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Plans - Plates 1, LP, 0-12, 0-17, 0-21, N18B/35, C-9, NC-11, NC-12.

Plans have not been included in the hardcopy of Record 1949/3.

SUMMARISED REPORT ON ORE PROSPECTS OF MINES HELD BY NEW OCCIDENTAL GOLD MINES, N.L., COBAR, NEW SOUTH WALES.

by

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DEPARTMENT OF SUPPLY & DEVELOPMENT.

Bureau of Mineral Resources, Geology & Geophysics.

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I. INTRODUCTION.

HISTORY AND PAST PRODUCTION.

The Great Cobar ore deposit was discovered in 1870 and the other important mines in the district, in the immediately succeeding years (for distribution of mines, see accompanying Plate No.1). Production commenced in 1871 and since that date mining at Cobar has been more or less continuous.

Available records indicate that, to the end of 1946, the field had produced 189,000 tons of copper, 1,000,000 oz. gold and 1,900,000 oz. silver. At current Australian prices this production is valued at approximately £A.27,000,000. Cobar has been the most important producer of copper in New South Wales, and in recent years, has also been the most important gold-mining centre.

PRESENT OPERATIONS.

At present, New Occidental Gold Mines N.L., own the New Occidental, Chesney and New Cobar mines, but the latter has been closed during the past year although it has been kept unwatered.

The Zinc Corporation Limited, through its subsidiary company, Enterprise Exploration Limited, is carrying out, with the aid of the Commonwealth Bureau of Mineral Resources, an extensive geological and geophysical examination of the area outlined on the accompanying Plate L P, with the hope of finding other orebodies. The Bureau itself has extended geological mapping over an area of approximately 2,000 square miles in the Cobar-Nymagee-Cambelego district with the ultimate aim of discovering other ore deposits, or even fields, of the Cobar type. In the Nymagee district (the Nymagee township is situated approximately 50 miles south-southeast of Cobar) North Broken Hill Limited is also carrying out, in co-operation with the Bureau, an extensive exploration programme which, however, is still in its preliminary stages.

II. MINES HELD AND OPERATED BY NEW OCCIDENTAL GOLD MINES, N.L.

1. NEW OCCIDENTAL MINE.

(a) History - The production history of the mine to the end of 1946 is summarised in Table I.

TABLE I.

PRODUCTION - NEW OCCIDENTAL MINE.

Year	Ore treated tons	Tailings treated tons	Slimes treated tons	Yield Gold oz.	Average Gold dwt/ton	Value £A
1889	690			718	20.8	474
1890	140			118.5	16.9	474
1891	2,534			1,555	12.3	6,207
1892	2,800			841	6.0	3,488
1893	4,400			1,090	4.9	
1894			no record			
1895	8,647			1,492	3.5	
1896	9,900			1,651	8.3	
1897-8	No record.		no record			
1899				3,703		
1900			no record			
	28,076			3,353	2.4	14,990
1901		22,215		3,079	2.6	9,887
1902	6,654			1,144	3.4	3,700
1903	45,567			8,800	3.9	34,200
	47,066			5,005	2.1	18,450
1904		34,000		3,870	2.3	15,250
	44,089			4,150	1.9	16,164
1905		34,300		4,544	2.6	14,924
			7,500	1,015	2.7	2,658
1906	46,258			4,821	2.1	17,755
		63,037		7,030	2.2	25,878
1907	45,103			3,959	1.7	14,662
			27,600	8,449	6.1	28,500
	51,103			4,480	1.8	15,338
1908		36,000		5,605	3.1	19,390
			40,771	3,599	1.8	22,909
	49,557			5,428	2.2	18,911
1909		35,000		5,925	3.6	20,243
	49,784			4,356	1.7	14,421
1910		35,000		5,878	3.6	16,775
			22,930	4,581	4.0	13,825
	33,164			1,755	1.0	5,077
	201(cons)			1,302	135.4	5,209
1911		33,800		6,424	3.8	21,186
			12,145	3,783	6.2	12,088
1912	36,827			11,895	6.4	48,251
1913	26,783			12,562	9.4	53,263
1914	28,739			11,768	8.2	49,897
1915	25,714			9,997	7.8	44,078
1916	13,297			6,600	9.9	27,602
1917	18,661			8,100	8.7	33,223
1918	10,176			4,334	8.5	18,370
1919			no record			
1920	42			420	200.0	1,780
1921	2,069			671	6.5	3,455
1922-34			no record			
1935	34,297			11,502	6.7	48,885
1936	72,373			24,276	6.7	103,173
1937	82,984			27,504	6.6	240,657
1937	2,585(floated)			802	6.2	7,016
1938	96,213			32,053	6.7	282,851
1939	97,524			34,386	7.1	335,607
1940	97,158			31,787	6.5	346,706
1941	87,458			27,886	6.3	365,751
1942	107,266			37,783	7.0	395,901
1943	85,125			30,479	7.1	318,875
1944	72,800			28,517	7.8	299,440
1945	16,780			6,114	7.3	64,947
1946	35,925		48,418	11,410	4.9	121,390
Total:	1,527,145	289,352	159,364	494,361	5.0	3,623,640

/ Approximate: Values for New Occidental and New Cobar not published separately
ø Approximate.

No exact figures of the production during 1947 and 1948 are yet available to the writer, but late in 1948 output from the mine had reached a rate of approximately 8,000 tons per month. The average head value for the eighteen months ended 30/5/48 was 6.19 dwt. gold per ton, which compares with 5.62 dwt. gold per ton for 1946. Recovery towards the end of 1948 was 89.1 per cent. Improved grade of ore in 1947/48, as compared with 1946, was partly due to a change in mining method. In 1946 and the first half of 1947 ore was being drawn which had previously been broken by blast hole drilling methods. These methods gave low breaking costs but the ore was in very large masses which later required secondary blasting and the method also produced a considerable dilution of the ore by wall rock.

(b) Shape and Dimensions of Lode - Reference to Plate C-17 will show that the lode is varied in pattern at the various levels, but essentially its shape is that of a clothes peg or tuning fork the eastern branch is known as the Eastern lode and the western branch as the Western lode. The Eastern lode has been worked over a maximum length of 480 ft. and a width of 10-25 ft. The Western lode is sub-parallel to the Eastern lode and at the southern end, in some instances, coalesces with it to form a continuous orebody up to 60 ft. wide. The northern portion of the Western lode is normally distinct from the Eastern lode and has been mined over widths of 15 to 40 ft. The Gossan lode lies to the west of the Western lode and is parallel to it. It has been mined appreciably only on No.1 and 2 levels, but recent diamond drilling intersected payable ore in this lode 675 ft. below No.14 level.

(c) Ore Reserves - Ore reserves at May 1948 were quoted as -

	Long tons	Grade dwt. per ton
Proved	357,205	6.7
Probable	158,000	—

The proved reserves amount to over 3½ years supply at the current rate of production, which is sufficient in the present circumstances. The grade is very good compared with that of the average West Australian gold mine.

(d) Future of the Mine - Study of Plate C-17 will show how the quantity of ore available has varied considerably from level to level and also that there has been a marked diminution in the size of the orebody at Nos. 13 and 14 levels. Fluctuations in grade during the history of the mine are also indicated to some extent on Table I, though this Table also reflects variations in the cost of mining over the period; thus Andrews records that in 1908 the total mining and milling costs were only 7/7.37 per ton. At that time, ore assaying 4.4 dwt. per ton was being worked at a profit, and the Company, in operations over some ten years prior to 1908, paid a total of £81,450 in dividends on a capital of only £4,320.

It should be noted, also, that the grades shown on Table I are misleading if taken by themselves, because from about 1895 to 1911, considerable quantities of tailings and slimes were treated and no separate record of the recovery from the ore, slimes, tailings, etc. was kept. This has caused the average gold yield per ton to appear to be unduly low.

Nevertheless, it is a fact that the mine had not been extremely rich when the present company took it over. At that time all ore had been extracted to No.6 level. At No.7 level the grade and quantity of ore available improved very markedly and reached a maximum at No.10 level from where the ore deposit again gradually diminished in size. It is considered that this diminution in the size of the orebody is again likely to be of a temporary nature and this is suggested by the fact that, as shown on Plate C-21, diamond drill hole T12B has intersected

payable ore at 1,000 ft. below the present lowest level which is itself 1850 ft. below the surface. The current grade of ore reserves and of the head value of the ore are relatively high and do not suggest/ likelihood of any marked drop in grade in the near future.

/the

The Cobar orebodies are characteristically pipe-like in form and are unusually continuous in depth. There appears to be every reason to believe that, provided mining and ventilation problems do not intervene, very considerable quantities of ore will be obtained below the present bottom of the New Occidental mine.

There is believed to be a considerable possibility also that, by driving northward from the northern end of the present known orebody, further payable ore may be found at horizons well above the present bottom level of the mine. Driving in this direction was recommended by the Bureau as a result of an extensive examination of the mine and initial exploration by the company, which had not reached the area of major interest outlined, could be described as promising and intersected some ore assaying up to 4 dwt. per ton. The position of this possible new orebody is shown on Plate M18B/35.

Summarising, it may be said that the New Occidental mine is at present favourably situated with regard to known ore reserves and it is expected that the orebody will continue strongly in depth and will probably again increase in size. There is the possibility of the discovery of more easily extractable ore within the present lease. The very considerable width of the orebody, the fact that very little support is required to hold the ground and the free-milling nature of the ore are extremely helpful factors in keeping costs within reason. However, the mine has now reached a depth of 1800 feet, ventilation is a problem on the bottom levels, the shaft is small and not in first-class condition and has to be utilised to the maximum to cope with the present rate of production. These latter factors will tend to become more important with the increasing depth of operation and the cost of stripping the present shaft, or of sinking a new shaft, would be very substantial and could hardly be undertaken by the Company in view of its present financial position. It is doubtful whether the size of the known orebodies would warrant the sinking of a new shaft, though this position could change entirely if a substantial new orebody was discovered, e.g. to the north of the known deposit. For the immediate future, however, the mine should be quite capable of producing perhaps 8,000 tons per month of ore of a grade close to the reserve figure of 6.7 dwt. per ton. It is known that the present management rightly adopts a somewhat conservative policy in estimating the grade of ore reserves.

2. THE CHESNEY MINE.

(a) History - Table II summarises the past production from this mine to the end of 1946.

Production for the eighteen months ended 30/6/48 was 37,429 tons with a head value of 2.35 dwt. gold per ton and 2.16 per cent copper. By the end of that period production had been increased to 4,500 tons per month. From 1904 to 1920 the Chesney Mine was worked by Great Cobar Limited and no separate records of gold and copper production are now available. The ore is reported to have been mined partly because of its siliceous nature which facilitated smelting of the basic Great Cobar ore. The mine was reopened in 1942 at the request of the Commonwealth Government in order to help supply Australia's copper requirements.

(b) Workings. Dimensions of Lode - The mine has been opened

TABLE II.

PRODUCTION - ORIENTAL MINE.

Year	Ore Raised	Ore treated	Yield		Average		Value £
			Gold	Copper	Gold	Copper	
	tons	tons	oz.	tons	dwt/ton	per cent	
1887	—	2	9	—	90	—	—
1888	—	59.5	127.3	—	43.7	—	—
1889	—	2,436	796.6	—	6.5	—	3,099
1890	—	880	586	—	13.3	—	—
1891	—	Not available	885.42	—	—	—	—
1892	—	—	—	—	—	—	—
1893	—	328	222.45	—	13.4	—	—
1894	—	1,965	1,019	—	10.4	—	—
1895	—	1,781	288	—	3.2	—	—
1896	—	2,440	436	—	2.5	—	—
1897	—	—	—	—	—	—	—
1898	—	—	—	—	—	—	—
1899	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—
1901	—	4,500	255	135	10.1	3.0	—
1902	—	420	9.5	—	0.4	—	—
1903	—	1,140	53.5	27.5	9.2	2.4	—
1904	16,685.11	16,685					
1905	45,310.73	45,310					
1906	25,613.73	25,613					
1907	Not available						
1908	51,579	51,473					
1909	41,272	40,679					
1910	34,236	32,076			Not available		
1911	22,431	22,919					
1912	67,000	45,995					
1913	—	57,035					
1914	—	45					
1915	—	—					
1916	5,684	5,481					
1917	—	251					
1918	—	—					
1919	41	—		3.5			257
1920	925	925		55			5,438
1921-42	—	—		-			—
1943	—	20,985	1,322	486	1.3	2.2	68,402
1944	—	38,688	5,735	881	2.9	2.3	154,785
1945	—	1,421	301	36	5.2	2.5	7,076
1946	—	5,605	832	141	5.0	2.5	£
Total:	311,970##	458,558					

£ Not stated.
Incomplete.

up by means of a three-compartment vertical shaft and eight levels, the lowest of which is 925 ft. below the surface (see Plate C/9). The lode has been mined over a length of 600 ft. and over widths up to 60 ft., the average width being approximately 30 ft. Below No.5 level the orebody consists of two gold-copper shoots each approximately 100 ft. in length connected by a low-grade copper-bearing lode.

The northern gold-copper pipe extends from near the surface to No.8 level, while the southern pipe was first found at No.6 level and is known to extend below No.8 level.

(c) Ore Reserves - Following were ore reserves 30/5/48 as estimated by the Company -

	Tons	Grade
Positive ore	190,155	(1.2 dwt. Au (1.88 per cent Cu
Probable ore above proposed No.9 level	191,000	

The lower estimated gold content of the ore reserves as compared with the head value of ore produced during the eighteen months ended 30/5/48 is due to the inclusion as reserves of/ large body of low grade gold-copper ore occurring in the /the central orebody. Previously most of the ore was mined from the north and southern gold-copper pipes. Exploration carried out since the above estimates were made has revealed the presence of a promising body of relatively high-grade gold-copper ore on the northern extension of the known orebodies at No.8 level.

(d) Future of the Mine - There are probably sufficient reserves of the grade indicated by the Company to maintain production at the current rate of approximately 4,500 tons per month for an indefinite period, particularly in view of the promising new discoveries at the northern end of the mine.

The overall grade of the ore is not high, but the orebody is very wide and mining costs should thus be relatively low. The mine enables the company to keep its tonnages at a reasonable figure and hence it is a big factor in keeping costs reasonably low. Should it be closed the cost per ton for the New Occidental mine is likely to be substantially increased. The Chesney mine also contributes to the Australian production approximately 800 tons per year of much needed copper.

3. THE NEW COBAR MINE.

(a) History - The history to the end of 1946 of the New Cobar mine is summarised in Table III. The main workings are shown in longitudinal section on Plate NC/11.

For the decade 1937-1946, the mine was successfully operated by the present Company, but was closed in April 1947 because during the preceding year the recovery had fallen to 3.56 dwt. gold per ton and 0.86 per cent copper as compared with a grade in 1946 of 5.28 dwt. gold per ton and 1.26 per cent copper. In addition the Company was faced with the problem of limited labour force and it was thought that this could be used most effectively by concentrating on the Chesney and New Occidental mines.

(b) Dimensions of Lode - Grade - The main lode extends in a northwesterly direction for a distance of 650 ft. and the payable width varies from 20 to 40 ft. From 1937 to 1946 the average recovery from this lode was 5.4 dwt. gold per ton and 1.3 per cent copper. Mining has reached a maximum depth of 1,277 ft. (No.10 level).

TABLE XII

PRODUCTION - NEW COBAR MINES.
(COBAR OR PORT MACQUARIE)

Year	Ore raised	Ore Treated: Crude ore	Ore Treated: Tailings etc.	Yield: Gold	Yield: Copper	Average: Gold	Average: Copper	Value
	tons	tons	tons	oz	tons	dwt/ton	per cent	£
1890				no record				
1891		600		150		5		
1892-5				no record				
1896		1,474		509		6.9		
1897-9				no record				
1900		72,607		7,971.24		2.2		27,818
			42,294	10,382.38		4.9		32,321
1901		74,349		16,153		4.9		54,767
1902		17,621		9,915		1.1		30,539
1903		76,307		32,840		8.6		100,916
1904		64,700		27,666		8.5		94,943
1905		15,176		10,508		13.8		32,750
1906		5,034		413		2.7		1,193
1906			5,179	2,235		8.6		7,026
1907	1,679							
		500		177.93	2.65	7.1	.5	712
1908								160
				75				321
1909	1,450	6,558		2,596		7.9		9,733
					98.0			1,354
1910	18,360	24,505						
1911	48,804	43,209						
1912		50,905						
1913		44,192		Included in Great Cobar Returns				
1914	11,829	11,829						
1915	—	—						
1916	19,115	21,548						
1917	19,823	15,235						
1918	6,421	9,132						
1919	179	637						
1920-36				no record				
1937		2,594		835	28	6.2	1.0	8,845
1938		48,004		14,474	648	6.0	1.3	130,245
1939		39,775		14,028	515	7.0	1.3	15,692≠
1940		51,908		15,372	579	5.9	1.1	201.891
1941		40,822		13,006	582	6.3	1.4	171,184
1942		35,029		8,935	491	5.1	1.4	135.159
1943		43,100		9,706	ø	4.4		153,887
1944		25,528		6,691	405	5.2	1.6	107,725
1945		54,183		12,623	744	4.6	1.4	216,387
1946		61,445		12,414	693	4.0	1.1	##
Total -								
1890-1946		956,706	47,473	231,672				
1937-1946		402,469		108,086	4,204	5.4	1.3	1,533,418

≠ Approximate; New Occidental and New Cobar not published separately.

ø New Cobar not recorded separately.

Not recorded.

Approximately 280 ft. north of the northern end of the main orebody along the same lode channel, a second deposit, known as the Jubilee lode, occurs. This has been partially proved at Nos. 2, 3, 4 and 7 levels to extend over a length of 150 ft. and to have a width of 10 to 18 ft. The ore appears to contain 1 to 2 per cent copper, and, probably, 1 to 2 dwt. gold per ton.

(c) Ore Reserves - The present ore reserves as given by the Company are -

	Tons.	Estimated Grade.
Positive ore above No.10 level	92,190	(8.6 dwt. Au (0.9 per cent Cu
Broken ore reserves	4,497	--

This estimate includes 43,500 tons of ore from the Jubilee orebody which, the Company estimates, contains 2 per cent copper but is low in gold content. This accounts for the low estimated gold content of the ore as compared with the average of past production which has been obtained almost exclusively from the main orebody.

(d) Future of the Mine - The overall picture of metal distribution in this mine is indicated broadly on Plate NC/11 which shows that below No.7 level there is a very marked drop in the size and grade of the orebody, at least to where it has been explored at No.9 level, 300 ft. below No.7 level. This fact, coupled with the fall in grade during the eighteen months preceding May 1948, was discouraging to the Company. However, the lode channel continues strongly in depth and there are no geological reasons why the orebody will not reform into its former dimensions. As shown on Plate NC/11 diamond drill hole 81A has intersected high-grade ore at a depth of 1,000 ft. below No.9 level, which strongly tends to confirm this opinion. However, in the present circumstances it seems wise for the Company to cease operations on this mine and to concentrate on the Chesney, where greater tonnages of ore are readily available. The question of mining the Jubilee orebody has been considered by the company. At present, there is insufficient evidence available to the writer of the actual grade of this deposit, to form a precise opinion concerning the likelihood of success of such a venture. In the past, the orebody has been considered to be of marginal grade.

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