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COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS

RECORDS:

1943/40

OCHRE DEPOSITS, RUMBALARA, CENTRAL AUSTRALIA

by

C.J. Sullivan

15928/65

COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF SUPPLY AND SHIPPING.

TELEPHONE:
CANBERRA 982.

TELEGRAMS:
CARE "MINPROD" CANBERRA.

MINERAL RESOURCES SURVEY,
CENSUS BUILDING,
CITY, CANBERRA.

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OCHRE DEPOSITS,
RUMBALARA
CENTRAL AUSTRALIA.

Report No 1943/40 Plans No

Situation and Access.

Rumbalara is a small siding on the Adelaide-Alice Springs railway line. It is about 120 miles by rail south of Alice Springs, the distance by road being 143 miles. The road is now practically impassible for heavy vehicles owing to the necessity of crossing the Depot Sandhills. The mine is 35 miles by road north-east of the siding. The distance to the mine would not be much more than 20 miles in a direct line (compass survey) but the road winds a good deal in order to avoid as many sandhills as possible. The deposit at present being worked is on the edge of The Simpson Desert and it is practically impossible for a motor vehicle to venture off the beaten track. The freight to Adelaide is said to be £2--14--8 per ton of ochre.

Leases--Production.

One lease only was held in the district at the time of the examination (29th. July--2nd. Aug. 1943.). This was Mineral Lease 10H, the property of The Australian United Paint Company of Adelaide. At the time, Mr. Martin who is mining this lease on contract, intended to peg two other leases.

The production from this lease as recorded by the Mines Department, Alice Springs is as follows:-

To 30/6/1940	------	570 tons
1940/1941	------	377 "
1941/1942.	------	661 "
To 30/12/42	------	390 "
Jan.-May 1943	-----	512 "
		2510 tons.

The Manager of the property believes that the total production is in the vicinity of 4,000 tons. He expects that the output for the year ~~ended 30/12/42~~ 1942 will be approximately 1,200 tons.

Geology.

The rocks in the vicinity of the deposit (Mineral Lease 10H) are ~~extremely~~ flatly bedded and form prominent mesas which rise some 400 feet above the level of the surrounding plain. David (Sir T.W.E., "A New Geological Map of The Commonwealth of Australia", Sheet 4 and Section 8) tentatively correlates these beds with the Permo-Carboniferous rocks of New South Wales. (The mine is situated about 25 miles north-east of the point marked Engoordina on this map.).

Section J---K illustrates the rock succession in the mesa which contains the ochre being exploited on lease 10H. It is considered most likely that meteoric waters have dissolved out the iron which was formerly present in the beds overlying the present ochre horizon----particularly in bed "B"--- and that this percolated downwards until it encountered the massive sandstone bed at about R.L.1,000 ft. Here the iron-bearing solutions have, ~~occasionally~~ penetrated for a few feet into the sandstone, but mainly they have deposited their load by replacing their ~~xxxxxx~~ the white kaolinitic rock

immediately above it's contact with the sandstone. At the base of the ochre which is mined, there is usually a layer 1½ to 2 ft. thick consisting of nearly pure limonite. It is thought that this may be ochre which has lost it's original structure and porosity owing to complete replacement.

The ochre itself usually forms a band 1½ to 4 ft. thick. The best of it has a golden yellow colour, an S.G. of about 2, and is very porous and absorbent. This latter quality causes it to hiss when placed in water and quickly disentegrate The ochre powders easily and gives a very fine grained product. Paint Companies will not use the gritty material. On this mine the ore is supposed to contain 55% Ferric Oxide in order to be of standard quality; other desireable qualities, which are not entirely dependent on iron content, are "Purity of Tone" and "Staining Strength". These appear to be functions of grain size i.e. freedom from grit, and of the microscopic structure of the material.

Possible Ore Reserves.

The chances of obtaining further supplies of ochre from M.L.10H can best be seen from the accompanying plan and sections. It is believed that approximately 4,000 tons have been obtained from the stoped area shown. It will be noted that most of the mining has been carried out beneath the saddle dividing the two hills. Here, the beds formerly overlying the ochre horizon have been eroded off to within 10 to 30 ft. of that level. This would tend to facilitate the action of meteoric waters in carrying the iron downwards and the present manager believes that most of the ochre occurs below the more eroded sections of the hills. It was noted however, that over practically the whole of the outcrop of the ochre horizon, the deposition of the hard limonite layer which forms the base of the ochre occurs. As this appears to have the same origin as the ochre, it is reasonable to expect that a considerable quantity of the latter remains to be mined. If larger scale production were desired from this lease, it would be sound practice to explore the sections below the hills by means of tunnels. It is pointed out that the location of mine openings has been largely governed by the problem of accesibility by motor vehicles. It had been found that loading was comparitively easy in the vicinity of the present workings, whereas the working of other sections of the deposit would involve the construction of tramways or of rather difficult roads. Nevertheless, the question of the relationship of the degree of erosion to the occurrence of ochre needs to be kept in mind. The degree of leaching in the rocks overlying the various prospects may form a useful pointer to the occurrence of ochre below. A light portable drill yielding a core might perform useful service as the ochre horizon is often less than 50 ft. below the surface. The ochre would not yield good cores though, and the cost of tunnelling here is relatively small.

In the sections so far mined it was found that some 50% of the material was of saleable grade and that the remainder was incompletely replaced. It is believed that the standard set during the past years was a very high one and a higher proportion of somewhat lower grade material could be obtained. Keeping this figure in mind, it is thought that if the ochre extends below the higher sections of the hills, there may be some 40,000 to 50,000 tons of material (saleable) remaining in this lease. (A factor of 22 cub. ft. to the ton has been used for this calculation) If the occurrence of ochre is limited by the present topography, the tonnage available is likely to have an upper limit of 5,000 to 10,000 tons.

It will be realised that prospecting is an urgent necessity if production is to be maintained from this lease. The manager who is very familiar with the deposit considers that with one European and one native prospecting continually, he could develope enough ore to enable the production to be doubled. At the present time there is practically no ore developed and very little prospecting is proceeding.

Other Deposits.

Two other deposits occurring about 12 miles by road south of M.L.10H were briefly inspected. It was found that exactly the same geological conditions prevailed here as on the deposit at present being worked. In this area the migration of iron seems to have been more intensive than on M.L.10H and there is a very extensive development of the hard limonitic material underlying the ochre. Samples of ochre from this locality have been forwarded for expert examination. The two deposits seen are each as large as the one at present being worked, and it is considered very likely that they are capable of producing at the same rate as the present mine. A small tunnel 6ft. long had been driven into each deposit. There are several deeply eroded mesas similar to that on which the ochre is being obtained on M.L.10H.

A belt of hills, perhaps 2 miles wide, extends from M.L.10H to the deposits mentioned above; in these hills the same beds are everywhere present and the same climatic conditions have been at work. As the ochre always occurs at the same horizon and as this is easily identifiable --even at a distance of several miles--the prospecting of these hills would be a relatively simple matter. It is considered, however, that the deposits mentioned above are very likely to be able to supply anything up to 5,000 tons per annum for some time to come.

Mining Methods.

Most of the mining is carried out by Australian Natives. A tunnel 6 ft. high and 4 ft. wide is first driven into the hill. The ochre is merely picked out; the harder ground above it sometimes requires one or two charges of explosive. From the drives the natives stope out the thickness of the ochre, all work being carried out from a sitting position. The ore is shovelled into the drives where it is bagged in double wheat sacks. From here it is wheeled in a wheel barrow to the dump at the head of a chute. Motor trucks back under this chute some 80ft. below and the ore is landed directly on to the trucks. The ten natives working on the mine are producing at the rate of 120 tons of ochre per man per year in addition to disposing of about the same amount of waste. The men seem to be suited to the work and are used to the living conditions. The manager states that he could obtain sufficient additional labour of this sort to double production but they would not be of the same standard as the present men. The men at present on the mine have been selected over a number of years. The natives appear to work well when supervised.

The above method of mining has the advantages of producing a very clean product and of using a minimum of essential materials. In some cases it would be easy to strip the overburden and push it over the side of the hill, but unless a large production is contemplated, it is not thought that the erection of elaborate is warranted. In some cases, the amount of stripping required would be considerable.

Water Supply.

There is no adequate water supply within reasonable distance of the mine. Water is carted by the railways from The Finke Siding, 40 miles south and sold to the miners @ 30/- per 1,000 galls. The railways do not like carting the water as the line is already overstrained. Some water is obtained from clay pans after rains.

As far as is known, the country is not favourable for the occurrence of underground water. The owners of Horseshoe Bend (Engoordina) Station on which the ochre deposits occur, have not obtained any water in this section. Their supplies are obtained from the sandy bed of the Finke river. There are no rivers or creeks of any considerable size in the vicinity of the deposits. The annual rainfall is approximately 7 inches. The sandy nature of the country causes the rain to soak in very quickly. However, a local water supply is of considerable importance and a site has been selected for a trial bore. A broad depression running westward from the hills crosses the road to the mine at a point 17 miles from the mine. Approximately three quarters of a mile west of the road, the depression breaks through a second line of hills. A trial hole could be put down on the upstream side of this gap. It is expected that the extensive water boring program which is being carried out by the Allied Works Council along the Main North Road will be completed shortly, and some drilling equipment should be available.

Mining Costs. (and Transport.)

The ochre is mined on a contract system, Mr. Martin being paid £3--10 per ton in the winter and £3--15 per ton in the summer for ochre delivered at the Rumbalara Siding. The Australasian Paint Company undertakes to supply the motor trucks for transport and also supplies bags. The contractors maintain the vehicles, supply petrol and oil, and tyres; they also supply mining equipment of all kinds. It was found that the Manager keeps good records of all expenditure and an analysis of the costs was made on the basis of the 600 tons of ochre delivered to Rumbalara Siding for the six months ending 30/6/43:—

Transport.	Shillings per ton.
Petrol and oil	8.6
Tyres and tubes	2.0
European Wages	13.6
Native wages and keep	2.0
Maintenance of trucks	2.0
	28.2 shillings per ton.

With unforseen breakages etc. the transport costs are probably in the vicinity of 30/- per ton. Thus £2--2--6 remains for overall mining and bagging of ore--including the construction of roads, chutes and overhead wires. It is believed that with the present labour, and while work is confined to the section of the lease at present being worked, a small profit can be made at this price. If it is desired to increase production however, it is thought that the following alterations may be necessary:-

	Increase in Price.
To cover the cost of employing one European and one native for prospecting purposes only.	5/- per ton
To cover the cost of the employment of less efficient labour, the installation of additional chutes and the construction of roads to the loading points.	5/-
	10/- per ton

The above is calculated on a basis of an annual production of 2,400 tons of ochre.

Transport.

At the time of the examination, the carting was 100 tons behind the mining and in addition Mr. Martin often had to leave the mine in order to try and repair the trucks. This was owing to the fact that the vehicles provided by the Company were inadequate for the work they were intended to do. These consisted of one 2 ton Dodge which had completed 80,000 miles of hard going and a similar type Bedford which had a cracked cylinder head which could not be replaced. The Bedford was the poorer of the two vehicles. Each truck carried 3½ tons, but they were difficult to maintain in running order. The round trip to the siding and back is completed in a day. The road is indifferent and the full day is necessary. It has been reported that the company has since provided a vehicle to replace one of the trucks. Adequate transport is an essential preliminary to any increase in production. The new prospects mentioned earlier in this report are some 11 miles closer to the railway siding than that on M.L. 104

Conclusion.

1. There are probably adequate supplies of ochre in the district to double or treble the present rate of production of 1,200 tons of ochre per annum.

2. Mr. L. Martin, the Manager of M.L.10H held by The Australasian United Paint Company of Adelaide, is familiar with the district and with ochre mining and, provided certain conditions were adhered to, it is very likely that he could provide the desired result. The conditions would be:

(a) The provision of adequate transport--- one 7 ton semi-trailer of the type used by the Army would seem to be suitable. These vehicles carry 10 tons comfortably.

(b) The provision of water. The bore need not be near any given deposit, as water can be back loaded on the return trip from the siding.

(c) A price rise of 10/- per ton as detailed above.

The increase in production need not necessarily be obtained from M.L.10H.

arrange for any augmented production which may be necessary up to the limit specified in (1).

(C.J.Sullivan.)

Geologist.

Wauchope Wolfram Field.
16/8/1943.

It is desirable that a water supply be developed as near the mining operations as possible but such supply