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1968

PARLIAMENT OF TASMANIA

DIRECTOR OF MINES

REPORT FOR THE YEAR ENDED 31 DECEMBER 1968

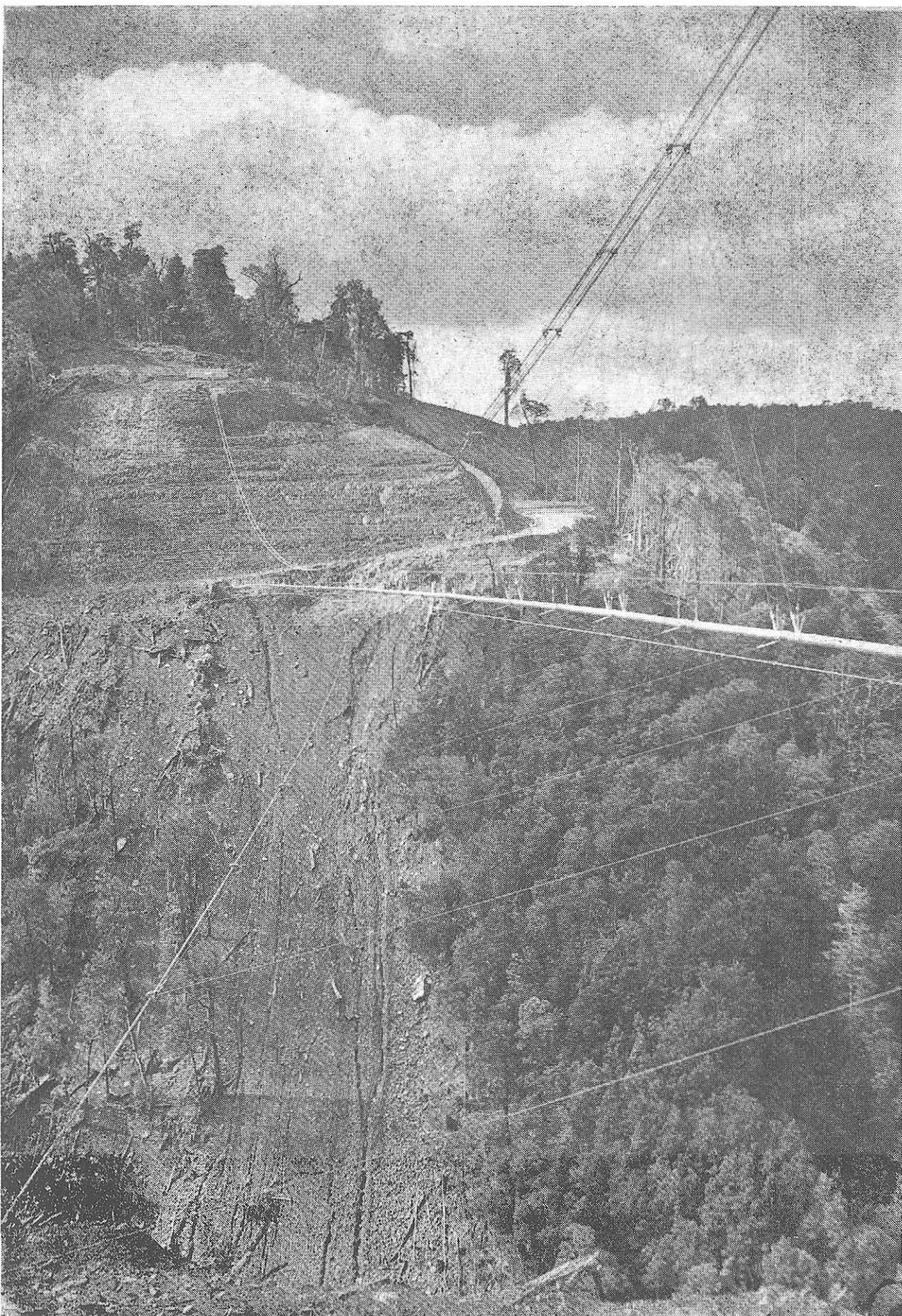
Presented to both Houses of Parliament by His Excellency's Command

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SAVAGE RIVER MINES:

Portion of the 53-mile pipeline which transports iron ore concentrates from Savage River to the pellet making plant at Port Latta, showing part of the 1,000-foot suspension bridge which carries the 9" pipeline across the Savage River, 450 feet above water level.

REPORT OF THE DIRECTOR OF MINES

Department of Mines,

Hobart, 23 May 1969.

THE HONOURABLE THE MINISTER FOR MINES.

I have the honour to present my report on the mining industry for the year ended 31 December 1968.

The value of metals and minerals produced was \$139,999,531 consisting of production from Tasmanian ores \$71,919,344 and \$68,080,187 from imported ores. This represents an overall increase of \$13,320,065 being an increase of \$16,666,634 in the value of production from Tasmanian ores and a decline of \$2,346,569 in the value of metallurgical production from imported ores.

The major reason for the increased value of the industry was the production of iron ore pellets from the Savage River iron ore deposits which amounted to \$9,650,636. The output of tin more than doubled from 1,529 tons in 1967 to 3,126 tons in 1968 and the value rose from \$4,735,799 to \$9,242,080. Tungsten as wolfram and as scheelite showed an overall increase of 219 tons as compared with last year and the value also rose by \$453,169.

However, although values increased, there was a slight but not significant fall in the production of copper, gold, lead, and silver. Zinc production recorded a fall of 170 tons and the value declined by \$248,874 but this does not represent a real decline but reports the statistical position as at the end of the year.

The value of production for 1968 represents an all-time record and illustrates the advances made by the mining industry. This value will be exceeded in 1969 as the result of greater production of iron ore pellets, increased output of tin by Renison and Cleveland mines, and the establishment of beach sand mining at King Island. Continued growth is assured as forward plans for expanded activities by our major producers reach the productive stage.

NEW DEVELOPMENTS

Naracoopa Rutile Ltd which was formed to exploit beach sand deposits at King Island which had been proven by Mt Costigan Mines Ltd proceeded with the construction of a treatment plant capable of producing 10,000 tons of rutile concentrates and 10,000 tons of zircon concentrates a year, in addition to ilmenite concentrates and a small quantity of tin concentrates. Production began towards the end of the year. Reserves proved to date indicate a life of eight years but the quantity of beach sands available for treatment are being added to by a programme of testing of areas held for exploration purposes outside the leases currently held. The company has made arrangements for shipment of its production by small vessels for later transshipment at Stanley into bulk freighters. The matter of port facilities at King Island is being investigated by Consultants and this could lead to improvements which will directly benefit the beach sand mining industry.

The first shipment of iron ore pellets was made from Port Latta on 13 April 1968 and up to the end of December 629,000 tons had been shipped in nine consignments. The rate of production has now reached the target of 2.25 million tons a year. This industry is now firmly established and has proved of great importance to the economy of western and north-western Tasmania.

At the Cleveland Mine at Luina productive mining which commenced at the end of 1967 was steadily increased to the proposed throughput of 250,000 tons of ore annually. Initial recoveries from the treatment plant have not been satisfactory but measures are being taken to increase its overall efficiency. Recoveries had improved towards the end of the year and can be expected to rise as more experience is gained in treatment of the ore under actual operating conditions. Ore reserves have been re-assessed at 2,842,000 tons averaging 1.02% tin and 0.44% copper.

At the Renison Tin Mine additional surface drilling has indicated possible ore reserves of 4,890,000 tons at a grade of 0.85% tin in an area known as North Bassett. Other exploratory drilling from underground sites enabled a re-assessment of reserves from the North Stebbins and Dreadnought lodes. Reserves from all sources have been assessed at 16,910,000 tons of an average grade of 0.82% tin which includes ore ready for mining, partly developed and probable and possible ore. The new treatment plant was worked to full capacity of 1,000 tons of ore a day but tin recoveries were below predicted levels. Recovery from ore from the Federal lode has been low because of very fine cassiterite grain size and complex cassiterite sulphide association and the

Company proposes to limit production from this source and to concentrate on the North Stebbins lode and other ore bodies which are more amenable to treatment until recovery problems of ore from the Federal lode are overcome. Additional gravity separation equipment and a pilot scale treatment plant have been installed to increase recoveries and are proving effective.

The Electrolytic Zinc Company continued with mine development and drilling at its Rosebery, Hercules and Farrell Mines. Ore reserves at the Rosebery and Hercules mine have been increased to 8,650,000 tons of a grade of 18.6% zinc, 5.6% lead, 0.89% copper, 5.1 oz silver and 2.2 dwt of gold a ton. At the Farrell Mine reserves have been assessed at 60,000 tons averaging 12.8% lead, 7.3% zinc, and 14.1 oz silver a ton. Progress was made with sinking of the new 22 feet diameter shaft No. 2 at the Rosebery mine. It is expected that the shaft and the associated mine development programme will be completed in 1971.

The Mt Lyell Co. at Queenstown has decided to proceed with a major expansion scheme designed to increase copper production to 25,000 tons a year by 1973. This involves the development of underground mines which will supplement and eventually replace production from the open-cut operations. Capital expenditure on this work is expected to amount to \$30 million over the next four years.

Exploratory drilling by the Company was continued on a vigorous scale and as a result of drilling on a geophysical anomaly a new ore body was located on the western flank of Mt Lyell known as Cape Horn. Indications are that this discovery contains 3,400,000 tons of ore of a grade of nearly 2% copper. The Company has assessed its current ore reserves at 41,868,000 tons averaging 1.40% copper, 0.06 oz silver, and 0.008 oz gold.

At the Aberfoyle Mine, Rossarden, mine development and diamond drilling work was continued which proved further extensions to known ore bodies and outlined other areas for future development. Ore reserves rose to 386,800 tons and in addition, indicated ore of 340,000 tons was assessed from testing of the Lutwyche prospect. Investigations are being continued.

The King Island Scheelite Mine at King Island increased production by 260 tons of concentrates during the year and continued with an active programme of exploration within its leases and in adjoining areas held under licence. Peko-Wallsend Limited has completed negotiations to take over King Island Scheelite (1947) Ltd and is currently engaged in an examination of the operations of the King Island Scheelite Mine.

The Endurance Tin Mining Co. N.L. was taken over by Mainland interests and a new company under the name of Endurance Mining Corporation N.L. was formed. The Company has ceased operations on the consolidated lease at South Mt Cameron and is in the process of constructing a storage dam preparatory to establishing productive mining in the Monarch area at Gladstone.

The Storeys Creek Tin Mine which is a subsidiary of North Australian Uranium Corporation N.L. concentrated on wolfram production at its mine at Storeys Creek but also produced approximately 50 tons of tin. The Dorset Dredge which is owned by the Storeys Creek Company almost ceased production because of uneconomic tin values but as a result of drilling undertaken by the management of the Dredge, further reserves were established in the Black Duck area where the Dredge is now operating. Continued production is, however, dependent upon the results of exploration being successful in locating deposits of tin bearing gravels capable of being mined at a profit.

Operators under the Mt Cameron Water Race were seriously affected by drought conditions last year and the Mt Cameron Water Race Board is to construct a dam at Chum Creek which should ensure regular supplies of water for sluicing.

It is pleasing to record an increase in production of coal from 76,541 tons in 1967 to 90,930 tons in 1968. This has been due to a contract for the supply of coal for the additional paper making capacity of the Australian Newsprint Mills at Boyer. The contract provides for the supply of about 70,000 tons of coal per year for five years. This has given new life to the coal mining industry in the Fingal Valley and will stabilize employment and generally benefit the economy of the district.

NEW PROJECTS

In July 1968 it was announced that E.Z. Industries Ltd and the Mt Lyell Mining and Railway Co. Ltd would jointly establish a sulphuric acid manufacturing plant at Burnie with a capacity of 420,000 tons a year. The plant will use pyrite supplied equally from the Electrolytic Zinc Co.'s mines at Rosebery and the Mt Lyell Co. at Queenstown. The capital cost involved will be \$14 million. The plant is scheduled for completion in 1970. The acid will be supplied for fertilizer production on the Mainland and also to Tasmanian users.

E.Z. Industries Ltd plan to establish a plant at Risdon for the treatment of a 900,000 ton dump of primary residue from the zinc refinery. In addition to the production of an estimated 22,000 tons of zinc a year the plant is expected to have an annual production of 230 tons of copper, 220 tons of cadmium, 18 tons of cobalt oxide and 35,000 tons of residue containing lead, zinc and silver. The plant is expected to be completed in 1970. Capital expenditure will exceed \$6 million.

The Goliath Portland Cement Co. which uses locally produced limestone, iron oxide and silica in cement manufacture and ancillary industrial production is installing an additional cement mill in order to provide additional operational flexibility and to make available the full output potential of the kilns now installed.

METAL PRICES

Copper.—The Australian price of copper which is fixed by the Copper Producer's Association was \$1,250 per ton at the end of 1967. This price remained unchanged for January 1968 increased to \$1,293 in February and \$1,350 in March. It then began to decline and reached a low of \$1,000 per ton from June to August. Although there was a small improvement during the remainder of the year the closing price was \$1,012.3 per ton or 45 cents per lb. This price reflects movements on the London Metal Exchange where the price ranged between £S446-£S727 per ton.

Lead.—The Australian price of lead remained at \$210 until the end of June. A small rise to \$212.6 took place in July. This was increased to \$230 in August, and remained unaltered for the balance of the year.

Tin.—The Australian price of tin averaged \$2,944 for 1968 and ranged between \$2,882 in August to \$3,096 in December. The supply of tin on a world basis exceeded demand and the International Tin Council through its Buffer Stock supported the tin price on the London Metal Exchange by purchasing tin on the market during the first three-quarters of the year. Prices, however, remained weak and were below £S1,300 per ton in August. At its meeting in London in September the Council because of the persistent weakness in the market decided to impose export controls on the six producing members of the Third International Tin Agreement, namely, Bolivia, Congo, Indonesia, Malaysia, Nigeria and Thailand. The Council also invited the Australian Government which has moved from its position of an importer of tin to being an exporter to limit its exports to the same degree as the producer members of the Agreement. After the announcement of the imposition of controls the price continued its downward trend and reached a low of £S1,228 early in October. Recovery then developed and by the end of October the price had risen to £S1,367 and by mid-November had reached £S1,456 which was the highest level for three years. The rise in price has been attributed by market observers not so much to export controls but to heavy buying by U.S. Consumers in expectation of industrial strikes, slowdown in deliveries of Malaysian tin due to temporary closing of smelters, uncertainty of the future position of world currencies, operations by London metal brokers and the suspension of sales of tin from the United States stockpile.

These price movements are important to Tasmanian producers since the new production from Renison and Cleveland mines is largely responsible for Australia becoming an exporter of tin rather than being an importer. However, the volume of exports from Australia of about 4,000 tons of concentrates in 1968 has not had any significant effect on the world position. The basis of export controls is being examined by the Commonwealth Government but unless the world position worsens it does not appear that quotas to be imposed will cause concern to Tasmanian producers. Almost the whole of our production is sold to the Associated Tin Smelters in Sydney which is the only smelter in Australia and except for a small tonnage its output is required for domestic consumption.

The price payable to Tasmanian tin producers is a unit rate quoted on a 70% tin concentrate based on the Australian price for metallic tin which reflects the price on the London Metal Exchange. This unit price ranged from \$24-65 in March to \$26-57 in December. Drought conditions in the north-eastern alluvial tin areas coupled with low prices resulted in a fall in production by small operators. According to information from overseas sources demand could exceed supply in 1969 and a rise in market price seems inevitable.

Tungsten.—Tungsten prices fluctuated during the year in a characteristic manner and ranged between \$31.46 and \$46.38 per long ton unit.

Producers of tungstic oxide are the Storeys Creek Aberfoyle Mines which market wolfram concentrates and the King Island Scheelite Mine which produces scheelite concentrates.

Zinc.—The Australian price of zinc which is fixed on a producers pricing basis remained at \$256 per ton until the end of March when it was increased to \$264 per ton. It remained unaltered at the end of the year. The price on the London Metal Exchange was £A114.3 during the whole

of 1968 and the quoted price of US13.50 cents per lb in U.S.A. remained constant. The figure of \$296 per ton quoted in the table of average metal prices hereunder represents the average Australian price to which reference has been made but with the addition of a differential of \$40 per ton to establish a price ex-Risdon.

Table showing the average Australian annual prices for minerals during recent years:—

	1965 \$A	1966 \$A	1967 \$A	1968 \$A
Copper (per ton)	742.00	961.67	1,062.49	1,098.83
Gold (per fine oz)	31.25	31.25	31.25	33.71
Lead (per ton)	280.00	247.08	216.25	218.33
Silver (per fine oz)	1.17	1.17	1.47	2.07
Tin (per ton)	3,637.97	3,322.83	3,100.49	2,943.83
Tungsten (per unit WO ₃)	24.91	36.30	42.49	39.11
Zinc (per ton)	326.00	309.33	301.00	296.00

EXPLORATION

Interest in exploration of the mineral resources of the State has never been on a higher level. Companies which have been engaged in exploration for some time are being required to restrict the areas held to localities where investigations have indicated that more intensive examinations are justified. This has had the effect of releasing areas to enable other interested companies to be granted licences to explore and in some cases to employ previously untried techniques of exploration.

At the end of 1968 a total of 69 licences covering 69,000 square miles of land and sea covered areas were held. It is estimated that over \$1 million was expended in 1968 in exploration outside existing mining leases.

Companies engaged in mineral exploration consist of the Mt Lyell Co., Renison Limited, The Electrolytic Zinc Co., Cleveland Tin Ltd, Pickands Mather & Co., Industrial and Mining Investigations, A.C.I. Operations Pty Ltd, Quest Exploration Pty Ltd, Aberfoyle Tin, The Broken Hill Pty Co. Ltd, McIntyre Mines Aust. Pty Ltd, Comstaff Pty Ltd, Heazlewood Nickel Prospecting Syndicate, King Island Scheelite, Naracoopa Rutile, Industrial Sands, Minerals Supplies, Storeys Creek Tin Mining Co., Geophoto Services, Endurance Corporation and a number of individuals, some of whom represent Mainland mining groups. Those engaged in oil search consist of the Broken Hill Pty Co. Ltd, Esso Exploration and Magellan Petroleum Southern Pty Ltd.

The Department of Mines has continued with regional investigations and with economic, hydrological and engineering surveys in the investigation of the mineral resources of the State.

The results of Departmental work is published in the form of maps, reports and bulletins and these are available to companies and persons interested in exploration and development of the mining industry.

The Department has employed its drilling plants in testing alluvial deposits in the North-East, investigating gold reefs at Alberton and Beaconsfield, coal deposits in the Fingal Valley, tin deposits at Waratah and in investigating underground water resources in the Longford and Scottsdale districts and in sand areas on the East Coast.

IRON ORE

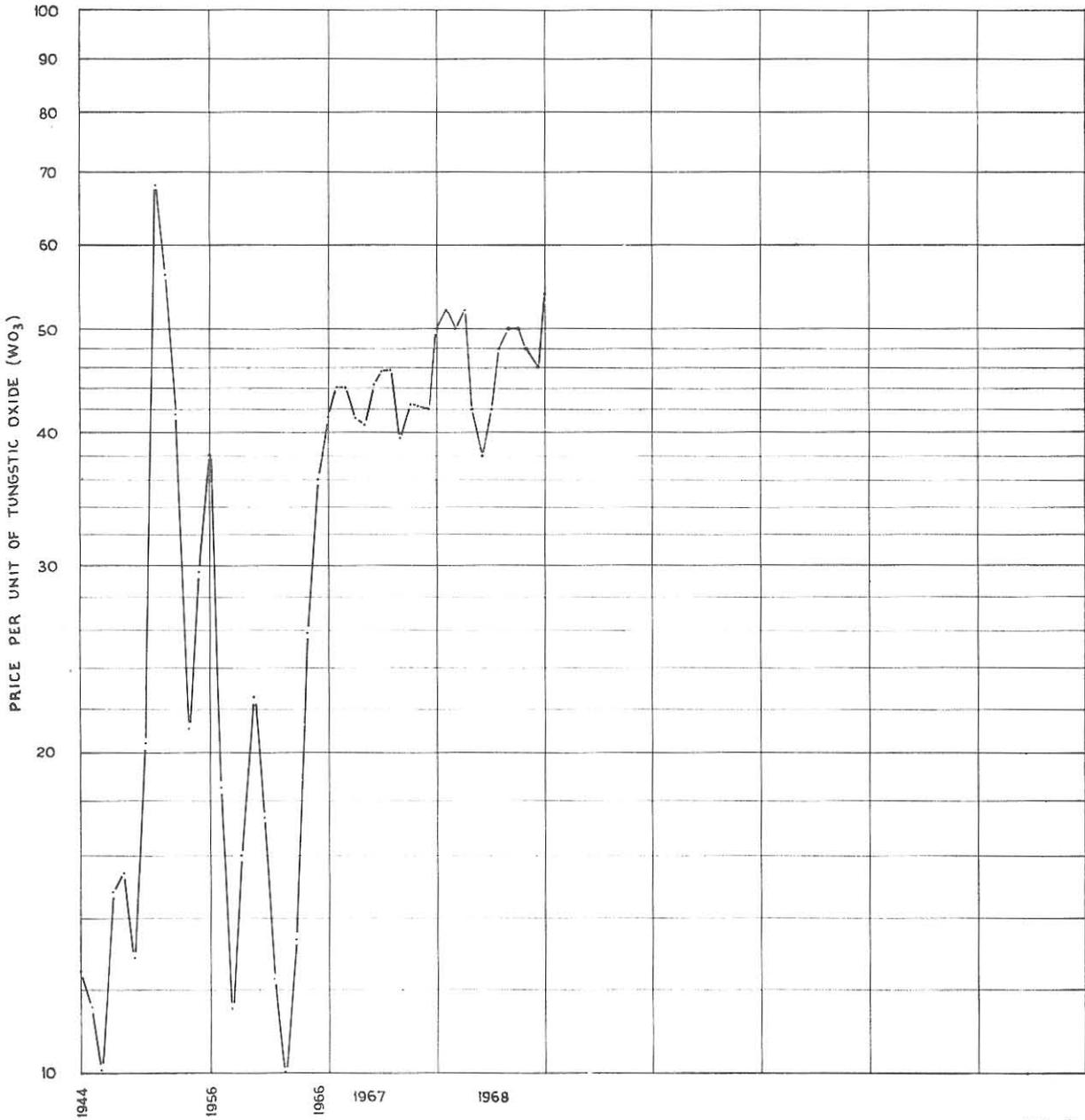
Production of iron ore pellets at Port Latta from ore produced and concentrated at Savage River has now reached the projected rate of 2.25 million tons a year and regular shipments are being made by bulk transport vessels to Japanese steel interests.

During the year ended 31 December 1968, shipments amounted to 629,000 tons, the first shipment having been made in April. The Department received a royalty of 15 cents per ton as provided by the Iron Ore (Savage River) Agreement Act 1965.

The lease granted at Savage River does not cover the whole of the iron ore deposits and Mr E. R. Hudson, the original promotor of the pellet making project, continues to hold a licence through his Company over an area of approximately 140 square miles. Exploration activities have continued and discussions and feasibility studies were undertaken by the licence holder to determine the possibilities of ultimately establishing an integrated steel industry. These investigations are being actively pursued.

TUNGSTEN PRICES

YEARLY AVERAGES 1944-1966 MONTHLY AVERAGES 1967-

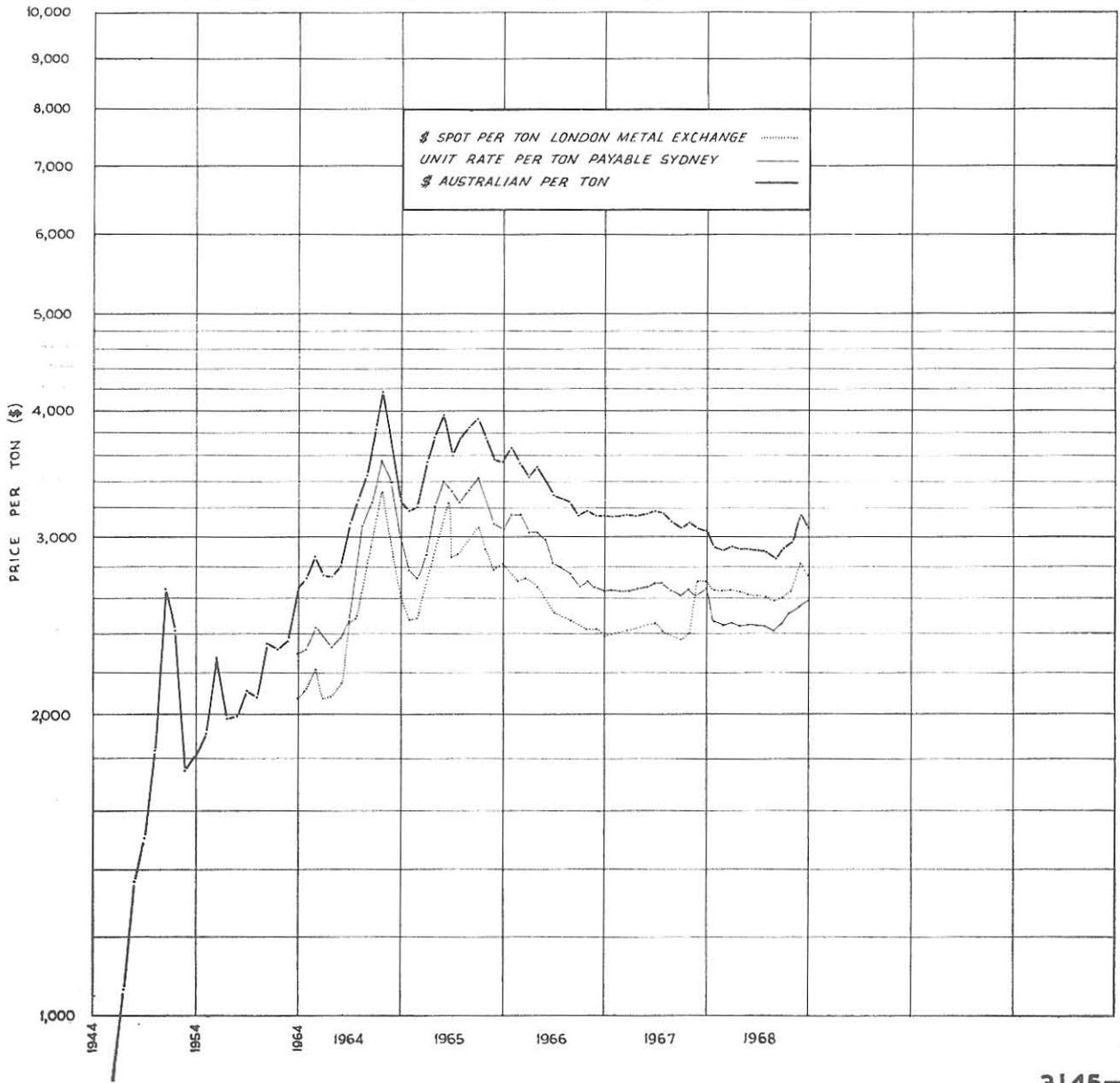


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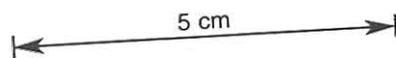
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TIN PRICES

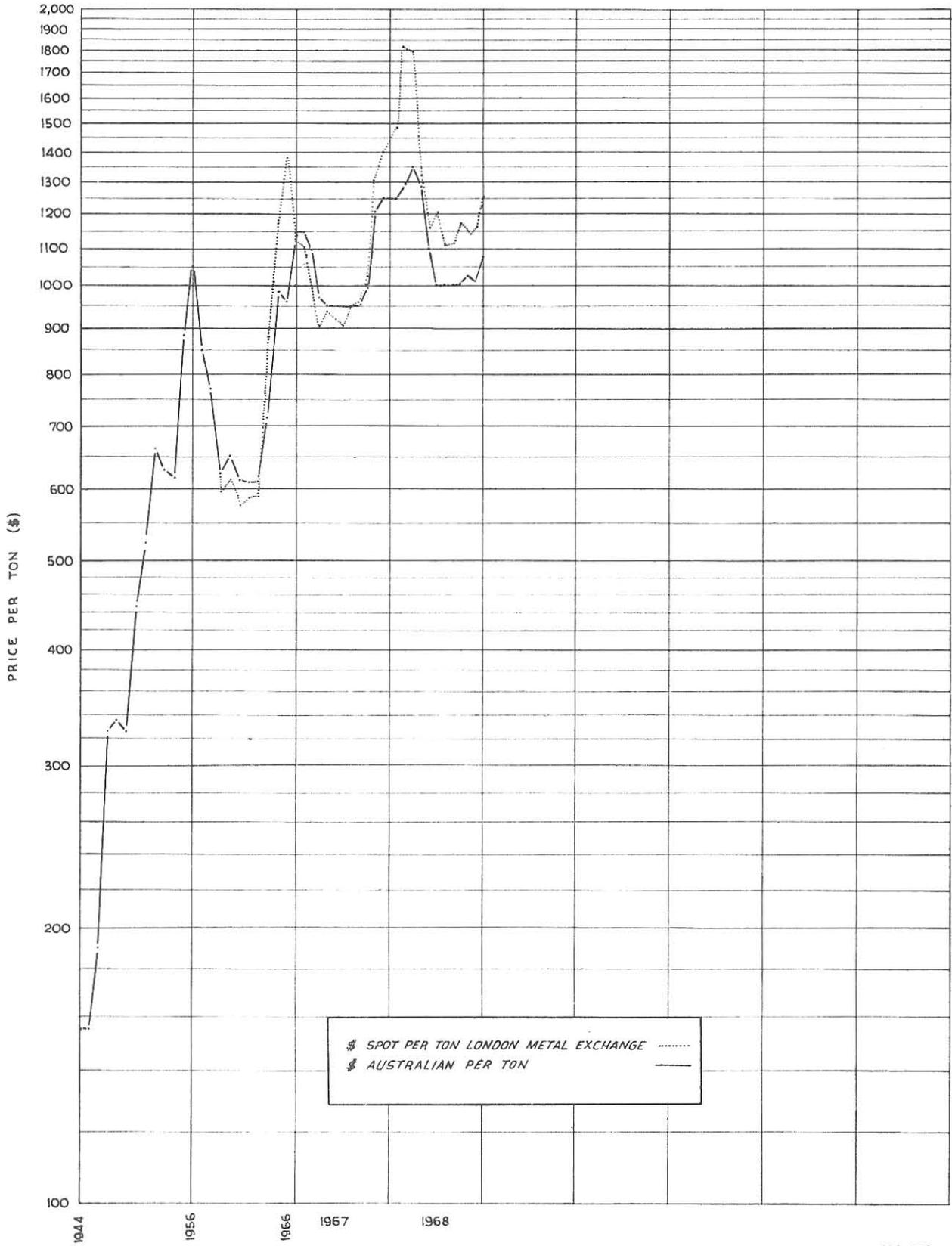
YEARLY AVERAGES 1944 - 1964 MONTHLY AVERAGES 1964 -



3145-M



COPPER PRICES YEARLY AVERAGES 1944-1966 MONTHLY AVERAGES 1967-



3146-M

5 cm

OIL

The bore in the portion of the Otway Basin which comes within the licence area held by Hematite Petroleum Pty Ltd in Bass Strait was put down in a position 48 miles north-west of King Island as indicated in my last report. The well known as Prawn A1 was completed in April 1968 at a depth of 10,477 feet without the location of significant hydrocarbons. A further well, known as Mullet 1, was put down about 36 miles north of Flinders Island but this was abandoned at 2,463 feet in January 1969.

Exploration Permits have been issued under the Petroleum (Submerged Lands) Act 1967, which is referred to in detail in my last report to former holders of Exploration Licences under the Mining Act 1939 to search for oil. The permits relate to off-shore areas to which the new legislation passed by the Commonwealth and all the States applies.

Details of permits and licences to search for petroleum are as follows:—

<i>Exploration Permits under Petroleum (Submerged Lands) Act</i>			
<i>Title No.</i>	<i>Title Holder</i>	<i>Area</i>	<i>Expiry Date</i>
T/1P	Magellan Petroleum Southern Pty Ltd	41 blocks	4.7.74
T/2P	"	117 "	4.7.74
T/3P	Hematite Petroleum Pty Ltd	342 "	16.7.74A
T/4P	"	394 "	16.7.74
T/5P	"	317 "	16.7.74
T/6P	"	400 "	16.7.74
T/7P	Esso Exploration and Production Aust. Inc.	147 "	6.9.74
T/8P	"	400 "	6.9.74
<i>Exploration Licences under Mining Act 1929</i>			
E.L. 18/65	Esso Exploration and Production Inc.	Internal waters only	17.9.69
E.L. 19/65	"	230 SM	
E.L. 15/67	Nudec Petroleum Pty Ltd	60 SM	17.9.69
		349 SM	9.4.69

LEGISLATION**The Mining Act 1929**

Section 12 of the Mining Act 1929 provided that no person directly or indirectly holding any interest in any mine in this State could continue to hold any office under the Act. This provision applied to the Director of Mines, Wardens of Mines, Registrars of Mines and other persons concerned with the administration of the Act. Because of the diversification of interests by all types of companies both mining and industrial a person holding office under the Act could quite unintentionally forfeit his office by, for example, holding shares in an industrial company which decided to invest in mining shares in this State or by holding a policy in an insurance company which had interests in Tasmanian mining. In order to protect the legal effect of decisions made by officers who may unwittingly commit a breach of Section 12 and to remove the unreasonable prohibitions imposed the section was repealed by the Mining Act 1968 and made effective from the date of commencement of that Act.

Mines Inspection Act 1968

The Mines and Works Regulation Act 1915, which governs health and safety in mines has remained substantially unaltered for 50 years. The Chief Inspectors of Mines of all the Australian States have met biennially for 20 years in order to formulate a basic code of safety for mining operations. The Mines Inspection Act 1968, which repeals the Mines and Works Regulation Act, was designed to achieve uniformity with other States. The modernisation of machinery in mines in Tasmania and the vast increase in mechanisation gave rise to the need for up-to-date legislation which features specialised inspection of mines and mining machinery. Pressure vessels and boilers will still remain subject to inspection under the Machinery Act but the specialised mining machinery and other machinery such as diesel engines used underground which are utilised under conditions peculiar to mining will be subject to the same legislative control as the actual mining operations.

Regulations under the new legislation which have been prepared are expected to be issued shortly and the new legislation will be proclaimed to become effective at the same time.

NATIONAL COAL RESEARCH ADVISORY COMMITTEE

This Committee is being re-constituted and the method of financing research projects is being revised. The proposed new scheme will involve direct commissioning by the coal mining industry and State Governments and instrumentalities of research projects of their own choice most desired by the industry and State authorities. The reconstituted Committee appointed by the Commonwealth will continue to function in recommending the allocation of Commonwealth funds amounting to \$260,000 per annum and in an advisory capacity in relation to coal research generally in Australia.

During the four years' existence of the present scheme the State has contributed \$5,000 each year to the Committee for research work but there have been no developments of economic significance to the coal mining industry of this State. The only Tasmanian project which received a grant from the Committee was an investigation carried out by the University of Tasmania on the use of micro-wave radiation in the study of pyrolysis reactions of coal and other similar substances such as oil shale. The present financial contribution of \$5,000 per annum will be discontinued under the new scheme but consideration will be given to sponsoring any research project which might assist our coal mining industry. Reports on research projects in Australia will continue to be examined for developments of significance.

WIRE ROPE COMMITTEE OF THE AUSTRALIAN MINERAL RESEARCH ASSOCIATION LIMITED

The success of the testing programme of the Wire Rope Committee has resulted in instruments for the non-destructive testing of wire ropes being purchased by some of Australia's largest mines. Research is continuing into the development of better testing methods and it is hoped that non-destructive testing instruments will be developed which could detect all faults that could cause sudden failure without having to remove the rope from its operating condition. This would have an important bearing on safety.

Ropes in use in Tasmanian mines were tested by the Project Scientist of the Committee in association with Mining Engineers of this Department. The contribution by Tasmania to the funds devoted to wire rope research by the Committee has amounted to \$2,000 over the past three years, and it is proposed to continue with a contribution to the cost of further research which has been planned over the next three years. Funds are also provided by the Commonwealth and State Governments and by the mining industry. The Director of Mines is a member of the Committee.

AUSTRALIAN MINERALS COUNCIL

Following the close liaison between the Commonwealth and the States on the off-shore petroleum legislation it was felt that there would be merit in the regular meeting of Commonwealth and State Ministers to discuss matters relating to the exploration and development of the mineral resources of Australia. It was decided to form an Australian Minerals Council comprising Commonwealth and State Ministers and the inaugural meeting was held at Parliament House, Canberra on 8 November 1968. The Council has approved the formation of an Advisory Committee of permanent heads of State Mines Departments and certain other officers of the States and Commonwealth. The existing specialist Conferences of Chief Inspectors of Mines, Chief Geologists and Chief Draftsmen will continue to function as supporting Committees to the Advisory Committee and to advise and report on appropriate matters as may be required by that Committee or the Council.

The Council has initiated a study of Australian mining legislation to establish the magnitude of the task of achieving parallel legislation, the problems involved and how these problems may be solved. The question of ensuring maximum return for Australia from its mineral resources has also been discussed.

The Council is to meet twice yearly to permit consideration of matters affecting the welfare of the mining and mineral industry throughout Australia.

REVENUE

Return Showing the Revenue Collected During the Year Ended 31 December 1968

Head of Revenue	Amount \$
Public Works and Services—Mines Department	27,312
Rent and Fees of Auriferous and Mineral Lands	84,126
Royalty on Iron Ore Pellets	50,812
Survey Fees	6,541
Fees under the Explosives and Inflammable Liquids Act	37,150
Total	\$205,941

Comparative Statement of Revenue from Mines, being Rents, Fees, Storage of Explosives, etc., Paid to the Treasury During the Years 1963 to 1968

Year	Amount \$
1963	114,072
1964	119,398
1965	125,606
1966	135,350
1967	161,892
1968	205,941

The above statement does not include Stamp Duties upon Transfer of Leases.

LEASES AND LICENCES

Return Showing Number and Area of New Leases and Licences Issued During the Year Ended 31 December 1968

Leases and Licences	Number	Area (acres)	Sluiceways
Barytes	1	40	
Coal	1	150	
Easements	5	8	
Gold	4	37	
Minerals	2	40	
Osmiridium	3	115	
Rutile	1	4	
Silica	4	260	
Sand and Gravel	6	154	
Silver Lead	1	2	
Tin	24	339	
Wolfram	1	35	
Water Licences	8	8	36
Total	61	1,192	36

Return Showing the Total Number of Leases and Licences in Force on 31 December 1968

Leases and Licences	Number	Area (acres)	Sluiceways
Barytes	2	80	
Bauxite	6	475	
Coal	12	3,351	
Clay	15	525	
Copper	4	12,543	
Copper-Nickel	3	120	
Dolomite	4	309	
Easements	69	1,987	
Feldspar	2	15	
Gold	25	1,356	
Granite	3	25	
Iron Ore	6	5,060	
Limestone	21	1,595	
Mica	1	20	
Minerals	25	5,735	
Ochre	2	8	
Nickel	1	80	
Osmiridium and Chromite	24	1,581	
Rutile-Tin	8	361	
Sand and Gravel	28	1,144	
Scheelite	5	2,277	
Silica	14	2,066	

Leases and Licences	Number	Area (acres)	Sluiceways
Silver-Lead	24	5,949	
Stone	52	4,955	
Tin	238	11,351	
Wolfram	14	2,291	
Uranium	1	50	
Water Licences	128	936	1,115
Total	737	66,245	1,115

Return Showing Number and Area of Leases and Licences Applied for During the Year Ended 31 December 1968

Leases and Licences	Number	Area (acres)	Sluiceways
Barytes	2	180	
Copper	1	34	
Coal	1	1,657	
Easements	1	1	
Gold	12	382	
Iron	2	160	
Minerals	2	40	
Osmiridium	5	886	
Rutile	22	1,558	
Scheelite	6	480	
Stone	5	120	
Sand and Gravel	5	133	
Silica	9	499	
Tin	24	4,620	
Wolfram	3	120	
Water	6	165	28
Total	106	11,035	28

Return Showing Total Number and Areas of All Types of Authorities to Prospect Held as at 31 December 1968

Type and Authority	Number	Area
Permits to enter and search on private land, including owner's permission	20	7,050 acres
Exploration Licences	46	15,189 sq. miles
Special Prospectors' Licences	23	179 sq. miles
Prospectors' Licences	188	9,400 acres
Miners' Rights	116	58 acres
Authorities to Prospect under Aid to Mining Act 1927	1	28 sq. miles
Permits to Explore for Petroleum under the Petroleum (Submerged Lands) Act	8	2,158 graticular blocks or 5,390 sq. miles

Table Showing Particulars of Exploration Licences and Special Prospectors' Licences in Force at 31 December 1968

Licence No.	Holder	Address	Area (sq. miles)	Situation	Expiry Date	Mineral
E.L. 4/61	Industrial & Mining Investigations Pty Ltd	Australia Sq., Sydney	147	Savage River	23.2.69	Minerals
E.L. 5/61	Industrial & Mining Investigations Pty Ltd	Australia Sq., Sydney	450	East Coast	24.2.69	Coal and limestone
E.L. 1/62	Electrolytic Zinc Co. of A/asia Pty Ltd	Rosebery	49	Rosebery	22.1.69	Minerals
E.L. 2/62	Electrolytic Zinc Co. of A/asia Pty Ltd	Rosebery	8	Dundas	12.3.69	Minerals
E.L. 1/63	Cleveland Tin N.L.	505 St Kilda Rd, Melbourne	15	Mt Cleveland	11.2.69	Tin
E.L. 2/63	Aberfoyle Tin N.L.	505 St Kilda Rd, Melbourne	87	Mt Lindsay	1.4.69	Minerals
E.L. 4/63	Storeys Creek Tin Mining Co. N.L.	505 St Kilda Rd, Melbourne	144	Moorina	18.6.69	Kaolin
E.L. 5/63	Comstaff Pty Ltd	120 William St, Melbourne	374	West Coast	30.4.69	Minerals

Particulars of Exploration Licences, etc.—continued

Licence No.	Holder	Address	Area (sq. miles)	Situation	Expiry Date	Mineral
E.L. 6/65	Ocean Mining A.G.	38 Canning St, Launceston	900	Dorset	18.5.69	Minerals
E.L. 7/65	Ocean Mining A.G.	38 Canning St, Launceston	600	King Island	18.5.69	Minerals
E.L. 8/65	Mt Lyell Mining and Railway Co. Ltd	Queenstown	110	Devon	12.5.69	Minerals
E.L. 10/65	Mt Costigan Mines Ltd	C/o W. D. Bartlett, Naracoopa, King Is.	2	King Island	14.5.69	Minerals and stone
E.L. 12/65	Pickands Mather & Co. International	Port Latta, Tas.	175	West Coast	21.12.68	Minerals except coal and oil
E.L. 13/65	Broken Hill Pty Co. Ltd	500 Bourke St, Melbourne	3,100	South-West	21.12.68	Minerals except coal and oil
E.L. 15/65	Broken Hill Pty Co. Ltd	500 Bourke St, Melbourne	1,700	Sheffield	2.1.69	Minerals except coal and oil
E.L. 18/65	Esso Exploration Aust. Inc.	Box 4249, Sydney	Internal Waters	W. and S.W. Coast	17.9.69	Petroleum, oil and gas
E.L. 19/65	Esso Exploration Aust. Inc.	Box 4249, G.P.O., Sydney	Internal Waters	East Coast	17.9.69	Petroleum, oil and gas
E.L. 9/66	Mt Lyell Mining and Railway Co. Ltd	Queenstown	83	Mt Tindall	5.2.69	Metallic mineral
E.L. 13/66	Naracoopa Rutile Ltd	King Island	27	Wayanna, King Is.	19.4.69	Tin and associated minerals
E.L. 14/66	Naracoopa Rutile Ltd.	King Island	18	Bingaree, King Is.	19.4.69	Tin and associated minerals
E.L. 15/66	King Island Scheelite	King Island	22	King Island	24.4.69	Metallic minerals
E.L. 1/67	M. M. Roberts	C/o W. C. Burrows, 76 Napoleon St, Battery Pt	28	King Island	19.1.69	Metallic minerals
E.L. 6/67	Pickands Mather & Co.	189 St Georges Ter., Perth, W.A.	6	Mackintosh River	17.5.69	Metallic minerals
E.L. 7/67	King Island Scheelite	Grassy, King Island	31	Beaconsfield	17.5.69	Metallic minerals
E.L. 9/67	W. C. Burrows	76 Napoleon St, Battery Pt	35	N.W. King Is.	12.2.69	Tin, titanium, etc.
E.L. 11/67	Storeys Creek Tin Mining Co. N.L.	Rossarden	20	Rossarden	21.1.69	Metallic minerals
E.L. 13/67	Planet Mining Co. Pty Ltd	280 George St, Sydney	264	Weymouth	25.2.69	Gold, rutile, etc.
E.L. 14/67	Costigan Mining Co. Aust. Pty Ltd	Box 3362, Sydney	140	West King Is.	30.12.68	Metallic minerals
E.L. 15/67	NUDEC Petroleum Pty Ltd	C/o C. G. Sulzberger, Deloraine	349	Longford	10.4.69	Oil
S.P.L. 399	Endurance Tin Mining Co.	81 Cameron St, Launceston	15	Mt Cameron	28.4.69	Tin
S.P.L. 2	Naracoopa Rutile Ltd.	King Island	1	Naracoopa	27.4.69	Minerals
S.P.L. 3	Electrolytic Zinc Co. of A/asia Ltd	Rosebery	10	Tullah	6.7.69	Minerals
S.P.L. 7	Naracoopa Rutile Ltd	King Island	1	Naracoopa	9.3.69	Minerals
S.P.L. 9	Mt Costigan Mines Ltd	C/o W. Bartlett, Naracoopa, King Island	1	Cowper Point	1.4.69	Tin
S.P.L. 20	Renison Ltd	Renison Bell	3	Ringville	16.2.69	Metallic minerals
S.P.L. 22	Electrolytic Zinc Co	Rosebery	15	Trial Harbour	9.6.69	Minerals
S.P.L. 24	Alstergren Pty Ltd	Box 4505, Melbourne	2	Cox Bight	19.1.69	Tin
S.P.L. 27	Renison Ltd	Renison Bell	5	South Dundas	19.1.69	Metallic minerals
S.P.L. 34	Storeys Creek Tin Mining Co. N.L.	Box 96, Gladstone	12	Gladstone	10.4.69	Metallic minerals
E.L. 1/68	Comstaff Pty Ltd	C/o Anglo American Corp. (Aust.) Ltd, 60 Market St., Melbourne	220	West Coast	31.4.69	Metallic minerals
E.L. 2/68	T. K. Shadforth	38 Elizabeth St, Hobart	2,180	Flinders Is.	9.5.69	Alluvial minerals
E.L. 3/68	E. Gatenby	King Island	55	King Is.	5.12.68	Alluvial minerals
E.L. 4/68	J. Curtain	King Island	75	King Island	11.1.69	Alluvial minerals
E.L. 5/68	Quest Exploration Pty Ltd	100 Collins St, Melbourne	100	Smithton	31.1.69	Chromite
E.L. 6/68	R. W. Leftwich	C/o Geophoto Resources Consultants, 30 Herschel St, Brisbane	650	Branxholm	23.2.69	Metallic minerals
E.L. 7/68	J. H. Rattigan	C/o Geophoto Resources Consultants, 30 Herschel St, Brisbane	124	Dundas	23.2.69	Metallic minerals
E.L. 8/68	Electrolytic Zinc Co. of A/asia Ltd	Rosebery	40	Strahan	23.2.69	Heavy minerals

Particulars of Exploration Licences, etc.—continued

Licence No.	Holder	Address	Area (sq. miles)	Situation	Expiry Date	Mineral
E.L. 9/68	D. Pearson	Ulverstone	40	Mawbana	16.3.69	Non-metallic minerals
E.L. 10/68	Industrial Sands Pty Ltd	P.O. Box 502, Devonport	20	Branch Creek	25.3.69	Minerals
E.L. 11/68	A. E. Bailey	Victoria St, Hobart	200	Catamaran	25.3.69	Heavy minerals
E.L. 12/68	E. G. McRae	C/o T. Shadforth, 30 Elizabeth St, Hobart	1,575	Cape Barren Is.	25.3.69	Alluvial minerals
E.L. 13/68	A. R. Dodson	401 Collins St, Melbourne	2	Cuprona	7.4.69	Minerals
E.L. 14/68	E. H. MacDonald	Australia Sq, Sydney	1	Natone	7.4.69	Minerals
E.L. 15/68	H. T. Reardon	Bothwell	62	Ringarooma	25.4.69	Metallic minerals
E.L. 16/68	A.C.I. Operations Pty Ltd	110 Gormans-ton Rd, Moonah	537	West Coast	4.5.69	Metallic minerals
E.L. 17/68	W. S. Singline	240 Mount St, Burnie	234	Black Range	4.5.69	Metallic minerals
S.P.L. 36	O. E. Harvey	Box 502, Devonport	3	Port Sorell	1.4.69	Non-metallic minerals
S.P.L. 37	Heazlewood Nickel Prospecting Syn.	104 Regent St, Sandy Bay	6	Heazlewood	7.5.69	Metallic minerals
S.P.L. 39	H. Meerding	Blackman's Bay	3	East Coast	7.6.69	Alluvial minerals
S.P.L. 40	K. Fielding	Ulverstone	2	Sisters Creek	31.12.68	Silica
S.P.L. 41	B. K. Fielding	Ulverstone	2	Rocky Cape	31.12.68	Silica
S.P.L. 42	M. C. Forster	7 Crelin St, Battery Pt	25	Mt Weld	18.3.69	Metallic minerals
S.P.L. 43	Quest Exploration Pty Ltd	100 Collins St, Melbourne	2	Lotta	25.3.69	Metallic minerals
S.P.L. 44	H. S. Forster	7 Crelin St, Battery Pt	25	Weld River	7.4.69	Metallic minerals
S.P.L. 45	J. C. Rudge	Latrobe	15	Sassafras	18.4.69	Minerals
S.P.L. 46	McIntyre Mines (Aust.) Pty Ltd	812 Bridge St, Sydney	19	Dundas	30.4.69	Minerals
S.P.L. 47	M. T. Ellis	Burnie	4	Mt Inglis	4.6.69	Alluvial minerals
S.P.L. 48	R. L. Rainbow	Winnaleah	3	Scottsdale	4.6.69	Alluvial minerals
S.P.L. 49	A. K. Archer	Longford	4	Friendly Beaches	13.6.69	Alluvial minerals

EXEMPTIONS

H. K. Turner. Leases 62M/63 and 63M/63 at Mt Lindsay from 1 April to 30 September 1968.
West Coast Enterprises Pty Ltd. Lease 47M/57 at Dundas from 1 August 1968 to 30 November 1968.

WARDEN'S COURT

J. D. Murray v. West Coast Enterprises Pty Ltd. Application for forfeiture lease 47M/57, which was heard by the Warden of Mines, Hobart, was adjourned *sine die*.

E. C. & L. W. Frecklington v. J. Curtain. This objection was heard by the Warden of Mines, Devonport, and dismissed.

O. E. Harvey v. W. A. & G. A. Tart. Objection to issue of lease at Port Sorell. The objection, which was submitted to the Warden of Mines, Devonport, has not yet been listed for hearing.

Estate E. A. Freeman; Alex R. Gee; Cornwall Co.; Estate J. E. McKenzie; A. F. B. O'Connor; J. C. & S. L. Youl, L. M. Faulkner and R. M. Green; Fingal Pastoral Company; D. G. Crisp v. Investment Trust Limited. Objection to granting of an Exploration Licence. The objections were heard in the Warden's Court at Launceston on 19 November 1968.

Legal argument was directed to technical matters relating to the application for the Exploration Licence and the Warden found that the applicant had failed to comply with Regulation 4 of the Mining Regulations as to marking out the land, that the application was lodged out of time, and that the advertisement had not complied with the requirements of Section 15C (2) of the Mining Act. For these reasons the Warden upheld the objection. An appeal to the Supreme Court has been lodged.

MINE MANAGER'S CERTIFICATES

During the year the Board of Examiners issued Metalliferous Mine Managers' Certificates of Competency to—

Alfred Colin Cruickshank; Anthony William Ackhurst; Bruce Leslie Grieve; David John Wilson; Lewis Milton Becker; Colin John Bannatyne Lewis.

**RETURN SHOWING VALUE OF TASMANIAN MINERALS IN RECENT YEARS WITH
AUSTRALIAN METAL PRICES**

Year	Value \$
1958	23,676,108
1959	25,532,522
1960	26,774,520
1961	26,758,954
1962	30,874,136
1963	32,206,272
1964	40,013,378
1965	43,755,904
1966	51,180,693
1967	55,252,710
1968	71,919,344

MINERAL PRODUCTION SINCE 1880

Quantity and Value of Mineral Production as at 31 December 1968

<i>Mineral</i>	<i>Total Quantity</i>	<i>Value</i> \$
METALLIC MINERALS—		
Antimony	3 (tons)	2,034
Bismuth	84 (tons)	59,288
Cadmium	1,748 (tons)	5,247,286
Cobalt Oxide	21.11 (tons)	43,306
Copper (Blister) to 1918 (now shown under Silver and Copper)	166,600 (tons)	27,577,054
Copper Matte	6,227 (tons)	267,472
Copper Ore to 1918 (now shown under Copper)	41,769 (tons)	1,155,746
Copper (from 1919)	498,251 (tons)	202,858,814
Crocoite	(specimens only)	3,582
Gold	2,764,987 (fine oz)	35,738,946
Ilmenite	550 (tons)	2,512
Iron Ore Pellets	760,083 (tons)	9,650,636
Iron Oxide (including Hematite, Limonite and Magnetite)	134,934 (tons)	363,197
Lead (from 1919)	400,173 (tons)	54,160,977
Manganese	1 (tons)	6
Manganese Dioxide (from 1957)	3,124 (tons)	101,777
Mercury	6,351 (lb)	39,051
Monazite	33 (tons)	1,214
Nickel	233 (tons)	81,036
Osmiridium	31,100 (oz)	1,418,771
Pyrite	1,807,115 (tons)	8,315,292
Rutile	1 (tons)	36
Scheelite	24,965 (tons)	50,623,914
Silica for Silicon Alloy Production	24,428 (tons)	204,854
Silicon as Silicon Alloys	28,592 (tons)	3,298,944
Silver Lead Ore to 1918 (now shown under Silver and Lead)	1,083,898 (tons)	12,858,582
Silver (from 1919)	50,242,668 (fine oz)	32,484,126
Sulphur as Sulphuric Acid (from 1957)	545,038 (mono tons)	5,999,944
Tin	155,703 (tons)	96,177,236
Wolfram	16,851 (tons)	23,152,853
Zinc	916,744 (tons)	153,099,194
Zinc Sulphate (from 1957)	3,001 (tons)	302,832
NON-METALLIC MINERALS—		
Asbestos	3,980 (tons)	34,284
Baryte	2,205 (tons)	16,478
Clay (from 1958)—		
Brick	1,151,836 (cubic yards)	2,185,763
Tile	37,791 (cubic yards)	50,298
Other	241,642 (cubic yards)	564,444
Dolomite	34,123 (tons)	199,740
Graphite	40 (tons)	214
Kaolin	111,086 (tons)	883,018
Limestone—		
Agricultural and Other	709,134 (tons)	1,703,932
Carbide	758,357 (tons)	2,127,176
Cement	5,576,055 (tons)	8,027,571
Chemical and Metallurgical	4,252,380 (tons)	5,145,658
Ochre	2,567 (tons)	18,363
Pebbles (from 1957)	8,841 (tons)	136,410
Sand (Moulding)	850 (tons)	9,550
Silica	197,034 (tons)	311,633
Talc	333 (tons)	2,154

<i>Mineral</i>		<i>Total Quantity</i>	<i>Value \$</i>
FUEL MINERALS—			
Coal	(tons)	9,576,929	24,986,905
Shale	(tons)	41,572	62,462
Peat	(tons)	128	7,420
CONSTRUCTION MATERIALS—			
Building Stone—			
Freestone	(cubic yards)	5,756	72,988
Granite	(cubic yards)	5,928	85,003
Other	(cubic yards)	6,500	18,559
Crushed and Broken Stone (from 1958)—			
Basalt	(cubic yards)	1,502,100	3,365,561
Dolerite	(cubic yards)	6,313,158	18,864,827
Limestone	(cubic yards)	251,327	632,148
Sandstone	(cubic yards)	43,365	74,331
Other	(cubic yards)	1,505,972	3,250,865
Gravel (from 1958)	(cubic yards)	12,917,720	13,768,854
Sand (from 1958)	(cubic yards)	1,168,131	1,588,213
Other Road Materials	(cubic yards)	880,264	1,105,705
			<u>\$814,591,039</u>

STATISTICS RELATING TO THE MINERAL INDUSTRY

<i>Mineral</i>	<i>Year ended 31 December 1967</i>		<i>Year ended 31 December 1968</i>	
	<i>Total Quantity</i>	<i>Value \$A</i>	<i>Total Quantity</i>	<i>Value \$A</i>
<i>Metallic Minerals—</i>				
Cadmium	(tons) 74	383,131	74	390,642
Cobalt Oxide	(tons) 1.14	3,860	1.11	4,683
Copper	(tons) 16,301	17,326,612	15,942	17,521,393
Crocoite			Specimens only	2,516
Gold	(fine oz) 34,677	1,083,667	33,526	1,135,108
Iron Ore Pellets	(tons)		760,083	9,650,636
Iron Oxide	(tons) 7,866	35,130	12,780	79,030
Lead	(tons) 11,930	2,578,032	11,754	2,568,982
Manganese Dioxide	(tons) 424	15,540	265	8,215
Mercury	(lb) 4,204	24,645	2,147	14,406
Osmiridium	(oz)		12	1,709
Pyrites	(tons) 59,714	358,284	42,504	255,024
Scheelite .....	* .....	.....	.....	.....
Silica for Silicon Alloy Product- tion	(tons) 4,459	44,590	4,360	43,600
Silicon as Silicon Alloys	(tons) 11,857	1,375,412	14,870	1,654,972
Silver	(fine oz) 1,503,354	2,225,257	1,474,461	3,062,004
Sulphur as Sulphuric Acid (mono tons)	72,347	723,470	65,157	1,335,718
Tin	(tons) 1,529	4,735,799	3,126	9,242,080
Tungsten as Tungstic Oxide	(tons) 1,635	5,032,488	1,944	5,485,657
Wolfram .....	* .....	.....	.....	.....
Zinc	(tons) 40,231	12,106,835	40,061	11,857,961
Zinc Sulphate	(tons) 301	34,307	87	9,656
<i>Value of Metallic Minerals</i> .....	.....	48,087,059	.....	\$64,323,992
<i>Non-Metallic Minerals—</i>				
Clay—				
Brick	(cubic yards) 102,383	208,306	106,736	227,642
Tile	(cubic yards) 2,800	6,450	3,500	7,700
Other	(cubic yards) 25,339	72,902	38,566	123,165
Dolomite	(tons) 2,143	12,361	2,534	15,070
Limestone—				
Agricultural	(tons) 41,220	98,421	30,205	71,210
Carbide	(tons) 16,234	62,290	23,686	105,510
Cement	(tons) 253,611	496,749	409,642	806,995
Chemical and Metallurgical	(tons) 33,670	103,155	32,239	98,410
Other	(tons) 3,714	6,258	39	704
Ochre	(tons) 97	1,459	11	164
Pebbles	(tons) 1,237	20,404	1,214	19,687
Sand (Moulding)	(tons)		850	9,550
Silica	(tons) 8,557	23,360	8,878	30,126
<i>Value of Non-Metallic Minerals</i> .....	.....	1,112,115	.....	1,515,933
<i>Fuel Minerals—</i>				
Coal	(tons) 76,541	324,553	90,930	411,642
Peat	(tons)		128	7,420
<i>Value of Fuel Minerals</i> .....	.....	.....	.....	419,062

STATISTICS RELATING TO THE MINERAL INDUSTRY—*continued.*

Mineral	Year ended 31 December 1967		Year ended 31 December 1968	
	Total Quantity	Value \$A	Total Quantity	Value \$A
<i>Construction Materials—</i>				
<i>Crushed and Broken Stone—</i>				
Basalt (cubic yards)	241,712	724,811	277,259	822,807
Dolerite (cubic yards)	628,356	2,128,932	605,680	2,092,905
Limestone (cubic yards)	13,389	40,167	17,728	53,184
Sandstone (cubic yards)	4,490	13,470	3,440	7,470
Other (cubic yards)	162,456	487,725	150,000	450,565
<i>Building Stone—</i>				
Freestone (cubic yards)	519	7,374	363	4,902
Granite (red) (cubic yards)	291	2,501	10	30
Other (cubic yards)	836	2,508	4,184	12,437
Gravel (cubic yards)	1,582,625	1,892,159	1,448,117	1,737,792
Sand (cubic yards)	189,530	294,102	211,919	287,578
Other Road Material (cubic yards)	116,922	135,234	148,497	190,687
<i>Value of Construction Materials</i> ....	....	5,728,983	....	5,660,357
<i>Total Value with Australian Metal Prices</i> ....	....	55,252,710	....	71,919,344
<i>Metallurgical Production from other than Tasmanian Ores—</i>				
Alumina ....	....	71,426,756	....	68,080,187
Aluminium .....	....		
Aluminium Hydrates .....	....		
Aluminium Sulphate .....	....		
Cadmium .....	....		
Cobalt Oxide .....	....		
Ferro-Manganese .....	....		
Titanium Dioxide .....	....	....	....	....
Zinc .....	....	....	....	....
<i>Value of Mining and Metallurgical Production</i> ....	....	\$123,869,616	....	\$139,999,531
Average Number of Men Employed	10,538		10,040	

* Now under Tungsten as Tungstic Oxide (concentrates).

AID TO MINING

Three parties were granted financial assistance, the total amount advanced being \$9,000.

The proprietors of the Stanhope Coal Mine at Avoca were assisted in the purchase of equipment to enable the belt conveyor system at the mine to be extended to enable present workings to be served. The mine is fully mechanised and a coal washing plant is installed.

Production totalled 13,952 tons during 1968 and seven men were employed. The mine usefully contributes to the maintenance of the limited market available to our coal producers. Two small parties also received advances, one for the purchase of piping for use in alluvial gold mining at Jane River and the other to enable a small scale tin miner to move his mining plant to areas where economic productive operations might be established.

The reservation at the old Mt Bischoff Mine, Waratah, continued to be held for exploration purposes by Comstaff Pty Ltd and an active programme of geological work and diamond drilling is being pursued. The Department completed a diamond drill hole at Fooks Lode without making intersection of the ore-body. Further drilling is to be undertaken.

Mining Plant

The mining plant available to test mineral discoveries was hired to test a tin deposit near Waratah and for investigation of gold reefs at Lefroy.

STATEMENT OF RECEIPTS AND PAYMENTS OF THE MINING TRUST FUND FOR THE YEAR ENDED 31 DECEMBER 1968

<i>Receipts</i>		<i>Payments</i>	
	\$		\$
Balance at 1 January 1968	23,999.68	Assistance	8,999.55
Repayment of loans	9,880.66	Maintenance—	
Interest on loans	628.41	Tribute area, Mt Bischoff	30.41
Tribute royalty	539.47	Mining plant	726.75
Hire of mining plant	210.02	Miscellaneous	80.37
Authorities to prospect	25.30	Balance to next Account	25,446.46
	<u>\$35,283.54</u>		<u>\$35,283.54</u>

Staff

The following were the staff movements during the year:—

Name	Position	Remarks	
Baker, W. E.	Geo. Chemist	Commenced	2.1.68
Kendall, K. T.	Senior Draughtsman	Resigned	4.3.68
Brown, L. C.	Clerk	Commenced	7.3.68
Powell, H. R.	Inspector of Explosives	Resigned	26.4.68
Black, J. L.	Mining Engineer and Inspector of Explosives	Resigned	3.5.68
Medwin, H.	Inspector of Explosives	Commenced	22.7.68
Hardy, D. M.	Draughtsman	Commenced	8.8.68
Hodgson, W. C.	Engineer Mechanical	Commenced	20.10.68
Blackman, H. C.	Drilling Superintendent	Resigned	29.11.68
Longman, M. J.	Geologist	Resigned	3.12.68

Scholarship

Messrs A. R. Beck and G. R. Green were granted Geology Scholarships.

CONCLUSION

Appreciation is recorded of the services rendered by officers of the Department, including officers of the Mines Draughting Section, Wardens of Mines and Registrars of Mines in the several mining districts.

A detailed review of operations and production follows, and the reports of the geological Survey Branch, the Mines and Explosives Branch, the Mount Cameron Water Race Board and the Ringarooma and Cascade Water Board are attached.

J. G. SYMONS, Director of Mines.

OPERATIONS AND PRODUCTION

1.—Metallic Minerals

CADMIUM

Quantity produced:—

	Tons	Value \$
1924-64	1,455	3,775,286
1965	70	357,116
1966	75	341,111
1967	74	383,131
1968	74	390,642
Total	1,748	\$5,247,286

This is a by-product obtained by the Electrolytic Zinc Company of Australasia Limited at its Risdon Works from zinc concentrates produced from the Rosebery and Williamsford Mines.

COBALT OXIDE

The source of the 1.11 tons of cobalt oxide of value \$4,683 was the same as that of cadmium above.

COPPER

Quantity and value of production:—

Year	From Tin Ores		From Lead-Zinc Ores		In Blister Copper		In Copper Ores		Total	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1919-1964	339	248,582	12,096	6,645,612	423,438	135,549,724	404	21,162	436,277	142,465,080
1965 .....	.....	.....	1,078	802,362	13,495	10,054,510	.....	.....	14,573	10,856,872
1966 .....	.....	.....	1,214	1,168,996	13,944	13,519,861	.....	.....	15,158	14,688,857
1967 .....	.....	.....	1,220	1,300,541	15,081	16,026,071	.....	.....	16,301	17,326,612
1968	169	173,213	1,303	1,433,063	14,470	15,915,117	.....	.....	15,942	17,521,393
Total	508	\$421,795	16,911	\$11,350,574	480,428	\$191,065,283	404	\$21,162	498,251	\$202,858,814

The Mount Lyell Mining and Railway Company Limited, Queenstown

Mining—	Tons
Overburden removed	1,424,763
Ore mined—	
Prince Lyell	100
West Lyell	2,159,113
Crown Lyell	87,539
Razorback	15,730
Limestone delivered to works	9,076
Silica delivered to works	3,368
Reduction—	
Concentrates smelted	51,606
Crown Lyell ore smelted	5,056
Precipitate smelted (North Lyell and Comstock)	123
Blister copper produced	13,388
Containing—	
Copper (tons)	13,268
Gold (fine oz)	8,486
Silver (fine oz)	79,332
Pyrite concentrate shipped	42,504
Total value of production	\$15,779,490

Average number of men employed—

Mining—

Open cut	215
Underground	130
Other	1,213
Total	1,558

Production from the inception to 31 December 1968—

Copper (tons)	640,442
Gold (fine oz)	639,768
Silver (fine oz)	16,357,373

Mr H. Murchie, Senior Mining Engineer Hobart, reports that development work in the underground mines was as follows:—

Mine	Driving feet	Rising feet	Winzing feet	Total feet
Crown Lyell	5,775	1,078	120	6,973
Royal Tharsis	102	.....	.....	102
Totals	5,877	1,078	120	7,075

Ore reserves, as published 30 June 1968, were as follows:—

	Tons	Cu. %
West Lyell—		
Open Cut	7,508,000	0.78
Underground	26,604,000	1.46
Lyell Tharsis	583,000	1.43
Crown Lyell No. 2	10,000	2.48
Crown Lyell No. 3	3,680,000	1.60
12 West Ore-body	52,000	10.50
Cape Horn	3,431,000	1.96
Total	41,868,000	1.40

This is a substantial increase on last year's reserves of 16.6 million tons at 1.026% Copper. Diamond drilling comprised 100 holes totalling 35,752 feet at West Lyell, Prince Lyell, Crown Lyell No. 3, North Lyell, Cape Horn, Gormanston, and Comstock. A large proportion of this drilling was carried out in the Cape Horn area to locate a new ore-body.

Underground development continues on the Crown Lyell No. 3 ore-body which is scheduled to commence production by mid-1969.

Major capital expenditure on plant and equipment included the following items:—

1. Caterpillar 988 wheel loader for West Lyell Open Cut.
2. Two LW16R Tourneau dozers.
3. Allis Chalmers TL645 front-end loader.
4. New underground change-house and offices.
5. Alimak Rise Climber.
6. Two Zax Drill Jumbos.
7. Simba 5 Rise Drilling Rig.
8. 7-ft. Symons Short Head Cone Crusher with scalping screen.
9. Eighteen No. 48 Agitair Float Cells to increase flotation capacity and recovery in mill.
10. 8-ft 10½-in. diameter six-discs Eimco copper concentrate filter.
11. Concentrate storage and handling building and equipment at Strahan.

To increase mill throughput the ball milling circuit was changed from four primary and seven secondary mills to five primary and six secondary mills.

Rubber ball mill liners were installed in one mill.

An explosives pump truck for slurry type explosives with an AN-SN base was introduced in the West Lyell open cut. Preparations were made for an extensive house-building programme to consist of 86 houses and 38 flats.

Cleveland Tin N.L., Luina

This company, reviewed under Tin, produced 877 tons of copper concentrates containing 169 tons of copper valued at \$173,213.

Electrolytic Zinc Company of Australasia Limited, Rosebery

This company, reviewed under Zinc, produced 12,558 tons of copper concentrate containing 1,303 tons of copper valued at \$1,433,063.

GOLD

Quantity produced—	Fine oz	Value \$
Prior to 1965	2,632,045	31,559,592
1965	30,084	940,126
1966	32,655	1,020,453
1967	34,677	1,083,667
1968	33,526	1,135,108
Total	<u>2,762,987</u>	<u>\$35,738,946</u>

Happy Valley Mining Co. Ltd., Lefroy

Mr A. W. Dick, acting for himself and others dewatered the 30-ft shaft and workings and sampled the lode. A small timber headframe gantry and ore bins were erected and a small roller crushing plant assembled. A small 4-ft x 3-ft copper plate and riffles were installed in the recovery box. Less than 1 oz of gold was recovered and no sales were recorded. One other man was employed apart from the manager.

The Mount Lyell Mining and Railway Company Limited, Queenstown

This company recovered 9,220 fine oz, valued at \$310,109, from sludge in the electrolytic copper refinery.

Electrolytic Zinc Company of Australasia Limited, Rosebery

Concentrates produced by this company contained 24,200 fine oz, valued at \$821,387.

Storeys Creek Tin Mining Co. N.L. (Dorset Tin Division), Gladstone

From the tin concentrate of this dredge, reviewed under Tin, 106 fine oz of gold, valued at \$3,612, was recovered.

IRON ORE (PELLETS)**Savage River Mines, Savage River and Port Latta**

Mr L. W. Morris, Senior Mining Engineer, and Mr E. C. Leyland, Mining Engineer, Burnie, report as follows:—

Savage River—	Tons
Overburden removed	6,236,310
Ore mined	1,832,285
Concentrate to Port Latta (dry)	869,147
Port Latta—	
Pellets produced (dry)	760,083
Value of Production	\$9,650,636
Average number of persons employed—	
Mining	79
Other	659
Total	<u>738</u>

Report.—In this, the first year of operations, Savage River Mines has produced the pellets as above under most adverse circumstances.

Coupled with the technical problems associated with a new plant and untrained personnel, the weather produced a record rainfall. This bad season in no small measure contributed to the

difficulties associated with the open-pit development, providing clean ore for the plant, the high labour turnover, and the problem of settling new arrivals in a new town. In view of these conditions it is most commendable to report that no serious accidents occurred on this company's property.

Open Cut.—Development of the pit progressed to the opening out of the fifth bench. Production for the year was largely lifted from the first three benches. The dump areas and the quarry for road metal were established.

Concentrator and Pellet Plant.—Major modifications and capital works carried out during the year were—

- Vacuum pump and filter;
- Installation of filter feed pump and relocation of pumps and piping;
- Replacement of rougher tailings pipe and modification to rougher collector box and launder;
- Seal water system to vacuum pumps;
- Emergency soda ash mixing and distribution system;
- Power plant purchase and installation of a Stal-Laval gas turbine generator of 9.6 megawatts capacity, to be operated by the Hydro-Electric Commission.

Off-Shore Loading Facilities.—During the year nine shipments of pellets averaging 70,997 tons per vessel were made and the installation also handled six oil tankers which discharged a total of 19,528 tons of fuel oil and 6,500 tons of turbine fuel.

Township.—The completion of the school, the hospital and shopping centre, the provision of sporting and recreational facilities and the making of gardens have established Savage River as a township.

IRON OXIDE

Quantity produced—

	Tons	Value \$
Prior to 1965	107,967	231,298
1965	3,524	9,836
1966	2,797	7,903
1967	7,866	35,130
1968	12,780	79,030
Total	134,934	\$363,197

Iron Cliffs Mine, Penguin

Mr A. Pearson continued to work the secondary ore at the Iron Cliffs Mine and supplied a cement works with 12,780 tons of haematite valued at \$79,030. Employment averaged four men.

LEAD

Quantity produced—

	Tons	Value \$
1919-1964	353,201	42,915,850
1965	11,126	3,103,600
1966	12,162	2,994,513
1967	11,930	2,578,032
1968	11,754	2,568,982
Total	400,173	\$54,160,977

Electrolytic Zinc Company of Australasia Limited, Rosebery

This company, reviewed under Zinc, produced 13,352 tons of lead concentrate and the total content of lead in the lead, zinc and copper concentrates was 11,754 tons valued at \$2,568,982.

MANGANESE DIOXIDE

This is recovered as a sludge in the electrolysis of zinc sulphate at the Risdon Works of the Electrolytic Zinc Company of Australasia Limited, the original source being the ore in its West Coast mines. The production of 265 tons was valued at \$8,215.

MERCURY

Quantity produced—

	Pounds	Value \$
1967	4,202	24,645
1968	2,147	14,406
Total	6,349	39,051

This is recovered at the Risdon Works of the Electrolytic Zinc Company of Australasia Limited from the roaster gases in the calcining of zinc concentrates. The ore containing the mercury is mined at the company's mines on the West Coast. Recovery was first made early in 1967. Production for the year was 2,147 lb valued at \$14,406.

OSMIRIDIUM

Messrs W. D. and N. Clark, Adamsfield, produced 12 oz of value \$1,709. Total production to date is 31,100 oz, valued at \$1,418,771.

PYRITE

Quantity produced—

	Tons	Value \$
1915-64	1,577,952	6,940,314
1965	58,868	353,208
1966	68,077	408,462
1967	59,714	358,284
1968	42,504	255,024
Total	1,807,115	\$8,315,292

This is produced and exported by the Mount Lyell Mining and Railway Company Limited for sulphuric acid manufacture.

SILICA FOR SILICON ALLOY PRODUCTION**The Broken Hill Proprietary Company Limited, Beaconsfield**

This company mined 4,360 tons of silica, valued at \$43,600, for export to Newcastle for the manufacture of silicon alloys.

SILICON**Tasmanian Electro-Metallurgical Company Proprietary Limited, Bell Bay**

This company smelted slag from ferro-manganese production with 3,375 tons of silica from Beaconsfield to produce silicon as silicon-manganese. The quantity of alloy produced was 14,870 tons valued at \$1,654,972. The average number of employees was 149.

SILVER

Silver is nowhere mined for itself but is a valuable by-product from copper, lead and zinc ores. The current producers are shown below—

Producer	Source	Quantity Fine oz	Value \$
E.Z. Co. of A/asia Ltd	Copper, Lead & Zinc Concentrates	1,386,881	2,882,292
Mt Lyell M. & R. Co. Ltd	Refinery sludge	87,580	179,712

Quantity and value of production—

Year	From Tin and Other Ores		From Silver-Lead Ore		From Copper Ore		From Lead-Zinc Ore		Total	
	Fine oz	\$	Fine oz	\$	Fine oz	\$	Fine oz	\$	Fine oz	\$
1919-64	121,787	101,764	17,690,600	5,749,634	3,695,118	1,430,284	22,866,068	16,538,354	44,373,573	23,820,036
1965	....	....	....	....	52,228	60,864	1,331,631	1,551,852	1,383,859	1,612,716
1966	....	....	....	....	59,878	70,070	1,447,543	1,694,043	1,507,421	1,764,113
1967	....	....	....	....	75,384	111,699	1,427,970	2,113,558	1,503,354	2,225,257
1968	....	....	....	....	87,580	179,712	1,386,881	2,882,292	1,474,461	3,062,004
Totals	121,787	\$101,764	17,690,600	\$5,749,634	3,970,188	\$1,852,629	28,460,093	\$24,780,099	50,242,668	\$32,484,126

SULPHUR AS SULPHURIC ACID

Sulphuric acid is produced in the roasting at Risdon of the zinc concentrates from the Rosebery and Hercules mines of the Electrolytic Zinc Company of Australasia Limited.

Quantity and value of production—

	Mono Tons	Value \$
1957-64	278,349	2,648,906
1965	64,172	641,720
1966	65,013	650,130
1967	72,347	723,470
1968	65,157	1,335,718
Total	545,038	\$5,999,944

TIN

Quantity produced:—

	Tons	Value \$
1873-1964	148,990	75,018,446
1965	1,027	3,761,758
1966	1,031	3,419,153
1967	1,529	4,735,799
1968	3,126	9,242,080
Total	155,703	\$96,177,236

Aberfoyle Tin N.L., Rossarden

Mr H. Murchie, Mining Engineer, Hobart, reports the average number of persons employed—

Underground	133
Surface	118
Staff	
Total	251

Tonnage of ore milled was 89,655, an increase of 2,993 tons over the preceding year. In addition 63,344 tons of accumulated tailings were re-treated.

Production from the ore treated consisted of 592 tons of tin concentrate containing 392 tons of tin valued at \$1,153,649 and 145 tons of wolfram concentrate containing 100 tons of tungstic oxide valued at \$389,595.

Underground development comprised:—

Driving	3,157
Cross cutting	785
Rising	751
Main orepass rising	148
Total	4,841

The hydraulic sand filling placed in production stopes was 54,154 tons, and in addition 4,100 tons was placed in old stopes near the shaft above 4 Level.

Underground diamond drilling comprised 58 holes with a total footage of 7,042 feet. A D.50 diamond drill was purchased during the year.

The ore pass system was extended allowing main ore hoisting to be carried out from 7, 12 and 14 Levels. The truck size for cage hoisting was increased from $\frac{1}{2}$ ton to $\frac{3}{4}$ ton capacity giving improved hoisting efficiency. Pumping capacity was increased by placing a third pump on 10 Level and installing an 8-inch column from 10 Level to 4 Level. A loco battery charge station was built on 11 Level.

Cleveland Tin N.L., Luina

Details of production are as follows:—

	Tons
Ore milled	192,573
Tin concentrate	1,312
Tin content	683
Copper concentrate	877
Copper content	169
Tin content	60
Total value:	\$2,378,150
Average employment—	
Surface	154
Underground	40

The crushing and treatment plant was completed early in the year and the initial through-put of stockpiled ore took place in March. During the year through-put was improved to such an extent that, in December, milled tonnage achieved the designed capacity. At the same time the percentage recovery of tin was steadily improving.

Mining.—Stoping was commenced on 'A' lens on 2, 3 and 4 levels and lenses 'B', 'C' and Henry's were driven on appropriate levels. The main ore pass system to the 7 level was developed and the main adit for 5 level commenced. The following development footages were achieved during the year:—

Item	Footage	Tons, Waste	Tons, Ore
Driving	3,498	.....	46,892
Cross-cutting	1,630	23,117	.....
Rising	336	97	850
Total	<u>5,464</u>	<u>23,214</u>	<u>47,742</u>

Capital equipment purchased and utilised underground included the following major items:—

- 1 "Tunmec" Tunnelling Rig
- 1 15-ton rear dump truck
- 1 5-yard front-end loader.

Milling.—The heavy media separation is working at about sixty per cent of planned capacity. The rate of through-put of the copper concentrate has been slow due to the stringent control of moisture content for export bags. This rate should be improved considerably with the drumming of the concentrate, for which a higher moisture content is permissible. Capital items purchased and installed included:—

- 1 Copper concentrate holding tank
- 3 Heavy media flotation cells.

Engineering.—A power-house was constructed and equipped and comprises:—

- 2 750 h.p. diesel engines
- 2 Alternators of 525 kilowatt capacity.

Townsite.—Three houses have been added to the township and a twenty-four room accommodation block, and an amenities hall, have been constructed at the single men's area.

Geological.—Underground mapping was kept abreast of the underground development, all diamond drill cores being logged, and sampled when necessary. Diamond drilling from the development headings to test for the parallel lenses at each horizon was continued during the year.

Hawkes Alluvial Tin Limited, King Island

This company commenced sluicing operations during the year producing 15 tons of concentrates containing 12 tons of tin which returned \$34,092. Four men were employed in this sluicing of 20,950 cubic yards.

Renison Limited, Renison Bell

This company treated 355,258 tons of ore for the production of 2,910 tons of concentrates containing 1,744 tons of tin valued at \$5,153,492.

Fifty-four per cent of this tonnage was mined from Federal Lode, twenty-four per cent from the Battery Lode and the remainder from North Stebbins, Dreadnought Lodes, and sundry small open-cuts. A marked improvement in tin recovery took place in the latter half of the year following the installation of a wedge wire screen to close the primary grinding circuit (supplementing a hydro-cyclone). A pilot plant to recover fine cassiterite by flotation was also commissioned in the last two quarters of the year.

Mining.—Cut and fill stoping in the Federal lode continued with a decrease in the height of lift to 7 feet being considered an improvement. Fill was obtained from development waste and also from the surface. The development of more openings for vehicular access resulted in greater flexibility in the stoping. Stoping at the Battery mine was virtually completed during the year and with the exception of a few remnants the breaking of ore has ceased. Development rock totalling 54,448 tons of ore was obtained from North Stebbins lode, a shallow dipping orebody of No. 2 Horizon.

The following development footages were achieved:—

	Feet
Main decline	1,300 (to 5,607 from portal)
Driving and cross-cutting	4,459
Rising and winzing	590
Total	6,349

The diamond drilling programme was continued for the following footages:—

	Feet
Exploratory drilling (U/g)	7,763
Operational drilling (U/g)	10,747
Exploratory drilling (Sur.)	732
Total	19,242

Township.—Construction at Zeehan for sixteen single staff employees and of twenty houses for married employees was in progress at the end of the year. The company, when this programme is completed, will have established a total of ninety houses at Zeehan.

The average employment was two hundred and forty-five of whom fifty-three were employed underground.

Mr W. J. Hodge, Dundas

Mr Hodge and his partner milled 900 tons from the Razorback Mine, producing concentrates containing 4.5 tons of tin valued at \$13,352.

Endurance Mining Corporation N.L., South Mount Cameron

This company treated 94,340 cubic yards from the Clifton Workings for the production of 54 tons of concentrate, containing 40 tons of tin, valued at \$118,602.

The average number of men employed was 10 in the open cut and 20 others, making a total of 30.

The eastern end of the Clifton lead was worked out and arrangements commenced for the transfer of operations to the western end. A change of management and name led to other changes, including purchase of the Monarch mine leases and a complete overhaul of the Frome power station. Check boring was commenced on the western end of the lead.

At the Monarch mine construction of a dam on the Little Boobyalla River was commenced.

Mussel Roe Mine, Pioneer

Mr V. Wood at his two working faces near the Mussel Roe River produced 3 tons of tin concentrate containing 2 tons of tin valued at \$6,687 from a total of 74,200 cubic yards. Average number of men employed was four.

This poor result was due firstly to the working out of the No. 1 face and secondly to difficulties with the No. 2 face, where due to water shortage, sluicing was not commenced until May. Overburden stripping was then persevered with for six weeks but the resultant clean up yielded only 8 cwt of cassiterite. Disappointing results attended all efforts to find payable values. Finally the plant was shifted to the lowest point on the lease down the river and the future of the mine will depend on the values encountered in this move. Total production for the year from this face was 18 cwt of tin oxide.

Pioneer Mine, Pioneer

Routine mining operations conducted by Mr V. Wood resulted in the recovery of concentrates containing 18 tons of tin valued at \$53,120 from 153,100 cubic yards of gravel. At the close of the year, however, the face had advanced to such an extent that it was beyond economic limits from the gravel pump and had become unwieldy. An average of six men were employed.

Mt Cameron Tin Syndicate, South Mount Cameron

Mining of comparatively shallow ground on the eastern lead, south of the Endurance, was pursued with indifferent results and declining values forced a closure of this face in the last quarter of the year. Production was 2 tons of tin valued at \$6,869 from 11,300 cubic yards of gravel, 3 men being employed.

Probert and Groves, South Mount Cameron

This party transferred their operations to a newly acquired lease (5M/67, 4 acres) adjoining the old Dorset dredge machinery site. This was worked in conjunction with a five acre lease (6M/67). Ground consisted mainly of shallow (10 inch) surfacings which were dozed into heaps and sluiced into a concentrating race. Operations yielded 4 tons of tin valued at \$12,108. Two men were engaged in this work. Ownership of the lease was transferred to M. Groves during the period.

Storeys Creek Tin Mining Co. N.L. (Dorset Tin Division), Gladstone

Operations by this company may be summarised as follows:—

Acres dredged: 26
 Yardage treated: 1,519,100
 Average depth: 35 feet
 Running time: 5,321 hours
 Percentage running time: 83
 Tons of concentrate: 91
 Tons of tin: 67
 Value of tin: \$197,183
 Average employment: 39 men.

The use of two-way radio and closed circuit television became firmly established. The dredge was moved from the McGregor to the Black Duck area on the leases. Drilling on leases was confined to the definition of the dredge course. The dredge was maintained in fully effective working condition with the provision of a new top tumbler and bull wheel.

Star Hill Syndicate, Gladstone

Decreasing values and tailing disposal problems constrained this syndicate to transfer operations to the northern end of the main face. Here, adjacent to the main access road, a pillar of ground between old water-filled workings and the existing face was opened up. Benefits deriving from this move were improved values and the solution of tailing disposal problems. Prior to this change tailings had been discharged onto flats flanking the Mussel Roe River with a small amount of seepage into the Mussel Roe itself.

Concentrate produced from the 151,800 cubic yards sluiced amounted to 18 tons with a tin content of 13 tons valued at \$39,547.

Messrs R. L. Rainbow & Son, Banca Mine

The dry summer precluded sluicing operations until the middle of May. A plentiful supply of water from then on permitted the working of two faces each four feet in depth. In addition, some shallow surfacings were dozed up and sluiced on the western side of the main Boobyalla Road. Production was 3.499 tons of tin in concentrates valued at \$10,392 from 12,500 cubic yards sluiced.

Cornwall Coal Co. N.L., Royal George

Work commenced on sinking the shaft to the 4 level, cutting plats at the 3 and 4 levels. From these plats crosscuts will be driven to the lode for driving along the lode. The ore recovered will be bulk tested so that a beneficiation process may be determined.

During the year the shaft was deepened 144 feet and the No. 3 level extended to 20 feet from the shaft. The shaft was still being deepened at the end of the year.

Storeys Creek Tin Mining Co. N.L., Storeys Creek

This company, reviewed under Tungsten, produced 68 tons of concentrate containing 50 tons of tin, valued at \$145,799.

Mr G. Machen, Waratah

Mr Machen carried on sluicing operations in North Valley, treating 50,500 cubic yards. Production was 14 tons of concentrates containing 9 tons of tin valued at \$28,514. An average of 2 men were employed.

Production by Small Workers

Many miners and prospectors throughout the State produced small quantities of concentrate by reason of either small-scale or part-time workings. Their work is described under the heading of various districts.

EAST COAST

Freycinet Tin Pty Ltd, Coles Bay: Operations were continued on leases 87M/64, 16M/65 and 38M/65 until 25 October, when the plant was temporarily shut down whilst further boring and prospecting ahead of the workings was carried out.

Concentrates recovered were 2.274 tons having a tin content of 1.594 tons valued at \$4,659.

Miscellaneous: Messrs J. M. Brook, A. C. Cowan, W. T. Kerrison and W. Munday produced individually concentrates containing 0.195 tons of tin valued at \$590.

AVOCA

Messrs N. R. and D. Fenton, Mount Rex, produced concentrates containing 0.366 tons of tin valued at \$1,094, from shallow alluvial workings.

Messrs Brinckman and Dicker, Mount Rex, mined and milled tin ore to produce concentrates containing 1,606 tons of tin valued at \$4,732.

RINGAROOMA-BRANXHOLM-DERBY

Mr T. Merritt, Ringarooma River Beaches, treated 3,025 cubic yards to produce concentrates containing .950 ton of tin valued at \$2,798.

Mr R. Kerrison, Ringarooma River Beaches, produced concentrates containing 1,623 tons of tin valued at \$3,703.

S. J. Kerrison, Mt Stronach, acquired a 40 h.p. Fordson tractor, 6 inch pump and 8 inch hydraulic elevator and tested a small area of ground on the Parr Rivulet, a tributary of the Great Forester River. Results were disappointing and the show was abandoned.

D. L. and W. J. Mullins, Branxholm: This party acquired the leases held by W. J. Stevens and worked the Mt Ruby mine as water supply permitted. This involved repairs to intake and fluming. The party hired a bulldozer to clear dense scrub ahead of the face. The ground is very stoney and progress in treating the ground was slow. Two men were engaged part-time and produced concentrates containing 0.299 ton of tin valued at \$895.

Messrs Targett and Bonner, Branxholm: This party acquired a lease on Black Creek above the highway and down stream from the old Arbor workings. Three men were regularly employed at weekends and holidays building a camp and installing pump, pipelines, blower, etc. A productive stage had not been reached by the end of 1968, but prospecting of the ground had revealed promising values.

Miscellaneous: Messrs K. Kerrison, J. Maumill, N. Wheeler, J. Holmes, A. D. Quinn and F. Butler, and Mrs D. McLaughlin produced individually small quantities of concentrates containing 2.23 tons of tin valued at \$5,055 from Cascade and Ringarooma River Beaches. Other small producers were Messrs L. M. Barnett, G. T. Lawry, P. Le Fevre, A. G. Machen, J. Melville, H. C. Walker, G. Willis and G. Rayner and party, who produced individually concentrates containing 0.547 ton of tin valued at \$1,602.

GLADSTONE

Mr E. King, Fly by Night Mine, produced concentrates containing 0.328 ton of tin valued at \$1,002.

Mr H. Standage, Amber Creek, produced concentrates containing 0.817 ton of tin valued at \$2,432.

Mr R. C. Lawry, Amber Hill, produced concentrates containing 0.745 ton of tin valued at \$2,175.

Mr N. B. Moore, North Mount Cameron, worked at weekends to produce concentrates containing 0.044 ton of tin valued at \$133.

Messrs K. D. and F. R. Richardson, South Mount Cameron, worked the Dry Gut Mine to produce concentrates containing 0.636 ton of tin valued at \$1,845.

Miscellaneous: Messrs P. M. Calvert, H. A. & M. F. Fenton, L. Green, B. G. R. Groves, D. Floyd and K. Richardson produced individually small quantities of concentrates containing 1.679 tons of tin valued at \$5,000.

MOUNT CAMERON-PIONEER

Messrs B. Bishop and P. Jones individually produced a total of 0.318 ton of tin in concentrates valued at \$971.

Messrs J. and M. J. Kerrison continued to sluice remnants of virgin ground left by early Chinese tin miners on the Garibaldi section. Production amounted to 1.991 tons of tin concentrates valued at \$5,908.

H. Summers: Treating very stony ground in Sapphire Creek, Mr. Summers and his partners won 0.222 ton of tin in concentrates valued at \$669. Operations were part time only.

MOORINA-WELDBOROUGH

Messrs A. J. Stevenson and Mullins Bros, Weldborough, continued sluicing at Red Hills, in dense scrub country. Results were again satisfactory despite the arduous nature of the work, production totalling 1.398 tons of tin in concentrates valued at \$4,129. Employment remained static at two men.

Messrs M. and J. Lambert: Part-time work by this party in Laffer Creek yielded 0.238 ton of tin in concentrates valued at \$704.

Mr R. Hyde took up a lease one mile above the bridge at Moorina in the Ringarooma River. Using a small 3-inch pump powered by a 4½ h.p. petrol motor and a wheelbarrow to feed his sluice box this operator won 0.424 ton of tin valued at \$1,261 in the final quarter of the year.

Messrs K. Banks and F. Coombes produced concentrates containing 0.028 ton of tin valued at \$81.

Mr H. Moses, operating on the Blue Tier, worked over ground in One-Mile Creek which had been sluiced in the early part of the century by Chinese tin miners. Patches of virgin ground and 'edgings' left by the old timers yielded concentrates containing 0.31 ton of tin valued at \$920. Mr. Moses moved his plant to the upper reaches of the Wyniford River near Mt Michael in the latter part of the year.

WARATAH

Mr. C. Housego produced concentrates containing 0.166 ton of tin valued at \$483.

Mr M. G. Glozier, from his underground working on Thompson's Lode, produced concentrates containing 0.089 ton of tin valued at \$264.

Mr J. Housego, from tailings in the Waratah River recovered 0.488 ton of tin in concentrates valued at \$1,434.

Mr E. Kelly returned 0.077 ton of tin in concentrates valued at \$223.

Mr D. Kenworthy, from a part-time operation at Pig Flat, produced 0.086 ton of tin in concentrates valued at \$256.

Mr L. W. Wills, working underground part time, returned 0.025 ton of tin in concentrates valued at \$76.

Mr S. R. Richardson, Thompson's Lode, produced concentrates containing 0.057 ton of tin valued at \$166.

Mr S. A. Tatlow treated 1,500 yards to yield 0.29 ton of tin in concentrates valued at \$842.

Mr G. Richardson produced concentrates containing 0.088 ton of tin valued at \$269.

WEST COAST

Mr R. E. Clarke, Grand Prize, produced 0.402 ton of tin in concentrates valued at \$1,229.

Mr A. R. Smith, Tasman River, North Heemskirk, produced concentrates containing 0.163 ton of tin valued at \$475.

Mr C. D. King, Port Davey, produced from the Melaleuca Mine, concentrates containing 2.274 tons of tin valued at \$6,734.

Mr A. A. Walker, Balfour, produced 0.091 ton of tin in concentrates of value \$265.

TUNGSTEN (SCHEELITE)

Quantity produced:—	Tons (Concentrates)	Value \$
1917-64	19,809	36,955,788
1965	1,185	2,090,600
1966	1,311	3,776,862
1967	1,200	3,673,100
1968	1,460	4,127,564
Total	24,965	\$50,623,914

King Island Scheelite (1947) Limited, Grassy

Production statistics:—

Mining

Over-burden removed

816,142 tons

Ore mined

286,268 tons

Treatment

Ore milled

277,242 tons

Concentrate recovered

1,460 tons

WO₃ content

1,054 tons

Value

\$4,127,564

Employment (average)

Opencut

25

Other

144

Total

169

During the year this company was the subject of two take-over bids, finally being bought by Peko-Wallsend Limited.

Diamond Drilling.—Sixty-four holes for a footage of 18,253 feet were drilled in a successful effort to increase the ore reserves.

Capital Items.—The following items were purchased and installed:—

Township—

Five new houses, a butcher's and baker's shops.

A sewerage scheme for the township.

Mill—

A 60" x 48" Primary Crusher (not installed to date).

An X-ray Fluorescent Assay unit.

A Hydraulic adjusting system for the Symons crusher.

Mine—

A large rubber-tyred dozer.

Two 35-ton diesel trucks.

Engineering—

An 1,100 k.w. diesel generating unit (not installed as yet).

TUNGSTEN (WOLFRAM)

Quantity produced:—	Tons (Concentrates)	Value \$
1899-1964	14,930	18,164,628
1965	492	903,040
1966	510	1,367,704
1967	435	1,359,388
1968	484	1,358,093
Total	16,851	\$23,152,853

Aberfoyle Tin N.L., Rossarden

Wolfram concentrate produced contained 100 tons of tungstic oxide (WO₃) valued at \$389,595. This company is reviewed under Tin.

Storeys Creek Tin Mining Co. N.L., Storeys Creek

Average number of persons employed:—

Underground	70
Surface	37
Total	107

Tonnage of ore milled was 42,051 tons, an increase of 5,035 tons over the previous year.

Production from the ore treated consisted of 339 tons of wolfram concentrate containing 247 tons of tungstic oxide (WO₃) valued at \$968,498 and 68 tons of tin concentrate containing 50 tons of tin valued at \$145,799.

Underground development comprised:—

Driving	2,434
Cross-cutting	601
Rising	904
Total	3,939

Underground diamond drilling comprised 57 holes totalling 6,218 feet. The recreation hall was completed at the single quarters.

Additions to the mill included:—

Auto drying and screening unit.

Hartz jig.

Vanner.

Rotap sizer.

The fire protection system was improved.

The main ore pass system was completed to 11 level.

A Kempe U2 diamond drill was purchased and an eight-inch lathe was installed in the workshops.

ZINC

Quantity produced:—	Tons	Value \$
1919-64	757,452	104,066,398
1965	38,096	12,419,442
1966	40,904	12,648,558
1967	40,231	12,106,835
1968	40,061	11,857,961
Total	916,744	\$153,099,194

Electrolytic Zinc Company of Australasia Limited

EXTRACTION FROM CONCENTRATES: RISDON

From other than Tasmanian Ore—	Tons
Zinc	92,153
Cadmium	206
Cobalt Oxide	17
Superphosphate	86,710
From Tasmanian Ore—	
Zinc	41,291
Cadmium	65
Cobalt Oxide	1.11
Manufactured products—	
Aluminium Sulphate	2,157
Ammonium Sulphate	14,075

The average number of men employed was 2,678.

WEST COAST DIVISION

Ore mined—									
Mine	Pb %	Zn %	Fe %	Cu %	Ag oz/ton	Au dwt/ton		Tons	
Hercules	5.2	17.3	12.5	0.35	5.8	1.8		24,514	
Rosebery	5.0	15.6	15.2	0.60	5.6	1.8		272,787	
Farrell	19.4	6.7	9.7	0.28	21.4	Nil		4,604	
									301,905
Concentrate produced—								Tons	
Lead Concentrate								82,458	
Copper Concentrate								13,352	
Zinc Concentrate								12,558	
Total								108,368	
Recoverable quantity in ore mined—									
Zinc								40,061 tons	
Lead								11,754 tons	
Copper								1,303 tons	
Cadmium								74 tons	
Silver								1,386,881 oz (fine)	
Gold								24,200 oz (fine)	
Cobalt Oxide								1 ton	
Manganese Dioxide								265 tons	
Zinc Sulphate								87 tons	
Sulphur as Sulphuric Acid								65,157 mono tons	
Mercury								2,147 lb	
Total value of production—	\$19,387,683								
Average number of persons employed—				Surface		Underground		Total	
Hercules Mine				9		26		35	
Rosebery Mine				375		330		705	
Farrell Mine				6		13		19	
Total				390		369		759	

ROSEBERY, HERCULES AND FARRELL MINES

Development:—

Rosebery Mine.—The sinking bank cross-cut (15' x 15') was advanced to the shaft site, a distance of 1,703 feet. Excavation of the winder and head-frame chambers was followed by an advance of 82 feet below the collar to enable the sinking stage to be installed with the main sinking winders. A depressed drive for ventilation was connected from the shaft cross-cut to the floor of the pre-sink. The new main haulage cross-cut (11' x 11') was commenced and advanced 34 feet. All this work was performed by the contractors Dillingham-Shaft Sinkers.

Normal mine development included ventilation ways comprised:—

Driving and cross-cutting, 2,232 feet
Rising and winzing, 1,231 feet.

Hercules Mine.—Rising, 171 feet.

Farrell Mine.—The deepening of the main shaft to 114 feet below 7 level was achieved by cross-cutting from the internal shaft on 9 level, rising and then stripping and timbering to final shaft contour.

Driving and cross-cutting, 410 feet
Rising, 368 feet.

Diamond Drilling:—

Rosebery.—17,914 feet which includes 534 feet of pilot and ventilation drilling.
Hercules.—2,732 feet of development drilling.
Farrell.—503 feet including 242 feet of pilot and ventilation drilling.
Prospects.—2,583 feet comprised of seven holes at Melba Flat and three holes at Tullah.

General:—

Mining.—Ore reserves for the Rosebery, Hercules and Farrell Mines (included for the first time) as at 30 June 1968 increased by 1,210,000 tons to 8,710,000 tons.

Ore Treatment.—The new zinc flotation section was completed and operated throughout most of the year.

Construction.—Work commenced on a new 4.6 m.w. diesel power station and this station was brought into operation early in 1969. A new compressor station containing three new 2,200 c.f.m. compressors and one 1,730 c.f.m. machine, moved from the old station, was completed and in operation. A decision was made to construct more houses and single men's quarters to accommodate the increased labour force required for the expansion of production.

RISDON WORKS

Production was reduced due to power restrictions, with the Ammonium Sulphate Plant output at the minimum rate at which it could be operated. Superphosphate production was reduced due to lower demand by Tasmanian agriculture. Capital expenditure for the year was \$4,156,000 which included:—

New foreshore conveyor system for handling incoming raw materials. Work was completed on the installation of semi-conductor silicon rectifiers to replace the rotary converters in No. 1 Conversion Station. New concentrate fluid bed roaster which will be commissioned in March 1969. New facilities for the preparation and storage of mixed fertilisers.

New projects are a residue treatment plant, new casting plant and No. 6 Cell Unit in the Electrolytic Divisions.

ZINC SULPHATE

This is a by-product from the treatment of zinc concentrate by the Electrolytic Zinc Company of Australasia Limited. The quantity produced was 87 tons of value \$9,656.

2.—Non-Metallic Minerals

CLAY

Quantity produced:—	Cubic yards	Value \$
1958-64	845,201	1,545,848
1965	147,796	283,004
1966	158,948	325,488
1967	130,522	287,658
1968	148,802	358,507
Total	1,431,269	\$2,800,505

Company	Clay Cu. yd	Value \$	No. of Men	Product
Campbell, John Pty Ltd, Launceston	1,400	1,400	12	Pipes
*Fenton, E. V., Kingston	8,456	21,140	1	Bricks
Goliath Portland Cement Co. Ltd, Rail- ton	31,451	106,933,	3	Cement
*Hazell Bros, Margate	16,198	40,494	1	Bricks
Hobart Brick Co., New Town and Grant- ton	9,015	22,537	44	Bricks
Huttons Bricks Pty Ltd, Pospect	14,125	28,250	14	Bricks

Company	Cu. yd Clay	\$ Value	Men No. of	Product
Luck Brick and Pipe Pty Ltd, Dulverton	6,580	10,136	12	Bricks
Machens Brick Pty Ltd, Kings Meadows	18,116	36,232	21	Bricks
Humes Ltd, Granton	11,900	29,750	12	Bricks
Humes Ltd, Granton	2,670	8,994	17	Pipes
Humes Ltd, Launceston	2,327	5,120	21	Pipes
McHugh Bros Pty Ltd, Prospect Vale	12,143	6,071	13	Bricks
*Wells, D. S., Blackman's Bay	2,443	6,108	1	Bricks
Wise, G. R. & Son, Relbia	2,158	2,158	....	Bricks
Wynyard Brick, Wynyard	6,320	25,484	11	Bricks
Wunderlich Pty Ltd, Loira and Launceston	3,500	7,700	23	Tiles

* Supplies to Hobart Brick Company

Humes Ltd, Granton

The average number of persons employed was 29.

The pan mill was remodified in the brickworks. Proposals have been put forward to convert existing kilns to oil fire. The fire fighting system has been improved.

Hobart Brick Co. Ltd, New Town

The average number of persons employed was 44.

A new brick drying system has been built which includes:—

One hundred and fifty feet long twin tunnels with capacity for 70 rail mounted flat cars. The cars are pushed into the tunnel from a traverser by hydraulic pushers. The dryer is heated by an oil heater rated at 6,000,000 B.T.U. with hot oil circulation through radiators. Air circulation is provided in the dryer by air inlet and exhaust fans each of 15 h.p. and twelve auxiliary fans each 7½ h.p. A 6,000 gallon oil storage tank has been built for the heating unit. It is hoped to increase brick production by 25 per cent. The electrical wiring of the works has been replaced by new cables in underground ducts, and is controlled from a central sub-station cabinet. Two former dryers have been converted to brick kilns and are operating successfully. A 1,500 gallon oil storage tank has been built behind the change house.

DOLOMITE

Quantity produced:—	Tons	Value \$
Prior to 1965	25,695	150,428
1965	1,145	6,784
1966	2,606	15,097
1967	2,143	12,361
1968	2,534	15,070
Total	34,123	\$199,740

Circular Head Dolomite and Trading Co. Pty Ltd, Smithton

This company, the sole producer, employed an average of one man and produced 2,534 tons, an increase of 391 tons. The stone is milled for top-dressing in agriculture.

KAOLIN

There has been no production since 1962. The total quantity produced since 1940 is 111,086 tons, valued at \$883,018.

LIMESTONE

Quantity and value of production and usage:—

Year	Manufacture of Cement		Manufacture of Carbide		Chemical and Metallurgical		Agricultural and Other		Totals	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1919-64	4,411,302	5,741,572	658,904	1,726,888	4,128,907	4,764,236	569,405	1,369,780	9,768,518	13,602,476
1965	249,107	487,818	30,315	118,432	29,075	90,874	29,917	74,482	338,414	771,606
1966	252,393	494,437	29,218	114,056	28,489	88,983	34,634	83,077	344,734	780,553
1967	253,611	496,749	16,234	62,290	33,670	103,155	44,934	104,679	348,449	766,873
1968	409,642	806,995	23,686	105,510	32,239	98,410	30,244	71,914	495,811	1,082,829
Totals	5,576,055	\$8,027,571	758,357	\$2,127,176	4,252,380	\$5,145,658	709,134	\$1,703,932	11,295,926	\$17,004,337

Addison and Coates, Cooee

This firm produced 3,000 tons of limestone valued at \$9,000.

Australian Commonwealth Carbide Company Ltd, Ida Bay and Electrona

This company quarried 23,686 tons of limestone at a cost of \$105,510 at Ida Bay and used it for the production of calcium carbide at Electrona. Calcium carbide production was 10,464 tons valued at \$1,349,022 and acetylene black production was 187 tons valued at \$94,838. The average number of persons employed was 197, of whom 19 were at the quarry.

Capital expenditure during the year was \$10,971. A new system of handling calcines and tar to the electrode mixer and boiler was installed. The limestone yard was concreted to improve handling of limestone to kiln.

Australian Newsprint Mills Limited, Maydena

This company quarried 4,115 tons of limestone at a cost of \$25,467. The limestone was burnt at their Boyer Mill and used in newsprint production. Six men were employed in the quarry throughout the year.

A. R. Beams, Flowery Gully

From his quarry, crushing plant and lime kiln, Mr. Beams produced:—	\$
2,706 tons Agricultural limestone, valued at	8,704
19,048 tons Limestone for chemical and metallurgical purposes, valued at	45,715
30 tons Burnt lime for various purposes, valued at	630
<u>21,784 tons</u>	<u>\$55,049</u>
Total value	

Thirteen men were employed.

New plant continued to operate satisfactorily. A programme of fairly close drilling was carried out by the Department of Mines in advance of top face to established grade of limestone and suitability for more extensive use in industry.

Goliath Portland Cement Co. Ltd, Railton

Limestone quarried and used in the manufacture of cement totalled 409,642 tons, at a cost of \$806,995. Employment in this quarry, for limestone for cement manufacture only, averaged 22 men.

Cement production totalled 311,125 tons valued overall at \$5,600,250. This production was all fine cement. Average employment was 308 men.

The wet process plant was operated to augment production during the longer than expected period required to bring the new dry process plant up to full production.

The power station, installed to overcome the power rationing, is operating very well and is adequate in size to cope with any likely limitations of the Hydro-Electric Commission's supply in the future. The Humbolt dry process plant, although it experienced an abnormal number of breakdowns and technical difficulties during the early months of operation, is now producing in excess of the design rate. It has consistently produced a very high quality product.

R. K. Sulzberger, Flowery Gully and Launceston

This operator quarried 217 tons of limestone at his Flowery Gully quarry. The stone was carried to his Launceston crushing plant and sold for agricultural purposes. The value being \$1,212.

Mineral Supplies, Ulverstone

Sales of stocks on hand by this firm amounted to nine tons, valued at \$74.

The Mount Lyell Mining and Railway Company Limited, Halls Creek

This company quarried 9,076 tons of limestone, valued at \$27,228, for delivery to the works at Queenstown from the quarry at Halls Creek. Quarrying operations were on a contract basis and the limestone was used as flux in the blast furnace or burnt to produce lime for use in the flotation plant.

Railton Lime Works, Railton

Two men were employed at this works to crush and mill 18,907 tons of limestone, valued at \$37,247, supplied by the Goliath Company.

Wright Stephenson Pty Ltd, Pulbeena

This company produced 5,375 tons of lime sand, valued at \$15,047, compared with 7,065 tons in the previous year. Average employment was two men.

OCHRE

Quantity produced:—	Tons	Value \$
1918-64	2,354	15,188
1965	40	544
1966	65	1,008
1967	97	1,459
1968	11	164
Total	2,567	\$18,363

A. Pearson, Spalford and Deep Creek

Production of red and yellow ochre from these pits was 11 tons, valued at \$164.

PEBBLES

Quantity produced:—	Tons	Value \$
1957-64	4,575	67,134
1965	920	14,002
1966	895	15,183
1967	1,237	20,404
1968	1,214	19,687
Total	8,841	\$136,410

A. Pearson, Ulverstone

The collection of pebbles for grinding was continued on the beaches around Ulverstone. The output was 1,214 tons, valued at \$19,687.

SAND (MOULDING)**Industrial Sands Pty Ltd, Eagle Point**

This company commenced operations in the last quarter on a large deposit of fine silica sand. A plant was installed to dry and coat the sand for moulding. Production was 850 tons, valued at \$9,550. An average of one man was employed.

SILICA

Quantity produced:—	Tons	Value \$
1936-64	170,023	237,358
1965	4,562	10,528
1966	5,014	10,261
1967	8,557	23,360
1968	8,878	30,126
Total	197,034	\$311,633

Australian Glass Manufacturers Ltd, South Arm

This company obtained 3,580 tons of silica sand, valued at \$6,495, for the manufacture of glass.

Mineral Supplies, Ulverstone

This firm supplied 96 tons of silica, valued at \$2,367.

The Mount Lyell Mining and Railway Company Limited, Queenstown

This company, reviewed under Copper, quarried 3,480 tons of silica, valued at \$12,180, for use as a flux.

3.—Construction Materials**BUILDING STONE**

Quantity produced:—	Cubic yards	Value \$
Granite (Red)	10	30
Freestone	363	4,902
Other	4,184	12,437
Total	4,557	\$17,369

CRUSHED AND BROKEN STONE**Basalt**

Quarry	Men	Cubic yards	Value \$
A.F.H., Surrey Hills	5	20,535	61,605
A.N.M., Maydena	4	26,266	78,798
Bonney Bros, Mooreville	10	138,500	415,500
King Island Council	3	13,100	30,300
Savage River Mines	N/R*	51,462	154,386
Weily, Bridgewater	7	15,483	46,479
Others	3	11,913	35,739
Total	32	277,259	\$822,807

* See Iron Ore.

Dolerite

Quarry	Men	Cubic yards	Value \$
Clothier, St Leonards	4	5,098	16,295
Devonport Marine Board	1	27,000	81,000
Electrolytic Zinc Co., Risdon	2	5,199	15,597
Glenorchy Quarries	4	27,516	82,548
Hobart Quarries, New Town	36	299,160	897,480
H.E.C., Poatina	3	6,930	46,943
H.E.C., Tarraleah	4	12,294	51,108
Launceston Quarries, Mowbray	13	64,220	187,168
Public Works Department	91	88,780	506,046
Pioneer Quarries, Flagstaff Gully	9	45,966	137,898
Rouse, G., St Leonards	3	10,815	32,445
Others	6	12,702	38,377
Total	176	605,680	\$2,092,905

Pioneer Quarries Pty Ltd, Flagstaff Gully

The crushing and screening plant at this quarry has been augmented by the installation of a primary Hadfield twin toggle 36" x 24" crusher. This is fed by a plate feeder and before reaching the crusher the rock passes over a Ross roll grizzly which removes the smalls and rubbish in the raw feed. The —6" rock is then stockpiled. The secondary crusher is fed from under the stockpile by a syntron feeder onto a rubber conveyor belt. The discharge from the secondary crusher is then conveyed to a triple deck vibratory screen giving the following products, — $\frac{1}{8}$ ", + $\frac{1}{8}$ — $\frac{5}{8}$ ", + $\frac{5}{8}$ —1", and an oversize product which is conveyed to an impact crusher, the discharge joining the discharge from the secondary crusher. The faces are now being reduced to 30 feet in height, sloping back at 75°. The stone is loaded out by a Kockum Landsverk K.L. 250 1½ cu. yd shovel into trucks. The face is drilled with a mobile Ingersoll Rand 450 drifter powered by an Ingersoll Rand 600 gyroflo air compressor.

Hobart Quarries Pty Ltd, New Town

A new bench was developed in the main quarry to provide five productive benches. A new face was opened at the rear of the quarry freehold property to produce fragmented stone both for use directly as road sub-base and for crushing into surface coarse road material. A new Ingersoll Rand drilling rig was purchased. An additional Caterpillar 977K Traxcavator fitted with a rock bucket was added to the loading equipment. A ten-ton White truck was purchased for the purpose of dumping surplus crushed stone from the bins into the stockpile area. A second-hand crushing plant was purchased from Savage River Mines. Water sprays were extensively installed on and around the crushing plant to suppress dust. A Coxon Auger Mixer was purchased for making ANFO explosive.

Limestone			
Quarry	Men	Cubic yards	Value \$
Weily, Glenorchy	10	17,728	\$53,184

G. J. Weily and Sons Pty Ltd, Glenorchy

During the year access to the quarry benches was not possible due to the quarry layout. These benches were stoped as it was considered dangerous to work them. A new quarry was developed above the old benches and a suitable access road was made. Working conditions are now regarded as much safer.

Sandstone			
Quarry	Men	Cubic yards	Value \$
Queenstown Council	2	3,440	\$7,470

Other Stone			
Quarry	Men	Cubic yards	Value \$
Devon Metal Supplies, Devonport ..	5	24,082	72,246
Hay, Currie	1	5,855	18,130
Hobden, Rokeby	1	8,671	26,013
Holloway, Round Hill	N/R	3,548	10,644
Jones, Round Hill	2	3,460	10,380
King Island Scheelite	N/R*	8,960	26,880
Mt Lyell Co., Queenstown	3	69,551	208,653
Sorell Council	4	3,174	9,522
Transport Commission, Leigh ..	5	12,389	37,167
Others	6	10,310	30,930
Total	27	150,000	\$450,565

* See Scheelite

GRAVEL			
Pit	Men	Cubic yards	Value \$
Associated Forest Holdings	1	74,810	74,810
Bonney Bros, Mooreville ..	6	22,651	43,188
Bothwell Council	4	26,805	26,805
Circular Head Council	2	27,107	27,107
Deloraine Council	2	52,016	58,536
Devonport Council	2	40,255	40,255

Pit	Men	Cubic yards	Value \$
Fielding, Flowerdale	4	63,299	72,720
Flinder's Island Council	4	63,318	63,318
George Town Council	4	21,200	21,200
Hamilton Council	2	20,091	20,091
Huon Council	2	23,009	23,009
Kentish Council	2	24,970	24,970
Oatlands Council	2	29,915	29,915
Pioneer Sand & Gravel Co., Mersey Lea	4	96,092	144,138
Portland Council	5	50,955	50,955
Ringarooma Council	2	25,439	25,439
Westbury Council	2	34,822	34,822
Woodfield & French, Launceston	14	36,368	36,368
Wynyard Council	1	20,766	20,766
Government Departments	87	393,917	508,517
Others	63	300,312	390,863
Total	215	1,448,117	\$1,737,792

SAND

Pit	Men	Cubic yards	Value \$
Atkinson, Sandford	3	10,719	10,719
Bonney Bros, Mooreville	6	36,642	69,266
Fielding, Calder	2	8,130	9,764
Grubb, Sandford	3	6,027	6,027
Hayward Const., Breadalbane	1	18,329	18,329
Kenny, Kelso	2	12,577	18,865
Long, South Arm	4	55,809	70,668
Males, South Arm	1	8,789	13,183
Pioneer Sand & Gravel, Mersey Lea .....	....	19,194	19,194
Turmine, Perth	1	7,459	8,431
Others	6	28,244	43,132
Total	29	211,919	\$287,578

OTHER ROADMAKING MATERIALS

Pit	Men	Cubic yards	Value \$
Devonport Council	N/R	15,942	15,942
Devonport Marine Board	1	4,350	4,350
Fielding, Ulverstone	2	4,151	4,877
Hay, Currie	1	4,870	15,570
Holloway, Round Hill	N/R	7,690	9,230
H.E.C., Poatina	3	4,280	27,820
Jones, Round Hill	2	3,401	4,249
Kauri Timber Co., Devonport	2	3,800	5,700
King Island Scheelite	N/R*	4,733	4,733
S.B. Constracting, White Hills	1	15,487	16,763
Ulverstone Council	4	14,405	14,405
Woodfield & French, Launceston	7	50,470	50,470
Wynyard Sawmilling Co.	1	4,200	4,200
Zeehan Council	3	4,950	4,950
Others	1	5,768	7,428
Total	28	148,497	190,687

4.—Fuel Materials

Quantity produced:—	COAL	
	Tons	Value \$
Prior to 1965	9,224,337	23,477,126
1965	102,457	420,346
1966	82,664	353,238
1967	76,541	324,553
1968	90,930	411,642
Total	9,576,929	\$24,986,905

M. W. R. Tindal, Mining Engineer, reports that there has been an increase in production of 14,389 tons of coal, equivalent to 19 per cent. The number of employees increased from 58 to 61 of whom 33 were employed underground. The production per man year increased from 2,319 to 2,755 tons for underground employees and from 1,320 to 1,491 overall.

Increased use of coal by Australian Newsprint Mills at Boyer has influenced the year's production. As the result of a request from Australian Newsprint Mills that coal be supplied in bottom dump wagons for economic handling on arrival at Boyer, the Railways designed and built a new wagon of aluminium. These are made up in unit trains to supply a definite tonnage daily to meet the requirements of Australian Newsprint Mills.

Duncan Coal Mine, Fingal

Operations at this mine have been in the same seam as in previous years. Pillar extraction has continued in the right-hand panel, and pillars extracted back to a line of pillars left to protect the conveyor belt heading. First workings have been carried out in the left-hand panel with conditions similar to those at the end of the previous year.

Because of the indicated increase in demand by the Australian Newsprint Mills at Boyer the company purchased and has now installed a new CM 38H Lee Norse Continuous Miner.

Whilst the operators are being trained the continuous miner will be operating in virgin coal. It is the intention then to extract the whole of the available pillars to the right of the endless rope haulage road leaving sufficient pillars to protect the haulage road.

The whole of the output has been cleaned at the washery. The rail haulage of coal in the unit train of the new 46-ton aluminium wagons has necessitated the raising of the discharge points at the loading bins and the creation of a stockpile of washed coal which can be rapidly recovered by a conveyor belt under the stockpile. This stockpile is a necessity due to the Railways requiring the unit train, having a capacity of 322 tons, to be loaded in 45 minutes.

Production from this mine was 75,299 tons gross, an increase of 13,551 tons, with a complement of 51 employees giving an increase in overall production per man year from 1,314 to 1,475 tons.

As in the previous year production has been on a four day week with the fifth day on maintenance.

New Stanhope Coal Mine, Avoca

Production for the whole of the year has been from first workings off the No. 2 Adit. The workings have all been in disturbed ground, and towards the end of the year a down throw fault was met in the left-hand workings, having an approximate throw of 14 feet, which would cut across the No. 2 adit heading. It appears that the down faulted member may have been disclosed off a prospecting heading. Methods of working and equipment are unchanged and there are no alterations to the way the coal is cleaned.

Production was 13,952 tons gross being an increase of 722 tons with an overall production per man year of 1,993 tons, an increase of 339. The average number of employees was seven, a decrease of one.

Sandfly Coal Mine, Kaoota

Coal from this mine is semi-anthracitic and is used in hop kilns, for household purposes and for the burning of lime at the Australian Newsprint Mills at Boyer. The extraction of pillars continued for the whole of the year with no change in the method of working.

Production was 1,679 tons, an increase of 116 tons for the year with three employees, giving an overall production per man year of 560 tons, an increase of 39 tons.

5.—Foreign Ores

The total value of the metallurgical products of four large works treating foreign ores imported into Tasmania was approximately \$68,080,187.

ALUMINIUM

Comalco Aluminium (Bell Bay) Ltd, Bell Bay

Operations by this company showed an increase of 145 tons of aluminium over the previous year.

Other products were—aluminium hydrates, 6,060 tons; and alumina, 1,567 tons.

In all 51,914 tons of aluminium were extracted from 136,633 tons of bauxite from Weipa and 43,672 tons of imported alumina. Average employment dropped by 17 to 1,030.

The year opened with severe power restrictions in force, resulting in a maximum power cut of some 35 per cent of total requirements. From 1 July onwards, the power position eased until full unrestricted power became available on 1 October 1968.

The No. 3 half potline, comprising 88 cells, was idle from completion during September 1967 until July 1968. Production capacity was increased to 73,000 long tons per annum. No other major capital projects were undertaken in 1968.

FERRO-MANGANESE

Tasmanian Electro-Metallurgical Co. Pty Ltd, Bell Bay

During the year 96,692 tons of manganese ore from Groote Eylandt was smelted to produce 52,538 tons of manganese alloys for the steel industry.

The alloys were 37,668 tons of high carbon ferro-manganese and 14,870 tons of silicon-manganese reported under Silicon.

TITANIUM DIOXIDE

Australian Titan Products Pty Ltd, Heybridge

This plant imported 46,920 tons of Western Australian ilmenite from which was produced 22,864 tons of titanium dioxide pigment.

Capital Expenditure.—During the year the following major projects were completed at a cost of \$444,256:—

Coating Plant
Acid Storage Tanks
Effluent Modifications

The effluent modifications were carried out as part of a continual programme to minimise effluent discolouration. The average number of employees for the year was 466.

BENTONITE

Savage River Mines, Port Latta

This company imported 5,961 tons of bentonite from the United States of America, for use as a bonding agent in the manufacture of iron ore pellets.

ZINC, CADMIUM COBALT OXIDE AND SUPERPHOSPHATE

Electrolytic Zinc Company of Australasia Limited, Risdon

This company, described under Zinc, produced zinc from Broken Hill concentrates together with small quantities of cadmium and cobalt oxide as by-products. The sulphuric acid derived from roasting the concentrates was used in making superphosphate fertilisers from phosphate rock imported from Nauru, Ocean and Christmas Islands.

GEOLOGICAL SURVEY BRANCH

Report of Chief Geologist I. B. Jennings, B.Sc. (Hons), A.M.Aust.I.M.M.

The Geological Survey Branch continued its functions of carrying out a systematic geological survey of the State, studying various aspects of the economic mineral deposits, undertaking an expanded programme of investigation into the groundwater resources and providing technical assistance to the mining industry as well as supplying specialized services in such fields as engineering geology, mineralogy, petrology, palaeontology and geochemistry.

During the year, the work of the Branch continued to be hampered to some degree by the shortage of professional staff and at the year's end, positions for four geologists, a librarian and a publications officer remained unfilled. Accommodation for the Branch also remains unsatisfactory with a large proportion of the offices situated in outside accommodation. However, it is anticipated that this position will be rectified during the coming year and that in addition, much needed additional library and technical record storage space will also become available.

Good progress was made in all fields of study during the year and a number of mapping projects were completed or carried to the point where publication can proceed in the immediate future. Among the new projects commenced was a detailed study of the tin bearing granites of North-East Tasmania which in the long term will result in a much clearer understanding of the tin mineralisation in that area and indicate areas for future prospecting. The geochemical laboratory at Derwent Park was equipped and a start has been made with several geochemical investigations.

Geologist D. Groves completed his research studies at the University of Tasmania and has submitted a thesis embodying the results of his work for a Doctor of Philosophy degree. This important work concerns the tin-sulphide deposits in Western Tasmania and is a very important contribution in this field. Geologist D. Leaman was granted a scholarship at the University of Tasmania to pursue research into the distribution and mode of occurrence of the dolerite intrusions in the Hobart-Brighton area. It is anticipated that this work will greatly enlarge the existing knowledge of these complex intrusions and prove of considerable value in several fields of study, particularly in relation to the distribution of groundwater in this district.

Geologist D. Gee received his Doctor of Philosophy degree for his studies on the tectonics of the Rocky Cape Geanticline. During the year, Dr Gee made a short visit to Macquarie Island to study the geology of a portion of the island and at the same time, collected stream sediment samples for analysis.

REGIONAL GEOLOGY

Senior Geologist E. Williams reports—

Progress during the year in regional geological mapping of 1-mile sheets:—

Explanatory notes of the Pipers River 1-mile Sheet are in press. Notes of the Table Cape, Burnie, Noland Bay and Mackintosh 1-mile Sheets are being compiled.

Burnie 1-mile Sheet has been published.

Pieman Heads 1-mile Sheet is in press.

Quamby 1-mile Sheet was completed by G. P. Pike, A. P. Bravo and W. L. Matthews and the sheet is being prepared for publication.

Frankford 1-mile Sheet: Geologist A. B. Gulline continued mapping in this area.

Beaconsfield 1-mile Sheet: Geologists R. D. Gee and P. J. Legge continued mapping in this area.

Rossarden-Mathinna Region, North-East Tasmania: Geologists A. P. Bravo and P. J. Legge are preparing reports of this region.

Gordon River Project: At the request of the Hydro-Electric Commission a study of the geology of the Lower Gordon River was completed by R. D. Gee, W. R. Moore, M. J. Clarke and G. P. Pike and a report is in press.

PUBLICATIONS

WILLIAMS, E., in press.—The Repeated Development of Identical Joint Patterns, North-East Tasmania. Geological Magazine, Cambridge.

ECONOMIC GEOLOGY

Senior Geologist A. J. Noldart reports—

The following studies were made during the year:—

1. METALLIC DEPOSITS.

- (a) Investigations continued on detrital tin deposits in the North-East. A detailed plane table mapping project on the eastern section of the Endurance mine was completed.
- (b) Drilling for detrital tin deposits on the Great Northern Plains was continued.
- (c) Examinations were made and advice given on detrital tin deposits for Mr H. Moses in the Frome River-Blue Tier districts, and for Mr J. Smith in the Warrentinna district.
- (d) Tin prospects were examined at the Pyramid, Cambria, Great Republic and Arba mines for the leaseholders.
- (e) A site was selected and an exploratory diamond drill hole completed at the Anchor mine, Blue Tier.
- (f) Exploratory diamond drilling continued at Fooks Lode, Waratah, and drilling was commenced at St Pauls tin mine, Royal George, and on a secondary target at the Tasmania mine, Beaconsfield. Drilling was continued at Alberton.
- (g) Site investigations, core logging, sampling and geological supervision of a drilling programme at the Copper King mine, Cuprona, was undertaken on behalf of Plantation Management Pty Ltd.
- (h) An examination of the Orieco copper mine, Upper Scamander, was undertaken on behalf of Scamander Mineral Development N.L.
- (i) An examination of a wolfram/scheelite prospect at Mt Horror was carried out and recommendations made for future prospecting.

2. FUEL MINERALS

- (a) Continuation of the diamond drilling programme on coal resources in the Fingal Valley. An interim report has been compiled.
- (b) Mapping programmes were completed on seam and roof structures in the New Stanhope and Duncan coal mines.

3. NON-METALLIC MINERALS

- (a) A diamond drilling programme was completed on the limestone deposits at Saltwater Lagoon, Friendly Beaches, and a report and plans compiled.
- (b) Auger drilling programmes were carried out for: white clay, Electrona district; brick-making materials in the Hobart district; clay materials in the Richmond area; and for kaolin in the Bridport-Gladstone district.
- (c) Investigations continued on the clay resources of the Hobart district.
- (d) Investigations were made on a proposed quarry site for building stone in the Pontville district.
- (e) Examinations were made of gravel deposits for road construction in the Gladstone-Herrick area.
- (f) An examination was made of sand deposits on the property of Mr W. Tart, East Port Sorell.

4. GEOPHYSICS

- (a) Gamma ray and resistivity probes of D.D.H. No. 7, Fingal.
- (b) Extension of a magnetometer survey of iron deposits at Iron Cliffs, Penguin.
- (c) Gravimetric and magnetic surveys of some 60 line miles in the Great Northern Plains-Gladstone area.
- (d) Magnetometer examinations of a suspected meteorite crater in the Corinna district.

5. SURVEYING

- (a) Mine level surveys of the New Stanhope and Duncan collieries.
- (b) Great Northern Plains: Setting out and levelling of 62½ miles of geophysical traverses.

- (c) Lefroy: Setting out of base line for geochemical sampling grid.
- (d) Extension of the Iron Cliffs iron survey: Setting out and levelling.
- (e) Preparatory investigation of mining leases, Gipps Creek area.
- (f) Setting out and levelling of drilling sites at the following localities: Fingal; Anchor Mine, Blue Tier; Tasmania Mine, Beaconsfield; Saltwater Lagoon, Friendly Beaches; Briseis tin mine, Derby.
- (g) Setting out and levelling of seismic traverses, Scottsdale area.
- (h) Setting out and levelling of geophysical grids at the following localities: State Library, Hobart; College of Advanced Education, Mt Nelson; the Gorge Bridge, Launceston; Glenorchy Post Office; C.M.F. sites at Warrane, Dowsing Point and Youngtown.

6. GENERAL

- (a) A mapping project to determine the economic potential of the Coles Bay-Bicheno district was completed.
- (b) A geological study of the Cape Portland district was completed and a report compiled.
- (c) A study of granite-sediment-mineralisation relationships was commenced in the Scamander-Ansons Bay district.
- (d) Close liaison was maintained with active exploration companies throughout Tasmania and examinations made of any significant mineralogical or geological developments.

ENGINEERING GEOLOGY AND GROUNDWATER

Senior Geologist P. C. Stevenson reports:—

ENGINEERING GEOLOGY

Six dam sites have been mapped and reported on at Triabunna, Patersonia and on the River Clyde. Feasibility studies have recommenced at Whitewater Creek damsite, Kingston.

Seismic investigations of building sites for foundation design have been carried out at the State Library, Warrane, Mt Nelson, Dowsing Point and Glenorchy in Hobart, at Cataract Gorge and Young Town in Launceston, and at Penguin.

A seismic survey was carried out on a dam site at Triabunna.

Some advice has been given to Rivers and Water Supply Commission on the geology of farm dams in the Devonport and Ulverstone areas, and landslips have been examined and reported on at Burnie, Devonport and White Hills, Launceston.

GROUNDWATER

In the Longford Basin the drilling and pump testing of 31 bore holes has been supervised and these have been logged geologically and geophysically. Further seismic and gravity work has been completed in the Basin.

In the Scottsdale area, mapping and geophysical work has continued and drilling has just commenced.

Testing of coastal sand aquifers on the East Coast has commenced.

Water bore sites have been selected in the Midlands, South East, North East and in the Burnie area.

GEOPHYSICS

The Section has carried out seismic, gravity and magnetometer work for the Economic Section in the Gladstone area and has prepared a geophysical log of a diamond drill hole at Fingal. In addition, a deep bore has been logged at Bracknell.

GENERAL

The Department has acquired an Olivetti Programma 101 Computer. This machine has increased the speed and accuracy of seismic calculations and has accounted for the completion of so many of these surveys.

The Section has been responsible for the compilation of the Tasmanian portion of the Groundwater Map of Australia to be published in 1970.

MAPPING AND ENGINEERING DRAUGHTING SECTION

Senior Draughtsman P. B. Nankivell reports—

The following progress has been made on the Geological Atlas 1-mile series:—

Burnie Sheet No. 28: Printed in fourteen colours.

Pieman Heads Sheet No. 42: Fair drawn, proof checked, will be printed early in 1969.

Quamby Sheet No. 46: Base map completed, geology being compiled.

Beaconsfield Sheet No. 30: Base map drawn.

Frankford Sheet No. 38 and Strahan Sheet No. 57: Further base map material was supplied to the Regional Mapping Section.

Other Material Prepared for Publication

Two multi-colour maps 'Gravity Survey—Tertiary Basins—Northern Tasmania' showing Residual Bouguer Anomaly contours and Bouguer Anomaly contours have been drawn ready for publication.

43. Monocolour maps, sections and diagrams for Explanatory Reports K55-4-31 Pipers River.

39. Monocolour maps, sections and diagrams for Technical Reports No. 12 (1967).

5. Monocolour maps and sections for Geological Survey Record No. 8 'Geology Lower Gordon River—particularly Devonian sequence'.

3. Graphs for Director of Mines Annual Report (1967).

The balance of time was utilized in draughting geophysical, geological and engineering plans associated with normal field services.

MINERALOGY AND PETROLOGY

Mineralogist and Petrologist G. Everard reports—

Petrological descriptions were made of suites of rocks from:—

Stanhope Coal Mine

Noland Bay Quadrangle

D.D.H. No. 6, Fingal.

Single specimens and small groups of specimens from Hellyer River, Blackwells Road, Burnie, Ridges Barite Show, Friendly Beaches, Middle Arm, Epping and Pyramid Mine, Scamander, were thin sectioned and described.

Sections of D.D.H. FL No. 2, Waratah, were described in thin section and mineralogical investigations made of samples of concentrates from Chilvers Bore, Bore No. 1, Derby, Bore No. 1, Scottsdale, and of sludge samples from C. Sulzberger's D.D.H., Bracknell.

Beach sand samples from Cape Portland, King Island, Coles Bay, Moulting Lagoon and Friendly Beaches were mineralogically described.

Samples of concentrates and ores from Branch Creek, Aberfoyle Mine, Mt Cleveland tin mine, Utah drilling, and North East off-shore drilling were investigated for the Chief Chemist and Metallurgist.

New specimens to the number of 240 were added to the Departmental Collection.

Two Osmiridium Certificates were issued and two rock and mineral collections supplied for educational purposes, and approximately 45 specimens including rocks, minerals, beach sands, and lode and alluvial material examined and identified for the general public.

PALAEONTOLOGY SECTION

Palaeontologist M. J. Clarke reports—

Good progress was maintained in the long-term study of Permian brachiopod faunas initiated last year. The main effort has centred on the regional mapping of the Quamby Sheet between Poatina and Golden Valley. A detailed account of Tasmanian Strophalosiidae, mostly collected from this area, is in the final stages of preparation for publication. Preliminary studies of Permian faunas from the Beaconsfield and Friendly Beaches areas indicate that certain lithological horizons hitherto regarded as isochronous with the Risdon Sandstone of the Hobart area, are in fact, quite separate and significantly different in age. These faunas have an added interest by virtue of their extreme diversity and contain certain groups of fossils hitherto unknown in Tasmania and rare elsewhere in Australia.

The collection and study of Devonian shelly faunas from the lower reaches of the Gordon River was undertaken in collaboration with the Regional Section. Certain important differences between the Gordon River and Zeehan Devonian sections are now apparent. Through the courtesy of Broken Hill Pty Ltd in providing helicopter access, it was possible to study the important but little-known Pt Hibbs section. The results of this work are now ready for publication. Certain palaeontological and other advice was provided periodically for the Hydro-Electric Commission throughout the year.

During the period 27-31 May a Specialist Symposium on Permian Stratigraphy and Palaeontology was attended in Canberra. At the same time, the opportunity was taken to study the palaeontological collections housed at the Bureau of Mineral Resources and the Australian National University.

Nearly one thousand specimens were added to the Departmental collection during the year.

GEOCHEMICAL

Geochemist W. E. Baker, reports—

A geochemical laboratory is being equipped at Derwent Park to deal with trace element analysis, largely by means of atomic absorption spectrophotometry. At the present stage, the laboratory can cope with the determination of a variety of trace elements in water, soils and other samples submitted in pulverulent form.

A project on gold distribution has been commenced and research into methods of trace gold analysis undertaken. Systematic soil sampling of the Lefroy goldfield has been commenced.

The determination of nickel and cobalt content of pyrite, pyrrhotite and arsenopyrite is being undertaken to examine the potential of this information in characterising the various ages and types of mineralization in the State.

Petterd's 1910 Catalogue of the Minerals of Tasmania has been completely re-written, the validity of the listed species assessed and many new entries have been made.

PUBLICATIONS

The following publications were received and issued during the year:—

Bulletin 49.—'Geology and Geophysics of the Cygnet District'.

Bulletin 50.—'Geology and Mineral Resources of Tasmania'.

Technical Report No. 11—1966.

Technical Report No. 12—1967.

Geological Survey Report No. 10.—'Permian Stratigraphy and Sedimentation in the Barn Bluff Area, Central Tasmania'.

Geological Survey Record No. 7.—'Re-appraisal of the Lower Permian Type Section, Golden Valley, Tasmania'.

The following publications were prepared for printing and lodged with the Government Printer:—

Explanatory Reports.—Pipers River Quadrangle.

Technical Reports.—No. 12.

CHEMICAL AND METALLURGICAL BRANCH
Report of the Chief Chemist and Metallurgist (H. K. Wellington,
B.E., F.S.A.S.M., A.M.Aust.IM.M.)

Type of Test	Number	Type of Test	Number
I QUANTITATIVE—		QUANTATIVE—ELEMENTS—	
<i>(a) Elements—</i>		<i>continued—</i>	
Aluminium	247	Titanium	127
Antimony	12	Tungsten	215
Arsenic	27	Vanadium	16
Barium	5	Zinc	112
Bismuth	6	Zirconium	31
Boron	8		7,184
Cadmium	7		
Calcium	280	<i>(b) Miscellaneous—</i>	
Carbon (Carbon dioxide)	122	Ash (Coals)	36
Chlorine	78	Coal analyses	46
Chromium	146	Deposit gauge tests	18
Cobalt	156	Ignition loss	21
Copper	413	Insoluble	2
Fluorine	105	Moisture	98
Gold	51	Radicals and complexes	27
Iron	683	Suspended solids	7
Lead	114	Water Analyses	119
Lithium	32		374
Magnesium	271	II QUALITATIVE	98
Manganese	98	III CERAMIC	33
Molybdenum	5	IV METALLURGICAL—	
Nickel	195	Amalgum retorting	1
Phosphorus	117	Density	22
Platinum	3	Heavy minerals	30
Potassium	48	Magnetic separations	84
Selenium	37	pH	3
Silica (Silicon)	393	Sizings	202
Silver	47		352
Sodium	26	Total	8,041
Strontium	1		
Sulphur	456		
Tellurium	1		
Tin (including van tin)	2,493		

RESEARCH INVESTIGATIONS

Tin	5
Tin and Copper	1
Copper, Lead and Zinc	1
Gold	2
Iron	1
Sulphur (Pyrite)	1
Tungsten	1
Total	12

Tin

R.556—During the long vacation a chemistry cadet, M. Wadsley, worked on the hydrochlorination of cassiterite at the Division of Mineral Chemistry, CSIRO, Melbourne.

Mr P. Kidd, Cambria Mine, Weldborough

R.563—A sample of stanniferous granite forkings was examined to determine the amount of easily recoverable tin which was found to be approximately half of the total tin.

Cleveland Tin N.L., Luina

R.570—The float reject from the H.M.S. plant assays high in tin because the heavy medium, ferrosilicon, has become fouled with pyrrhotite. Tests were made aimed at finding a method for determining the ferrosilicon content of the medium. By determining the specific gravity of the medium solids and applying a formula, the percentage of ferrosilicon could be estimated.

R.575—In order to assist the final treatment section of the mill a sample of thickened rougher concentrate was subjected to hydraulic cyclone desliming tests following which samples of deslimed material were fed to a Geco hydrosizer and a hydroclassifier.

Ben Lomond Perpetual Republic Syndicate, Gipps Creek

R.580—Samples from the stamp battery and table operating on Great Republic ore were sized and assayed. Approximately three-quarters of the tin was being recovered in the plant.

Tin and Copper

Cleveland Tin N.L., Luina

R.565—The Research Officer, Mr P. L. James, was seconded for six months to Cleveland where he assisted the company overcome difficulties in the mill tin and copper circuits.

Copper, Lead and Zinc

Brinckman & Dicker, Mount Rex Mine

R.571—This project aimed to make a mixed copper-lead-zinc concentrate low in tin which is a penalizable impurity. Such a concentrate containing 0.1% Sn was produced.

Gold

Kennecott Explorations (Aust.) Pty Ltd, Wodonga, Victoria

R.560—A sample of alluvial river sand was submitted primarily for gold extraction. The sample contained insufficient gold, but could possibly contain sufficient tin for further investigation.

Mr R. Taylor, Mathinna—Sand

R.567—The sample, which contained very-finely-sized gold, was found to respond well to amalgamation.

Iron

R.561—The sizing analyses obtained by grinding Savage River Ore under dry and wet conditions were compared over a range of grinding times. It was found that wet grinding produced a more uniformly-sized product.

Sulphur (Pyrite)

Electrolytic Zinc Co. of A/asia Ltd, Rosebery

R.564—Samples of Branch Creek pyritic ore were floated under a range of conditions aimed at obtaining a high-grade sulphur concentrate. Sulphur recoveries were poor—60% recovery in a 44% S concentrate being the best that can be expected.

Tungsten

Mr G. Gerke, Mount Horror Mine

R.527—Tests showed that a good recovery of wolfram could be expected from this ore. Scheelite was also present.

Ceramics

Humes Ltd (Vitrified Clay Division), Launceston

R.536—Tests using Prospect clay and manganese dioxide to produce tan-faced bricks showed that the colours produced in a commercial kiln varied too widely or this to be economic.

Wynyard Brick Co., Wynyard

R.562—Tests showed King's clay, if used alone or with up to 50% of Marshall's clay, would make good bricks if fired at 800°C.

Comalco (Bell Bay) Ltd, Bell Bay

R.574—Tests showed that the addition of Comalco red mud tailings to local clays enhanced extrusion, but excessive efflorescence of salts in the tailings made them unsuitable in brick manufacture. Little colour change occurred when the tailings were added to the clays.

MINES AND EXPLOSIVES BRANCH

Report of the Deputy State Mining Engineer and Deputy Chief Inspector of Mines and Explosives, Mr P. M. Johnstone, B.E., M.Aust.I.M.M.

The Mines and Works Regulation Act 1915

EMPLOYMENT

The average number of persons employed in the Mining, Metallurgical and Quarrying industry was 10,040, a decrease of 498. There was a decrease of 90 men engaged in governmental quarrying, but the principal cause of the overall reduction in numbers was the completion of major construction projects. A feature was the increase of 16 per cent in underground employees.

ACCIDENTS

The number of registered accidents was 126 in which 120 men were injured and six killed. In calculation of the rates per thousand, 164 employees in the total of 10,040 were disregarded because their employers do not submit accident reports

LOCATION OF ACCIDENTS

Section of the Industry	UNDERGROUND Number of Persons				SURFACE Number of Persons				TOTAL Number of Persons			
	Employed	Killed	Injured	Per Cent Injured	Employed	Killed	Injured	Per Cent Injured	Employed	Killed	Injured	Per Cent Injured
Coal	33	...	2	6.1	28	...	...	...	61	...	2	3.3
Copper	130	...	2	1.5	1,428	1	2	0.2	1,558	1	4	0.3
Iron .....	...	...	...	...	742	...	4	...	742	...	4	...
Silver-lead-zinc	416	...	21	5.0	380	...	4	1.1	796	...	25	3.1
Tin and Tungsten	397	...	10	3.4	808	1	12	1.6	1,105	1	22	2.1
Quarries, Works, Prospecting, etc. ....	...	...	...	...	5,614	4	63	1.2	5,614	4	63	1.2
Total	876	...	35	4.0	9,000	6	85	1.0	9,876	6	120	1.3
Not reported .....	...	...	...	...	164	...	...	...	164	...	...	...
					9,164				10,040			

DESCRIPTION OF FATAL AND SERIOUS ACCIDENTS

Fatal—

- P. Wilson, King Island Scheelite: Using washing machine with faulty wiring; electrocuted.
 J. Nixon, Mount Lyell Co.: Contacted H.T. equipment while installing wiring in a substation; electrocuted.
 S. J. Miller, Electrolytic Zinc Co., Risdon: Fell through uncompleted walkway on a conveyor gallery under construction.
 P. J. Brearley, Comalco: Guiding a portable light standard on travelling crane which contacted overhead cable; electrocuted.
 R. Galigati, Goliath Co.: Fell when beam upon which he was working gave way.
 N. R. Campbell, Goliath Co.: Caught by conveyor belt against a roller and chute.

Serious—

- R. J. Evans, Comalco: Foot run over by fork-lift truck; compound fracture.
 B. G. Barrett, Pioneer Quarries: Jumped off lorry; broken leg.
 D. Peart, Comalco: Contacted H.T. cable with ladder; electrical burns to feet, left hand and arm.
 K. J. Walker, Electrolytic Zinc Co., Risdon: Feet slipped off plank into hot calcine; burns to feet and hand.
 B. B. Woolley, Electrolytic Zinc Co., Risdon: Leant against removable panel in railing and fell; broken collar bone.
 D. Bartulin, Mount Lyell Co.: Jammed between face of drive and jumbo by train; ruptured lung, abrasions head and chest.
 C. R. Parry, Titan Products: Working from a ladder which slipped; broken leg.
 K. Harrison, Savage River Mines, Port Latta: Standing on conveyor belt without locking out control, belt started up; broken arm.
 R. J. Watkins, Electrolytic Zinc Co., Risdon: A ladle of molten metal was bumped causing spillage into boot; severe burns.
 L. Blogojeric, Cleveland Tin: Struck by air manifold blown off pipe; severe lacerations to lower leg.
 S. Bester, Cleveland Tin: Struck by log being pulled by bulldozer; broken leg.
 F. Barringer, Rouse's Quarry: Struck in eye by scat whilst spalling; lost eye.
 H. Flugel, Renison: Slipped on rill; prolapsed disc.
 T. W. Duff, Electrolytic Zinc Co., Rosebery: Working with pinch bar and hammer; struck in eye by piece of steel.
 H. T. Weaver, Electrolytic Zinc Co., Rosebery: Fingers caught in air hammer; lost parts of two fingers.
 J. C. Roles, Titan Products: While handling a filter drum, crushed between drum shaft and buildings; broken ribs and shoulder blade.
 P. Martin, Comalco: Fell with bosun's chair when rope broke; head injuries.

TABLE SHOWING RATES PER THOUSAND KILLED OR INJURED

Period	No. of Persons Employed	No. of Accidents	Number of Persons			Number per Thousand		
			Killed	Injured	Total	Killed	Injured	Total
1892-1930*								
1931-1940†								
1941-1950‡								
1951-1960§								
1961	8,493	108	1	107	108	0.119	12.720	12.839
1962	8,708	68	2	66	68	0.234	7.726	7.961
1963	8,836	86	4	83	87	0.461	9.575	10.037
1964	8,815	68	5	63	68	0.581	7.316	7.897
1965	9,038	93	4	89	93	0.465	10.342	10.808
1966	10,122	82	8	74	82	0.825	7.636	8.461
1967	10,538	146	6	141	147	0.583	13.711	14.294
1968	10,040	126	6	120	126	0.608	12.151	12.759

* See Report of Director of Mines—1954.

‡ See Report of Director of Mines—1960.

† See Report of Director of Mines—1956.

§ See Report of Director of Mines—1964.

INCIDENCE OF ACCIDENTS

Place and Cause of Accident	Number of Persons Killed	Number of Persons Injured (Incapacitated for over 14 days)
<i>Section A.—Metalliferous Mines—</i>		
1. Below Ground—		
(a) Explosions .....	.....	.....
(b) Falls of Ground .....	.....	2
(c) Falling down Shafts, etc. ....	.....	2
(d) Other Causes .....	.....	29
2. Above Ground—		
(a) Machinery in Motion .....	.....	6
(b) Other Causes	2	19
3. Accidents in Batteries, Ore-dressing, Smelting and other Metallurgical Works, etc.	4	60
Total Metalliferous Mines (A)	<u>6</u>	<u>118</u>
<i>Section B.—Coal Mines—</i>		
4. Below Ground—		
(a) Mine Explosions (fire damp, etc.) .....	.....	.....
(b) Explosives (dynamite, etc.) .....	.....	.....
(c) Falls of Earth .....	.....	1
(d) Other Causes .....	.....	1
5. Above Ground—		
(a) Machinery in Motion .....	.....	.....
(b) Other Causes .....	.....	.....
Total Coal Mines (B)	<u>.....</u>	<u>2</u>
Total All Mines (A) and (B)	<u>6</u>	<u>120</u>

INSPECTION

Mr J. L. Black, Mining Engineer and Inspector of Mines, Burnie, resigned in April, and the position remained vacant. Mr W. C. Hodgson was appointed Mechanical Engineer in October, based in Hobart, to undertake inspection of machinery to be required under the Mines Inspection Act 1968, when proclaimed.

DANGEROUS GOODS

The Explosives and Inflammable Liquids Acts

EXPLOSIVES

The following quantities of explosives were imported during the year through the ports shown:—

	Burnie	Hobart	Launceston	Naracoopa	Stanley	Strahan	Total
Nitro Compounds (lb) .....	.....	.....	823,650	23,000	791,500	1,194,200	2,832,350
Detonators .....	.....	.....	1,145,400	2,400	831,880	186,500	2,166,180
Explosives Shipments (No.) .....	.....	.....	8	1	6	8	23
Ammonium Nitrate (imported for use as an explosive) (lb)	82,560	323,600	892,000	.....	898,000	.....	2,196,160

NOTE.—Exported from Launceston—77,650 lb. nitro-compound in one shipment.

The number of licences and permits issued were: Magazine Licences, 118; Other Licences, 493; Shot Firer's Permits, 64; Total, 675.

PROSECUTIONS

Prosecutions were successful for breaches of the Explosives Act in the following cases:—

Two for firing charges of explosives when not holding a subsisting permit, and two in relation to useage.

ACCIDENTS AND OUTRAGES

Two men broke into premises at Maydena and stole gelignite, detonators and a quantity of safety fuse. These men were apprehended and pleaded guilty to charges of—

1. Damaging an unoccupied house.
2. Firing charges in bread boxes.
3. Damaging road signs with explosives.
4. Exploding gelignite in woodheaps.

EXPLOSIVES AUTHORIZED DURING THE YEAR

1. Aquaflex.
2. Geoflex.
3. Norma shotgun powder No. 2010.
4. Norma shotgun powder No. 2020.
5. Norma handgun powder No. 1010.
6. Norma handgun powder No. 1020.
7. Molanal—a new definition approved.
8. Anzite—a new definition approved.
9. Aquamex—a new definition approved.

NOTE.—The authorisation of 'Carlit' was withdrawn.

FIREWORKS BANNED

The following types of fireworks were banned during the year: Pulling crackers, Pearls rockets, Glitterons lights rockets, and Rising Moons with spinners.

INSPECTION

Nitro-compounds imported were inspected and found to be in good order. Imports of fireworks were inspected and tested and, with four exceptions, were approved for sale within the State. Magazines and vehicles used for conveying explosives have been regularly inspected, and departmental officers have supervised blasting operations carried out by municipal councils and construction firms.

INFLAMMABLE LIQUIDS

The following quantities in tons of inflammable liquids were imported in bulk during the year through the ports shown:—

	Bell Bay	Burnie	Devonport	Hobart	Total
Aviation Gasoline .....	.....	.....	.....	1,871	1,871
Kerosene—					
Aviation	818	.....	.....	10,191	11,009
Lighting .....	.....	.....	992	1,220	2,212
Power .....	.....	2,800	648	600	4,048
Motor Spirit—					
Premium	41,282	17,870	30,124	69,922	159,198
Regular	14,337	5,890	14,119	29,768	64,114
L.P. Gas	198	.....	.....	.....	198
Total	<u>56,635</u>	<u>26,560</u>	<u>45,883</u>	<u>113,572</u>	<u>242,650</u>
Tankships (No.)	<u>15</u>	<u>8</u>	<u>11</u>	<u>25</u>	<u>59</u>

Licences to Keep, 2,081; Plans Approved, 325; Exemptions Granted, 34; Permits to Import, 26.

ACCIDENTS

A 44-gallon drum of bitumenised paint exploded when a spark from an electric welder ignited the paint. Fortunately, the operator was not injured.

A semi-trailer unit conveying 3,000 gallons of inflammable liquid overturned on the Plenty Road. It appeared that the road gave way under the near side trailer wheels, dragging the unit over an embankment. Leaking product was successfully dispersed or recovered. The driver was killed.

DRILLING

Details of the drilling carried out during the year are as follows:—

<i>Diamond—</i>			
Number of Holes	Total Footage		Object
12	707		Bridge Foundations—Launceston
3	1,135		Coal Exploration—Fingal
1	95		Tin Exploration—Royal George
4	81		Building Stone—Pontville
1	804		Gold Exploration—Alberton
4	283		Road Cutting—Tunnel Hill
2	1,036		Limestone—Coles Bay
1	248		Tin Exploration—Waratah
1	353		Gold Exploration—Beaconsfield
2	851		Tin Exploration—Blue Tier
5	59		Foundation—Hobart Hospital
5	339		Foundation—State Library
5	531		Limestone—Flowery Gully
<hr/> 46	<hr/> 6,522		
<i>Churn—</i>			
6	918		Tin Exploration—Endurance
1	436		Tin Exploration—Briseis
17	1,141		Tin Exploration—Great Northern Plain
1	87		Water Investigation—Nubeena
3	118		Bridge Foundation—Launceston
14	1,656		Geological Investigation (Water), Cressy
3	186		Water Investigation—Conara
18	568		Foundation Investigation—Devonport
1	105		Geological Investigation—Scottsdale
17	633		Water Investigation—N.W.
<hr/> 81	<hr/> 5,848		
<i>Rotary—</i>			
20	8,360		Water Investigation—Longford
4	351		Water Supply—Port Latta
<hr/> 24	<hr/> 8,711		
<i>Auger—</i>			
18	553		Water Investigation—Longford
133	5,483		Water Investigation—Scottsdale
326	7,286		Clay Investigation—N.E. and Others
40	683		Clay (Private)—Margate
29	346		Tin (Private)—Gladstone
7	241		Clay (Private)—Ulverstone
<hr/> 573	<hr/> 14,592		

DIAMOND DRILLING

Four plants operated continuously throughout the year.

At Fingal the investigation of the coal reserves was continued, and Hole No. 6 was stopped at 1502 feet after penetrating the Permian series at 1480 feet. Hole No. 7 was started in sandstone but had to be abandoned at 171 feet owing to heavy ground apparently caused by a fault. A new hole started close by has reached 907 feet.

Drilling continued intermittently at Alberton and Hole No. 3 is unfinished at 804 feet with no interesting intersections to date.

At Beaconsfield a hole was started to try to intersect a second lode believed to exist at the Tasmania mine but drilling again has been interrupted and the present depth is only 353 feet.

Two holes were drilled to test the grade of limestone in the Coles Bay area and drilling was also done at Blue Tier and Royal George to test for tin. The Waratah hole was completed to a depth of 817 feet and indicated that further holes are warranted.

The other plants were occupied with foundation work and limestone testing for a commercial firm.

CHURN DRILLING

One plant continued on the investigation of alluvial tin areas, including the completion of a hole to 436 feet at Derby. The hole had been drilled to the bottom of the basalt by a contract driller with a large rotary plant. This plant is at present testing the leases of a mining company.

The other two plants were engaged in foundation testing for the P.W.D., water boring for farmers and water investigation work for the Geological Section.

ROTARY DRILLING

This drill continued to work on water investigation work for the Geological Branch and proved to be most economical to operate. It was also used to sink four water bores for a mining company that suddenly found itself short of water, and the results were most satisfactory.

AUGER DRILLING

This drill was used mainly on water and clay investigations for the Geological Branch but some alluvial tin testing was also done. Some of this was merely to prove the absence of tin in areas of Crown land before alienation and the plant proved quite satisfactory where the ground was above the water table and no heavy wash existed. Work was also done for a tin miner who washed his own samples, and he appeared quite satisfied with the results.

SOUTHERN DISTRICT

Mr J. B. Braithwaite, B.C.E., B.M.E., M.Aust.I.M.M., A.M.I.E.Aust.,

Mr H. Murchie, B.Sc., D.R.T.C., M.Aust.I.M.M., Hobart—

EMPLOYMENT

The average number of persons employed was 4,988, an increase of 1,447 on last year. The Mount Lyell Mining and Railway Co. Limited, Queenstown, was added to the Southern District during the year and accounts for an addition of 1,558 to the above figure.

ACCIDENTS

Reportable accidents for the year were: One fatal, eleven serious and forty-six minor, a total of fifty-eight registered accidents.

Over 80% of the serious accidents and the single fatal accident occurred at the Electrolytic Zinc Company, Risdon. The opinion expressed in my last report has not altered—

(a) These accidents are avoidable;

(b) Supervisors are not paying sufficient attention to safe working practice.

I cannot record any improvement in the past year. The Electrolytic Zinc Company's record compares unfavourably with that of the underground mines in the district, where conditions are generally most hazardous and workers less experienced.

PROSECUTIONS

Two employees of a contracting company were successfully prosecuted in July for breaches of the Explosives Act relating to usage.

The manager and five employees of a quarry were successfully prosecuted in November for breaches of the Mines and Works Regulation Act and General Rules relating to the use of eye protective equipment.

FIRST AUSTRALIAN PNEUMOCONIOSIS CONFERENCE

The above conference was attended in Sydney during February. Valuable information on up-to-date dust sampling equipment and methods was obtained. Following the interest that was stimulated by the conference a survey was made of the incidence of pneumoconiosis in the Tasmanian mining industry.

WINDING PRACTICE

Two winding accidents in the Aberfoyle shaft in May and June resulted in an investigation being made into the winding practice at the Aberfoyle Mine. Several unsafe procedures were discovered which resulted in a general check-up on winding practice throughout the State. This has provided useful information and conditions generally have been improved.

CAVE RESCUE—CLAREMONT

With Mr Braithwaite, Mr Jobson and Mr Goodrick, I assisted the State Disaster Organization with the rescue of T. Walter from a cave in Claremont. A rescue party of ten volunteers, led by Mr Titcombe, from the Aberfoyle and Storeys Creek Mines represented the mining industry in the operations. At the request of the Police the cave entrance was blasted following the rescue.

BLASTING IN BUILT-UP AREAS

Numerous investigations were made into blasting complaints during the year. Most of the complaints were unfounded, but it is a cause for concern that many contractors are making no effort to relate charge loading with distances from buildings. A pamphlet headed 'Advice on Blasting Procedures in Towns' was issued by the Department during the year to assist contractors in controlling their blasting operations.

NORTH-EASTERN DISTRICT

Mr L. F. Egan, A.M.Aust.I.M.M., Launceston—

ACCIDENTS

Of the 12 accidents registered for the year, three were fatal. Of the fatal accidents, two occurred on a cement manufacturing works and one on a major metallurgical plant. The last-named resulted from accidental contact between the top of a portable light and high tension wires causing the victim to be electrocuted.

The first of the other fatalities occurred when a welder fell 35 feet. A concrete cantilever beam supporting a plank on which he was standing failed due to the inadvertent cutting of the top layers of reinforcing steel.

The other fatality resulted from the victim falling against a moving belt and being dragged under a holding-down roller and squeezed up against a feed chute.

Of the non-fatal accidents the most serious caused the loss of an eye when a scat flew and hit a man during spalling work. He was not wearing the protective lenses supplied.

An unusual accident occurred as the result of an explosion of an accumulation of CO gas in the downcomer pipe of a gas scrubbing system. The pipe was open and the system was thought to be gas-free at the time. The victim fell some 15 feet and sustained head injuries as well as superficial burns to the face.

The remaining accidents caused a variety of injuries, including concussion and bruising, fractured legs, fractured wrist, amputated finger and electrical burns to left hand and left arm. Thorough investigations of these accidents were made and the institution of remedial measures was required wherever considered necessary.

EXPLORATION

L. Price, Pyramid, Upper Scamander—S.P.L. 403—

Employment on this area varied between one and three and work consisted of scrub cutting, building an access road, prospecting and sampling. The licence was surrendered.

Storeys Creek Tin N.L., Gladstone—E.L. 4/63—

This area taken up in the search for kaolin was left idle during the year.

New Consolidated Gold Fields of A'asia Ltd—S.P.L. 33, 2 square miles—

Some confirmatory sampling was carried on during the second quarter of the year, two men being employed therein, but the licence was surrendered.

Electrolytic Zinc Co. of A'asia Ltd—E.L. 12/67—

Branch Creek area, 20 square miles. This company examined pyrite deposits in the vicinity of Branch Creek and some metallurgical research was carried out by the Department. The licence was abandoned in the second half of the year.

Ocean Mining A.G.—E.L. 6/65—

Continued their geophysical and sampling investigation of the 900 square mile off-shore area, employment varying between eight and three men.

Utah Development Co.—E.L. 2/67 and 2/65—

(North East Tasmania and 1,575 square miles of southern part of Flinders Island) employed four men and five men respectively on mapping and drilling appraisals in the first half of the year. Both licences were abandoned subsequently.

Planet Mining Co. Pty Ltd—E.L. 13/67, 363 square miles—

Employed one man part time in evaluation of data previously assembled, and subsequently surrendered.

King Island Scheelite (1947) Ltd—E.L. 7/67—

Continued their exploration of the 31 square mile area in the Beaconsfield district. Employment varied between four and six men.

Storeys Creek Tin N.L.—S.P.L. 34—

Twelve square miles of Mussel Roe River flats, vicinity of Gladstone. Two lines of holes were sunk across the valley, totalling 17. Depth ranges from 19 to 53 feet with decomposed granite bottom.

T. K. Shadforth—E.L. 2/68—

Comprising 2,080 square miles of Northern half of the Furneaux Group. Some drilling was carried on during the last quarter of the year.

J. C. Rudge—S.P.L. 45—

Fifteen square miles embracing the Franklin River, east of Sassafras; has prospected the area.

O. E. Harvey—E.L. 10/68—

Twenty square miles embracing area held formerly under licence E.L. 12/67 by the Electrolytic Zinc Co. of A'asia. Work consisted of sampling and metallurgical research on the pyrite deposit with a view to possible use in the manufacture of sulphuric acid. One man was employed in the field.

O. E. Harvey—S.P.L. 36—

Comprising 1,600 acres in the river bed at Port Sorell.

R. W. Leftwich—E.L. 6/68, 650 square miles—

Conducted highly sophisticated geophysical examinations of this terrain employing up to seven men.

Nudec Petroleum Exploration Pty Ltd—E.L. 15/67—

Continued to explore for petroleum in the Cressy-Bracknell area. A depth of 2,250 feet was drilled with the E5000 Mindril rig reducing from 7 inches to 2½ inches. The hole passed through a variety of mudstone, marine sands, clays and coal but bottomed on dolerite at 2,220 feet.

EASTERN DISTRICT

Mr W. R. Tindal, A.W.A.S.M., M.Aust.I.M.M., Hobart—

EMPLOYMENT

In the coal industry 61 men were employed, an increase of 4 men, being made up of 33 employees underground and 28 on the surface. The quarrying industry employed 56 men and three men were employed in tin mining.

ACCIDENTS

Three minor accidents occurred, two underground in coal mines and one in the Royal George Mine during shaft sinking.

ELECTRICAL INSPECTION

The state of electrical installations and equipment on mines and works has been constantly under review. In cases where the conditions are unsatisfactory orders have been issued for improvements to comply with the Mines and Works Regulations Act 1915. There has been a steady improvement, particularly in the high standard of new installations.

GROUND VIBRATIONS DUE TO BLASTING

An S.E. Model 2005/6 UV Recorder and ancillary gear was obtained together with four Phillips electric dynamic pick-ups. This instrument is used to measure the intensity and frequencies of vibrations in the ground generated from the detonation of explosives.

NORTH-WESTERN DISTRICT

Mr L. W. Morris, A.W.A.S.M., M.Aust.I.M.M.,
Mr E. C. Leyland, A.W.A.S.M., A.M.Aust.I.M.M., Burnie—

ACCIDENTS AND OUTRAGES

On several occasions the Police in the area have called for assistance to remove and destroy various quantities of explosive which they have located or received. No accidents occurred.

MANUFACTURE OF EXPLOSIVES

Imperial Chemical Industries of Australia and New Zealand Limited produced in excess of 50 tons per month of A.N. mixtures and slurry explosives at the Savage River Plant. These products were sold to Savage River Mines and the Mount Lyell Mining and Railway Company Limited. The plant and magazine were operated at the high standard of cleanliness and safe working practice instituted from the commencement of operations.

INSPECTIONS

All inflammable liquid installations were regularly inspected during the year. Three breaks, separate as to time and place, occurred in a main pump-line from wharf to depot and on each occasion the repairs were inspected. Departmental action resulted in the pipeline being cement-lined and no further delays in discharge have occurred.

EXPLORATION AND PROSPECTING

There were twenty-nine exploration licences current and four pending at the end of the year and twelve special prospecting licences also current.

Naracoopa Rutile Limited, King Island—E.L. 14/66, 10/65, 13/66 and S.P.L. 2 and 9—

The year was curtailed as available man power was absorbed in bringing the concentrating plant into operation.

Electrolytic Zinc Co. of A'asia Limited—E.L. 1/62, 2/62, 8/68 and S.P.L. 3 and 22—

E.L. 1/62 is the area between and around the mines at Rosebery and Williamsford.

E.L. 2/62, Melba Flat, near Zeehan. Diamond drilling for copper and nickel was carried out early in the year.

E.L. 8/68 covers the beach sand area west of Strahan. Preliminary investigation work has been carried out.

S.P.L. 3. This area surrounds the Tullah mines and has been the subject of some investigation.

S.P.L. 22. Trial Harbour, Zeehan area. Prospecting and diamond drilling work was carried out in the early part of the year.

Pickands Mather and Co. International—E.L. 12/65 and 6/67—

E.L. 12/65 is in area surrounding Queenstown and Gormanston. Geological work and diamond drilling has been done during the year.

E.L. 6/67. The area is near Rosebery but little work has been done on it for the year.

Mt Lyell Mining and Railway Company Limited—E.L. 8/65 and 9/66, S.P.L. 20.

E.L. 8/65 surrounds the old tin and tungsten mines at Moina. The Company has done considerable prospecting and survey work on the area.

E.L. 9/66. The Company did a considerable amount of prospecting work on this area.

S.P.L. 20. Intermittent work continued on this area.

King Island Scheelite (1947) Limited—E.L. 15/66.

Active exploration and diamond drilling, using up to four diamond drills, and the Gemco drill, has been continued throughout the year. A considerable tonnage of high grade scheelite ore is indicated in the Bald Hill area.

Quest Exploration Pty Ltd—E.L. 5/68—

Some sampling and other minor work was done during the year.

A.C.I. Operations Pty Ltd—E.L. 16/68—

Granted late in the year and no work done in 1968.

Industrial and Mining Investigations Pty Ltd—E.L. 4/61—

Diamond drilling on the iron ore deposits continued throughout the year.

Comstaff Pty Ltd—E.L. 1/68 and 5/63—

Active exploration continued throughout the year, with over 30 men being employed during the drier periods.

Aberfoyle Tin N.L.—E.L. 2/63—

Covers the Mount Lindsay area. Active exploration, diamond and other drilling, and geochemical prospecting was carried out during the drier periods. Access was principally by helicopter.

J. H. Rattigan—E.L. 7/68—

Little surface work but considerable aerial surveying by various methods was done during the year.

E. H. McDonald—E.L. 14/68—

Diamond drilling for iron ore commenced during the year.

W. S. Singline—E.L. 17/68—

W. S. Singline has done some churn drilling on an iron ore deposit which was not completed at the end of last year.

Cleveland Tin N.L.—E.L. 1/63—

Covers the old Magnet mine near Waratah and the surrounding area. Three diamond drill holes were completed at sites decided by geology and geochemical anomaly around the Magnet mine.

Renison Limited—S.P.L. 27—

Renison Limited staff have been active on this area throughout the year.

McIntyre Mines (Aust.) Pty Ltd—S.P.L. 46—

Considerable survey and geological work has been done on this area.

Heazlewood Nickel Prospecting Syndicate N.L.—S.P.L. 37—

Has let an option over the area to Amax Mining (Aust.) Incorporated who have had between four and six men permanently employed on this area during the year.

Mr M. T. Ellis—S.P.L. 47—

Mr Ellis and associates have done considerable prospecting by line cutting, trench cutting, etc.

K. Fielding and B. K. Fielding—S.P.L. 40 and 41—

These areas are relinquished as from 31 December 1968.

Comstaff Pty Ltd—7AP/AM

This area covers the old Mount Bischoff mine at Waratah and surrounding area. Work was concentrated here during bad weather and staff were used in outlying E.L.'s during the better weather. Recently, additional staff have been appointed and considerable work is to be done on this area in an attempt to reach a conclusion.

REPORT OF THE MT CAMERON WATER RACE BOARD FOR THE YEAR ENDED 31 DECEMBER 1968

The Honourable the Minister for Mines.

SIR,

We have the honour to submit the report of the Mt Cameron Water Race Board for the year ended 31 December 1968.

Production of tin concentrates was 18.9 tons as compared with 30.845 tons for 1967 and water supplied consisted of 1,622 sluiceheads all of which was on the Fixed or Cash Scale of charges.

The average rainfall was slightly higher than in 1967 but there was a general shortage of water supplies which is reflected in the number of sluiceheads delivered, in tin concentrates produced and in revenue received. Total receipts from water charges to producers was \$5,196 as compared with \$5,957 for last year but receipts from other sources rose from \$120 in 1967 to \$315 in 1968. Expenditure amounted to \$6,849 representing a reduction of \$718 on the previous year. The overall operating loss was \$1,337 which was reimbursed from Consolidated Revenue.

REVENUE

The race system and dams have been maintained in good order although the quantity of water flowing through the races was very low until storages were replenished by good rainfall in August. The proposed replacement of the Chum Creek Syphon was not proceeded with following further investigations which indicated that it should continue to provide satisfactory service for a considerable time.

The Board has investigated a proposal to construct a dam at Chum Creek which would provide an assured supply of 30 sluiceheads of water for five days per week for 50 weeks a year. Tenders were invited for the construction of the earthworks and the successful tenderer was the Avoca Transport Company for \$4,900. The cost of pipes and valves amounted to \$2,500. Delay in delivery of the pipes prevented dam construction from proceeding before the end of the year. When the dam is functioning it should ensure a continuity of tin mining by producers and result in profitable operations by the Race.

Appreciation is recorded of the services of the Manager and the Channel Keepers.

We have the honour to be, Sir,

Your obedient servants,

J. G. SYMONS, Chairman

H. K. TURNER, Member

V. WOOD, Member.

MOUNT CAMERON WATER RACE SUSPENSE ACCOUNT STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 DECEMBER 1968

<i>Receipts</i>	\$	<i>Payments</i>	\$
Sale of water—		Salaries and wages excluding pay-roll tax	6,512.35
Fixed or Cash Sale	5,196.35	Car allowance—Manager	100.00
Royalty Scale	0.00	Insurance	152.18
Domestic use	195.00	Maintenance	64.15
Hire of pipes	120.00	Miscellaneous	20.25
Balance (loss)	1,337.48		
	<u>\$6,848.83</u>		<u>\$6,848.83</u>

MOUNT CAMERON WATER RACE STATISTICS FOR THE YEAR ENDED 31 DECEMBER 1968

<i>Registered Rainfall</i>		<i>Production</i>			
Great Mussel Roe	31 inches 89 points	Tin Oxide produced—			
Little Mussel Roe	31 inches 22 points	Tons	cwt	qr	lb
<i>Water Services</i>		Royalty Scale			
Average number of claims supplied per week	2	Fixed Scale	18	9	2
Average number of claims supplied in any one week	2		18	9	2
Sluiceheads supplied—			18	9	2
Fixed Scale	1,622	Employment average per week—			
Royalty Scale		Royalty Scale			
	<u>1,622</u>	Fixed Scale			8
					<u>8</u>

REPORT OF THE RINGAROOMA AND CASCADE WATER BOARD ...
FOR THE YEAR ENDED 31 DECEMBER 1968

The Honourable the Minister for Mines.

SIR,

We have the honour to submit the report of the Ringarooma and Cascade Water Board for the year ended 31 December 1968.

Since the closure of the Race system in 1962 the Board has continued to exist under the provisions of the Ringarooma and Cascade Water Agreement Act 1947. Its only function has been to maintain the Cascade and Paris dams so that they will be preserved for use should future developments in the district require water storage facilities.

Expenditure consisted of caretaking of the dams and interest on the capital cost of the System. There was no revenue. In accordance with the provisions of the Ringarooma and Cascade Water Agreement Act 1947, the deficit of \$1,059.62 was met from Consolidated Revenue.

We have the honour to be, Sir,

Your obedient servants,

J. G. SYMONS, Chairman

H. K. TURNER, Member

N. P. EDWARDS, Member.

RINGAROOMA AND CASCADE (WATER) SUSPENSE ACCOUNT

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 DECEMBER 1968

<i>Receipts</i>	\$	<i>Payments</i>	\$
Balance (loss)	1,059.62	Ringarooma Race—Wages	150.00
		Interest on capital cost of Ringarooma and Cascade Water System	909.62
	<u>\$1,059.62</u>		<u>\$1,059.62</u>