



1973

PARLIAMENT OF TASMANIA

DIRECTOR OF MINES

REPORT FOR THE YEAR ENDED 31 DECEMBER 1972

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

By Authority:

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Turair survey helicopter near Rosebery (see page 49).

Courtesy Electrolytic Zinc Co.

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REPORT OF THE DIRECTOR OF MINES

Department of Mines,
Hobart, 1 July 1973

THE HONOURABLE THE MINISTER FOR MINES

I present my Report on the mining industry for the year ended 31 December 1972.

The value of metals and minerals produced from Tasmanian ores was \$136 847 182 compared with \$118 620 235 for 1971, representing an increase of 16%. In addition metallurgical production from imported ores and concentrates was valued at \$107 310 085 compared with \$111 892 092 for 1971.

The total of \$244 157 267 represents a new record and exceeds the 1971 record by \$13 644 940.

Movements in production and value of all mineral products are shown in detail later in the Report, but I list hereunder particulars of the principal minerals produced.

<i>Mineral</i>	1971		1972	
	<i>Quantity</i>	<i>Value</i> \$	<i>Quantity</i>	<i>Value</i> \$
Copper (tons)	24 800	24 803 453	27 367	26 226 228
Gold (fine oz)	53 365	1 933 457	57 264	2 873 567
Iron ore pellets (tons)	2 158 879	27 038 303	2 335 561	27 527 624
Lead (tons) ..	12 255	2 926 075	19 982	4 951 450
Silver (fine oz)	1 669 493	2 172 403	2 547 037	3 666 297
Tin (tons)	6 071	19 854 601	6 717	22 439 882
Tungsten as tungstic oxide (tons) ..	1 716	7 826 272	1 891	5 927 063
Zinc (tons) ..	41 183	14 829 575	65 765	24 869 254

It will be noted that in all cases there have been substantial increases, the most significant being copper, lead, tin and zinc. This reflects the results of completion of large programmes of expansion by the major mining companies.

DEVELOPMENTS

The main feature of the year has been progress with the large expansion programmes commenced by our major mines in previous years. Open-cut operations by the Mt Lyell Company, Queenstown ceased on 31 August 1972 and production of copper ore will in future be derived solely from underground mining operations which have been developed as part of the company's plans to increase copper output. At the Electrolytic Zinc Company's mine at Rosebery production of zinc has increased from 41 183 tons to 65 765 tons and there were also substantial rises in the recovery of lead, copper, silver and gold as a result of the completion of the \$50 million capital expansion programme. There have been additions to ore reserves and plant improvements at the Renison tin mine at Renison Bell and the Cleveland tin mine at Luina. A major programme which will ultimately result in doubling of production is planned at the King Island scheelite mine but this has been delayed to some extent by the low level of metal prices. The Electrolytic Zinc Company has commissioned new plant at Risdon to recover zinc and other metals from the residue dump. The limestone industry at Mole Creek referred to in my previous Report is now in production and is supplying limestone to Australian Pulp and Paper Mills at Burnie and lime for the Tasmanian market.

BMI Mining Pty Ltd is preparing plans to reopen the Endurance tin mine at South Mt Cameron and the company is actively investigating other areas of alluvial tin deposits in the north-east. Some small operators in the north-east have been assisted to improve their mining methods and as a result have increased the quantity of tin being produced and are now able to mine deposits previously unavailable with the older methods of production. Ludbrooks Ltd are endeavouring to establish alluvial tin mining in the Port Davey district where the company has been engaged in exploration for the past five years. There is also active interest in assessing other known alluvial tin deposits in the north-east to determine whether viable productive operations can be established.

Studies are continuing prior to commercial development of a large silica deposit discovered by Comalco in the vicinity of Cape Sorell on the West Coast. Evaluation of clay deposits in the north-east for use in paper making by Australian Pulp and Paper Mills at Burnie is being continued. On the West Coast options granted by small-scale lode tin producers have been exercised and the company concerned plans to continue operations on the same scale and to undertake further investigations of ore reserves and methods of treatment of the ore with the object of expanding operations at a later stage.

In February 1972 Naracoopa Rutile Ltd which was engaged in beach sand mining at King Island, was forced into liquidation and the mine was closed. Subsequently the leases and plant were sold to Kibuka Mines Pty Ltd, a company incorporated in New South Wales. This company has completely reorganised methods of mining, installed additional plant, made provision for rehabilitation of mined areas and has recommenced productive mining.

Ringarooma Mining Pty Ltd who were granted leases along the Waratah River near the old Mt Bischoff tin mine in 1971 have installed a concentrating plant and have commenced productive mining. The company has constructed a road to the mine and has provided housing for its employees.

PRODUCTION

The Mt Lyell Company treated 2.4 million tons of ore having an average assay of 1.18% copper during 1972 for the production of 91 985 tons of copper concentrates containing 23 906 tons of copper, 15 480 oz of gold and 131 222 oz of silver. The copper concentrates were shipped to Japan and to Port Kembla for treatment. The record quantity of ore milled and copper produced has resulted from greater production of ore from underground sources. The production of ore from the West Lyell open-cut ceased on 31 August 1972 and as underground mining is fully established, production of copper will be further increased. A total of 119 596 tons of pyritic concentrate was disposed of for acid manufacture.

The expansion scheme begun in 1968 has continued and development at Prince Lyell below the West Lyell open-cut was maintained on schedule and enabled a smooth changeover from open-cut to underground mining. The shaft at Prince Lyell was completed to 2 125 feet and all equipment installed for commissioning early in 1973. The last major surface installation as part of the expansion programme was completed with the installation of a new secondary crusher and the erection of a new intermediate ore storage bin at the concentration plant. Extra flotation plant was also installed to allow better treatment of the higher grade ore from underground mining.

Exploratory drilling has continued. Present ore reserves have been assessed at 32.9 million tons of proved ore averaging 1.48% copper, 0.067 oz of silver per ton and 0.012 oz of gold per ton and of this only 1.1 million tons could be won by open-cut methods. Probable ore is calculated at 6 million tons assaying 1.47% copper, 0.06 oz/ton silver and 0.009 oz/ton gold, and possible ore at 2.23 million tons assaying 1.06% copper, 0.100 oz/ton silver and 0.010 oz/ton gold.

Regular shipments of iron ore pellets to Japan were made by Savage River Mines and 2 335 561 tons of pellets were produced for export from Port Latta. Since the first shipment was made in April 1968 over 9 million tons of pellets have been sent to Japan involving over 143 separate shipments. The project has not yet been successful financially and the Australian participants have reported that there has been no return to date on the capital invested.

The holder of the exploration licence covering the Savage River iron ore deposits outside the leases held by Savage River Mines, has persisted in investigations directed to the establishment of an integrated steel industry. A feasibility study has been made and discussions have taken place with overseas interests. Investigations are being continued.

The principal tin producers were Renison Ltd and Cleveland Tin N.L. which are the two leading tin mines in Australia.

A feature of the operations of Renison Ltd at Renison Bell was the significant increase in tin recoveries which rose to 69%. This has been attributed to modifications in the grinding circuit which has reduced the loss of fine cassiterite (tin oxide) and also to an improvement in the flotation plant. Further investi-

gations to maximise recoveries are in process. Tin production totalled 4 008 tons from the treatment of 447 673 tons of ore. The company has reported that proved ore has been assessed at 3.26 million tonnes averaging 1.33% tin and probable ore at 4.0 million tonnes averaging 1.29% tin. Possible ore is estimated at 9.2 million tonnes averaging 0.86% tin. Exploratory drilling within the leases is continuing and the company is also engaged in exploration activities on areas held under licence outside the mining leases.

Production has been assisted by the commissioning of the new cassiterite flotation plant. A total of 5 566 tons of copper concentrates and 3 849 tons of tin concentrates were produced containing 2 290 tons of tin metal and 1 022 tons of copper from the treatment of 390 875 tons of ore. Drilling to locate and test further ore bodies is in progress and a further assessment of ore reserves will then be made. Current reserves of ore have been assessed at 2.9 million tonnes averaging 0.87% tin and 0.31% copper.

The serious economic effects of the depressed prices for tin and tungsten have necessitated economies at the Storeys Creek and Aberfoyle mines operated by Aberfoyle Limited. In November 1971 the mill at Storeys Creek was closed and ore from both mines has since been treated at the Aberfoyle mill. Improved mining practices introduced resulted in the combined ore grade being increased from 0.58% to 0.69%. Ore produced from the Storeys Creek mine amounted to 51 867 tons and 68 649 tons were mined at the Aberfoyle mine. The metal content of ore treated was 270 tons of tin and 557 tons of tungstic oxide. Indicated and inferred ore reserves at the Aberfoyle mine were assessed at 388 000 tons and at the Storeys Creek mine at 233 000 tons.

BMI Mining Pty Ltd produced 43 tons of tin metal from operations at the Monarch mine at South Mt Cameron and the company is still drilling at the old Endurance mine before planing to recommence productive mining. The combined production by a number of smaller operators of alluvial tin mines in the north-east of the State usefully contributes to the total tin production in Tasmania.

Production of tungsten is recorded as tungstic oxide and is derived from the scheelite mined by King Island Scheelite Ltd at King Island and from wolfram tin ores at the Storeys Creek tin mine at Storeys Creek and the Aberfoyle tin mine at Rossarden. A total of 299 000 tons of ore was treated at the King Island scheelite mine for the recovery of 1 334 tons of tungstic oxide and at the Storeys Creek and Aberfoyle mines which now use the one treatment plant 51 867 tons of ore was mined and milled for the recovery of 557 tons of tungstic oxide and 270 tons of tin.

The King Island scheelite mine which is part of the Peko-Wallsend group has been conducting an extensive programme of exploration both on the company's leases and on exploration licences on adjacent areas. The company has reported that ore reserves remain unchanged at 7 million tons averaging 0.75% tungstic oxide.

A start has been made on a decline entry for the mining development of No. 3 ore body at Bold Head. Detailed study of No. 2 ore body which extends beyond a fault is in progress. Development of underground mining on No. 3 ore body will involve capital expenditure in excess of \$4 million, but a planned programme to double existing ore production and increase output has been deferred because of depressed scheelite prices. The construction of the deep water port at Grassy using overburden from the open-cut mining operations has been completed and is now in operation. This will greatly facilitate mining operations and will benefit King Island as a whole.

Detailed design has commenced on an artificial scheelite plant capable of handling all of the current flotation production of scheelite. This will remove contaminating molybdenum giving a purer product for the market. It is expected that the plant will be commissioned in 1973 at a capital cost of about \$800 000.

The Electrolytic Zinc Company of Australasia Limited which operates the Rosebery, Hercules and Farrell mines treated 493 771 tons of ore for the recovery of 65 765 tons of zinc, 19 982 tons of lead, 2 439 tons of copper, 2 330 157 oz of silver and 41 784 oz of gold. In addition 98 499 tons of pyrite were produced for use in the sulphuric acid plant at Burnie operated by North West Acid Pty Ltd owned by the company and the Mt Lyell Company. The large expansion programme commenced in 1968 was completed.

Ore reserves have been assessed at 9·2 million tons at the Rosebery mine, 200 000 tons at the Hercules mine and 65 000 tons at the Farrell mine.

METAL PRICES

The general level of prices has reduced profitability by producers at a time of rising costs and major producers whose production has increased as a result of completion of large capital programmes of expansion are not receiving the return which could have been expected.

The position for some mines, particularly the tin mines, has been seriously affected by currency revaluation which has further reduced revenue from sales of metals. The full impact on the industry as a whole cannot be assessed at the present time, but some producers could experience serious financial difficulties. The Commonwealth Government is considering applications for assistance to one section of the industry most affected by revaluation.

Copper.—The Australian price of copper which is fixed by the Copper Producers Association rose from \$918 per ton at the end of 1971 to \$941 in January. It increased to \$1 008 per ton in March and April 1972 and was again quoted at \$941 in July which was the ruling price at the end of the year. The association adopted metric quotes as from 1 July 1972 and the figure of \$925·94 per metric ton has been converted to \$941 per ton to enable a ready comparison to be made with prices ruling in the first half of the year and in previous years. It will be noted that the average price for 1972 represents a fall of \$45 per ton on the 1971 average but is a fall of \$427 per ton on the 1969 price. It is in fact the lowest price since 1965.

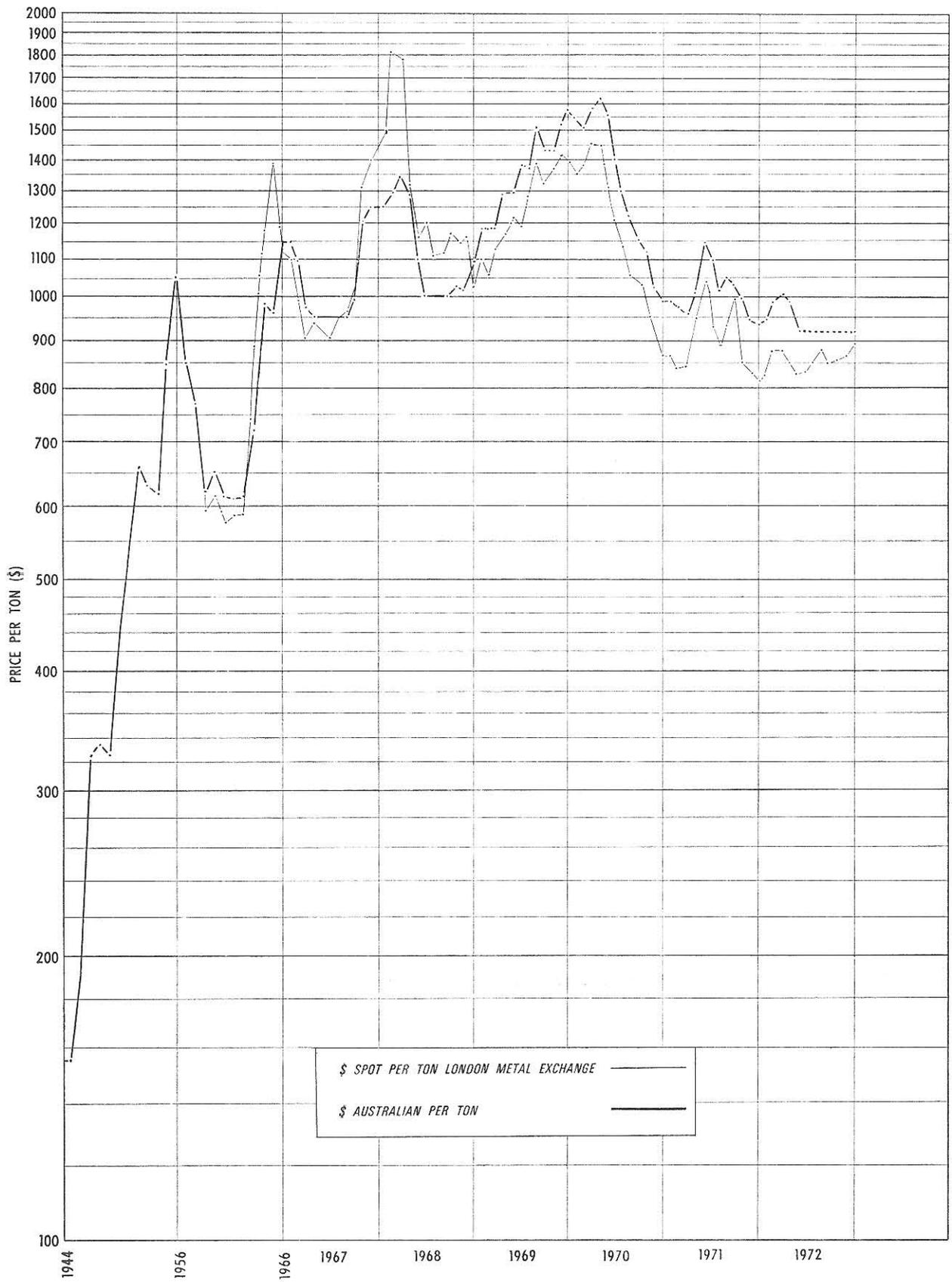
Tin.—The Australian price which is based on the landed price of imported tin varies daily with the Straits (Penang) quotation. The Australian smelter purchases concentrates from producers based on the Penang price less deductions for smelting and other charges. On this basis the price payable to Tasmanian producers for 70% tin concentrates ranged from a daily average of from \$28·31 to \$29·18 per long ton unit during most of the year but had declined to \$26·71 per long ton unit in December. The average Australian price for tin metal was \$3 338 per ton which was slightly in advance of the 1971 figure.

The price has remained relatively stable for some years. The International Tin Council of which Australia is a member operates a price stabilisation scheme and maintains a buffer stock of metal which enables tin to be bought or sold on the open market when prices reach predetermined levels. At the end of the year the quantity of tin reaching the market exceeded the demand and was beyond the normal controls exercised through the buffer stocks. Quotas were imposed and allotting of quantities for individual producers was being arranged by the Commonwealth Government. If significant restrictions on production are imposed it could seriously impair the expanding production by Renison Ltd and Cleveland Tin N.L., which are Australia's principal producers. It will also prevent development of other new mines which cannot commence operations without a quota consistent with their potential productive capacity. The full effect of quotas will not be clear until 1973.

Tungsten.—Scheelite produced by King Island Scheelite Ltd and wolfram from the operations of the Storeys Creek and Aberfoyle mines are marketed as tungstic oxide and operations at both mines are vitally affected by metal prices. The market for tungstic oxide is notoriously unstable and unpredictable, and producers seek firm contracts with consumers where possible. The average price per long ton unit for 1972 was \$31·11 which represents a fall of \$14·72 per unit as compared with 1971. It represents the lowest average price since 1965 when it was \$24·91 per long ton unit.

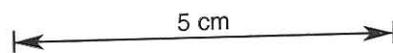
The low price level is retarding a progressive programme of expansion being undertaken at the King Island scheelite mine.

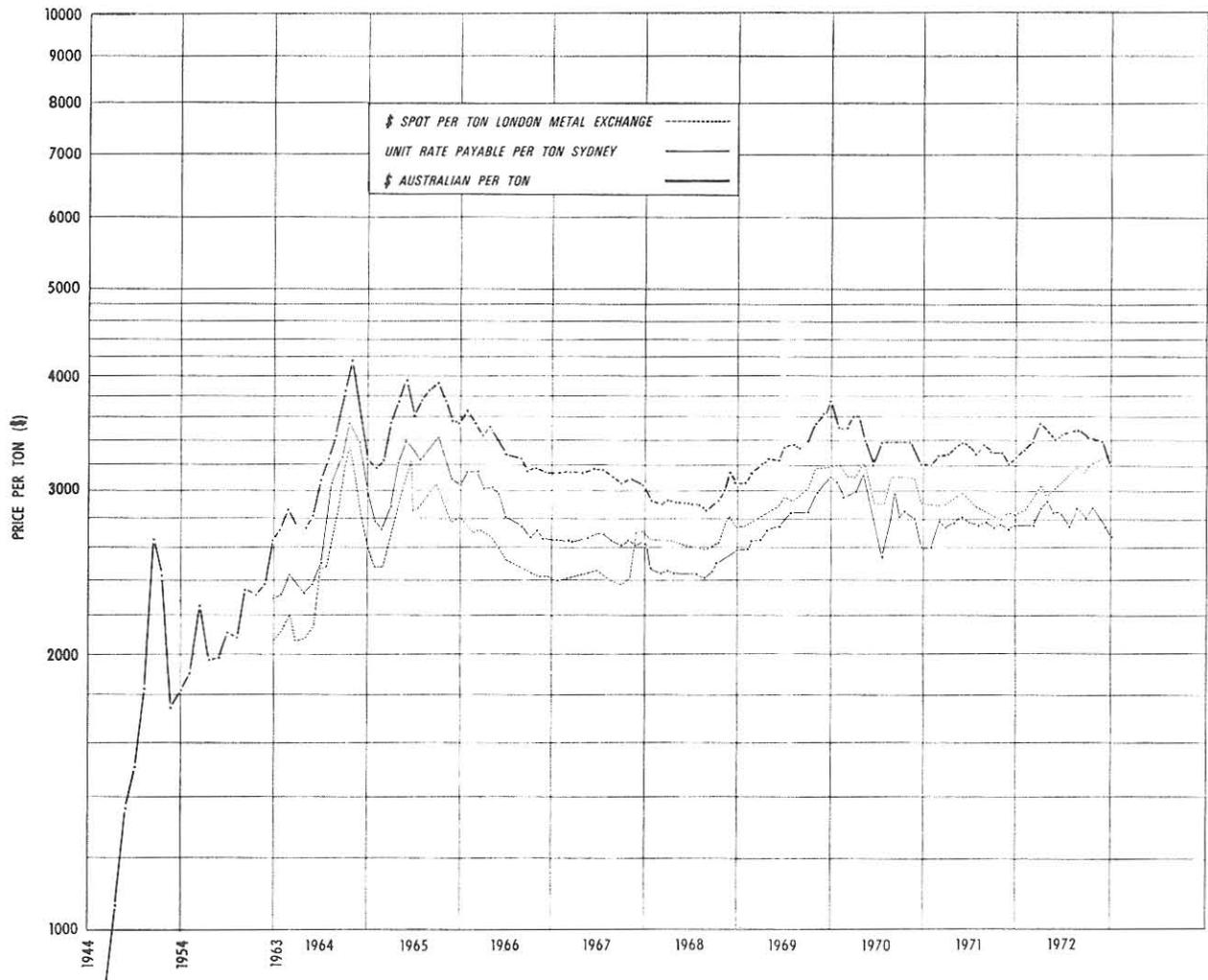
Zinc.—The Australian price (adjusted for Risdon) remained at \$375 per ton until November when it increased to \$394, which was the ruling price at the end of the year. As will be seen from the following table the price of zinc has shown a steady upward trend.



COPPER PRICES

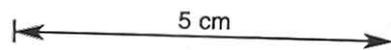
YEARLY AVERAGES 1944-1966, MONTHLY AVERAGES FROM 1967

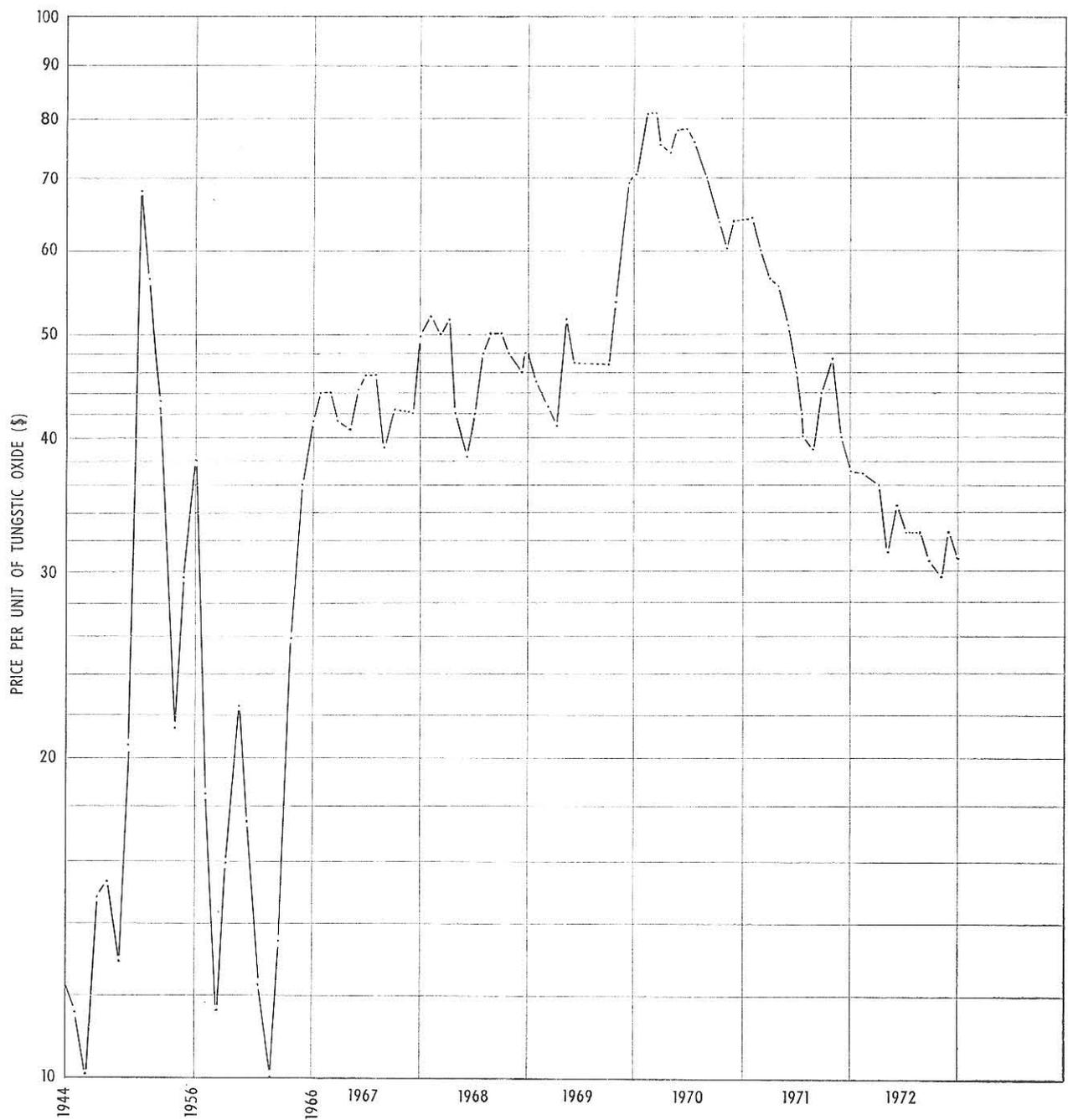




TIN PRICES

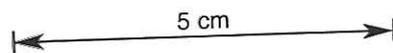
YEARLY AVERAGES 1944-1964, MONTHLY AVERAGES FROM 1964





TUNGSTEN PRICES

YEARLY AVERAGES 1944-1966, MONTHLY AVERAGES FROM 1967



AVERAGE AUSTRALIAN PRICES, 1968-1972 (\$A)

<i>Commodity</i>	<i>Unit</i>	1968 \$	1969 \$	1970 \$	1971 \$	1972 \$
Copper	ton	1 098·83	1 368·31	1 314·14	1 004·27	959·59
Gold	fine oz	33·71	36·69	32·21	35·97	49·43
Lead	ton	218·33	262·67	281·67	242·50	247·50
Silver	fine oz	2·07	1·62	1·57	1·33	1·33
Tin	ton	2 943·83	3 292·33	3 430·17	3 275·00	3 338·00
Tungsten	unit WO ₃	39·11	45·91	68·56	45·83	31·11
Zinc	ton	296·00	310·99	327·00	355·00	378·17

EXPLORATION

There has been a limited demand for exploration licences, but active programmes of investigation of the mineral resources have been continued on existing licences by well established companies either locally based or incorporated in other Australian States. Companies dependent upon capital from flotation on the stock exchanges have ceased exploration activities because of the present unfavourable conditions for raising funds for mining ventures and no longer hold licences. As a matter of policy the Department has required holders of large areas to relinquish portion of such areas after the holders have had sufficient time to determine areas of potential interest for the location of mineral deposits. This has resulted in more intensive programmes of exploration and the recording of more comprehensive data on specific areas. At the end of the year fifty-seven exploration licences and thirty-three special prospector's licences were in force. In addition six permits to search for petroleum in off-shore areas adjacent to the Tasmanian coastline were held.

The Department of Mines has continued its programme of regional geological mapping, economic geology, groundwater investigations and engineering geology. Publications of maps and reports are made regularly and the services of all professional staff of the Department is available to assist the mining industry. Departmental publications and reports filed by former holders of exploration areas whose licences are no longer current are on 'open file' and are in constant demand by mining companies and consultants.

Drilling plants owned by the Department are employed in testing mineral deposits in areas selected by departmental staff. Plants are also available for hire for testing mineral deposits, boring for supplies of underground water and for foundation testing and other engineering purposes. Drilling projects being undertaken by the Department at the end of the year consisted of testing of coal deposits in the Mt Nicholas area, examination of a nickel-gold occurrence at Beaconsfield and investigation of the underground water resources of the Scottsdale-Bridport district. Technical reports on the results of the drilling are published as a basis for future work by companies or individuals capable of developing any mineral deposits of commercial value which may be located.

OIL

Drilling operations by Hematite Petroleum Pty Ltd at the sites known as Pelican 1 and Pelican 2 in Tasmanian waters in Bass Strait produced shows of hydrocarbons. Following a reassessment of technical data Pelican No. 3 well was put down about 50 miles north of Burnie and 5½ miles from Pelican No. 1 and 4 miles from Pelican No. 2. This well proved disappointing after a production test below 9 100 feet. A trace of hydrocarbons was obtained. The overall results indicate the difficulties of assessing the Pelican structure covering a big area with very high gas pressures at depth. The company has drilled a further well known as Poonboon No. 1 at a site NNE of Pelican 3 about 65 miles north of Burnie. This was completed at 10 715 feet and is recorded as a dry hole. The drilling vessel then moved to a site approximately 15 miles north-west of Poonboon 1 and a further well known as Tarook 1 was spudded in. The hole was completed at 9 100 feet without success. The rig was then moved to a bore known as Durroon No. 1 approximately 30 miles west of Flinders Island. This was drilled to a depth of 9 922 feet and was reported as being dry.

More details of the bores are as under:—

<i>Name of Bore</i>	<i>Situation</i>	<i>Period of Drilling</i>	<i>Final Depth (ft)</i>	<i>Classification</i>
Pelican No. 3	Lat. 40° 15' 44.99" S Long. 145° 51' 50.60" E	30.4.72 to 13.6.72	9 537	Unsuccessful but with minor hydrocarbon showings
Poonboon 1	Lat. 40° 08' 15.19" S Long. 145° 55' 01.29" E	28.8.72 to 2.10.72	10 715	Unsuccessful — no significant hydrocarbons
Tarook 1	Lat. 40° 02' 36.95" S Long. 145° 40' 28.56" E	2.10.72 to 21.10.72	9 100	Unsuccessful — abandoned without hydrocarbon shows
Durroon 1	Lat. 40° 32' 02.94" S Long. 147° 12' 48.49" E	21.10.72 to 24.11.72	9 922	Unsuccessful — abandoned without hydrocarbon shows

Esso Exploration and Production Aust. Inc. surrendered exploration permit T/8P and exploration licence 18/65.

The only authorities in force covering the search for petroleum consist of the following permits issued under the Petroleum (Submerged Lands) Act:—

<i>Title No.</i>	<i>Title Holder</i>	<i>Blocks</i>	<i>Location</i>	<i>Expiry Date</i>
T/1P	Magellan Petroleum Aust. Ltd	41	Bass Strait	4.7.74
T/3P	Hematite Petroleum Pty Ltd	342	Bass Strait	16.7.74
T/4P	Hematite Petroleum Pty Ltd	394	Bass Strait	16.7.74
T/5P	Hematite Petroleum Pty Ltd	317	Bass Strait	16.7.74
T/6P	Hematite Petroleum Pty Ltd	400	Bass Strait	16.7.74
T/9P	Magellan Petroleum Aust. Ltd	4	Bass Strait	11.4.75

LEGISLATION

Mining Act 1929 and Mines Inspection Act 1968

There were no amendments to this legislation.

Explosives Act 1916

The regulations were amended by Statutory Rules 1972, No. 237 to make licences to sell explosives subject to a condition limiting the sale of fireworks belonging to Division 3 of the firework class (other than certain excepted fireworks). The condition provides that licensees must not sell, at any time, the above fireworks to persons apparently under the age of 18 years and that they may sell those fireworks to other persons only during the period commencing 11 May and ending on 24 May in any one year. Power is given to the Chief Inspector of Explosives to permit sales of the above fireworks at other periods. The fireworks excepted from the condition are amorces or toy caps, throwdowns, snaps for bonbon crackers, starting pistol caps, streamer bombs, and indoor table bombs. The regulations also correct and 'tidy up' other provisions in the Principal Regulations and alter the size and explosive content of bungers and similar fireworks that are prohibited from being imported into the State.

Inflammable Liquids Act 1929

The regulations were amended by Statutory Rules 1972, No. 9 to alter the provisions of the Principal Regulations relating to the conveyance on vessels in a harbour at an ordinary berth of certain substances that are liable to spontaneous combustion or are oxidising agents. The regulations also amend the provision relating to the capacity of certain portable tanks for the conveyance on water of Class A liquids, Class B liquids and dangerous commodities. Other amendments relate to the supply of liquefied petroleum gas and increase certain fees payable under the Principal Regulations.

Department of Mines (Investigations) Act 1972

Geologists of the Department of Mines have been undertaking geological surveys and other investigations throughout the State since 1883 but there has never been any legal authority to enter on private land. Permission has been readily given by land owners for entry for departmental purposes but the lack of authority to enter has been highlighted in recent times because of the necessity to enter particular blocks of land in connection with investigation of areas which might be subject to landslips. Acting on legal advice, legislation was prepared to authorise officers of the Department of Mines to enter any land for the purposes of making geological and geophysical investigations and any other scientific investigation of the earth. The Act

requires that an occupier of land should be given at least three days' notice before entering land and it contains an instruction that on entry as little damage as possible should be done to the land. Where damage is unavoidable it is provided that the Crown shall pay full compensation.

As a matter of policy the Department will still continue to seek consent before entering private land and it is only when permission is refused and entry is essential to make scientific investigations that the Department will proceed under the provisions of the Act.

In practice the legislation will not change the procedures under which our geologists have been operating for almost 100 years but they have been now given the same legal powers of entry which land surveyors and valuers possess.

MINING AND THE ENVIRONMENT

This subject was foremost amongst the items considered by the Australian Minerals Council at the sixth meeting held in May 1972. The Council consists of Ministers for Mines from each of the States and the Commonwealth Ministers for National Development, Interior and External Territories. The Council indicated its appreciation of the efforts being made by governments and the mining companies to preserve the quality of the environment. It agreed to a set of principles which it considered governments need to have regard to in considering the matter of mining and its relation to the environment. These express the unanimous view of both State and Commonwealth Government Ministers concerned with mining and represent an important expression of policy. It is the view of the Council that:—

- (a) Mining is necessary for sound national development and it can be carried out while achieving a rational balance between resources development and the maintenance of an acceptable level of environmental quality;
- (b) There is a need for objectivity and balanced viewpoints in relating national resources to the needs of the nation as a whole;
- (c) There is a need for due consideration to be given to the non-renewable nature of mineral resources and the facts that mining can take place only where economic deposits occur and that small areas only are involved with relative short-term occupancy.

There is a need for governments to:—

- (a) Initiate forward studies to determine the optimum use of land in the public interest;
- (b) Determine the mineral potential in areas of proposed national parks and reserves as early as possible to enable balanced decisions to be made about development of the area;
- (c) Formulate effective measures in advance in regard to proposals for mineral development so that effects of mining operations on the environment may be controlled and so that an acceptable level of environmental quality, both during and after mining, may be maintained;
- (d) Include as far as is possible in statutory measures, mining titles or agreements, and administrative directions, appropriate provisions or requirements concerning the environment and the reasonable rehabilitation of mined areas for a future use;
- (e) Institute research and investigation which would enable resource development to go ahead consistently with proper environmental management;
- (f) When formulating policies and making decisions in relation to mining activities, co-operate with and take account of the views of other governmental agencies and representative private groups engaged in or interested in the effect of these activities on the environment.

In my last Report I referred to the work of our mining engineers to alleviate the pollution problem at mines and works where these conditions exist and to the part played by our laboratory in monitoring the results of measures taken to combat pollution. This work has been continued and has been intensified. Particular mention is made of controls imposed on sand mining operations in the South Arm area where proper practices were not being observed. Operations are now being carried out under controlled conditions and rehabilitation of mined areas is being undertaken. The principles imposed in the South Arm area are being applied throughout the State and improvements in mining methods and waste disposal as well as rehabilitation of land is being practised. Mine operators are aware that many past practices cannot be continued and are planning their operations so that disturbance of the environment is kept to acceptable levels.

The Department has taken part in discussions concerning the anti-pollution legislation now before Parliament and will make available all departmental services to assist in measures directed to control of the environment.

AUSTRALIAN MINERALS COUNCIL

The Council consists of the Ministers for Mines of all the States and the Commonwealth Ministers of National Development, Interior and External Territories. It is concerned with all matters relating to the investigation and development of the mineral resources of Australia. The Council is assisted by an advisory committee consisting of the Heads of the Departments of Mines from each State and representatives of the Commonwealth Department of National Development, Interior and External Territories. The conferences of Chief Inspectors of Mines and Chief Geologists of the States function as sub-committees.

During the year the advisory committee met on several occasions and the Council held its first meeting on a mining field at Mt Newman in Western Australia. Previous meetings have been held in the capital cities. The principal item discussed by the Council was the subject of Mining and the Environment to which reference has already been made. The Council also considered principles to be incorporated in a common code of mining legislation and reports on the proceedings in the United National Committee on the Peaceful Uses of the Seabed, the prevention, control and liability in regard to blowouts and oil spillages arising from off-shore petroleum activities. Misrepresentation of exploration information by some mining company promoters was also considered and approval was given in principle to a proposal for legislation for the registration of geologists and geophysicists and the control of geological and geophysical practice in Australia.

The Council has served a very useful purpose both for those engaged in administration of the mining industry through government departments and for the industry itself and it is hoped that the recent change in the functions of several Commonwealth departments will enable the work of the Council to continue.

REVENUE

REVENUE COLLECTED DURING THE YEAR ENDED 31 DECEMBER 1972

<i>Head of Revenue</i>	\$
Public Works and Services—Mines Department	54 435
Rent and Fees of Auriferous and Mineral Lands	150 772
Royalty on Iron Ore Pellets	309 735
Survey Fees	3 472
Fees under the Explosives and Inflammable Liquids Act	45 402
TOTAL	563 816

COMPARATIVE STATEMENT OF REVENUE FROM MINES, BEING RENTS, FEES, STORAGE OF EXPLOSIVES, ETC., PAID TO THE TREASURY DURING THE YEARS 1967 TO 1972

<i>Year</i>	\$	<i>Year</i>	\$
1967	161 892	1970	528 666
1968	205 941	1971	597 937
1969	445 712	1972	563 816

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 1972

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (acres)</i>	<i>Sluiceheads</i>
Coal	1	200	....
Easements	3	35	....
Gold	1	10	....
Gravel and sand	10	2 002	....
Iron ore	1	40	....
Limestone	2	770	....
Marble	2	80	....
Osmiridium	2	18	....
Silver-lead	2	90	....
Stone	1	45	....
Tin	38	527	....
Water licences	10	40	40
Wolfram	3	280	....
TOTAL	76	4 137	40

TOTAL NUMBER OF LEASES AND LICENCES IN FORCE ON 31 DECEMBER 1972

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (acres)</i>	<i>Sluiceheads</i>
Antimony	4	320	....
Bauxite	6	475	....
Barytes	2	80	....
Clay	11	362	....
Coal	11	3 901	....
Copper and gold	7	1 395	....
Dolomite	4	309	....
Easements	67	2 328	....
Feldspar	2	15	....
Gold	31	1 059	....
Granite	2	20	....
Iron ore	10	5 720	....
Kaolin	3	160	....
Limestone	3	2 405	....
Marble	4	160	....
Mica	1	20	....
Minerals	63	12 263	....
Ochre	2	8	....
Osmiridium and chromite	9	1 356	....
Nickel	1	80	....
Sand and gravel	34	3 093	....
Scheelite	8	636	....
Silica	10	1 403	....
Silver-lead	21	2 090	....
Stone	50	1 272	....
Tin	373	18 477	....
Wolfram	19	3 126	....
Water licences	157	1 030	1 317
TOTAL	915	65 563	1 317

NUMBER AND AREA OF LEASES AND LICENCES APPLIED FOR DURING THE YEAR ENDED
31 DECEMBER 1972

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (acres)</i>	<i>Sluiceways</i>
Clay	3	80	....
Copper	10	800	....
Easements ..	6	50	....
Gold	6	97	....
Gravel ..	4	64	....
Ilmenite and rutile	2	62	....
Minerals	11	590	....
Sand	10	1 981	....
Stone	4	223	....
Silica	1	270	....
Tin	61	2 327	....
Water	2	....	2
TOTAL ..	120	6 544	2

TOTAL NUMBER OF ALL TYPES OF PROSPECTING RIGHTS HELD AS AT
31 DECEMBER 1972

<i>Mining Tenement</i>	<i>Number</i>	<i>Area</i>
Permits to enter and search on private land, including owners' consents	18	41 687 acres
Exploration licences	57	6 800 square miles
Special Prospector's licences	23	175 square miles
Miners Rights	83	41 acres
Prospectors licences ..	167	8 350 acres
Authorities to prospect under the Aid to Mining Act 1927	1	9 square miles
Permits to explore for petroleum under the Petroleum (Submerged Lands) Act 1967	6	1 498 graticular blocks (36 950 square miles)

Exemptions

The following exemption to the labour covenant of leases was granted in circumstances beyond the control of the lessee:—

Northern Chromite Pty Ltd; Lease 67M/72 from 1 July to 31 December 1973.

WARDENS' COURT

Objections by land owners to the granting of an Exploration Licence applied for by Investment Trust Ltd. The appeal to the Supreme Court from the decision of the Warden of Mines at Launceston has not been proceeded with by the applicant. As reported for the past two years this position is unsatisfactory and it has not been possible to find any legal process to force a hearing.

K. Barrass v. D. W. and J. Smith. Application for forfeiture of lease 24M/60.

N. F. Clark v. Crystal Valley Co. Ltd. Application for forfeiture of lease 2M/70.

L. J. Groves v. Storeys Creek Tin Mining Co. N.L. Application for forfeiture of lease 8M/62 and easement licence 11W/63.

These actions were withdrawn by the applicants before being heard by the Warden of Mines.

Tasmanian Conservation Trust, Hobart and Launceston Branches; South-West Committee; Society for Growing Australian Plants; Launceston Walking Club; Launceston Field Naturalists Club; R. A. Wyatt v. Mineral Holdings Australia Pty Ltd. Objections to an application for a Special Prospector's Licence in the vicinity of Milford Creek and New River Lagoon.

The area concerned is located in the South-western Mining District for which the Director of Mines is the Warden. In order that there would be no possible conflict between the function of Director of Mines who is required by the Mining Act to make a recommendation to the Minister as to the granting of Special Prospector's Licences and the function of the Warden who is empowered by the Act to hear and determine objections, the Warden of Mines (Mr J. Temple-Smith) for the Western and North-western Mining District consented to act. The hearing took place at Devonport on 4 and 5 December 1972. The Warden upheld a submission by counsel for the objectors that the objectors had an interest in the land within the meaning of section 15c (3) of the Mining Act 1929, and were thus entitled to object and after hearing of lengthy evidence gave as his finding that mining activity is not compatible with the recreational and aesthetic uses of the area and refused the application for the Special Prospector's Licences.

The finding of the Warden was made the subject of an appeal to the Supreme Court. Mr Justice Nettlefold ordered that the decision of the Warden be reversed and that the objections be struck out as incompetent.

MINE MANAGERS' CERTIFICATES

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

By Examination—

<i>Cert. No.</i>	
215/72	Vernon Middlemas
217/72	Robert Patrick Callaghan
218/72	Derek John Miller

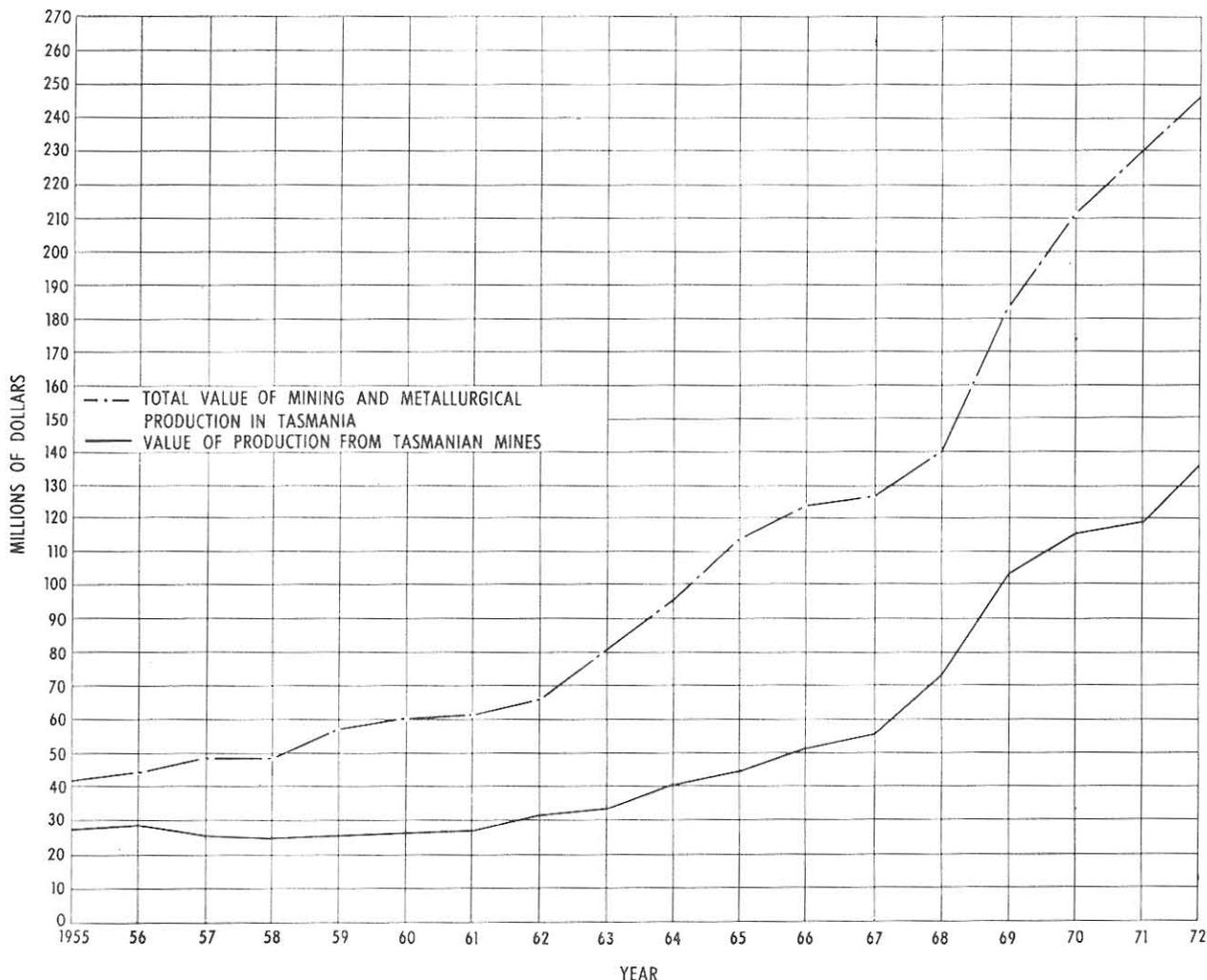
Certificate Issued Upon Presentation of a Certificate

Issued by a Recognised Authority—

216/72	Denis Walter McMahon
219/72	Phillip Clive Lockyer
220/72	Michael John Butland.

VALUE OF TASMANIAN MINERALS IN RECENT YEARS WITH AUSTRALIAN METAL PRICES

<i>Year</i>	\$	<i>Year</i>	\$
1963	32 206 272	1968	71 919 344
1964	40 013 378	1969	104 150 500
1965	43 755 904	1970	115 469 042
1966	51 180 693	1971	118 620 235
1967	55 252 710	1972	127 605 021

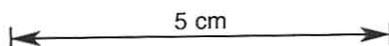


VALUE OF MINING AND METALLURGICAL PRODUCTION, 1955-72.

MINERAL PRODUCTION SINCE 1880

QUANTITY AND VALUE OF MINERAL PRODUCTION AS AT 31 DECEMBER 1972

<i>Mineral</i>	<i>Unit</i>	<i>Total Quantity</i>	<i>Value \$</i>
METALLIC MINERALS			
Antimony	(tonne)	3	2 034
Bismuth	(tonne)	105	59 455
Cadmium	(tonne)	2 067	6 708 816
Cobalt oxide	(tonne)	31.72	79 054
Copper (blister) to 1918 (now shown under Silver and Copper)	(tonne)	169 273	27 577 054
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)	600 214	307 745 993
Crocoite	(specimens only)	....	12 902
Gold	(kilogram)	91 746	43 151 669
Ilmenite	(tonne)	558	2 512
Iron ore pellets	(tonne)	9 195 473	112 009 843
Iron oxide (including hematite, limonite and magnetite)	(tonne)	178 511	623 137
Lead (from 1919)	(tonne)	461 996	68 100 995
Manganese	(tonne)	1	6
Manganese dioxide (from 1957)	(tonne)	6 302	211 950
Mercury	(kilogram)	6 711	84 394
Monazite	(tonne)	34	1 214
Nickel	(tonne)	237	81 036
Osmiridium	(kilogram)	881	1 418 771



<i>Mineral</i>	<i>Unit</i>	<i>Total Quantity</i>	<i>Value \$</i>
Pyrite (to 1971)	(tonne)	2 124 070	10 239 957
Pyrite (from 1972)	(tonne)	221 595	....
Rutile	(tonne)	1	36
Rutile (concentrates)	(tonne)	19 781	3 113 480
Scheelite ..	(tonne)	31 455	70 287 337
Silica for silicon alloy production	(tonne)	57 612	527 594
Silicon as silicon alloys	(tonne)	106 451	11 539 396
Silver-lead ore to 1918 (now shown under Silver and Lead) ..	(tonne)	1 101 295	12 858 582
Silver (from 1919)	(kilogram)	1 783 246	42 907 244
Sulphur as sulphuric acid (from 1957)	(mono tonne)	1 615 579	21 774 118
Tin ..	(tonne)	181 066	171 216 682
Wolfram ..	(tonne)	20 227	34 045 113
Zinc ..	(tonne)	1 120 222	217 929 322
Zinc sulphate (from 1957)	(tonne)	3 251	324 177
Zircon (concentrates) ..	(tonne)	16 197	890 965
NON-METALLIC MINERALS			
Asbestos ..	(tonne)	4 044	34 284
Baryte	(tonne)	2 240	16 478
Clay (from 1958)—			
Brick	(metre ³)	1 160 708	2 938 645
Tile ..	(metre ³)	41 831	83 317
Other	(metre ³)	364 853	1 326 058
Dolomite ..	(tonne)	46 793	270 110
Graphite ..	(tonne)	41	214
Kaolin	(tonne)	112 869	883 018
Limestone—			
Agricultural and other	(tonne)	869 018	2 058 190
Carbide	(tonne)	874 062	3 037 825
Cement	(tonne)	7 397 095	11 384 828
Chemical and metallurgical ..	(tonne)	4 488 380	5 879 163
Ochre	(tonne)	2 849	21 852
Pebbles (from 1957) ..	(tonne)	14 917	245 349
Sand (moulding) ..	(tonne)	864	9 550
Silica	(tonne)	302 897	703 413
Talc	(tonne)	338	2 154
FUEL MINERALS			
Coal ..	(tonne)	10 231 094	27 312 998
Shale ..	(tonne)	42 239	62 462
Peat ..	(tonne)	960	54 036
CONSTRUCTION MATERIALS			
Building stone—			
Freestone	(metre ³)	9 192	186 714
Granite	(metre ³)	4 616	85 753
Other	(metre ³)	8 459	32 245
Crushed and broken stone (from 1958)—			
Basalt	(metre ³)	1 853 502	6 131 621
Dolerite ..	(metre ³)	7 051 152	27 758 808
Limestone	(metre ³)	281 933	986 547
Sandstone	(metre ³)	34 753	80 761
Other	(metre ³)	2 240 198	7 566 980
Gravel (from 1958)	(metre ³)	13 882 799	19 975 755
Sand from 1958) ..	(metre ³)	1 490 202	2 720 050
Other road materials	(metre ³)	2 502 701	3 807 512
			\$1 292 604 719

STATISTICS RELATING TO THE MINERAL INDUSTRY

YEAR ENDED 31 DECEMBER 1972

<i>Mineral</i>	<i>Metric</i>		<i>Imperial</i>		<i>Value \$A</i>
	<i>Unit</i>	<i>Total Quantity</i>	<i>Unit</i>	<i>Total Quantity</i>	
METALLIC MINERALS—					
Bismuth	tonne	20	ton	20	167
Cadmium	tonne	138	ton	136	658 560
Cobalt oxide	tonne	4.56	ton	4.49	17 656
Copper	tonne	27 806	ton	27 367	26 226 228
Crocoite	specimens only		specimens only		1 500
Gold	kilogram	1 781	fine oz	57 264	2 873 567
Iron ore pellets	tonne	2 373 047	ton	2 335 561	27 527 624
Iron oxide	tonne	9 783	ton	9 628	61 956
Lead	tonne	20 303	ton	19 982	4 951 450
Manganese dioxide	tonne	2 205	ton	2 170	79 443
Mercury	kilogram	593	lb	1 307	2 986
Silica for silicon alloy production	tonne	3 851	ton	3 790	37 900
Silicon as silicon alloys	tonne	16 603	ton	16 341	1 786 770
Silver	kilogram	79 222	fine oz	2 547 037	3 666 297
Sulphur—					
Pyrites	tonne	221 595	ton	218 095	....
Sulphuric acid from pyrites	mono tonne	357 528	mono ton	351 880	5 258 779
Sulphuric acid from zinc concentrates	mono tonne	96 210	mono ton	94 690	1 217 939
Tin	tonne	6 825	ton	6 717	22 439 882
Tungsten as tungstic oxide	tonne	1 921	ton	1 891	5 927 063
Zinc	tonne	66 811	ton	65 756	24 869 254
<i>Value of Metallic Minerals</i> .. .. .	....	....	....	....	127,605 021
NON-METALLIC MINERALS—					
Clay—					
Brick	metre ³	70 596	cubic yd	92 282	183 710
Tile	metre ³	6 135	cubic yd	8 019	16 038
Other	metre ³	58 187	cubic yd	76 062	246 288
Dolomite	tonne	4 630	ton	4 557	26 815
Limestone—					
Agricultural	tonne	28 247	ton	27 801	96 037
Carbide	tonne	25 225	ton	24 827	258 058
Cement	tonne	471 393	ton	463 947	913 975
Chemical and metallurgical	tonne	53 265	ton	52 424	286 151
Other	tonne	11 335	ton	11 156	6 773
Ochre	tonne	48	ton	47	721
Pebbles	tonne	1 716	ton	1 689	28 714
Silica	tonne	16 261	ton	16 004	45 317
<i>Value of Non-Metallic Minerals</i> .. .. .	....	....	....	....	2 108 597
FUEL MINERALS—					
Coal	tonne	132 242	ton	130 153	589 015
Peat	tonne	308	ton	303	17 328
<i>Value of Fuel Minerals</i> .. .. .	....	....	....	....	606 343
CONSTRUCTION MATERIALS—					
Building Stone—					
Freestone	metre ³	2 083	cubic yd	2 723	36 930
Granite	metre ³	Nil	cubic yd	Nil	Nil
Granite (Red)	metre ³	Nil	cubic yd	Nil	Nil
Other	metre ³	1 219	cubic yd	1 593	4 779

<i>Mineral</i>	<i>Metric</i>		<i>Imperial</i>		<i>Value \$A</i>
	<i>Unit</i>	<i>Total Quantity</i>	<i>Unit</i>	<i>Total Quantity</i>	
Crushed and broken stone—					
Basalt	metre ³	239 869	cubic yd	313 554	940 662
Dolerite	metre ³	494 389	cubic yd	646 260	1 958 765
Limestone	metre ³	18 708	cubic yd	24 455	73 365
Sandstone	metre ³	46	cubic yd	60	180
Other	metre ³	370 430	cubic yd	484 222	1 452 595
Gravel	metre ³	1 005 421	cubic yd	1 314 276	1 545 362
Sand	metre ³	124 855	cubic yd	163 209	256 794
Other road material	metre ³	144 814	cubic yd	189 300	257 789
<i>Value of Construction Materials</i> .....	....	....	....	....	6 527 221
<i>Total Value with Australian Metal Prices</i> .....	....	....	....	....	136 847 182
METALLURGICAL PRODUCTION FROM OTHER THAN TASMANIAN ORES—					
Alumina .....	}	....	....	....	107 310 085
Aluminium					
Aluminium hydrates					
Aluminium sulphates					
Cadmium					
Cobalt oxide					
Ferro-manganese					
Titanium dioxide					
Zinc					
<i>Value of Mining and Metallurgical Production</i> .....	....	....	....	....	244 157 267

Average number of employees 10 345

AID TO MINING

Nine lessees were granted financial assistance. At one small coal mine equipment was lost and damage resulted from a collapse.

An advance was made to enable rehabilitation work to be undertaken. This enabled production operations to continue and the amount has since been repaid by a royalty on coal produced.

The use of more modern methods of tin mining using earth-moving equipment and jigs has been advocated for some years and as a result many of the smaller operators are changing over from the former practices of hydraulic sluicing. This has enabled producers to obtain better recoveries, higher grade concentrates and continuous production in place of periodical 'clean-ups' and further has enabled tin-bearing gravels to be mined which was previously not possible. It has also particular advantages in that less water is used and drainage and tailings disposal problems are lessened.

Eight of the smaller producers were assisted in the purchase of items of pumping equipment and earth-moving machines to add to equipment already installed and will serve to increase production capacity. All loans are secured by registered mortgages and repayment is required to be made by royalty on the proceeds of mining products sold. A low rate of interest is charged. All royalty repayments are credited to the Mining Trust Fund and are available to finance other parties who require financial assistance. Advances are made only in cases where upon investigation a mining engineer or a geologist of the Department is satisfied that the mineral deposit to be worked has reasonable prospects of economic development.

Mt Bischoff Mine: The reserved area in the vicinity of the old mine continued to be held under an Authority to Prospect by Comstaff Pty Ltd and investigations are being undertaken by Anglo-American Corporation. There was little interest by working parties of tributors although some small areas continue to be held by tributors. Tributors are required to pay a royalty of 2½% of the gross proceeds of tin produced.

Mining Plant: The items of mining plant purchased some years ago for hire to small operators to test prospects were not used.

STAFF

The following were the staff movements during the year:—

<i>Name</i>	<i>Position</i>	<i>Remarks</i>	
Anderson, R. G.	Chemist	Resigned	17.4.72
Brown, A. V. ..	Geologist	Appointed	27.3.72
Chandler, G. W.	Clerk	Appointed	21.2.72
Cook, B. E. (Miss)	Draughtswoman	Appointed	7.12.72
Cromer, W. C.	Geologist	Appointed	21.2.72
Forsyth, S. M.	Geologist	Appointed	1.6.72
Galbraith, A. S. T.	Geologist	Appointed	2.3.72
Gerike, R. E. G. (Miss) ..	Laboratory Technician	Appointed	4.9.72
Knights, C. J. (Miss)	Geologist	Appointed	19.3.72
McClenaghan, M. P.	Geologist	Appointed	4.1.72
McClenaghan, J. (Mrs) ..	Geologist	Appointed	11.10.72
Nankivell, P. B.	Draughtsman	Appointed	6.11.72
Oates, I. G.	Clerk	Transferred	4.5.72
Shelverton, D. V. ..	Clerk	Appointed	18.4.72
Turner, N. J.	Geologist	Appointed	1.2.72
Walters, B. M. (Mrs)	Stenographer	Appointed	31.1.72
Walters, J. H.	Clerk	Resigned	9.2.72
Williams, P. R.	Geologist	Appointed	1.2.72

SCHOLARSHIP

P. L. F. Collins was granted an extension of his scholarship to enable him to study for an Honours Degree.

OBITUARY

I record with regret the sudden death of Mr T. J. Walsh, Senior Draughtsman of the Department on 12 March 1972.

OVERSEAS VISIT

The Chief Geologist (I. B. Jennings) attended the 24th International Geological Congress in Canada and visited USA for purposes of inspection of landslip sites and discussions with the United States Geological Survey.

CONCLUSION

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

A detailed review of operations and production, 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

CADMIUM: QUANTITY AND VALUE OF PRODUCTION

Year	Tons	\$	Year	Tons	\$
1924-67	1 674	4 856 644	1970	38	275 140
1968	74	390 642	1971	74	272 563
1969	39	255 267	1972	136	658 560
			Total	2 035	6 708 816

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 4.49 tons of cobalt oxide of value \$17 656 was the same as that of cadmium above.

COPPER

COPPER: SOURCE, QUANTITY AND VALUE OF PRODUCTION

Year	From tin ores		From lead-zinc ores		In blister copper		From copper ores		Total	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1919-1967	339	248 582	15 608	9 917 511	465 958	175 150 166	404	21 162	482 309	185 337 421
1968	169	173 213	1 303	1 433 063	14 470	15 915 117	....	....	15 942	17 521 393
1969	569	787 851	1 337	1 837 597	12 799	17 499 587	2 594	3 546 678	17 299	23 671 713
1970	763	1 011 242	1 256	1 680 941	....	....	20 997	27 493 602	23 016	30 185 785
1971	910	917 843	1 643	1 629 093	....	....	22 247	22 256 517	24 800	24 803 453
1972	1 022	981 414	2 439	2 341 658	....	....	23 906	22 903 156	27 367	26 226 228
Total	3 772	4 120 145	23 586	18 839 863	493 227	208 564 870	70 148	76 221 115	590 733	307 745 993

The Mount Lyell Mining and Railway Company Limited, Queenstown

	Tons
Mining—	
Overburden removed from West Lyell Mine	83 781
Ore mined—	
Prince Lyell	531 647
West Lyell	829 216
Crown Lyell	552 730
Cape Horn	424 534
Lyell Tharsis	30 081
Royal Tharsis	14 285
	2 382 493
Limestone delivered to works	2 808
Copper concentrate produced	91 985
Containing—	
Copper (tons)	23 906
Silver (fine oz)	131 222
Gold (fine oz)	15 480
Pyrite concentrate produced	119 596
Total value of production	\$22 789 016

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

Mine	MINE DEVELOPMENT				
	Shaft Sinking (ft)	*Driving and Cross-cutting (ft)	Rising (ft)	Diamond Drilling (ft)	Core Recovery (ft)
Prince Lyell	1 127	13 226	2 615	8 886	7 431
Cape Horn	....	7 697	2 053	10 085	8 711
Crown ..	....	2 293	1 226	....	....
Lyell Tharsis	....	2 376	714	....	....
Royal Tharsis	....	1 927	....	....	....
Exploration	....	....	....	1 248	1 099
	<u>1 127</u>	<u>27 519</u>	<u>6 608</u>	<u>20 219</u>	<u>17 241</u>

* All driving and cross-cutting listed, with the exception of that in the Crown Mine, is negotiable by trackless diesel equipment.

No. 1 Shaft, Prince Lyell

The Siemens double drum cage winder was installed with final commissioning to take place when the sinking sheaves are moved. Roberts-Holland (the contractors) advanced the shaft a distance of 1 127 feet to the planned depth of 2 125 feet. An average sinking rate of 8·3 feet per day was achieved, including the concrete lining of the shaft.

Excavation—Using a drilling jumbo the best round to suit the local ground conditions and the sinking cycle, was found to be 7 feet. Boggging was carried out using a Fulton cactus grab (capacity 20 cubic feet) with the hoisting rate varying from twenty to fourteen kibbles per hour, each of 8-ton capacity. The plat cutting (2 539 cu. yd) and the initial plat development (839 feet) were carried out by air leg mounted rock drills. This horizontal development was undertaken with an Eimco 630 bogging directly into kibbles on the shaft bottom.

Ground Support—

Shaft lining	1 011 feet
Total concrete in lining and plats	8 502 cubic yards
Rock bolts	7 695
Mesh-wire	61 916 square feet
Mild strap steel	9 828 feet

Ground conditions deteriorated during the year and the cutting of a basalt dyke of variable thickness, which remained in the vicinity of the shaft wall for over 200 feet, necessitated temporary support between the lining and the face. Meshing and strapping with rock bolts was the method utilised to contain the ground, with the unlined section being reduced to a minimum over this vertical interval. No serious water problems were encountered.

Equipping—

Shaft steelwork	975 feet
Brattice wall	709 feet

Roberts-Holland decided upon a novel but most successful method of equipping the shaft. The sinking stage was brought to the surface, the two lower decks were removed and the suspension points for the individual compartment working platforms strengthened. The stage was then lowered close to the shaft face and the platforms suspended. Equipping proceeded from the shaft bottom upwards with the working platforms secure in the installed fixed guides. Materials, i.e., buntons and brattice panels, etc., were lowered by the sinking winder, passed through the stage, and were positioned by the use of chain blocks mounted on the stage. In the lowest section of the shaft, where the loading and spillage bins are situated, an advance of 15 feet per day was achieved, including the installation of the structural steel for the bins. Once above this area an average of 35 feet per day was being maintained at the end of the year, including the installation of the brattice wall, shaft buntons and guides, two 10-inch pump columns, one 3-inch pump column and one 12-inch air column, with the removal of the sinking concrete and air columns and the ventilation ducting being effected.

General—Some corrosion was found in the fabricated steel of the head-frame. To arrest this the interior of the boxed sections was cleaned down and painted. The contractors maintained a positive safety programme throughout the year which achieved a commendable result. The average employment figure was sixty-eight men.

Prince Lyell Mine

The decline from the 11 140-foot bench of the West Lyell open-cut was advanced to link with the Prince Lyell decline. The budget target of 740 000 tons was not achieved; Stopes 1-4 provided the bulk of the 531 647 tons produced. Stopes 2, 3 and 4 broke through to the 960 bench of the open-cut, after the open-cut ceased production. The direct loading of the ore from the diesel carriers on to the rail trucks coupled with poor train availability contributed in some measure to the failure to realise the target. In an attempt to speed up the ore handling through the low level loading points two Wagner ST8s and one Eimco 917 8 cubic yard LHD units were purchased towards the end of the year. The introduction of the sub-level caving method below the 735 level has been altered due to failure to achieve development targets. It is now proposed to develop another block for mining by open stoping, which demands far less horizontal development.

The quantity of air available for primary ventilation was more than adequate, but some difficulty was experienced in ventilating the many development headings demanded by the system of mining adopted.

The underground workshop and the re-fuelling station were commissioned during the year and all maintenance and repairs, other than major engine overhauls, are now carried out in this workshop.

Cape Horn

The decline from the 11 155-foot adit was advanced to within approximately 300 feet of the haulage drive. A contractor completed three holes using a Robbins 61R raise borer from the sub-levels off the decline to the haulage drive (a 7-foot diameter rise to serve as an ore pass, a 6-foot diameter rise to serve as an exhaust airway and a 4-foot diameter rise as a cut-off slot). A direct cost comparison between the ore pass risen with an Alimak and the one bored with the raise borer favoured the former method but the particular cutter used in the latter method may have been unsuitable for local conditions.

The budget production target at 358 000 tons was exceeded by 65 000 tons. The bulk of this tonnage came from the sub-level caving section which is now almost complete. Indications are that an extraction figure of more than 70% has been achieved from the sub-level caving stoping method, however, this figure includes dilution which could not be assessed. It was found necessary to continue hauling the ore to the surface with the diesel vehicles for transport to the crusher, due to the locomotive availability for the long trip via the North Lyell tunnel to the Cape Horn ore pass having a low priority. Ground conditions in the sub-level open stope area have improved considerably and little support is necessary in comparison with the cave section above the crown pillar. An excellent safety record held by the underground workers on this mine was marred by an explosive mishap which occurred in December.

Crown Mine

Little new development was carried out on this mine. Production failed to reach the budget target by some 46 000 tons. The extraction of the pillars between the stopes on the upper levels was deferred until the open-cut reaches the planned depth thus limiting the output of the upper levels.

Due to ground failure in a scam drift, mill-holes were cut and extraction proceeded using first a small LHD diesel and then a Cavo. This permitted a direct comparison between scraping, diesel loading and the operation of a Cavo. Under the conditions applicable in this particular area the Cavo was found to give the best production figures.

Ground movement in the lower 12 West cut and fill stope curtailed production from this high grade ore body for the majority of the year. Development in the foot wall was commenced to permit the mining of the remnant block next year.

Crown Three Open-cut

A further 1½ million tons of overburden was removed permitting the production of 200 572 tons of ore. This operation is being conducted by Jeffreys Earthworks Pty Ltd, contractors to the company. Difficulties have been experienced in maintaining benches, dumps and roads partly due to the site conditions but largely to equipment availability.

Lyell Tharsis

The development of this ore body for sub-level open stoping has been completed, and drilling of the rings commenced. Ground support was required in the northern end of the extraction headings and the ventilation rise was lost due to self-caving.

Royal Tharsis

Horizontal development at tunnel horizon was completed during the year. Two rises were commenced, one for ventilation, the other being the slot rise. Stopping production should commence in 1973 to assist in meeting any shortfalls in output from Prince Lyell.

West Lyell Open-cut

Open-cut operations finished in September. An island of mullock was left on the 960 bench to expedite the cessation of open-cutting and to assist in controlling water inflow. The open-cut has been worked since 1935 and 103 million tons of rock have been removed for a yield of 56·5 million tons of ore.

GENERAL

Underground mines provided 55% of the ore treated for the year, an increase of 18% on the figures for 1971.

During the year the use of computers was extended. A 1904A machine in Melbourne utilising the ICL Pert package processes the Prince Lyell network, comprising 1 500 activities. Twenty-five separate resource categories (e.g., LHDs, Jumbos, men) are used to determine a schedule of optimum resource allocation. Simulation systems for the rail haulage system and the Prince Lyell ventilation network have also been commenced. The company has recently purchased a small PDP8E digital computer for solving routine survey calculations and other simple repetitive problems.

In order to eliminate the problems which have occurred, due to the necessity for a greater number of trains to use a single track, the company have ordered a centralised traffic control system for the rail transport on the 710 level haulage. Improved availability of the Asea LGBT9 locomotives was obtained during the year.

ORE RESERVES AT 30 JUNE 1972

<i>Mine</i>	<i>Tons</i>	<i>Copper</i>	<i>Silver</i>	<i>Gold</i>
PROVED ORE—		(%)	(oz/ton)	(oz/ton)
West Lyell Open-cut	112 000	0·74	0·05	0·008
Crown 3 Open-cut ..	1 043 000	1·15	0·13	0·012
Prince Lyell	26 306 000	1·46	0·05	0·008
Lyell Tharsis	363 000	1·43	0·05	0·008
Crown 3	2 220 000	1·50	0·13	0·012
Twelve West	21 000	8·50	1·00	0·005
Cape Horn	2 907 000	1·80	0·14	0·040
	<u>32 972 000</u>	<u>1·48</u>	<u>0·067</u>	<u>0·012</u>
PROBABLE ORE—				
'A' Lens West Lyell	2 455 000	1·46	0·05	0·008
Royal Tharsis	2 835 000	1·38	0·05	0·008
Crown 2	36 000	2·99	0·80	0·010
Cape Horn	675 000	1·80	0·14	0·040
	<u>6 001 000</u>	<u>1·47</u>	<u>0·06</u>	<u>0·009</u>
POSSIBLE ORE (not reserves)—				
Cape Horn	2 235 000	1·06	0·100	0·010

MILLING

Crushing

The commissioning of a new secondary cone crusher and an intermediate ore storage bin took place in December. The standard 7-foot Symons cone crusher reduces nominal 8-inch ore to 2-inch and was placed on a epoxy-mastic 'bed' above the concrete foundations. An Allis Chalmers plate decked screen was incorporated ahead of the crusher to improve screening capabilities. From the crusher the 2-inch ore is fed on a deep troughing 48-inch conveyor to a continuously moving tripper feeding the 200-foot long ore storage bin. Ore is recovered from the storage bin by two rotary plough reclaimers and conveyed to the tertiary crushing section. Capacity of this new storage is 15 000 tons and should permit greater flexibility in crusher, rail and locomotive maintenance schedules.

Flotation

The 120A Agitair flotation cells originally installed for copper slime scavenging have now been transferred to 'rougher' duties following middling flotation. Two-stage desliming has allowed the rejection of the second stage slimes to the final tail.

Filtration

Cleaner filtrate has been obtained by the use of mono-filament filter cloth which has reduced blinding and moisture content. Improved life is expected from this cloth to compensate for the increased cost.

Concentrate

	Tons	Copper (%)	Sulphur (%)
Copper	91 985 (DLT)	25.99	...
Pyrite	103,123	0.36	48.04

The concentrate transport operators (from Queenstown to Melba Flats) have completed 1.8 million main road miles without an accident.

SAFETY

Accidents

Man hours exposure	3 108 418
Frequency rate	44.3
Severity rate	6 669
Mean duration (days)	9.2

The frequency rate and the mean duration rate both show improvement on the figures for 1971, with the results from the underground section showing an overall improvement. Two fatal accidents resulted in the high severity rate. Both of these accidents, although separate in regard to time and place, occurred on the surface and involved the driving of vehicles on the lease.

CAPITAL EXPENDITURE

During the year the following capital items were either purchased or ordered:—

- Siemens centralised traffic control system for ore train haulage.
- Conveyances for Prince Lyell No. 1 Shaft.
- Lime handling facility.
- Secondary crusher and storage bin.
- One Eimco 916T20 diesel underground truck.
- Two Wagner ST8 LHD units.
- One Eimco 917 LHD unit.
- Two Richardson 72-inch fans.
- Two Atlas Copco Cavo 510A autoloaders.
- Four Tamrock PK1032 ring drilling rigs.
- Additional mine cars.
- One BLH Austin-Western 18-ton mobile crane.

Cleveland Tin N.L., Luina

This company, reviewed under Tin, produced 5 566 tons of copper concentrates containing 1 022 tons of copper valued at \$981 414.

Electrolytic Zinc Company of Australasia Limited, Rosebery

This company, reviewed under Zinc, produced 19 619 tons of copper concentrates containing 2 439 tons of copper valued at \$2 341 658.

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

Year	<i>Value</i>		Year	<i>Value</i>	
	<i>Fine oz</i>	\$		<i>Fine oz</i>	\$
Prior to 1968	2 729 461	34 603 838	1970	39 386	1 266 882
1968	33 526	1 135 108	1971	53 365	1 933 457
1969	36 705	1 338 817	1972	57 264	2 873 567
			Total	2 949 707	43 151 669

The Mount Lyell Mining and Railway Company Limited, Queenstown

This company recovered 15 480 fine oz, valued at \$768 933, from sludge in the electrolytic copper refinery.

Electrolytic Zinc Company of Australasia Limited, Rosebery

Concentrates produced by this company contained 41 784 fine oz, valued at \$2 104 634.

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

P. Allan, Mining Engineer, Burnie, reports as follows:—

	<i>Tons</i>
Savage River—	
Overburden removed	8 651 606
Ore mined	5 054 168
Concentrate to Port Latta (dry)	2 314 816
Port Latta—	
Pellets produced (dry)	2 335 561
Value of production	\$27 527 624
Average number of persons employed—	
Mining	126
Other	534
Total	660

A total of thirty-six shipments averaging 64 455 tons per vessel and nine oil tankers discharging a total of 41 990 tons of fuel oil passed through Port Latta.

At Savage River the open-cut is now developed down to the eleventh lift while the southern end has been opened up and allows for more flexibility in ore production. Mill shut down time was considerably below expectation and the planned lift to the emergency tailing dam was able to be delayed. Total production lost due to strikes, breakdowns, etc., only amounted to 14 000 tons compared with 183 000 tons in 1971.

Plans were inaugurated for a new emergency dam and raising of the main tailings dam; the Hydro-Electric Commission were employed as construction and stability consultants.

An additional 4 600 feet of diamond drilling was completed to further define the existing ore body but there has been no change in the ore reserve estimates.

In the concentrator a second magnetic cobbing pulley was installed in the autogenous mill re-cycle circuit and the tailings disposal system was upgraded with the addition of a tailings booster pump station.

In the town site work continued with landscaping, fencing, drainage, curbing and footpath construction but no additional housing has been constructed.

Capital expenditure during the year was concentrated on improving the pit lighting and the replacement of six utility trucks.

The accident statistics for both properties show an improvement, this year's total of thirty-two being 36% less than in 1971.

At Savage River one man tripped over a pallet and broke his ankle. At Port Latta two serious accidents occurred; one when a man fell from a scaffolding and suffered serious back injuries, and the other when a man slipped and fell under a travelling feeder conveyor and sustained serious injuries to his foot when it was trapped between a bogie wheel and the rail.

IRON OXIDE

IRON OXIDE: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>Value</i> \$	<i>Year</i>	<i>Tons</i>	<i>Value</i> \$
Prior to 1968	122 154	284 167	1970	9 457	60 667
1968	12 780	79 030	1971	10 555	65 526
1969	11 117	71 791	1972	9 628	61 956
			Total	175 691	623 137

Iron Cliffs Mine, Penguin

A. Pearson continued to work the secondary ore at the Iron Cliffs Mine and supplied a cement works with 9 628 tons of hematite valued at \$61 956. Employment averaged four men.

LEAD

LEAD: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>Value</i> \$	<i>Year</i>	<i>Tons</i>	<i>Value</i> \$
1919 to 1967	388 419	51 591 995	1970	10 558	2 981 018
1968	11 754	2 568 982	1971	12 255	2 926 075
1969	11 730	3 081 475	1972	19 982	4 951 450
			Total	454 698	68 100 995

Electrolytic Zinc Company of Australasia Limited, Rosebery

This company, reviewed under Zinc, produced 25 539 tons of lead concentrate and the total content of lead in the lead, zinc and copper concentrates was 19 982 tons valued at \$4 951 450.

South Comet Mine, Dundas

During the year no production was recorded from this lease; however, the option holders Texins Development Pty Ltd carried out an extensive programme of sampling, underground mapping and diamond drilling. Following this programme the option was exercised and a feasibility study on the proved ore potential of this area is planned.

Adelaide Mine, Dundas

F. Mikhailovic and partner continued to work this mine full time throughout the year. Two sub-levels were driven off the rise from No. 3 adit to the surface, No. 1 at 15 feet below the surface and No. 2 at 30 feet. Good specimen crocoite was stoped out between No. 1 sub-level and the surface with the mined area being back filled. An exploration winze was sunk to 20 feet north of the stoped area but yielded little value and was accordingly back filled. Towards the latter part of the year work was concentrated again in No. 3 adit with some good patches of dundasite encountered during stripping of the old drive.

Specimens recovered and sold during the year realised \$5 000. The mine was placed under option to Texins Development Pty Ltd by the owner Mr Murray; permission was granted for the mining party to continue their operation until the option agreement was either exercised or allowed to lapse.

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 2 170 tons was valued at \$79 443.

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

Year	Pounds	Value	Year	Pounds	Value	
		\$			\$	
1967	4 204	24 645	1970	2 845	16 166	
1968	2 147	14 406	1971	665	2 484	
1969	3 626	23 707	1972	1 307	2 986	
				Total	14 794	84 394

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 1 307 lb, valued at \$2 986.

OSMIRIDIUM

Total production to date is 31 100 oz, valued at \$1 418 771.

PYRITE**PYRITE: QUANTITY AND VALUE OF PRODUCTION**

Year	Tons	Year	Tons	
1915 to 1967	1 764 611	1970	75 338	
1968	42 504	1971	179 529	
1969	28 535	1972	218 095	
			Total	2 308 612

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 exported to its works at Newcastle a total of 3 790 tons, valued at \$37 900. 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 5 508 tons of local Beaconsfield quartzite combined with slag from ferro-manganese production for a yield of 16 341 tons of silico-manganese valued at \$1 786 770. 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.

SILVER: PRODUCERS, SOURCE, QUANTITY AND VALUE OF PRODUCTION, 1972

<i>Producer</i>	<i>Source</i>	<i>Fine oz</i>	<i>\$</i>
Cleveland Tin N.L.	Tin and copper concentrates	21 047	29 950
E.Z. Co. of A/asia Ltd	Copper, lead and zinc concentrates	2 330 157	3 350 980
Mt Lyell M. & R. Co. Ltd	Refinery sludge	131 222	187 381

SILVER: 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>Fine oz</i>	<i>\$</i>	<i>Fine oz</i>	<i>\$</i>	<i>Fine oz</i>	<i>\$</i>	<i>Fine oz</i>	<i>\$</i>	<i>Fine oz</i>	<i>\$</i>
1919-1967	121 787	101 764	17 690 600	5 749 634	3 882 608	1 672 917	27 073 212	21 897 807	48 768 207	29 422 122
1968	3 745	7 756	....	....	87 580	179 712	1 386 881	2 882 292	1 478 206	3 069 760
1969	15 361	24 762	....	....	76 030	123 116	1 379 716	2 223 832	1 471 107	2 371 710
1970	18 750	29 513	....	....	113 198	177 458	1 304 499	2 060 012	1 436 447	2 266 983
1971	23 794	31 741	....	....	118 076	156 351	1 551 417	2 016 052	1 693 287	2 204 144
1972	82 697	123 722	....	....	134 183	191 595	2 330 157	3 350 980	2 547 037	3 666 297
Totals	266 134	319 258	17 690 600	5 749 634	4 411 675	2 501 149	35 025 882	34 430 975	57 394 291	43 001 016

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 tons</i>	<i>\$</i>	<i>Tons</i>	<i>Mono tons</i>	<i>\$</i>	<i>Mono tons</i>	<i>\$</i>
1957-1967	479,881	4 664 226	....	....	....	479 881	4 664 226
1968	65 157	1 335 718	....	....	....	65 157	1 335 718
1969	53 756	1 158 662	....	....	....	53 756	1 158 662
1970	58,451	889 263	75 338	87 376	1 415 482	145 827	2 304 745
1971	50 826	628 629	179 529	348 041	5 205 420	398 867	5 834 049
1972	94 690	1 217 939	240 422	351 880	5 258 779	446 570	6 476 718
Totals	802 761	9 894 437	495 289	787 297	11 879 681	1 590 058	21 774 118

North-West Acid Proprietary Limited, Wivenhoe

This company continued to treat pyrite concentrates produced by the Electrolytic Zinc Company, Rosebery, and the Mount Lyell Mining and Railway Company, Queenstown. Production for the year was 344 081 mono tons of acid.

Capital Expenditure

A capital expenditure of \$160 000 was incurred in purchasing new items or modifying existing equipment, details are as follows:—

- Improved facilities for lime addition.
- Modifications to the main roaster outlet flues.
- Duplication of product acid pumping and cooling facilities.
- Improved communication systems.
- Catalyst screening equipment.
- Provision of equipment for bulk lime use.

Production

No major changes in the mode of operation took place during the year under review. However, progress has been made towards minimising downtime for maintenance of equipment, in areas where annual shutdown periods of three weeks had previously been envisaged. In effect, these areas can now be phased for maintenance at differing times throughout the year to coincide with the unplanned breakdown maintenance periods. This should result in maintaining production rates at a higher daily level with improved availability. The possible treatment of calcine residues for potential marketing continues to be assessed.

General

Further improvement in noise attenuation, following the major programme of 1971, has been marginal in the area of continuous plant noise. Aperiodic noises which are naturally disturbing, especially at night, continue to be investigated and, where possible, corrected. In both these noise spheres correction measures are generally empirical. Other areas of environmental protection continue to be investigated by the company and some success has been achieved.

Safety

An average of 108 people was employed during the year.

Four accidents occurred during the year, one of which was serious. Work injury statistics are:—

Man hours exposure	268 278
Frequency rate	15
Severity rate	302
Mean duration (days)	20

TIN

TIN: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>Value</i> \$	<i>Year</i>	<i>Tons</i>	<i>Value</i> \$
1873 to 1967	152 577	86 935 156	1970	4 939	16 927 602
1968	3 126	9 242 080	1971	6 071	19 854 601
1969	4 776	15 817 361	1972	6 717	22 439 882
			Total ...	178 206	171 216 682

Aberfoyle Ltd, Rossarden

R. C. Thomas, Mining Engineer, Hobart, reports the average number of persons employed:—

Underground	93
Surface, mill and other staff	109
Total	202

This was a decrease of fifty-two compared with 1971.

Production from the ore treated consisted of 355 tons of tin concentrate containing 239 tons of tin valued at \$799 062 and 239 tons of wolfram concentrate containing 177 tons of tungstic oxide valued at \$546 114.

	<i>Tons</i>
Tonnage of ore milled	53 818
Tailings retreated	21 052
Sand fill placed in stopes	29 888
Underground development—	
	<i>Feet</i>
Driving	519
Cross-cutting	48
Rising	673
Total	1 240

The following expenditure was incurred on capital works:—

	\$
Mill modifications	1 673
New attachments for cages	4 970
Total	6 643

During the year the secondary crushing section of the mill was altered by replacing the 24-inch Symons crusher with the 36-inch Symons crusher from the Storeys Creek mill. The automatic lime dispenser was incorporated into the tailings circuit. A start was made on the construction of an ore storage bin to receive ore from Storeys Creek mine. The batch treatment of tin concentrates from the magnetic separators has been replaced by installing a flotation table in the cleaning circuit and this is operating successfully. A start was made on enlarging the tailings dam and altering the tailings line to a peripheral discharge.

Ore reserves, as published at 30 June 1972, were as follows:—

	<i>Tons</i>
Indicated ore	316 400
Inferred ore	71 600
Total	388 000

BMI Mining Pty Ltd, South Mount Cameron

Clive Monk Area—Old Endurance Lease: An area of ground containing 30 000 cubic yards to a depth of 18 inches was dozed and treated, ground value being assessed at 14 oz SnO₂ per cubic yard. Equipment consisted of an 8-inch-8-inch K & L pump powered by a 180 h.p. Rolls Royce diesel, water supply being from the main Endurance workings lake.

Western Endurance: One man was employed to sluice 5 213 cubic yards of gravel and obtain concentrates containing 2 tons of tin valued at \$6 534.

Monarch Mine: The acquisition of a Bucyrus Eyrie 88B dragline excavator contributed substantially to improved mining methods. The dragline is equipped with a 110-foot boom, weighs 170 tons and is powered by a twelve-cylinder 300 h.p. Detroit diesel motor. Some experimentation was made with medium capacity dump trucks, the final choice being a 20-cubic yard Kockum.

In the effort to combat pollution of the Boobyalla River by mine effluent, a system of dewatering and settling dams was devised which has reduced the problem to within reasonable limits.

A total of 183 431 cubic yards was treated during the year for a yield of 60·918 tons of concentrates containing 43·43 tons of tin valued at \$144 529. Employment averaged twenty-nine men.

Cleveland Tin N.L., Luina

E. C. Leyland, Mining Engineer, Burnie, reports that there has been a further increase this year in the tonnage treated; 390 875 tons containing 0·857% Sn and 0·380% Cu, were treated. Recoveries were as follows:—

	<i>Tons</i>
Tin concentrate	3 849
Tin content	2 135
Copper concentrate	5 566
Copper content	1 022
Tin content	155

DEVELOPMENT

	<i>Ore (ft)</i>	<i>Mullock (ft)</i>
Driving and cross-cutting	7 252	3 681
Decline advance ....	....	791
Rising ....	....	665
	<hr/>	<hr/>
	7 252	5 137
	<hr/>	<hr/>

Note.—All development with the exception of the rises is negotiable by diesel vehicles.

PRODUCTION

Mine production reached 385 023 tons, an increase of 53 547 tons above the figure for 1971. Of this tonnage the preponderance came from development and silling, 238 439 tons, with the balance 146 584 tons coming from stoping. The mining method used in the upper levels, mechanised sub-level overhead benching (MSOB) is still being used for the lower block. MSOB is an inflexible and high capital cost mining method which poses several operational problems, in particular: the ventilation of parallel drives for the whole length of the ore lenses during diesel development (a minimum of four on each level); the impracticality of providing a second access to the stope floors; in the event of ground movement from a higher level the bogging of as much ore as possible at the brow, affords no protection to any personnel in the drive from the effects of an air blast; any discontinuity in vertical section of the ore requires either that a pillar be left (leaving the broken ore from above behind) or the mining of mullock to permit the vertical longwall retreat; with the loss of all development headings in ore any strike extensions not located prior to the initial development require separate development from the main cross-cut (e.g., Khaki Lode).

Vehicle access to the lower block (i.e., below the old haulage level at the 1 125 foot R.L.) is by a single decline at a grade of 1 in 9. Road building and maintenance are receiving more attention than formerly which should improve the availability of the haulage equipment. The increase in mine depth has necessitated major changes in power distribution and pumping capacity.

CAPITAL EXPENDITURE

During the year the following items of equipment were added to the mining fleet:—

- One wagner MTF 25.35 truck.
- One Terex R17 truck.
- One Gardner-Denver mini-bore jumbo.
- One Wabco rubber-tyred dozer.
- One Ingersoll Rand rock breaker (secondary breaking at crusher).
- Two Fiat tractors—service vehicles.
- One diesel Land Rover.

Additions were made to the survey office for the geologists and new magazines were built for the storage of explosives.

MILLING

Crushing: Four-inch Linatex rubber wear plates were fitted to the primary jaw crusher vibrating feeder in an attempt to improve wear characteristics. With the screen oversize conveyor structure widened to take a 36-inch belt, stoppages due to blockage and spillage have been reduced. In addition the closed setting of the jaw crusher has been opened from 5 inches to 8 inches, resulting in improved jaw liner life.

Grinding: The following table gives the wear details of Mn steel, Ni-hard and a mixture of both types of shell liners which have been used in the 6 ft x 10 ft rod mill. In all cases the profile has been of the wave type.

SHELL LINER WEAR RATES 6 FT x 10 FT ROD MILL

<i>Liner material</i>	<i>Ore milled (Tons)</i>
Mn steel	83-92 000
50% Mn steel, 50% Ni-hard	70-83 000
Ni-hard	153 000

A set of Firestone rubber shell liners were removed from the 8 ft x 7 ft primary ball mill because of failure along the lamination plans after sixteen months of service. Three sets of lifter bars were used during this period. Steel liners, which have a life of six months, are now being used in order to reduce mine stocks prior to a set of Skega rubber liners being fitted.

A second set of Skega lifter bars was installed in the two regrind mills, at seventy-nine weeks in the 6 ft x 5 ft and at seventy-three weeks in the 6 ft x 7 ft mill. A third set of lifter bars will be fitted to these mills in 1973.

Flotation: A cassiterite flotation section was successfully commissioned in March. The flotation reagents are SM119 collector and MIBC frother. Pulp pH is modified with sulphuric acid and sodium hydroxide. Automatic controls have been incorporated in this flotation circuit where possible.

Gravity Treatment: With the introduction of the cassiterite flotation section overloading of the vanner section was eliminated. The replacement of the 3-inch Warman vanner feed desliming cyclones with 6-inch Krebbs cyclones yielded a short size range vanner feed. The cyclone overflow is deslimed with 3-inch Krebbs cyclones and becomes the cassiterite flotation feed. The decreased size of this feed has enabled the vanner belt slope to be increased from 2° 50' to 3° 50' resulting in higher concentrate and lower tailing grades in the primary vanner section.

GENERAL

Capital Expenditure: Capital expenditure for the year was \$560 256. The addition of twenty houses to the town of Luina, coupled with civil works in the town and extensions to existing buildings accounted for over half this expenditure. The company now possesses 125 house for staff and employees; three are at Waratah, the remainder are at Luina.

Exploration: A deep drilling programme to investigate the depth extensions of the Cleveland mine commenced in October 1972. As a result of this work, measured and indicated ore reserves at 1 March 1973 are given as 2.9 million tonnes, containing 0.87% tin, and 0.31% copper.

Diamond drilling on the mine lease totalled 47 493 feet of which 28 688 feet was drilled underground.

A programme of gridding, geochemistry, geophysics and detailed geological mapping was initiated in November. This programme will include areas of the lease and exploration licence in the proximity of the Cleveland mine. It is then planned to extend the regional mapping to cover the whole licence area.

Safety: Of the 241 members of the work force sixty-six are underground employees. The following is the work injury record for the year:—

Man hours exposure	....	....	....	....	....	409 874
Frequency rate	....	....	....	....	....	51·2
Severity rate	..	....	....	....	....	1 278·3
Mean duration (days)	....	....	....	....	....	17·8

These figures indicate a commendable improvement on those published for 1971.

Incidents: A fire, of unknown cause, occurred in No. 2 surface substation on Sunday, 12 October 1972. All work was stopped in the mine for twenty-four hours and a further two days were required to pump out the water from the decline.

Renison Limited, Renison Bell

P. Allan, Mining Engineer, Burnie, reports that the company adopted the use of metric units at the beginning of the year.

Ore mined—	Tonnes
Federal ..	94 811
Lower North Stebbins ..	84 213
Upper North Stebbins ..	77 914
Lower Dreadnought	208
Upper Dreadnought	99 688
Colebrook	74 023
Penzance	2 066
Howard ..	4 656
Murchison	15 687
Bassett	886
Montana open-cut ..	2 000
	<hr/>
	456 152
	<hr/>
Tin concentrates produced—	
High grade	6 083
Low grade	4 033
	<hr/>
	10 116
	<hr/>
Tin content	4 139
Overall recovery	69%

The Renison Decline advanced 334 metres to 3 134 m from, and 331 m below, the portal. This is well below the current limit of stoping operations but it is being advanced for exploratory purposes and access for future shaft development. In addition 2 802 m of driving and cross-cutting and 549 m of rising were completed.

For trial purposes a 156 m section of 2 m diameter ventilation rise was raise-bored with satisfactory results.

A section of the No. 2 adit decline was concrete lined where it passes under the Murchison Highway and the 118 m³/s No. 6 ventilation fan was commissioned.

The ore bodies currently defined consist of two major steeply dipping shear lodes named Federal and Bassett and a number of smaller ore bodies occurring in the flat-bedded No. 2 and No. 3 horizons. As the latter become more clearly delineated they have been named as separate ore bodies so that we now have the North and South Stebbins, Dreadnought and Murchison in the No. 2 horizon while the Colebrook, Penzance and Howard have been defined in the No. 3 horizon.

Federal ore has proved troublesome in the past for treatment but improvements in the mill procedure have allowed a much larger proportion of Federal ore to be mined and treated this year while production has been gained for the first time from the No. 3 horizon. Although the No. 3 horizon bodies are much thinner than those in No. 2 the diesel powered trackless equipment is continuing to prove quite suitable.

Ore treatment has steadily improved with an average recovery for the year of 69% with an average head grade of 1.32% Sn. Modifications have included the introduction of wedge wire screens in the primary ball mill feed line to bypass material already at flotation size while the primary mill pumps have been enlarged to give an increased capacity. Sulphide regrinding and refloatation is now carried out as an independent operation.

Experimental work is being conducted on plant trials with a Yuba-Richards jig to evaluate its possible application. In addition, following successful laboratory testing, it is intended to test a Humphrey spiral for the treatment of the feed to the coarse rougher tables while an extensive investigation is in progress on the application of heavy media separation. It has been found that plus 2 micron material is amenable to flotation for the recovery of cassiterite but not in the presence of minus 2 micron material. Test work has demonstrated that 40 mm polyurethane cyclones will satisfactorily remove minus 2 micron slimes from vanner tails and other fine end products.

The company drilled 5 500 m in seventeen surface holes and 9 080 m in 106 underground holes. Surface drilling to test the No. 3 horizon resulted in several encouraging intersections and holes into the South Bassett confirmed both ore grade and width. Results from the North Bassett were still inconclusive.

Underground drilling was concentrated on proving additional ore in the No. 2 and No. 3 horizons and the Central Bassett ore bodies. The No. 2 horizon drilling resulted in substantial increases in the reserves in the Dreadnought and Murchison lodes while the No. 3 horizon drilling proved additional reserves in the Colebrook lode, reasonably delineated the Penzance lode and partially delineated the Howard lode.

As a direct result of this drilling programme and in accordance with the suggestions by the committee set up on behalf of the Australasian Institute of Mining and Metallurgy and the Australian Mining Industry Council the ore reserves have been re-classified.

The reserves in the Federal ore body have been reduced by some 1 828 800 tonnes following the exclusion of ore no longer regarded as economical while the Bassett ore body has had 2 032 000 tonnes added to reserves as a result of ore transferred from No. 2 horizon reserve but now regarded as part of the Bassett structure along with the transfer of possible ore to probable ore as a result of drilling.

No. 2 horizon ore bodies reserves have been reduced by approximately 812 800 tones due to transfer to Bassett reserves and mining, offset to a certain extent by additional ore delineated.

No. 3 horizon reserves were increased by 914 400 tonnes as a direct result of the drilling programme.

The total of probable and proved ore reserves increased by approximately 609 600 tonnes at an increased grade while the possible reserves decreased by approximately 1 016 000 tonnes.

Ore reserves at September 1972 stood as follows:—

Ore Body	Probable		Proved		Possible	
	(Tonnes)	%	(Tonnes)	%	(Tonnes)	%
Federal	914 000	1.04	787 000	0.9	....	....
Bassett	1 407 000	1.30	625 000	1.30	8 100 000	0.85
No. 2 Horizon	508 000	1.14	1 001 000	1.30	400 000	1.13
No. 3 Horizon	864 000	1.50	833 000	1.80	700 000	0.87
Other lodes	305 000	1.60	20 000	0.62	....	....
Total	3 998 000	1.29	3 266 000	1.33	9 200 000	0.86

Capital expenditure for the year was as follows:—	\$
Housing and amenities	118 000
Site buildings and road sealing ..	165 000
Services equipment	93 000
Mine plant and equipment	322 000
Concentrator	344 000
Exploration ..	222 000
Mine development	675 000
Total ..	1 939 000

Eighty accidents occurred during the year, one of which was serious and another fatal. The company employed an average of 390 men.

The serious accident occurred when a learner driver lost control of an ore carrier when descending the decline and collided with an ascending laden vehicle. The driver of the second vehicle in attempting to leave his carrier had his leg trapped and sustained injuries which later resulted in his having to have an amputation below the knee.

On 22 February the back of the 3C stope in the Upper Dreadnought ore body failed causing the instantaneous death of D. Palmer. As a result of the accident considerable re-planning has been done on stope pillar layout where the dip in the ore bodies tends to flatten while considering interest is being shown in the development of an entirely mechanical scaler.

The company is to be congratulated on the attention it pays to ventilation requirements, there having been no complaints at any time about underground conditions.

Ringarooma Mining Pty Ltd, Waratah

This mine on a lease in North Valley, Waratah, commenced production in August 1972. Approximately 50 000 cubic yards of gravel was excavated and treated to produce 11.1 tons of concentrates containing 6.59 tons of tin valued at \$21 530. A total of seventeen men were employed. Capital expenditure was \$400 000.

The operation employs a North West 6 dragline with a 1½-yard bucket feeding a grizzly plant. The grizzly plant produces — 2½-inch material which is pumped 800 feet to the concentrator. The oversize is dumped using a short inclined conveyor. At the concentrator the feed passes through a double shell trommel + ¼-inch — ¾-inch to a 30-inch cyclone. The cyclone underflow gravitates to a sump where water is added and this gravitates to a 24-inch cyclone feeding a six-cell 42-inch x 42-inch primary jig. The trommel oversize in the range + ¾-inch — 2½-inch passes a modified two-cell 42-inch x 42-inch jig where coarse tin is taken off as an above screen product. All the jigs overflow to a tails sump, where a 10/8 gravel pump driven by a 180 h.p. diesel engine to combat surging, pumps the discharge to the tailings dam. Jig underflows (hutch product) gravitate to a sump and are pumped to a 12-inch cyclone feeding the four-cell 30-inch x 30-inch secondary jigs. Spigots 1 and 2 products go directly to the tin shed and spigots 3 and 4 products are recirculated in the secondary circuit.

In the tin shed the product is screened, dried and tabled to float off pyrite. Serious contamination by old pyritic tails precluded the preparation of a saleable product at the inception of the operation and approximately 150 tons of this material is awaiting retreatment. Pyrite contamination at present is conditioned in the tin shed and pyrite removed on the float table. The pyrite removed will later be ground to — 40 mesh and much of the tin recovered on the tables. The product is dried on a wood-fired table drier and drummed for shipment. The reagents used are sulphuric acid, kerosene and ethyl xanthate. These are only used in small quantities and are drip fed under manual control. An estimate of the ore reserves is not available as only a portion of the lease has been sampled and logged.

There have been complaints regarding pollution of the Arthur River by the mining operation. The company has been instructed to provide additional tailings areas and settling ponds for operating under closed circuit conditions. To achieve this aim and provide for systematic rehabilitation of the mined out areas, a detailed mining plan is required. This has not yet been done.

The company has built nine houses in the Waratah township and one on the North Valley lease. An HEC power line was extended to North Valley and transformers installed to supply power to the mine.

Accidents

Man hours exposure	....	....	....	....	....	....	....	15 360
Number of accidents	....	....	....	....	....	....	....	2
Frequency rate	....	....	....	....	....	....	....	130
Severity rate	..	....	....	....	....	....	....	390
Mean duration (days)	....	....	....	....	....	....	....	3

V. Wood, Pioneer Mine, Pioneer

Of major importance during the year was the acquisition of the Frome power station and power transmission system from the BMI Mining Company. This will ultimately effect a substantial cut in cost per cubic yard treated. Throughput was maintained at 80 cubic yards per hour on the bottom bench, the figure for the top bench being over 100 cubic yards per hour. The rapid advance of the face occasioned the moving of the 10-inch gravel pump and the ore dressing plant to positions more convenient to the face.

Production from 158 540 cubic yards of gravel pumped was 18.561 tons of tin in concentrates valued at \$61 942.

G. Machen, Ringarooma River, Derby

Operating on a tribute arrangement with the Briseis Co., Mr Machen set a box in the river and erected a scalping grizzly above in order to remove river shingle. A front-end loader and trucks were used to transport the gravels to the grizzly, the tin bearing fines being concentrated in the box. In all, over a period of three months, Mr Machen recovered 8½ tons of tin concentrates. He assessed the value of the river gravels at 4 lb/cubic yard. The concentrates contained 5.25 tons of tin valued at \$17 682.

Tania Mining Company, Moorina

This company set up boxes and fabricated a steel pontoon on which they installed an 8-inch gravel pump and motor and a 6-inch pressure pump and motor in ground adjoining the Weld River. Heavy flooding during the winter months brought about the abandonment of the show. Concentrates produced contained 0.227 ton of tin valued at \$757.

R. Hyde and B. Trevena, Ringarooma River, Moorina

This party installed a 6-inch diesel driven pump set, rock separation hopper, 8-inch hydraulic elevator and sluice boxes. A Ruston 10 RB backactor/dragline was acquired and put in to operation. In addition a 20-cubic yard per hour diaphragm jig was constructed. So far no pollution problems have arisen due to stacking of tailings and the lack of clay in the river wash. A tandem axle dump truck of 11 cubic yards capacity was acquired to transport feed to the jig.

Tin concentrates produced contained 1.59 tons of tin, valued at \$5 312.

K. Kerrison, Ringarooma River Beaches

Mr Kerrison adopted a mechanised system in place of manual operations. He constructed a 20-cubic yard per hour diaphragm jig and mounted it on an old truck chassis. He also acquired a four-wheel fully articulated Scoopmobile front-end loader, a 55 h.p. tractor with power take off and a 4-inch-4-inch Warman pump. Equipped with this he worked on the downstream end of his leases and during operating time averaged 1 cwt SnO₂ per shift. The poorest ground yielded 1½ lb SnO₂ per cubic yard. The construction of the plant, road cutting, running in periods and breakdowns occupied eight months of the year but despite this production from 6 822 cubic yards of gravel treated was 3.905 tons of tin in concentrates valued at \$12 987.

Razorback Mine, Dundas

Mr Hodge mined 210 tons of ore to produce 1.51 tons of concentrates valued at \$2 676.

On 9 October the option held by Minops Pty Ltd over this mine was exercised. For the remainder of the year the new owners employed two men full time running batch samples through the old mill. New samples were cut every 10 feet in the old drives and cross-cuts and the 1 000 lb samples were carefully milled to assess recovery and efficacy of gravity treatment. Minops also carried out sampling south of the open-cut looking for a possible lode extension. Plans were under consideration for a site for the treatment plant, the type of plant required, suitable areas for the tailings disposal and a new access road for the proposed open-cut. It is expected that construction work will commence early in 1973. The company have announced that proved reserves are 320 000 tons averaging 0.74% tin in the oxidised zone.

Black Creek Tin Mining Syndicate, Branxholm

This syndicate of three employed two men full time and worked weekends themselves for the recovery of 3.464 tons of concentrates from 13 850 cubic yards of gravel.

A Perkins diesel motor of 165 h.p. was brought into commission to drive a 6-inch-6-inch K & L pump and in an effort to prevent pollution of Black Creek, tailings were dewatered and the water recirculated. The filling of the sump lake with tailings necessitated the introduction of a winch and scraper to remove tailings and provide a satisfactory sump hole. Values were down to approximately $\frac{1}{2}$ lb of SnO₂ per cubic yard.

Mount Cameron Tin Syndicate, South Mount Cameron

This syndicate installed a new 8-inch Warman gravel pump, powered by a 90 h.p. Thames diesel motor. With a lift of 12 feet and working on half throttle, throughput averaged 50 cubic yards per hour.

Production from 45 050 cubic yards of gravel was 10.048 tons of tin in concentrates valued at \$33 615.

L. J. Groves, Eastern Lead Mine, South Mount Cameron

The major work for the year was the construction of a holding dam for a water supply. Tailings in mine effluent were dewatered in old workings and the run off part retained in the No. 1 dam and recirculated. The run off from this dam is particularly well clarified before it reaches the next user 1 mile further downstream and samples of this water showed the total of suspended solids to be within reasonable limits.

Employing contractors with heavy earth moving equipment this party dozed up 9 500 cubic yards of shallow tin-bearing surfacings which they sluiced and treated for a recovery of concentrates containing 2.224 tons of tin valued at \$7 440.

R. L. Rainbow and Son, Banca Mine, Winnaleah

This party continued to mine both areas east and west of the road and treated 32 000 cubic yards for the recovery of concentrates containing 6.644 tons of tin valued at \$22 175. Employment averaged two men.

R. C. Lawry, Gladstone

Mr Lawry obtained concentrates containing 4.959 tons of tin valued at \$16 498 from two mines.

Sawpit Creek Mine: A short-term mine was established on this creek in the Garfield area. Face depth averaged 20 feet and overall values varied between $\frac{3}{4}$ lb-1 lb SnO₂ per cubic yard. Using a 7-inch-8-inch K & L pump throughput was maintained at 30 cubic yards per hour. Mr Lawry operated this show single handed.

No. 2 Mine: This was another of the Star Hill faces and two men were employed. The face was 35 feet high. Electric power was used to drive a 7-inch-8-inch K & L pump. Tin was concentrated in the bottom band of wash and much dead work was involved in exposing it.

C. D. King, Port Davey

Mr King produced concentrates containing 5·273 tons of tin, valued at \$17 503, from the Melaleuca mine.

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

Retreating tailings at the old tin dressing sheds at South Mount Cameron this company recovered 6·95 tons of concentrates containing 4·953 tons of tin valued at \$16 652. Employment averaged three men.

Allied Mining Enterprises, South Mount Cameron

This company continued to sluice dozed up surfacing and during the year acquired an 8-inch gravel pump and electric motor. For a short period increased throughput resulted from the operation of this unit but water restrictions due to drought conditions compelled the temporary shelving of this pump set. Pollution problems were kept under reasonable control by dewatering the tailings and recirculating the water. The capacity of the lake from which pumping was taking place provided ample dilution of the effluent.

The treatment of 45 800 cubic yards of gravel yielded concentrates containing 14·768 tons of tin, valued at \$49 416.

A. J. Stevenson and Mullins Bros, Weld River Mine, Moorina

Ground treated by this party consisted mainly of a layer of tailings from old Chinese work at the beginning of the century. Here and there a remnant of virgin ground was left, particularly around stumps of trees. In all 5 500 cubic yards were treated for the recovery of 1·4 tons of concentrates.

Hawkes Alluvial Tin Ltd, King Island

Operations became unprofitable and the mine was abandoned. Concentrates produced contained 3·581 tons of tin valued at \$12 023. Two men were employed.

Kibuka Mines Pty Ltd, Naracoopa

This company, reviewed under Titanium, produced 0·996 ton of concentrates containing 0·727 ton of tin valued at \$2 433.

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 various districts.

EAST COAST

L. D. McRae, Coles Bay, produced concentrates containing 0·523 ton of tin valued at \$1 763.

T. H. Fitzallan produced concentrates containing 0·038 ton of tin valued at \$127.

BRANXHOLM-DERBY

D. L. and W. J. Mullins, Ruby Flats. These brothers worked their Ruby Flats lease spasmodically during the year, treating 1 300 cubic yards for a recovery of concentrates containing 0·596 ton of tin valued at \$1 970.

K. Banks, Ringarooma River Beaches. Treating ground which averaged 2 lb SnO₂/cubic yard this operator recovered concentrates containing 0·018 ton of tin valued at \$61.

J. Maumill, Ringarooma River Beaches, Mutual Area. Mr Maumill worked his river leases south of the Mutual Bridge for nine months of the year and treated 1 335 cubic yards for a recovery of 4·1 lb SnO₂/cubic yard. Concentrates produced contained 0·853 ton of tin valued at \$2 866.

G. and M. Rayner, Derby. This partnership worked a small beach in the Ringarooma River about 400 yards below the main road bridge. They recovered concentrates containing 0·283 ton of tin valued at \$949 from 180 cubic yards of river gravels.

L. M. Barnett, Star of Peace Mine, Branxholm. Mr Barnett's total production amounted to 2 tons of concentrates derived from the sluicing of shallow ground east of the old Star of Peace mine. The bulk of the ground sluiced and for which the volume treated was recorded, averaged 0.9 lb SnO₂/cubic yard. The tin contained was 1.559 tons valued at \$5 154.

Miscellaneous. Messrs R. Kerrison, T. Kincade and L. and T. Merritt produced individually concentrates containing 0.321 ton of tin valued at \$1 061.

PIONEER-SOUTH MOUNT CAMERON-GLADSTONE

B. Padgett, Campbell Creek, South Mount Cameron. This miner treated 2 000 cubic yards of shallow ground in the vicinity of Campbell Creek on a 5-acre lease adjoining the Gladstone road. His return of 0.879 ton of concentrates represented a recovery of 0.5 lb SnO₂/cubic yard. Workable reserves were depleted in the third quarter.

Miscellaneous. Messrs T. Bishop, W. Bartels, G. Cox, B. Dawe, H. Fenton, A. D. Green, G. Green, J. Kerrison, N. B. Moore, H. Standage, R. Sutton and J. B. Veasey produced individually concentrates containing 2.568 tons of tin valued at \$8 558.

MOORINA-WELDBOROUGH-EAST COAST

Messrs Bryce, N. F. Clark, F. Gillies, L. Holloway, C. Hyde, D. Kerrison, E. M. King, C. G. Mallison, J. P. Reynolds, G. Whitney and T. Yaxley produced individually concentrates containing 0.486 ton of tin valued at \$1 619.

WARATAH AND WEST COAST

Messrs V. J. Davis, M. G. Glozier, C. and J. Housego, J. Kenworthy and L. W. Wills produced individually concentrates containing 1.515 tons of tin valued at \$5 062.

TITANIUM

Kibuka Mines Pty Ltd, Naracoopa

This is a new company formed by Buka Minerals to operate in the rutile sand area close to Naracoopa, King Island previously owned by Naracoopa Rutile Limited. The latter company went into liquidation early in the year and was taken over by Buka from the receiver in August. McSweeney and Partners have been appointed the managing agents for Kibuka Mines Pty Ltd and were responsible for the feasibility study which was conducted before the takeover.

The new company has demonstrated its serious intent by foregoing any attempt to embark on a mining programme before re-furbishing, re-arranging and extending the treatment plant, their entire effort to date being concentrated to this end. One major alteration to the concentrator circuit, intended to improve the saleability of the product, has been the introduction of two attritioning units. One of these, a revolving drum scrubber unit, deals with an 80% pulp density feed and, using caustic soda at the rate of 1 lb/ton, removes organic staining. The other, a conventional Wemco four-cell agitation attritioner, treats the 80% pulp density feed with a mixture of calcium hypochlorite and hydrochloric acid to remove inorganic staining.

The power supply for the entire operation has been rationalised into a conventional power house having a total capacity of 1.5 megawatts from four 225 KVA Mirlees-Brush alternator units. To assist with preventive maintenance a well equipped workshop has been established and to ensure a consistent water supply for both mining and concentrating, a dam site has been developed on a neighbouring farm property to give a reserve of more than 20 million gallons.

Some 4 000 metres of drilling have been completed on site, the programme being intended to give a detailed picture of the basement contours, the extent of limonisation and laterisation, the variations in grade and the general geomorphology of the area. While the programme is still incomplete indications are that what was previously considered the basement at 15 metres depth is a cobble stone horizon, and that mineral-bearing sands extend down to 25 metres in places. The deposit is also proving more mineralogically complicated and erratically graded than previously believed, so much so that gravel reserves must be completely re-assessed.

Initial planning calls for the excavation of a small dredge pond, where a pontoon mounted gravel pump will deliver the material via pipelines to the primary concentrator. It is intended that, rather than move the pump frequently, a bulldozer will be employed to win the material, break it up and present it to the gravel pump. Considering the usual winter conditions on King Island, the second part of the operation will be observed with interest.

The company intends to employ some forty-eight to fifty men operating a seven-day week on a rotating four-shift basis. As King Island is not a labour intensive area and because the previous company had a problem in the lack of competence at all levels in their operation, an additional ten houses have been leased or purchased with the hope that the accommodation will serve as an inducement for suitably experienced employees.

In accordance with the conditions of their lease, the company intends to conduct a full programme of rehabilitation and already have two agronomists on the staff engaged in the requirements for 17.4 acres requiring treatment.

TUNGSTEN (SCHEELITE)

TUNGSTEN (SCHEELITE): QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons (Concentrates)</i>	<i>Tons (WO₃)</i>	<i>Value \$</i>
1917-1967	23 505	....	46 496 350
1968	1 460	1 054	4 127 564
1969	1 530	1 092	5 084 758
1970	1 070	761	5 253 996
1971	1 585	1 133	5 130 809
1972	1 808	1 335	4 193 860
Total	30 958		70 287 337

King Island Scheelite Limited, Grassy

Production statistics—

Waste mined (tonnes)	2 466 608
Ore mined (tonnes)	480 754
Ore milled (tonnes)	309 753
Head grade (WO ₃)	0.609%
Concentrate produced (tonnes)	1 887
Concentrate grade (WO ₃)	73.87%
Value	\$4 193 860

All measurements are now in metric units.

Average number of persons employed—

Open-cut	66
Other	298
Underground	4
Total	368

Open-cut

An increase in the waste : ore ratio during 1971 considerably improved conditions in the open-cut to the extent that this year the ratio was comfortably reduced to 5-1 while maintaining the availability of ore. As will be seen from the production statistics, not all mined ore was treated, about one-third was of low grade and was stockpiled. Conditions in the open-cut continued to improve during the year and it is confidently expected the waste : ore ratio will be further reduced. About 1 336 metres of diamond drilling have assisted greatly in blocking out the immediate ore prospects for the current year.

Bold Head

Development work was begun on the Bold Head underground mine where, on completion of a box-cut down to solid rock, a false portal was constructed of steel sets and back filled. After a delay of several months due to shipping difficulties, the 1 in 10 decline was started and had advanced 53.4 metres by the end of the year. The need to bench the box-cut, install the false portal and advance the steel sets with the face using local employees unskilled in underground mining have delayed this work but progress has nevertheless continued. Deterioration in ground conditions brought advance to a halt at the end of the year but the indications were that cement grouting from surface along the line of advance was having the desired effect.

While a Caterpillar 980B was found to be more than adequate for mucking out the decline at this stage, there are some early doubts on the applicability of the Atlas-Copco jumbo to this particular type of heading. Air, power, water and ventilation services and a temporary pumping sump have been established. Work is progressing on the installation of the permanent compressor and the local service area.

Mill

Considerable time and trouble have been taken by mill and maintenance personnel to upgrade the general standard of the mill which has been severely criticised on inspections during the year and it is pleasing to record the visible improvement.

Dust extraction and control still remains a problem which appears to be associated more with personnel than with equipment. In the two crushing sections the alterations this year have been concerned with the removal of equipment. An intermediate 48-inch x 42-inch Hadfield jaw crusher between the primary and secondary crushers has been inoperative since 1971 and merely served as a funnel between the primary crusher reclaim conveyor and the coarse ore bin. The removal of this crusher and the installation of a new discharge chute in its place has removed a potential bottleneck. In the secondary crushing section, the reclaim conveyor from the coarse ore bin previously fed to a Jacques cascade vibrating bar grizzly with 1½-inch spacing. Removal of the grizzly and extension of the conveyor to feed directly to the gyratory secondary crushers has had no adverse effect in the crushing performance and has considerably increased crusher availability by eliminating the excessive down time occasioned by the continual maintenance and wet ore blockages experienced with the grizzly.

The CSR-developed ore sorting plant introduced last year has not to date come up to expectations, throughput having been obtained for short periods up to 35 t./hour as opposed to the design throughput of 60 t./hour. Mechanical handling and minor sorting and wear difficulties have been the major restrictions but it is hoped that modifications to the mechanical handling equipment will allow for a detailed metallurgical assessment of the other difficulties.

In the grinding circuit the primary 6 ft x 6 ft ball mill has been installed with Skega rubber liners and the 6 ft x 6 ft regrind mill with Firestone rubber liners. Both appear to have improved the performance characteristics. Overall throughput has increased with the replacement of the 20-mesh screens by 16-mesh screens.

In the gravity section evaluation of materials is still continuing; Dunlop Chutex rubber is being tested as a replacement for linoleum on the James table decks where its performance is proving most satisfactory and assessment is once more being made of the availability and costs of Holman fibreglass table decks.

New Complex

The new complex lying half way between the present mill and the Bold Head development is planned as a more central service site. In addition to stores, core shed and power house, an office and change-house have been established for the Bold Head mine. The power house should be commissioned early in 1973.

Diamond Drilling

The company completed 3 869 metres of diamond drilling on the island. In addition to the 1 336 metres mentioned in the open-cut some 1 335 metres were development drilling on new ore bodies and 1 082 metres were on field exploration prospects. Some 116 metres were drilled for industrial site foundations.

Ore Reserves

Ore reserves are given as 7 110 000 tonnes (0.75% (WO₃)).

Capital Expenditure

Capital investment for the year included:—

	\$
New complex	372 480
Open-cut and mill	131 870
Bold Head mine	428 971

TUNGSTEN (WOLFRAM)

TUNGSTEN (WOLFRAM): QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons (Concentrates)</i>	<i>Tons (WO₃)</i>	<i>Value \$</i>
1899-1967	16 367	697	21 794 760
1968	484	347	1 358 093
1969	602	437	2 034 886
1970	896	649	4 428 708
1971	800	583	2 695 463
1972	759	557	1 733 203
Total	19 908		34 045 113

Aberfoyle Limited, Rossarden

Aberfoyle Mine: Wolfram concentrate produced contained 177 tons of tungstic oxide (WO₃) valued at \$546 114. The company is reviewed under Tin.

Storeys Creek Mine: Average number of persons employed—

Underground	87
Surface	6
Total ..	93

Tonnage of ore milled was 51 867 a decrease of 5 179 tons over the previous year.

Production from the ore treated consisted of 520 tons of wolfram concentrate containing 380 tons of tungstic oxide (WO₃) valued at \$1 187 089, and 44 tons of tin concentrate containing 31 tons of tin valued at \$104 088.

Underground development comprised—

	<i>Feet</i>
Driving ..	797
Cross-cutting ..	81
Rising	1 056
Total	1 934

Sand-fill placed underground amounted to 21 052 tons. Underground diamond drilling comprised twenty-nine holes giving a total footage of 2 589.

The following expenditure was incurred on capital works:—

	\$
Rod mill modifications	560
Power supply	668
Exploration	230
New cage attachments	4 970
Total	<u>6 428</u>

During the year the automatic lime dispenser in the mine water discharge system and a pump station on 11 level were commissioned and are operating satisfactorily.

The ore reserves as published at 31 June 1971 are:—

	<i>Tons</i>
Indicated ore	207 000
Inferred ore	25 950
Total	<u>232 950</u>

ZINC

ZINC: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>Value</i> \$	<i>Year</i>	<i>Tons</i>	<i>Value</i> \$
1919-1967	876 683	141 241 233	1970	37 723	12 335 394
1968	40 061	11 857 961	1971	41 183	14 829 575
1969	41 121	12 795 905	1972	65 756	24 869 254
			Total	<u>1 102 527</u>	<u>217 929 322</u>

Electrolytic Zinc Company of Australasia Limited

EXTRACTION FROM CONCENTRATES: RISDON

From other than Tasmanian ore—	<i>Tons</i>
Zinc	117 289
Cadmium	313
Cobalt oxide	29
Superphosphate	84 700
From Tasmanian ore—	
Zinc	68 373
Cadmium	144
Cobalt oxide	4·49
Manufactured products—	
Aluminium sulphate	2 895
Ammonium sulphate	28 105

The average number of men employed was 2 484.

WEST COAST DIVISION

Ore mined—

<i>Mine</i>	<i>Tons</i>	<i>Pb</i> %	<i>Zn</i> %	<i>Cu</i> %	<i>Ag</i> oz/ton	<i>Au</i> dwt/ton	<i>Fe</i> %	<i>S</i> %
Rosebery	446 875	5·54	17·24	0·66	6·67	2·65	14·05	21·96
Hercules	38 326	4·60	13·30	0·35	3·34	1·42	7·25	13·62
Farrell	9 694	11·31	4·40	0·18	15·91	....	....	3·55
Dumps	39 188	3·73	7·19	0·30	5·86	0·73	10·47	13·78
Total	<u>534 083</u>	<u>5·45</u>	<u>15·99</u>	<u>0·60</u>	<u>6·54</u>	<u>2·38</u>	<u>13·06</u>	<u>20·43</u>

Concentrate produced—				<i>Tons</i>
Zinc concentrate	....	....	....	144 855
Lead concentrate	....	....	....	25 539
Copper concentrate	....	....	....	19 619
Pyrite concentrate	....	....	....	98 499
Recoverable quantity in ore mined—				
Zinc	....	....	....	65 756 tons
Lead	....	....	....	19 982 tons
Copper	....	....	....	2 439 tons
Cadmium	....	....	....	136 tons
Silver	..	....	....	2 330 157 fine oz
Gold	....	....	....	41 784 fine oz
Cobalt oxide	....	....	....	4 tons
Manganese dioxide	....	....	....	2 170 tons
Mercury	....	....	....	1 307 lb

Total value of production—\$39 682 773.

Average number of persons employed—	<i>Surface</i>	<i>Underground</i>	<i>Total</i>
Hercules Mine	10	35	45
Rosebery Mine	458	567	1 025
Farrell Mine	6	22	28
Total	474	624	1 098

DEVELOPMENT

<i>Item</i>	<i>Rosebery (ft)</i>	<i>Hercules (ft)</i>	<i>Farrell (ft)</i>	<i>Prospects (ft)</i>
Driving and cross-cutting	3 575	403	637	....
Rising	1 875	30	71	....
Diamond drilling	20 089	3 345	275	4 034

H. Murchie, Senior Mining Engineer, Burnie, reports—

Rosebery Mine—No. 2 Main Shaft Project—The electrical and mechanical contractors GEC-AEI completed modification and commissioning work early in 1972. Non-destructive rope testing equipment has not yet been installed. Since commissioning, shaft operation which has been below designed capacity, has been generally satisfactory.

Mine Ventilation—Excavations for the Northern Upcast Airway were completed with a break-through to surface following an advance of 70 feet. This airway did not improve the ventilation system and continued delays resulted when smoke could not be cleared following firing. A detailed ventilation survey was made and this resulted in connections being driven to the Southern Upcast Airway on 9 and 11 levels totalling 155 feet of cross-cutting. The ventilation system is now satisfactory for the present mine workings. To provide for future ventilation requirements additional work will be necessary in the Northern Upcast Airway involving stripping and connections on 9, 10 and 11 levels.

Production

During the year ore mined amounted to 494 895 tons from the Rosebery, Hercules and Farrell mines, an increase of 52% compared with 1971. In addition a total of 39 188 tons of dump material was treated through the mill. This material contained 42% recoverable concentrate and helped to meet the increased mill capacity. Several new stoping methods are being developed to improve safety and increase productivity. These include Uniset stopes, underhand chambering, uphole cut-and-fill stoping and long-hole open stoping. To date there is still insufficient information to evaluate the new methods, however, especially with Uniset stoping, the results have been encouraging.

The sand fill system was duplicated by installing a new 4-inch diameter rubber lined pipeline. The system extends down to the new stopes on 15 level and has a capacity of 84 tons/hour.

A Robbins 61R raise borer was used to drill and ream a mullock pass from 17 level to 16 level a total of 178 feet at 6 feet diameter. The machine also drilled an ore pass from 16 level to 15 level. The work was done by contractors and the results are being studied to evaluate the effectiveness of this method. Cage rising was used for the first time at Rosebery to develop the slot and access rises to the 15 level long-hole stopes. These rises were driven without incident. Dust extraction is now provided for at 16 level ore pass system with a bank of filter bags and an extraction fan.

At the end of 1972, ore reserves for the three mines amounted to 9 192 880 tons.

General

The trackless autoloader fleet was enlarged by two units to a total of sixteen for use in cut-and-fill and long-hole stopes. Two Atlas-Copco Promec M109 drill rigs were purchased for long-hole drilling in 15 level E lens stopes.

Pollution Control

The following steps have been taken to improve the quality of the effluent discharge into the Stitt River:—

- (1) Extra clean-up facilities were provided at the concentrator at a cost of \$78 000. Additional sumps were built and pumps were installed. The pipeline to the tailings dam was duplicated and this permitted the settling and treatment of larger quantities of mill discharge.
- (2) Metering equipment is being used to check the quantities of mine and mill discharge waters.
- (3) Automatic measuring equipment is collecting daily samples at strategic positions on 7 level and 8 level mine water, and Assay Creek which passes through the mine surface area and carries mine and mill water, and the outflow from No. 2 residue dam. The samples are analysed for TSS, TDS, pH, Pb, Zn, Fe, Cu, Cd, As.
- (4) An old water race is being re-opened to greatly reduce rainwater run-off across Rosebery mine surface area. An allied project will also divert natural run-off from entering the residue dams, increasing the efficiency of the dams.
- (5) Work is under way for the construction of the Bobadill tailings dam which will treat all disposable liquid wastes from both the mill and mine workings.

During the year complaints were made by South Rosebery residents about dust drifting from reclamation work at the old tailings dam. Official complaints highlighted the problem and the Zeehan Commission served an abatement notice on the company. Steps taken to remedy the situation included logging weather conditions and relating the operations to them. Suggestions that the mine upcast airway was polluting the town with dust fall-out were investigated and proved to be unfounded.

Exploration

Diamond drilling was carried out at Trial Harbour (one hole, 26 feet), Melba Flats (five holes totalling 819 feet), Mount Black (four holes totalling 1 235 feet). Outside contractors drilled one long-hole a total of 1 653 feet at Mount Black.

In the exploration licence areas of Trial Harbour, Melba Flats and Mount Black activity also included geological mapping, geological soil sampling, and geophysical surveying. The Mount Black licence area was also surveyed by the helicopter-borne electro-magnetic (Turair) method and airborne magnetometer.

Accidents

Man hours exposure	....	....	....	....	....	2 428 999
Number of accidents	....	....	....	....	....	439
Frequency rate	....	....	....	....	....	181
Severity rate	..	....	....	....	....	10 249
Mean duration (days)	..	....	....	....	....	16

An accident prevention programme is being vigorously pursued in an effort to reduce the number of accidents. This programme includes supervisor training courses conducted by the National Safety Council. I look forward to being able to record improved results in the future, due to a growing awareness of the problem by everyone concerned and a determination to achieve a solution.

An explosion took place in the 4 level explosives magazine at the Hercules mine on 11 December 1972. The magazine was destroyed and the Shift Boss, C. H. Knowles, who was working in the magazine at the time of the explosion was killed.

A rockfall in stope No. 12Q4S North face buried miner R. C. Seen at the Rosebery mine on 1 March 1972. Rescue attempts for the next three days were unsuccessful in the recovery of Mr Seen. The area was sandfilled to support the heavy ground and prevent further collapse. Rescue teams tunnelled through the sandfilled area and recovered Mr Seen's body on 18 March 1972.

A miner, K. Pimenidis, died in the Queenstown Hospital on 14 November 1972 as the result of injuries sustained underground at the Rosebery mine on 9 November 1972. Mr Pimenidis was barring down some loose slabs of rock in the 1351 North Stope when they fell and fatally injured him.

The standard of accident recording and investigation at the mine has been poor. Accidents that should have been investigated were reported too late for action to be taken. CZ 6 rules were not correctly observed and thus the man hours exposure, frequency rate and severity rate are not strictly correct. I consider the provisions of section 21 (4) of the Mines Inspection Act are not being observed, and the mine manager has been instructed in writing that monthly accident returns are required promptly and accurately.

RISDON WORKS

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

- Improvements to No. 6 cell unit.
- Completion of the compressed air cooling tower.
- Further improvements to the leaching and residue treatment processes.
- Continued commissioning and improvements to the zinc stacking and strapping line.
- Further improvements to wharf berths and adjacent storage areas.
- Improvements to the anode cleaning machine.

2.—Non-Metallic Minerals

CLAY

CLAY: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Cubic yards</i>	<i>Value</i> \$	<i>Year</i>	<i>Cubic yards</i>	<i>Value</i> \$
1958-1967	1 282 467	2 441 998	1970	136 787	350 495
1968	148 802	358 507	1971	147 441	384 447
1969	158 121	366 537	1972	176 363	446 036
			Total	2 049 981	4 348 020

CLAY: DETAILS OF PRODUCTION

<i>Company</i>	<i>Clay (cu. yd)</i>	<i>Value \$</i>	<i>No. of Men</i>	<i>Product</i>
Agripipe Pottery Pty Ltd, Relbia	380	570	4	Pipes
Bones, I. M., Kingston*	3 500	8 400	1	Bricks
Campbell, John Pty Ltd, Launceston	3 500	3 500	11	Pipes
Goliath Portland Cement Co., Railton	63 562	216 110	....	Cement
Grierson, Dodges Ferry*	2 204	5 290	....	Bricks
Hazell Bros, Margate*	17 275	44 235	2	Bricks
Hobart Brick Co., Granton	9 841	12 394	47	Bricks
Humes Ltd, Granton	5 481	19 974	21	Pipes
Humes Ltd, Prospect Vale	2 461	5 414	16	Pipes
Huttons Bricks, Launceston	20 520	41 040	18	Bricks
Machens Bricks Pty Ltd, Kings Meadows	21 244	42 488	24	Bricks
Noonan, J. E., Copping*	4 083	9 823	1	Bricks
Wise, G. R., Youngtown	1 058	1 290	1	Pipes
Wunderlich Ltd	8 019	16 038	24	Tiles
Zolati and Son, Dulverton	13 235	19 470	22	Bricks
Total	176 363	446 036	192	

* Suppliers to Hobart Brick Company

DOLOMITE

DOLOMITE: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>Value \$</i>	<i>Year</i>	<i>Tons</i>	<i>Value \$</i>
Prior to 1968	31 589	184 670	1970	3 341	20 045
1968	2 534	15 070	1971	2 518	14 406
1969	1 515	9 104	1972	4 557	26 815
			Total	46 054	270 110

Circular Head Dolomite and Trading Co. Pty Ltd, Smithton

This company, the sole producer, employed an average of three men and produced 4 557 tons, an increase of 2 039 tons. The stone is milled for top-dressing in agriculture.

KAOLIN

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

LIMESTONE

LIMESTONE: QUANTITY AND VALUE OF PRODUCTION AND USAGE

<i>Year</i>	<i>Manufacture of cement</i>		<i>Manufacture of carbide</i>		<i>Chemical and metallurgical</i>		<i>Agricultural and other</i>		<i>Totals</i>	
	<i>Tons</i>	<i>\$</i>	<i>Tons</i>	<i>\$</i>	<i>Tons</i>	<i>\$</i>	<i>Tons</i>	<i>\$</i>	<i>Tons</i>	<i>\$</i>
1919-1967	5 166 413	7 220 576	734 671	2 021 666	4 220 141	5 047 248	678 890	1 632 018	10 800 115	15 921 508
1968	409 642	806 995	23 686	105 510	32 239	98 410	30 244	71 914	495 811	1 082 829
1969	448 638	883 816	22 683	163 282	37 489	136 500	41 264	88 804	550 074	1 272 402
1970	413 957	815 496	28 660	232 029	36 089	134 035	30 487	63 425	509 193	1 244 985
1971	377 650	743 970	25 728	257 280	39 098	176 819	35 499	99 219	477 975	1 277 288
1972	463 947	913 975	24 827	258 058	52 424	286 151	38 957	102 810	580 155	1 560 994
Totals	7 280 247	11 384 828	860 255	3 037 825	4 417 480	5 879 163	855 341	2 058 190	13 413 323	22 360 006

Australian Commonwealth Carbide Company Ltd, Ida Bay and Electrona

This company quarried 37 778 tons of limestone valued at \$391 811 at Ida Bay. Of this 24 827 tons was used in the production of calcium carbide at the Electrona works and 12 951 tons was supplied to the Electrolytic Zinc Company at Risdon for metallurgical purposes.

Calcium carbide production was 10 960 tons valued at \$1 786 108 and acetylene black production was 218 tons valued at \$130 126. The average number of persons employed was 197 of whom twenty-six were employed at the quarry.

Capital improvements at Electrona included a new elevator in the coal bin, Sweco vibrator screens installed in the packing house circuit, new fire fighting equipment and new fans in the acetylene black plant.

Australian Newsprint Mills Ltd, Maydena

This company quarried 10 573 tons of limestone valued at \$77 338. The limestone was burnt at their Boyer mill and used in newsprint production. Seven men were employed in the quarry.

A. R. Beams, Flowery Gully

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

	<i>Tons</i>	<i>\$</i>
Agricultural Limestone	1 159	2 895
Limestone for chemical and metallurgical purposes	4 608	11 520
Burnt lime for various purposes	15	495
	<hr/>	<hr/>
Total	5 782	14 910
	<hr/>	<hr/>

Five men were employed.

Goliath Portland Cement Co. Ltd, Railton

A total of 463 947 tons of limestone with a cost value of \$913 975 was quarried and used in the manufacture of cement. An average of twenty-two men was employed in the quarry, for this production.

In addition to the above 11 094 tons of limestone, valued at \$5 816 was produced for sale.

Production amounted to 354 299 tons of fine cement valued at \$6 377 382. An average of 295 men was employed.

A major re-equipment programme took place in the quarry. A number of old trucks were replaced with two R.35 Terex 35-ton units. The old loader was replaced with a Terex 72/71, 7-cubic yard loader and a new Terex 82/30 bulldozer was acquired. The total capital value of this equipment is \$36 500.

Cement Works: In the cement works no major new equipment was installed. The western end of the Ray Materials Storage was enclosed, to minimise the movement of airborne dust.

Asbestos Cement Factory: A comprehensive dust collection system was installed in this area to collect the dust from all the cutting and trimming operations.

Safety: Only one lost time injury occurred during the year the frequency rate was 1. This accident occurred in the quarry. The Cement and Concrete Association of Australia conducts a safety contest throughout the industry (sixteen cement plants) divided into quarry and works sections and as the company was the only cement works to have an accident free year in the works section, it won the shield for 1972.

R. K. Sulzberger, Flowery Gully

Using a mobile crushing plant Mr Sulzberger crushed a total of 24 tons valued at \$288.

The Mount Lyell Mining and Railway Company Limited, Halls Creek

This company quarried 2 808 tons of limestone, valued at \$7 581 for delivery to the works at Queens-town from the quarry at Halls Creek. The limestone was burnt to produce lime for use in the flotation plant.

Railton Lime Works, Railton

Two men were employed at this works to crush and mill 11 094 tons of limestone, valued at \$5 816 supplied by the Goliath Company.

Wright Stephenson Pty Ltd, Pulbeena

This company produced 11 834 tons of lime sand, valued at \$61 119, compared with 7 393 tons in the previous year. Average employment was two men.

Addison & Coates, King Island

Production was 450 tons valued at \$900 in the first quarter of the year.

Mole Creek Limestone Ltd, Mole Creek

In their first productive year this company produced 21 460 tons of limestone for chemical and metal-lurgical purposes, valued at \$55 671, with an average employment of seven.

OCHRE

OCHRE: QUANTITY AND VALUE OF PRODUCTION

Year	Tons	Value	Year	Tons	Value	
		\$			\$	
1918-1967	2 556	18 199	1970	41	595	
1968	11	164	1971	70	982	
1969	79	1 191	1972	47	721	
				Total	2 804	21 852

A. Pearson, Spalford and Deep Creek

Production of red and yellow ochre from these pits was 47 tons, valued at \$721.

Mineral Supplies, Ulverstone

This firm produced 29 tons valued at \$45.

G. R. Wise, Youngtown

A total of 327 tons, valued at \$654, was produced. Average employment was one man.

H. K. Fielding Pty Ltd, Ulverstone

This company quarried 990 tons of silica, valued at \$1 485 for use by the Goliath Portland Cement Company.

L. G. Holloway, Burnie

Twenty-nine tons of silica, valued at \$45 were produced.

PEBBLES

PEBBLES: QUANTITY AND VALUE OF PRODUCTION

Year	Tons	Value	Year	Tons	Value	
		\$			\$	
1957-1967	7 627	116 723	1970	1 642	31 943	
1968	1 214	19 687	1971	1 486	29 246	
1969	1 023	19 036	1972	1 689	28 714	
				Total	14 681	245 349

A. Pearson, Ulverstone

The collection of pebbles for grinding was continued on the beaches around Ulverstone. The output was 1 494 tons, valued at \$27 639. An average of seven men was employed.

G. R. Wise, Youngtown

Production was 195 tons of pebbles valued at \$1 075.

SILICA**SILICA: QUANTITY AND VALUE OF PRODUCTION**

<i>Year</i>	<i>Tons</i>	<i>Value</i> <i>\$</i>	<i>Year</i>	<i>Tons</i>	<i>Value</i> <i>\$</i>
1936-1967	188 156	281 507	1970	35 066	157 306
1968	8 878	30 126	1971	28 005	95 976
1969	22 003	93 181	1972	16 004	43 317
			Total ...	298 112	703 413

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

A total of 9 336 tons of silica sand, valued at \$18 672, 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 5 287 tons of sands in various grades and sizings valued at \$23 815. An average of four men was employed.

A new engine and sand pump set was installed on the barge to provide the raw feed for fine sand production but this system was discontinued temporarily in favour of open-cut pit work.

3.— Construction Materials**BUILDING STONE****BUILDING STONE: QUANTITY AND VALUE OF PRODUCTION**

<i>Stone</i>	<i>Producer</i>	<i>Cubic yards</i>	<i>Value (\$)</i>	<i>No. of men</i>
Freestone	Etna Stone Pty Ltd, Pontville	2 321	32 600	5
	L. G. Holloway, Burnie	40	120	....
	Kingston Quarries	110	1 100	2
	Pontville Freestone, Molesworth	252	3 110	1
Other		1 593	4 779	....
	Total	4 316	41 709	8

CRUSHED AND BROKEN STONE**Basalt****BASALT: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION**

<i>Quarry</i>	<i>Men</i>	<i>Cubic yards</i>	<i>Value (\$)</i>
AFH, Surrey Hills	1	20 754	62 262
ANM, Maydena	2	11 911	35 733
Bonney Bros, Coocoe	14	39 707	119 121
Hobart Quarries, Bridgewater	6	99 497	298 491
L. G. Holloway, Round Hill	2	5 254	15 762
Talisker Blue Metals, Relbia	9	100 985	302 955
Woodfield and French, Relbia	11	35 446	106 338
Totals	45	313 554	940 662

Dolerite

DOLERITE: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

<i>Quarry</i>	<i>Men</i>	<i>Cubic yards</i>	<i>Value (\$)</i>
Devon Metal Supplies, Devonport	15	21 369	64 107
Electrolytic Zinc Co., Risdon	NA*	50 577	151 731
Forestry Commission	NR†	4 635	13 905
Glenorchy Quarries, Glenorchy	5	32 605	97 815
Hobart Quarries, New Town	38	280 442	841 326
Hydro-Electric Commission, Tarraleah and Poatina	3	4 005	32 000
Huon Council, Huonville	1	10 365	31 095
C. R. Johnson, Mornington	1	8 678	26 034
Launceston Quarries, Mowbray	16	69 062	207 186
Pioneer Quarries, Flagstaff Gully	14	132 122	396 366
Public Works Department	NR†	32 000	96 000
R. K. Sulzberger	1	400	1 200
Total	95	646 260	1 958 675

* See Zinc † See Gravel

Hobart Quarries Pty Ltd, New Town

A total of 280 442 cubic yards valued at \$841 326 was produced at the Giblin Street quarry. The average number of persons employed in the quarry was twelve.

Capital expenditure at the quarry was:—

	\$
Loading equipment and vehicles ..	60 000
Additions to road metal plant ..	55 000
Rolls crusher ..	30 000
Blending plant and wet mix extension ..	19 600
	<hr/>
	164 600
	<hr/>

Limestone

LIMESTONE: PRODUCER, QUANTITY AND VALUE OF PRODUCTION

<i>Quarry</i>	<i>Men</i>	<i>Cubic yards</i>	<i>Value (\$)</i>
Hobart Quarries, Lenah Valley	7	19 798	59 394
G. J. Weily, Glenorchy	—	4 657	13 971
Totals	7	24 455	73 365

Sandstone

SANDSTONE: PRODUCER, QUANTITY AND VALUE OF PRODUCTION

<i>Quarry</i>	<i>Cubic yards</i>	<i>Value (\$)</i>
M. C. Cure, Claremont	10	30
L. G. Holloway, Burnie	50	150
Totals	60	180

Other Stone

OTHER STONE: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

<i>Quarry</i>	<i>Men</i>	<i>Cubic yards</i>	<i>Value (\$)</i>
Forestry Commission	NR*	33 175	99 525
L. Hobden Pty Ltd, Rokeby	5	4 701	14 103
Hydro-Electric Commission, Scotts Peak	8	253 694	761 082
Hydro-Electric Commission, Strathgordon	29	132 414	397 242
C.R. Johnson, Cambridge	NR*	21 234	63 702
Renison Ltd, Zeehan	NR†	15 000	45 000
Transport Commission, Launceston	2	6 776	20 328
Others	5	17 228	51 613
Totals	49	484 222	1 452 595

* See Gravel † See Tin

GRAVEL

GRAVEL: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

<i>Pit</i>	<i>Men</i>	<i>Cubic yards</i>	<i>Value (\$)</i>
AFH, Surrey Hills	6	85 827	85 827
Beaconsfield Municipal Council	2	15 800	15 800
Bonney Bros, Cooe	NR*	22 240	35 480
Broken Hill Pty Co. Ltd, Beaconsfield	NR†	44 193	44 193
Campbell Town Municipal Council	1	13 414	13 414
Circular Head Municipal Council	2	32 762	32 762
Deloraine Municipal Council	2	38 870	38 870
Devonport Municipal Council	1	31 698	31 698
Esperance Municipal Council	1	16 658	16 658
Evandale Municipal Council	1	14 035	39 002
H. K. Fielding, Flowerdale	2	90 434	115 572
Fingal Municipal Council	1	17 860	17 860
Flinders Island Municipal Council	5	32 764	32 764
Forestry Commission	14	73 918	73 918
George Town Municipal Council	3	54 520	54 520
Green Ponds Municipal Council	1	11 070	11 070
Hamilton Municipal Council	1	18 428	18 428
Hobart Quarries, New Town	NR‡	15 920	17 800
C. R. Johnson, Cambridge	1	15 555	15 555
Kentish Municipal Council	1	17 000	17 000
L. King Pty Ltd, Devonport	14	12 501	28 232
Latrobe Municipal Council	6	17 440	17 440
Lilydale Municipal Council	2	18 570	46 425
Longford Municipal Council	2	8 685	8 685
New Norfolk Municipal Council	1	14 580	14 580
Oatlands Municipal Council	1	28 917	28 917
Penguin Municipal Council	3	18 550	19 000
Portland Municipal Council	5	15 735	15 735
Public Works Department	100	200 000	200 000
Ringarooma Municipal Council	2	30 099	30 099
Scottsdale Municipal Council	2	18 300	36 600
Spring Bay Municipal Council	1	9 872	9 872
Ulverstone Municipal Council	2	39 191	39 191
Westbury Municipal Council	3	32 402	32 402
Woodfield and French, Beaconsfield	32	82 735	165 470
Others .....	.....	103 733	124 523
Totals	221	1 314 276	1 545 362

* See Crushed and Broken Stone (Basalt)

† See Woodfield and French

‡ See Crushed and Broken Stone (Dolerite)

SAND

SAND: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

<i>Pit</i>	<i>Men</i>	<i>Cubic yards</i>	<i>Value (\$)</i>
Bonney Bros, Cooece	NR*	18 389	30 508
S. J. Clark	1	1 353	4 735
Devon Metal Supplies, Devonport	NR†	4 507	4 507
H. K. Fielding, Ulverstone	NR†	2 176	3 264
Flinders Island Municipal Council	NR†	7 126	7 126
G. Gerke, Scottsdale	NR†	1 806	3 612
G. R. Grubb, Sandford .. .. .	...	2 295	2 295
P. R. Harrison, South Arm	1	3 000	3 000
Hobart Quarries	1	20 730	20 730
Hydro-Electric Commission, Strathgordon	NR‡	13 792	13 792
C. R. Johnson, Cambridge	NR†	2 674	3 974
D. C. Kenny, Kelso	2	19 299	28 949
L. King Pty Ltd, Devonport	NR†	2 502	6 794
C. A. Long, South Arm	4	29 356	44 742
I. J. Lutwyche, Prospect Vale	1	2 811	7 603
G. L. Males, South Arm	2	12 960	43 878
Renison Ltd	1	1 650	1 650
Scottsdale Municipal Council	NR†	2 000	4 000
C. G. Turmine	1	1 979	2 577
Woodfield and French, West Tamar	NR†	3 579	7 158
Others	2	9 225	11 900
Totals	16	163 209	256 794

* See Crushed and Broken Stone (Basalt)

† See Gravel

‡ See Crushed and Broken Stone (Other)

OTHER ROAD MAKING MATERIAL

OTHER ROAD MAKING MATERIAL: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

<i>Pit</i>	<i>Men</i>	<i>Cubic yards</i>	<i>Value (\$)</i>
Devonport Municipal Council	1	32 659	32 659
H. K. Fielding, Ulverstone .. .. .	...*	5 040	6 980
F. D. Hay, Currie	2	3 683	12 097
L. G. Holloway, Burnie .. .. .	...†	5 304	7 027
Hydro-Electric Commission, Strathgordon .. .. .	...†	23 533	23 533
C. R. Johnson, Cambridge	1	5 422	5 422
R. Jones Pty Ltd, Burnie	1	5 550	5 550
Mt Lyell Mining and Railway Co. Ltd, Queenstown	4	44 184	88 368
Savage River Mines .. .. .	...‡	6 390	12 780
St Leonards Municipal Council	1	5 656	5 656
Woodfield and French, Launceston .. .. .	...†	42 059	42 394
Zeehan Municipal Council .. .. .	...*	2 838	2 838
Others	2	6 982	12 485
Totals	12	189 300	257 789

* See Gravel

† See Crushed and Broken Stone

‡ See Iron Ore

4.—Fuel Minerals

COAL

COAL: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>Value</i> \$	<i>Year</i>	<i>Tons</i>	<i>Value</i> \$
Prior to 1968	9 485 999	24 575 263	1970	124 499	617 565
1968	90 930	411 642	1971	121 965	600 140
1969	115 933	519 373	1972	130 153	589 015
			Total ...	10 069 479	27 312 998

W. R. Tindal, Mining Engineer, Hobart reports that there has been an increase in production of 8 319 tonnes. The number of employees decreased from fifty-two to fifty-one, of whom twenty-eight were employed underground. The production per man year increased from 4 130 to 4 722 tonnes for underground employees, and from 2 383 to 2 593 overall.

Duncan Coal Mine, Fingal

Production by the Cornwall Coal Company N.L. was obtained from an area to the left-hand side of the main heading and towards what was known as the Burma Section in the abandoned section of the mine. The area of coal which was causing coal washing problems has been passed through.

The main heading has been dewatered and advanced a distance of 150 metres in coal which appears to be similar to that in the producing area.

The continuous miner continued to function well. The ordinary coal cutting picks have been replaced by needle points which give less impact on the machine, coarser coal, less dust and quieter working conditions.

Production from the mine was 118 784 tonnes, an increase of 4 757 tonnes with a complement of forty-four employees, giving an increase in overall production per man year from 2 592 to 2 700 tonnes.

New Stanhope Coal Mine, Avoca

Pillar production was commenced and continued in No. 1 adit for the whole year.

Production was 13 451 tonnes, an increase of 3 571 tonnes, with an overall production per man year of 1 921 tonnes, an increase of 510. The average number of employees was seven.

Sandfly Mine, Kaoota

There was no production for the year and prospecting has ceased. The mine and leases have been abandoned.

5.—Foreign Ores

The total value of the metallurgical products of four large works treating foreign ores imported into Tasmania was approximately \$107 310 085.

ALUMINIUM

Comalco Aluminium (Bell Bay) Ltd, Bell Bay

In the production of 79 194 tons of aluminium, 150 951 tons of Weipa bauxite and 98 680 tons of imported alumina were processed.

Other products were: 7 820 tons of aluminium hydrates and 3 873 tons of alumina. Average employment was 1 181 men.

FERRO-MANGANESE

Tasmanian Electro-Metallurgical Co. Pty Ltd, Bell Bay

During the year 84 625 tons of manganese ore from Groote Eylandt were smelted to produce 69 980 tons of manganese alloys for the steel industry.

The alloys were 53 639 tons of high carbon ferro-manganese and 16 341 tons of silicon-manganese reported under Silicon.

Accidents

Average number of employees	142
Man hours exposure	298 024
Frequency rate	6.7
Severity rate	1 265
Number of accidents	2

TITANIUM DIOXIDE

Tioxide Australia Pty Ltd, Heybridge (formerly Australian Titan Products Pty Ltd)

Production of titanium dioxide pigment from imported Western Australia ilmenite continued consistently throughout the year despite a general downtrend in demand at the beginning of the year. Overseas production, particularly in the United States, decreased and allowed the market to recover quickly.

Capital expenditure for the year was \$431 000, spent mainly on the completion of a new control laboratory and the acquisition of capital stores in preparation for 1973 construction work.

Further work on effluent control involved the completion of the sea drifter survey and a survey of the sea bed in the region of the outfall. These have led to a decision to extend the 6-inch pipeline 3 000 feet northwards to a total length of 7 500 feet and a discharge depth of 65 feet below low water.

Work at the planning stage began in 1971 to instal a scrubbing plant for digester gaseous effluent but this was suspended in late 1971 due to the down-turn in export trading conditions and the resultant financial pressures. With some materials and instrumentation now on site, work on this project is expected to begin again with completion envisaged by mid-1974.

The demonstrable effectiveness of the company's safety programme which resulted in the final seven months of 1971 being accident free has continued throughout 1972, no company employee being injured during the year and only one minor accident to a contractor's employee being reported.

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.

As indicated last year the end of the mineral boom provided the opportunity to bring the complement of the professional staff of the Branch up to full strength. The Branch now comprises forty-three officers in the following categories:—

Geologists	23
Publications Officer (geologist)	1
Specialist Geological Officers	4
Surveyor	1
Draughtsmen and Juniors	6
Librarian	1
Field Assistants	6
Laboratory Assistant	1

The staff increment during the year was seven geologists and a junior draughtswoman. It is perhaps interesting to note that the Branch now employs three female field geologists.

The staff expansion has created additional work for the supporting services, in particular geological drafting, editing and printing, library services and field assistants. There can be no doubt that these problems will be aggravated during the coming year and further staff for such purposes will be necessary in order to avoid a backlog of unpublished geological data.

The year has seen unprecedented progress in geological mapping of the State. During the year six geological sheets on a scale of 1 : 250 000 covering the entire State, apart from the Straits Islands, were completed. Of these one is in the process of drafting for publication and it is planned to produce the remainder, as well as a new 1 : 500 000 geological map of the State by 1976. In addition to the 1 : 250 000 series the normal systematic programme has been accelerated and expanded. The change to metric standards has necessitated a change in the systematic geological mapping programme from a standard 1 mile 1 inch base map to 1 : 50 000 sheets in order to conform with the adopted Commonwealth-wide standards. Progress in regional mapping is outlined in the report by the Supervising Geologist in charge of the Regional Mapping Section.

In the Economic Geology field the Branch has maintained its services to the mining and exploration companies and continued to assess the work being carried out on exploration licences and special prospecting licences. The study of the non-metallic mineral resources of the State, particularly with regard to sand and aggregate supplies is proceeding well. All data on known deposits is being collected from the various authorities concerned in this field and studies are continuing into the conservation and environmental impact of the extractive industries in the State. The work of assessing the alluvial tin deposits in North-Eastern Tasmania and various other studies in Economic Geology are set out in the report of the Supervising Geologist in charge of this Section.

The main area of study during the year for the Engineering Geology and Groundwater Section has been the completion of a detailed study of the landslip areas in the Tamar Valley. This work has resulted in the production of a zone map to guide future urban development in that area.

The assessment of the groundwater potential of portion of North-Eastern Tasmania is approaching completion and work has commenced on a programme of assessment in the Latrobe and Port Sorell areas. Advice has been given on many individual landslip problems, other engineering geology matters and water bore locations have been sited for numerous individuals.

Despite staff shortages the Geological Draughting Section and the Library have maintained a high level of service to the Branch officers and the public. However it is clear that additional staff are necessary in the immediate future in order to maintain proper service.

The various specialist officers engaged in palaeontology, mineralogy, geochemistry and geophysics have continued research programmes into their various fields of expertise as well as providing expert knowledge to officers within the Branch and the public.

It is with deep regret that I must record the untimely death of our Senior Draughtsman, Mr J. Walsh, during the year. Mr Walsh was appointed to this position in August 1970 after many years as a cartographer with the Lands and Surveys Department. He brought to the position a wealth of experience and skill and his death was a severe blow to the Department.

During the year two geology scholarship holders, P. R. Williams and W. C. Cromer completed their Honours year studies and took up duties with the Geological Survey Branch. Dr D. Leaman, previously employed in the Engineering Geology and Groundwater Section, was reclassified to a specialist position as geophysicist so that he can devote his full time to the development of geophysical services within the Branch and the application of various geophysical systems to the whole range of geological problems in the State.

During the latter part of the year I attended the International Geological Congress held in Montreal, Canada. In association with the Congress, numerous excursions were held and I was able to attend a pre-session excursion on Engineering Geology and mineral deposits in British Columbia, a mid-session excursion to landslip areas in the vicinity of Quebec and a post-session excursion to study stratiform sulphide deposits in Quebec and New Brunswick.

During the course of my visit overseas the opportunity was taken to visit various geological institutes in North America. In particular, very useful discussions were held with the relevant interested geologists in the Washington State Survey, California Survey and the United States Geological Survey concerning the problems of landslips in urban areas.

The value of such overseas visits and the opportunity to visit and discuss mutual problems with world authorities in various geological fields is of immense importance and value to the Department and to the State.

REGIONAL GEOLOGY

Supervising Geologist E. Williams reports—

Geologists A. V. Brown, S. M. Forsythe, Dr M. McClenaghan, N. J. Turner and P. R. Williams joined the Section early in the year. Geologist Dr J. McClenaghan joined late in the year.

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

Explanatory reports have been compiled for the Quamby, Beaconsfield, Hobart, Burnie and Sheffield 1-mile sheets. The reports for Mackintosh, Frankford, Pieman Heads and Brighton 1-mile sheets are being prepared.

Hobart 1 : 50 000 Sheet is in press.

Frankford 1-mile Sheet is in press.

Brighton 1-mile Sheet is being compiled.

Scottsdale 1-mile Sheet: Geologists A. V. Brown, P. W. Baillie, M. McClenaghan, N. J. Turner and P. R. Williams continued mapping the region.

Kingborough 1-mile Sheet: Senior Geologist N. Farmer continued mapping in this area.

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

Oatlands 1-mile Sheet: Geologist S. M. Forsythe continued the mapping of the region.

Strahan 1-mile Sheet: Geologists K. D. Corbett, E. B. Corbett, P. W. Baillie, N. J. Turner, P. R. Williams, A. V. Brown and M. McClenaghan continued work in this region.

Lyell 1-mile Sheet: Geologists K. D. Corbett and E. B. Corbett commenced mapping in this area.

Smithton 1-mile Sheet: Geologists K. D. Corbett and E. B. Corbett commenced mapping in this area.

Huntley 1-mile Sheet: Geologists M. McClenaghan and J. McClenaghan commenced mapping this region.

Much office time of all the geologists in this Section was devoted to the compilation of maps at 1 : 250 000 scale of the Tasmanian mainland.

ECONOMIC GEOLOGY

Supervising Geologist A. J. Noldart reports—

The following activities were carried out during the year:—

METALLIC DEPOSITS

- (a) Investigations continued on detrital tin deposits in the north-eastern districts.
- (b) Continuation of the investigation of granitic rocks and associated mineralisation in the eastern and north-eastern districts.
- (c) Commencement of studies on the distribution and geochemistry of granitic rocks on Cape Barren Island and further investigation of associated detrital deposits.
- (d) Completion of drilling of detrital deposits in the Mt William area and completion of plans and report.
- (e) Further examination of gold deposits in the Mathinna district.

- (f) Completion of exploratory diamond drilling Fooks Lode, Waratah; continuation of drilling at the Salisbury goldfield; commencement of drilling at Lefroy and Moina.
- (g) Completion of studies in the Branhholm area and at the Spray and Queensbury mines, Zeehan district.
- (h) General advice to prospectors and examination of the mineral potential of areas under application for purchase from the Crown.

FUEL MINERALS

- (a) Continuation of exploratory diamond drilling for coal in the Fingal Valley.
- (b) Continuation of studies at the New Stanhope, Sandfly (now closed) and Duncan coal mines.

NON-METALLIC MINERALS

- (a) Construction materials survey of Tasmania involving records of Government departments municipal councils and private industry.
- (b) Field investigations to complement records of (a) above.
- (c) Investigation and report on beach shingle extraction in the Devonport area.
- (d) Investigation into the gravel extraction industry in the Calder-Flowerdale area.
- (e) Continuation study of clay resources, Launceston and Hobart areas.
- (f) Examination of kaolin deposits, Gladstone area.
- (g) Sundry investigations on behalf of Government and semi-government authorities and for the extraction industry, including the Forestry Commission, Department of Public Works and Etna Stone Pty Ltd, Pontville.
- (h) General advice as requested to the extractive industry throughout Tasmania.

GENERAL

- (a) Completion of field work on the granites of the Hunter Island Group and map compilation.
- (b) Completion of field work on the coastline between Cape Portland and Musselroe Bay. Report and maps submitted.
- (c) Completion of economic appendix for the Quamby 1-mile geological map sheet explanatory notes. Continuation of compilation of appendices for the Burnie and Beaconsfield sheets and commencement of field work on the Mackintosh, Sheffield and Hobart sheets.
- (d) Continuation of mapping of host rock of the Mt Lyell district in conjunction with the Regional Section.
- (e) Compilation of reports on Beaconsfield nickel, Tasmanian bauxite deposits, secondary tin deposits, sundry mineralisation and non-metallic commodities in Tasmania for inclusion in the third edition of 'Economic Geology of Australia and Papua New Guinea'.
- (f) Liaison was maintained with mineral exploration companies throughout Tasmania and inspections of works in progress carried out in association with company staff.

ENGINEERING GEOLOGY

Supervising Geologist P. C. Stevenson reports—

STAFF

The Section, at the beginning of the year, consisted of the Supervising Geologist and four geologists. D. E. Leaman was appointed geophysicist in January, W. C. Cromer joined in February and Miss C. J. Knights joined in March. S. Forsyth was detached to the Regional Section throughout the year.

LANDSLIP INVESTIGATIONS

The work of the Section this year has been dominated by landslip investigations. Senior Geologist W. L. Matthews and Geologist C. J. Knights have spent most of the year working on the regional landslip map of the Tamar Valley and have produced a zone map for planning purposes and a geomorphological map. The stability conditions at fourteen subdivisions have been reported, the most detailed investigation, involving

soil sampling and stability analysis, being that at Panorama Heights, Devonport. Other subdivisions have attracted continuing attention. That at Freshwater Point, Legana, was the object of a visit by Dr J. D. Croft on behalf of the development company. Two landslips affecting the Tasmanian railways system, at Rhyndaston and at Penguin were the subject of work and reports.

Supervising Geologist P. C. Stevenson visited the New Zealand Geological Survey and the Poverty Bay Catchment Board in December to visit landslip areas and discuss methods and results.

WATER SURVEYS

The Longford Basin survey (W. L. Matthews) has been completed and is being written up. The Scottsdale-Bridport survey (W. R. Moore) is in its last stages, preliminary geology and geophysical work has been conducted in the Port Sorell-Devonport area (W. C. Cromer) and a geological reconnaissance of the Mole Creek area (C. J. Knights) carried out. Regional mapping continues at Oatlands (S. Forsyth).

The State Underground Water Committee met in February and the Technical Committee on Underground Water and the State Committee on Water Quality met in March.

Water in coastal sands has been investigated and reported on at South Arm and Nine Mile Beach.

GEOPHYSICAL SURVEYS

New geophysical survey techniques have been used to discover engineering information. Marine surveys at St Helens, in Elwick Bay, and at the mouth of the Derwent in collaboration with the Hobart Marine Board have given sea floor information, and experimental geothermal surveys have been tried at Scottsdale and Lefroy.

GEOPHYSICS

Geophysicist D. E. Leaman reports—

Considerable time has been spent in developing techniques to aid the solution of difficult physical and structural problems. The main activities during the year were centred on deep lead and landslip problems.

DEEP LEADS

Leads at Winnaleah, Boobyalla, Clifton, Strahan, St Helens and in the Derwent Estuary have been examined. Seismic refraction methods have been used generally with the exception of the Winnaleah area where resistivity soundings were used in a preliminary way to guide test drilling. This latter method has now been calibrated in this area and can be used where thick basalts are present.

LANDSLIPS

An assessment has been made of the physical properties of landslip materials and a listing of useful methods prepared. Some seismic refraction, resistivity and vibration tests were made on landslips at St Helens and near Batman Bridge. Landslip areas at George Town and Beaconsfield have been surveyed with these methods.

CATALOGUE OF GEOPHYSICAL WORK IN TASMANIA

A set of references and maps listing all geophysical surveys done in Tasmania, for which information is available, has been prepared. Its greatest use will be as a guide to mining and development companies and their agents as basic reference material and will save much time spent on search. Updating is proposed at six to twelve-month intervals.

ORE DEPOSITS

Gravity surveys have been undertaken at Oliver Hill and Beulah. Electrical and thermal methods have been tested at Lefroy in attempts to locate quartz veins.

GENERAL AND DEVELOPMENTAL

The regional gravity survey of North-Eastern Tasmania is now virtually complete. During the year developmental work was continued on the methods of temperature surveys and their use for groundwater location. The method was used at Bridport and Lefroy. Work was also begun on use of piezoelectric methods for location of quartz veins with tests at Lefroy. An introductory examination of vibration methods was also made with regard to special application to the problems of landslips and blasting damage.

MAPPING AND ENGINEERING DRAUGHTING

Senior Draughtsman D. M. Hardy reports—

During most of the year the Section was understaffed, due to the loss of T. J. Walsh, but in November the Section saw the return of P. B. Nankivell, while later in December Miss B. E. Cook joined the staff as a junior.

The following progress was made on colour map productions:—

Frankford, Sheet 38: Ready for colour proofing, expected to be printed by mid-1973. This was to be the last of the 1-mile series, future maps will be produced at a scale of 1 : 50 000.

Hobart, Sheet 82: The late changeover in scale from 1 mile to 1 inch to 1 : 50 000 of this sheet involved some months delay, but it is now at the printers.

Work on the map 'Geology of the Blue Tier Batholith' was recommenced late in the year and it should be printed in 1973.

The Burnie Sheet of the 1 : 250 000 series was commenced in December.

Proline drilling sections of the Longford Basin were finished and would be printed early in 1973. These sections were to go with the Quamby Explanatory Report.

The Hobart Engineering Geology set of maps were completed, but would only be available in dyeline form.

The balance of time was used in drawing 120 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, in the areas of Mt Nicholas, Valley mine and Duncan mine.
- (b) Continuation of surveying in the Duncan mine and the New Stanhope coal mines.
- (c) Surveying and levelling at the Sandfly coal mine, Kaoota.
- (d) Continuation of surveying and levelling of the Etna stone quarry, Pontville.
- (e) Survey around Mt Nicholas to old Cornwall and Mt Nicholas adits.
- (f) Continuation of surveying and levelling of a landslip in the Tamar district.
- (g) Surveying and levelling of a landslip in the North Scottsdale district.
- (h) Surveying and levelling at Oliver Hill, Sheffield.
- (i) Lewisham quarry—grid laid out for drill holes.
- (j) Surveying and levelling at Ding Dong Spur, Mathinna, for gold investigations.
- (k) Surveying and levelling at Lower Beulah for a gravity survey.

MINERALOGY AND PETROLOGY

Mineralogist and Petrologist G. Everard reports—

Core was examined from DDHs Nos. 1 and 2, Fingal, at various depths from 197 feet to 511 feet and from 55 feet to 700 feet respectively. Density determinations were made on all specimens. Clay samples were examined from DDH No. 16.

Suites of specimens from Longford quadrangle and from Frankford quadrangle were examined in thin section.

Mineralogical determinations were made of detrital samples from Mt William bores.

Various rock specimens from Weld River, Andover, Molesworth, Bell Bay, Cleveland and Cressy were examined in thin section.

Concentrates from the St Dizier mine and King Island scheelite mine were mineralogically examined.

About fifty rocks, minerals, concentrates, etc., were identified for the general public. Many enquiries of a technical nature were attended to and samples of rocks and minerals supplied for scientific and educational purposes.

GEOCHEMISTRY

Geochemist W. E. Baker reports—

During the year approximately 6 500 element analyses were made for aluminium, antimony, barium, bismuth, calcium, cobalt, copper, gold, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, silicon, silver, sodium, tin and zinc. These analyses were made on samples which included stream sediments and waters, soils, minerals, vegetation and humic materials. The substantial increase in analytical output has been due to a great deal of out of office hours work which has been necessary to keep up to date with research commitments on humic acids.

Stream sediment sampling in the vicinity of Mt Roland was completed and three areas of anomalously high metal values were detected. Soil sampling programmes to follow up these anomalies were commenced in December.

The X-ray diffraction equipment was a continuous source of problems during the year. Service is practically non-existent in Tasmania and despite the expenditure of a large number of man hours on the equipment it has yet to provide the Department with a satisfactory performance level.

The laboratory set-up remains completely unsatisfactory and is a severe trial to those who must attempt to provide services from it.

PALAEONTOLOGY

Palaeontologist M. J. Clarke reports—

Much of the year's programme has involved the detailed collection, preparation and identification of fossils from well-exposed shore platform sections at Deep Bay, Shag Point, Drip Beach and Wheatley Bay in the Kingborough quadrangle. The preliminary analysis of species distributions throughout these sections, has provided solutions to many of the difficulties encountered to date over certain problematical parts of the Permian stratigraphical column in faunas of Gondwanan aspect. These difficulties have been experienced not only in Tasmania, but also elsewhere in Eastern Australia and New Zealand. There is little doubt that these sections are the best examples of their kind anywhere in the world, and fully merit detailed long-term investigation.

The period 28 April to 17 May was spent outside Tasmania. Part of this time was utilised at the University of New England, Armidale in the examination of comparative material from the Sydney and Queensland Bowen Basins. The remainder involved the examination of certain important comparative stratigraphic and palaeontological sections in the Cranky Corner Basin, the Hunter Valley, and the South Coast

Nowra-Ulladulla areas in New South Wales. Both projects were carried out with the assistance of Dr B. Runnegar, University of New England and Dr J. M. Dickins, Bureau of Mineral Resources Canberra. Attendance and participation in the 44th ANZAAS Congress held in Sydney over the period 14-18 August and the Central Plateau Symposium organised by the Royal Society of Tasmania and held at Poatina, 11-12 November, is also recorded.

Considerable time has also been allocated to the preparation of material for publication. Papers completed and now in press include:—

DEPARTMENTAL

- (1) Faunas from the Ferntree Group, Southern Tasmania.
- (2) The Fisher Tunnel Permian section and its relation to the Kansas Creek Section, Tasmania (with Senior Geologist Dr N. Farmer).

OTHERS

- (1) Permo-Carboniferous rocks and fossils of the Poatina area (with Senior Geologists Dr N. Farmer and A. B. Gulline) *in* BANKS, M. R., The Lake Country of Tasmania. *Pap. Proc. R. Soc. Tasm.*
- (2) Parmeener Supergroup Stratigraphy, Tasmania (with Senior Geologists Dr N. Farmer and A. B. Gulline). Australian Institute of Mining and Metallurgy, Petroleum Volume.

Progress is also well advanced on the preparation of a paper on 'The Stratigraphy and Palaeontology of the lower (Permo-Carboniferous) parts of the Parmeener Supergroup, Tasmania' (with M. R. Banks, University of Tasmania.) This is to be presented at the 3rd International Gondwanaland Congress, Canberra, August 1973.

Collections of fossils from the Kingborough, Oatlands, Sorell and Strahan quadrangles have been identified and commented on as necessary for the regional mapping programme.

Identifications, age assessments and various other comments on fossil material submitted by schools and other members of the general public, have again been provided.

LIBRARY

Librarian Mrs B. W. Marriott reports—

Reorganisation of the Library has continued throughout the year. Records of exchange with other institutions have been transferred to visible record cards. It is intended that the serial accession records and the circulation records will be transferred to similar equipment in the near future. Better facilities for readers have been provided during the year, including reading tables, better heating and a makeshift serial display stand. Work is continuing on the Tasmanian Geological Index. Reorganisation and stocktaking of the British Serials has been completed. Fifteen new serial titles and one bibliography have been added to the Library collection. Although the organisation with the Library is gradually improving, lack of adequate shelving and space necessitates disorder in some sections.

PUBLICATIONS

Publications Officer E. L. Martin reports—

The following publications were printed during the year:—

- Geological Survey Bulletin No. 52. Gravity survey of the Hobart district.
- Geological Survey Bulletin No. 53. The zoned mineral deposits of the Scamander-St Helens district.
- Geological Survey Record No. 11. Mineralogy of the mines and prospects of the Zeehan field.

The following publications were in press at the end of 1972:—

- Geological Survey Bulletin No. 54. A century of tin mining at Mount Bischoff, 1871-1971.
- Geological Survey Explanatory Report—Quamby.
- Technical Reports No. 15.

An account of the discovery and early development of the Mt Bischoff tin mine was prepared as a contribution to Geological Survey Bulletin No. 54.

A photolettering system has been developed and a number of alphabets and symbols have been prepared.

A series of computer programmes has been compiled to assist with metric conversion.

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 handled and determinations made, exceeded those of the previous record year, 1965, and are more than twice those for 1969.

<i>Year</i>	<i>Samples registered</i>	<i>Determinations made</i>	<i>Average number of determinations per sample</i>
1965	5 056	10 013	1.98
1969	2 575	5 125	1.99
1972	7 011	10 937	1.56

The most significant figure above is the 1.56 determinations per sample which is much lower than any previous figure, the previous lowest being in 1966, when it was 1.80. This low figure is an indication of the greater proportion of sample preparation at present being done. The average for the period 1960-1972 inclusive is 2.04 determinations per sample.

As tin determinations by X-ray fluorescence comprises a high proportion of the total determinations, and about double the preparation time is required for these, there has been little time for other work by the laboratory assistants.

TYPE AND NUMBER OF TESTS

<i>Type of Test</i>	<i>Number</i>	<i>Type of Test</i>	<i>Number</i>
I. QUANTITATIVE—			
Elements—		Molybdenum	52
Aluminium	177	Nickel	21
Antimony	22	Nitrogen	2
Arsenic	38	Phosphorus	93
Barium	12	Platinum group	30
Bismuth	39	Potassium	70
Cadmium	6	Rubidium	11
Calcium	211	Silicon	208
Carbon (including CO ₂)	66	Silver	75
Chlorine	2	Sodium	71
Chromium	84	Strontium	9
Cobalt	1	Sulphur	105
Copper	162	Tin	4 490
Gold	101	Titanium	95
Hafnium	1	Tungsten	220
Iron	307	Vanadium	42
Lead	127	Yttrium	11
Magnesium	220	Zinc	134
Manganese	93	Zirconium	11

Waters—			III. CERAMIC—		
Complete analysis	120		Clay determination	606	
Partial analysis	358		Fusion point	5	
Deposit gauges	166		Moisture	28	
		644	Pressing and firing	45	
Miscellaneous—					684
Ash (coals)	174		IV. METALLURGICAL—		
Calorific value	12		Calcining	22	
Ignition loss	135		Calculation	32	
Insoluble	30		Flotation	8	
Moisture	20		Heavy liquid separation ..	28	
Radicals and complexes	12		Magnetic separation ..	19	
Total salts in bricks ..	7		Melting point	8	
Volatiles (coals)	8		Miscellaneous	2	
		398	Panning	5	
		8 461	pH	2	
II. QUALITATIVE		53	Sizing	1 031	
			Tabling	582	
					1 739
			Total		10 937

RESEARCH INVESTIGATIONS

Tin	5	Non-metallics	1
Chromite	2	Miscellaneous	2
Gold	2	Pollution	2
Copper	1	Ceramics	1
Coal	2		
		Total	18

SUMMARY OF INVESTIGATIONS

Tin

R.638—Minops Pty Ltd, St Dizier, Zeehan

Five samples representing the different types of ore in this mine were examined. The ore consists of finely divided and intimately mixed magnetite, cassiterite, sulphides and siliceous gangue.

Magnetite assaying 67% Fe can be produced at $-75 \mu\text{m}$ size using magnetic separation.

Tin concentration using magnetic separation, tabling and sulphide flotation produced a concentrate assaying 7% Sn and containing 63% of the tin.

This ore is difficult to treat and requires further investigation.

R.640—Ringarooma Mining Pty Ltd, North Valley, Waratah

A sample of alluvial from a test pit in the bed of the Waratah River in North Valley was submitted for sizing and tin distribution.

Virtually all the tin was contained in the $-1.18 \text{ mm} + \text{C/S } 2$ fraction which contained 30% of the mass and assayed 0.5% Sn. The overall head assay was 0.1% Sn.

R.643—Aberfoyle Management Pty Ltd, Queen Hill, Zeehan

A sample from along 50 feet of adit was taken for tin concentration tests to assess the ore dressing problems involved.

Concentration proved extremely difficult using magnetic separation, sulphide flotation and tabling as a recovery of only 7.1% of the tin was achieved in a concentrate assaying 57.7% Sn.

R.646—K. Kerrison, Ringarooma River, Derby

Four samples of tin concentrate ranging in grade from 43.8 to 74.0% Sn were submitted from workings at various points along the river. Magnetic separation produced concentrates assaying 69.3 to 76.7% Sn from these with recoveries in excess of 99% in all cases. The main impurity was ilmenite which was indistinguishable from the cassiterite by visual examination.

R.649—Minops Pty Ltd, Razorback, Dundas

The company took bulk samples (about 450 kg) from the Razorback open-cut. These samples were treated in the Razorback mill to yield rougher concentrates which were submitted for further concentration to market grade.

It was calculated that the company's milling had recovered 56% of the tin in rougher concentrates averaging 13% Sn from a mill feed assaying 0.7% Sn.

The upgrading recovered 78% of the tin in the rougher concentrates in a final concentrate which assayed 69.0% Sn and contained penalisable amounts of iron, sulphur and arsenic.

A by-product was chromite concentrate assaying 43% Cr_2O_3 .

Chromite**R.644—Northern Chromite N.L., Barnes Hill, Beaconsfield**

The company submitted a sample of water from Andersons's Creek and a number of flotation reagents it proposed using in place of those used in R.632.

Test work showed that the Anderson's Creek water was satisfactory but none of the proposed reagents, which were less costly, gave improved results and some were detrimental.

R.650—Northern Chromite N.L., Barnes Hill, Beaconsfield

As a result of a geological appraisal of the area five samples were submitted as representative of the ore. These samples showed that the chromite occurred in completely different host material as well as in the sandy material submitted in R.632.

While one sample was more easily concentrated than was the case in R.632, others were more difficult. A composite of the five gave a recovery of 72% in a chromite concentrate assaying 51% Cr_2O_3 .

Gold**R.647—Director of Mines, Warnes Lookout, Jane River**

A sample of pyritic concentrate containing free gold was submitted for examination.

Most of the gold was as free grains with 77% being + 150 μm in size.

R.655 Part I—BMI Mining Pty Ltd, Residue Dumps, Beaconsfield

When the company submitted samples for gold extraction tests from the above dumps a survey of previous work on these dumps was made.

The unpublished work done between 1936 and 1944 was reviewed in the first part of this project. This showed the problems likely to be encountered and proposed a method of investigation.

Copper**R.593—Director of Mines, Copper-tin Concentrate from Cleveland Tin N.L., Luina**

The flotation copper-tin concentrate was subjected to leaching using sulphuric acid, Titan effluent (a waste product containing free sulphuric acid) and ferric chloride/hydrochloric acid mixtures in order to remove the copper from this concentrate.

Leaching at 104° C with a solvent containing 1 022 g/l ferric chloride and 58 g/l hydrochloric acid recovered 88% of the copper as cement copper.

Further stages for the recovery of tin and sulphur were outlined.

Coal

R.651—Cornwall Coal Company N.L., Washery, Fingal

The washery was sampled to assess its performance and the reason for the high ash content of the washed coal.

This survey indicated inefficient jigging in the finer sizes. The cause was attributed to the jigging conditions and in particular the build up of fine solids in the water circuit of the washery.

R.654—Cornwall Coal Company N.L., Washery, Fingal

This project followed R.651 to investigate the elimination of fine solids from the circulating water.

The addition of sulphuric acid to give a pH of 5 improved the settling rate of the suspended solids. Flotation tests showed coal could be recovered from these solids. This would increase the coal recovered by the washery and reduce the settling facilities needed.

Non-metallics

R.648—Minops Pty Ltd, Razorback, Dundas

A sample of 'talc ore' assaying 24.3% MgO was submitted for concentration tests. Flotation tests showed a talc concentrate assaying 25.4% MgO and containing 81.9% of the MgO could be made. An XRD examination of this concentrate showed it was talc even though the MgO content was less than the theoretical 31.8%.

Miscellaneous

R.548—Director of Mines, Corrosion of Copper in Hot Water Systems

Corrosion problems arising in rural areas are periodically brought to this Department.

In this project data on such problems since 1966 have been collected. In addition a dam used for a dairy hot water supply was sampled for twenty-seven months and the life of the corroding components recorded.

The variation in the water from such a supply was noted. The conclusions to be drawn from single water samples were questioned. Conclusions were made upon which to base recommendations regarding waters.

R.630—Director of Mines, Study of Siebtechnik Grinding

The effect of grinding time and vessel loading were studied for 10, 100 and 250 cm³ steel vessels using quartzite, granite and limestone.

Also the effect of grinding on XRF tin and tungsten assays was noted.

Pollution

R.609 Part II—North-West Acid Pty Ltd, Burnie, Australian Titan Products Pty Ltd, Heybridge

Tests done on a laboratory-produced calcine in R.609 Part I, were repeated on a calcine produced in the plant of North-West Acid from burning a mixture of 75% Mt Lyell and 25% Rosebery pyrite.

The plant-produced calcine was not as reactive with respect to its arsenic content as the laboratory-produced material.

R.645—Repc Bearing Co. Pty Ltd, Invermay Road Plant, Launceston

Filtration tests were made on the treated effluent from the company's plating works.

Ceramics

R.639—Director of Mines

Annual survey of brick production 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 10 345, a decrease of 508. The number of men employed underground rose by 9% to 1 432. This decrease was evenly spread over tin and zinc mining operations, employment in other mining remaining static. On the surface as expansion programmes approached completion fewer construction workers were employed.

ACCIDENTS

Accidents were reported and recorded in accordance with Australian Standard No. 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, 114 employees in the total of 10 345 were disregarded because their employers do not submit accident reports.

The number of accidents was 1 161 in which 1 155 men were injured and six killed.

ACCIDENT STATISTICS (A.S. No. CZ6)

<i>Employer</i>	<i>Exposure man-hours</i>	<i>No. of injuries</i>	<i>Frequency rate</i>	<i>Days charged</i>	<i>Severity rate</i>	<i>Mean duration</i>
Aberfoyle	562 319	63	112.2	722	1 285	11
BMI	65 871	7	106.3	111	1 687	16
Cleveland	409 874	21	51.2	524	1 278	25
EZ	2 428 999	439	167.5	24 875	10 249	23
Kibuka	32 442	3	92.5	16	493	5
King Island	891 878	57	63.9	588	659	12
Mt Lyell	3 108 418	138	44.3	20 720	6 666	48
Renison	775 249	81	104.3	11 100	14 186	176
Ringarooma	15 360	2	130.0	6	3 903	3
Savage River	903 875	26	28.7	218	241	7
Total Large Mines ..	9 194 132	837	91.0	58 900	6 400	71

<i>Employer</i>	<i>Exposure man-hours</i>	<i>No. of injuries</i>	<i>Frequency rate</i>	<i>Days charged</i>	<i>Severity rate</i>	<i>Mean duration</i>
Carbide	314 714	56	177.9	344	1 093	6
Comalco	2 400 452	3	1.2	52	22	17
EZ	4 676 499	203	45.5	1 230	271	6
Goliath	612 676	1	1.6	41	67	41
NW Acid	268 278	4	15.0	81	295	20
Savage River	541 071	5	9.2	176	326	35
Temco	298 031	6	22.2	142	476	24
Tioxide	863 556	1	1.1	13	15	13
Total Large Works	9 975 277	279	28.0	2 079	209	7
Collieries	87 944	9	102.3	73	830	8
Quarries	187 509	36	73.8	271	555	8
Total	19 729 502	1 161	58.7	61 323	3 120	53

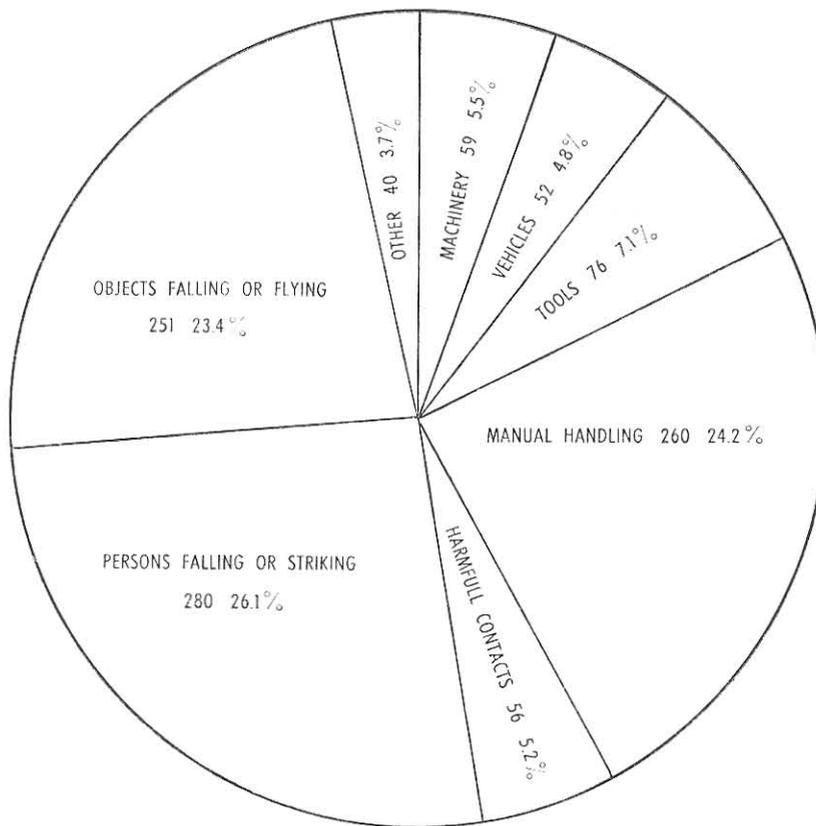
DESCRIPTION OF FATAL AND SERIOUS ACCIDENTS

Fatal

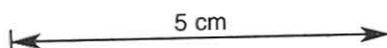
- D. Palmer, Renison: Struck by fall of ground in stope.
- R. J. Duncanson, Mount Lyell: Driving truck in reverse; rolled down slope.
- P. Cooper, Mount Lyell: Driving bulldozer in reverse; rolled over bench.
- R. C. Seen, EZ Co., Rosebery: Struck by fall of ground in stope.
- K. Pimenidis, EZ Co., Rosebery: Struck by fall of ground in stope.
- C. H. Knowles, EZ Co., Rosebery: Involved in explosion in underground magazine.

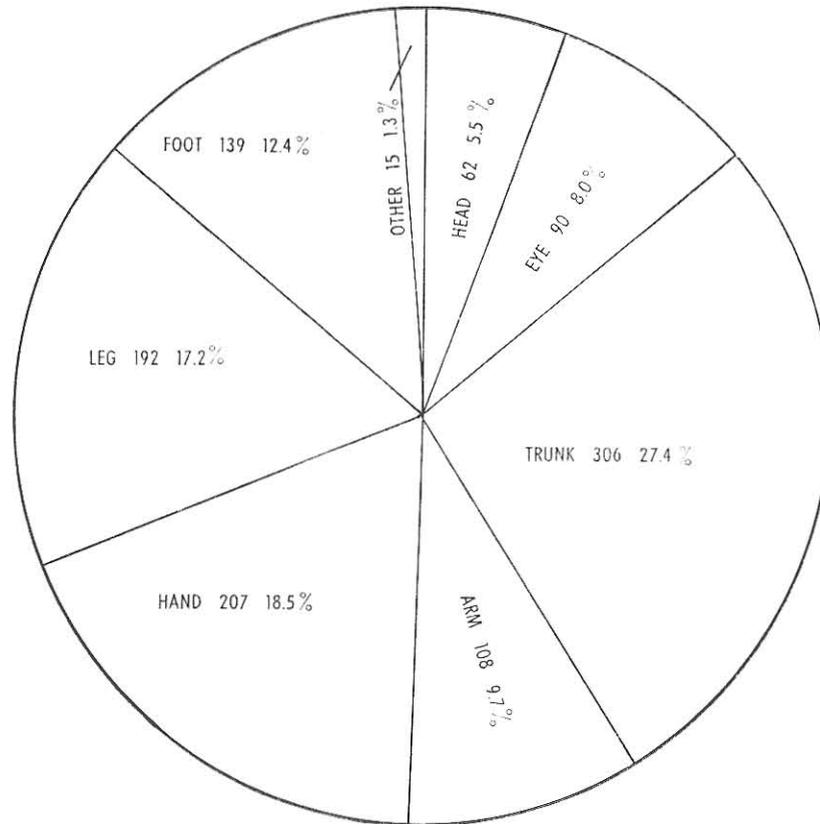
Serious

- D. Witana, Renison: Leg crushed between two vehicles; amputated.
- W. Bridgeman, Savage River: Fell from scaffold; injured back.
- J. E. Joseph, Savage River: Foot crushed by mechanical feeder.
- V. Price, E. Smith, Commonwealth Carbide: Molten carbide in boots from explosion at furnace taphole; severe burns.
- P. E. Goodsell, Commonwealth Carbide: Molten carbide in boot from explosion at furnace taphole; severe burns.
- G. Pennington, Aberfoyle: Used hand to free fan blades with power on; severely lacerated.
- R. Gault, EZ Co., Rosebery: Crushed between loco and chute; broken collar bone, internal injuries.
- S. Powell, EZ Co., Rosebery: Struck by rock; broken hand.
- B. Duhig, EZ Co., Rosebery: Foot jammed in chute door; broken.
- R. Stone, EZ Co., Rosebery: Jammed by bogger bucket; broken leg.
- M. Zuljevic, EZ Co., Rosebery: Pinned by scraper; broken leg.
- R. Zappart, EZ Co., Rosebery: Fell in ladderway; broken jaw and knee cap.
- R. Kupka, EZ Co., Rosebery: Struck by rock; broken leg.
- R. Kelland, EZ Co., Rosebery: Struck by rock; broken leg.
- J. Benkovic, Mount Lyell: Struck by falling rock while firing a drawpoint; broken leg.
- W. J. Malkin, Mount Lyell: Struck by falling steel set; possible broken pelvis and ruptured bowel.
- R. O'Shea, Mount Lyell: Struck by fall of ground while barring down; broken leg, lacerated foot.
- O. Rochford, Mount Lyell: Trod on piece of pipe while cleaning floor; broken leg.
- P. N. McLean, Mount Lyell: Bored into misfire; both eyes injured.
- M. Webster, Cleveland Tin: Struck by fall of ground; broken ankle, collar bone and back.
- G. Wilburs, Cleveland Tin: Backed truck over stockpile; broken collar bone.
- K. Smith, North West Acid: Arm caught in conveyor.

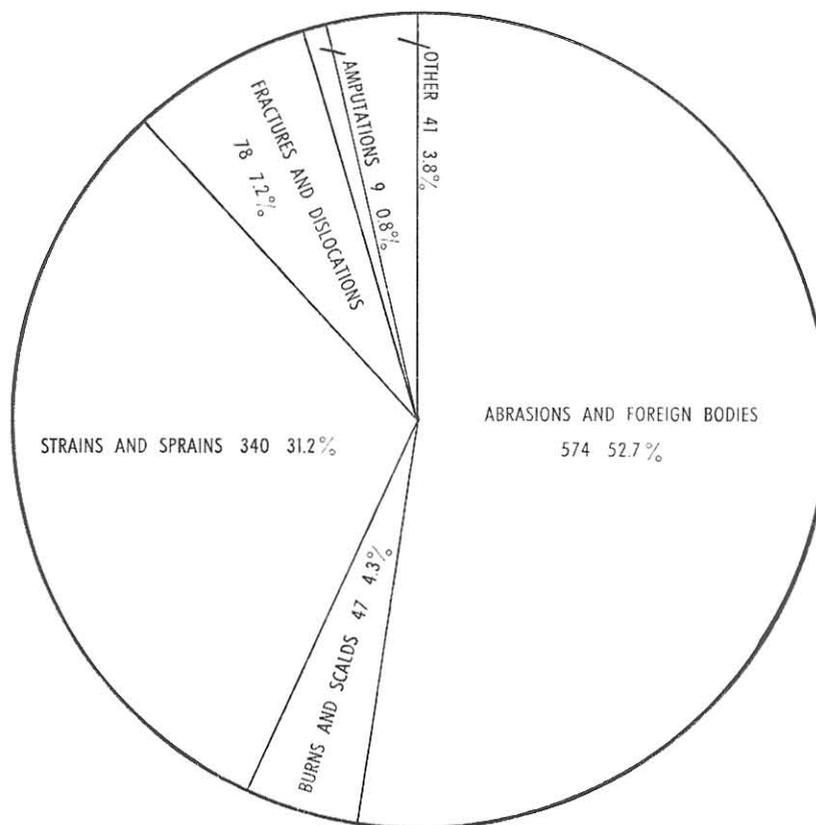


Accident Factor

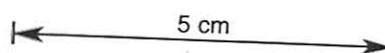




Accidents: Location of Injury



Accidents: Nature of Injury



DANGEROUS GOODS*The Explosives and Inflammable Liquids Acts*

IMPORTS OF EXPLOSIVES

	<i>Hobart</i>	<i>Launceston</i>	<i>King Island</i>	<i>Stanley</i>	<i>Straban</i>	<i>Total</i>
Nitro-compounds (lb)	506 250	310 250	229 400	446 300	1 063 700	2 555 900
Detonators	162 600	373 400	20 500	22 700	234 850	814 050
Explosives shipments (No.) ..	6	6	6	6	6	30
Ammonium nitrate imported for use as an explosive (tons)						

The number of licences and permits issued were: Magazine Licences, 113; Other Licences, 427; Shot Firer's Permits, 70.

IMPORTS OF INFLAMMABLE LIQUIDS

	<i>Bell Bay</i>	<i>Burnie</i>	<i>Devonport</i>	<i>Hobart</i>	<i>Naracoopa</i>	<i>Total</i>
Inflammable liquids imported in bulk (tons)—						
Aviation gasoline	1 687	....	....	1 800	....	3 487
Kerosene—						
Aviation	4 452	....	....	6 749	....	11 201
Lighting ....	....	....	1 706	2 600	....	4 306
Power .. ....	....	....	471	500	....	971
Motor spirit—						
Premium	39 743	19 189	32 209	69 973	1 257	162 371
Regular	22 302	8 960	11 646	33 425	....	76 333
LP gas	1 319	....	....	300	....	1 619
Total	69 503	28 149	46 032	115 347	1 257	260 288
Tankships (No.)	28	8	9	16	2	63

Licences to keep, 2 191; Plans approved, 293; Exemptions granted, 22; Permits to import, 22.

MECHANICAL INSPECTION**W. C. Hodgson, M.I.E.Aust., Hobart**

Equipment designs and construction were examined for approval throughout the year, included sinking and equipping machinery for the Prince Lyell shaft.

The adoption of 1.5% manganese steel for shaft conveyance attachments is almost completed. The difficulty of obtaining this material has limited progress at Rosebery where much equipment of a non-standard nature is in use and difficult to replace.

Winding inspection sheets were introduced to facilitate inspection procedures, and to provide a more convenient record and guidance on how the inspections required by the regulations are to be carried out. Those sheets are now in the hands of all mines where winding is carried out, and their implementation is progressing.

Field inspections were made at all larger mines and works and included fifteen winding installations, eighty cranes and hoists, five lifts, conveyor systems and other equipment. Improved conveyor safety is being encouraged in all areas, and substantial improvements achieved—in particular at Comalco and Goliath. All conveyors at these two plants now comply with the latest safety code and it is hoped to achieve similar improvements at all plants.

Candidates examined for certificates of competency comprised thirty-eight crane drivers, five winder drivers and two internal combustion engine drivers.

DRILLING

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

DIAMOND DRILLING

Five plants and the combination auger-diamond drill operated throughout the year, the three largest being changed over to wireline for most of the work.

Coal

Work on the Mt Nicholas area was stopped as the last hole confirmed that there are apparently no economic seams extending much to the west of the old workings.

Both drills then operated in the area to the south-east of the Duncan and Valley mines but at a much greater elevation. The area is covered by about 300 metres of dolerite of which 100 or more metres can be scree. Even when the dolerite is solid there may be seams of zeolites which are sufficiently wide to jam the drill rods due to the expansion of the minerals on exposure to water. Several holes have had to be abandoned due to these difficulties so that very little has been accomplished during the year.

Three holes were put down into the coal seams at Kaoota but failed to indicate any viable areas.

Mineral Investigation

Limestone at Railton and Mole Creek were drilled on behalf of Goliath Portland Cement Co Ltd and Mole Creek Limestone Pty Ltd. Further work was carried out on the sandstones at Pontville for Etna Stone Pty Ltd.

At Waratah two holes were drilled but failed to prove any extension of the lode indicated by earlier drilling.

The first of a series of three holes to test a geophysical anomaly was completed at Lefroy.

The search for gold and/or nickel lodes indicated by old workings at Salisbury in the Beaconsfield area was continued and although drilling was difficult all targets were reached.

At Moina a series of holes partly to test the skarn for scheelite indicated by old workings and partly for stratigraphic information was started.

Foundation Testing

Bridge, road and building sites were drilled for the PWD or consulting engineers on Government projects and a considerable amount of drilling was carried out in connection with the Bell Bay railway. The Gemco again proved most useful for this type of work, the augers being used as far as possible and then the diamond triple tube wireline barrel to obtain core from the harder rocks. Much of the work was done in conjunction with the Materials and Research Section of the PWD whose technicians carried out penetration tests, etc., or took samples for testing in the laboratory.

Slip Areas

Drilling with both the Gemco and conventional drills was carried out for departmental geologists and although the work was slow, reasonable core recoveries were obtained even in unconsolidated material. The deepest hole was 62 metres.

ROTARY DRILLING

This rig operated in the Scottsdale-Gladstone area throughout the year, the work being concerned mainly with water resources but one hole to 334 metres was more for general stratigraphic reasons. As the drill crew carried out extensive pumping tests and logging of the holes the figures do not represent the time performance of the drill.

CHURN DRILLING

Mineral Investigation

Work in the Mt William area was completed without indicating any economic deposits.

Site Preparation

The PWD met difficulties when driving piles for the New Norfolk Bridge and it was necessary to drill a large number of holes through 3 to 4 metres of loose material on the river bed to enable the contractor to drill blast holes in the bedrock.

At the McPartlan Pass on the Gordon River scheme diamond drilling had failed to show soft decomposed schist on the route of the canal connecting the new Lake Pedder and Lake Gordon and a churn drill was used to determine the extent of this material. The drill was operated successfully on very soft ground by mounting it on a large flat sled.

Water Investigation

Both rigs spent most of the time in the Scottsdale-Winnaleah area on water investigation and the Down-the-hole-hammer was tried out for the first time. A 6¾-inch bit was used to drill a number of holes through the basalt and then 6-inch casing was placed to enable the normal churn drilling to continue. This proved successful even in quite broken basalt. In many parts of this area, however, there is more than one layer of basalt with clays and sands in between and it is proposed to obtain a 5½-inch DTH hammer to operate in the 6-inch casing and thus enable 5-inch casing to be driven below the second basalt layer.

DRILLING DETAILS

	<i>Location</i>	<i>Purpose</i>	<i>No. of holes</i>	<i>Total Depth (metres)</i>
<i>Diamond</i>				
	Colebrook	Slip investigation	1	6·10
	Hobart	Site investigation	3	45·72
	Bushy Park	Slip investigation	2	17·68
	Pontville	Sandstone investigation	7	58·11
	New Norfolk	Site investigation	6	35·67
	Waratah	Mineral investigation	2	320·24
	Railton	Limestone investigation	6	159·42
	Kaoota ..	Coal investigation	3	205·08
	Salisbury	Mineral investigation	2	283·86
	Beaconsfield	Slip investigation	4	138·38
	Lefroy ..	Mineral investigation	1	106·08
	Cygnets ..	Stratigraphic	2	257·39
	Hobart	Site investigation	4	58·08
	Mole Creek	Limestone investigation	4	182·64
	Moina ..	Mineral investigation	1	279·50
	Fingal ..	Coal investigation	2	502·84
	Fingal ..	Coal investigation	3	105·81
			53	2 762·60
<i>Diamond/Auger</i>				
	Launceston ..	Site investigation	5	31·39
	Glengarry ..	Stratigraphic	11	28·64
	Devonport ..	Site investigation	17	60·35
	Devonport ..	Water table determination	10	74·77
	Devonport ..	Site investigation	5	37·49
	Launceston ..	Site investigation	6	102·10
	Launceston ..	Site investigation	7	41·99
	Snug	Stratigraphic	38	215·22
	Kingston	Site investigation	9	27·43
	Winnaleah ..	Stratigraphic	1	29·87
	Hobart	Site investigation	8	110·25
	Burnie ..	Site investigation	10	128·36

	<i>Location</i>	<i>Purpose</i>	<i>No. of holes</i>	<i>Total Depth (metres)</i>
	Devonport	Site investigation	3	39.31
	Snug	Stratigraphic	1	11.09
	Launceston	Site investigation	21	92.23
	Scottsdale	Stratigraphic	22	145.47
	Snug	Stratigraphic	15	128.21
	Dolphin Sands	Water testing	1	13.71
			<hr/> 171	<hr/> 1 319.61
<i>Churn</i>				
	Mt William	Mineral testing	4	59.43
	New Norfolk	Site preparation	32	96.32
	Strathgordon	Canal route	16	133.99
	Winnaleah	Water investigation	7	400.47
	Winnaleah	Water investigation	13	406.80
			<hr/> 72	<hr/> 1 097.01
<i>Rotary</i>				
	Bridport	Water investigation	16	1 347.19

SUMMARY OF DRILLING

<i>Drill type</i>	<i>No. of drills operating</i>	<i>Metres drilled</i>	<i>Total cost (\$)</i>	<i>Cost per metre (\$)</i>	<i>Cost per shift (\$)</i>
Diamond	5	2 762.60	83 344.70	30.17	72.54
Diamond/Auger	1	1 391.61	17 926.28	13.58	81.86
Churn	2	1 097.01	37 022.07	33.75	86.70
Rotary	1	1 347.19	16 949.38	12.58	70.63
	<hr/> 9	<hr/> 6 598.41	<hr/> 155 242.43		

NORTH-WESTERN DISTRICT

H. Murchie, B.Sc., D.R.T.C., M.Aust.I.M.M.
 E. C. Leyland, A.W.A.S.M., A.M.Aust.I.M.M.
 P. Allan, B.Sc., A.H.-W.C., A.M.I.M.M., Burnie

In February delegates from the Australian Minerals Council were conducted on a tour covering the West Coast mines. Visits were made to the Mount Lyell Mining and Railway Company Limited, Renison Limited, Electrolytic Zinc Company of Australasia Limited, Savage River Mines and Cleveland Tin N.L.

H. Murchie attended the Chief Inspectors' of Mines Conference in Wellington, New Zealand in March and gained valuable experience on procedures related to mining legislation.

He also visited Esso-BHP's Bass Strait oil and natural gas field in November. The tour included inspections of offshore production platforms Halibut and Kingfisher in the Gippsland Basin, the Longford processing and crude oil stabilisation plant, the Long Island Point fractionation plant, Long Island Point jetty and Barry Beach marine terminal. The Esso management spared no effort in ensuring that the visit was interesting and instructive.

New office premises were occupied in March when the new Government Offices in Burnie were opened: the accommodation is excellent.

EXPLORATION

Mt Lyell Mining and Railway Co. Ltd

E.L. 10/69 (45 square miles). Work was largely concentrated in the area south of Queenstown. The grid established in 1971, to the north of Mt Huxley, was covered by geological mapping and ground magnetic work; a restricted programme of soil sampling was also made to investigate the degree of contamination from the old Mt Lyell smelter. The mapping was subsequently extended north towards the Consolidated Mining Lease and west towards the Queen River. A total of 10 miles of tracks was cut into the south-western part of the area to provide access for mapping. Other areas where mapping was continued included the southern slopes of Mt Sedgwick, the eastern end of Mt Lyell and the King River Gorge.

E.L. 9/66 (67 square miles). Geological mapping continued in the following areas: Henry Fault-Mt Read, White Spur, Anthony Creek Valley, Lake Selina, the south-western corner of the licence area and also in the zone between Basin Lake and Howard's Anomaly. In the Selina area samples of pyrite mineralisation from diamond drill holes 4, 5 and 6, were included in a geochemical project to investigate the variations in trace element content of the sulphides in the Mt Read volcanic rocks. Conductivity and magnetic susceptibility tests were also conducted on core from diamond drill holes Selina 3 and 4, to determine the most suitable geophysical tool for future investigations in the area.

Towards the end of the year diamond drill hole Selina 7 was collared and had advanced to a depth of 687 feet. In order to establish the diamond drill rig on site, a considerable amount of road construction, maintenance and site preparation was necessary.

The completion of diamond drill holes, Red Hills 3, at a depth of 402 feet ended the initial diamond drilling programme at Red Hills.

In preparation for an induced polarisation survey to be conducted in January 1973, about 15 line miles of traverse lines were cleared and pegged, in the Henty Fault-Mt Read zone in the northern part of the licence area.

Texins Development Pty Ltd

E.L. 7/68 Geology: Detailed mapping of the central Dundas area at a scale of 1 : 1 200 covered 3 square miles. Reconnaissance mapping of the Amber Creek area, 11 square miles, was completed. Underground mapping of the South Comet mine adits 1 and 3, and of adit 1 of the Adelaide mine was also completed.

Geophysics: VLF surveys over grid lines in the central Dundas and Amber Creek areas were carried out. A magnetic survey over the Amber Creek grid was also completed. IP orientation surveys were run in several boreholes in the South Comet area.

Geochemistry: Soil sampling surveys were confined to the Montezuma and Central Dundas areas.

Drilling: Diamond drill footage completed during the year was 17 400, as follows:—

Kosminsky Hill	....	....	....	....	10 holes	8 000 feet
South Comet	..	....	....	....	14 holes	8 400 feet
Montezuma	....	....	....	....	2 holes	1 000 feet

General: A total of 120 000 line feet was cut during the year, with 1 200 hours of contract bulldozing carried out on road making and levelling diamond drill sites.

EXPLOSIVES

Of the several incidents involving the mishandling or misuse of explosives investigated during the year, two resulted in serious accidents. A resumé of these incidents follows:—

- (a) Two young men at the Que River near Rosebery were using explosives on a fishing excursion; they were unaware of the difference between millisecond and half-second delay detonators and this resulted in, what they considered to be, a premature explosion. One lost his right hand and the other received minor damage to his arm.

- (b) A miner bored into a 'butt' containing fracture in the Cape Horn mine and the resultant explosion caused severe facial injuries with the loss of sight in one eye and severe damage to the sight of the other eye.

A check of the stock of the magazines at Mt Lyell Mining and Railway Co. Ltd against the stock record cards, failed to account for eight cases of anzite. The company re-checked the magazines, checked with the manufacturers and other magazines in the State, but failed to locate the missing cases. It was considered either that the manufacturers had supplied eight cases of a different type which had not been checked out or that a miscount during the transfers from ship to shore to magazine had occurred.

Following complaints from the Parents and Citizens' Association all shops in Queenstown selling fireworks were inspected. Action was taken to remove the cause of the complaints.

The magazine at the Spray mine was illegally broken into by children, but fortunately the police were able to recover all the detonators. As the mine was not being worked the manager was instructed to remove all stock from the magazines.

INFLAMMABLE LIQUIDS

An unapproved tank vehicle operated by Lyell Transport was checked at Queenstown and found to be contravening the regulations. The load being carried was 5 000 gallons of Class 'A', 315 gallons of lubricating oil, 135 gallons of distillate and 213 lb of oxygen. Prosecution is pending.

A vehicle carrying bulk acid overturned in River Street, Burnie. Prompt attention by NW Acid personnel prevented any serious damage resulting from this spillage. The tanks of the contractor concerned were later checked and modifications were required to the sealing of the fittings on top of the tank.

During the year a visit was made to the Esso installations at Longford, Barry Beach and Long Island.

FIRES

Although not officially reported to the Department, several fires involving diesel engines have occurred underground, at least one of which proved most difficult to extinguish. The quick action of an alert shift boss in driving the vehicle under a 1-inch 'take-off' from the main high pressure water line and flooding the engine compartment, no doubt prevented a serious incident. Other underground fires recorded in the past two years have been—

- (a) a 'rubbish' fire, No. 14 level, Rosebery mine;
- (b) an underground compressor, Cape Horn haulage.

DIESEL ENGINES

Considerable attention has been devoted to the quality and the quantity of air required to ventilate headings in which diesel engines operate. This policy has been successful and no serious fuming cases have been recorded. However, the actual operation of vehicles has resulted in several serious accidents, three of which have resulted in the drivers being totally incapacitated.

NORTH-EASTERN DISTRICT

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

The development of a crushed limestone plant run in conjunction with a hydrated lime plant at Mole Creek resulted in full-time employment for fifteen local workers. In the establishment of these operations the company adopted a policy of preserving the natural ecology of the area as far as possible. Landscaping of approaches by the planting of ornamental trees and flowering succulents have contributed to pleasant surroundings.

Main interest, centered on the mechanisation of mining methods by a large mainland company operating on the Vicary Creek flats. A 6-cubic yard dragline and associated equipment was acquired for this purpose. Small-scale but relatively systematic methods of tin mining were adopted by two parties operating in the bed of the Ringarooma River, one at Moorina and the other 3 miles downstream from Derby.

Determined efforts were made throughout the year to ensure that all mine operators made every effort to keep water pollution under control. To this end frequent samplings of mine effluents and water courses were made and the miners co-operated by the construction of tailings dams and successive settling dams. It is possible that the use of settling agents such as lime or alum may sometimes be necessary to clarify discoloured waters.

EXPLORATION

Tenneco Aust. Inc.

E.L. 16/72. This exploration licence extends from Frankford to beyond Dilston and to south of Tunbridge. The company undertook a search for secondary radioactive minerals in the Midlands Tertiary Basin. Rotary drilling to 500 feet was carried out.

BMI Mining Pty Ltd

E.L. 19/70. Operations were confined to mapping and sampling. Staff consisted of one geologist and two field assistants. The north-eastern section of the licence was reduced in area.

S.P.L. 118, E.L. 21/72, Beaconsfield area. One man was employed on soil sampling work.

E.L. 15/72. This area of 1 300 acres was held previously by H. J. Stacpoole. No exploratory work was carried on before the end of the year.

E.L. 24/70, Banca area. Work on this licence consisted of surveying and percussion drilling. One drill rig was used and employment averaged four men (one supervising geologist and three drillers).

Texins Development Pty Ltd

E.L. 6/68. This company was active during the year with one to three geologists in the field and three full-time field assistants. Two diamond drill rigs were in operation for the major part of the year. The area was further reduced during the year from 220 square miles to 205 square miles.

M. L. Watt

S.P.L. 92. Prospecting work on this licence was of a desultory nature, one man being engaged part time.

J. E. Beams

E.L. 46/71, Golconda area. Mr Beams, in partnership with another, operated an auger drill in a series of shallow holes.

N. B. Brown

S.P.L. 107, Mt Victoria area. Operations by this licensee and another consisted of prospecting by means of trenching. Prospecting is to continue into 1973.

APPM

E.L. 20/70, Tonganah area. Some auger boring was carried out during the year.

E.L. 21/70. Some random drilling was carried out and some satisfactory clay deposits were located.

Mineral Holdings

S.P.L. 106. No prospecting work was recorded.

SOUTHERN DISTRICT**J. B. Braithwaite, B.C.E., B.M.E., M.Aust.I.M.M., M.I.E.Aust.****R. C. Thomas, A.C.S.M., A.M.I.M.M., M.Aust.I.M.M., Hobart****STRATHGORDON**

Pearson Bridge Pty Ltd completed the sinking of the Bus Bar Shaft of 36 feet diameter to the final depth of 600 feet, and also completed the inner and outer concrete linings of the shaft to 570 feet. The contract was completed in September. The average number of men employed on the contract was thirty persons underground, five persons on surface and five persons on staff.

GENERAL

The Department continued to give assistance to the police on request especially in the recovery and destruction of explosives. Assistance was rendered to other departments in connection with blasting operations.

Complaints from the public regarding nuisances from blasting operations were dealt with and where necessary modifications to operations were introduced to minimise these nuisances.

The process of bringing under mining leases the winning of sand, clay and other construction minerals on private land continued and the conditions of the mining leases are being enforced.

Report of the Mount Cameron Water Race Board for the year ended 31 December 1972

THE HONOURABLE THE MINISTER FOR MINES

We submit the Report of the Mount Cameron Water Race Board for the year ended 31 December 1972.

The Board has been concerned at the continuing lack of demand for water for mining purposes and the continuing loss being experienced in operating the race system. Exploratory work is being undertaken on a number of areas which could be served by the race and should these investigations result in the establishment of productive mining operations the financial position would improve.

The race system is in good order but due to the very low rainfall experienced, the upper section of the system was not carrying the maximum amount of water for which it was designed and supplies were obtained mainly from the Chum Dam which was constructed in May 1969. Unemployment relief funds made available through the Department of Mines were used to employ labour for race cleaning and the section near the Cybele is now in excellent order. Maintenance work on some sections of the race has been deferred until demand for water from these particular sources develops.

The Board has under consideration a proposal to re-draft the existing regulations made under the Mount Cameron Water Race Act 1926, and at its meeting in January it was resolved to increase water charges for mining purposes from \$3 to \$8 per sluichead for day water and to \$3.70 per sluichead for night water. The rate for domestic water was also increased from \$2 to \$4 for each consumer. As a result revenue received from the sale of water increased from \$1 170 last year to \$2 516. Although no water was used until the beginning of April the one user on the Fixed or Cash scale was supplied with fifteen sluicheads daily from then until the end of the year and one small producer was supplied with water early in the year for which payment was made by a royalty on the proceeds of tin concentrates sold. However, the increased income was offset by higher operational costs, particularly due to increased rates of pay. The loss of \$8 260 for the year was only marginally less than for 1971.

The cost of operating the system continues to grow and it is proposed to provide in the new regulations for higher water charges. Unless new mines are opened or existing operations expanded considerably a continuing loss must be expected. A successful outcome to current exploration activities is necessary if the race is to return to profitable working enjoyed in former years.

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 1972

	<i>Receipts</i>	\$	<i>Payments</i>	\$
Sale of Water—			Salaries and wages, including pay-roll tax	10 146.69
Fixed on cash sale	2 136.75	Insurance	238.31
Royalty scale	131.06	Maintenance	41.37
Domestic use	248.00	Car allowance	300.00
Miscellaneous	3.62	Miscellaneous	52.97
Balance (Loss)	8 259.91		
		\$10 779.34		\$10 779.34

MOUNT CAMERON WATER RACE

STATISTICS FOR THE YEAR ENDED 31 DECEMBER 1972

<i>Registered Rainfall</i>		<i>Production</i>		<i>Tons</i>
Great Musselroe	30 inches 27 points	Tin oxide produced—		
Little Musselroe	26 inches 28 points	Fixed scale		5·80
		Royalty scale		0·313
				<hr/> 6·113 <hr/>
<i>Water Services</i>		<i>Employment</i>		
Average number of claims supplied per week	1	Average per week—		
Greatest number of claims supplied in any one week	1	Royalty scale		
Sluiceways supplied—		Fixed scale		2
Fixed scale	540			<hr/> 2 <hr/>
Royalty scale	5			
	<hr/> 545 <hr/>			

Report of the Ringarooma and Cascade Water Board for the year ended 31 December 1972

THE HONOURABLE THE MINISTER FOR MINES

We submit the Report of the Ringarooma and Cascade Water Board for the year ended 31 December 1972.

There have been no positive developments in plans to re-open the old Briseis mine at Derby which it is proposed should obtain a water supply from the Cascade Dam. Negotiations are in progress with a company engaged in alluvial tin mining in the north-east of the State. The Cascade Dam is in good order and the Mt Paris Dam is kept empty. Both dams are essential to the re-establishment of tin mining operations in the area. Plans to use the dams for irrigation purposes have proved to be uneconomic.

The loss of \$1 170·26 represents interest on the capital cost of purchase of the Ringarooma and Cascade water system in 1947 and the cost of caretaking of the Cascade Dam.

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 1972

<i>Receipts</i>		<i>\$</i>	<i>Payments</i>		<i>\$</i>
Balance (loss)		1 170·26	Caretaking		150·00
			Interest on capital cost		1 020·26
		<hr/> \$1 170·26 <hr/>			<hr/> 1 170·26 <hr/>