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PARLIAMENT OF TASMANIA

# **DIRECTOR OF MINES**

**REPORT FOR THE YEAR ENDED 31 DECEMBER 1975**

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

By Authority:

T. J. HUGHES, Government Printer, Tasmania



Diamond drilling for the proposed River Derwent Bridge at Dowsings Point. Re-positioning the drilling barge (top), drilling in progress (left centre), removing the core barrel (right centre), core barrel opened to expose core (bottom).

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# REPORT OF THE DIRECTOR OF MINES

Department of Mines,  
Hobart, 1 July 1976

THE MINISTER FOR MINES

I present my Report on the mining industry for the year ended 31 December 1975.

The value of metals and minerals produced from Tasmanian ores on the basis of Australian metal prices was \$173 317 865 as compared with \$177 327 923 for 1974. In addition metallurgical production from imported ores and concentrates was valued at \$135 013 109 compared with \$145 802 921 for 1974. This is the first decline in the value of the industry recorded since 1961.

The production of copper, gold, silver, iron ore pellets, lead and tin fell but increases in the output of zinc, tungstic oxide, rutile and zircon were recorded.

Economic factors which depressed metal prices on world markets were the major reason for the decline. Producers were obliged to reduce output by either working fewer shifts or reducing staff.

Details of production and value of all mining products are shown elsewhere in this Report but particulars of the principal minerals are summarised below:—

<i>Commodity</i>	1974		1975	
	<i>Quantity</i>	<i>Value</i> \$	<i>Quantity</i>	<i>Value</i> \$
Copper (tonnes) ....	28 441	35 837 416	25 698	24 606 515
Gold (kilograms) ..	1 385	5 118 359	1 453	5 712 948
Iron ore pellets (tonnes) ....	2 230 197	26 475 112	2 054 522	25 829 883
Lead (tonnes) ....	12 637	5 048 404	11 380	3 524 700
Silver (kilograms) ....	62 093	7 169 721	55 853	6 110 155
Tin (tonnes) ..	5 951	34 221 518	5 494	30 093 128
Tungsten as tungstic oxide (tonnes)	1 302	7 876 323	1 744	11 910 827
Zinc (tonnes) ....	53 803	30 973 172	54 326	35 873 182

## DEVELOPMENTS

The mining industry has been affected by world economic conditions and has been caught in the squeeze between increasing costs and falling prices with a resulting fall in profitability. Despite these unfavourable conditions the industry has maintained production at the highest level consistent with the economics of operation. Programs of expansion and development of existing mines have been continued and active exploration outside mining leases has not decreased. Exploration to discover and develop new ore bodies is vital to the future of mining which relies on an irreplaceable resource and the work being undertaken by major companies in Tasmania is of prime importance to the industry and its continuing value to the economy of the State.

Investigation of the zinc-lead deposit by Cominco Exploration Pty Ltd at Que River near Mt Charter was advanced. A drilling program totalling 11 303 metres was completed. Indicated ore has been assessed at five million tonnes assaying 0.3% copper, 5.8% lead, 10.1% zinc, 103 grams/tonne of silver and 2 grams/tonne of gold and 700 000 tonnes assessed at 1.7% copper, 2.9% lead, 5.1% zinc and 58 grams/tonne silver. An exploration decline to the ore zone is proposed together with a feasibility study to determine the economic viability of the occurrence.

Allstate Tasmania Pty Ltd which has been carrying out investigations including drilling at the old Tasmania gold mine at Beaconsfield since 1973 has completed a feasibility report and is proposing to dewater the old shaft as part of further testing before finally deciding to commence productive mining.

The installation of a milling plant at the old Razorback mine at Dundas has been completed and adjustments are in progress before full scale production can be commenced.

The clay mine established by A.P.P.M. Ltd at Tonganah near Scottsdale as a source of raw material for use in the paper-making industry was officially opened in December and productive operations have begun.

The silica deposits at Port Sorell south of Macquarie Harbour which were discovered by Comalco Ltd some four years ago are still being investigated but the commercial viability of the occurrence has not yet been established.

Industrial and Mining Investigations Pty Ltd which has been actively investigating the setting up of another iron ore industry using the Savage River iron ore deposits outside the leases occupied by Savage River Mines has a proposal for production of iron ore pellets for export under consideration. Negotiations with overseas interests are in progress and a decision is expected early in 1976.

Consolidated Goldfields Australia Ltd, which had purchased the Carbide Works at Electrona and had acquired silica leases at the Weld River as a source of raw material for the production of silicon alloys at the works, continued to operate at Electrona for the production of carbide using limestone from Ida Bay. The company has decided that the project is not economic and has offered its interests for sale. The Government is endeavouring to attract other companies to continue to operate the Electrona works.

Interest has been displayed by an Italian consortium in re-establishing the industry of red granite quarrying at Coles Bay for the local market and export. Because of the possible effect on the environment the Government decided to prohibit the proposed quarrying and enquiries were made to locate other sources of red granite in less sensitive areas. Preliminary investigations and the collection of granite samples from other areas confirm that the Coles Bay granite is unique in colour and is the only known red granite suitable for commercial purposes. The Government has reversed its previous decision and a comprehensive environmental study of the likely impact of a quarrying industry on the Coles Bay area has been ordered.

## PRODUCTION

### *Copper*

The major producer is the Mt Lyell Mining and Railway Co. Ltd, Queenstown, but significant quantities are also produced from the processing of zinc-lead ores by the Electrolytic Zinc Co., Rosebery and from tin mining operations by Cleveland Tin N.L. at Luina.

The Mt Lyell Co. treated 2.1 million tonnes of ore averaging 1.06% copper for the production of 89 667 tonnes of copper concentrates containing 22 954 tonnes of copper, 448 kilograms of gold and 4 402 kilograms of silver. The copper concentrates were transported by road to Melba Flats and thence by rail to Burnie for shipment to Port Kembla and Japan. Pyrite concentrates produced amounted to 108 885 tonnes which were railed to North-West Acid Pty Ltd, owned jointly with the Electrolytic Zinc Co., for the manufacture of sulphuric acid. Apart from about a quarter of a million tonnes of surface ore, ore was produced from underground sources.

Exploration drilling continued on the company's leases. An assessment of ore reserves has indicated proven ore totalling 28.8 million tonnes, averaging 1.45% copper, 3.138 grams of silver and 0.440 grams of gold per tonne whilst probable ore was estimated to be 10.3 million tonnes averaging 1.4% copper, 1.713 grams of silver and 0.252 grams of gold per tonne. Possible ore was estimated at 1.9 million tonnes of an average grade of 1.28% copper, 3.061 grams of silver and 0.306 grams of gold per tonne, as a result of exploratory drilling.

The expansion program which commenced in 1968 has fallen behind schedule because of difficult ground conditions and the collapse of a development waste pass. The price of copper has resulted in operations being conducted at a loss and has caused a slowing down of the program.

The decline in the price of copper which was evident at the end of 1974 continued as discussed under Metal Prices. The Company maintained its policy of forward trading on the London Metal Exchange and succeeded in off-setting the loss from mining operations in 1974-75.

The Electrolytic Zinc Co. at Rosebery produced 2 174 tonnes of copper from the treatment of its zinc-lead ores and 570 tonnes were produced by Cleveland Tin N.L. at Luina as part of its tin mining operations.

#### *Iron Ore*

Pellets produced from iron ore mined at Savage River totalled 2 054 522 tonnes compared with 2 230 197 tonnes for the previous year. Shipment of pellets to Japan from Port Latta continued under contract.

The holder of the exploration licence covering the Savage River ore deposits outside the leases being mined by Savage River Mines has continued with active investigations with the object of establishing a further industry.

#### *Tin*

Total production was 5 494 tonnes, the principal producers being Renison Limited at Renison Bell, Cleveland Tin N.L. at Luina and Ringarooma Mining Pty Ltd at Waratah.

Production by Renison Limited totalled 3 548 tonnes of tin from the mining of 481 640 tonnes of ore. The overall recovery of tin metal in concentrates was 67·6% as compared with 68·8% last year. Construction of the heavy media separation plant was completed in December 1974. Contamination required the installation of a small screening flotation plant to assist in cleaning the media. The installation was commissioned in May and has operated satisfactorily in maintaining the percentage of overall recoveries of tin metal in concentrates.

Proved reserves were assessed at 6·10 million tonnes containing 1·40% tin and probable reserves were fixed at 2·94 million tonnes averaging 1·21% tin. Possible ore was estimated at 7·76 million tonnes expected to average 1·21% tin.

The Company has maintained an active program of exploration outside the leases and is conducting investigations in six separate areas.

At the Cleveland mine at Luina, production consisted of 1 409 tonnes of tin and 570 tonnes of copper from the milling of 283 489 tonnes of ore. Exploration and drilling is planned. Indicated ore has been calculated at 1·9 million tonnes averaging 0·82% tin and 0·32% copper. The Company, which is one of the Aberfoyle Group, is concerned in joint venture arrangements covering exploration at three locations outside its leases.

At the Storeys Creek and Aberfoyle mines operated by Aberfoyle Tin Ltd 52 297 tonnes of ore were treated for the recovery of 181 tonnes of tin and 226 tonnes of wolfram concentrate.

Ringarooma Mines Pty Ltd operating on alluvial deposits in Waratah Creek at Waratah treated 172 000 cubic metres of ground for the recovery of 265 tonnes of tin.

Tin mining remains an important industry in the north-east of the State, and eight of the larger operators produced an aggregate of 79 tonnes of tin the principal producer being the BMI Mining Co. which had an output of 28 tonnes from operations at the Endurance mine.

#### *Tungsten*

The producers are King Island Scheelite who mine scheelite at King Island and the Storeys Creek and Aberfoyle mines who produce wolfram concentrates from the mining of wolfram-tin ores in the vicinity of Rossarden.

The King Island Scheelite mine treated 295 943 tonnes of ore for the production of 1 518 tonnes of tungstic oxide. Ore from the Storeys Creek mine and the Aberfoyle mine are treated at the Aberfoyle mill where 51 772 tonnes of ore were processed for the recovery of 226 tonnes of tungstic oxide and 181 tonnes of tin.

Ore reserves at the Dolphin and Bold Head mines on King Island have been assessed at 7 million tonnes with an average grade of 0.8% tungstic oxide.

The price of tungstic oxide was maintained on a considerably higher level than in 1974 and this has resulted in an overall increase in production from all mines whilst the value of the output increased by more than 50%.

#### *Zinc-Lead*

The Electrolytic Zinc Co. at Rosebery treated 559 700 tonnes of ore principally from the Rosebery mine with some small tonnages from the Hercules mine and from old dumps at the Magnet mine for the recovery of 54 326 tonnes of zinc, 11 380 tonnes of lead, 51 451 kilograms of silver and 975 kilograms of gold. A total of 115 538 tonnes of pyrite was produced for use in the manufacture of sulphuric acid at Burnie by North-West Acid Pty Ltd, a company jointly owned by the Electrolytic Zinc Co. and the Mt Lyell Co. The No. 3 residue dam at Bobadil and the effluent pump station were completed at a cost of \$4 million and the Rosebery mine area now meets current environmental standards.

Ore reserves assessed at 9 018 086 tonnes consisting of 8 633 264 tonnes at the Rosebery mine, 313 824 tonnes at the Hercules mine at Williamsford and 70 998 tonnes at the Farrell mine at Tullah were not significantly reduced during 1974-75.

Output of zinc at the Company's Risdon plant which treats concentrates from Rosebery and imported concentrates from the Broken Hill mines was 103 778 tonnes compared with 113 345 tonnes for 1973-74.

### METAL PRICES

The following table shows the average metal prices for 1975:—

Commodity	Unit	AVERAGE AUSTRALIAN PRICES, 1973-1975 (\$A)		
		1973 \$	1974 \$	1975 \$
Copper	tonne	1 252.66	1 273.33	958.25
Gold	kilogram	2 247.00	3 692.03	3 949.55
Lead	tonne	280.50	399.17	317.50
Silver	kilogram	58.35	115.21	109.56
Tin	tonne	3 532.00	5 775.25	5 475.92
Tungsten	tonne	30.17	62.31	68.47
Zinc	tonne	425.50	582.00	660.58

#### *Copper*

The Australian price of copper which was \$1 000 per tonne at the end of 1974 continued its downward trend and was quoted at \$900 per tonne at the end of January 1975. It rose to \$1080 briefly in mid-April then declined in stages through April, May and June to \$900 per tonne at the end of June. There was a recovery of \$20 per tonne in each of the months of July, August and September to \$960 per tonne but the price again fell and was quoted at \$920 per tonne at the end of the year. On the London Metal Exchange the price ranged from a low of £498 per tonne in January to a high of £586 per tonne in December 1975. The operations of our principal producer the Mt Lyell Mining & Railway Co. Limited at Queenstown have been seriously affected and production has continued at a substantial loss. An improvement in the world economic situation early in 1976 has stimulated consumer demand on the London Metal Exchange with a consequent rise in price. This is reflected in the Australian price which has begun an upward trend.

#### *Tin*

On 18 April 1975 the International Tin Council, of which Australia is a producer member, imposed a tin quota on producers in an endeavour to stabilise the price of tin by restricting the quantity of tin available to consumers. At that date the price quoted on the London Metal Exchange was £3 011 per tonne. The quota has had the affect of arresting the decline and apart from an upward trend of approximately \$100 per ton

from mid-July to mid-October the price has remained fairly constant and was quoted at £3 071 on the L.M.E. at the end of the year. Small tin producers in the State have not been affected by the quota but the major producers Renison Limited and Cleveland Tin N.L. have been obliged to limit production.

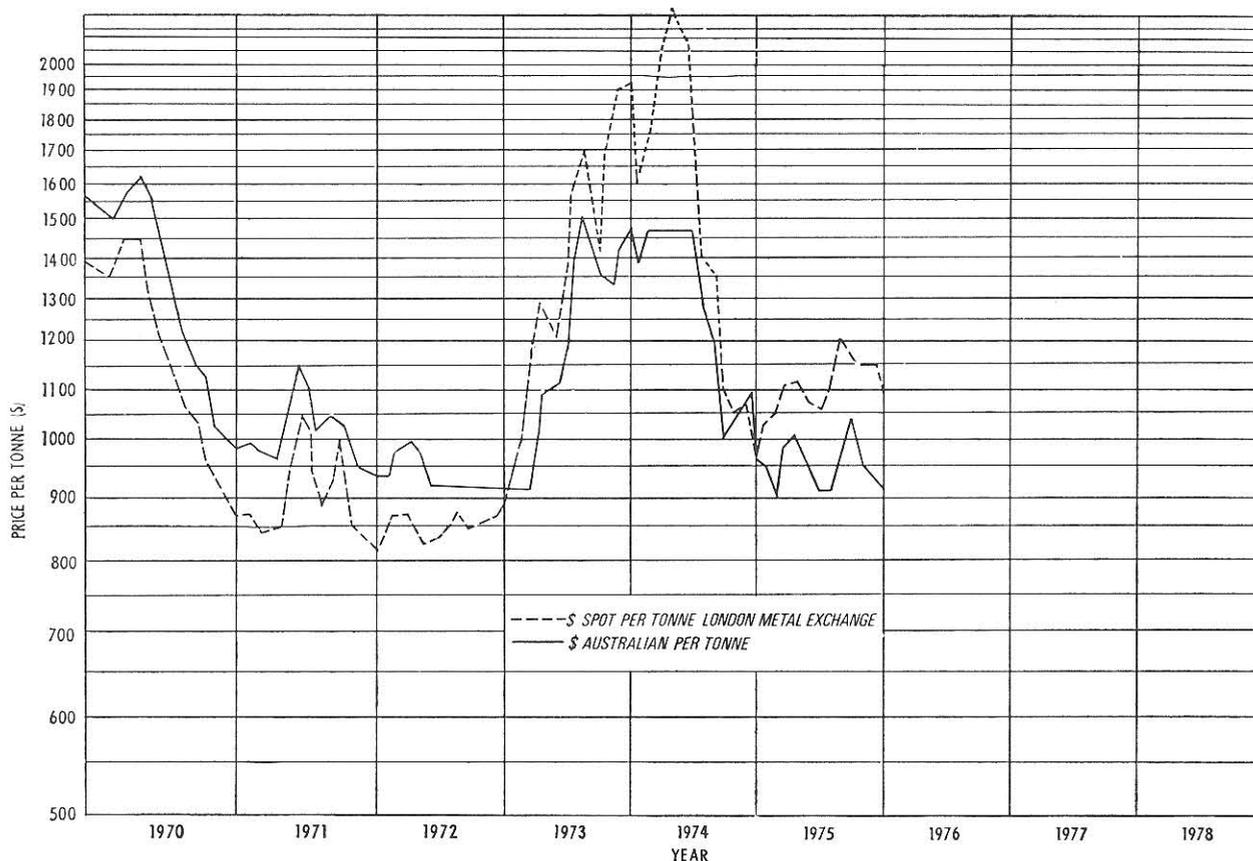
*Tungsten*

The improved market position for tungsten oxide which was evident in 1974 was continued in 1975 and the price quoted on the London Metal Exchange per unit of 22.50 lb ranged from a low of £38 per unit in January to a high of £44 per unit at the end of the year. The equivalent in Australian currency would represent a range of \$61.5 to \$71.2 per unit. The price of tungstic oxide determines the value of production of scheelite from the scheelite mine at King Island and wolfram from the Storeys Creek mine. The existing market has stimulated productive activities of these mines.

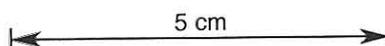
*Zinc*

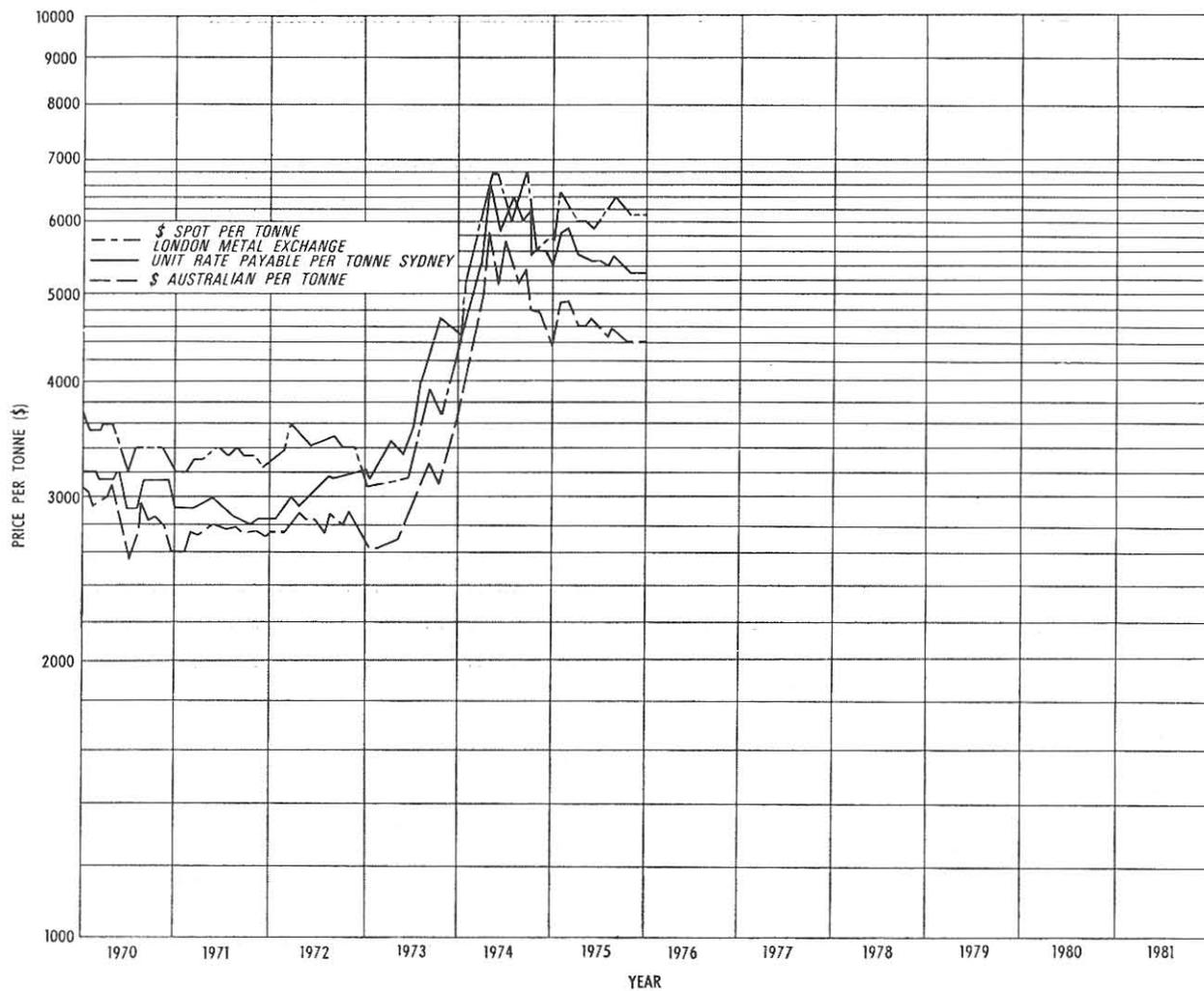
There has been a fall in the demand for zinc as a result of most major consuming countries experiencing difficult economic conditions and this has had serious consequences on the production of refined zinc by the Electrolytic Zinc Company at Risdon which was obliged to curtail production and retrench some of its employees. However, full production was maintained at the Company's mine at Rosebery.

The price on the London Metal Exchange at the end of 1974 was £332 per tonne and the Australian price was \$652. During 1975 the L.M.E. price ranged from a low of £332 per tonne in February to £359 per tonne in September and was quoted at £343 per tonne at the end of the year. The Australian price ranged from \$672 per tonne for the first half of the year and following falls to \$654 and \$635 per tonne was given at \$669 per tonne at the end of December.



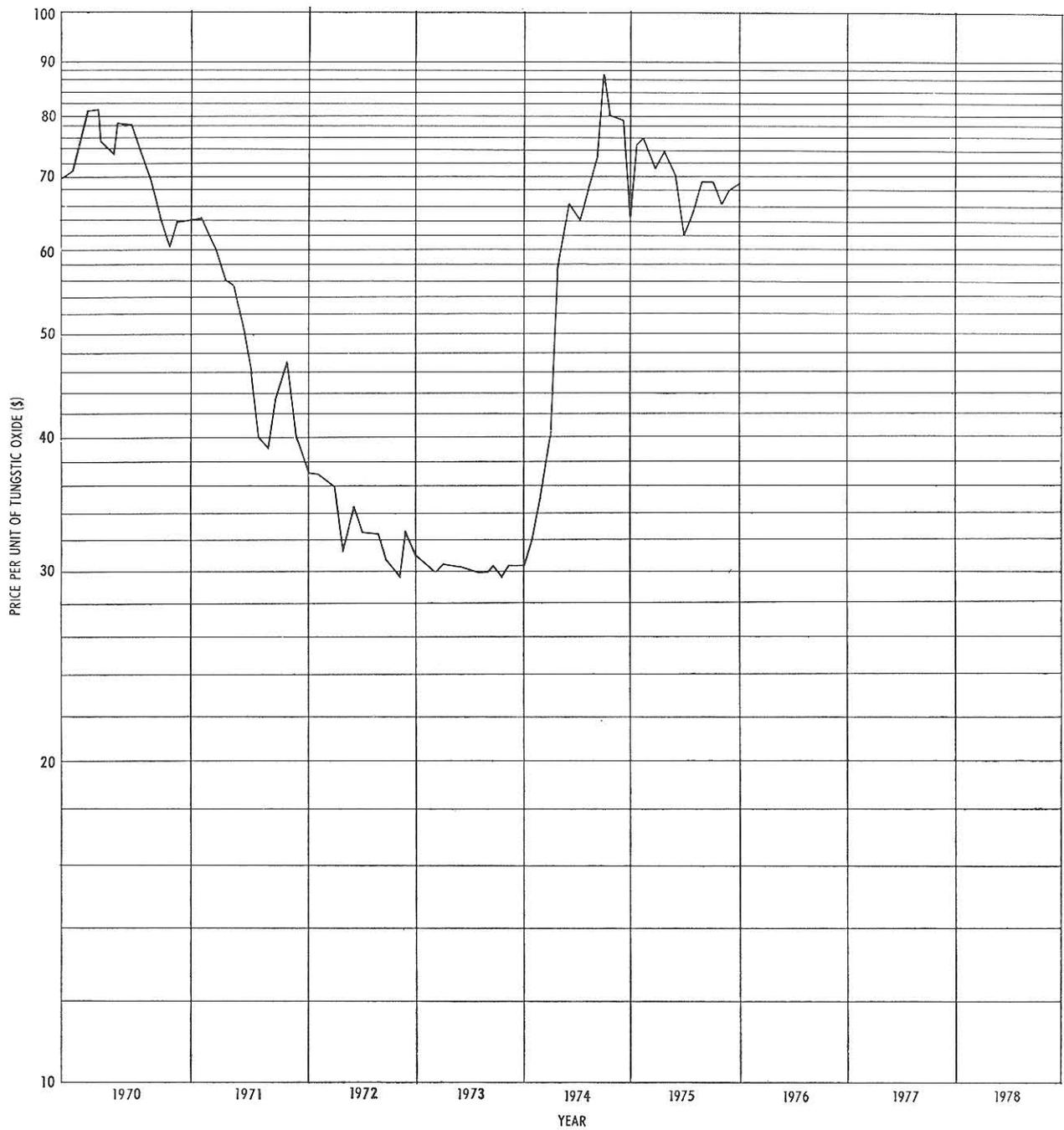
COPPER PRICES  
MONTHLY AVERAGES, 1970-1975





TIN PRICES  
MONTHLY AVERAGES, 1970-1975

5 cm



TUNGSTEN PRICES  
MONTHLY AVERAGES, 1970-1975

5 cm

### EXPLORATION

A total of 847 exploration and special prospector's licences were current at 31 December 1975 and active programs of exploration are being undertaken in western and north-western Tasmania. The major producing companies in the State continued exploration within their mining leases and all hold licences to investigate the potential mineral resources of areas adjacent to their mines. In addition there are twelve other companies which maintain progressive programs of work on exploration licences. Cominco Exploration Pty Ltd of which the Aberfoyle, Storeys Creek and Cleveland mines are subsidiaries, has undertaken detailed drilling on a promising zinc-lead discovery north of Rosebery and has converted part of its holding into mining leases.

Hematite Petroleum Pty Ltd continues to hold four exploration permits to search for oil in Bass Strait and is maintaining a constant program of investigations.

Licence holders are required to renew licences at six-monthly intervals and where investigations are not being undertaken on a satisfactory scale some areas are being required to be relinquished and released for investigation by other interested companies.

The Department has maintained its established program of regional geological mapping, economic geology, groundwater investigations and engineering geology. Publications of maps and reports are made regularly for the information of interested parties and professional staff are always available to assist and advise the mining industry. Departmental publications and information by former exploration licence holders when placed on 'open file' are in constant demand by mining companies and other holders and potential holders of exploration licences. The Department's drilling plants are engaged in testing mineral and coal deposits, and in the investigation and measurement of underground water resources in selected areas. The results of Departmental work are published and core samples are made available for examination by interested parties.

### COAL

The Cornwall Coal Company which operates the Duncan Mine at Fingal was the only producer. As stated in my last report the Goliath Portland Cement Co. at Railton decided to revert to the use of coal. This has provided a stimulus to the coal mining industry and the Cornwall Coal Company has equipped its operations to meet the increased demand which will result in more than doubling the rate of production within a few years. There have been technical difficulties with furnaces at the Goliath Cement works which have reduced the anticipated consumption of coal in 1975.

### OIL

Hematite Petroleum Pty Ltd is the sole holder of exploration permits in Bass Strait issued under the provisions of the Petroleum (Submerged Lands) Act 1967. The four permits as detailed in my last report, comprising 475 blocks, will remain current until 16 July 1979. The delay in a decision by the High Court to challenges by some of the States to the validity of the Seas and Submerged Lands Act 1967 of the Commonwealth together with restrictions on overseas investments and other aspects of the minerals and energy policy of the Commonwealth Government has resulted in limitation of exploration activities. No drilling was undertaken in the permit areas and investigations have been confined to re-assessment of geophysical and other data obtained from previous work.

### LEGISLATION

There were no amendments to the various Acts administered by the Department but the following regulations were made:—

- Mines Inspection Regulations 1975 (Statutory Rules 1975, No. 231).
- Mining Amendment Regulations 1975 (S.R. 1975, No. 264).
- Mining Amendment Regulations (No. 2) 1975 (S.R. 1975, No. 272).
- Mining Amendment Regulations (No. 3) 1975 (S.R. 1975, No. 304).

*Mines Inspection Regulations 1975.* The previous Regulations of 1969 were rescinded and replaced by new and comprehensive regulations for the purposes of the Mines Inspection Act 1968.

### *Mining Regulations*

Surveys: Statutory Rules 1975, No. 272 rescinded the previous provisions relating to surveys and survey fees. Because of the high cost of complete cadastral surveys of mining leases such surveys will only be required in cases of conflict of boundaries and other special circumstances. In these instances the full fees chargeable by the Institution of Surveyors will apply. When a complete survey is unnecessary a fee of \$25 will be charged to locate the marking-out notice. This will enable the lease to be fixed on the ground with reasonable accuracy and will assist in the preparation of more exact lease plans and mineral charts showing leases held in particular areas.

### *Royalties (S.R. 1975, Nos. 264 and 304)*

There has been provision in section 30 of the Mining Act since 1964 for the payment of royalty on mining products but for various reasons a Regulation to prescribe the rates of royalty was not made. As part of the Budget for 1975-76 the Government has decided that as from 1 October 1975 a royalty of 2% of the proceeds from the sale of mining products should be imposed, such royalty not to exceed the amount of the profit. No royalty was to be payable where the proceeds of mining products did not exceed \$50 000 in any quarter and coal, oil, pyrite, silica, dolomite, limestone, limesand, ochre, kaolin and stone were exempt from royalty. The current royalty rates for oil, sand and gravel remained unchanged. The foregoing proposals were incorporated in a Regulation S.R. 1975, No. 264. The mining companies objected to the payment of royalty and when the Regulation was tabled in Parliament notices of motion were given in both Houses that the Regulation should be disallowed. As a result of representations from the major producers the Government agreed to vary the basis of royalty and a Regulation (S.R. 1975, No. 304) to amend the previous Regulation was made. This continues the provision of the previous Regulation except in the matter of the rate of royalty which is now 2% of the proceeds from the sale of mining products or 5% of the profits whichever is the less. The Government also agreed to reduce the royalty by 20% in place of the previous 10% where a mining product is treated in the State for recovery of a metal. It is proposed that royalty should be payable quarterly at the rate of 2% of the proceeds received from the sale of mining products in that quarter but where the producer submits information that this amount will exceed 5% of the profit royalty payable will be fixed so as not to be greater than 5% of the profit. The overall position will be adjusted at the end of a 4-quarterly yearly period so that the royalty payable will be either 2% of the proceeds or 5% of the profits whichever is the less.

The Budget estimate of revenue from royalty on the basis of the original Regulation was \$750 000 in the half-year as from 1 October 1975 but as a result of the amendments to the rate to be charged this has been revised and \$400 000 is the royalty which it is expected to collect in 1975-76 or \$800 000 in a full year. However, because of depressed metal prices and high production costs which resulted in reduced profits a forward estimate of revenue is difficult.

## MINING AND THE ENVIRONMENT

The acceptance by the mining industry of the need to protect the environment as a normal procedure in mining is a considerable achievement over a short period and reflects great credit on those engaged in the industry. This has been possible by co-operation between the industry, this Department and the Department of the Environment. The antipathy to mining which is present in some quarters is a relic of the past and such an attitude is completely unjustified under present conditions. Every application for a mining lease is examined by professional officers in the fields of mining and in various aspects of environmental control as well as by the applicant and conditions are imposed to ensure that mining is undertaken subject to controls which enable the use of our natural resources but with a minimum effect on the environment. Opportunity is provided under the Environment Protection Act for objections to be lodged by all persons who may be affected by proposed mining operations or by the many activities defined as 'scheduled premises' in the legislation. Objections are examined by an expert panel before licences to operate are granted and the conditions applicable to the conduct of operations in each individual case are designed.

### *Planning legislation*

Planning legislation to control land use and to set up a Planning Commission has been drafted and has been submitted to Parliament. This will provide for further controls on the mining industry. Mining should

as a result of the application of planning and environmental standards be regarded in its proper perspective and recognised as an industry essential to the economy of the State which should be allowed the use of our natural resources within the framework of conditions which will ensure that resources are not wasted but are used so as to cause minimum interference to other resources which are of scientific, aesthetic or other value not measurable in economic terms. As I have stated in a previous Report there must be a balanced approach, first of all to the use of the land and the particular resource and then to ensure that any development is controlled so that an acceptable level of environmental quality is maintained both during and after mining or other development. In the national interest all, not just some, of our natural resources should be available for the benefit of present and future generations. The proposed planning legislation in conjunction with controls exercised by this Department and licences to operate granted by the Department of the Environment are the means by which the balance between development and conservation of our resources may be achieved.

### THE FUTURE OF MINING

Mining involves the use of a wasting asset and minerals used cannot be regenerated. In order that mining products which are so essential for our way of life and for the economy of the country may continue to be produced there must be constant exploration by mining companies both on their mining leases and in other areas where geological conditions are favourable for the occurrence of minerals. It is, therefore, essential not only for the mining companies but for the whole community that the area available for exploration should not be unreasonably restricted and that the search for minerals should be encouraged consistent with protection of the natural environment. It must be recognised that full use should be made of all our natural resources and that only in circumstances where one natural resource of national significance would be irretrievably lost if another is developed that a determination must be made after full investigations have been undertaken as to the resource to be preserved.

The Department of Mines has always been concerned when areas of land of known or potential mineral value are reserved and access denied for exploration and mining. It has been the policy to vigorously oppose the reservation of such land, in the interest of the future of the mining industry and the economy of the State. It is considered that except in extraordinary circumstances mining is not incompatible with reserves made to protect our natural resources subject to the observance of rigid conditions to prevent unavoidable damage to the environment. This can operate in other countries and with mutual understanding of all the resources involved it can function here. Several instances already exist in Tasmania of operating mines which were known in the early part of this century and which have only become viable because of technological advances and the expansion in demand arising from economic growth. Other potential mineral deposits of similar character exist and the Department continues to press to ensure that these minerals are available to be mined when conditions are favourable. It can take several years from discovery of a mineral capable of being developed commercially before productive mining can be established, and before this there must be intensive exploration to locate such mineral deposits. This is well known to the mining industry but unfortunately the public are largely unaware of the importance of exploration, that mineral deposits can only be found after long and expensive search and that they are dependent upon a healthy mining industry for their quality of life. It is this lack of understanding which results in so much opposition to exploration and mining particularly in the more remote parts of the State. As I stated in my 1973 Report the object must be to adopt a balanced approach first of all to the use of the land and the particular resource, and then to ensure that any development is controlled so that an acceptable level of environmental quality is maintained both during and after mining or other development. The mining industry has accepted the principles of environmental control which now forms an integral part of mining operations. It is unfortunate that many people who also accept these principles are unable to recognise that mining which has always existed must continue and that controlled use of our natural resources will enable all not just some of our resources to be available for the benefit and welfare of people not only in the short-term but for the future.

### AUSTRALIAN MINERALS COUNCIL

The Council consisting of the Ministers for Mines of the States and the equivalent Commonwealth Minister has not met since 1972 as I have reported previously because of a decision of the Commonwealth Minister for Minerals and Energy not to participate. Ministers for Mines of the States met in Sydney in April 1975 both meetings being preceded by meetings of the Advisory Committee comprising the permanent

Heads of the Departments of Mines of the States. Matters of mutual interest were discussed. It is most desirable in the interest of the mining industry that there should be close liaison between the Commonwealth and the States so that conflicts of policy may be avoided and an understanding of respective rights and interests may be developed.

### REVENUE

#### REVENUE COLLECTED DURING THE YEAR ENDED 31 DECEMBER 1975

<i>Heads of Revenue</i>	\$
Mines Department (Drilling) .....	67 885
Rent and fees of Auriferous and Mineral Lands .....	164 793
Royalty on Iron Ore Pellets .....	312 321
Survey Fees .....	1 328
Fees under the Explosives and Inflammable Liquids Act .....	55 932
<b>TOTAL</b> .....	<b>602 259</b>

#### COMPARATIVE STATEMENT OF REVENUE FROM MINES BEING RENTS, FEES, STORAGE OF EXPLOSIVES, ETC., PAID TO THE TREASURY DURING THE YEARS 1970 TO 1975

<i>Year</i>	\$	<i>Year</i>	\$
1970 .....	528 666	1973 .....	641 380
1971 .....	597 937	1974 .....	649 029
1972 .....	563 816	1975 .....	602 259

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

### LEASES AND LICENCES

#### NUMBER AND AREA OF NEW LEASES AND LICENCES ISSUED DURING THE YEAR ENDED 31 DECEMBER 1975

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (ha)</i>	<i>Sluiceways</i>
Clay .....	1	75	....
Easements .....	5	22	....
Gold .....	4	127	....
Minerals .....	2	48	....
Osmiridium .....	3	192	....
Silver-lead and zinc .....	1	102	....
Stone .....	15	737	....
Tin .....	18	565	....
Water licences .....	5	2	15
<b>TOTAL</b> .....	<b>54</b>	<b>1 870</b>	<b>15</b>

## TOTAL NUMBER OF LEASES AND LICENCES IN FORCE ON 31 DECEMBER 1975

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (ha)</i>	<i>Sluiceheads</i>
Antimony	1	32	....
Bauxite	6	192	....
Clay	21	329	....
Coal	15	2 073	....
Copper	3	4 976	....
Dolomite	4	130	....
Gold	37	621	....
Granite	4	10	....
Iron ore	17	2 638	....
Kaolin	7	350	....
Limestone	12	514	....
Marble	2	32	....
Minerals	42	5 400	....
Ochre	2	3	....
Osmiridium and chromite	5	210	....
Nickel	1	32	....
Rutile	2	746	....
Sand and gravel	41	3 637	....
Silver-lead and zinc	18	989	....
Slate	1	15	....
Stone	83	3 961	....
Tin	288	9 970	....
Wolfram and tin	20	1 614	....
Water licences	138	433	962
Easements	77	656	....
<b>TOTAL</b>	<b>847</b>	<b>39 563</b>	<b>962</b>

NUMBER AND AREA OF LEASES AND LICENCES APPLIED FOR DURING THE YEAR ENDED  
31 DECEMBER 1975

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (ha)</i>	<i>Sluiceheads</i>
Coal	2	204	....
Copper	1	4 912	....
Gemstones	3	22	....
Gold	6	67	....
Gravel and sand	10	855	....
Iron ore	5	90	....
Limestone	1	4	....
Minerals	5	2 170	....
Rutile and zircon	1	100	....
Silica	6	835	....
Silver-lead and zinc	11	410	....
Stone	19	709	....
Tin	18	1 105	....
Water and easements	5	25	2
<b>TOTAL</b>	<b>93</b>	<b>11 508</b>	<b>2</b>

TOTAL NUMBER OF ALL TYPES OF PROSPECTING RIGHTS HELD AS AT  
31 DECEMBER 1975

<i>Mining Tenement</i>	<i>Number</i>	<i>Area</i>
Permits to enter and search on private land, including owners' consents .. .. .	7	4 813 ha
Exploration licences .. .. .	62	7 681 ha
Special Prospector's licences .. .. .	11	392 ha
Miners Rights .. .. .	86	21 ha
Prospectors licences .. .. .	160	4 000 ha
Authorities to prospect under the Aid to Mining Act 1927 .. .. .	1	23 km <sup>2</sup>
Permits to explore for petroleum under the Petroleum (Submerged Lands) Act 1967 .. .	4	475 graticular blocks (28 595 km <sup>2</sup> )

### WARDENS' COURT

*Tasmanian Conservation Trust and others (Stow and others) v. Minerals Holdings Australia Pty Ltd.* As recorded in my last Report the finding of the Warden of Mines to objections to an application for a Special Prospector's Licence at New River in favour of the objectors has been reversed by the Supreme Court and that this judgment had gone on appeal to the Full Court. In a judgment dated 26 May 1975 the Full Court unanimously dismissed the Appeal. This judgment has now been the subject of a further appeal to the High Court.

*Allstate (Tas.) Pty Ltd v. Estate of late H. D. Windred.* Applications for forfeiture of lease 1517/G Beaconsfield.

The Warden of Mines, Launceston, has not yet heard this application.

*D. L. Nichols v. R. & E. Monty.* Applications for forfeiture of lease 1M/59, 4M/59 and 1W/59, Coles Bay.

The objectors have not pursued this application.

*H. N. Thomas v. J. M. Dwyer.* Application for forfeiture of lease 100M/68, Mathinna.

This action was settled out of Court.

*C. F. Giblin, R. G. Anderson, S. Lodge, G. M. Camm, R. W. Harris, L. R. Landford, P. D. Morley, K. Radcliffe, L. T. P. Cosgrove, J. M. Wilson, A. L. Bell, G. P. Marchant, P. Atwell, J. N. Winterborn, A. Bond, G. S. Parssey, J. L. Ross, W. Adock, C. Martin, D. Martin, M. Glennie, L. E. Trenham, M. A. Trenham, P. A. Trenham, D. N. Trenham, D. F. Trenham, M. Winter, M. Babin, F. Babin, J. Shea, L. D. Winterborn, W. Stubbs, A. G. Anderson, A. B. Pusey, D. J. Fox, P. M. Tippers, P. Clarkson, A. Roberts, N. H. Knop, R. H. Trousselot, R. E. Trousselot, I. R. Winter, S. Morgan, W. Moore, W. T. Palmer, J. J. Kennedy, Seven Mile Beach Progress Association, B. S. Hearps, P. Everett, K. Blackwell, R. Peel, R. A. Waller, Pacey, R. and family, J. P. Butterworth, J. E. Bowden, Loongana Sawmill Pty Ltd, Royal Hobart Golf Club, P. J. Morgan, T. Byas, K. R. Filleul, P. McMullen, A. M. McMullen, J. V. Knowles, G. Casimaty, S. R. Glover, G. Hearps, D. Walter, V. Mackey, A. A. Glover, Sorell Municipal Council, S. K. Gledhill, R. B. Davies, J. E. Cook, R. C. Bowling, R. E. and C. H. Lewis v. Louisa Mining Corporation N.L.* Objections to applications for exploration licence Cambridge-Seven Mile Beach area.

The objections were heard by the Warden of Mines, Hobart for the Central Mining District on 15 September 1975. Many of the objections were withdrawn before the hearing and the remainder were either struck out for non-appearance or dismissed after hearing evidence.

*A. O. Harris, A. Hodgson, A. L. Stephenson, P. M. Ross, J. Reid, B. G. Reid, A. G. Bain, P. Elias, Tasmanian Orchid Society, R. Carrington-Smith, W. H. Croft, H. Clarke, Tasmanian Conservation Trust, J. R. Brown, P. A. Palmer v. Louisa Mining Corporation N.L.* Objections to an application for an exploration licence at Bruny Island.

The matter was heard by the Warden of Mines, Hobart for the Central Mining District on 16 September 1975. Several of the objections were withdrawn before the hearing and the remainder were either struck out for non-appearance or dismissed after hearing evidence. Notices of Appeal to the Supreme Court by A. Harris, J. M. Reid, W. H. Croft and P. Elias have been lodged. The appeal has not yet been heard.

*M. Hopwood, Municipality of Bruny, M. W. & I. M. Young v. H. J. Wright.* Objections to an application for an exploration licence at Bruny Island.

The objections which were heard by the Warden of Mines, Hobart for the Central Mining District were dismissed. In addition to the official objections referred to, a petition signed by 666 persons against the granting of the licence was lodged.

*J. D. Clark v. Freycinet Tin Mining Pty Ltd.* Application for the forfeiture of leases at Coles Bay.

This application was withdrawn before it was heard by the Warden of Mines.

*South-West Tasmania Committee (N.S.W. Branch) and Australian Conservation Foundation v. J. D. Clark.* Objections to application for exploration licence, King William Range.

The objections were heard by the Warden of Mines, Hobart for the Central Mining District who ordered their dismissal.

*Australian Conservation Foundation and Tasmanian Conservation Trust v. C. C. J. Blacklow.* Objection to application for exploration licence, Great Musselroe Bay.

The objectors did not appear and as the applicant had reduced the area of the application to exclude the particular land referred to in the objections the Warden of Mines, Launceston ruled that the objectors should be presumed to have withdrawn their objections.

### MINE MANAGERS' CERTIFICATES

Metalliferous Mine Managers' Certificates were issued by the Board of Examiners under the Mines Inspection Act 1968 as follows:—

*By examination viva voce—*

*Certificate No.*

240/75 Raymond Anthony Alex Seymour

*Certificate Issued Upon Presentation of a Certificate*

*Issued by a Recognised Authority—*

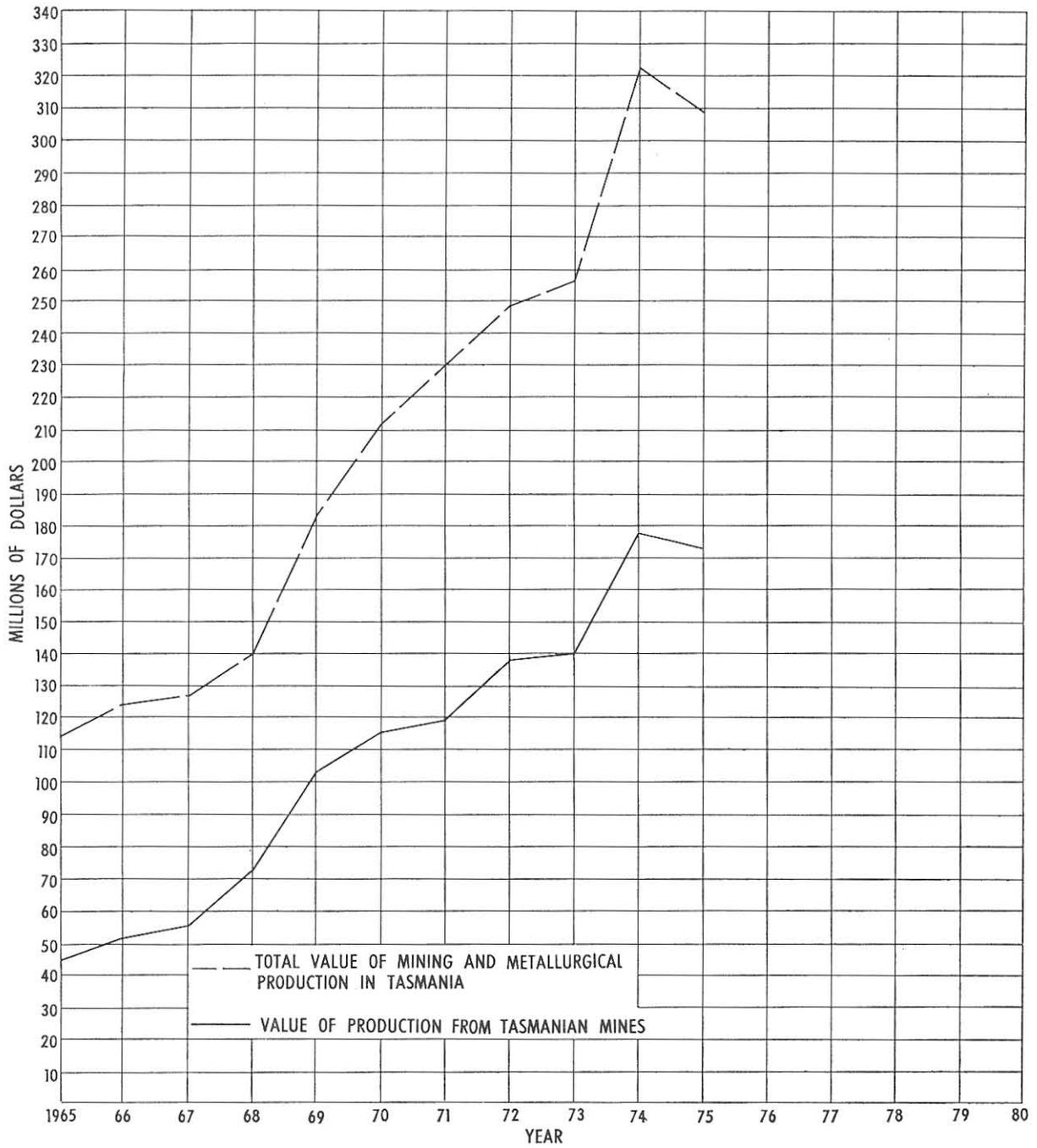
*Certificate No.*

239/75 Ian Gordon Kennedy

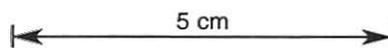
241/75 Joseph Paul Sacco

### VALUE OF TASMANIAN MINERALS IN RECENT YEARS WITH AUSTRALIAN METAL PRICES

<i>Year</i>	<i>\$</i>	<i>Year</i>	<i>\$</i>
1966	51 180 693	1971	119 998 652
1967	55 252 710	1972	136 847 182
1968	71 919 344	1973	139 557 052
1969	104 150 500	1974	177 327 923
1970	115 469 042	1975	173 317 865



VALUE OF MINING AND METALLURGICAL PRODUCTION, 1965-1975



## MINERAL PRODUCTION SINCE 1880

QUANTITY AND VALUE OF MINERAL PRODUCTION AS AT 31 DECEMBER 1975

<i>Mineral</i>	<i>Unit</i>	<i>Total Quantity</i>	<i>Value \$</i>
METALLIC MINERALS			
Antimony .....	(tonne)	3	2 034
Bismuth .....	(kilogram)	110 080	503 385
Cadmium .....	(tonne)	2 526	9 279 286
Cobalt oxide .....	(tonne)	80·2	333 258
Copper (blister) to 1918 (now shown under Silver and Copper) .....	(tonne)	169 273	21 577 054
Copper matte .....	(tonne)	6 326	267 472
Copper ore to 1918 (now shown under Copper) .....	(tonne)	42 439	1 155 746
Copper (from 1919) .....	(tonne)	679 682	400 366 554
Crocoite .....	(specimens only)	....	24 971
Gold .....	(kilogram)	95 903	56 970 867
Ilmenite .....	(tonne)	558	2 512
Iron ore pellets .....	(tonne)	15 893 973	191 971 445
Iron oxide (including hematite, limonite and magnetite) .....	(tonne)	212 508	871 492
Lead (from 1919) .....	(tonne)	500 375	80 765 259
Manganese .....	(tonne)	1	6
Manganese dioxide (from 1957) .....	(tonne)	10 402	389 087
Mercury .....	(kilogram)	7 536	89 781
Monazite .....	(tonne)	34	1 214
Nickel .....	(tonne)	237	81 036
Osmiridium .....	(kilogram)	881	1 418 771
Pyrite (to 1971) .....	(tonne)	2 124 070	10 239 957
Pyrite (from 1972) .....	(tonne)	915 067	....
Rutile .....	(tonne)	1	36
Rutile (concentrates) .....	(tonne)	32 572	6 144 052
Scheelite .....	(tonne)	36 807	91 118 908
Silica for silicon alloy production .....	(tonne)	77 825	729 724
Silicon as silicon alloys .....	(tonne)	165 188	19 046 425
Silver-lead ore to 1918 (now shown under Silver and Lead) .....	(tonne)	1 101 295	12 858 582
Silver (from 1919) .....	(kilogram)	1 961 272	59 740 683
Sulphur as sulphuric acid (from 1957) .....	(mono tonne)	2 785 750	42 702 832
Tin .....	(tonne)	198 185	255 752 887
Wolfram .....	(tonne)	21 121	37 492 443
Zinc .....	(tonne)	1 280 500	307 226 754
Zinc sulphate (from 1957) .....	(tonne)	3 251	324 177
Zircon (concentrates) .....	(tonne)	31 765	4 042 197
NON-METALLIC MINERALS			
Asbestos .....	(tonne)	4 044	34 284
Baryte .....	(tonne)	2 240	16 478
Clay (from 1958)—			
Brick .....	(metre <sup>3</sup> )	1 372 280	3 608 164
Tile .....	(metre <sup>3</sup> )	56 990	128 073
Other .....	(metre <sup>3</sup> )	475 792	1 965 897
Dolomite .....	(tonne)	63 434	387 737
Graphite .....	(tonne)	41	214
Kaolin .....	(tonne)	112 869	883 018

<i>Mineral</i>	<i>Unit</i>	<i>Total Quantity</i>	<i>Value \$</i>
<b>Limestone—</b>			
Agricultural and other .. .. .	(tonne)	1 071 285	2 668 595
Carbide .. .. .	(tonne)	938 797	3 795 509
Cement .. .. .	(tonne)	8 724 728	13 960 201
Chemical and metallurgical .. .. .	(tonne)	4 672 860	6 955 754
Ochre .. .. .	(tonne)	2 949	23 483
Pebbles (from 1957) .. .. .	(tonne)	18 026	314 578
Sand (moulding) .. .. .	(tonne)	864	9 550
Silica .. .. .	(tonne)	372 981	926 177
Talc .. .. .	(tonne)	338	2 154
<b>FUEL MINERALS</b>			
Coal .. .. .	(tonne)	10 635 064	29 495 029
Shale .. .. .	(tonne)	42 239	62 462
Peat .. .. .	(tonne)	1 837	121 421
<b>CONSTRUCTION MATERIALS</b>			
<b>Building stone—</b>			
Freestone .. .. .	(metre <sup>3</sup> )	12 002	463 165
Granite .. .. .	(metre <sup>3</sup> )	4 642	90 858
Other .. .. .	(metre <sup>3</sup> )	12 976	78 605
<b>Crushed and broken stone (from 1958)—</b>			
Basalt .. .. .	(metre <sup>3</sup> )	2 753 826	11 226 399
Dolerite .. .. .	(metre <sup>3</sup> )	8 409 378	35 292 298
Limestone .. .. .	(metre <sup>3</sup> )	336 774	1 282 432
Sandstone .. .. .	(metre <sup>3</sup> )	36 275	88 620
Other .. .. .	(metre <sup>3</sup> )	2 613 971	9 599 871
Gravel (from 1958) .. .. .	(metre <sup>3</sup> )	18 102 153	30 874 802
Sand (from 1958) .. .. .	(metre <sup>3</sup> )	1 900 032	4 210 965
Other road making material .. .. .	(metre <sup>3</sup> )	2 944 049	5 122 436
			\$1 783 180 116

### STATISTICS RELATING TO THE MINERAL INDUSTRY

<i>Mineral</i>	<i>Year Ended 31 December 1974</i>		<i>Year Ended 31 December 1975</i>	
	<i>Total Quantity</i>	<i>Value \$A</i>	<i>Total Quantity</i>	<i>Value \$A</i>
<b>METALLIC MINERALS</b>				
Bismuth .. .. . (kilogram)	....	....	....	....
Cadmium .. .. . (tonne)	126	760 230	155	784 240
Cobalt oxide .. .. . (tonne)	20·7	104 159	17·55	107 855
Copper .. .. . (tonne)	28 441	35 837 416	25 698	24 606 515
Crocoite .. .. . (specimens only)	....	3 595	....	7 724
Gold .. .. . (kilogram)	1 385	5 118 359	1 453	5 712 948
Iron ore pellets .. .. . (tonne)	2 230 197	26 475 112	2 054 522	25 829 883
Iron oxide .. .. . (tonne)	11 005	73 192	10 699	92 769
Lead .. .. . (tonne)	12 637	5 048 404	11 380	3 524 700
Manganese dioxide .. .. . (tonne)	1 308	63 744	392	16 346
Mercury .. .. . (kilogram)	71	922	210	1 200
Rutile (concentrates) .. .. . (tonne)	4 322	1 062 973	5 504	1 579 311
Silica for silicon alloy production .. .. . (tonne)	3 450	34 500	5 742	57 420
Silicon as silicon alloys .. .. . (tonne)	21 573	2 828 217	12 310	1 929 021
Silver .. .. . (kilogram)	62 093	7 169 721	55 853	6 110 155
<b>Sulphur—</b>				
Pyrites .. .. . (tonne)	224 251	....	224 423	....
Sulphuric acid from pyrites .. .. . (mono tonne)	301 872	5 452 341	332 753	6 924 011
Sulphuric acid from zinc concentrates (mono tonne)	79 200	1 300 706	63 362	1 240 198
Tin .. .. . (tonne)	5 951	34 221 518	5 494	30 093 128
Tungsten as tungstic oxide .. .. . (tonne)	1 302	7 876 323	1 744	11 910 827
Zinc .. .. . (tonne)	53 803	30 973 172	54 326	35 873 182
Zircon (concentrates) .. .. . (tonne)	5 531	1 145 030	8 799	1 933 412
<i>Value of Metallic Minerals</i> .. .. .	....	165 549 634	....	158 334 845

<i>Mineral</i>	<i>Year Ended 31 December 1974</i>		<i>Year Ended 31 December 1975</i>		
	<i>Total Quantity</i>	<i>Value \$A</i>	<i>Total Quantity</i>	<i>Value \$A</i>	
<b>NON-METALLIC MINERALS</b>					
Clay—					
Brick .....	(metre <sup>3</sup> )	70 443	225 840	72 369	243 576
Tile .....	(metre <sup>3</sup> )	7 404	20 440	4 872	16 763
Other .....	(metre <sup>3</sup> )	33 640	141 789	35 046	311 891
Dolomite .....	(tonne)	6 434	47 444	5 042	40 543
Limestone—					
Agricultural .....	(tonne)	68 217	194 115	30 341	141 220
Carbide .....	(tonne)	22 487	270 331	18 865	269 704
Cement .....	(tonne)	421 145	817 020	417 615	810 173
Chemical and metallurgical .....	(tonne)	64 333	392 620	54 548	340 424
Other .....	(tonne)	23 529	50 809	24 111	44 549
Ochre .....	(tonne)	38	621	....	....
Pebbles .....	(tonne)	1 426	35 519	859	15 622
Silica .....	(tonne)	25 410	74 828	27 573	95 257
<i>Value of Non-Metallic Minerals</i> .....		....	2 271 376	....	2 329 722
<b>FUEL MINERALS</b>					
Coal .....	(tonne)	127 460	678 665	161 922	972 491
Peat .....	(tonne)	318	27 000	375	29 873
<i>Value of Fuel Minerals</i> .....		....	705 665	....	1 002 364
<b>CONSTRUCTION MATERIALS</b>					
Building stone—					
Freestone .....	(metre <sup>3</sup> )	911	111 644	866	67 789
Granite (red) .....	(metre <sup>3</sup> )	4	1 080	....	....
Other .....	(metre <sup>3</sup> )	705	1 900	260	21 150
Crushed and broken stone—					
Basalt .....	(metre <sup>3</sup> )	303 048	1 581 288	345 041	2 244 005
Dolerite .....	(metre <sup>3</sup> )	462 179	2 354 858	379 339	2 590 183
Limestone .....	(metre <sup>3</sup> )	16 121	81 105	16 575	104 055
Sandstone .....	(metre <sup>3</sup> )	15	324	....	....
Other .....	(metre <sup>3</sup> )	113 930	610 831	71 524	482 202
Gravel .....	(metre <sup>3</sup> )	1 518 673	3 209 562	1 393 842	4 919 143
Sand .....	(metre <sup>3</sup> )	163 442	602 944	108 675	530 019
Other road making material .....	(metre <sup>3</sup> )	80 947	245 712	196 011	692 388
<i>Value of Construction Materials</i> .....		....	8 801 248	....	11 650 934
<i>Total Value with Australian Metal Prices</i>		....	177 327 923	....	173 317 865
<b>METALLURGICAL PRODUCTION FROM OTHER THAN TASMANIAN ORES</b>					
Alumina .....	}	....	145 802 921	....	135 013 109
Aluminium .....					
Aluminium hydrates .....					
Aluminium sulphates .....					
Cadmium .....					
Cobalt oxide .....					
Ferro-manganese .....					
Titanium dioxide .....	....	323 130 844	....	308 330 974	
Zinc .....	....	323 130 844	....	308 330 974	
<i>Value of Mining and Metallurgical Production</i>		....	323 130 844	....	308 330 974
Average number of Employees .....		10 103		9 163	

### AID TO MINING

Four projects were assisted during the year to purchase plant and equipment in connection with alluvial tin mining operations in the Derby district, at Middleton Creek on the East Coast, at Gladstone and in the vicinity of Melaleuca Inlet in the Port Davey area. In all cases security was taken by a registered mortgage deed over the plant at the mine. Repayment of the amount advanced is required to be made by a royalty of 7½% of the proceeds from the sale of minerals produced. The interest rate was fixed at 6% payable half-yearly. Two of the projects have commenced repayments, one project has not yet reached the production stage and another after commencing operations could not continue and has since closed down. The plant is being stored pending favourable opportunity for its disposal for use in other mining operations. Another project which received a loan last year has ceased operations and negotiations are in progress for the disposal of the plant and repayment of the amount advanced under the loan.

*Mt Bischoff Tin Mine:* This continues to be held under an Authority to Prospect by Comstaff Pty Ltd but there have been no developments although investigations were continued throughout the year. There was no activity by the three parties who hold tribute areas.

#### STATEMENT OF RECEIPTS AND PAYMENTS OF THE MINING TRUST FUND FOR THE YEAR ENDED 31 DECEMBER 1975

<i>Receipts</i>	\$	<i>Payments</i>	\$
Balance from last Account .....	13 414·17	Assistance to individuals and companies .....	26 467·77
Repayment of loans .....	14 832·63	Balance to Next Account .....	3 804·58
Interest on loans .....	1 795·18		
Authority to prospect .....	145·10		
Tribute royalty .....	35·27		
Other .....	50·00		
	<u>\$30 272·35</u>		<u>\$30 272·35</u>

### STAFF

The following staff changes occurred during the year:—

<i>Name</i>	<i>Position</i>	<i>Remarks</i>	
Barker, M. A. (Miss) .....	Typist	Resigned	20.6.75
Barr, G. P. (Miss) .....	Typist	Appointed	7.7.75
Bartkus, E. J. ....	Electrical Engineer	Appointed	9.6.75
Bates, J. A. ....	Assistant Publications Officer	Resigned	6.8.75
Braithwaite, J. B. ....	Senior Mining Engineer	Retired	1.3.75
Cox, S. F. ..	Geologist	Resigned	29.8.75
Dawe, V. C. ....	Laboratory Assistant	Retired	19.2.75
Dix, M. J. ....	Assistant Publications Officer	Appointed	27.11.75
Egan, L. F. ....	Mining Engineer	Retired	31.3.75
Hopkins, P. N. ..	Clerk	Appointed	21.7.75
Johnson, E. A. ..	Field Assistant	Appointed	8.4.75
Ladaniwskyj, J. S. ....	Draughtsman	Appointed	24.2.75
Matthews, D. J. ....	Field Assistant	Appointed	6.3.75
Maxfield, V. M. (Miss) .....	Typist	Appointed	13.1.75
Morrison, C. J. ..	Clerk	Transferred	6.2.75
Saunders, H. J. (Miss) .....	Records Clerk	Transferred	29.5.75

<i>Name</i>	<i>Position</i>	<i>Remarks</i>	
Seymour, R. A. A. ....	Mining Engineer	Appointed	19.5.75
Sloane, D. J. ....	Geologist	Appointed	13.1.75
Smith, C. P. ....	Registrar of Mines	Promoted	9.10.75
Thomas, G. A. ..	Senior Draughtsman	Promoted	13.11.75
Thomas, P. ....	Chemist	Resigned	18.7.75
Tindal, W. R. ....	Senior Mining Engineer	Promoted	3.4.75
Watson, G. W. ....	Clerk	Appointed	18.9.75
Webb, C. S. ....	Clerk	Transferred	25.6.75
White, E. L. (Miss) ....	Clerk	Appointed	7.7.75
Wyatt, D. J. ....	Field Assistant	Appointed	20.3.75

### *Obituary*

It is with regret I record the death of Mr A. B. Cumming, the Registrar of Mines, Hobart, who was killed in a road accident on 19 August 1975.

### *Draughting staff*

It has been traditional for Lands Department staff to undertake all duties associated with plans, survey diagrams and descriptions of boundaries of mining tenements issued by the Department of Mines under the provisions of the Mining Act 1929. By arrangement with the Director of Lands and the Public Service Board a transfer of the staff to the Department of Mines was approved as from 24 July 1975.

### **SCHOLARSHIP**

J. L. Everard was awarded a geological scholarship to study for the degree of Bachelor of Science.

### **OVERSEAS VISIT**

The Director of Mines, who was appointed by the International Labour Office in 1972 to a Panel of Consultants on safety and health in mines, was invited to attend a meeting of the Panel at Toronto, Canada to study and discuss a draft of a code entitled 'Safety and Health in the use of diesel-powered equipment underground in mines.' This Department has had considerable experience in authorising the use of such equipment underground in this State and the Director was able to make a significant contribution to the making of a Code for world wide use in the mining industry. Opportunity was taken during the visit to inspect the important nickel mining area at Sudbury which is well known for its mining practices.

Mr W. Hodgson, Mechanical Engineer visited South Africa and the United Kingdom to study latest practices in the design, construction, operation, inspection and maintenance of mine shaft and winding equipment. The rapidly increasing complexity of these installations in Tasmanian mines in recent years has placed demands upon inspectorial staff which could best be satisfied by study of manufacturing techniques in the United Kingdom and inspection of equipment in use in major mines in South Africa. As a result the Department is now better equipped to ensure that the latest techniques are employed for the safe installation and operation of modern shaft and winding machinery according to the circumstances under which the equipment is used in this State.

### **CONCLUSION**

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

A detailed review of operations and production, and the reports of the Geological Survey Branch, the Chemical and Metallurgical Branch, the Mines and Explosives Branch, the Mount Cameron Water Race Board and the Ringarooma and Cascade Water Board follow.

J. G. SYMONS, Director of Mines.

# OPERATIONS AND PRODUCTION

## 1. — Metallic Minerals

### CADMIUM

Year	QUANTITY AND VALUE OF PRODUCTION				
	Tonnes		\$		
1924-1970 .. ... ..	1 854	5 777 693	1973 .. ... ..	178	1 026 000
1971 .. ... ..	75	272 563	1974 .. ... ..	126	760 230
1972 .. ... ..	138	658 560	1975 .. ... ..	155	784 240
			Total ..	2 526	9 279 286

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 17.55 tonnes of cobalt oxide of value \$107 855 was the same as that of cadmium.

### COPPER

#### SOURCE, QUANTITY AND VALUE OF PRODUCTION

Year	From tin ores		From lead-zinc ores		In blister copper		From copper ores		Total	
	Tonnes	\$	Tonnes	\$	Tonnes	\$	Tonnes	\$	Tonnes	\$
1919-1970 ...	1 869	2 220 888	19 818	14 869 112	501 143	208 564 870	24 380	31 061 442	547 210	256 716 312
1971 .. ...	925	917 843	1 669	1 629 093	....	....	22 604	22 256 517	25 198	24 803 453
1972 .. ...	1 038	981 414	2 478	2 341 658	....	....	24 290	22 903 156	27 806	26 226 228
1973 .. ...	750	941 501	1 746	2 256 020	....	....	22 833	28 979 109	25 329	32 176 630
1974 .. ...	533	678 871	2 555	3 263 125	....	....	25 353	31 895 420	28 441	35 837 416
1975 .. ...	570	545 487	2 174	2 080 831	....	....	22 954	21 980 197	25 698	24 606 515
Total ...	5 685	6 286 004	30 440	26 439 839	501 143	208 564 870	142 414	159 075 841	679 682	400 366 554

#### The Mount Lyell Mining and Railway Company Limited, Queenstown

	Tonnes
Mining—	
Overburden removed from Crown Open-Cut (waste) .. ... ..	24 300
Ore mined—	
Prince Lyell .. ... ..	1 245 220
West Lyell Stockpile .. ... ..	107 400
Crown Lyell .. ... ..	145 464
Cape Horn .. ... ..	429 219
Lyell Tharsis .. ... ..	169 956
Royal Tharsis .. ... ..	679
Crown Three open cut .. ... ..	58 493
	2 156 431
Copper concentrate produced .. ... ..	89 667
Containing—	
Copper (tonnes) .. ... ..	22 954
Silver (grams) .. ... ..	4 403 002
Gold (grams) .. ... ..	477 556
Pyrite concentrate produced .. ... ..	105 760
Total value of production .. ... ..	\$24 677 033

The average number of persons employed was 597 underground and 714 on the surface.

Metal production from the inception of the company to 31 December 1975 was:—

Copper	....	....	....	....	....	....	....	....	....	....	805 739 tonnes
Silver	..	....	....	....	....	....	....	....	....	....	535 975 659 grams
Gold	....	....	....	....	....	....	....	....	....	....	22 964 570 grams

E. C. Leyland, Mining Engineer, Burnie, reports:—

		MINE DEVELOPMENT			
<i>Mine Area</i>		<i>Driving and Cross-cutting (m)</i>	<i>Rising (m)</i>	<i>Diamond Drilling (m)</i>	<i>Raise Boring (m)</i>
Prince Lyell	....	7 896	373	1 472	....
Cape Horn	....	975	174	431	....
Crown	..	188	92	....	....
Lyell Tharsis	....	30	....	....	....
Royal Tharsis	....	133	72	....	....
'A' Lens	....	138	....	1 887	....
Other	..	....	....	3 051	568
Total		9 360	711	6 841	568

#### *No. 1 Shaft Prince Lyell*

Although that section of the shaft between 16 and 17 levels which was affected by ground movement last year appeared to have stabilised following the cable anchoring, further movement occurred and pressure on two dividers caused bowing in two buntons. Re-alignment was undertaken and no further trouble has been experienced.

The dam on 15 level was completed and the permanent pumping installations from 15-11 levels commissioned. Details have been finalised of an improved system pumping from shaft bottom to 15 level. Discharge of all mine water at 11 level is presently into the North Lyell tunnel, but this water will be diverted to flow beneath the conveyor when the conveyor tunnel is completed.

The mechanical and electrical workshops at the surface, close to the shaft, were equipped and occupied early in the year.

Two contracts were undertaken at the shaft by the joint venture group (Roberts, Union Corporation, Holland). The first was the excavation of the main haulage drive to the Prince Lyell ore body on 17 level. This drive is planned to service the main ore passes from 14 level and to connect to the southern exhaust airway. At the start, 60 m of conventional driving was carried out for the introduction of the Robbins 133/146 mole. Moling commenced but owing to ground closure around the head which necessitated blasting to free it, the drive was put on a seven day week basis until completion, an average advance of 72 m per week being achieved. Sections of the drive were supported with 277 sets and in other portions 1 496 rock bolts were grouted in. The drive was 863 m in length and 4 m in diameter.

It was found that closure of up to 45 cm had taken place in the drive near the commencement of moling where there is faulting parallel to the main fault striking west of the ore body and shaft. The set rings had to be removed and the drive stripped and re-timbered before the mole could be extricated. The mole then commenced the Cape Horn haulage drive; 1 800 m in length on 14 level. In the first two weeks 182 m was driven.

The main decline (4.5 x 5.5 m) was driven 1 400 m to completion at a down gradient of 1 in 9. The equipment consisted of an Atlas Copco three-boom jumbo and an Eimco 920 L.H.D. Towards the finish the L.H.D. was travelling 60 km per day.

Development of the crusher station complex on 17 and 18 levels was continued. The top arch of the crusher chamber has been cut and supported with cable bolts and grouted dowels the whole being meshed and shot-creted.

On the surface the earthworks for the overland conveyor system were completed and the ore pass connecting to the conveyor adit was completed. The steel work at this pass and the concrete beams for the conveyor were being installed in December.

#### *Prince Lyell Mine*

Due to the failure of the development program for the No. 1 shaft to maintain schedule, it remains necessary to treat the shaft and the mine as separate entities. Development at the mine has been towards the preparation of the second block (92 m level to 182 m level) for open stoping, the horizontal development being partly completed. The decline below 92 m level was advanced 10 m for the year, and an exhaust airway from the 92 m level was risen to the 195 m level to link with the southern exhaust airway.

Production achieved the budget target in tonnage, mostly from pillar recovery, but not in grade. Fragmentation of pillars resulted in a high proportion of secondary blasting. A test using Molanite gave encouraging results, but poor consistency of this slurry prevented a major firing. A secondary breaking machine achieved moderate success. After a designated number of operating hours diesel units are now transported to the workshop at West Lyell completely stripped, strengthened, modified and re-assembled.

#### *Cape Horn Mine*

Development has been concentrated on the 197 m level (the pillar recovery level) with the decline having been advanced to 60 m beyond the 170 m level. Following collapses in stopes 5 and 3 although the target tonnage for the year was achieved, the grade was well below reserve. In stope 5 the initial self-caving of the hanging wall filled the stope to the 290 m level. When the crown pillar above the 315 m level collapsed the damage from the resultant air blast was confined to the 315 m level. The empty stopes 1 and 2 are still stable, stope 3 has filled itself to the 290 m level with material from foot and hanging wall caving, and the pillars 2-3 and 3-4 are showing serious deterioration. When extraction from stope 4 is completed it is planned to attempt a major blast of the remaining pillars.

#### *Crown Mine*

The floor of the open-cut reached the designed level in May and was then stopped to permit an acceleration of the underground mining of the block from 4 level through to the cut. Stope 5-6 pillar was fired but dilution from the faulted hanging wall severely reduced grade expectations. Adverse scraping conditions in the scam drifts coupled with water in the ore passes remain the main impediments to improved production. To combat these conditions, mill-holes have been cut in the footwall side of the scam drifts for loading with a L.H.D. unit.

#### *Lyell Tharsis Mine*

A large vertical pillar was left to restrict the flow of oxidised waste from the surface to the draw point. With the cutting of a new slot ring, firing recommenced, but the pillar failed and in periods of wet weather dilution becomes heavy. Tonnage and grade did not achieve the targets.

#### *Royal Tharsis, 'A' lens, 'B' lens*

All horizontal development for 'B' lens was completed during the year and the slot and ventilation rises have been commenced. The Royal Tharsis block is ready for production in 1977.

### GENERAL

Underground mines provided 92% of the ore for the year. The mining of floor and rib pillars has, in addition to posing special problems in mine stability, resulted in reduced production for 1975. The surge capacity provided by the intermediate ore storage bin has not yet been utilised to full advantage. With the

depressed copper price the company has successfully improved stope drilling efficiency and made strenuous efforts to contain costs. In view of the emphasis on a major capital development program at Prince Lyell shaft, in difficult ground conditions, a creditable cost result has been achieved.

The mine geology section has been greatly involved with the mine's rock mechanics problems and has, in addition to the normal structural mapping, provided data on pillar and hanging wall strengths. A draw-point control sampling system was instituted during the year. The exploration drilling on the mines was aimed at the continuation of the West Tharsis ore in depth by drilling from 11 and 14 levels. Two deep holes indicated that the Prince Lyell ore body extends below 17 level.

ORE RESERVES AT 30 JUNE 1975

Mine	Tonnes	Copper (%)	Silver (g/t)	Gold (g/t)
<b>PROVED ORE—</b>				
Prince Lyell	25 048 000	1.42	3.000	0.400
Lyell Tharsis	450 000	1.22	1.531	0.245
Crown Three	1 712 000	1.75	3.980	0.367
Crown Two	10 000	2.50	24.490	0.306
Twelve West	29 000	9.50	30.612	0.153
Cape Horn	1 560 000	1.57	4.286	1.224
<b>Total</b>	<b>28 809 000</b>	<b>1.45</b>	<b>3.138</b>	<b>0.440</b>
<b>PROBABLE ORE—</b>				
'A' Lens	4 524 000	1.32	1.531	0.245
Royal Tharsis	2 338 000	1.48	1.531	0.245
Prince Lyell	2 223 000	1.38	3.000	0.400
Cape Horn	1 223 000	1.75	3.061	0.306
<b>Total</b>	<b>10 308 000</b>	<b>1.42</b>	<b>1.713</b>	<b>0.252</b>
<b>POSSIBLE ORE (not reserves)—</b>				
Cape Horn	1 939 000	1.28	3.061	0.306
<b>Total</b>	<b>1 939 000</b>	<b>1.28</b>	<b>3.061</b>	<b>0.306</b>

MILLING

Concentrate

	Tonnes	Copper (%)	Sulphur (%)
Copper	89 667	25.6	...
Pyrite	105 760	0.35	47.3

General

The mill operated for 348 days, down time including five days due to a fire on conveyor and eight days for maintenance.

A full survey involving the sampling of all streams in the grinding and flotation sections was undertaken with the C.S.I.R.O. to indicate areas for improvement. In addition to the ninety-two samples taken, information was gathered on flow rates, size range, density, pH and power consumption.

Several tests were run on the flotation of pyrite from the formerly rejected slimes. Indications were that about 30 000 tonnes of pyrite could be recovered annually from this procedure, in addition to the normal coarse pyrite production.

An investigation into the distribution of gold and silver in various sections of the plant was carried out when it was found that wood pulp collecting on flotation froth was trapping these metals.



**Electrolytic Zinc Company of Australasia Limited, Rosebery**

This company, reviewed under Zinc, produced 18 226 tonnes of copper concentrates containing 2 174 tonnes of copper valued at \$2 080 831.

**GOLD****QUANTITY AND VALUE OF PRODUCTION**

Year	Kilograms	Value	Year	Kilograms	Value
		\$			\$
Prior to 1971	88 305	38 344 645	1973	1 319	2 987 891
1971	1 660	1 933 457	1974	1 385	5 118 359
1972	1 781	2 873 567	1975	1 453	5 712 948
				<u>95 903</u>	<u>56 970 867</u>

**The Mount Lyell Mining and Railway Company Limited, Queenstown**

This company recovered 478 kilograms, valued at \$1 889 239 from sludge in the electrolytic copper refinery.

**Electrolytic Zinc Company of Australasia Limited, Rosebery**

Concentrates produced by this company contained 975 kilograms, valued at \$3 820 373.

**BMI Mining Pty Ltd, South Mount Cameron**

Concentrates produced by this company contained 0.8 kilograms of gold valued at \$3 211.

**Lisle Goldfield**

Two small workers, Messrs H. A. Graham and W. T. Imlach recovered 31 grams of gold valued at \$125.

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

	Tonnes
Savage River—	
Overburden removed	9 277 809
Ore mined	4 848 670
Concentrate to Port Latta (dry)	2 059 909
Port Latta—	
Pellets produced (dry)	2 054 522
Value of production	\$25 829 883
Average number of persons employed—	
Mining	151
Other	507
<b>Total</b>	<u>658</u>

R. C. Thomas, Mining Engineer, Burnie reports that at Savage River the pit bottom reached the 13 level and the eastern side was operating on the 6 and 7 levels. A report from the consultants recommended reinforcing, drill hole drainage, and pre-split blasting of the pit final banks. These measures will be adopted on the East 6, 7 and 8 banks during 1976. A further eight 85-tonne G.M. Terex trucks were leased during the year and six of the old 45 tonne trucks were sold. The crusher ramp was up-graded and the workshop doors enlarged and automated to accommodate the larger trucks. Two new bulldozers and a front-end loader capable of loading the new trucks were also leased. The leasing of new equipment was reflected in the increase in overburden removal although ore production remained static. The study into an automatic grind control system continued.

At Port Latta twenty-eight shipments of pellets, averaging 68 737 tonnes per vessel, and nine oil tankers, discharging a total of 41 721 tonnes of fuel oil, passed through the port during the year. Power factor correction equipment was installed in the plant.

Seventy-six reportable accidents occurred during the year, sixteen at Port Latta, an increase of 14% and sixty occurred at Savage River, an increase of 13%. Accident statistics for the year were:—

	Accidents	Days Lost		Man Hours	Frequency Rate	Severity Rate	Mean Duration (Days)
		Working	Calendar				
Savage River ....	60	417	446	856 175	70·1	521	6·95
Port Latta ....	16	180	662	521 992	30·6	1 268	11·25
Combined ....	76	597	1 108	1 378 167	55·2	804	7·85

### IRON OXIDE

#### QUANTITY AND VALUE OF PRODUCTION

Year	Tonnes	Value		Year	Tonnes	Value	
		\$				\$	
Prior to 1971 ....	158 004	495 655		1973 ....	12 293	82 394	
1971 ....	10 724	65 526		1974 ....	11 005	73 192	
1972 ....	9 783	61 956		1975 ....	10 699	92 769	
				Total ....	212 508	871 492	

#### Iron Cliffs Mine, Penguin

A. Pearson continued to work the secondary ore at the Iron Cliffs mine and supplied a cement works with 10 699 tonnes of hematite valued at \$92 769. Employment averaged five men.

### LEAD

#### QUANTITY AND VALUE OF PRODUCTION

Year	Tonnes	Value		Year	Tonnes	Value	
		\$				\$	
1919 to 1970 ....	429 241	60 223 470		1973 ....	14 362	4 091 160	
1971 ....	12 452	2 926 075		1974 ....	12 637	5 048 404	
1972 ....	20 303	4 951 450		1975 ....	11 380	3 524 700	
				Total ....	500 375	80 765 259	

#### Electrolytic Zinc Company of Australasia Limited, Rosebery

This company, reviewed under Zinc, produced 13 836 tonnes of lead concentrate and the total content of lead in the lead, zinc and copper concentrates was 11 380 tonnes valued at \$3 524 700.

#### South Comet Mine, Dundas

The leases covering this mine were forfeited to Messrs Bennett, Bennett & Smyth, who with two men and a bulldozer re-opened and improved the old road into the mine to avoid the Comet Hill gradient. The mine was sampled throughout, rails laid in 3 level Adit and a section made ready for production.

#### SPECIMENS OF LEAD MINERALS

#### Adelaide Mine, Dundas

Production of crocoite by Mr F. Mihajlowits, valued at \$5 000, was obtained from a cross-cut in the old stope wall. The access road to the lease was improved by re-routing through the West Comet area. A stockpile area for mullock was levelled, to avoid stream pollution, and rails were placed in Number 3 adit to service a rise designed to link Number 2 lode with Number 3 adit and permit easy access.

**Red Lead P.A., Dundas**

Production of mineral specimens by Messrs Herman & Mihajlowits was valued at \$6 500. The mineral corkite ( $\text{PbFe}_3\text{PO}_4\text{SO}_4(\text{OH})_6$ ) was found and some specimens recovered. Over 60 m of driving in two new adits to intersect the lode at different horizons was achieved. Ten metres of rising for a ventilation link was completed. The access road via West Comet and the Adelaide lease was improved to permit four wheel drive traffic throughout the year. The market and price for mineral specimens is currently poor, however, the lease-holders have good areas ready for mining when demand recovers.

**Miscellaneous, Dundas**

The value of small workers' production of crocoite was as follows:—

	\$
F. Mihajlowits from the Anderson prospect .. .. .	400
J. L. Sievers from the West Comet Mine .. .. .	87

**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 392 tonnes was valued at \$16 346.

**MERCURY****QUANTITY AND VALUE OF PRODUCTION**

<i>Year</i>	<i>Value</i>		<i>Year</i>	<i>Value</i>	
	<i>Kilograms</i>	<i>\$</i>		<i>Kilograms</i>	<i>\$</i>
1967 to 1970 .. .. .	5 816	78 924	1973 .. .. .	544	3 265
1971 .. .. .	302	2 484	1974 .. .. .	71	922
1972 .. .. .	593	2 986	1975 .. .. .	210	1 200
				7 536	89 781

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 mine on the West Coast. Recovery was first made early in 1967. Production for the year was 210 kilograms, valued at \$1 200.

**OSMIRIDIUM**

Total production to date is 881 kilograms, valued at \$1 418 771.

**PYRITE****QUANTITY PRODUCED**

<i>Year</i>	<i>Tonnes</i>	<i>Year</i>	<i>Tonnes</i>
1915 to 1970 .. .. .	1 941 659	1973 .. .. .	244 798
1971 .. .. .	182 411	1974 .. .. .	224 251
1972 .. .. .	221 595	1975 .. .. .	224 423
			3 039 137

Since 1969 pyrite concentrates produced by the Mount Lyell Mining and Railway Company Limited, Queenstown and the Electrolytic Zinc Company of Australasia have been sent to the North-West Acid Pty Ltd treatment plant at Wivenhoe.

No value is reported for the pyrites as this is included in the value reported for sulphur as sulphuric acid.

### SILICA FOR SILICON ALLOY PRODUCTION

#### The Broken Hill Proprietary Company Limited, Beaconsfield

This company mined and supplied to the Tasmanian Electro-Metallurgical Company 5 742 tonnes of silica valued at \$57 420. A local contracting firm carried out the work.

### SILICON

#### Tasmanian Electro-Metallurgical Company Proprietary Limited, Bell Bay

In the production of silicon as silico-manganese this company smelted 393 tonnes of local Beaconsfield quartzite combined with slag from ferro-manganese production for a yield of 12 310 tonnes of silico-manganese valued at \$1 929 021. The average number of persons employed is shown under Ferro-Manganese.

### SILVER

Silver is nowhere mined for itself but is a valuable by-product from copper, lead and zinc ores.

#### PRODUCERS, SOURCE, QUANTITY AND VALUE OF PRODUCTION, 1975

<i>Producer</i>	<i>Source</i>	<i>Kilograms</i>	<i>\$</i>
EZ Co. of A/asia Ltd	Copper, lead and zinc concentrates	51 451	5 631 116
Mt Lyell M. & R. Co. Ltd	Refinery sludge	4 402	479 039

#### SOURCE, QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>From tin and other ores</i>		<i>From silver-lead ore</i>		<i>From copper ore</i>		<i>From lead-zinc ore</i>		<i>Total</i>	
	<i>Kilograms</i>	<i>\$</i>	<i>Kilograms</i>	<i>\$</i>	<i>Kilograms</i>	<i>\$</i>	<i>Kilograms</i>	<i>\$</i>	<i>Kilograms</i>	<i>\$</i>
1919-1970 ..	3 788	101 764	550 239	5 749 634	129 373	2 153 203	968 697	29 063 943	1 652 097	37 068 544
1971 .. ....	.....	.....	.....	.....	3 673	156 351	48 254	2 016 052	51 927	2 172 403
1972 .. ....	2 572	123 722	.....	.....	4 174	191 595	72 476	3 350 980	79 222	3 666 297
1973 .. ....	663	38 686	.....	.....	3 944	231 726	55 473	3 283 151	60 080	3 553 563
1974 .. ....	445	51 273	9	1 045	5 217	602 181	56 422	6 515 222	62 093	7 169 721
1975 .. ....	.....	.....	.....	.....	4 402	479 039	51 451	5 631 116	55 853	6 110 155
Totals ....	7 468	315 445	550 248	5 750 679	150 783	3 814 095	1 252 773	49 860 464	1 961 272	59 740 683

### SULPHUR

Sulphuric acid is produced in the roasting at Risdon of the zinc concentrates from the West Coast mines of the Electrolytic Zinc Company of Australasia Limited, and from the treatment by North-West Acid Pty Ltd of pyrite concentrates produced by the Electrolytic Zinc Company and by the Mount Lyell Mining and Railway Company Limited.

#### SULPHUR AS SULPHURIC ACID: SOURCE, QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>From zinc concentrates</i>		<i>From pyrite concentrates</i>			<i>Total</i>	
			<i>Pyrite</i>	<i>Acid</i>			
	<i>Mono tonnes</i>	<i>\$</i>	<i>Tonnes</i>	<i>Mono tonnes</i>	<i>\$</i>	<i>Mono tonnes</i>	<i>\$</i>
1957-1970 .. ....	667 794	8 047 869	76 547	88 778	1 415 482	756 572	9 463 351
1971 .. ....	51 642	628 629	182 410	353 627	5 205 420	405 269	5 834 049
1972 .. ....	96 209	1 217 939	244 281	357 528	5 258 779	453 737	6 476 718
1973 .. ....	61 895	827 631	242 618	331 090	5 183 827	392 985	6 011 458
1974 .. ....	79 200	1 300 706	232 763	301 872	5 452 341	381 072	6 753 047
1975 .. ....	63 362	1 240 198	222 626	332 753	6 924 011	396 115	8 164 209
Totals ....	1 020 102	13 262 972	1 201 245	1 765 648	29 439 860	2 785 750	42 702 832



The following expenditure was incurred on capital works:—

	\$
Aberfoyle Mill modifications.... ..	6 800
Storeys Creek rodmill additions.... ..	1 500
Aberfoyle Mine pumps .... ..	11 500
Haulage truck .... ..	24 500

In addition, \$13 950 was spent on the chemical treatment of mine drainage water and \$12 290 on slime dam control.

A reappraisal of ore reserves at the end of the year led to them being cut severely.

#### **BMI Mining Pty Ltd, South Mount Cameron**

Three sluice boxes were operated in the Endurance and Post Office areas. They were fed with shallow surface wash by means of elevating scrapers and dozers.

A total of 163 935 cubic metres was treated during the year for a yield of 38·927 tonnes of concentrates containing 28·453 tonnes of tin valued at \$157 658. Employment averaged twelve men.

#### **Cleveland Tin N.L., Luina**

E. C. Leyland, Mining Engineer, Burnie, reports that there has been a decrease this year in the tonnage treated: 283 489 tonnes containing 0·78% Sn and 0·32% Cu, were treated. Recoveries were as follows:—

	<i>Tonnes</i>
Tin concentrate .... ..	2 321
Tin content .. ..	1 409
Copper concentrate .... ..	2 728
Copper content .... ..	570
Tin content .. ..	74

#### DEVELOPMENT

	<i>Ore (m)</i>	<i>Mullock (m)</i>
Driving and cross-cutting .... ..	530	253
Decline advance .... ..	....	240
Rising .... ..	98	17
	<hr/> 628	<hr/> 510

This development advanced the decline to the 15 level horizon, completed the development of Hall's lode on 13 level, approximately half the development on 14 level and included the exploration drive south from the decline, between 14 and 15 levels, up to the mineralised zone of the 'B' South lode.

#### PRODUCTION

The initial quota from the International Tin Council represented a cut in sales of 30 to 35% but this was eased to 20% on 1 October. The mill was at first changed from a seven day continuous shift operation to a three shift five day week. However, at the end of the year a three shift six day week was introduced to cover the necessary throughput. The mining was changed to a two shifts per day five day week operation instead of three shifts as was the practice prior to the quota imposition. Manpower was cut from an average of 240 at the beginning of the year to 203.

Ring drilling remained well ahead of current production requirements with 278 478 tonnes being ready for blasting. The introduction of new haulage equipment has not only improved availability but has also had a marked effect on maintenance costs. The current underground fleet consists of:—

- Two Caterpillar 980B loaders
- Two 35 tonne Wigtrucks
- Three M.T.F.'s completely rebuilt and up-graded to 30 tonnes capacity
- Two S.T.5 A's completely rebuilt as reserve units.

To permit greater tonnage control an 80 tonne weighbridge was installed and all ore and mullock hauled from the mine is now weighed. The fully automatic block light system has been commissioned in the main decline and is working satisfactorily.

#### MILLING

The mill operated for a total of 306 days. During two separate periods full plant test-runs treating Khaki ore exclusively were conducted. In an attempt to improve the poor recovery, obtained from this ore various modifications were introduced. At the end of the year the final results of the last test were not available but indications were that throughput and recovery had not been materially increased. A stockpile of 5000 tonnes of 'B' South ore from the development on 14 level has been bulk sampled and a study on optimum grinding size and tin particle size distribution is planned. Control of ore blending into the crushing section is now carried out by the operation of a Caterpillar 980B, loading directly from the various stockpiles.

Ore reserves in tonnes are as follows:—

	<i>Tonnes</i>	<i>% Cassiterite Tin</i>	<i>% Copper</i>
Indicated	1 895 000	0·82	0·32

Not included in these figures is the area of 'B' South lens between 14 level and 10 level. The grade of the 45 metres which has been developed on 14 level is higher than that indicated by drilling and further development may result in this block reaching ore reserve grade. Diamond drilling on the lease has been confined to that drilling necessary for current production, and confirming ore lens geometry.

#### SAFETY

The following is the work injury record for the year:—

Man hours exposure	401 942
Frequency rate	121·9
Severity rate	1 605·7
Mean duration (working days)	9·4

Employment figures for the year gave an average of 222 employees of whom forty-six were underground workers. Labour turnover in some categories remained high at over one hundred per cent.

#### Renison Limited, Renison Bell

Ore mined—	<i>Tonnes</i>
Federal	113 642
Stebbins Lode	206 467
Dreadnought Lode	48 256
Colebrook Lode	43 902
Penzance Lode	11 097
Murchison	52 007
	<hr/> 475 371 <hr/>

Tin concentrates produced—								<i>Tonnes</i>
High grade	....	....	....	....	....	....	....	6 384
Low grade	....	....	....	....	....	....	....	1 754
								8 138
Tin content	....	....	....	....	....	....	....	3 548
Overall recovery	....	....	....	....	....	....	....	67.6%

R. C. Thomas, Mining Engineer, Burnie, reports that the Renison decline advanced 264 metres to 4 080 metres, from, and 441 metres below the portal. In addition 3 590 metres of driving and cross cutting and 457 metres of rising were completed.

Ore treated amounted to 482 213 tonnes at 1.18% Sn, compared with 407 227 tonnes at 1.37% Sn treated in 1974.

The major effort in the concentrator went into commissioning the heavy media separation plant. Contamination of the heavy media by pyrrhotite required the installation of a small screening-flotation plant to clean the media. The sulphide flotation circuit was expanded to provide extra capacity made necessary by the HMS. Commissioning of an on-stream analysis system to monitor the sulphide flotation circuit was commenced.

The search for known ore zones along the Bassett-Federal Structure and in the No. 2 and No. 3 Horizon bed by diamond drilling, outlined substantial extensions at depth, and exploration in these areas will continue.

In the Renison Bell area a diamond drilling and surface sampling program was undertaken to test the Pine Hill granite intrusion but with disappointing results. To the north-west of the Renison Mine four diamond drill holes were completed into the Owen-Meredith Shear Zone to test a possible narrow high grade silver lode, but again, with the exception of one hole, the results were disappointing.

Altogether seventy-four diamond drill holes were drilled totalling 13 781 metres, of which nineteen or 6 929 metres were drilled from surface sites and fifty-five or 6 852 metres were drilled from underground sites.

Although turnover of employees increased slightly compared with 1974, recruitment improved during the year. Construction of new housing in Zeehan progressed well and was substantially completed by the end of the year, providing accommodation for some sixty families.

Late in April the International Tin Council imposed export restrictions on the producer members, which represents a cut of approximately 18% in Australian exports as compared with 1974. Due to lack of local demand the tin sales for the quota period were about 70% of total production. The outlook for 1976 will be clouded by the export restrictions and this coupled with inflation will have an inhibiting effect on the Company's operation in the ensuing year.

After allowing for depletion, by mining, the combined proved and probable reserves decreased slightly by 274 000 tonnes but the proved reserves increased by 1 057 000 tonnes to 6 107 000 tonnes at an average grade of 1.40% Sn.

Ore reserves at September 1975 were as follows:—

<i>Orebody</i>	<i>Probable (Tonnes)</i>	<i>%</i>	<i>Proved (Tonnes)</i>	<i>%</i>	<i>Possible (Tonnes)</i>	<i>%</i>
Bassett-Federal	1 469 000	1.05	1 932 000	1.02	6 280 000	1.23
No. 2 Horizon	510 000	1.26	1 625 000	1.45	980 000	1.19
No. 3 Horizon	420 000	1.60	2 300 000	1.70	500 000	1.00
Other lodes	550 000	1.30	250 000	1.40	....	....
Totals	2 949 000	1.21	6 107 000	1.40	7 760 000	1.21

Capital expenditure for the year was as follows:—

	\$
Mining department ....	862 000
Housing and welfare ....	1 649 000
Vehicles and equipment ....	792 000
Concentrator and other plant ..	1 113 000
	<hr/>
	4 416 000
	<hr/>

#### SAFETY

One hundred and sixty-five accidents occurred during the year but none was fatal. The total number of persons employed was 428 of whom 110 were underground workers.

Accident statistics for the year were:—

Man hours exposure ....	794 491
Frequency rate ..	207·7
Severity rate ....	3 781
Mean duration (days) ....	12·7

#### **Ringarooma Mining Pty Ltd, Waratah**

This company produced 432 tonnes of tin concentrates containing 265 tonnes of tin from 172 000 cubic metres of gravel. An average of twenty-one men was employed.

Areas to the north of the concentrator, which had been only partially worked, have been reworked and now are being used as tailing ponds. The number and extent of tailings dams have been increased so that the final outflow is similar to the water flowing down the Waratah River, which has been confined to the eastern side of the valley. At the start of the year the river was flowing on the western side while the original bed was being worked. Much of the excavated bed of the river was filled in by debris brought down from the upper reaches when the Magnet dam was breached. This debris has been cleared out again but very little cassiterite was recovered from it. The river has now been returned to its original position.

This flood also badly damaged all the tailings dams and these have since been restored and enlarged. The concentrator and ancillary plant suffered no damage, although a week's production was lost. A good access road has been made between the river and the tailings dam and has reached a point 1 kilometre north of the treatment plant.

At the close of the period testing was being carried out 1 kilometre downstream from the concentrator. A drainage channel was being cleared on the western side of the valley and on completion a sampling cut across the valley was to be made.

#### **V. Wood, Pioneer Mine, Pioneer**

Production from an estimated 124 000 m<sup>3</sup> of gravel treated was 22·4 tonnes of tin in concentrates valued at \$122 341. An average of seven men was employed.

#### **K. Kerrison, Ringarooma River Beaches**

Mr Kerrison continued operations with a front-end loader and jig, to produce 4·3 tonnes of tin in concentrates valued at \$23 904 from 14 000 m<sup>3</sup> of gravel.

#### **Mount Cameron Tin Syndicate, Gladstone**

This syndicate operated in the Garfield area to produce 10·2 tonnes of tin in concentrates valued at \$55 971 from 25 475 m<sup>3</sup> of gravel.

**T. G. Rainbow, White Rock, Winnaleah**

Mr Rainbow transferred operations from the Banca Mine and sluiced 8 819 m<sup>3</sup> to recover concentrates containing 4.1 tonnes of tin valued at \$22 412. A new tailing dam was constructed.

**Allied Mining Enterprises Pty Ltd, South Mount Cameron**

This company ceased work after sluicing 18 900 m<sup>3</sup> of gravel which yielded concentrates containing 4.3 tonnes of tin valued at \$24 077.

**NSW Mining Co. Pty Ltd, Derby**

This company worked in the Ringarooma River below the Mutual Bridge using a jig and grizzly and a dragline and front-end loader to produce 6.4 tonnes of tin valued at \$35 380; three men were employed.

**R. C. Lawry, Gladstone**

Mr Lawry continued work in the Garfield area to obtain concentrates containing 3.0 tonnes of tin valued at \$16 275.

**C. D. King, Port Davey**

Mr King produced concentrates containing 2.65 tonnes of tin, valued at \$14 723 from the Melaleuca Mine.

**Minops Pty Ltd, Dundas***Razorback Mine*

Construction of the mill at the Razorback Mine commenced in December 1974, but operations did not commence until September, with the designed throughput being achieved in November.

## PRODUCTION

From a throughput of 13 000 tonnes 25.3 tonnes of concentrates containing 14 tonnes of tin were recovered but not sold.

The mill equipment comprised:—

## Crushing Section—

- Primary hammer mill
- Autogenous trommel
- Secondary hammer mill

## Grinding Section—

- Primary screen and rod mill

## Gravity Section—

- 12 tables
- 6 vanners

## Cleaning Section:—

- Magnetic Separators.

Flotation of sulphides has proved unnecessary so far but concentrates have been found to contain lead at 40.5%, due to a manganese-iron-lead mineral phase. Investigations into the further treatment of the magnetic fractions are to be carried out.

The open-cut mining was carried out by local contractors. Tin recovery has been disappointing possibly due to the usual settling-in period of a gravity concentrator and a difficult tin particle distribution in the oxidised material being mined. No alteration in ore reserves resulted from the year's work.

## EXPLORATION

Exploration was confined to the Razorback shear zone. Trenching by bulldozer was carried out to the south of the main ore zone and sulphides were revealed justifying further work. From the waste removal the ore shoots have been found to be larger than expected. Mapping and geochemical sampling were continued over the gossan zone at the Grand Prize Mine.

**Oonah Mine, Zeehan**

Work at the Oonah Mine has been confined to field geology and the collection of samples for metallurgical test work to assess cassiterite flotation potential.

**Gippsland Minerals N.L., Queen Hill**

Six diamond drill holes were drilled with an average length of 250 metres. Two holes intersected the projected plunge of the Queen Hill lode but the thickest intersection of economic grade tin was 1.2 metres. One hole under the Montana workings, following upon the intersections made by holes drilled in 1972, intersected a narrow lode with only minor tin mineralisation. The hole drilled under Stormsdown Mine intersected 1.37% tin over 5 metres. This information will assist interpretation of the plunge of the lode formation.

**R. S. Laffer, North Heemskirk**

At the St Dizier Mine the option holders completed their investigations and did not renew or exercise their option. Mr Laffer cleaned out the old drive he commenced some years ago with a view to undertaking further development.

Testing of the Tasman (or Granville Mine) was carried out by sinking several small pits and the material tested for tin. Following favourable results Mr Laffer decided to install his plant in this area. The plant consists of a double drum diesel powered scraper, vibrating screen, elevator and jigs for the undersize and a conveyor and tip truck for the oversize. At the end of the year a test run was made but the water pump motor was under-powered.

**Andrew Duncan Pty Ltd, Gladstone**

Towards the end of the year this company made preparations to start a gravel pump and sluice box operation at South Cybele Creek. Expenditure on equipment to the end of the year was \$25 000. Operations should start early in 1976.

**Consolidated Eastern Tin Pty Ltd, Coles Bay**

This company set up an elaborate portable plant to treat alluvial ground on the plateau above Bluestone Bay, but failed to reach production beyond concentrates containing 0.064 tonnes of tin valued at \$336.

**Production by Small Workers**

Many miners and prospectors throughout the State produce small quantities of concentrates by reason of either small-scale or part-time working. Their work is described under the headings of the various districts.

## EAST COAST

*T. H. Fitzallen* produced concentrates containing 0.043 tonne of tin valued at \$226.

*J. P. Reynolds, St Helens*, produced concentrates containing 0.232 tonne of tin valued at \$1 268.

*Miscellaneous.* Messrs H. E. Betts, H. T. Moses, B. E. Pitchford and G. Robinson produced individually concentrates containing 0.153 tonne of tin valued at \$830.

## BRANXHOLM-DERBY

*L. M. Barnett, Star of Peace Mine, Branxholm.* Mr Barnett's concentrates contained 0·222 tonnes of tin valued at \$1 265.

*G. Machen & E. Hayes, Derby* produced concentrates containing 0·421 tonne of tin valued at \$2 312.

*Miscellaneous.* Messrs Banks and Hodgetts, J. Lambert and J. C. Mott produced individually concentrates containing 0·2 tonne of tin valued at \$1 114.

## PIONEER-SOUTH MOUNT CAMERON-GLADSTONE

*W. Bartels, Gladstone,* produced concentrates containing 0·038 tonne of tin valued at \$209.

*L. J. Groves, Eastern Lead, South Mount Cameron,* Mr Groves, using earth-moving equipment, mined gravel for sluicing. Concentrates produced contained 0·509 tonne of tin valued at \$2 757.

*D. Dawe, Harden's Ravine,* produced concentrates containing 0·308 tonne of tin valued at \$1 619.

*R. J. Moore, Gladstone,* produced concentrates containing 0·324 tonne of tin valued at \$1 703.

*K. M. Richardson, Swain Creek,* produced concentrates containing 0·625 tonne of tin valued at \$3 344.

## WARATAH AND WEST COAST

*P. R. H. Wilson, Melaleuca.* Mr Wilson's workings produced concentrates containing 0·795 tonne of tin valued at \$4 219.

*Miscellaneous.* At Waratah Messrs R. Barker, Cooney and O'Connor, M. Glozier, P. R. Heathcote, E. Kelly and D. R. Kenworthy produced individually concentrates containing 0·639 tonne of tin valued at \$3 565.

## TITANIUM

## TITANIUM DIOXIDE: QUANTITY AND VALUE OF PRODUCTION

Year	Tonnes	Value	Year	Tonnes	Value
		\$			\$
1969/70	12 145	1 991 360	1973	2 846	388 288
1971	6 584	1 122 120	1974	4 139	1 062 973
1972	.....	.....	1975	5 279	1 579 311
				<hr/>	<hr/>
				30 993	6 144 052
				<hr/>	<hr/>

## Kibuka Mines Pty Ltd, Naracoopa

*Mining*

During the year mining was concentrated between the plant and the Fraser River on what is known as Llanherne Beach. Extraction and re-treatment of the old tailings was completed and the deposit worked in a southerly direction towards the cable station. Two production units were used, the buried loader, which consists of a buried hopper, conveyors and a trommel fed by bulldozers, and the 'pot-holer' which is a pontoon mounted sand pump fed by a dredge head. Alterations to the buried loader increased its capacity from 150 tonnes to over 300 tonnes of sand per hour and it thus became the sole production unit.

The old tailings area north of the plant was levelled out and top soil spread for planting grass and trees. Marram grass was also planted on the dunes between the mine access road and the sea in areas which had previously been disturbed.

*Milling*

Further alterations were made to the primary separation plant. Spirals replaced some of the sluices and Wright trays with variable throat angles were installed, increasing the capacity.

In the secondary wet plant a further two banks of spirals and additional wet magnetic separators were installed. A shed for drying concentrates prior to treatment in the dry plant was placed in operation.

A tin-table was installed, but not used and a Reading electromagnetic separator was set up in the dry plant.

Capital expenditure for the year was in excess of \$500 000, major items being Caterpillar engines for use throughout the mine, trays and wet magnets for the plant, and a ball mill for grinding zircon.

From the treatment of 769 774 tonnes of sand, 5 504 tonnes of rutile and 8 799 tonnes of zircon concentrates were produced. An average of sixty-one men was employed.

Major development work for the next year will be the complete installation of the ball mill to produce zircon flour, and extensions to the workshops and laboratory facilities.

### TUNGSTEN (SCHEELITE)

#### TUNGSTIC OXIDE: QUANTITY AND VALUE OF PRODUCTION

Year	Tonnes (Concentrates)	Tonnes (WO <sub>3</sub> )	Value \$
1917 to 1970	28 008	773	60 962 668
1971	1 610	1 151	5 130 809
1972	1 837	1 355	4 193 860
1973	1 682	1 244	3 663 649
1974	1 588	1 143	6 800 473
1975	2 082	1 519	10 367 449
<b>Total</b>	<b>36 807</b>	<b>.....</b>	<b>91 118 908</b>

#### King Island Scheelite Limited, Grassy

##### Production statistics—

##### Ore mined (tonnes)—

Bold Head	108 121
Dolphin	145 354
Mill throughput (tonnes)	295 943
Concentrate produced (tonnes)	2 082
Concentrate grade (WO <sub>3</sub> )	72.61%

##### Average number of persons employed—

Underground	71
Other surface	330
	<hr/>
	401
	<hr/>

R. Billingham, Mining Engineer, Hobart, reports:—

#### MINING

##### Bold Head Mine

The main decline advanced 168 metres to the +972 m RL where development temporarily ceased. Mining was concentrated on level and stope development and stoping. Development driving amounted to 582 metres and a further 107 metres of hand rising for ventilation, access and ore passes were carried out.

The Kennametal 1.8 metre raise borer continued to operate at Bold Head and 145 metres of rises were reamed. The second ventilation rise to surface was completed and a second 35.4 m<sup>3</sup>/s fan was installed. Ladderways were installed in the second outlet to surface. Two further internal rises were bored for access and ventilation to 'A' lens orebody.

Ore was stoped from the 'B' lens main orebody and from various orebodies along the boundary fault.

*Dolphin Mine*

The main decline advanced 216 metres to the -135 m RL. Poor ground requiring grouting and steel sets was met in two areas. A foot wall decline from the -75 m level to connect into the main decline to provide the major trucking access was commenced and advanced 262 metres. This decline advanced mainly in good standing quartzite.

Level development of 334 metres was on the -100 m RL and the ventilation drive. Stope development was confined to access drives and ramps on the -75 m RL and the -130 m RL for mining the wedge block. A second outlet was established from the -75 m RL to the open-cut. The two ventilation rises from the -75 m RL were equipped with 35.4 m<sup>3</sup>/s fans and a ventilation rise from the -130 m RL to the -75 m RL was reamed out.

With the assistance of the C.S.I.R.O. a rock mechanics program was set up. Bench marks were installed in the open-cut and on the -75 m RL level to monitor ground movement. The C.S.I.R.O. are to instal extensometers in eight locations into the backs and through the pillars of the -130 m RL stope. All post pillars are to be rock bolted on a systematic basis and rock stitching will be used through major faults.

## MILLING

Improvements in the grinding section included the removal of all Hummer screens and installation of a Mogensen sizer on No. 1 mill; close circuiting of a bank of spirals and a 38 centimetre cyclone with No. 3 regrind mill; removal of the bowl rake classifier and installation of a 51 centimetre cyclone. In the gravity section ten spirals and some new float cells were installed. The flotation section was improved by the addition of a fifth conditioner and installation of automatic storage and mixing for soda ash and alum. In the concentrate cleaning section a cross-belt magnetic separator, a second roaster, a second leaching tank, a second three-disc filter and an HCl storage tank were installed. Work continued on the upgrading of electrical wiring and switchboards.

At the end of the year work commenced on the first stage of increasing the mill capacity to 330 000 tonnes throughput per year. Investigations are underway to further increase this to 400 000 tonnes per year.

## CAPITAL EXPENDITURE

The major capital expenditure was for equipment and services in the two underground mines and the upgrading of the mill to remove bottlenecks preventing increased mineral recovery.

Capital expenditure was as follows:—

	\$
Underground mines ....	1 381 540
Concentrator ....	535 577
Engineering and power ....	118 729
Miscellaneous ....	44 731
	<hr/>
	2 080 577
	<hr/>

## TUNGSTEN (WOLFRAM)

## TUNGSTIC OXIDE: QUANTITY AND VALUE OF PRODUCTION

Year	Tonnes (Concentrates)	Tonnes (WO <sub>3</sub> )	Value \$
1899-1969 ....	17 733	444	25 187 739
1970 ....	910	659	4 428 708
1971 ....	813	592	2 695 463
1972 ....	771	566	1 733 203
1973 ....	375	278	828 102
1974 ....	216	159	1 075 850
1975 ....	303	225	1 543 378
	<hr/>		
Total ....	21 121		37 492 443
	<hr/>		<hr/>

**Aberfoyle Ltd, Rossarden**

Production by this company, reviewed under Tin, was as follows:—

<i>Mine</i>	<i>Concentrates (Tonnes)</i>	<i>WO<sub>2</sub> content (Tonnes)</i>	<i>Value \$</i>
Aberfoyle .....	115	85	582 439
Storeys Creek .....	188	140	960 939

**ZINC****QUANTITY AND VALUE OF PRODUCTION**

<i>Year</i>	<i>Tonnes</i>	<i>Value \$</i>	<i>Year</i>	<i>Tonnes</i>	<i>Value \$</i>
1919-1970 .....	1 011 567	178 230 493	1973 .....	52 149	22 451 078
1971 .....	41 844	14 829 575	1974 .....	53 803	30 973 172
1972 .....	66 811	24 869 254	1975 .....	54 326	35 873 182
			Total .....	1 280 500	307 226 754

**Electrolytic Zinc Company of Australasia Limited****EXTRACTION FROM CONCENTRATES: RISDON**

	<i>Tonnes</i>
From other than Tasmanian ore—	
Zinc .....	79 073
Cadmium .....	217
Cobalt oxide .....	2
Superphosphate .....	15 823
From Tasmanian ore—	
Zinc .....	45 954
Cadmium .....	103
Cobalt oxide .....	17·55
Manufactured products—	
Aluminium sulphate .....	2 833
Ammonium sulphate .....	25 892

The average number of men employed was 2 058.

**WEST COAST DIVISION****Ore mined—**

<i>Mine</i>	<i>Tonnes</i>	<i>Pb %</i>	<i>Zn %</i>	<i>Cu %</i>	<i>Ag g/t</i>	<i>Au g/t</i>	<i>Fe %</i>
Rosebery .....	411 481	4·7	13·97	0·87	142·53	2·12	18·2
Hercules .....	40 934	4·05	11·7	0·47	78·52	1·73	9·38
Dumps .....	107 285	2·8	8·8	0·19	120·0	1·20	11·20
Total .....	559 700	4·3	12·85	0·71	133·73	1·92	16·52

**Concentrate produced—**

	<i>Tonnes</i>
Zinc concentrate .....	122 096
Lead concentrate .....	13 836
Copper concentrate .....	18 226
Pyrite concentrate .....	115 538

Recoverable quantity in ore mined—	Tonnes
Zinc .....	54 326
Lead .....	11 380
Copper .....	2 174
Cadmium .....	155
Silver ..	51 451
Gold .....	975
Cobalt oxide .....	18
Manganese dioxide .....	392
Mercury .....	210

Total value of production—\$50 135 353.

Average number of persons employed—	Surface	Underground	Total
Hercules Mine .....	8	34	42
Rosebery Mine .....	454	551	1 005
Farrell Mine ..	2	1	3
Dumps .....	1	...	1
<b>Total</b> .....	<b>465</b>	<b>586</b>	<b>1 051</b>

R. C. Thomas, Mining Engineer, Burnie, reports that operations were confined to the Rosebery and Hercules mines, the latter operating on a single shift basis. Due to a continuing shortage in labour and the low zinc grade the Farrell Mine has remained on a care and maintenance basis.

#### *Development*

Development at the Rosebery Mine was concentrated on No. 15, 16 and 17 levels where long hole stoping blocks are being brought into production. Some 1 726 metres of driving and cross-cutting and 438 metres of rising were completed during the year. At the Hercules Mine 73 metres of driving and 37 metres of rising were completed.

Diamond drilling consisted of 8 888 metres at Rosebery and 1 171 metres at Hercules.

#### *Production*

At the Rosebery Mine long hole methods of stoping with larger equipment contributed to the higher rate of production. The year has been one of consolidation where the new techniques introduced in the last few years have resulted in increased efficiency. Fully grouted rock bolts have been found successful in draw points and drives. The hanging wall of one long hole stope has been pre-bolted ahead of stope firing, using steel tendons. This method will be extended to conventional stopes if successful.

A mix of A.N.F.O. and polystyrene balls is under investigation as a low energy explosive in the timber stopes.

A road was constructed through difficult terrain for access to the Magnet Mine. Removal of the tailings dump began in May 1975, and is continuing. The material is road hauled to Rosebery and mixed with run-of-mine ore.

At Hercules Mine trucking operations were increased from a one to a two shift basis to meet the increased production mainly from the open pit operation.

Ore reserves of all mines at 9 December 1975 amounted to 8 950 000 tonnes.

The number of lost time accidents showed a significant decrease during the year and there were no fatal accidents.

*Accidents*

Number of accidents	574
Man hours exposure	2 340 745
Frequency rate	245
Severity rate	4 531
Mean duration (days)	13

*Capital expenditure*

Major capital spending during 1975 included the commencement, continuation or completion of the following projects:—

- Additional new houses and upgrading of older houses.
- Bobadil dam and environmental control program.
- Additional equipment for mine rescue teams.
- Revised underground pumping system at Rosebery Mine.
- Addition and replacement of rock drilling equipment.
- Additional underground loaders.
- Upgrading of E.D.P. installation.
- Additional auxiliary ventilation fans.
- Utility air hoists.
- Cactus grab for shaft cleaning.
- Surface residue pumping system.
- Non-destructive rope test equipment.
- Spare 8-tonne haulage skip.
- Upgrading Rosebery compressor station.
- Replacement of motor vehicles and front-end loader.
- Replacement of lathes.
- New batteries and equipment.
- Sealing plant roads.

## RISDON WORKS

R. Billingham, Mining Engineer, Hobart, reports that the major development work involving capital expenditure included:—

- Completion of a new fluid bed zinc concentrate roaster complex which included work in the electrical, roasting, leaching and acid divisions.
- Further work on the recovery and recycling of zinc dust precipitate and area effluents.
- Improvements to the leaching and residue treatment plants, particularly in the drying and handling of residues and in the purification and filtering sections.
- Continuation of the construction of a plant to treat acid plant washtower discards.
- Provision of pilot plants for research into methods of treatment of effluents and residues.
- Replacement of motor vehicles and mobile equipment.
- The commencement of the construction of a new limestone grinding plant in the leaching division.

**Aberfoyle Tin N.L., Que River**

The Abex Joint Venture has indicated ore reserves calculated from the results of diamond drilling carried out in 1974 and 1975 as follows:—

	<i>Tonnes</i>	<i>Copper</i> %	<i>Lead</i> %	<i>Zinc</i> %	<i>Silver</i> g/t	<i>Gold</i> g/t
Pb-Zn lenses	4 200 000	0.36	6.5	11.6	107	2
Cu lenses	640 000	1.7	3.0	5.3	55	...

Total drilling on the three leases is now 16 185 metres in ninety-three holes. Five lenses (S, P north, P south, Q and N) have been outlined with the first three lenses considered to be closed. Geological mapping is continuing with soil sampling and I.P. coverage completed. An exploration decline (4 m x 4.5 m) at a gradient of 1 in 9 was planned to be driven into P lens in order to extract a parcel of ore for metallurgical testing. At the end of the year the portal was excavated and a stockpile established. An office, small change room, workshop and store were erected, with power being supplied by a diesel alternator.

### ZIRCON

#### ZIRCONIUM DIOXIDE: QUANTITY AND VALUE OF PRODUCTION

Year	Tonnes	Value	Year	Tonnes	Value
		\$			\$
1969-70	10 073	673 587	1973	817	72 790
1971	2 489	217 378	1974	3 627	1 145 030
1972	....	....	1975	5 818	1 933 412
Total				22 824	4 042 197

#### Kibuka Mines Pty Ltd, Naracoopa

This company, reviewed under Titanium, produced 8 799 tonnes of zircon concentrates.

## 2. — Non-Metallic Minerals

### CLAY

#### QUANTITY AND VALUE OF PRODUCTION

Year	m <sup>3</sup>	Value	Year	m <sup>3</sup>	Value
		\$			\$
1958-1970	1 319 682	3 517 537	1973	113 896	393 815
1971	112 792	384 447	1974	111 487	388 069
1972	134 918	446 036	1975	112 287	572 230
Total				1 905 062	5 702 134

#### DETAILS OF PRODUCTION

Company	Clay m <sup>3</sup>	Value \$	No. of men	Product
Agrippe Pottery Pty Ltd, Relbia	....	....	3	Pipes
Clifton Bricks (Tas.) Pty Ltd, Kings Meadows	14 537	47 519	22	Bricks
H. L. Curran, Oyster Bay	353	1 059	....	Bricks
Goliath Portland Cement Co., Railton	27 838	123 600	....	Cement
M. A. Grierson, Dodges Ferry*	1 124	4 184	1	Bricks
Hazell Brothers, Margate*	15 460	65 300	4	Bricks
Hobart Brick Co., Granton	7 503	22 461	39	Bricks
Hobart Brick Co., Kingston	4 359	14 391	1	Bricks
Humes Limited, Granton	2 748	11 951	21	Pipes
Humes Limited, Prospect Vale	2 476	4 952	14	Pipes
Huttons Bricks Pty Ltd, Launceston	19 893	65 027	23	Bricks
John Campbell Pty Ltd, Launceston	956	1 250	8	Pipes
G. R. Wise, Launceston	535	1 120	....	Bricks
Wunderlich Ltd, Launceston	4 872	16 763	11	Tiles
Zolati & Son Pty Ltd, Dulverton	8 605	22 515	21	Bricks
Total	111 259	402 092	168	

\* Suppliers to Hobart Brick Company

#### Hobart Brick Co., New Town

By mid-1975 the new brick plant was in operation. The plant consists basically of a clay extrusion machine, automatic cutting and settling equipment, a tunnel dryer, an automatic tunnel kiln and palletising equipment. Production capacity of the plant is some 20 million bricks per year.

**DOLOMITE**  
QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tonnes</i>	<i>Value</i> \$	<i>Year</i>	<i>Tonnes</i>	<i>Value</i> \$
Prior to 1971	39 605	228 889	1973	5 165	29 640
1971	2 558	14 406	1974	6 434	47 444
1972	4 630	26 815	1975	5 042	40 543
			<b>Total</b>	<b>63 434</b>	<b>387 737</b>

**Circular Head Dolomite and Trading Co. Pty Ltd, Smithton**

This company, the sole producer, employed an average of five men and produced 5 042 tonnes, a decrease of 1 392 tonnes. The stone is milled for top-dressing in agriculture.

A new treatment plant is under construction near the dolomite quarry. This will enable the portable crushing plant to be withdrawn from the floor of the open pit and the faces to be developed in all directions. It is intended to use this new plant in addition to the present treatment plant at the railway siding, which will be fed with oversize material.

**KAOLIN**  
QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Production</i> (tonnes)	<i>Value</i> (\$)
1940-1962	112 869	883 018
1975	2 056	170 138
<b>Total</b>	<b>114 925</b>	<b>1 053 156</b>

**Ballarat Clay Co. Pty Ltd, Tonganah**

The whole production came from this new enterprise by Associated Pulp and Paper Mills Ltd to replace imported kaolin used in papermaking. The deposit, consisting of decomposed granite, is mined with two electric shovels and hauled to the treatment plant.

The plant includes a stockpile area for blending, an apron feeder, log washer, bowl classifier, cyclones, centrifuges, vibrating screens, vacuum filters, and a number of storage ponds. These ponds consist of excavations lined with 'hypalon' sheeting. Chemicals are added at various points in the circuit to either disperse or flocculate the clay as required. The finished product is pumped in slurry form into plastic bags holding 7-9 tonnes mounted on flat top railway wagons for transport to A.P.P.M.'s mills at Burnie and Wesley Vale. The bags are returned empty.

Tailings amounting to 70-75% of the earth mined and containing the coarser fractions of the decomposed granite are returned to the mined out area for fill.

A series of ponds has been constructed to treat any water discharged from the plant and settle out any solids present.

Total cost of bringing the operations into production was \$2 150 000. Annual production will be about 20 000 tonnes of filler clay.

**LIMESTONE**  
QUANTITY, VALUE OF PRODUCTION AND USAGE

Year	Manufacture of cement		Manufacture of carbide		Chemical and metallurgical		Agricultural and other		Totals	
	Tonnes	\$	Tonnes	\$	Tonnes	\$	Tonnes	\$	Tonnes	\$
1919-1970 ....	6 541 991	9 726 883	822 696	2 522 487	4 395 389	5 416 193	793 418	1 856 161	12 553 494	19 521 724
1971 ....	383 711	743 970	26 141	257 280	39 726	176 819	36 018	99 219	485 596	1 277 288
1972 ....	471 393	913 975	25 225	258 058	53 265	286 151	39 582	102 810	589 465	1 560 994
1973 ....	488 873	948 180	23 383	217 649	65 599	343 547	56 069	179 712	633 924	1 689 088
1974 ....	421 145	817 020	22 487	270 331	64 333	392 620	91 746	244 924	599 711	1 724 895
1975 ....	417 615	810 173	18 865	269 704	54 548	340 424	54 452	185 769	545 480	1 606 070
Totals ..	8 724 728	13 960 201	938 797	3 795 509	4 672 860	6 955 754	1 071 285	2 668 595	15 407 670	27 380 059

**Australian Commonwealth Carbide Company Ltd and Kemerton Pty Ltd, Ida Bay and Electrona**

A change in ownership was effected in February. These companies quarried 27 591 tonnes of limestone valued at \$371 751 at Ida Bay. Of this 18 865 tonnes were used in the production of calcium carbide at the Electrona works and 8 726 tonnes were supplied to the Electrolytic Zinc Company at Risdon for metallurgical purposes.

Calcium carbide production was 9 395 tonnes valued at \$2 102 044 and acetylene black production was 168 tonnes valued at \$200 566. The average number of persons employed was 168 of whom fifteen were employed at the quarry.

Major developments at the quarry were the changeover from rail-sea to road transport to the works, and the installation of a crushing plant by Bender's Spreading Services Pty Ltd.

**A. R. Beams, Flowery Gully**

From his quarry, crushing plant and lime kiln, Mr Beams produced—

	Tonnes	\$
Agricultural limestone .. .. .	2 262	6 717
Limestone for chemical and metallurgical purposes ....	3 977	14 328
Burnt lime for various purposes .. .. .	35	1 155
Total .. .. .	6 274	22 200

Six men were employed.

**Goliath Portland Cement Co. Ltd, Railton**

A total of 417 615 tonnes of limestone with a cost value of \$810 173 was quarried and used in the manufacture of cement. An average of eighteen men was employed in the quarry, for this production.

In addition to the above, 12 018 tonnes of limestone, valued at \$7 258 was produced for sale.

Production of fine cement amounted to 320 432 tonnes valued at \$5 394 101. An average of 295 men was employed.

The cement plant was converted back to coal firing at the end of the year after several years on oil fuel. Coal from the Cornwall Coal Co's Duncan Mine is used, being delivered in hopper bottom rail wagons. From the unloading station the coal is conveyed to stockpiles around two rill towers. From there it passes through a pulveriser and coal storage bin before being fired into the cement kiln. The process is fully instrumented and automated; the installation cost \$1 600 000. Anticipated usage of coal is 60 000 tonnes/year.

**Mole Creek Limestone Ltd, Mole Creek**

Production was 41 745 tonnes of limestone for chemical and metallurgical purposes and 12 681 tonnes for agricultural and other purposes, of total value \$278 931. Average employment was fifteen men.

**Railton Lime Works, Railton**

Two men were employed at this works to crush and mill 12 018 tonnes of limestone, valued at \$7 258 supplied by the Goliath Company.

**Wright Stephenson Pty Ltd, Pulbeena**

This company produced 10 729 tonnes of lime sand, valued at \$59 693 compared with 13 292 tonnes in the previous year. Average employment was two men.

The limestone is extracted from the pit area by dragline and the limestone heaped on top of the bench for drainage. The floor of the pit is covered with water which has to be continually kept down by pumps. The lime is loaded into railway trucks after passing through a mill.

**Addison & Coates, King Island**

Production was 920 tonnes valued at \$1 800 in the first half of the year.

**R. K. Sulzberger, Flowery Gully**

Using a mobile crushing plant Mr Sulzberger crushed a total of 363 tonnes valued at \$7 465.

**OCHRE****QUANTITY AND VALUE OF PRODUCTION**

<i>Year</i>	<i>Tonnes</i>	<i>Value</i> \$	<i>Year</i>	<i>Tonnes</i>	<i>Value</i> \$
1918-1970	2 730	20 149	1973	62	1 010
1971	71	982	1974	38	621
1972	48	721	1975	....	....
<b>Total</b>				<b>2 949</b>	<b>23 483</b>

**PEBBLES****QUANTITY AND VALUE OF PRODUCTION**

<i>Year</i>	<i>Tonnes</i>	<i>Value</i> \$	<i>Year</i>	<i>Tonnes</i>	<i>Value</i> \$
1957-1970	11 691	187 389	1973	824	18 088
1971	1 510	29 246	1974	1 426	35 519
1972	1 716	28 714	1975	859	15 622
<b>Total</b>				<b>18 026</b>	<b>314 578</b>

**Mineral Supplies, Ulverstone**

The collection of pebbles for grinding was continued on the beaches around Ulverstone. The output was 391 tonnes, valued at \$13 022. An average of five men was employed.

**G. R. Wise, Youngtown**

Production was 92 tonnes of pebbles valued at \$720.

**SILICA**

## QUANTITY AND VALUE OF PRODUCTION

Year	Tonnes	Value	Year	Tonnes	Value
		\$			\$
1936-1970 .. .. .	258 182	562 120	1973 .. .. .	17 101	52 679
1971 .. .. .	28 454	95 976	1974 .. .. .	25 410	74 828
1972 .. .. .	16 261	45 317	1975 .. .. .	27 573	95 257
			Total ..	372 981	926 177

**F. R. and C. M. Lazenby, South Arm**

A total of 13 161 tonnes of silica sand, valued at \$26 322 was produced for the manufacture of glass.

**Industrial Sands Pty Ltd, Eagle Point**

This company continued to refine silica sands for various industrial purposes, producing 14 324 tonnes of sands in various grades and sizings valued at \$66 962. An average of six men was employed.

**Mineral Supplies, Ulverstone**

This firm produced 88 tonnes valued at \$1 973.

**3. — Construction Materials****BUILDING STONE**

## QUANTITY AND VALUE OF PRODUCTION

Stone	Producer	m <sup>3</sup>	Value (\$)	No. of men
Freestone	Etna Stone Pty Ltd, Pontville .. .. .	339	55 879	10
	L. G. Holloway Round Hill .. .. .	134	875	....
	Kingston Quarries .. .. .	118	3 475	1
	Pontville Freestone, Molesworth .. .. .	275	7 560	1
	Total .. .. .	866	67 789	12

**CRUSHED AND BROKEN STONE****Basalt**

## PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

Quarry	Men	m <sup>3</sup>	Value (\$)
AFH, Surrey Hills .. .. .	....*	16 078	86 540
ANM, Maydena .. .. .	5	16 795	105 511
Brambles, Calder .. .. .	16	29 187	177 933
Brighton Municipal Council .. .. .	....*	2 829	18 603
Hobart Quarries, Bridgewater .. .. .	10	163 038	1 144 920
L. G. Holloway, Round Hill .. .. .	1	4 570	31 990
Readymix Concrete, Merseylea .. .. .	3	13 109	80 479
St Leonards Council, Launceston .. .. .	1	3 462	17 310
Talisker Blue Metals, Relbia .. .. .	8	46 499	303 001
Woodfield and French, Relbia .. .. .	....*	48 798	273 878
Others .. .. .	2	676	3 840
Totals .. .. .	46	345 041	2 244 005

\* See Gravel

**Hobart Quarries Pty Ltd, Bridgewater**

Production at the quarry continued to expand through the year and some \$300 000 were spent on upgrading the plant. Improvements were made to the primary crushing section, surgepile and screening section. New equipment included a Cat 988 loader. The average number of persons employed was ten. Proposals are being put forward for a new plant with increased capacity.

**Brambles Holdings Ltd, West Mooreville**

This company operates a quarry on lease 881P/M working a 12 metre high vertical face. The soil overburden is stripped before quarrying and stockpiled. The full depth of the flow is not being worked.

The nature of this flow is such that working a 12 metre face is dangerous and the height should not exceed 3 metres.

The greater part of Brambles requirements are obtained from lease 868P/M, of I. A. & P. P. Young. A shallow face is being worked in this area in a very broken up section of the basalt flow.

**Dolerite****PRODUCERS, QUANTITY AND VALUE OF PRODUCTION**

<i>Quarry</i>	<i>Men</i>	<i>m<sup>3</sup></i>	<i>Value (\$)</i>
Devon Metal Supplies, Devonport .. .. .	8	11 151	73 423
Forestry Commission .. .. .	16	22 643	153 555
Glenorchy Quarries .. .. .	6	39 494	244 194
Hobart Quarries .. .. .	41	151 486	995 444
Huon Council, Huonville .. .. .	...	918	1 836
C. R. Johnson, Cambridge .. .. .	1	4 680	32 760
Launceston Quarries, Mowbray .. .. .	12	63 703	446 201
Pioneer Quarries, Flagstaff Gully .. .. .	18	84 520	637 868
R. K. Sulzberger, Launceston .. .. .	...	153	765
Others .. .. .	4	591	4 137
<b>Totals .. .. .</b>	<b>106</b>	<b>379 339</b>	<b>2 590 183</b>

**Hobart Quarries Pty Ltd, New Town**

A total of 151 486 m<sup>3</sup>, valued at \$995 444 was produced at the Giblin Street quarry. The average number of persons employed in the quarry was forty-one.

**Pioneer Quarries Pty Ltd, Flagstaff Gully**

Rearrangement of the secondary and tertiary crushing sections helped to improve capacity. Some \$50 000 was spent on the purchase of a Jacques triple deck screen and 130 cm Symons gyratory crusher. The average number of persons employed in the quarry was eighteen.

**Limestone****PRODUCER, QUANTITY AND VALUE OF PRODUCTION**

<i>Quarry</i>	<i>Men</i>	<i>m<sup>3</sup></i>	<i>Value (\$)</i>
G. J. Weily, Glenorchy .. .. .	7	16 575	104 055

**Other Stone****PRODUCERS, QUANTITY AND VALUE OF PRODUCTION**

<i>Quarry</i>	<i>Men</i>	<i>m<sup>3</sup></i>	<i>Value (\$)</i>
APPM Diddleum Plains .. .. .	...	6 471	45 297
Forestry Commission .. .. .	...*	17 757	124 299
L. G. Holloway, Round Hill .. .. .	...	80	560
Hydro-Electric Commission, Scotts Peak .. .. .	4	2 835	14 175
Hydro-Electric Commission, Pieman Heads .. .. .	6	22 950	160 650
Hydro-Electric Commission, Strathgordon .. .. .	7	10 864	67 402
Savage River Mines, Savage River .. .. .	...†	2 081	14 567
Sorell Council, Sorell .. .. .	1	2 800	19 600
Transport Commission, Launceston .. .. .	4	5 127	32 811
Others .. .. .	...	559	2 841
<b>Totals .. .. .</b>	<b>22</b>	<b>71 524</b>	<b>482 202</b>

\* See Dolerite

† See Iron Ore

## GRAVEL

## PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

<i>Pit</i>	<i>Men</i>	<i>m<sup>3</sup></i>	<i>Value (\$)</i>
Associated Forest Holdings, Surrey Hills ....	6	69 555	264 687
Beaconsfield Municipality ....	2	14 001	46 440
Brambles Holdings, Burnie ....	....*	25 668	116 488
Broken Hill Pty Co. Ltd, Beaconsfield ....	....†	10 199	31 039
Campbell Town Council ....	1	10 056	35 367
Circular Head Council ....	3	34 723	99 659
Deloraine Council ....	1	22 185	106 365
Devonport Council ....	2	40 048	135 152
Fingal Council ..	1	11 987	43 939
Flinders Council ..	1	19 475	56 506
Forestry Commission ....	5	53 555	200 107
George Town Council ....	3	30 913	111 488
G. Gerke, Scottsdale ..	1	10 929	32 570
Hamilton Council ....	2	19 097	61 123
Kentish Council ....	4	50 369	172 936
Lands Department ....	4	17 452	53 018
Lilydale Council ....	1	10 376	43 485
Longford Council ....	1	23 214	62 100
New Norfolk Council ....	2	14 354	43 723
Oatlands Council ....	4	22 807	69 881
Portland Council ....	2	27 008	78 745
Public Works Department ....	100	588 655	1 998 260
Richmond Council ....	2	11 619	42 876
Ringarooma Council ....	2	12 076	40 805
Scottsdale Council ....	2	12 622	43 950
Ulverstone Council ....	2	17 318	60 244
Westbury Council ....	1	15 958	57 470
Woodfield and French ....	52	73 220	356 716
Others ..	48	124 403	454 004
<b>Totals ..</b>	<b>255</b>	<b>1 393 842</b>	<b>4 919 143</b>

\* See Crushed and Broken Stone (Basalt)

† See Woodfield and French

#### Besser Tasmania Pty Ltd, Flowerdale

A lease 33M/73, B. K. Fielding, is the area where this Company intends to produce gravel to their requirements for the manufacture of concrete blocks. A washing, crushing and screening plant has been partially erected during the year. An access road has been made off Calder Road to the site. To ensure adequate water a dam has been built within the lease. The wall of this dam is also part of the access road. Tailings dams have been formed which will enable water to be returned to the circuit. The completion of the washery, dam and road was delayed many months due to excessive rainfall. The erection of the washery should be completed early in 1976. This washery is the first on the gravel deposits in the Inglis Valley and it is anticipated that this will be the forerunner of more.

#### Brambles Holdings Ltd, Flowerdale

Brambles operate a gravel screening plant on lease 34M/67 known as Ponderosa. This area has been worked by a number of operators in the past in a haphazard manner. Reserves of gravel appear to be large. There is no evidence of basement and the management has been convinced that areas should be completely worked out in a regular manner. The amount of gravel being recovered from allegedly worked-out areas is surprising.

Production from this quarry is used for concrete, road construction, brick manufacture and building in general.

## SAND

## PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

<i>Pit</i>	<i>Men</i>	<i>m<sup>3</sup></i>	<i>Value (\$)</i>
L. & I. Bassett, Launceston ....	....*	1 851	10 387
Cambridge Washed Sands, Sorell ....	2	3 478	27 268
R. P. Cousins, Beauty Point ....	6	13 247	90 900
Flinders Council .. ....	....*	2 457	12 285
Forestry Commission .. ....	....†	5 930	11 860
George Town Council ....	....*	6 330	31 650
Hobart Quarries, South Arm ....	†	6 006	30 030
L. King Pty Ltd, Devonport ....	....*	5 245	24 221
G. L. Males, South Arm ....	4	8 943	45 275
Stubbs Sand and Gravel Pty Ltd, Devonport ....	5	11 918	58 833
L. A. Swain, Perth .. ....	1	8 946	33 420
Woodfield and French, West Tamar ....	....*	12 569	62 565
Others .. ....	....	21 755	91 325
<b>Totals .. ....</b>	<b>18</b>	<b>108 675</b>	<b>530 019</b>

\* See Gravel

† See Crushed and Broken Stone (Dolerite)

## OTHER ROAD MAKING MATERIAL

## PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

<i>Pit</i>	<i>Men</i>	<i>m<sup>3</sup></i>	<i>Value (\$)</i>
Cleveland Tin N.L., Luina ....	....*	4 083	18 315
Forestry Commission .. ....	....†	25 467	51 438
L. G. Holloway, Round Hill ....	....‡	2 400	12 000
Hydro-Electric Commission, Pieman River ....	....§	11 475	57 375
Hydro-Electric Commission, Strathgordon ....	....¶	1 130	5 650
Mt Lyell Mining and Railway Co. Ltd, Queenstown	4	35 398	183 757
Public Works Department ....	....¶	70 414	191 399
Ringarooma Council ....	....¶	2 174	5 944
Ross Council ....	....	4 972	17 875
F. K. N. Scheppein ....	2	5 210	10 420
Shields Quarries ....	....	2 589	5 178
Sorell Council ....	....	2 243	8 413
Spring Bay Council ....	....¶	1 444	3 347
G. R. Wise .. ....	....¶	1 039	4 969
Woodfield & French ....	....¶	18 388	91 940
Zeehan Council ....	1	5 280	15 711
Others .. ....	1	2 305	8 657
<b>Totals .. ....</b>	<b>8</b>	<b>196 011</b>	<b>692 388</b>

\* See Tin

† See Dolerite

‡ See Crushed and Broken Stone, Basalt

§ See Other Road Making Material

¶ See Gravel

## 4. — Fuel Materials

### COAL

#### QUANTITY AND VALUE OF PRODUCTION

Year	Tonnes	Value	Year	Tonnes	Value
		\$			\$
Prior to 1971 .. ....	9 974 930	26 123 843	1973 .. ....	114 588	530 875
1971 .. ....	123 922	600 140	1974 .. ....	127 460	678 665
1972 .. ....	132 242	589 015	1975 .. ....	161 922	972 491
			<b>Total</b> ....	<b>10 635 064</b>	<b>29 495 029</b>

H. Murchie, Senior Mining Engineer, Hobart, reports that there has been an increase in production of 34 462 tonnes. The number of employees increased from fifty-six to seventy-one, of whom thirty-eight were employed underground. The production per man year decreased from 4 552 to 4 261 tonnes for underground employees, but increased from 2 276 to 2 281 overall.

#### Duncan Coal Mine, Fingal

Production increased by 34 462 tonnes and the number of men employed by fifteen. To meet the increased demand for coal, the production cycle went on to a two-shift operation. A diesel personnel carrier was introduced underground and numerous brick stoppings were built to improve underground ventilation.

## 5. — Foreign Ores

The total value of the metallurgical products of four large works treating foreign ores imported into Tasmania was approximately \$135 013 109.

### ALUMINIUM

#### Comalco Aluminium (Bell Bay) Ltd, Bell Bay

In the production of 82 978 tonnes of aluminium, 161 340 tonnes of imported alumina were processed.

Another product was 125 tonnes of alumina. Average employment was 1 059 men.

The expansion program consisting of No. 4 pot line and No. 4 direct chill casting station was wound down and halted at the end of the year due to the general economic climate affecting sales. The No. 4 pot line building has been completed but not equipped. It will cost about \$20 million and is designed to increase capacity from 96 000 to 116 000 tonnes of aluminium per year. The No. 4 casting station includes a large holding furnace and is intended for the production of rolling blocks.

### FERRO-MANGANESE

#### Tasmanian Electro-Metallurgical Co. Pty Ltd, Bell Bay

During the year 54 824 tonnes of manganese ore from Groote Eylandt were smelted to produce 61 608 tonnes of manganese alloys for the steel industry.

The alloys were 49 298 tonnes of high carbon ferro-manganese and 12 310 tonnes of silico-manganese reported under Silicon.

The expansion program started in 1974 continued. It consists of a sinter plant to treat manganese ore fines, and two additional furnaces: one to produce ferro-manganese and the other ferro-silicon. The total cost will be \$36 million and completion is scheduled for 1976.

### TITANIUM DIOXIDE

#### Tioxide Australia Pty Ltd, Heybridge

Production of titanium dioxide from Western Australian ilmenite was comparable to that of last year.

Capital expenditure increased by 66% and included expenditure on the replacement and extension of the effluent line, No. 2 sludge dam, installation of digester gas scrubbing equipment, an additional concentrator, wet treatment modifications, re-location of the raw materials store, 95% acid dilution plant and a number of minor items.

The number of persons employed increased by four to 459 and the turnover rate increased from 10% to 14.6%.

#### *Accident Statistics*

Accidents .. ... .. .	17
Days lost—	
Calendar .. ... .. .	522
Working .. ... .. .	373
Man hours .. ... .. .	888 139
Frequency rate .. ... .. .	19
Severity rate .. ... .. .	588
Mean duration (days) .. ... .. .	22

### 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 to expand the range of services offered in various fields. As reported in previous years the volume of geological advice on such matters as environmental control, land use planning, education, geoscience information and a variety of other matters continued to occupy a significant portion of the Branch officers' time. This trend is welcome as it has long been considered that geological input into decision making in a variety of subjects is an important and useful service.

In all the usual fields of work such as regional mapping, economic geology, engineering geology and groundwater investigations, impressive progress was maintained. The specialist officers continued to provide expert services and assist the work of other officers in their fields of expertise. Reports of the various section heads and the specialist officers follow this report.

Library services were expanded and improved so far as possible having regard to the crippling restrictions imposed by inadequate space and facilities. Efforts are continuing to improve the accommodation available and the use of microfilm has been investigated. A plan to microfilm departmental records and data has been drawn up but has had to be deferred for the time being until the Department of Film Production is able to offer adequate microfilm services.

The decision to hold the International Geological Congress in Australia during 1976 has generated a great deal of interest and work throughout the geological community in the country. All geological Surveys will be deeply involved in this event and this Branch in common with its counterparts on the mainland is involved in the planning and organisation of excursions, preparation of guide books, special editions of geological maps and the preparation of papers for presentation at the Congress. The Geological Draughting Section has been particularly busy preparing geological maps and diagrams for the Congress and their efforts will be rewarded by the production of an impressive new series of 1:250 000 geological maps of the State, a new geological map of the State on a scale of 1:500 000 together with numerous other maps and diagrams for publications related to the Congress.

As foreshadowed in last year's report, the implementation of landslip zoning under section 431A of the Local Government Act has imposed a strain on the Engineering Geology Section. The subject of landslip zonation is quite complex scientifically, and as it has a direct impact upon property values it also has social and political overtones. The officers responsible for decisions in this area are approaching the problems which have arisen with great care and regard for the parties likely to be affected. In order to proceed in this fashion considerable geological investigation and analysis of results is necessary and in some cases this inevitably leads to what may appear to be long delays in arriving at a final decision. However given the serious nature of the problems and the effect of the final recommendations upon a wide cross-section of people, it is felt that the prime consideration should be that decisions are made in the light of thorough investigations and adequate data. The increased work generated by these investigations has greatly increased the work load of the section and approval has been obtained for an additional geologist to be recruited for work on landslips. Applications for this position have been called and it is hoped to finalise the appointment early in 1976.

The collapse of the Tasman Bridge early in the year created a demand for investigations into a number of aspects concerned with the restoration of the bridge; demolition of the debris on the river bed and the investigations of proposed new bridge lines. Most of this work required the use of marine refraction seismic techniques and reports on the significant aspects were supplied as required. Fortunately sufficient drilling data was available, together with additional drilling carried out in conjunction with the seismic surveys, to allow reasonably accurate predictions to be made of the geological conditions of the substrata of the river bed by such means. The Branch had been conducting investigations into the geological history of the Derwent estuary for some years as and when time permitted and the sudden demand for geological information had therefore, to some extent been anticipated. In particular the extremely low seismic velocities in the silts and muds overlying the river bed were quickly appreciated so that depth predictions which otherwise would have been seriously in error were corrected and the final seismic predictions gave good agreement with the drilling results.

## REGIONAL GEOLOGY

### Supervising Geologist E. Williams reports—

P. R. Williams returned from the University in November. Dr J. McClenaghan resigned from the Department in July, and S. F. Cox in November.

Progress during the year was as follows:—

#### 1:250 000 Map Series—

Queenstown Sheet and accompanying Explanatory Notes have been published. Hobart Sheet has been published. Oatlands, Port Davey and King Island-Flinders Island are being drafted for publication.

#### 1:500 000 Map of Tasmania—

This Sheet has been drafted for publication.

#### 1:50 000 Map Series—

Lake River and Brighton Sheets have been published.

Ringarooma, Oatlands and Strahan Sheets are being drafted for publication.

Strahan Sheet: Geologist P. W. Baillie, S. F. Cox and K. Corbett completed the field work.

Kingborough Sheet: Senior Geologist N. Farmer completed mapping this region.

Sorell Sheet: Senior Geologist A. B. Gulline continued work in this region.

Huntley Sheet: Geologist M. McClenaghan, J. McClenaghan, A. V. Brown, N. J. Turner and P. W. Baillie continued mapping the area.

Blue Tier Sheet: Geologist M. McClenaghan commenced mapping.

Boobyalla Sheet: Geologists P. W. Baillie, N. J. Turner and S. F. Cox commenced mapping.

Interlaken Sheet: Geologist S. Forsyth commenced mapping.

Explanatory Notes of the 1-mile Burnie and Sheffield Sheets and for the 1:50 000 Brighton Sheet have been prepared. Reports for 1-mile Mackintosh, Frankford and Pieman Heads Sheets and the 1:50 000 Oatlands Sheet are being prepared.

## ECONOMIC GEOLOGY

### Supervising Geologist A. J. Noldart reports—

The staff of the section comprised a supervising geologist two senior geologists and three geologists. Geologist G. R. Green returned to duty in March from Ph.D studies at the University of Tasmania and Geologist P.L.F. Collins commenced similar studies in October.

The following activities were carried out during the year:—

#### METALLICS

- (a) Continued investigation of detrital tin deposits in the north-east generally, and in particular commencement of seismic studies to determine potential in-filled valley/basin structures in little known areas.
- (b) Commencement of drilling and economic appraisal of Surrey Lagoon, Herrick, in above program.
- (c) Continuation of exploratory drilling program at Oliver Hill and commencement of drilling at Claude Road.
- (d) Commencement of geological, geochemical and geophysical investigation of reported and potential mineralisation Big Ben Creek area, Zeehan district.
- (e) Examination of mineral prospects and small mines throughout the State. Examination of mineral potential of areas under application to purchase from the Crown. Advice to prospectors and general public.

## FUEL MINERALS

- (a) Continuation of exploratory diamond drilling in the north-east coal fields.
- (b) Continuation of studies in the Duncan Coal Mine, Fingal.
- (c) Commencement of X-ray diffraction studies of dirt bands in coal horizons intersected in exploration drilling program.
- (d) Commencement of compilation of interim report on north-east coal fields.

## NON-METALLICS

- (a) Continuation of construction materials survey and register from records of Government departments, municipal councils and private industry.
- (b) Field investigations to complete the above records.
- (c) Processing and compilation of data from the Flowerdale-Calder River gravel sampling.
- (d) Completion of X-ray diffraction analyses, petrographic studies and evaluation of economic potential of limestone deposits in the Gordon-Olga-Denison River areas.
- (e) Compilation of report on the extractive industry for the Tamar Regional Planning Authority.
- (f) Miscellaneous investigation on behalf of Governmental and semi-governmental authorities and general advice to the extractive industry throughout Tasmania.

## GENERAL

- (a) Continuation of studies of the Cambrian succession of the Mt Darwin-Rosebery mineralised belt and of mineral relationships.
- (b) Continuation of field work and compilation of the economic appendix for the Mackintosh map sheet explanatory notes and completion of the Burnie metallic section.
- (c) Completion of investigations and compilation of report on economic potential of areas affected by possible power development in the lower Gordon and King-Franklin River systems.
- (d) Continuation of field work and compilation of data on the Furneaux Group for the 1:250 000 and 1:500 000 map sheets.
- (e) Completion of economic appendix for the Hobart map sheet explanatory notes and commencement of the Brighton appendix.
- (f) Compilation of data on the Eddystone Pt-Mt William explanatory program.
- (g) Planning and preparation for the Tasmanian section of the 25th International Geological Congress field excursion and associated literature.
- (h) Liaison was maintained with mineral exploration companies throughout Tasmania and investigations of works in progress carried out in association with company staff.

## ENGINEERING GEOLOGY

**Supervising Geologist P. C. Stevenson reports—**

The section has consisted of a supervising geologist, two senior geologists and three geologists. The latest arrival, geologist D. J. Sloane, joined the Department in January.

This has been a normal year with most time being taken up in groundwater and ground stability work. Major studies of groundwater have continued in the north-east, at Devonport-Port Sorell, at Sorell in the south-east and on coastal sand aquifers at Seven Mile Beach and Greens Beach. Special studies for specific purposes have been made at Tonganah for A.P.P.M., at Gladstone for the Ringarooma Council, at Rushy Lagoon for Amatil, at Penguin for the Penguin Council and on Flinders Island for the Flinders Council. Minor surveys of a routine nature have been made at Dodges Ferry, Lauderdale, Lewisham, Kettering, Bruny Island, Scamander, Dianas Basin and Alanvale. A water quality problem was investigated at Lilydale for the Council.

The annual meeting of the Technical Committee on Underground Water was taken on by Tasmania at short notice and was held in Launceston in April. The 4th Groundwater School took place in Adelaide and was attended by one senior geologist. Another water-related activity was a compilation of the 1:250 000 groundwater sheets for Oatlands and Launceston.

Slope stability work has been heavy, mainly in routine subdivisional reports in the Tamar Valley and North-West Coast. Longer studies have included St Leonards reservoirs (which has been accepted as a paper at the International Geological Congress), Boat Harbour resulting in a proclamation, the Mt Nicholas forestry area, some unusual sandhill slips affecting forestry operations at Strahan, and detailed geomorphological mapping at Beauty Point. Small studies of road-cutting failures at Dysart and Sugar Loaf Hill, rock falls at Paloona, Midway Point and New Norfolk, and soil stability at Somerset, Collinsvale and Ambleside have been made. A rock testing program has been instituted and a senior geologist attended a short course at Adelaide on rock mechanics. Two members of the section attended the 2nd Australian-New Zealand Conference on Geomechanics at which a paper was given.

Vibration studies have been made at Port Arthur on the old buildings and at Launceston, and special studies have been made of drainage problems at the Forestry Department nursery at Perth, and at proposed cemetery sites at Kingston.

Dam sites have been examined on the East Coast and in detail at Four Springs near Westbury.

Finally, mapping studies have been made at Dover for catchment information, at Port Arthur as part of the Heritage study, and some petrological work has been done on the Wesley Vale area basalts.

Geophysical services to other sections have been provided in the Mount Cameron area in the form of seismic profiling of basement, and geophysics has been used in estimates of quarry reserves at Relbia.

The year has been one in which applied geomorphology and quantitative rock mechanics have been added to the methods available and the section has also been able to use radioactive dating to extend the knowledge of basalts in the north-east. The section has also been involved in a detailed geomorphological and hydrological study in the north-east financed by the Australian Water Resources Council and undertaken by the Geography Department of the University of Tasmania.

## GEOPHYSICS

### Geophysicist D. E. Leaman reports—

The year was dominated by the collapse of the Tasman Bridge and the consequent flow on of urgent projects along the River Derwent between the Tasman Bridge and Dowsings Point.

#### DERWENT CROSSINGS

Several months were spent on direct survey projects at potential bridge sites, general assessment of river bed structure, or experimental surveys to provide background data on many questions that might have arisen at short notice. A magnetic survey of the river was completed and several bridge sites were evaluated generally. Only sites at Dowsings Point were examined in detail by seismic and magnetic methods. A good general picture of the river, its bed, sediments and history is now available. An assessment of the effect of explosives on structures in water was also made to provide background information should damaged piles need fragmentation. This empirical and experimental survey proved invaluable at a late stage in deliberations for bridge design alternatives.

#### ORE DEPOSITS

An electrical survey of a prospect near Zeehan was begun.

#### OTHER DEPOSITS

The gravity survey with associated mapping and drilling was continued south of Fingal-St Marys as part of a project to evaluate coal reserves.

## OTHER PROJECTS

Due to commitments to Derwent surveys and the coal survey few regional projects were undertaken and with few exceptions all surveys related to landslips, buildings, dams were undertaken by the Engineering Geology Section.

## GENERAL AND DEVELOPMENTAL

Work on the magnetic evaluation of Tasmania's dolerites was restricted and most developmental research was directed toward water vibration transmission and damage assessments as mentioned above.

## MAPPING AND ENGINEERING DRAUGHTING

**Senior Draughtsman D. M. Hardy reports—**

The following progress was made on colour map productions:—

## The 1:50 000 Series

- Lake River, Sheet No. 54—Printed in nine colours;
- Brighton, Sheet No. 75—Printed in eight colours;
- Kingborough, Sheet No. 88—Work on this was stopped but will resume in 1976;
- Ringarooma, Sheet No. 32—Fair drawing proceeding;
- Oatlands, Sheet No. 68—Fair drawing proceeding.

## The 1:250 000 Series

- Launceston, SK 55-4—Printed in twenty colours;
- Queenstown, SK 55-5—Printed in sixteen colours;
- Oatlands, SK 55-6—Near completion, should be printed early in 1976;
- Hobart, SK 55-8—Printed in eighteen colours.

Due to pressure of other work no progress was made on the 1:500 000 Geology of Tasmania, until late in the year.

A two colour map of the Lower Gordon and King Franklin Electric Power Schemes, showing mineral resources and mining potential was produced and printed using the silk screen process.

The balance of time was used in drawing 125 geophysical, geological, palaeontological and engineering plans and diagrams for Technical Reports, Geological Survey Bulletins and normal field services.

## SURVEYING

**Surveyor G. Benn reports—**

The following surveys were carried out during the year:—

- (a) Continuation of surveying and levelling of diamond drill holes at Fingal.
- (b) Continuation of surveying and levelling in the Duncan Mine, Fingal, and the connection of the 'New Stanhope' Mine to the State Grid.
- (c) Continuation of surveying and levelling of landslips in the St Leonards and Tamar Valley district.
- (d) Surveys were continued at the old coal mines, Jubilee, Cardiff, Seymour, and Dalmayne, in order to connect these to the State Grid.
- (e) Surveys in connection with seismic work at Scottsdale, A.P.P.M. and Dowsings Point.
- (f) Landslip zone demarcation boundary set out at Boat Harbour.
- (g) Two drill holes at Claude Road, Sheffield, were surveyed.
- (h) A survey of four bore holes at the Department of Mines site at Mornington was carried out.
- (i) Oliver Hill bore holes 1, 2 and 3 were surveyed and levelled.
- (j) A survey for profile lines at Seven Mile Beach and Greens Beach was carried out.
- (k) Two grids were laid out at Zeehan.
- (l) Plans were prepared of all surveys.

## MINERALOGY AND PETROLOGY

### Mineralogist and Petrologist G. Everard reports—

The years investigations illustrate the wide impact of petrological techniques. To assist in solving a problem in the papermaking process specimens of Swedish granite taken from rollers used in the machinery at A.N.M. Boyer were compared in thin section with granite from New Hampshire U.S.A. The granites were found to be so similar that no improvement could be expected by substituting one for the other.

Densities of about ninety specimens of dolerite taken from D.D.H.21, Fingal were determined and plotted for comparison with those of the Chapel Street, Glenorchy D.D.H.

Flotation concentrate, received from the Chief Chemist and Metallurgist, of Macquarie Harbour sediments was examined for furnace slag, sulphides and other minerals.

Rock from P.W.D. quarries was examined to assess the durability and type of eventual breakdown.

A suite of specimens collected by Senior Geologist, D. J. Jennings from basic dykes along the East Coast from Cape Tourville to Musselroe Bay was described in thin section.

Rock specimens from a quarry at Orford taken from either side of a mudstone-dolerite contact were examined in thin section.

Soil samples from Burnie were examined for Soilmech Pty Ltd to infer the nature of the bedrock and its suitability for architectural foundations.

Counts of asbestos fibres in atmospheric dust were made on samples taken by P. Allan at Goliath Cement Works, Railton.

A bright blue mineral found by Senior Geologist, W. L. Matthews was identified as a variety of turquoise.

About 150 alluvial samples from Bores 1-11 in the Herrick area were examined for cassiterite and other heavy minerals.

Various specimens were examined of rock, soil, concentrates etc. from Roger River West, Forth Springs, St Leonards, Robbins Pty Ltd of Kingston, Sorell, Hunter Island, Charter Hall leases Gladstone as collected by Department Geologists.

A collection of typical Tasmanian ores, rocks and minerals was selected and forwarded to the University of Papua-New Guinea.

Over 100 rock and mineral specimens, ores and concentrates were examined for prospectors and mineral collectors.

## GEOCHEMISTRY

### Geochemist W. E. Baker reports—

During the year some 5 000 analyses were carried out for various elements in soils, vegetation, stream sediments, water and humic materials.

Further sampling in the vicinity of Mt Roland gave no clear indication of the origin of the copper anomalies in that area. Drilling has so far revealed only traces of copper sulphides. In one section lenses of pyrite have been found to be localized on the boundary between acidic volcanic rocks and greywacke. Further drilling will be undertaken during 1976.

At Oliver Hill drilling indicates that the gossans present in that area probably represent the residues of small pods of mineralization once present. This program will be completed early in 1976.

In the area north-west of Zeehan airborne geophysics indicated an anomaly east of the known lode exposures. Geochemical sampling was undertaken along traverses set out for ground geophysical investigations. Analyses of these samples failed to give any indication of anomalous metal distribution.

The X-ray diffraction equipment has been used extensively in the study of dolomite distribution in limestones and in general studies of clays. Numerous faults developed during the year and many of these are probably due to the unsatisfactory siting of the equipment.

Whilst the laboratory continues to function for routine work, the conditions are a severe trial to those attempting to provide geochemical services. The provision of a full range of services to the Geological Survey will not be possible until laboratories meeting the normal required standards are constructed.

## PALAEONTOLOGY

### Palaeontologist M. J. Clarke reports—

Work has again proceeded well in several areas. The major investigations have involved the study of fossil assemblages collected from the Brighton, Hobart, Huntley, Kingborough, Maria, Oatlands and Sorell Quadrangles.

Probably the most significant discoveries are those in the Huntley Quadrangle. Collections of well-preserved brachiopods and trilobites by A. V. Brown and N. Turner from the Trial Ridge Beds are of late Middle Cambrian age. The sub-June Group unconformity in the Huntley Quadrangle is now dated with considerable precision by virtue of these faunas and the previously known middle Late Cambrian (Franconian) assemblages from the overlying Singing Creek Formation. Several important faunas have been located by P. W. Baillie in well-exposed Eldon Group correlates in the Tiger Range area. In particular, two localities yield diverse and exceptionally well-preserved material with graptolites, trilobites and brachiopods. The former are the most exact of all Early Palaeozoic zonal fossils, but unfortunately have previously been very rare in Tasmanian sequences. The lower fauna is Late Ordovician (Late Caradocian) in age and contains *Leptograptus*, *Orthograptus*, *Brongniartella*, *Bumastus*, *Encrinurus*, *Eobronteus*, *Flexicalymene*, trinucleids *Dolerorthis*, *Hedstroemina*, *Heterorthis*, *Kjerulfina* and *Onniella*. The upper fauna is Early Silurian (earliest Late Llandoveryan) in age and contains *Monograptus sedgwicki* (Portlock), diplograptids, *Dalmanites*, *Decoroproetus*, *Leonaspis*, *Leangella*, *Meifodia*, *Strophochonetes* and *Gillatia*. These faunas as a whole permit a far greater palaeontological control over the lower parts of an Eldon Group correlate than has been possible in the past, and the upper fauna allows an almost exact correlation with Early Silurian rocks in the Heathcote area, Victoria. Completely enrolled and pyritised specimens of the trilobite *Pliomerina* occur in the basal Gordon Limestone (Early Ordovician) of the same general area.

Late Permian faunas have been proved to have a widespread areal distribution throughout the Hobart Brighton, Oatlands, Sorell and Kingborough Quadrangles. Formal biostratigraphic nomenclature for Tasmanian Late Palaeozoic (Permo-Carboniferous) rocks has been established as a prelude to the description of the Tasmanian *Eurydesma* fauna. The development of this fauna in Tasmania is superior to developments elsewhere in the world, and it is appropriate that Tasmania should serve as the standard sequence. A paper outlining the scheme is now in press.

Assistance with the collection of Triassic vertebrate material from Old Beach following road widening activities by the Public Works Department resulting from the collapse of the Tasman Bridge, identification of fossils in the Mount Carmel School teaching collections, and the identification of fossil materials presented by members of the general public is recorded.

Attendance and participation in the palaeontological symposia which formed part of the program of the 1st Australian Geological Convention, held 12-16 May in Adelaide, is also recorded.

The assistance of several outside experts is again gratefully acknowledged. Dr J. B. Jago (South Australia) has continued his identifications of Tasmanian Cambrian trilobite faunas, and Dr E. M. Kemp (Bureau of Mineral Resources, Canberra) and W. K. Harris (Geological Survey, South Australia) have provided age assessments and comments on certain Permo-Carboniferous and Early Tertiary microfloral assemblages respectively.

## LIBRARY

### Acting Librarian M. Bennett, reports—

During 1975 the Department of Mines entered into an agreement with the State Library of Tasmania whereby the State Library provides staff for the Mines Department Library as well as handling all book ordering and journal subscriptions. At present all book ordering is being handled centrally by the State Library and it is anticipated that journals will also be handled centrally in the near future.

A Geoscience Information Seminar organized by the Australian Mineral Foundation was held in Adelaide during March 1975 and was attended by I. Jennings (Chief Geologist), Mrs J. Scaife (Librarian), and Miss G. Davies (Student Librarian). The seminar discussed the state of geoscience information services in Australia and the various data sources: Two important decisions flowing from the meeting were to set up a working party to formulate the establishment of an Australian Geoscience Information Association and for the AMF to produce a revised edition of their thesaurus of geoscience terms.

Discussions have been held with the Department of Film Production regarding a suitable format for micro-filming Departmental records and data. Preliminary agreement has been reached but no progress has been made pending the Department of Film Production obtaining suitable accommodation for their microfilm unit.

Visits were made by the Library Staff to the Launceston Branch Office in order to assist with the organization of the collection held there.

Lack of space to properly house the collections continues to be a pressing problem which does not appear likely to be solved in the foreseeable future. Some consideration has been given to the possibility of replacing back-sets of some journals with microform editions, and also to acquiring more journals on microform in future as a possible solution to the problem. This will depend upon the availability of funds.

### STAFF

The present staff comprises a librarian, student librarian, and a part-time clerical assistant. The former librarian Mrs J. Scaife resigned in July and M. Bennett (B.Sc, DipLib., A.L.A.A.) was appointed acting librarian. Mrs W. Grubb (B.Sc (Hons)) who is currently studying for a Diploma in Librarianship at the Tasmanian College of Advanced Education, was appointed student librarian in November to replace the former student librarian Miss G. Davies who resigned at the end of July.

### COLLECTIONS

Additions to collecting during 1975:—

Monographs 137; Subscription Journals 5.

Present Holdings:—

Monographs 2 000 (approx.); Serials 300 (approx.).

Approximately one-third of the serials are received on subscriptions, while the remainder are received on a gift or exchange basis.

In June the classification scheme for books was changed from Universal Decimal Classification to Dewey Decimal Classification, in line with that used by the State Library.

Reorganization of the United States and foreign exchange collections has almost been completed and most of these holdings have been listed.

Indexing of Tasmanian Mines Department reports is still in progress with published reports having so far been completed, and recent (post 1970) unpublished reports almost completed.

### REFERENCE AND INFORMATION SERVICES

The weekly accession list has been continued. Detailed subject profiles have been produced for most of the professional staff to assist the librarian with the provision of current awareness services. Staff are making increasing use of the inter-library loan facilities offered and during 1975 approximately 361 requests were received. Daily statistics on the number of readily answerable queries received by the library, have been kept since October. These have averaged about seven or eight per week. In addition, during the year nineteen requests for information requiring extensive searches were received from staff.

## PUBLICATIONS

## Publications Officer E. L. Martin reports—

The following publications were printed during the year:—

- Geological Survey Bulletin No. 53. The zoned mineral deposits of the Scamander-St Helens district, by D. I. Groves (Reprint).
- Geological Survey Paper No. 1 Gravity survey of the Tamar region, northern Tasmania, by D. E. Leaman, P. A. Symonds and J. E. Shirley (Reprint).
- Geological Survey Paper No. 2. Gravity survey of north-eastern Tasmania, by D. E. Leaman and P. A. Symonds.
- Geological Survey Explanatory Report, Geological atlas 1:250 000 series. Sheet SK-55/4, Launceston, by M. P. McClenaghan and P. W. Baillie.
- Technical Reports No. 18 (for 1973).
- Technical Reports No. 19 (for 1974).

The Queenstown 1:250 000 Explanatory Report was in press at the end of the year, and the Hobart 1:50 000 Explanatory Report was almost ready for the printer. Editing of the Brighton 1:50 000 and Burnie 1:63 360 Explanatory Reports and of Bulletin 55 (Blue Tier Batholith) was commenced.

Seventy-six Unpublished Reports were edited and issued, and subject indexes to the 1973 and 1974 Unpublished Reports were prepared. Other reports included notes to accompany the Preliminary Resources Maps of North-Eastern Tasmania and a revised edition of Landslips in the Tamar Valley.

Photographic work included the production of field and laboratory photographs, lecture slides, illustrations for publications and phototypesetting.

J. A. Bates, Assistant Publications Officer resigned in August; M. J. Dix was appointed to fill the vacant position at the end of October.

The Publications Officer attended the Second Australian Geoscience Information Association Working Party Meeting in Melbourne on 23 October.

## NON-DEPARTMENTAL PUBLICATIONS

The following articles by members of the Geological Survey staff\* were published during the year:—

- BAILLIE, P. W.\*; WILLIAMS, P. R.\* 1975. Sedimentary and structural features of the Bell Shale correlate (Early Devonian), Strahan Quadrangle, western Tasmania. *Pap.Proc.R.Soc.Tasm.* 109:1-15.
- BROWN, A. V.\*; TURNER, N. J.\*; WILLIAMS, E.\* 1975. The basal beds of the Junee Group. *Pap.Proc.R.Soc.Tasm.* 109:107-109.
- CLARKE, M. J.\*; BANKS, M. R. 1975. The stratigraphy of the lower (Permo-Carboniferous) parts of the Parmeener Super-Group, Tasmania in CAMPBELL, K. S. W. (ed.). *Gondwana geology: papers presented to the 3rd Gondwana Symposium, Canberra, Australia, 1973*: 453-467. A.N.U. Press: Canberra.
- CORBETT, K. D.\* 1975. The Late Cambrian to Early Ordovician sequence in the Denison Range, south-west Tasmania. *Pap.Proc.R.Soc.Tasm.* 109:111-120.
- CORBETT, K. D.\*; BANKS, M. R. 1975. Revised terminology of the Late Cambrian-Ordovician sequence of the Florentine-Denison Range area, and the significance of the 'Junee Group'. *Pap.Proc.R.Soc.Tasm.* 109:121-126.
- LEAMAN, D. E.\* 1975. Form, mechanism and control of dolerite intrusion near Hobart, Tasmania. *J.geol.Soc.Aust.* 22(2):175-186.
- STEVENSON, P. C.\* 1975. A predictive landslip survey and its social impact. *2nd Aust.-N.Z Conf. Geomech*: 10-15. Institution of Engineers, Australia (Natl Conf. Publ. 75/4).

## CHEMICAL AND METALLURGICAL BRANCH

Report of the Chief Chemist and Metallurgist, H. K. Wellington, B.E., F.S.A.S.M., A.M.Aust.I.M.M.

The number of samples registered again fell this year to the lowest intake since 1961. The number of determinations made declined significantly to the lowest number since 1970 but the ratio of determinations per sample registered (4.00) remained at the high level of last year.

The number of tin determinations declined to less than half the number in the previous year to reach the lowest number since 1959. This has been caused by the almost total exclusion of samples from exploration but umpire tin assays are an increasing source of work.

Included in the determinations were sixty-eight complete rock analyses some of which with trace determinations involved twenty-nine determinations on a single sample.

The individual determinations made on water samples have not been listed but in general a complete analysis involves about ten determinations and a partial analysis about three.

TYPE AND NUMBER OF TESTS			
<i>Type of Test</i>	<i>Number</i>	<i>Type of Test</i>	<i>Number</i>
I. QUANTITATIVE—		Yttrium ....	69
Elements—		Zinc ..	315
Aluminium ....	183	Zirconium ..	73
Antimony ....	13		6 369
Arsenic ....	214	Waters*—	
Barium ....	10	Complete analysis ....	239
Bismuth ..	1	Partial analysis ....	166
Boron ....	2	Deposit gauges ....	54
Cadmium ..	113		459
Calcium ....	390	Miscellaneous—	
Carbon (including CO <sub>2</sub> )	37	Ash (coals) ....	159
Chlorine ..	87	Calorific value ..	29
Chromium ....	149	Combined water ....	46
Cobalt ....	71	Ignition loss ....	179
Copper ....	325	Insoluble ..	171
Fluorine ..	9	Moisture ..	65
Gold ....	96	Soluble salts in bricks ....	20
Iron (ferric) ....	698	Volatiles (coals) ....	26
Iron (ferrous) ..	109		695
Lead .....	341	II. QUALITATIVE ....	13
Lithium ....	63	III. CERAMIC—	
Magnesium ....	285	Clay determination ..	83
Manganese ....	99	Fusion point ....	7
Mercury ....	109	Brick test ..	10
Molybdenum ....	4		100
Nickel ....	168	IV. METALLURGICAL—	
Niobium ....	43	Amalgam retorting ....	2
Nitrogen ....	7	Crushing and grinding ....	6
Phosphorus ....	107	Density ....	5
Platinum ....	1	Flotation ....	1
Potassium ....	117	Heavy liquid separation	49
Rubidium ....	69	Heavy metal solubility	
Selenium ..	172	curve ....	1
Silicon ....	305	Jig ....	3
Silver .....	111	Magnetic separation ....	213
Sodium ....	129	Neutralising effects ....	2
Strontium ....	90	pH ....	16
Sulphur (including SO <sub>2</sub>		Settling tests ....	11
and SO <sub>3</sub> ) ....	362	Sizings ....	509
Tin ....	671	Tabling ....	5
Tantalum ..	2		823
Tellurium ....	11		
Titanium ..	121	Total ....	8 459
Tungsten ..	40		
Vanadium ....	78		

\* See notes preceding this table

## RESEARCH INVESTIGATIONS

Tin .....	6	Sulphur (pyrite) .....	1
Tungsten/molybdenum .....	1	Oil Shale ..	1
Gold ..	1	Pollution ..	2
Copper/tin .....	1	Ceramics ..	1
Chromite ..	2		—
		Total .....	16
			—

## SUMMARY OF INVESTIGATIONS

## Tin

**R.688**—Northern Developments (Tas.) Pty Ltd, Arthur River Gravels

Five samples were received upon which sizings and tin distributions were done. Most of the tin occurred in the size range from one millimetre to 75  $\mu\text{m}$ .

Primary jig concentration recovered 68% of the tin in a 2% Sn concentrate or 35% of the tin in a 7% Sn concentrate.

Upgrading of this initial concentrate to market grade required grinding, sulphide flotation, magnetic separation and further gravity concentration. The material had the characteristics of a mill middling which probably came from the old Mt Bischoff operations.

Coarse gold was present, the average content in the tested material being 0.2 g/t.

**R.691**—Minops Pty Ltd, Razorback Mine, Dundas

Products made in R.686 by Minops were further investigated. The less oxidized material yielded a better recovery than the highly oxidized material. Some relatively coarse cassiterite was found in the materials tested.

**R.699**—Minops Pty Ltd, Razorback Mine Dundas

Further work was done on primary middlings and magnetics from R.686 and R.691.

Grinding, high intensity wet magnetic separation and gravity separation were employed to produce concentrates assaying around 70% Sn and increasing overall recovery about 2%. Further low grade products (20-30% Sn) were also made.

**R.701**—Cleveland Tin N.L., Luina

A parcel of 15 tonnes of minus 50 mm Khaki Lode ore was delivered for test work.

Adequate liberation of cassiterite was achieved by grinding to pass 300  $\mu\text{m}$  with two thirds of the tin recovered in concentrates grading 60% Sn.

About half the total feed mass requires regrinding to produce low tin tailings. The sulphide concentrate has to pass 100  $\mu\text{m}$  for cassiterite liberation. The sulphide content of the sample was about half that found in Halls Lode but the siderite content of Khaki lode material was higher.

**R.704**—Minops Pty Ltd, Razorback Mine, Dundas

Magnetic separation, both wet and dry, was used to upgrade concentrates produced in R.649. Dry magnetic separation gave better results than wet.

**R.705**—Cleveland Tin N.L., Luina

A heavy liquid separation (density 2.95 t/m<sup>3</sup>) on Khaki ore (same sample as R.701) showed that when crushed to pass 12.7 mm a mass rejection from the plus 600  $\mu\text{m}$  material of 35% was possible with a 5% tin loss. The float fraction assayed 0.13% Sn.

### Tungsten-Molybdenum

R.594, Part II—King Island Scheelite Ltd, Grassy, King Island

Further batch and pilot plant work was done. A scheelite concentrate assaying 71.6%  $WO_3$  was made plus a molybdenum concentrate assaying 45.3% Mo.

### Gold

R.697—BMI Mining Pty Ltd, Middle Arm, Beaconsfield

Samples from boring tidal areas of old tailings in Middle Arm were cyanided 'as received' for gold recovery. The head assay was 2.4 g/t Au and recovery of gold 49.6%.

### Copper-Tin

R.690—S.R.M. Harvey, Macquarie Harbour Sediments

Samples from drilling the sediments in Macquarie Harbour were found to yield a low grade copper concentrate by very fine grinding of a bulk sulphide concentrate. A significant amount of tin was observed in the sulphide 'rich' sample.

### Chromite

R.692—Minops Pty Ltd, Razorback Mine Dundas

Efforts to separate chromite by flotation from the gravity tin concentrate were unsuccessful.

R.696—Northern Chromite N.L. Barnes Hill, Beaconsfield

A request was made by the company to see if a moulding sand and mould wash could be produced from their material.

The yield of moulding sand was low at the size specified as most of the sand was too fine. Between 8 and 45% of the chromite was in this gravity product.

A mould wash was produced by flotation. It contained 10% of the total chromite.

About two thirds of the flotation concentrate remained after removal of the mould wash fraction. This assayed 55%  $Cr_2O_3$  and 6%  $SiO_2$ .

### Sulphur (Pyrite)

R.707—Savage River Mines, Savage River

Savage River Mines submitted a sample of pyrite tailing for gravity concentration tests aimed at producing a pyrite concentrate for sulphuric acid production.

Jig and spiral concentration was tried but a suitable grade and recovery of sulphur was not achieved by the relatively simple process demanded.

### Oil Shale

R.693—Endeavour Oil Company N.L., Latrobe Shale

A sample of shale concentrate produced during pilot plant operations around 1940 was examined.

It was found further grinding followed by flotation yielded a 12.6% ash concentrate from a feed product containing 33% ash. (Subsequent work, R.694, shows 12.6% ash is equivalent to 550 litres/t of oil.)

### Pollution

R.680—Department of Mines, Oxidation of Mine Wastes

Results after eighteen months of testing were issued to the mining companies whose tailing are being examined. Additional work to that proceeding is envisaged in the light of results so far.

R.710—Department of Mines, Magnet Mine Residue Dumps, Waratah Area

The Magnet dumps had been standing untouched for about fifty years until the E.Z. Company began their recovery in 1975. The opportunity was taken to sample the dumps to assess the oxidation that had occurred.

### Ceramics

R.695—Department of Mines, Annual Survey of Bricks

In December 1974 a survey was made of bricks being produced in the State.

## MINES AND EXPLOSIVES BRANCH

Report of the Deputy State Mining Engineer and Deputy Chief Inspector of Mines and Explosives,  
P. M. Johnstone, B.E., M.Aust.I.M.M.  
*The Mines Inspection Act 1968*

### EMPLOYMENT

The average number of persons employed in the mining, metallurgical and quarrying industry was 9 613, a decrease of 490. The number of men employed underground rose by 7% to 1 587. This increase was due to completion of the changeover by the Mount Lyell Mining and Railway Co. Ltd and King Island Scheelite (Warman International Ltd) from open-cut to underground mining. The overall decrease reflects the poor demand for metals.

### ACCIDENTS

Accidents were reported and recorded in accordance with Australian Standard CZ6, Recording and Measuring Work Injury Experience. By this practice all disabling injuries causing the loss of one shift or more are recorded. In calculating the rates, 100 employees in the total of 9 613 were disregarded because their employers do not submit accident reports.

The number of accidents was 1 058 in which 1 055 men were injured and 3 killed.

### ACCIDENT STATISTICS (A.S. CZ6)

<i>Employer</i>	<i>Man-hours exposure</i>	<i>No. of injuries</i>	<i>Frequency rate</i>	<i>Days charged</i>	<i>Severity rate</i>	<i>Mean duration (days)</i>
Aberfoyle .. .. .	353 271	74	209.5	1 285	3 637	17
BMI .. .. .	20 536	1	48.7	1	49	1
Cleveland Tin .. .. .	401 942	49	121.9	461	1 606	9
EZ, Rosebery .. .. .	2 340 745	574	245.2	10 606	4 531	13
Kibuka .. .. .	109 021	17	155.9	429	3 935	21
King Island .. .. .	783 999	125	159.4	1 251	1 596	7
Minops .. .. .	17 651	6	339.2	40	2 266	4
Mt Lyell .. .. .	2 679 380	245	91.4	20 328	8 977	18
Renison .. .. .	794 491	165	207.7	3 004	3 781	13
Ringarooma .. .. .	56 348	4	70.9	123	2 183	31
Savage River .. .. .	856 175	60	70.0	446	521	7
Miscellaneous .. .. .	80 683	25	309.9	310	3 842	11
All mines .. .. .	8 494 242	1 345	158.3	38 284	4 507	28
APPM .. .. .	11 690	3	256.6	9	770	3
Comalco .. .. .	2 079 792	71	34.6	1 583	761	22
EZ, Risdon .. .. .	3 594 968	260	72.4	9 937	2 764	27
Goliath .. .. .	583 122	8	13.7	273	468	34
Kemerton .. .. .	285 872	40	139.9	396	1 385	7
Mole Creek .. .. .	29 123	....	....	....	....	....
NW Acid .. .. .	241 791	13	53.8	135	558	10
Port Latta .. .. .	521 992	16	30.7	662	1 268	11
Temco .. .. .	324 116	3	9.3	93	287	31
Tioxide .. .. .	888 139	17	19.4	522	588	22
Ceramic .. .. .	287 609	38	132.1	420	1 460	11
All works .. .. .	8 848 214	469	53.0	14 030	1 586	30
Collieries .. .. .	114 171	10	87.6	129	1 130	13
Quarries .. .. .	261 258	34	130.1	272	1 041	8
Totals .. .. .	17 717 885	1 858	104.9	52 715	2 975	28

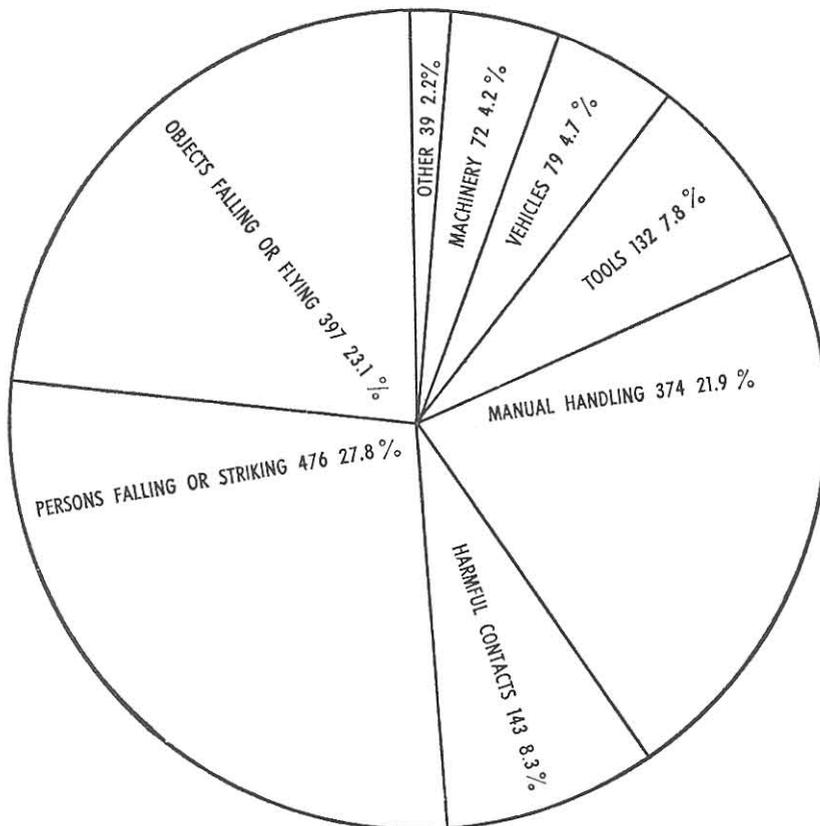
DESCRIPTION OF FATAL AND SERIOUS ACCIDENTS

Fatal

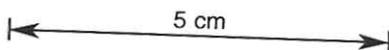
- C. A. Phillips, Mt Lyell: Struck by inrush of ore and water from ore pass after a hang-up.
- S. W. Perry, Mt Lyell: Drivers compartment on ore carrier broke loose.
- J. L. Brown, Mt Lyell: Driving a loader in mill with inadequate head room; struck head on beam.

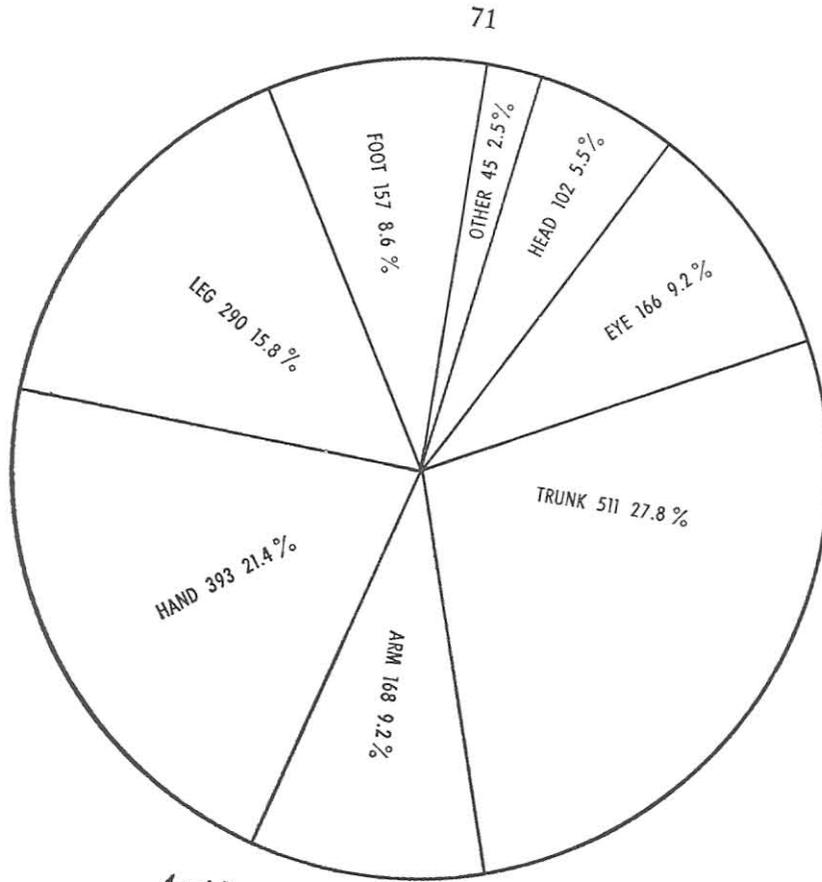
Serious

- G. H. Bugg, Mt Lyell: Jammed between loco and truck; broken pelvis.
- W. Bailey, Mt Lyell: Electrical flash; severe burns.
- A. R. Lovett, Mt Lyell: Broken pipe hit foot; lost toes.
- G. Cullen, Mt Lyell: Crane load slipped; broken arm and internal injuries.
- M. Sartori, Mt Lyell: Overall cuff caught in lathe; scalped and bruised.
- A. Schnitzhofer, Mt Lyell: Overturned drill rig; severe bruising.
- G. J. Brealey, Mt Lyell: Fell off chair; broken wrist.
- A. L. Curtis, Mt Lyell: Hair caught by drilling rod; scalped.
- S. Furge, Mt Lyell: Rock fall; broken leg.
- E. C. Luke, Mt Lyell: Fumed.
- P. Scott-Smith, Cleveland Tin: Rock fall; dislocated shoulder.
- D. Luke, Cleveland Tin: Rock fall; broken back.
- D. Bourne, Cleveland Tin: Foot slipped from ladder; injured knee.
- D. McLachlan, EZ Co., Rosebery: Fell from moving trolley, crushed pelvis.
- J. J. Woods, EZ Co., Rosebery: Rock fall; broken leg.
- K. McMillan, EZ Co., Rosebery: Hand jammed between ore truck and timber set; lost finger.
- V. Porter, EZ Co., Rosebery: Jammed by loco; broken ribs.
- J. Dunne, EZ Co., Rosebery: Jammed between bogger and timber; broken leg.
- P. A. Grimes, EZ Co., Rosebery: Fell in ore pass; broken arm.
- G. W. Clarke, EZ Co., Rosebery: Struck by timber falling down pass; back and chest injuries.
- S. Malika, Renison: Rock fall; multiple fractures.
- I. Wotherspoon, Renison: Trapped by sidewall while training driver; broken leg.
- A. Greenough, Renison: Pinned by drill rig and runaway vehicle; broken leg.
- J. Ricketto, Savage River: Vehicle fire; burns to head and arms.
- G. Alexander, Port Latta: Caught in wire rope; lost finger.

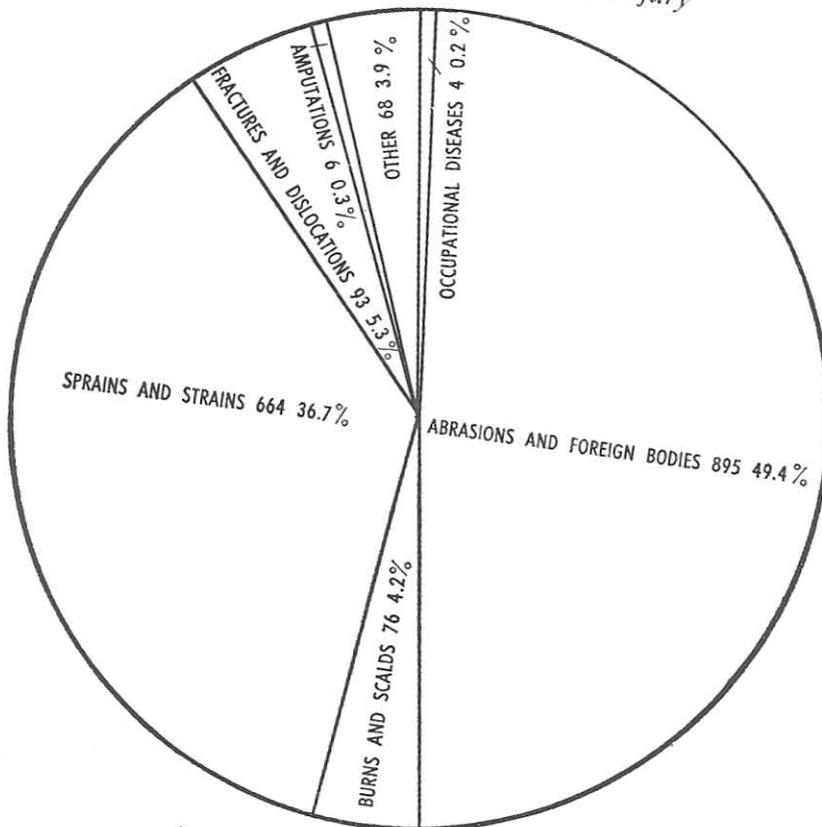


Accident Factor





Accidents : Location of Injury



Accidents : Nature of Injury

5 cm

**DANGEROUS GOODS**  
*The Explosives and Inflammable Liquids Acts*

IMPORTS OF EXPLOSIVES

	<i>Hobart</i>	<i>Launceston</i>	<i>Grassy</i>	<i>Burnie</i>	<i>Straban</i>	<i>Total</i>
Nitro-compounds (kg) .. .. .	195 500	46 525	97 500	189 000	270 450	789 975
Detonators .. .. .	438 000	100 000	154 000	441 450	733 000	1 866 450
Explosives shipments (No.) ..	3	3	3	3	3	15
Ammonium nitrate imported for use as an explosive (tonnes) ..	....	....	....	....	....	3 440

The number of licences and permits issued were: Magazine Licences, 66; Other Licences, 150; Shot Firer's Permits, 57.

IMPORTS OF INFLAMMABLE LIQUIDS

	<i>Bell Bay</i>	<i>Burnie</i>	<i>Devonport</i>	<i>Hobart</i>	<i>Total</i>
Inflammable liquids imported in bulk (tonnes)—					
Aviation gasoline .. .. .	3 251	....	....	400	3 651
Kerosene—					
Aviation .. .. .	3 955	....	....	14 828	18 783
Lighting .. .. .	....	194	2 408	3 374	5 976
Power .. .. .	....	....	....	298	298
Motor spirit—					
Premium .. .. .	57 356	32 227	37 930	107 823	235 336
Regular .. .. .	18 149	6 145	7 740	22 886	55 190
LP gas .. .. .	1 535	....	....	1 941	3 476
Total .. .. .	84 516	38 566	48 078	151 550	322 170
Tankships (No.) .. .. .	14	12	11	12	49

Licences to keep, 2 205; Plans approved, 322; Exemptions granted, 14; Permits to import, 20.

*Outrages*

The amenities building on the Lyell Highway at Scarlet Creek was extensively damaged when some 2 kg of explosive was electrically detonated in a W.C. bowl. No one was present at the time of the explosion.

*Accidents*

Two men were injured at Launceston when flyrock escaped from a blasting mat. One mat was clearly inadequate.

There were two spillages during the year, both at Devonport, one from a tanker and the other from a tank vehicle during discharge at a service station. The petrol flowed into underground drainage to the river. Both spillages were cleaned up immediately.

**SPECIAL INVESTIGATIONS**

**P. Allan, B.Sc., A.H.-W.C., M.I.M.M., M.Aust. I.M.M., Hobart.**

DIESEL ENGINES UNDERGROUND

Pursuant to Regulation 128 (2) of the Mines Inspection Regulations 1975, twenty-one diesel engine types were tested and subsequently approved for underground use in mines. A further two engines failed to obtain approval.

As the new 1975 regulations eased the requirement for the use of water scrubbers, there has been a rise and fall in the popularity of the diffuser type of exhaust conditioner. While these have been found effective when used on the smaller type engines, the larger, load-carrying engines have proved to be adversely affected by the greater exhaust back-pressures caused by these devices.

It continues to be the policy to forbid the use of catalytic type conditioners on the grounds of intermittent operation, high exhaust temperatures and the consequent prolongation of the nitric oxide phase in the exhaust gases.

It had been obvious for some time that in a few instances anomalies existed between mines with regard to equivalent approvals. The first part of a survey was carried out during the year to rationalise the existing approvals and an approval list of forty-nine currently operating diesel-engine types issued. The second stage of the survey is now in progress to determine the exact number of individual engines currently in use. The survey proved necessary to catch up with the fluctuations in the use of engines, replacements and the supplanting of one type for another.

This year has seen an enormous decrease in the number of air-cooled engines and a raise in popularity for the water-cooled.

Assistance has been given both intra and interstate to enquirers for information on testing equipment and procedures.

ENGINES OPERATING UNDERGROUND AS AT 31 DECEMBER 1975

<i>Make</i>	<i>Type</i>	<i>Number in Use</i>
Allis-Chalmers	D262	2
Caterpillar	D330c/D3304 T/C	5
	D333 N.A.	3
	D3306 N.A.	6
	D3306 T.C.	20
	D3306 TC/AC	8
	D343 TC/AC	5
	D343 TC	1
	D3204 N.A.	2
Cummins	NH 220	3
Deutz	F 3L 812	2
	F 4L 812	12
	F 4L 912W	1
	F 6L 812	12
	F 6L 413V	1
	F 6L 912	1
	F 8L 714	26
	F 19L 714	7
	F 12L 714	2
Ferguson	AD/152	1
Fiat	500	6
Ford	2504 E	1
	2512 E	1
	2514 E	18
	Super Major	2
	2711 E	1
International	A 414	1
	AUD 264	1
Leyland	680	7
	600	4
Lister	SR 4	1
Mercedes	OM 6361	2
Perkins	354	1
	236	1
	D 3152	3
Rover	Series III	44
Toyota	H	11
Volvo	Penta TD 100A	4

## VIBRATION MONITORING

Use of the vibration monitoring equipment has been intermittent, the principal applications being investigations into blasting complaints in the vicinity of Launceston Quarries, pile-driving vibration at the Burnie Overpass, construction vibration at the Lindisfarne Main Road and the Midland Highway as well as field studies in the vicinity of Bridgewater quarries. Assistance was given to the Australian Road Research Board with traffic studies in the town of Richmond.

To assist with reconstruction on the Tasman Bridge, the equipment was modified and loaned to the Bridge Reconstruction Committee for the duration of the emergency while a more compact and versatile unit was assembled based on a Sanei 6-channel recording oscillograph and a Sanei multi-amplifier unit. Using two omni-directional detectors in place of the previous six uni-directional detectors and with the entire unit battery operated the application and mobility of the equipment has been greatly enhanced.

Calibration can be carried out quite effectively by the electrical testing laboratories of the Hydro-Electric Commission. As the equipment is used informatively and not legislatively there has not been any requirement for NATA certification.

A number of site investigations were carried out in answer to complaints of blasting damage, but in all cases the damage was traceable to soil movements.

## NOISE INVESTIGATIONS

No serious noise complaints have been received during the year and investigations have been confined to noise distribution from quarries and local surveys.

## DUST INVESTIGATIONS

Dust investigations have been mainly concerned with asbestos fibre counts and although the counts have been well within acceptable limits, some general matters relating to the overall condition of the asbestos-cement works at Railton have required attention. It is intended that continuing random sampling of the plant will be carried out at irregular intervals.

## MECHANICAL AND ELECTRICAL INSPECTION

**W. C. Hodgson, M.I.E.Aust.**

**E. J. Bartkus, M.I.E.Aust., Hobart**

Routine plant inspection continued on all mines and works where extensive use is made of machinery. In cases where the conditions were found unsatisfactory requests have been issued for improvements to comply with the Mines Inspection Act.

*Hoists*

**ROSEBERY No. 2 SHAFT:** Winders have undergone design changes by G.E.C. to improve brake safety. These have been approved and will be implemented early in 1976.

**PRINCE LYELL SHAFT:** In line with the revised winding and signalling regulations, the brakes on these winders are undergoing review by Siemens to increase safety. Some problems associated with digital control systems on Prince Lyell and Rosebery No. 2 shaft winders required some modifications to circuitry and operating parameters.

*Vehicles*

Agricultural tractors are no longer used on mines and the maintenance and braking standards of all other vehicles has improved markedly.

*General*

Upgrading of electrical installations and control systems is proceeding in some works with, a trend towards solid state controls and automation.

Certificates of competency were issued to sixty-six candidates examined. Examination of new plant and equipment for approval continued to a lesser extent than in previous years but included designs for \$28 million extension to Temco, conversion from oil to coal firing at Goliath, completion of new Razorback Mill, A.P.P.M. Tonganah Clay Mine and proposed crushing plant for Circular Head Dolomite.

## DRILLING

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

### DIAMOND DRILLING

Six diamond drills were operated by the four crews available. A fifth crew was recruited, but the foreman resigned after six weeks. Recruiting and training competent diamond drillers is a difficult task.

The diamond-auger rig worked throughout the year. The crew were transferred to the Keystone drill to undertake drilling for the Derwent River crossing at Dowsings Point from April into August. A diamond drill crew was used to man the Gemco during that period as the drill was continually in demand.

### Coal Exploration

Two holes were successfully completed in 1975; one to a depth of 503 metres and the other to 466 metres.

### Mineral Investigations

Investigations of the geochemical anomaly at Oliver Hill was continued and four holes were completed. Three holes were also drilled at Claude Road as part of this investigation.

### ROTARY DRILLING

The Failing drill completed the investigation in the Port Sorell area and then moved to the Pipers River area on groundwater investigation.

The Mayhew 1000 worked in the Gladstone area and then moved to Sorell. A Gardner-Denver 600 compressor was purchased for this plant and improved its performance when using the down-the-hole hammer.

### CHURN DRILLING

The Keystone drill started on water investigations in the Winnaleah and Endurance areas. It was moved to Herrick on tin exploration where fourteen holes were completed by the end of the year.

### DRILLING DETAILS

<i>Location</i>	<i>Purpose</i>	<i>Drill</i>	<i>No. of holes</i>	<i>Total depth (metres)</i>
<i>Diamond—</i>				
Four Springs	Site investigation	F20C 2	4	45.96
White Hills	Landslip investigation	F20C 2	1	66.17
Colebrook	Landslip investigation	F20C 2	4	35.99
Stanley	Landslip investigation	F20C 2	8	48.72
Harford	Stratigraphic investigation	F20C 2	1	62.19
Risdon Wharf	Underwater blasting	JSL	20	17.49
Fingal	Coal investigation	30 HD	1	183.27
Margate	Stratigraphic investigation	12 B	2	87.47
Lochaber	Coal investigation	12 B	1	144.75
Fingal	Coal investigation	12 B	1	100.76
Fingal	Coal investigation	Edeco	1	178.32
Lochaber	Coal investigation	Edeco	1	73.81
Olivers Hill	Mineral investigation	F20C 1	4	217.98
Claude Road	Mineral investigation	F20C 1	3	436.95
			52	1 699.83

<i>Location</i>	<i>Purpose</i>	<i>Drill</i>	<i>No. of holes</i>	<i>Total depth (metres)</i>
<i>Diamond/Auger—</i>				
Lindisfarne ....	Road cutting investigation		5	65·51
Bruny Island ....	Water table determination		8	45·80
Mornington ....	Foundation investigation		4	25·64
Riverside ..	Foundation investigation		5	62·46
Sorell ..	Water investigation		9	73·60
Spring Hill ..	Road investigation		1	15·00
Freshwater Point ...	Landslip investigation		1	60·32
White Hills ..	Landslip investigation		1	19·25
Launceston ..	Foundation investigation		3	45·00
Bradys Lookout ..	Landslip investigation		8	138·85
Kayena ..	Landslip investigation		1	30·65
Tomahawk ..	Stratigraphic investigation		2	12·28
Jericho ....	Stratigraphic investigation		2	57·73
Mowbray ..	Road investigation		2	32·40
St Leonards ..	Road investigation		3	28·63
			—	—
			55	713·12
			—	—
<i>Churn/Diamond—</i>				
River Derwent ....	Bridge foundation	K55-2	6	262·22
			—	—
			6	262·22
			—	—
<i>Churn—</i>				
Winnaleah ....	Water investigation	K55-1	1	7·62
Endurance ..	Water investigation	K55-1	3	193·50
Herrick ....	Tin investigation	K55-1	14	515·00
			—	—
			18	716·12
			—	—
<i>Rotary/Percussion—</i>				
Rushy Lagoon ....	Water investigation	Mayhew 1000	8	257·14
Sorell ....	Water investigation	Mayhew 1000	2	151·00
Hobart Airport ....	Water investigation	Mayhew 1000	2	90·00
Bruny Island ....	Water investigation	Mayhew 1000	3	76·00
Harford ....	Water investigation	WW1	14	734·00
Oatlands ..	Water investigation	WW1	3	41·44
Tonganah ....	Water investigation	WW1	2	88·93
Pipers River ....	Water investigation	WW1	3	187·45
			—	—
			37	1 625·96
			—	—

## SUMMARY OF DRILLING

<i>Drill type</i>	<i>No. of drills operating</i>	<i>Depth (metres)</i>
Diamond ....	5	1 699·83
Diamond/Auger ..	1	713·12
Churn/Diamond ..	1	262·22
Churn ....	1	716·12
Rotary/Percussion ....	2	1 625·96
	—	—
	10	5 017·25
	—	—

**NORTH-WESTERN DISTRICT****W. R. Tindal, A.W.A.S.M., M.Aust.I.M.M.****E. C. Leyland, A.W.A.S.M., A.M.Aust.I.M.M.****R. C. Thomas, A.C.S.M., M.Aust.I.M., Burnie**

## EXPLORATION

*Electrolytic Zinc Co. of Australasia Ltd*

E.L. 1/62, Mt Black. The Rosebery host rock horizon was tested by diamond drill holes 500 metres north of previous drilling and also east of the Koonya workings. No significant mineralisation was present in the host rock sequence intersected. Geochemical soil anomalies located north of the Rosebery Mine and between the Salisbury and Jupiter prospects were further tested with auger and pit sampling with discouraging results.

Topographic plans on 1:5000 scale of the western half of the lease were completed during the year and have enabled accurate replotting of all exploration data. Topographic mapping on 1:1000 scale of the Rosebery Mine and townsite areas have been substantially completed.

During the year a research program to test the application of the mercury soil sampling geochemical techniques to the exploration for Rosebery-type ore bodies has been completed.

S.P.L. 132, Mt Dundas. Activity has been limited to geochemical soil sampling of grid lines previously established for an induced polarisation survey. The 1:5000 scale topographic mapping program over E. L. 1/62 was extended to the south to cover this area.

S.P.L. 3, Tullah. Geological mapping of the Tullah area has been completed. The possibility of open pit operations being established at the Murchison Mine was investigated and will continue into 1976. A large portion of this licence is now dominated by H.E.C. construction activities.

E.L. 12/72, Bulgobac. The systematic application of geochemical or geophysical techniques is difficult due to the irregular slope of this lease. In conjunction with Comstaff, whose E.L. 5/63 almost surrounds this lease an airborne geophysical survey using the Barringer Input system was completed. Comstaff Pty Ltd managed this survey which was contracted to Geoterrex Pty Ltd. Ground investigation of anomalies located by this survey will commence in 1976.

Part of E.L. 13/65, Jukes-Darwin Venture. The joint venture with B.H.P. and International Nickel Australia Ltd was terminated during the year due to lack of encouraging results. Geological mapping and stream sediment geochemical surveys of the Clark and Garfield rivers has been completed.

S.P.L. 10, Lynchford. This licence formed part of the Jukes-Darwin Joint Venture and was taken out to cover Cambrian volcanic rocks to the west of the Jukes-Darwin area. A minor amount of geological mapping and stream sediment sampling of the Garfield River drainage system was undertaken. This licence has not been renewed.

*Mt Lyell Mining and Railway Co. Ltd*

E.L. 10/69, Dora-Huxley Area. Detailed geological mapping and geochemical soil and rock sampling continued in the Little Owen area, in the vicinity of the old mine workings and over the previously outlined geophysical anomalous zones. Similar investigations were conducted in the Whip Spur-Lynch Creek-King River-Mt Huxley area.

E.L. 41/71, Henty-Yolande Area. Detailed geological mapping and geochemical soil sampling programs were conducted over the geophysical anomalous zones on the West Sedgwick, Madam Howard and Basin Lake grids. Elsewhere, work was confined to reconnaissance mapping.

E.L. 9/66, Mt Tyndall area. Five diamond drill holes were completed during the year, for a total advance of 1 371 metres. The holes tested coincident geophysical and geochemical anomalies in the Henty Fault zone and Howard's anomaly. All holes intersected black pyritic siltstones carrying trace to minor base metal con-

tent in acid-intermediate volcanic sequences. Exploration of the White Spur area commenced with the establishment of grid lines, geological mapping and geochemical soil sampling. At the end of the year follow-up investigations, involving detailed mapping and soil sampling, were in progress in the Red Hills-Gooseneck area.

S.P.L. 129, Zeehan-Trial Harbour area. Exploration was largely confined to Area D, in the vicinity of Kelvin & Mayne's workings. The area was covered by a gradient array induced polarisation survey, which indicated a strong anomalous zone coincident with the previously outlined anomalous geochemical tin and ground magnetometer responses. This zone was tested by a diamond drill hole which was sunk in granite to a depth of 413 metres after intersecting 30 metres of some massive magnetite-pyrrhotite mineralisation containing minor tin values, in a sequence of metasomatised Cambrian sediments.

To the south of this area, mapping outlined a gossanous zone carrying anomalous tin and copper values and yielding anomalous geophysical responses. Several test lines were flown in the evaluation of the Airborne Input E-M System and indicated an extensive conductive zone to the east of the licence boundary. A further 11 km<sup>2</sup> were pegged to include this zone in the licence.

#### *Minops Pty Ltd*

S.P.L. 133. Routine geological mapping and stream and dump sampling in a search specifically for tin were undertaken. No evidence of tin mineralisation was found and the licence was relinquished. A lease 63M/75 was taken up on a portion of this area to cover the Southern extension of the Razorback shear zone south of 1M/75.

S.P.L. 120. Surface sampling was undertaken and a lease, 62M/75, was pegged to cover an area known as anomaly A. The licence was then relinquished.

#### *Cominco Exploration Pty Ltd*

E.L. 15/73, Hatfield River. In the course of extensive gridding, soil sampling, induced polarisation geophysics and mapping, an old barytes prospect in the Mount Charter area was located. Two diamond drill holes with a total length of 382 metres were drilled it was established that the lithology was similar to that at the Que River prospect.

E.L. 2/70 Mackintosh River. Further gridding, soil geochemistry, geophysics and mapping has extended the geological knowledge of the Que River prospect.

#### EXPLOSIVES

On 28 April 1975 miner A. Peuthe was boring a face on the 150 metre level of the Prince Lyell Mine. The drill rod on one of the booms jammed at collaring and when Mr Peuthe climbed from the jumbo and struck the rod at the chuck with a steel an explosion took place and he received severe lacerations and bruising. A close inspection of the face later revealed the remains of a 'butt'. It was indeed fortunate that the miner was three metres from the face at the time of the accident.

At the request of the Devonport Technical College, lectures for shotfirers were given over a ten week period with a practical session at the end. Enrolment consisted of twenty-one engineers, shotfirers and shotfirer's assistants; nineteen completed the course.

#### ACID SPILLAGE

An acid spillage occurred in the export line from the plant of N.W. Acid Pty Ltd. No major damage was done to the unoccupied land, the acid was neutralised, and the area fenced. Following this spillage all bends and angular sections of the pipe were inspected and a life expectancy determined. Regular replacement of these sections has now been instituted.

#### INFLAMMABLE LIQUIDS

Further fuel spillages from tank vehicles travelling on the Murchison Highway have been reported. All spillage occurs on the steeper sections of this route. With the introduction of automatic filling at the main tank depots no check is carried out by oil company personnel to determine if the driver has secured all tank ports.

An explosion occurred when combustion failed to take place in an air furnace at the brickworks at Dulverton. Severe damage was caused to one end of the furnace with minor damage to the external wall of the building. A malfunction of the photocell and, or solenoid switch was deemed to be the cause.

#### FIRES

A fire, caused by hot metal from welding falling on to a conveyor in the crushing section of the Mount Lyell Mining & Railway Co. Ltd's mill destroyed the conveyor and did considerable damage to electrical control systems.

#### FLOODING

Due to excessive and continual rainfall in the Waratah area the wall of an old dam, known as the Magnet No. 1 Dam, totally collapsed, the released water taking the town dam and cutting the road near the waterfall. The torrent denuded the floor of the Waratah River for a distance of 2 km downstream from the falls and left the valley strewn with large boulders. The treatment plant operated by J. Housego and the bridge upstream from the old power house were washed away. The treatment plant of S. A. Tatlow was also strewn over the valley and the tables were covered with a metre of mud.

Ringarooma Mining plant was not harmed but the tailings dams were all washed away.

### NORTH-EASTERN DISTRICT

**R. A. A. Seymour, B.Sc., M.I.M.M., A.M. Aust.I.M.M., Launceston**

Poor metal prices caused problems for some of the smaller tin miners and led Comalco to halt an expansion program. New developments consisted of the completion of A.P.P.M.'s kaolin mine near Scottsdale, the continuing construction of additional furnaces at Temco, and a new small tin mining venture near Gladstone.

Several inspections of mines and gravel pits were made with an officer of the Department of the Environment. Other work included the investigation of blasting complaints, and effluent sampling in the Ringarooma and South Esk valleys.

#### EXPLORATION

E.L. 17/73. Feasibility studies at the Tasmania Mine continued.

E.L. 4/74. Metallurgical testing of oil shale continued.

E.L. 15/75. Geochemical sampling was carried out in an area centred on Deloraine.

E.L. 19/74. Extensive sampling of beach sands on the central east coast was carried out with rougher concentration at a central plant.

### SOUTHERN DISTRICT

**R. Billingham, B.Sc., A.R.S.M., A.M.Aust.I.M.M., Hobart.**

#### STRATHGORDON

Considerable progress was made during the year by Pearson Bridge Pty Ltd in driving the tailrace tunnel for the Hydro-Electric Commission at Strathgordon. By the end of the year the 10-metre diameter tunnel was within 1 000 metres of holing when progress was halted by bad ground conditions. Some forty-five persons are employed on the project.

#### GENERAL

Inspections were made of numerous small lease areas used for winning construction materials. Investigations were made following complaints from the public concerning blasting nuisance and where necessary modifications to procedures were introduced.

## EXPLORATION

*Geopeko Limited*

During the year E.L. 23/69 was relinquished, leaving E.L. 15/66 as the only exploration licence held by the company on King Island. Field exploration activity was concentrated in the Grassy area around the perimeter of the Grassy Granite and within a few miles of the Dolphin Mine. A total of 2 331 metres of auger drilling were carried out using a truck-mounted rig, and 207 metres of auger-core drilling were completed. Some 446 metres of diamond drilling were carried out on three prospects. This work was a continuation of a program to define closely the geological units and structure in the Grassy Granite contact zone. E.L. 9/69, 13/75 and 21/73. During the year E.L. 23/74 and 14/72 were relinquished, and the areas then included in the renewed E.L. 9/69. Extensive Gemco drilling and scintillometer surveys were carried out in E.L. 9/69 and 13/75, and the eastern shores of the island between Fraser River and Lavinia Point have been explored. A further licence E.L. 12/75 was taken out in the south-west of King Island.

## Report of the Mount Cameron Water Race Board for the year ended 31 December 1975

THE MINISTER FOR MINES

We submit the Report of the Mount Cameron Water Race Board for the year ended 31 December 1975.

As a result of the growing losses the Board has investigated alternatives for reducing operational expenses and increasing revenue. The system must be maintained in reasonable condition in order to be functional and any increase in water charges is not considered to be practicable at present. The future of the Race lies in a greater demand for water and it is pleasing to report that a new consumer for mining purposes has been obtained and there is a possibility of a further mine requiring water for sluicing operations.

The Race system is generally in good order. Twin aluminium pipes have been fabricated and installed at the intake to the Cybele Syphon which has improved the flow of water to one consumer. Difficulties in maintaining a sufficient flow of water to the new consumer have been due to obstructions in the race between the Chum Dam and Syphon No. 2. The use of mechanical equipment will probably be necessary in order to clear this section of the system.

The loss increased substantially from \$13 204 last year to \$18 767 resulting from unavoidable increases in wages and in workers compensation insurance premiums. The Board expects a significant improvement in its financial position during 1976 but this is entirely dependent on the growth in revenue from the use of water from expanded tin mining operations.

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 1975

<i>Receipts</i>	\$	<i>Payments</i>	\$
Sale of water—		Salaries and wages, including pay-roll tax ....	20 201·65
Fixed on cash sale ....	3 052·50	Insurance ....	1 742·52
Royalty scale ....	....	Car allowance ....	150·00
Domestic use ....	496·00	Maintenance materials ....	221·15
Balance (loss) ..	18 766·82	Miscellaneous ....	....
	\$22 315·32		\$22 315·32

### MOUNT CAMERON WATER RACE

STATISTICS FOR YEAR ENDED 31 DECEMBER 1975

<i>Registered Rainfall</i>		<i>Production</i>	<i>Tonnes</i>
Great Musselroe ..	1 273 mm	Tin oxide produced—	
Little Musselroe ..	1 239 mm	Fixed scale ....	17·78
		Royalty scale ....	....
		<i>Employment</i>	
		Average per week—	
		Fixed scale ....	4
		Royalty scale ....	....
			4
			—
			780
			—

## Report of the Ringarooma and Cascade Water Board for the year ended 31 December 1975

THE MINISTER FOR MINES

We submit the report of the Ringarooma and Cascade Water Board for the year ended 31 December 1975.

The Board has maintained the Cascade Dam and retained ownership of the Mt Paris Dam, which is kept empty, in order that it will be possible to supply water to the old Briseis Mine should efforts for its reopening be successful. There has been no development of proposals to use the dams for irrigation schemes.

The Board has no revenue and the cost of caretaking the Cascade Dam and the interest on the capital cost of the water system is reimbursed from Consolidated Revenue.

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 1975

<i>Receipts</i>	\$	<i>Payments</i>	\$
Balance (loss) .....	1 297·24	Interest on capital cost .....	1 147·24
		Caretaking .....	150·00
	<u>\$1 297·24</u>		<u>\$1 297·24</u>