAGU SWAMP

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On the south-western borders of Montagu Swamp are several gravel banks, remnants of extensive alluvial deposits, which contain appreciable quantities of chromite, with lesser amounts of cassiterite, rutile and gold. These gravels have been prospected for some time by Mr. A. A. Walker of Smithton and his associates, who have applied for a special prospecting area of about 24 square miles. Some of the gravels are at present being carted away and used by the Closer Settlement Department for roads in the area being developed by them in the Montagu Swamp; other patches are being used for timber roads in the area. The gravels make an excellent road surface.

Location

About 20 miles from Smithton on the Marrawah Road and just beyond the Montagu River there is a camp on the southern side of the road at which a timber and gravel carting road leads south for several miles. At four to six miles along this road are banks of gravel, some of which have been opened by pits and quarries.

Nature of Deposits

The country rock in the neighbourhood of these gravels is a slate or shale, but due to the quick weathering of it does not easily outcrop. However, it weathers to a brownish yellow clay which occurs at or near the surface. This was eroded in Pleistocene times by large streams, which have left well-sorted gravels along their former beds. It would appear that at this time the main rivers flowed northward from the neighbourhood of Waratah and Balfour. Thus the Arthur flowed out of the Duck Valley; the Rapid and possibly the Norton and the Leigh out of the Montagu Swamp and the Frankland out of the Welcome Swamp. Subsequent capture by the headwaters of a river which is now the lower Arthur turned the waters of these rivers to the west but left the broad alluvial plains. Further erosion has removed a certain amount of the alluvium but much remains that must have had its origin in the country to the east of Mt. Balfour and to the south of the present Arthur and Frankland rivers. It is probable that the origin of the tin and the chromite lay in rocks in this area. Certainly there are tin deposits at Balfour and intrusions of ultra-basic rocks, the source of chromite, in this general area. The area to the east of Balfour and west of Waratah is really the great unknown portion of Tasmania and organised prospecting in this

area may yet yield substantial discoveries of tin, gold and the basic minerals of which these alluvial deposits so many miles away are but an indication.

Grade of Deposits

Since the 9th November last, when Mr. Walker first forwarded a sample of concentrate to the laboratory, the Chief Chemist has conducted several assays and concentration tests on this material. His ore dressing investigations, Nos. R292, R293, R294 and R295 of the 8th May and 14th June last, are quoted freely in this section.

Sample R292 was a sample of alluvial material weighing 105 lbs. forwarded by Mr. Walker.

R293 a sample of 7½ lbs. forwarded by Mr. Walker.

R294 a sample of 6 lbs. collected by me. It was from a chromite-rich layer in the wash and was partially concentrated. R292 was stated to be from the same locality, a small cut put into the side of a stream bank a few chains east of a hut about five miles along the gravel road.

R295 was a sample collected by me from the main gravel quarry about six miles from the Marawah road. A channel sample was taken over about 10 feet in two different points in the quarry. The sample weighed 75 lbs.

The quantities of concentrate obtained by jig concentration and analysis of products are shown below. Coarse barren material was removed prior to concentration by screening.

	R294	R295
Jig concentrate percentage	17.68	1.4
Magnetic Fraction	17.61	1.39
Cr ₂ O ₃	58.4	58.6
Fe	14.5	15.0
Non-Magnetic Fraction	0.07	0.01
Tin	36.9	17.2
Rutile	21.4	36.4
Insoluble	25.5	24.1

The concentrating of R292 by jiggling and tabling resulted in a concentrate of 2.86 per cent by weight with the following analysis:—

	Per cent
Cr ₂ O ₃	55.0
Al ₂ O ₃	12.6
Fe	16.1
MgO	10.0
TiO ₂	0.43
Tin	0.08
Gold	1.26 grns. per ton

and magnetic separation of the chromite from the rutile, tin and gold resulted in the following products:—

	Cr ₂ O ₃	Al ₂ O ₃	Fe	MgO
Magnetic Concentrate				
2.8 per cent	55.5	12.8	16.3	10.3%
Non-Magnetic Concentrate		Tin	TiO₂	Gold
0.037 per cent		7.5	40.8%	5 dwt./ton

Mr. W. Manson has calculated the gross value of a ton of concentrate (using the following figures: tin, 163s. 3d. per unit; chromite, £17 per ton; rutile, £140 per ton, and gold, £15 12s. 6d. per oz.).

	£	s.	d.
Chromite—99 per cent	16	16	7
Tin—0.08 per cent	0	13	0
Rutile—0.43 per cent	0	12	0
Gold—1.26 grns./ton	0	0	10
	£18	2	5

Mr. Manson has also tabulated the following results to show the comparison between the various samples:—

Percentage	R292	R293	R294	R295
Concentrate	2.86	9.6	17.68	1.4
Chromite	2.83	9.57	17.61	1.39
Tin	0.002	0.005	0.026	0.0017
Rutile	0.01	0.003	0.015	0.0036

with the following proportions—

	Chromite	Tin	Rutile
R292	1000	0.7	3.5
R293	1000	0.52	0.31
R294	1000	1.47	0.85
R295	1000	1.22	2.59

It will be seen that although the proportions of tin and rutile do vary somewhat, they are of the same order and the samples taken from the same locality vary as much as those from different ones. The chromite itself is not concentrated at the bottom of the wash but occurs right through, although here and there are richer bands varying in width from a few inches (as at the cut by the creek) to a foot or so (as in the quarry).

Finally the results from the laboratory include some sizing tests. A sizing of sample R292 consisting mainly of water-worn quartz showed:—

Fraction	% Weight
+ 3/8 inch (aperture 0.33 in.)	8.2
+ 6 mesh (aperture 0.14 in.)	13.1
+ 10 mesh British Standard	20.2
+ 14 mesh British Standard	11.8
+ 16 mesh British Standard	6.5
+ 22 mesh British Standard	10.6
+ 30 mesh British Standard	7.6
+ 44 mesh British Standard	7.1
+ 52 mesh British Standard	3.3
+ 60 mesh British Standard	1.2
+ 85 mesh British Standard	1.7
+ 100 mesh British Standard	0.4
+ 200 mesh British Standard	1.1
— 200 mesh British Standard	7.2
	100.0

The sizing analysis of the concentrate showed:—

B.S. Screen Fraction	R292 Jig Conc.	Table Conc.	R295
+ 25	0.8 per cent
+ 30	6.4 per cent	29.6 per cent
+ 44	36.5 per cent	24.5 per cent	25.8 per cent
+ 52	30.9 per cent	25.0 per cent	14.9 per cent
+ 60	12.6 per cent	17.9 per cent	7.9 per cent
+ 85	11.4 per cent	23.4 per cent	17.1 per cent
+ 100 ..	0.9 per cent	3.2 per cent	2.7 per cent
— 100 ..	0.5 per cent	6.0 per cent	2.0 per cent

On the results obtained from these preliminary tests it is evident that the deposit is sufficiently interesting to warrant further investigation. It must be remembered that the material is very large in extent and could probably be handled by ground sluicing.

During the next week or so it is hoped to get half a ton of the material for further testing in the laboratory. As soon as a hand-boring plant is available it is expected that a detailed programme of prospecting can be commenced.