AR1971

1972 (No. 28)

TASMANIA

1972

PARLIAMENT OF TASMANIA

# DIRECTOR OF MINES

## REPORT FOR THE YEAR ENDED 31 DECEMBER 1971

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

By Authority:

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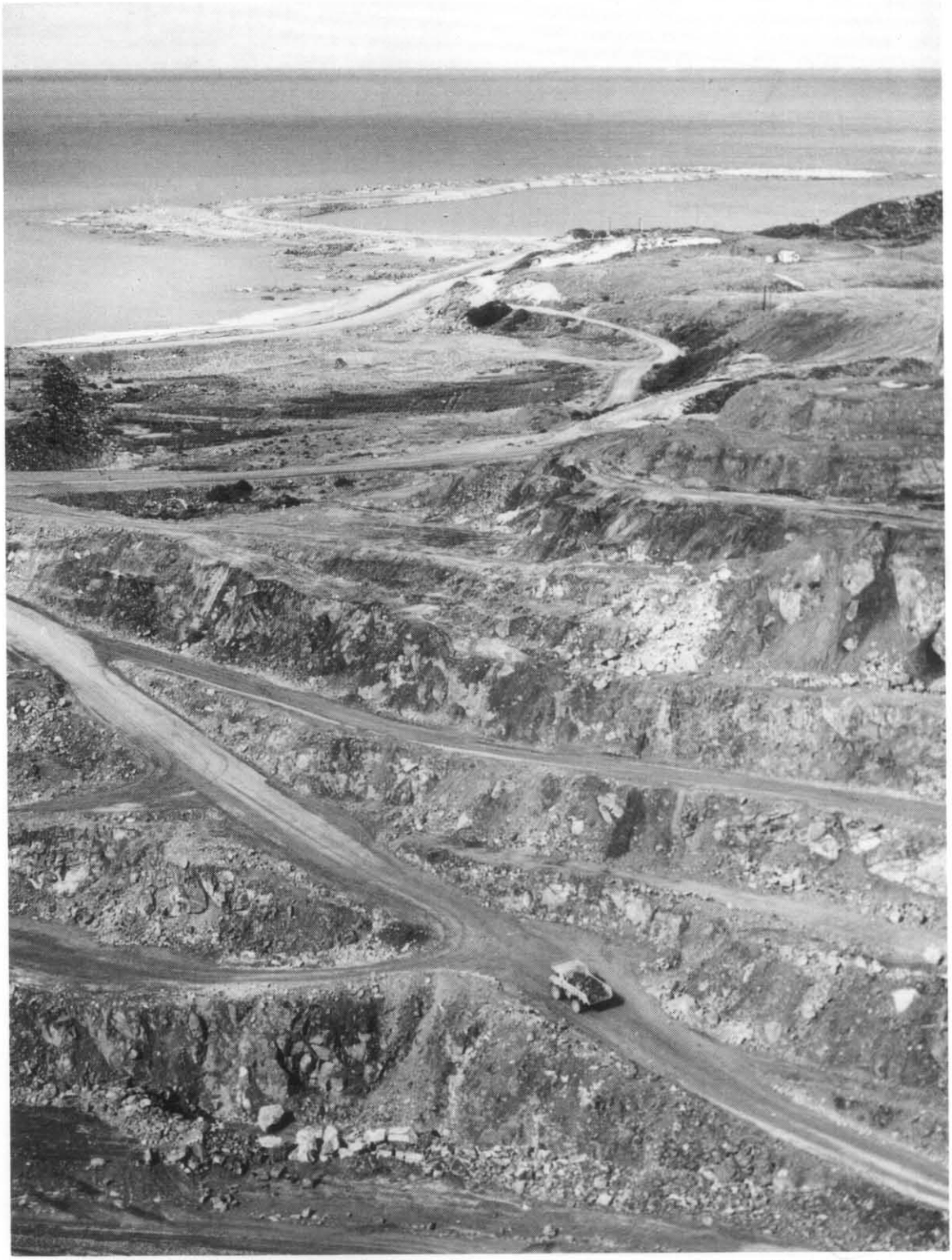

King Island Scheelite Ltd open-cut and the breakwater for the new port at Grassy. The breakwater is being built from overburden from the open-cut.

[*Photo: The Mercury*]

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# REPORT OF THE DIRECTOR OF MINES

Department of Mines,
Hobart, 1 July 1972

THE HONOURABLE THE MINISTER FOR MINES

I present my report on the mining industry for the year ended 31 December 1971.

The value of metals and minerals produced from Tasmanian ores was $118,620,235 as compared with $115,469,042 for 1970, representing an increase of 2.8%. In addition metallurgical production from imported raw materials was $111,892,092 compared with $96,507,223 for 1970, an increase of 15.9%. The total of $230,512,327 represents a new record and surpasses the 1970 record by $18.5 million.

Despite significant increases in the production of all our principal minerals the value of Tasmanian ores rose by only 3.2 million. This reflects the general lower level of metal prices in 1971 compared with 1970 and fails to illustrate the appreciable growth in output by the major mining companies.

The production of copper rose from 23,016 tons in 1970 to 28,400 tons; iron ore pellets from 1,887,479 tons to 2,158,879 tons; lead from 10,558 tons to 12,255 tons; pyrites for sulphuric acid manufacture from 75,338 tons to 179,529 tons; silver from 1,417,697 oz to 1,669,493 oz; tin from 4,939 tons to 6,071 tons; tungstic oxide from 1,411 tons to 1,716 tons and zinc from 37,723 tons to 41,183 tons.

## NEW DEVELOPMENTS

The year under review was characterised by development in the expansion programmes in progress at the major mines. These are referred to in more detail hereunder but briefly they consist of increase in the production of copper concentrates by the Mt Lyell Company and the commencement of shaft sinking operations as part of the programme of development of underground mining operations which will in 1972 replace the open-cut operations that have been a feature of the company's working for many years; continued progress for a $50 million capital expenditure programme at the mines of the Electrolytic Zinc Company, Rosebery; plant additions and development of further ore reserves at the Renison Bell tin mine; increases in ore reserves at the Cleveland Mine, Luina and plans for installation of new plant; redevelopment of mining and treatment facilities which will ultimately result in the doubling of production at the King Island Scheelite mine and the commissioning of a new plant at the Electrolytic Zinc Company's works at Risdon to recover zinc and other metals from the residue dump. Comalco Ltd at Bell Bay have completed the second stage of No. 3 pot-line and now have a productive capacity of 94,000 tons of aluminium per year.

A limestone industry has been established at Mole Creek jointly by Associated Pulp and Paper Mills Ltd, Burnie and David Mitchell Estates Ltd of Lilydale, Victoria to provide supplies of lime for the paper making industry and for building and other purposes for the Tasmanian market.

Silica deposits on the west coast have been examined by Comalco Ltd and studies are not in progress as to the possibilities of commercial development. Australian Pulp and Paper Mills Ltd of Burnie are evaluating the kaolin deposits in north-eastern Tasmania for use in paper making. Progress is being made with reopening the Endurance Tin mine which has been taken over by a subsidiary of Blue Metal Industries of New South Wales. A number of smaller lessees have granted options to established mining companies and, in some cases, there are encouraging possibilities that productive mining operations will be developed.

## PRODUCTION

The Mt Lyell Mining and Railway Company Limited, Queenstown treated 2.42 million tons of ore from which 82,073 tons of copper concentrates were produced containing 22,247 tons of copper, 13,524 oz of gold and 118,076 oz of silver. In addition 89,272 tons of pyrites were produced.

Current reserves of proved ore from all sources have been assessed at 35 million tons averaging 1.46% copper, 0.07 oz silver and 0.012 oz gold per ton. The reserves consist of 2 million tons available to open-cut mining and 33 million tons to be mined underground. Probable ore from underground sources

amounts to 4.5 million tons estimated to contain 1.42% copper, 0.58 oz silver and 0.008 oz gold per ton. Possible ore in the Cape Horn ore body below the North Lyell Tunnel level has been assessed at 2 million tons averaging 1.30% copper, 0.100 oz silver and 0.010 oz gold per ton. Further drilling is to be undertaken to define the likely quantity and grade of reserves.

The expansion programme which was commenced in 1968 continued to make good progress and underground development of new mines was advanced. The sinking of the main shaft at the Prince Lyell mine began. Erection of the headframe and commissioning of the skipwinder has been completed and the shaft sinking contractors are now sinking and lining the 25-foot diameter shaft with concrete.

The concentration plant achieved a record throughput.

Regular shipments of iron ore pellets from Savage River mines to Japan were maintained and 2,158,879 tons were exported from Port Latta.

Active interest is still being displayed in the feasibility of the establishment of a steel industry based on the available ore reserves at Savage River. Studies are still in progress and there have not yet been any positive developments.

The economics of production for export from several small iron ore deposits on the north-west coast have not proved favourable to the establishment of productive operations.

At the King Island Scheelite mine a total of 286,614 tons of ore were treated for the production of 1,133 tons of tungstic oxide valued at $5.1 million.

The King Island Scheelite mine, which is part of the Peko-Wallsend group, has undertaken a capital expenditure programme of $12 million which involves virtually a redevelopment of mining and treatment facilities which will ultimately result in the doubling of the present throughput of ore to 450,000 tons a year.

The programme has, however, been deferred pending research on artificial scheelite and a clearer indication of when the world market can absorb the additional production proposed.

A vigorous programme of exploration has been undertaken on the company's leases and in adjoining areas held under exploration licences. Extensive diamond drilling has outlined additional ore bodies and when new developments are completed ore will be mined from the present open-cut and from two underground mines, one just east of the open-cut and the other at Bold Head about 1 mile north of the existing mine. Reserves are estimated at over 7 million tons of ore assaying 0.75% tungstic oxide.

Under an arrangement with the Government the company has constructed a new deep water port at Grassy to replace the port at Currie which has navigational limits. The work included the building of a 2,000 feet long breakwater from overburden from the open-cut mining operations.

At the Storeys Creek Tin mine 57,046 tons of wolfram-tin ores were treated for the recovery of 330 tons of tungstic oxide and 20 tons of tin. The neighbouring Aberfoyle Mine, which produced 329 tons of tin, also recovered 252 tons of tungstic oxide from the treatment of 97,691 tons of tin-wolfram ores.

At the Renison Mine at Renison Bell, which is the largest producer of tin in Australia, 437,860 tons of ore were treated for the recovery of 3,787 tons of tin metal.

A programme of surface exploratory drilling, and underground drilling to aid mine development was maintained. A new ore body which lies below North Stebbins lode was outlined and estimated to contain 775,000 tons of ore assaying 2.38% tin. Ore reserves comprising possible, probable and proved tonnages were assessed at 16.68 million tons averaging 1.01% tin. This quantity is slightly greater than the estimates for last year and the grade has increased significantly from 0.84%.

The quantity of ore treated was slightly greater than in the previous year and the grade was appreciably higher at 1.37% tin. Recovery decreased from 58.7% to 54.6%. This was due in part to delays in commissioning the new cassiterite flotation plant and to defects in the centrifuge desliming separation. A satisfactory separation in grade and recovery of the coarser material has been achieved and additional equipment is required to treat the finer material.

Construction of the new cassiterite flotation plant and additions to the research laboratory were completed and a new change house is in the final stages of construction. A further fifty-five houses for employees were built at Zeehan.

Production at the Cleveland Mine, Luina continues to show an upward trend. A total of 331,476 tons of ore was treated for the recovery of 1,786 tons of tin and 910 tons of copper. A new cassiterite flotation plant is in process of installation and should come into operation early in 1972. Ore reserves have been increased by 0.83 million tons to 3.7 million tons averaging 1.02% tin and 0.46% copper. Diamond drilling at depth in the central and south-western extensions of the ore body indicated a possible addition of a further 2.8 million tons of mineable ore.

The Dorset Tin Dredge was finally closed on 20 March 1971 after having operated in various areas in the vicinity of the Ringarooma and Dorset Rivers since 1944.

The operations of the Endurance Corporation in Tasmania were taken over by BMI Mining Pty Ltd a subsidiary of Blue Metal Industries of New South Wales. The company is employing modern earth moving techniques in its operations. Productive mining has commenced at the Monarch Tin mine and preliminary work is in progress to recommence mining at the Endurance Tin mine at South Mount Cameron. The company is also interested in the possibilities of larger scale mining by some smaller operators in north-eastern Tasmania. Operations at the old Pioneer Mine at Pioneer, by a newly formed small company in the Gladstone area and by Hawkes Alluvial Ltd at King Island are making a useful contribution to the overall output of the tin mining industry.

The Electrolytic Zinc Company at Rosebery, which operates the Rosebery, Hercules and Farrell mines, treated 325,223 tons of ore for the recovery of 41,183 tons of zinc, 12,255 tons of lead, 1,643 tons of copper, 1,551,417 oz of silver and 39,828 oz of gold; and 90,257 tons of pyrites.

Ore production is now beginning to increase to a projected rate of 600,000 tons per year as the $50 million expansion programme nears completion. The new 22 feet diameter concrete-lined main shaft has been completed to a depth of 1,760 feet and has been equipped with electric friction winders and other equipment including rolling stock; it was commissioned in October. New change rooms, office blocks, assay and metallurgical blocks and a new pyrite treatment plant have been provided and alterations and extensions made to the concentrating mill. A filtration and loading station have been built at Primrose to facilitate transport of the zinc, lead, copper and pyrite concentrates by the company's Emu Bay Railway system to Burnie where part of the pyrite concentrate is used for acid manufacture at the North West Acid Pty Ltd works operated as a joint venture with the Mt Lyell Company. The other concentrates are shipped to Port Kembla, Risdon and Japan for final treatment.

The company has increased its work force to 1,000 men and has erected 146 houses as well as more accommodation for single men.

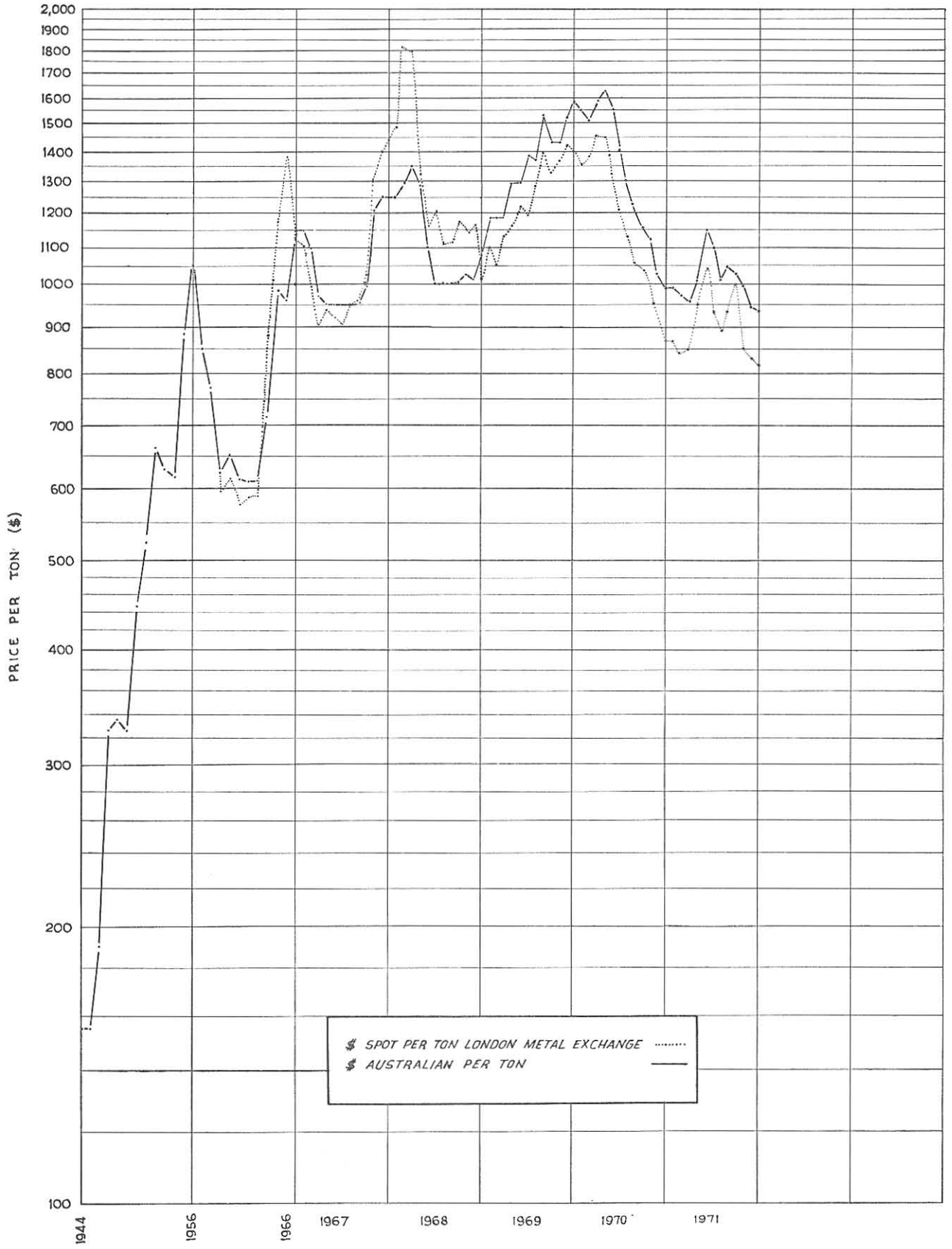
At the Farrell mine at Tullah a new steel headframe has been installed as part of a development plan to increase ore production to 25,000 tons a year.

Ore reserves have been assessed at 8.8 million tons at the Rosebery mine, 250,000 tons at the Hercules and 60,000 tons at the Farrell mine.

At its Risdon works, where zinc is recovered from concentrates from its West Coast mines and from interstate sources, the Electrolytic Zinc Company has commissioned a new plant to recover zinc and other metals from a 1.2 million ton residue dump which has accumulated during thirty years of stockpiling. Zinc, cadmium, cobalt oxide, mercury and manganese dioxide will be recovered at Risdon and a concentrate containing lead, copper and silver will be sent to Port Pirie for final treatment. Zinc production alone will amount to 60 tons per day and this, added to treatment of zinc concentrates being received from Risdon and Port Pirie, will enable the total works output to reach 550 tons per day. Treatment of the stockpile and residues from continuing shipments of zinc concentrates will provide a continuous process and enhance the value of the Risdon works as a Tasmanian industry.

## METAL PRICES

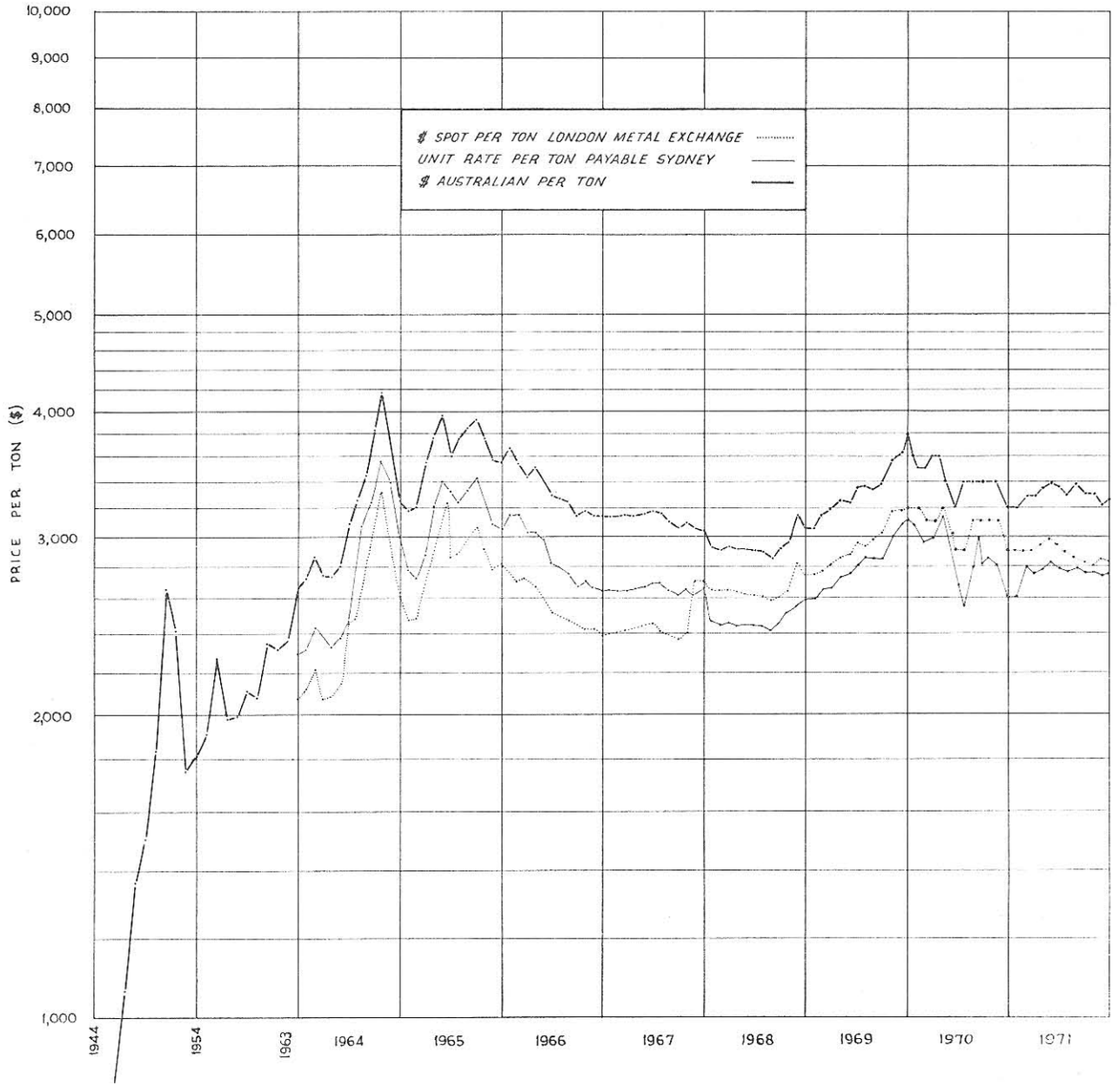
The prices of the principal metals produced declined generally in 1971 during the time when productive capacity at the major mines was increasing as extensive expansion programmes were completed. This, as I have previously stated, prevented the overall value of the industry from being a true indication of the growth which took place in 1971.




COPPER PRICES

YEARLY AVERAGES 1944-1966, MONTHLY AVERAGES FROM 1967

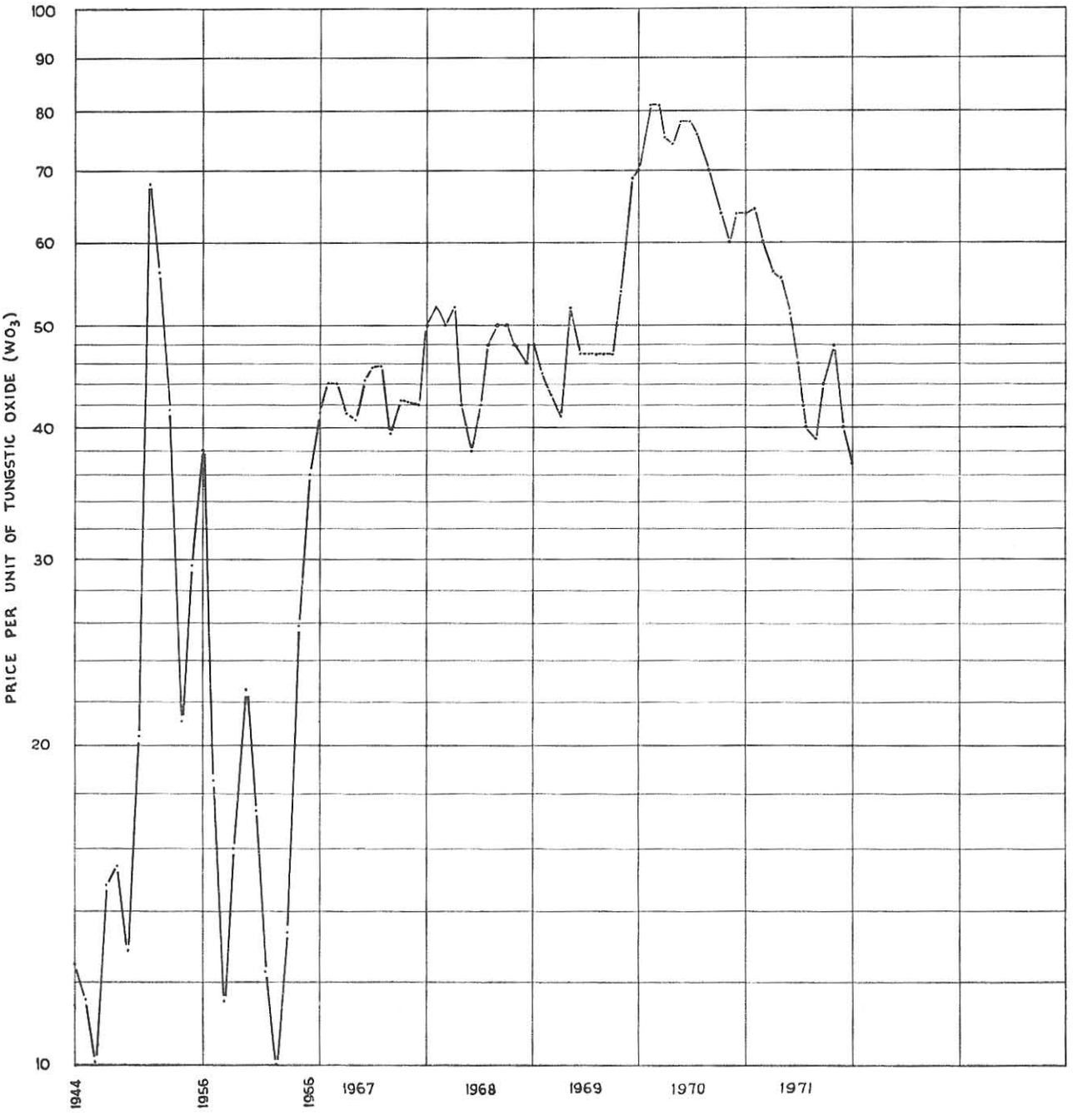
5 cm




TIN PRICES

YEARLY AVERAGES 1944-1964, MONTHLY AVERAGES FROM 1964

5 cm




TUNGSTEN PRICES

YEARLY AVERAGES 1944-1966, MONTHLY AVERAGES FROM 1967

5 cm

*Copper.*—The average Australian price of copper which is fixed by the Copper Producers Association ranged from a high of $1,030 per ton in July and August to a low of $918 per ton at the end of the year, and on average was $310 per ton less than in 1970. The price is based on that ruling on the London Metal Exchange.

*Lead.*—The Australian price declined to $250 per ton in January and remained constant until October when a further fall to $220 per ton was recorded. This remained unchanged at the end of the year.

*Tin.*—The Australian price is based on the landed price of imported tin and varies daily with the Straits quotation. The Australian smelter purchases concentrates from producers at a price based on the Straits price, less deductions equivalent to Malaysian smelting, freight and other charges.

The decline in the Australian price of tin which commenced in May 1970 continued in 1971 and ranged between a low of $3,216 in December to a high of $3,370 in March. Prices on the London Metal Exchange and on the Straits and United States markets followed the same trend. The operation of the buffer stock set up by the International Tin Council had not arrested the decline in 1971 but in the early months of 1972 an upward trend was evident. The depressed price has not affected production and output at Renison and Cleveland mines, which are Australia's two principal producers, recorded considerable increases.

*Tungsten.*—The price of tungstic oxide governs the value of the output of scheelite by the King Island Scheelite mine and of wolfram by the Storeys Creek and Aberfoyle mines. The market price was $62.16 per long ton unit in January but thereafter there was a decline each month, except for a temporary recovery to $43.376 l.t.u. in October, until a low of $34.430 l.t.u. was reached in December.

The commencing date for a large programme of capital expenditure by King Island Scheelite Ltd has been postponed because of the current low prices.

*Zinc.*—The Australian price (adjusted for Risdon) remained at $327 per ton, until June when it was increased to $375 per ton which continued as the ruling price until the end of the year.

AVERAGE AUSTRALIAN PRICES, 1967-1971 ($A)

| *Commodity* | *Unit* | 1967 $ | 1968 $ | 1969 $ | 1970 $ | 1971 $ |
|---|---|---|---|---|---|---|
| Copper .... .... .... | ton | 1,062.49 | 1,098.83 | 1,368.31 | 1,314,14 | 1,004.27 |
| Gold .... .... .... .... | fine oz | 31.25 | 33.71 | 36.69 | 32.21 | 35.97 |
| Lead .... .... .... .... | ton | 216.25 | 218.33 | 262.67 | 281.67 | 242.50 |
| Rutile .. .... .... .... | ton | .... | .... | .... | 164.25 | 165.05 |
| Silver .. .... .... .... | fine oz | 1.47 | 2.07 | 1.62 | 1.57 | 1.33 |
| Tin .... .... .... .... | ton | 3,100.49 | 2,943.83 | 3,292.33 | 3,430.17 | 3,275.00 |
| Tungsten .... .... .... | unit $WO_3$ | 42.49 | 39.11 | 45.91 | 68.56 | 45.83 |
| Zinc .... .... .... .... | ton | 301.00 | 296.00 | 310.99 | 327.00 | 355.00 |
| Zircon .. .... .... .... | ton | .... | .... | .... | 55.29 | 57.66 |

## EXPLORATION

On 31 December 1971 there were eighty-three exploration licences and twenty-eight special prospector's licences in force to search for minerals in the State covering a total area of 11,542 square miles and seven exploration permits were also held to search for petroleum in off-shore areas adjacent to the Tasmanian coastline embracing the whole of Bass Strait and areas adjacent to our east and west coasts.

In my last Report I referred to the high level of demand for exploration areas and to the fact that several applications were received for some areas which had to be decided on priorities of application and according to proposed programmes of work. At one time the whole of the known potential mineral bearing areas were in occupation for exploration purposes. The development of conditions on the Stock Exchanges which severely limited the amount of capital available for investment in exploration affected the performance of some licence holders and several relinquished licences or were not granted extensions of the term of licences. Apart from a small number of licence holders whose activities relate to limited

areas current licences are held by established mining companies with the financial resources to undertake planned programmes of exploration. These holders have been required to reduce areas held under licence to localities where exploration has indicated some potential for the discovery of mineral deposits. It is considered that present circumstances will result in more comprehensive exploration activities and in the recording of more positive data on the potential mineral resources of the State. It is estimated that $3.2 million was expended by licence holders during the year.

The Department of Mines has continued its programme of regional geological investigations, economic geology, groundwater investigations and engineering geology. Publication of maps, bulletins and reports are made regularly and the services of all professional staff of the Department together with geological and mining information on record is available to advise and assist enquirers.

Drilling plants, when not engaged in boring for hirers, are employed in testing mineral deposits, the information gained is available to enquirers. Arrangements are made for any discoveries to be granted under licence or leased to persons or companies capable of developing the mineral deposit.

Departmental plants have been used in boring coal deposits in the Fingal Valley and at Mt Nicholas, gold- and nickel-bearing areas at Beaconsfield, and lode tin deposits at Waratah. In addition investigation of the underground water resources in the Scottsdale-Bridport area was undertaken using three drilling plants. Boring for stratigraphic purposes was conducted at Glenorchy and at Cygnet; two plants were employed in boring for engineering purposes, at Launceston and at Beaconsfield.

## IRON ORE

Production of iron ore pellets at Port Latta from iron ore mined and concentrated at Savage River totalled 2,158,879 tons valued at $27,038,303.

The feasibility of establishing a steel industry based on iron ore deposits at Savage River outside the leases held for the pellet industry continues to be investigated by E. R. Hudson of Industrial and Mining Investigations Pty Ltd, who was responsible for the establishment of the present pellet export industry. The area is held under an exploration licence.

## OIL

Since drilling operations by Hematite Petroleum Pty Ltd last year indicated hydrocarbon shows in three bores in Tasmanian waters in Bass Strait the technical data obtained have been re-assessed with the object of selecting a site for further boring in 1972.

Magellan Petroleum Australia Ltd and its associates commenced boring at a site 40 miles north-east of Flinders Island known as Sailfish No. 1 in Tasmanian waters using the 11,000-ton drilling vessel 'Glomar Conception'. The target was stated to be a well-defined seismic anomaly interpreted as a limestone biohermal reef and it was proposed to drill to 6,000 feet. However, the bore was abandoned at 4,665 feet with negative results as volcanic rocks were encountered.

Details of permits and licences in force covering the search for petroleum are:—

### EXPLORATION PERMITS UNDER PETROLEUM (SUBMERGED LANDS) ACT

| *Title No.* | *Title Holder* | *Area (blocks)* | *Expiry Date* |
|---|---|---|---|
| T/1P | Magellan Petroleum Australia Ltd | 41 | 4.7.74 |
| T/3P | Hematite Petroleum Pty Ltd | 342 | 16.7.74 |
| T/4P | Hematite Petroleum Pty Ltd | 394 | 16.7.74 |
| T/5P | Hematite Petroleum Pty Ltd | 317 | 16.7.74 |
| T/6P | Hematite Petroleum Pty Ltd | 400 | 16.7.74 |
| T/8P | Esso Exploration & Production Aust. Inc. | 205 | 6.9.74 |
| T/9P | Magellan Petroleum Australia Ltd | 4 | 11.4.75 |

### EXPLORATION LICENCE UNDER MINING ACT 1929

| *Title No.* | *Title Holder* | *Area (sq miles)* | *Expiry Date* |
|---|---|---|---|
| E.L. 18/65 | Esso Exploration & Production Aust. Inc. | 230 | 17.9.71 |

## LEGISLATION

### Mining Act 1929

There were no amendments to the Act or Regulations but it is pleasing to record that the whole of the legislation was reprinted in consolidated form.

### Mines Inspection Act 1968

The definition 'works' was amended and widened by Act No. 62 of 1971 to make it clear that constructional works at a mine are subject to control under the Mines Inspection Act. Under the previous definition 'works' did not include works under construction, that is 'works' were not subject to control under the Act until productive mining operations commenced. The amendment removes this anomaly and enables the authority responsible for control of completed works to approve and inspect such works in the construction stage. It also removes confusion as to requirements to be met by contractors, suppliers of equipment and mine owners who will have to satisfy the same authority in the construction and in the operational stage of any 'works' on a mine.

The Act has also been amended to fix a minimum age of 16 years for employment in underground work in mines. This brings the State into line with the other States and conforms with Convention No. 123 of the International Labour Organisation 'Minimum Age (Underground Work) 1965' to which Australia is a signatory. The previous age limit in this State was 15 years.

### Explosives Act 1916

The existing legislation provides for the proper storage of explosives and the keeping of stock records as well as the licensing of shotfirers. Explosives storages are inspected regularly by officers of the Department and efforts are made to ensure that safe practices are observed both in the actual use of explosives as well as in storage. Unfortunately there have been cases of individual carelessness in storage and handling which have resulted in detonators and other explosives coming into the hands of children. In an endeavour to bring home to people in charge of explosives their responsibility to the community the Act was amended to increase penalties for improper storage to $10 for every detonator and $1 per pound of other explosives or $200 whichever is the greater.

The Regulations were amended on two occasions. Statutory Rules 1971, No. 103 provided for the branding of detonators with the words 'Detonator—Danger' in letters at least one-eighth of an inch high on the case of every detonator imported into the State after 1 January 1972. Importation of certain fireworks were prohibited and their maximum size and the amount of gunpowder used in them was reduced. A provision was also made to provide for the replacement of certain fire extinguishers by less toxic and more effective types. The maximum permitted speed of vehicles carrying explosives was increased by 5 m.p.h. to 30 m.p.h. in built-up areas and to 45 m.p.h. in open areas. A variation was also made in the permitted size of packaging of some types of explosives.

Under Statutory Rules 1971, No. 257 licence and permit fees were increased and some new fees introduced.

### Inflammable Liquids Act 1929

The Regulations were amended by Statutory Rules 1971, No. 121 to provide for the following matters:—

(*a*) The special provisions of Part X of the Principal Regulations relating to liquefied petroleum gas and anhydrous ammonia are extended to the use of those gases;

(*b*) The regulations require L.P. gas systems in or on buildings, caravans, and vessels used for pleasure to be installed, altered and repaired in accordance with prescribed codes;

(*c*) On and after 1 January 1972, L.P. gas systems involving cylinders which contain, individually or collectively more than 20 pounds of L.P. gas may be installed, altered and repaired in or on buildings only by holders of gas fitter's certificates granted under the Plumbers' Registration Act 1951;

(*d*) On and after 1 January 1972, L.P. gas systems involving cylinders which contain individually or collectively, more than 5 pounds of L.P. gas may be installed, altered and repaired in or on caravans and vessels used for pleasure only by holders of the above certificates;

(*e*) Prohibition of the supply of L.P. gas in quantities exceeding 20 pounds, except by holders of gas suppliers' licences issued under the Principal Regulations;

(*f*) The maximum quantities of certain dangerous commodities that may be conveyed on vessels in harbours have been amended.

(*g*) The prohibition on tankers crossing the Tasman Bridge at peak hours was extended to include vehicles carrying demountable tanks of inflammable liquids.

## MINING AND THE ENVIRONMENT

The concern of the mining industry for the environmental problems associated with its activities and its desire to reach a common understanding with genuine conservationists has been demonstrated by seminars organised in Victoria, New South Wales and Queensland by the Australian Conservation Foundation and by the major producers organisation, known as the Australian Mining Industry Council. The general theme was 'Mining and the Environment'.

In my last year's Report I used the expression 'Conservation' and referred to the fact that conservation of the natural environment goes hand in hand with anti-pollution measures. My use of the phrase 'Mining and Environment' in this paragraph has been selected to emphasise the dual nature of the problem. Conservation, in addition to conserving the environment and preventing wasteful exploitation, is concerned with the wise use of natural resources involving not only those resources but conflicting demands for land use. Pollution is concerned with waste from industry and methods of operation by industry which might unnecessarily damage the environment.

Although it is difficult to reconcile land use demands the mining industry feels that most conflicts, including the demand for national parks, can be satisfactorily resolved by an objective study of the problems by all parties of the facts of each particular situation. The mining industry recognises that land used for mining must be rehabilitated to the best purpose. One important factor which emerged from the seminars to which I have referred is the need for official bodies and procedures to encourage planning for future use and to resolve conflicts, in the public interest.

There is some confusion in much which is being said and written on the subject of conservation and it is interpreted by many as total preservation. Whilst preservation can be justified in some circumstances, conservation is primarily concerned to ensure that society has the maximum present and future benefits from the use of natural resources. It must not be forgotten that mining is a 'wasting asset' involving time-limited occupation and that provided there is adequate rehabilitation by the mining industry the land is still available after mining activity has ceased for the usually longer term competing uses for the same land.

Pollution is a problem which has occupied the constant attention of mining engineers of the Department so far as operational activities at mines are concerned and our laboratory at Launceston has continued to play an active role in the analysis of samples from deposit gauges.

The Government is preparing legislation to make provision for the protection of the environment.

A survey of mines and works in the State has indicated that during the past three years at least $3 has been expended in measures designed to combat pollution and that there will be a continuing annual operational expenditure of an estimated $200,000 to maintain and service the control measures which have been instituted.

## AUSTRALIAN MINERALS COUNCIL

The Council, which was formed to facilitate examination and discussion on matters relating to the administration of the mineral resources of Australia, consists of the Commonwealth Ministers for National Development, Interior and External Territories and the Minister for Mines of each State. The Council is assisted by an Advisory Committee comprising the Head of each State Mines Department and representatives of the Commonwealth Departments of National Development, Interior and External Territories. The Conferences of Chief Inspectors of Mines and of Chief Geologists act as sub-committees.

The Council has been concerned with such matters as mining and the environment, administration of the offshore petroleum legislation and studies being made with the object of endeavouring to formulate a common code for incorporation in the Mining Acts of all the States.

## REVENUE

REVENUE COLLECTED DURING THE YEAR ENDED 31 DECEMBER 1971

| *Head of Revenue* | $ |
|---|---|
| Public Works and Services—Mines Department | 69,617 |
| Rent and Fees of Auriferous and Mineral Lands | 155,058 |
| Royalty on Iron Ore Pellets | 325,471 |
| Survey Fees | 4,359 |
| Fees under the Explosives and Inflammable Liquids Act | 43,432 |
| TOTAL | 597,937 |

COMPARATIVE STATEMENT OF REVENUE FROM MINES, BEING RENTS, FEES, STORAGE OF EXPLOSIVES, ETC., PAID TO THE TREASURY DURING THE YEARS 1966 TO 1971

| *Year* | $ | *Year* | $ |
|---|---|---|---|
| 1966 | 135,350 | 1969 | 445,712 |
| 1967 | 161,892 | 1970 | 528,666 |
| 1968 | 205,941 | 1971 | 597,937 |

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 1971

| *Leases and Licences* | *Number* | *Area (acres)* | *Sluiceheads* |
|---|---|---|---|
| Antimony | 1 | 80 | .... |
| Copper and gold | 2 | 160 | .... |
| Easements | 1 | 80 | .... |
| Gold | 3 | 54 | .... |
| Gravel | 1 | 10 | .... |
| Minerals | 1 | 50 | .... |
| Molybdenite | 2 | 100 | .... |
| Rutile | 2 | 160 | .... |
| Silver-lead | 4 | 320 | .... |
| Scheelite | 2 | 160 | .... |
| Slate | 1 | 37 | .... |
| Stone | 6 | 416 | .... |
| Tin | 28 | 745 | .... |
| Water licences | 13 | 202.5 | 94 |
| Wolfram | 1 | 50 | .... |
| TOTAL | 68 | 2,624.5 | 94 |

TOTAL NUMBER OF LEASES AND LICENCES IN FORCE ON 31 DECEMBER 1971

| *Leases and Licences* | *Number* | *Area (acres)* | *Sluiceheads* |
|---|---|---|---|
| Antimony | 4 | 320 | .... |
| Bauxite | 6 | 475 | .... |
| Barytes | 2 | 80 | .... |
| Clay | 11 | 362 | .... |
| Coal | 10 | 3,701 | .... |
| Copper and gold | 7 | 1,395 | .... |
| Copper-nickel | 3 | 120 | .... |

| *Leases and Licences* | *Number* | *Area (acres)* | *Sluiceheads* |
|---|---|---|---|
| Dolomite | 4 | 309 | .... |
| Easements | 64 | 2,295 | .... |
| Feldspar | 2 | 15 | .... |
| Gold | 30 | 1,049 | .... |
| Granite | 3 | 25 | .... |
| Iron ore | 9 | 5,680 | .... |
| Kaolin | 3 | 160 | .... |
| Limestone | 1 | 1,635 | .... |
| Marble | 2 | 80 | .... |
| Mica | 1 | 20 | .... |
| Minerals | 68 | 12,663 | .... |
| Ochre | 2 | 8 | .... |
| Osmiridium and chromite | 8 | 2,134 | .... |
| Nickel | 1 | 80 | .... |
| Sand and gravel | 28 | 1,133 | .... |
| Scheelite | 8 | 636 | .... |
| Silica | 10 | 1,403 | .... |
| Silver-lead | 23 | 2,320 | .... |
| Stone | 51 | 1,242 | .... |
| Tin | 357 | 18,434 | .... |
| Wolfram | 16 | 2,846 | .... |
| Water licences | 147 | 990 | 1,277 |
| TOTAL | 881 | 61,910 | 1,277 |

NUMBER AND AREA OF LEASES AND LICENCES APPLIED FOR DURING THE YEAR ENDED 31 DECEMBER 1971

| *Leases and Licences* | *Number* | *Area (acres)* | *Sluiceheads* |
|---|---|---|---|
| Coal | 1 | 200 | .... |
| Copper | 1 | 80 | .... |
| Easements | 5 | 184 | .... |
| Feldspar | 1 | 40 | .... |
| Gold | 5 | 150 | .... |
| Limestone | 2 | 160 | .... |
| Marble | 1 | 60 | .... |
| Minerals | 7 | 265 | .... |
| Osmiridium | 1 | 10 | .... |
| Silver-lead | 1 | 10 | .... |
| Silica | 8 | 250 | .... |
| Tin | 69 | 3,101 | .... |
| Wolfram | 3 | 180 | .... |
| Water | 12 | 7 | 79 |
| TOTAL | 117 | 4,597 | 79 |

TOTAL NUMBER AND AREAS OF ALL TYPES OF PROSPECTING RIGHTS HELD AS AT 31 DECEMBER 1971

| *Mining Tenement* | *Number* | *Area* |
|---|---|---|
| Permits to enter and search on private land, including owners' consents | 22 | 53,264 acres |
| Exploration licences | 83 | 11,322 square miles |
| Special Prospector's licences | 22 | 220 square miles |
| Miners Rights | 83 | 41 acres |
| Prospectors licences | 191 | 9,550 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 | 7 | 1,703 graticular blocks (42,600 square miles) |

EXPLORATION LICENCES AND SPECIAL PROSPECTORS LICENCES IN FORCE AT 31 DECEMBER 1971

| *Licence No.* | *Holder* | *Address* | *Area (sq. miles)* | *Situation* | *Expiry Date* |
|---|---|---|---|---|---|
| E.L. 4/61 | Industrial & Mining Investigations Pty Ltd | Australia Square, Sydney | 147 | Savage River | 23.8.72 |
| E.L. 5/61 | Industrial & Mining Investigations Pty Ltd | Australia Square, Sydney | 450 | East Coast | 24.8.72 |
| E.L. 1/62 | Electrolytic Zinc Co. of A/asia Pty Ltd | Rosebery | 49 | Rosebery | 22.7.72 |
| E.L. 2/62 | Electrolytic Zinc Co. of A/asia Pty Ltd | Rosebery | 10 | Dundas | 12.3.72 |
| E.L. 1/63 | Cleveland Tin N.L. | 233 Collins Street, Melbourne | 27 | Mt Cleveland | 10.8.72 |
| E.L. 2/63 | Aberfoyle Tin N.L. | 233 Collins Street, Melbourne | 87 | Mt Lindsay | 1.4.72 |
| E.L. 5/63 | Comstaff Pty Ltd | 60 Market Street, Melbourne | 288 | West Coast | 30.6.72 |
| E.L. 8/65 | Mt Lyell Mining and Railway Co. Ltd | Queenstown | 28 | Devon | 12.5.72 |
| E.L. 13/65 | Broken Hill Pty Co. Ltd | 500 Bourke Street, Melbourne | 748 | SW Tasmania | 21.6.72 |
| E.L. 18/65 | Esso Exploration Production Aust. | Box 4249, Sydney | 230 (internal waters) | W & SW Coast | 17.9.72 |
| E.L. 9/66 | Mt Lyell Mining and Railway Co. Ltd | Queenstown | 67 | Mt Tyndall | 5.8.72 |
| E.L. 13/66 | Naracoopa Rutile Ltd | King Island | 15 | Wayanna, King Island | 19.4.72 |
| E.L. 15/66 | King Island Scheelite | King Island | 24 | King Island | 24.4.72 |
| E.L. 11/67 | Storeys Creek Tin Mining Co. N.L. | Rossarden | 22 | Rossarden | 21.7.72 |
| E.L. 1/68 | Comstaff Pty Ltd | C/o Anglo-American Corp., Aust. Ltd | 220 | West Coast | 30.6.72 |
| E.L. 4/68 | J. Curtain | King Island | 5 | King Island | 11.7.72 |
| E.L. 6/68 | Texins Development Pty Ltd | C/o Geophoto Resources Consultants, 30 Herschel Street, Brisbane | 256 | Branxholm | 23.2.72 |
| E.L. 7/68 | Texins Development Pty Ltd | C/o Geophoto Resources Consultants, 30 Herschel Street, Brisbane | 122 | Dundas | 23.2.72 |
| E.L. 15/68 | Ringarooma Mining Pty Ltd | 147 Macquarie Street, Hobart | 28 | Ringarooma | 25.4.72 |
| E.L. 16/68 | A.C.I. Operations Pty Ltd | 110 Gormanston Road, Moonah | 162 | West Coast | 4.5.72 |
| E.L. 17/68 | Tasminex N.L. | 93 York Street, Launceston | 189 | Black Range | 4.5.72 |
| E.L. 1/69 | Tasminex N.L. | 93 York Street, Launceston | 107 | Natone | 10.8.72 |
| E.L. 4/69 | King Island Scheelite (1947) Ltd | King Island | 35 | NW King Island | 14.3.72 |
| E.L. 5/69 | King Island Scheelite (1947) Ltd | King Island | 116 | W King Island | 14.3.72 |
| E.L. 7/69 | Allstate Exploration N.L. | C/o A. H. Dickens & Co., George Street, Sydney | 5,300 | Beaconsfield | 21.4.72 |
| E.L. 8/69 | Tasminex N.L. | 93 York Street, Launceston | 49 | Neasey Plains, Arthur River | 12.5.72 |
| E.L. 9/69 | Naracoopa Rutile Ltd | 291 George Street Sydney | 15 | Sea Elephant Bay | 21.5.72 |
| E.L. 10/69 | Mt Lyell Mining and Railway Co. Ltd | Queenstown | 45 | Queenstown | 5.6.72 |
| E.L. 19/69 | Mole Creek Limestone Pty Ltd | 418 Swan Street, Richmond, Victoria | 32 | Mole Creek | 3.3.72 |
| E.L. 23/69 | King Island Scheelite (1947) Ltd | King Island | 55 | King Island | 16.4.72 |
| E.L. 2/70 | Aberfoyle Tin N.L. | 233 Collins Street, Melbourne | 226 | Mt Remus | 30.6.72 |
| E.L. 5/70 | B. R. Forster | 12 Delamere Crescent, Trevallyn | 15 | Bridport | 30.1.72 |
| E.L. 11/70 | McClarm Prospecting Syndicate N.L. | C/o A. McCormick, 104 Regent Street, Sandy Bay | 4 | Lower Beulah | 4.9.72 |
| E.L. 18/70 | B.M.I. Mining Pty Ltd | P.O. Box 42, Wentworthville, N.S.W. | 250 | Cape Barren Island | 24.3.72 |
| E.L. 19/70 | B.M.I. Mining Pty Ltd | P.O. Box 42, Wentworthville, N.S.W. | 158 | NE Tasmania | 24.3.72 |
| E.L. 20/70 | Associated Pulp & Paper Mills Ltd | Burnie | 31 | Mt Stronach | 2.4.72 |
| E.L. 21/70 | Associated Pulp & Paper Mills Ltd | Burnie | 144 | Pioneer | 2.4.72 |

PARTICULARS OF EXPLORATION LICENCES, ETC.—*continued*

| *Licence No.* | *Holder* | *Address* | *Area (sq miles)* | *Situation* | *Expiry Date* |
|---|---|---|---|---|---|
| E.L. 22/70 | Oceanic Exploration Co. | C/o Butler, McIntyre & Butler, 28 Murray Street, Hobart | 24 | Diddleum Plains | 2.4.72 |
| E.L. 24/70 | B.M.I. Mining Pty Ltd | P.O. Box 42, Wentworthville, N.S.W. | 118 | Warrentinna | 14.4.72 |
| E.L. 42/70 | Nebo Explorations Pty Ltd | 39 Harrington Street, Hobart | 157 | Parrawe | 15.4.72 |
| E.L. 43/70 | Mineral Holdings Aust. Pty Ltd | 343 Collins Street, Melbourne | 23 | West Takone | 15.4.72 |
| E.L. 44/70 | A. R. Dodson | C/o Minops Ltd, 505 St Kilda Road, Melbourne | 60 | Zeehan | 3.4.72 |
| E.L. 45/70 | R. B. Ling | Edith Creek | 24 | Edith Creek | 4.5.72 |
| E.L. 47/70 | Fimiston Minerals N.L. | 74 Pitt Street, Sydney | 293 | Macquarie Harbour | 18.5.72 |
| E.L. 48/70 | Renison Ltd | Renison Bell | 173 | Pieman River | 10.6.72 |
| E.L. 49/70 | A.C.I. Minerals Pty Ltd | P.O. Box 872J, Hobart | 138 | Sandy Cape | 10.6.72 |
| E.L. 50/70 | Bassmin (Aust.) Pty Ltd | P.O. Box 1981R, Melbourne | 12 | SW King Island | 8.6.72 |
| E.L. 53/70 | Valley Exploration Pty Ltd | 28 Market Street, Melbourne | 40 | Stanley River | 10.6.72 |
| E.L. 54/70 | Bassmin (Aust.) Pty Ltd | P.O. Box 1981R, Melbourne | 18 | Yellow Rock | 10.6.72 |
| E.L. 1/71 | Comalco Limited | G.P.O. Box 2773Y, Melbourne | 22 | Cape Sorell | 7.7.72 |
| E.L. 4/71 | L. L. Lewis | C/o Opalton Mining N.L., G.P.O. Box 5222, Sydney | 110 | Montagu | 13.7.72 |
| E.L. 7/71 | J. C. Rudge | Latrobe | 15 | East Sassafrass | 19.1.72 |
| E.L. 9/71 | Bassmin (Aust.) Pty Ltd | P.O. Box 1981R, Melbourne | 9 | Sea Elephant River | 19.7.72 |
| E.L. 15/71 | Bassmin (Aust.) Pty Ltd | G.P.O. Box 1981R, Melbourne | 3 | Sea Elephant River | 22.3.72 |
| E.L. 18/71 | Ludbrooks Limited | 7 Murray Street, Hobart | 167 | SW Tasmania | 20.4.72 |
| E.L. 31/71 | C. V. Johnson | 315 Main Road, Glenorchy | 30 | vcty King William | 16.2.72 |
| E.L. 33/71 | Allstates Tas. Pty Ltd | C/o W. D. Bartlett, Gravelly Beach | 7 | Beaconsfield | 2.6.72 |
| E.L. 36/71 | Mining Systems (Tas.) Pty Ltd | P.O. Box 707, Burnie | 11 | Black River | 4.2.72 |
| E.L. 41/71 | Mt Lyell Mining and Railway Co. Ltd | Queenstown | 48 | Queenstown | 4.2.72 |
| E.L. 42/71 | Renison Limited | Renison Bell | 8 | Renison Bell | 23.8.72 |
| E.L. 43/71 | R. B. Winspear | Bicheno | 5 | Bellingham | 12.4.72 |
| E.L. 44/71 | Tasminex N.L. | 83 George Street, Launceston | 60 | Hampshire | 10.3.72 |
| E.L. 46/71 | J. E. Beams | 53 Forster Street, Launceston | 3 | Lone Star Creek | 21.6.72 |
| E.L. 47/71 | Gippsland Minerals N.L. | 138 Flinders Street, Melbourne | 16 | Zeehan | 21.6.72 |
| S.P.L. 3 | Electrolytic Zinc Co. of A/asia Ltd | Rosebery | 10 | Tullah | 6.7.71 |
| S.P.L. 22 | Electrolytic Zinc Co. of A/asia Ltd | Rosebery | 23 | Trial Harbour | 9.6.72 |
| S.P.L. 24 | Ludbrooks Ltd | Box 4505, Melbourne | 21 | Cox Bight | 19.7.72 |
| S.P.L. 27 | Renison Ltd | Renison Bell | 5 | South Dundas | 19.7.72 |
| S.P.L. 37 | Heazlewood Nickel Prospecting Syn. N.L. | C/o A. McCormick, 104 Regent Street, Sandy Bay | 6 | Heazlewood | 7.5.72 |
| S.P.L. 46 | McIntyre Mines (Aust.) Pty Ltd | 8-12 Bridge Street, Sydney | 19 | Dundas | 30.4.72 |
| S.P.L. 61 | Eastern Tin Pty Ltd | 114 Collins Street, Hobart | 4 | Coles Bay | 24.3.72 |
| S.P.L. 62 | A. R. Smith | Longford | 25 | Professor Range | 2.4.72 |
| S.P.L. 70 | D. M. Lewis | Swansea | 11 | Mt Maud | 14.4.72 |
| S.P.L. 77 | R. C. Lawry | Gladstone | 3 | Gladstone | 25.2.72 |
| S.P.L. 80 | B. Padgett | Nunamara | 1 | vcty Dorset Dredge | 5.3.72 |

PARTICULARS OF EXPLORATION LICENCES, ETC.—*continued*

| *Licence No.* | *Holder* | *Address* | *Area (sq miles)* | *Situation* | *Expiry Date* |
|---|---|---|---|---|---|
| S.P.L. 82 | J. S. Cox | Ringarooma | 4 | Mt Maurice | 11.3.72 |
| S.P.L. 86 | E. K. King | Private Bag, Derby | 5 | Gladstone | 2.4.72 |
| S.P.L. 92 | M. L. Watt | Gladstone | 6 | Gladstone | 29.3.72 |
| S.P.L. 93 | H. J. Stackpole | Scottsdale | 3 | Mt Cameron | 29.3.72 |
| S.P.L. 94 | Mt Lyell Mining and Railway Co. Ltd | Queenstown | 5 | Strahan | 13.4.72 |
| S.P.L. 95 | Texins Development Pty Ltd | 30 Herschell Street, Brisbane | 8 | S Heemskirk | 10.5.72 |
| S.P.L. 97 | Ludbrooks Ltd | 7 Murray Street, Hobart | 18 | Port Davey | 5.8.72 |
| S.P.L. 99 | I. M. Tuckwell | 33 Erskine Street, Sydney | 4 | Godkin Range | 28.4.72 |
| S.P.L. 105 | N. F. Clark | 13 Hoffman Street, Midway Point | 13 | Cardigan River | 25.4.72 |
| S.P.L. 106 | Mineral Holdings Aust. Pty Ltd | 447 Collins Street, Melbourne | 22 | Branxholm | 27.4.72 |
| S.P.L. 107 | N. B. Brown | Ringarooma | 1 | Una Plain | 15.6.72 |

## EXEMPTIONS

The following exemptions to the labour covenants of leases were granted in circumstances beyond the control of the lessees:—

D. C. Dunkley, B. F. Groves and F. A. Rubens; Lease 54M/68, Zeehan from 1 March to 31 May 1971.

T. W. Davies: Leases 758P/M, 759P/M, 764P/M, 767P/M, 768P/M, 772P/M and 773P/M at Beaconsfield from 1 May 1971 to 30 June 1972 conditionally that testing of ore reserves was carried out and to enable purchase and installation of plant to proceed.

## WARDEN'S COURT

*Objections by land owners to the granting of an Exploration Licence applied for by Investment Trust Ltd.* This matter was referred to in my last Report. The appeal to the Supreme Court from the Warden's decision has not been proceeded with by the company and as a consequence the land concerned in the application remains 'tied up'. The Department is unable to deal with the application for the exploration licence and all enquiries for leases within the area applied for must be rejected. The whole position is most unsatisfactory but the Department has no legal power to break the deadlock.

*John Hood Pty Ltd* v. *A.C.I. Operations Pty Ltd.*

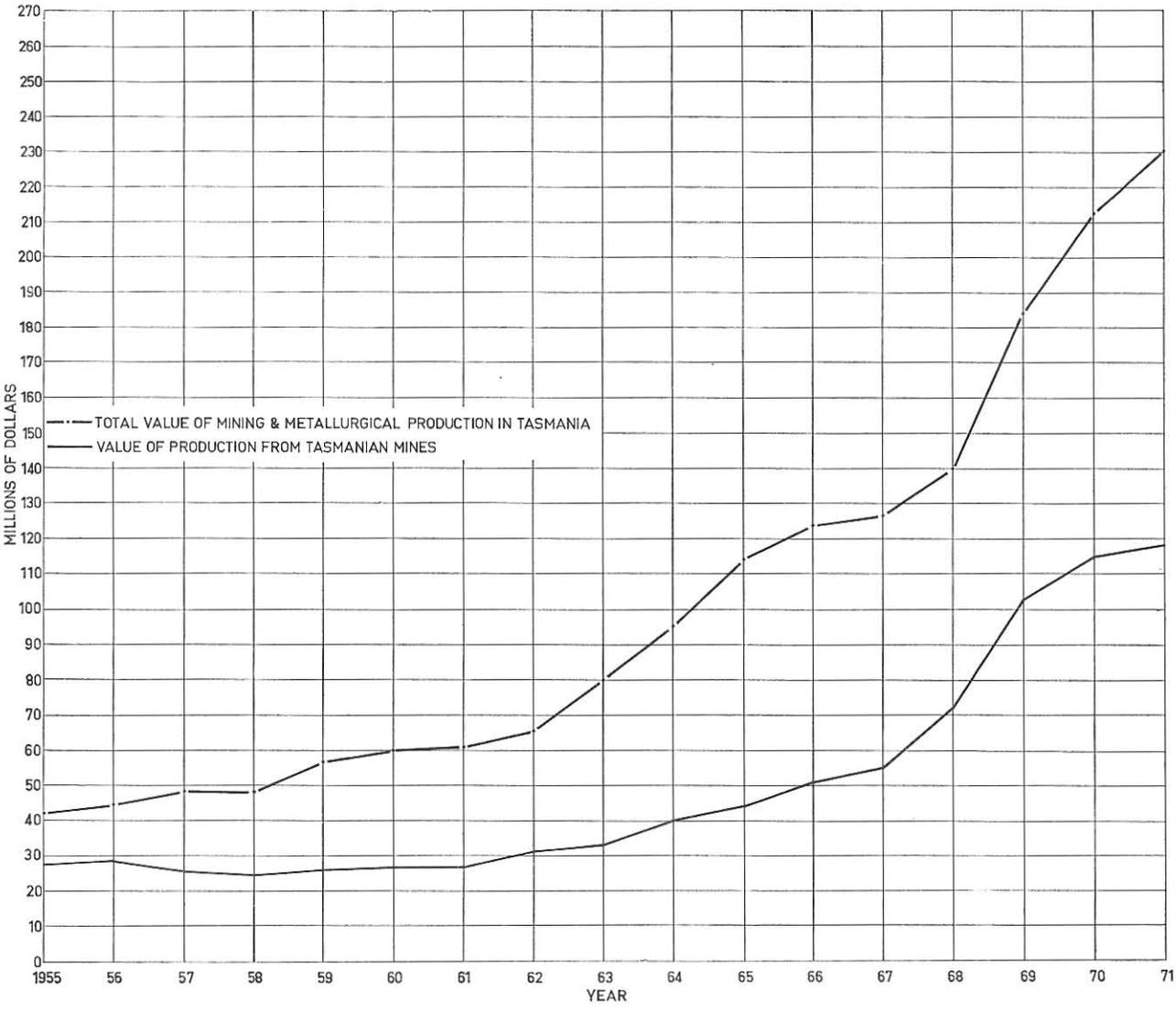
*John Hood Pty Ltd* v. *Renison Limited.* These actions relate to an objection by the plaintiff to the granting of exploration licences granted to the defendants in respect of areas in western and north-western Tasmania. The Warden of Mines at Devonport (J. Temple-Smith) refused the objection with costs against the plaintiff.

## MINE MANAGERS' CERTIFICATES

Metalliferous Mine Managers' Certificates were issued by the Board of Examiners under the Mines Inspection Act 1968, to Malcolm James Hillbeck, Terence Alexander Ward, Claude Edgar Caldwell Wearne, John Carrack Boyce, John Raymond Brett, Frederick Eldred St George Halton, Frederick William Kipling, Roy Henderson Swan, Waino Elmer Seppanen, Roger Billingham, Roy Columbus Thomas, Charles MacFarlane and Terence Frederick Lanz.

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

| *Year* | $ | *Year* | $ |
|---|---|---|---|
| 1962 | 30,874,136 | 1967 | 55,252,710 |
| 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 |




VALUE OF MINING AND METALLURGICAL PRODUCTION, 1955-71

## MINERAL PRODUCTION SINCE 1880

QUANTITY AND VALUE OF MINERAL PRODUCTION AS AT 31 DECEMBER 1971

| *Mineral* | | *Total Quantity* | *Value* $ |
|---|---|---|---|
| METALLIC MINERALS | | | |
| Antimony | (tons) | 3 | 2,034 |
| Bismuth | (tons) | 84 | 59,288 |
| Cadmium | (tons) | 1,899 | 6,050,256 |
| Cobalt oxide | (tons) | 26.74 | 61,398 |
| Copper (blister) to 1918 (now shown under Silver and Copper | (tons) | 166,600 | 27,577,054 |
| Copper matte | (tons) | 6,227 | 267,472 |
| Copper ore to 1918 (now shown under Copper) | (tons) | 41,769 | 1,155,746 |
| Copper (from 1919) | (tons) | 563,366 | 281,519,765 |
| Crocoite | (specimens only) | .... | 11,402 |
| Gold | (fine oz) | 2,892,443 | 40,278,102 |
| Ilmenite | (tons) | 550 | 2,512 |
| Iron ore pellets | (tons) | 6,714,656 | 84,482,219 |
| Iron oxide (including hematite, limonite and magnetite) | (tons) | 166,063 | 561,181 |
| Lead (from 1919) | (tons) | 434,716 | 63,149,545 |
| Manganese | (tons) | 1 | 6 |
| Manganese dioxide (from 1957) | (tons) | 4,032 | 132,507 |

5 cm

| *Mineral* | | *Total Quantity* | *Value* $ |
|---|---|---|---|
| Mercury | (lb) | 13,487 | 81,408 |
| Monazite | (tons) | 33 | 1,214 |
| Nickel | (tons) | 233 | 81,036 |
| Osmiridium | (oz) | 31,100 | 1,418,771 |
| Pyrite (to 1970) | (tons) | 1,910,988 | 8,691,653 |
| Pyrite (from 1971) | (tons) | 179,529 | .... |
| Rutile | (tons) | 1 | 36 |
| Rutile (concentrates) | (tons) | 19,469 | 3,113,480 |
| Scheelite | (tons) | 29,150 | 66,093,477 |
| Silica for silicon alloy production | (tons) | 52,912 | 489,694 |
| Silicon as silicon alloys | (tons) | 88,429 | 9,752,599 |
| Silver-lead ore to 1918 (now shown under Silver and Lead) | (tons) | 1,083,898 | 12,858,582 |
| Silver (from 1919) | (fine oz) | 54,785,604 | 39,240,947 |
| Sulphur as sulphuric acid (from 1957) | (mono tons) | 898,787 | 12,370,679 |
| Tin | (tons) | 171,489 | 148,776,800 |
| Wolfram | (tons) | 19,149 | 32,311,910 |
| Zinc | (tons) | 1,036,771 | 193,060,068 |
| Zinc sulphate (from 1957) | (tons) | 3,200 | 324,177 |
| Zircon (concentrates) | (tons) | 15,941 | 890,965 |
| **NON-METALLIC MINERALS** | | | |
| Asbestos | (tons) | 3,980 | 34,284 |
| Baryte | (tons) | 2,205 | 16,478 |
| Clay (from 1958)— | | | |
| Brick | (cubic yards) | 1,425,822 | 2,754,935 |
| Tile | (cubic yards) | 46,689 | 67,279 |
| Other | (cubic yards) | 401,107 | 1,079,770 |
| Dolomite | (tons) | 41,497 | 243,295 |
| Graphite | (tons) | 40 | 214 |
| Kaolin | (tons) | 111,086 | 883,018 |
| Limestone— | | | |
| Agricultural and other | (tons) | 816,334 | 1,955,380 |
| Carbide | (tons) | 835,428 | 2,779,767 |
| Cement | (tons) | 6,816,300 | 10,470,853 |
| Chemical and metallurgical | (tons) | 4,365,056 | 5,593,012 |
| Ochre | (tons) | 2,757 | 21,131 |
| Pebbles (from 1957) | (tons) | 12,992 | 216,635 |
| Sand (Moulding) | (tons) | 850 | 9,550 |
| Silica | (tons) | 282,108 | 658,096 |
| Talc | (tons) | 333 | 2,154 |
| **FUEL MINERALS** | | | |
| Coal | (tons) | 9,939,326 | 26,723,983 |
| Shale | (tons) | 41,572 | 62,462 |
| Peat | (tons) | 642 | 36,708 |
| **CONSTRUCTION MATERIALS** | | | |
| Building stone— | | | |
| Freestone | (cubic yards) | 9,298 | 149,784 |
| Granite | (cubic yards) | 6,038 | 85,753 |
| Other | (cubic yards) | 9,469 | 27,466 |
| Crushed and broken stone (from 1958)— | | | |
| Basalt | (cubic yards) | 2,110,566 | 5,190,959 |
| Dolerite | (cubic yards) | 8,575,977 | 25,800,043 |
| Limestone | (cubic yards) | 344,288 | 913,182 |
| Sandstone | (cubic yards) | 45,395 | 80,581 |
| Other | (cubic yards) | 2,445,580 | 6,114,385 |
| Gravel (from 1958) | (cubic yards) | 16,843,082 | 18,430,393 |
| Sand (from 1958) | (cubic yards) | 1,785,818 | 2,463,256 |
| Other road materials | (cubic yards) | 3,084,020 | 3,549,723 |
| | | | $1,152,830,816 |

## STATISTICS RELATING TO THE MINERAL INDUSTRY

| Mineral | Year ended 31 December 1970 | | Year ended 31 December 1971 | |
|---|---|---|---|---|
| | Total Quantity | Value $A | Total Quantity | Value $A |
| METALLIC MINERALS— | | | | |
| Cadmium (tons) | 38 | 275,140 | 74 | 272,563 |
| Cobalt oxide (tons) | 1.51 | 5,902 | 1.92 | 7,596 |
| Copper (tons) | 23,016 | 30,185,785 | 24,800 | 24,803,453 |
| Crocoite | Specimens only | .... | Specimens only | 7,500 |
| Gold (fine oz) | 39,386 | 1,266,882 | 53,365 | 1,933,457 |
| Iron ore pellets (tons) | 1,887,479 | 23,708,579 | 2,158,879 | 27,038,303 |
| Iron oxide (tons) | 9,457 | 60,667 | 10,555 | 65,526 |
| Lead (tons) | 10,558 | 2,981,018 | 12,255 | 2,926,075 |
| Manganese dioxide (tons) | 194 | 6,982 | 501 | 17,034 |
| Mercury (lb) | 2,845 | 16,166 | 665 | 2,484 |
| Pyrites (tons) | 75,338 | 205,151 | 179,529 | ....* |
| Rutile (concentrates) (tons) | 7,409 | 1,216,274 | 6,821 | 1,122,120 |
| Silica for silicon alloy production (tons) | 14,535 | 145,350 | 8,092 | 80,920 |
| Silicon as silicon alloys (tons) | 27,021 | 2,777,913 | 16,780 | 1,911,782 |
| Silver (fine oz) | 1,417,697 | 2,237,470 | 1,669,493 | 2,172,403 |
| Sulphur as sulphuric acid (mono tons) | 145,827 | 2,304,745 | ....* | 5,834,049* |
| Tin (tons) | 4,939 | 16,927,602 | 6,071 | 19,854,601 |
| Tungsten as tungstic oxide (tons) | 1,410 | 9,682,704 | 1,716 | 7,826,272 |
| Zinc (tons) | 37,723 | 12,335,394 | 41,183 | 14,829,575 |
| Zinc sulphate (tons) | 92 | 9,780 | Nil | Nil |
| Zircon (concentrates) (tons) | 6,075 | 333,052 | 3,770 | 217,378 |
| *Value of Metallic Minerals* | .... | 106,682,556 | .... | 109,544,674 |
| NON-METALLIC MINERALS— | | | | |
| Clay— | | | | |
| Brick (cubic yards) | 83,920 | 183,459 | 79,980 | 165,417 |
| Tile (cubic yards) | 2,256 | 4,512 | 3,429 | 6,858 |
| Other (cubic yards) | 50,611 | 162,524 | 64,032 | 212,172 |
| Dolomite (tons) | 3,341 | 20,045 | 2,518 | 14,406 |
| Limestone— | | | | |
| Agricultural (tons) | 26,626 | 58,714 | 23,877 | 91,833 |
| Carbide (tons) | 28,660 | 232,029 | 25,728 | 257,280 |
| Cement (tons) | 413,957 | 815,496 | 377,650 | 743,970 |
| Chemical and metallurgical (tons) | 36,089 | 134,035 | 39,098 | 176,819 |
| Other (tons) | 3,861 | 4,711 | 11,572 | 7,386 |
| Ochre (tons) | 41 | 595 | 70 | 982 |
| Pebbles (tons) | 1,642 | 31,943 | 1,486 | 29,246 |
| Silica (tons) | 35,066 | 157,306 | 28,005 | 95,976 |
| *Value of Non-Metallic Minerals* | .... | 1,805,369 | .... | 1,802,345 |
| FUEL MINERALS— | | | | |
| Coal (tons) | 124,499 | 617,565 | 121,965 | 600,140 |
| Peat (tons) | 139 | 8,000 | 224 | 12,832 |
| *Value of Fuel Minerals* | .... | 625,565 | .... | 612,972 |
| CONSTRUCTION MATERIALS— | | | | |
| Crushed and broken stone— | | | | |
| Basalt (cubic yards) | 213,119 | 639,357 | 136,135 | 408,405 |
| Dolerite (cubic yards) | 745,612 | 2,250,451 | 880,711 | 2,663,693 |
| Limestone (cubic yards) | 31,201 | 93,603 | 37,607 | 112,821 |
| Sandstone (cubic yards) | 30 | 250 | Nil | Nil |
| Other (cubic yards) | 317,124 | 978,232 | 528,630 | 1,586,277 |

STATISTICS RELATING TO THE MINERAL INDUSTRY—*continued*

| *Mineral* | *Year ended 31 December 1970* | | *Year ended 31 December 1971* | |
|---|---|---|---|---|
| | *Total Quantity* | *Value $A* | *Total Quantity* | *Value $A* |
| Building stone— | | | | |
| Freestone .... .... (cubic yards) | 1,444 | 24,911 | 1,025 | 36,666 |
| Granite .... .... .... (cubic yards) | .... | .... | 60 | 600 |
| Other .... .... .... (cubic yards) | 640 | 1,920 | Nil | Nil |
| Gravel .... .... .... .... (cubic yards) | 1,327,471 | 1,584,145 | 1,168,953 | 1,371,838 |
| Sand .. .... .... .... .... (cubic yards) | 234,463 | 336,262 | 145,417 | 197,228 |
| Other road material .... (cubic yards) | 388,216 | 446,422 | 197,246 | 282,716 |
| *Value of Construction Materials* .... | .... | 6,355,553 | .... | 6,660,244 |
| *Total Value with Australian Metal Prices* .. .... .... .... .... .... .... | .... | 115,469,043 | .... | 118,620,235 |
| METALLURGICAL PRODUCTION FROM OTHER THAN TASMANIAN ORES— | | | | |
| Alumina .. .... .... .... .... .... .... .... | .... | 96,507,223 | .... | 111,892,092 |
| Aluminium .... .... .... .... .... .... .... | | | | |
| Aluminium hydrates .... .... .... .... .... | | | | |
| Aluminium sulphate .... .... .... .... .... | | | | |
| Cadmium .. .... .... .... .... .... .... .... | | | | |
| Cobalt oxide .. .... .... .... .... .... .... | | | | |
| Ferro-manganese .. .... .... .... .... .... | | | | |
| Titanium dioxide .. .... .... .... .... .... | | | | |
| Zinc .. .... .... .... .... .... .... .... .... | | | | |
| *Value of Mining and Metallurgical Production* .. .... .... .... .... .... | .... | 211,976,266 | .... | 230,512,327 |
| Average Number of Employees .... .... .... | 10,773 | | 10,853 | |

* Amendment to 1970 figures:—

Pyrites—179,529 tons (value included with Sulphur as sulphuric acid)
Sulphur as sulphuric acid—398,867 mono tons, value $5,834,049

## AID TO MINING

One operator engaged in alluvial tin mining in the Gladstone district was granted financial assistance for drilling operations and for purchase of a pump and piping.

Loans are repayable by royalty, usually 7½%, based on the gross proceeds of minerals produced. Interest at a low rate is charged and a Mortgage Deed is taken as security over the assets at the mine.

Repayments are credited to the Mining Trust Fund and are used to finance other projects. All applications for assistance are investigated by a mining engineer or a geologist of the Department and advances are made only in those cases where it is considered that the mineral deposit to be worked has prospects of economic development.

*Mt Bischoff Mine:* The reserved areas in the vicinity of the old mine continued to be held under an Authority to Prospect and exploration is being undertaken by Anglo-American Corporation on behalf of Comstaff Pty Ltd. Small tribute parties retained interest in production from tribute areas and engaged in intermittent operations. A tribute royalty of 2½% is payable on tin produced.

*Mining Plant:* There was no demand for hire of the small compressor, drill, pump and winch purchased some years ago to enable testing of prospects.

STATEMENT OF RECEIPTS AND PAYMENTS OF THE MINING TRUST FUND FOR THE YEAR ENDED 31 DECEMBER 1971

| *Receipts* | $ | *Payments* | $ |
|---|---|---|---|
| Balance as at 1 January 1971 | 21,977.29 | Assistance | 4,425.00 |
| Repayment of loans | 6,870.62 | Maintenance— | |
| Interest on loans | 1,112.19 | Tribute area, Mt Bischoff | 93.54 |
| Tribute royalty | 1,005.43 | Mining plant | 19.40 |
| Hire of mining plant | 16.00 | Balance to next Account | 26,443.59 |
| | $30,981.53 | | $30,981.53 |

## STAFF

The following were the staff movements during the year:—

| *Name* | *Position* | *Remarks* | |
|---|---|---|---|
| Abtmaier, B. F. | Geologist | Resigned | 8.9.71 |
| Bailey, Mrs K. L. | Typist | Resigned | 22.2.71 |
| Bellenger, Miss L. V. | Typist | Appointed | 6.12.71 |
| Benn, G. | Surveyor | Appointed | 16.4.71 |
| Connolly, G. L. | Typist | Resigned | 29.1.71 |
| Corbett, Mrs E. B. | Geologist | Appointed | 8.3.71 |
| Corbett, K. D. | Geologist | Appointed | 8.3.71 |
| Eastoe, R. J. | Laboratory Assistant | Appointed | 2.2.71 |
| Elmer, S. | Geologist | Resigned | 24.12.71 |
| Frith, M. D. | Cadet Chemist | Appointed | 4.2.71 |
| Green, G. R. | Geologist | Appointed | 2.2.71 |
| Harris, S. | Field Assistant | Resigned | 24.3.71 |
| Hewitt, Miss C. G. | Typist | Appointed | 23.3.71 |
| James, B. N. | Field Assistant | Appointed | 15.7.71 |
| Lane, D. J. | Field Assistant | Appointed | 19.7.71 |
| Littlejohn, A. B. | Field Assistant | Resigned | 25.6.71 |
| Mackinnon, H. M. G. | Draughtsman | Appointed | 4.1.71 |
| Marriott, Mrs W. | Technical Officer | Appointed | 21.4.71 |
| McIntyre, J. A. | Accountant | Appointed | 11.3.71 |
| Norton, Miss M. P. | Typist | Appointed | 2.2.71 |
| Phillips, Miss L. M. | Typist | Resigned | 6.10.71 |
| Roby, R. N. J. | Chemist | Appointed | 12.12.71 |
| Smith, C. P. | Clerk | Appointed | 14.1.71 |
| Thomas, R. C. | Mining Engineer | Appointed | 7.6.71 |
| Thomas, P. | Chemist | Appointed | 18.1.71 |
| Warren, J. P. | Laboratory Technician | Resigned | 29.1.71 |
| Webb, C. S. | Laboratory Technician | Appointed | 2.2.71 |

## SCHOLARSHIPS

Geology Scholarships were awarded to R. H. Castleton and M. Ingham.

## OVERSEAS VISIT

During the year the Deputy State Mining Engineer (P. M. Johnstone) visited South Africa, Zambia and Sweden to study new mining techniques the application of which are of interest in mining development in this State.

## CONCLUSION

Appreciation is recorded of the services rendered by officers of the Department, including officers of the Mines Draughting Section, Wardens of Mines and 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 | $ |
|---|---|---|---|---|---|
| 1924–66 | 1,600 | 4,473,513 | 1969 | 39 | 255,267 |
| 1967 | 74 | 383,131 | 1970 | 38 | 275,140 |
| 1968 | 74 | 390,642 | 1971 | 74 | 272,563 |
| | | | Total | 1,899 | 6,050,256 |

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

### COBALT OXIDE

The source of the 1.92 tons of cobalt oxide of value $7,596 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 | $ |
| 1919–1966 | 339 | 248,582 | 14,388 | 8,616,970 | 450,877 | 159,124,095 | 404 | 212,162 | 466,008 | 168,010,809 |
| 1967 | .... | .... | 1,220 | 1,300,541 | 15,081 | 16,026,071 | .... | .... | 16,301 | 17,326,612 |
| 1968 | 169 | 173,213 | 1,303 | 1,433,063 | 14,470 | 15,915,117 | .... | .... | 15,942 | 17,521,393 |
| 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 |
| Total | 2,750 | 3,138,731 | 21,147 | 16,498,205 | 493,227 | 208,564,870 | 46,242 | 53,317,959 | 563,366 | 281,519,765 |

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

| | Tons |
|---|---|
| Mining— | |
| Overburden removed from West Lyell Mine | 327,584 |
| Ore mined— | |
| Prince Lyell | 223,545 |
| West Lyell | 1,511,452 |
| Crown Lyell | 427,547 |
| Cape Horn | 231,829 |
| Lyell Tharsis | 27,342 |
| Precipitate | 33 |
| | 2,421,748 |
| Limestone delivered to works | 8,001 |
| Copper concentrate produced | 86,455 |
| Containing— | |
| Copper (tons) | 22,247 |
| Silver (fine oz) | 118,076 |
| Gold (fine oz) | 13,524 |
| Pyrite concentrate produced | 89,272 |
| Total value of production | $23,366,097 |

| Average number of men employed— | *Tons* |
|---|---|
| Open cut | 110 |
| Underground | 334 |
| Other | 1,099 |
| Total | 1,543 |

Production from the inception to 31 December 1971—

| | |
|---|---|
| Copper (tons) | 699,083 |
| Gold (fine oz) | 677,489 |
| Silver (fine oz) | 16,664,477 |

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

DEVELOPMENT

| *Mine* | *Shaft Sinking (ft)* | *Driving and Cross-cutting* (ft)* | *Rising (ft)* | *Diamond Drilling (ft)* |
|---|---|---|---|---|
| Prince Lyell | 888 | 17,042 | 1,111 | 2,404 |
| Cape Horn | .... | 12,399 | 1,149 | 6,406 |
| Crown | .... | 2,344 | 1,232 | .... |
| Lyell Tharsis | .... | 963 | 218 | .... |
| Royal Tharsis | .... | 232 | .... | .... |
| Exploration | .... | .... | .... | 8,181 |
| Total | 888 | 32,980 | 3,710 | 16,991 |

* 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 winder house and headframe were completed and the Siemens skip winder was commissioned for sinking operations. Shaft sinking commenced and had reached 980 feet below the collar at the end of the year. Plats were cut at No. 11, 12 and 13 Levels. No serious water problems were encountered nor did the ground conditions delay the contractors (Messrs Roberts Holland) unduly. The installation of the cage winder was commenced by Siemens towards the end of the year. At the present rate of progress, sinking should be completed by the end of July 1972, and the equipping could then be finished before the end of that year.

*Prince Lyell Decline.* Two levels, the 830 and 735, were developed from this decline. An underground workshop was cut and after equipping will be brought into service in 1972. Provision has also been made for the installation of an underground re-fuelling station near the workshop.

*Cape Horn.* The haulage drive development from the North Lyell tunnel has reached the ore body and preparatory work for the ore pass and ventilation rises is in progress. Contractors have been engaged to drill these rises using a raise borer. The difficulties experienced with ground conditions at this mine have necessitated a change in mining method; future development below the 1,155 feet sub-level is aimed at converting from sub-level caving to sub-level open stoping leaving a 50-foot pillar under the cave. No ore extraction figures are available for the cave to date but will be assessed when caving is complete in 1972.

*Crown Mine.* The tonnage produced nearly equalled the budget figure. Excess water in an ore pass, deterioration of the draw point brows and walls in the scram drifts, have prevented the target being reached. Overburden stripping of Crown 3 open-cut (above the sub-level open stopes on the upper levels of Crown Mine) was commenced and during the year 1,018,000 cubic yards were removed. A major slip of about 50,000 cubic yards occurred during the year, but fortunately resulted in no serious injury or damage to property. A small parcel of ore was produced towards the end of 1971 and when blended with 'run of mine' ore gave no serious metallurgical problems.

*Lyell Tharsis.* Developments of the Lyell Tharsis ore body for sub-level open stoping was commenced during the year.

*Royal Tharsis.* A development drive from the North Lyell Tunnel towards the Royal Tharsis ore body was commenced. It is also planned to mine this ore body by sub-level open stoping.

*West Lyell Open Cut.* Operations have proceeded normally during the year. The open-cut has provided 60% of the ore treated. At the end of the year one 30-foot bench, the 960, remained to be mined and this will be excavated before the end of 1972. The monitoring of the northern slide has shown a continuous movement of about 1 inch per fortnight; the rate of movement has not increased.

## General

Underground mines provided 37% of the ore treated, which is almost double the quantity furnished from these sources during 1970. A repetition of this effort in 1972 will fulfill production requirements without recourse to the 1.25 million tons of stockpiled open-cut ore which is lower in grade than the underground ore. The feed grade of the 2,424,104 tons treated was 1.029% Cu and the metallurgical recovery was improved to 89.19%.

### ORE RESERVES (AT 5 JANUARY 1972)

PROVED ORE

| *Mine* | *Tons* | *Copper (%)* | *Silver (oz/ton)* | *Gold (oz/ton)* |
|---|---|---|---|---|
| West Lyell O/C .... | 830,800 | 0.74 | 0.05 | 0.008 |
| Crown Three O/C .... | 1,047,300 | 1.15 | 0.13 | 0.012 |
| Prince Lyell .... .... | 26,445,400 | 1.46 | 0.05 | 0.008 |
| Lyell Tharsis .... .... | 376,800 | 1.43 | 0.05 | 0.008 |
| Crown Three .... .... | 2,926,000 | 1.60 | 0.13 | 0.012 |
| Twelve West .... .... | 19,900 | 8.50 | 1.00 | 0.005 |
| Cape Horn Upper .... | 3,693,900 | 1.60 | 0.14 | 0.040 |
| Total .... .... .... | 35,340,100 | 1.46 | 0.07 | 0.012 |

PROBABLE ORE

| *Mine* | *Tons* | *Copper (%)* | *Silver (oz/ton)* | *Gold (oz/ton)* |
|---|---|---|---|---|
| 'A' Lens, West Lyell | 2,455,000 | 1.46 | 0.05 | 0.008 |
| Royal Tharsis .... .... | 2,060,000 | 1.33 | 0.05 | 0.008 |
| Crown Two .. .... .... | 48,700 | 2.99 | 0.80 | 0.010 |
| Total .... .... .... | 4,563,700 | 1.42 | 0.058 | 0.008 |

POSSIBLE ORE

| *Mine* | *Tons* | *Copper (%)* | *Silver (oz/ton)* | *Gold (oz/ton)* |
|---|---|---|---|---|
| Cape Horn Lower .... | 2,000,000 | 1.30 | 0.100 | 0.010 |

## Milling

New equipment has been installed and circuit changes made in all three stages of ore treatment.

*Grinding and Classification*

*Primary.* The No. 1 ball mill was further modified during the year and following the replacement of the rake classifier by cyclones in 1969 the feed method was altered from scoop to centre feed.

*Primary-Secondary Units.* Three primary-secondary ball mill units operated for various periods, but classification capacity at the secondary grinding stage was found to be the limiting factor for maximum tonnage.

*Rubber Mill Linings.* Skega linings continued to give satisfactory performance in secondary grinding. Shell liners in No. 7 ball mill lasted 125 weeks with one key bar change. A full set of liners has since run 43 weeks without attention. A full set of liners, end, shell and grates, has given 105 weeks service in No. 9 ball mill, key bars having been changed in mid 1971. Performance in the secondary grinding encouraged the trial of shell liners in No. 3 primary ball mill which has a relatively heavy duty, with 4 inch balls and $-\frac{1}{2}$ inch ore. No problems have been encountered in nine weeks. A closed loop feed controller was installed on No. 1 primary ball mill.

*Flotation*

A bank of six No. 120 Agitair flotation cells was installed for copper slime scavenging. These single impeller machines are the first of their type to be commissioned in Australia, and their use released two banks, each of eighteen No. 48 Agitairs, for additional sand scavenging. The sands are now scavenged twice in series before pyrite flotation, pyrite tails being returned for a final copper scavenge. This new circuit incorporates two 6 inch Galigher sump pumps pumping tailings from sand scavenger tailing boxes. Concentrates from the first three cells of the slime scavenger are pumped by 2½ inch Galigher sump pumps. Six No. 48 Agitair cells were installed as a second cleaner in the pyrite circuit, where all rougher and first cleaner concentrates are now handled by 2½ inch Galigher sump pumps. There are now thirteen of these pumps in the copper and pyrite circuits. Production of pyrite from the fine sand fraction of copper slime scavenger tailings recommenced after down-time due to mechanical problems with the 4 inch cyclones. Twelve-inch cyclones are now in use on this duty. Copper circuit pH was monitored by a probe in the copper rougher tailings. Lime addition rate to primary grinding is controlled from the flotation floor but the system is not automated. The percentage o solids in the copper rougher tailings is now continuously monitored.

*Filtration*

The percentage of solids is monitored at the copper filter feed pump by the differential pressure method.

### Capital Expenditure

During the year the following capital items were either purchased or utilised for the first time:—

A new Apprentice Training Centre was constructed and received an initial intake of first year apprentices. This training centre is a great credit to the company and should well repay the expenditure, in the quality of the apprentices sent out to the various shops after their first year.

The wood stove pipe between the upper and lower power stations at Lake Margaret was renewed.

The following new items were purchased for the underground mines:—

Three Hagglund shuttle cars.
Two three-boom drill jumbos.
One L.H.D. Eimco loader.
Skips, cage and winding engines for Prince Lyell shaft.
Headframe for Prince Lyell shaft.

Extensions were made to the mill building.

### Safety

*Accidents*

| | |
|---|---|
| Exposure | 3,180,326 man hours |
| Frequency rate | 45 |
| Severity rate | 2,500 |
| Mean duration | 55 days |

These figures indicate that some improvement over the 1970 figures has been achieved. A fatal accident and thirteen serious accidents account for the high severity rate.

### Exploration and Diamond Drilling

During the calendar year the diamond drilling section completed forty-three holes for a total footage of 16,991 with an average core recovery of 80.7%. All drilling was carried out on the consolidated lease at Queenstown.

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

This company, reviewed under Tin, produced 4,618 tons of copper concentrates containing 910 tons of copper valued at $917,843.

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

This company, reviewed under Zinc, produced 13,005 tons of copper concentrate containing 1,643 tons of copper valued at $1,629,093.

## GOLD

GOLD: QUANTITY AND VALUE OF PRODUCTION

| Year | Fine oz | Value $ | Year | Fine oz | Value $ |
|---|---|---|---|---|---|
| Prior to 1967 | 2,694,784 | 32,520,171 | 1969 | 36,705 | 1,338,817 |
| 1967 | 34,677 | 1,083,667 | 1970 | 39,386 | 1,266,882 |
| 1968 | 33,526 | 1,135,108 | 1971 | 53,365 | 1,933,457 |
| | | | Total | 2,892,443 | 40,278,102 |

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

This company recovered 13,524 fine oz, valued at $487,303, from sludge in the electrolytic copper refinery.

### Electrolytic Zinc Company of Australasia Limited, Rosebery

Concentrates produced by this company contained 39,828 fine oz, valued at $1,445,697.

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

From the tin concentrate of this dredge, reviewed under tin, 13 fine oz of gold, valued at $457, was recovered.

## IRON ORE (PELLETS)

### Savage River Mines, Savage River and Port Latta

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

| | Tons |
|---|---|
| Savage River— | |
| Overburden removed | 6,215,654 |
| Ore mined | 4,439,648 |
| Concentrate to Port Latta (dry) | 2,158,641 |
| Port Latta— | |
| Pellets produced (dry) | 2,158,879 |
| Value of production | $27,038,303 |
| Average number of persons employed— | |
| Mining | 120 |
| Other | 519 |
| Total | 639 |

The pellet plant at Port Latta produced 2,158,879 tons of pellets and 14,440 tons of chips; 2,272,965 tons of pellets and 17,604 tons of chips were shipped during the year. A total of thirty-six shipments averaging 64,070 tons per vessel and seven oil tankers discharging 34,745 tons of fuel oil passed through the port. The total number of employees was 648; 383 at Savage River and 265 at Port Latta.

At Savage River the open-cut is developed down to the tenth lift and outlines are now better defined as benches become firmly established. Over the southern half of the open-cut a new magnetometer survey was carried out to obtain better definition of the ore body. The emergency tailing dam has been strengthened with the addition of 747,254 tons of waste rock placed as a back-up to the main wall, which will be raised in the current year. In the main tailings basin a new overflow slot has been cut at the northern end, thus substantially increasing the retention time and ensuring the clarity of the discharge. Work has continued in improving the pit lighting. One bulldozer and seven utility trucks have been replaced.

In the concentrator a magnetic cobbing pulley has been installed in the AM recycle circuit together with two rougher magnetic separators, four additional tailings cyclones and two pumps. Approximately 183,000 tons of concentrate production were lost during the year due to plant difficulties. Almost three full days' production (20,000 tons) were lost due to problems with the crushing plant and ore handling system in September, October and November while approximately thirty days (102,000) tons were lost

on the No. 2 line (half the plant) due to problems with the ball mill clutch and pinion. Half the plant had to be closed for thirty-six days when metal cracking problems were experienced with the trunnion bearing on No. 1 autogenous mill. The plant, however, can still operate at 75% capacity under these conditions so that the equivalent loss of production was only some 61,000 tons.

In the Savage River town site an additional twenty-four houses have been completed and work continues on fencing, drainage, curbing, footpaths and general landscaping.

At the Port Latta pelletising plant a conveyor deluge system has been installed on the off-shore belt, a concrete apron has been included in the bentonite storage area and a storage and amenities facility has been constructed in the reclaim area. During the year some minor production loss resulted from the need to rebrick two furnaces while one complete top gas collector was replaced. A spare for the latter is now carried in stock. A 12 x 5 rod mill was commissioned as an addition to the plant.

After comments in the last year's Report there have been fewer accidents; the total of fifty for the year was 27% less than in 1970. There were thirty-nine lost time accidents at Savage River and eleven at Port Latta, a reduction of more than 50%. Four months of the year were completely accident-free Two serious accidents occurred at Savage River; one employee lost a joint of the ring finger on his left hand when he accidently gripped the safety grille on a compressor fan, the other employee's foot was crushed under a drill levelling jack.

## IRON OXIDE

IRON OXIDE: QUANTITY AND VALUE OF PRODUCTION

| *Year* | *Tons* | *Value* $ | *Year* | *Tons* | *Value* $ |
|---|---|---|---|---|---|
| Prior to 1967 | 114,288 | 249,037 | 1969 | 11,117 | 71,791 |
| 1967 | 7,866 | 35,130 | 1970 | 9,457 | 60,667 |
| 1968 | 12,780 | 79,030 | 1971 | 10,555 | 65,526 |
| | | | Total | 166,063 | 561,181 |

### Iron Cliffs Mine, Penguin

A. Pearson continued to work the secondary ore at the Iron Cliffs Mine and supplied a cement works with 10,555 tons of hematite valued at $65,526. Employment averaged six men.

## LEAD

LEAD: QUANTITY AND VALUE OF PRODUCTION

| *Year* | *Tons* | *Value* $ | *Year* | *Tons* | *Value* $ |
|---|---|---|---|---|---|
| 1919–1966 | 376,489 | 49,013,963 | 1969 | 11,730 | 3,081,475 |
| 1967 | 11,930 | 2,578,032 | 1970 | 10,558 | 2,981,018 |
| 1968 | 11,754 | 2,568,982 | 1971 | 12,255 | 2,926,075 |
| | | | Total | 434,716 | 63,149,545 |

### Electrolytic Zinc Company of Australiasia Limited, Rosebery

This company, reviewed under Zinc, produced 16,319 tons of lead concentrate and the total content of lead in the lead, zinc and copper concentrates was 12,255 tons valued at $2,926,075.

### South Comet Mine, Dundas

In the early months of the year four men continued to operate this mine, which is under lease to J. A. Smyth. A leading stope was taken off No. 3 Level and 217 tons were transported to Rosebery for treatment by the Electrolytic Zinc Company. Due to the lower zinc grade, the fall in both lead and zinc prices and the cost of maintaining the road into the mine, production ceased in May. The lease is still under option to Texins Development Pty Ltd.

**Adelaide Mine, Dundas**

In May, F. Mikhailovic became a working partner with J. D. Murray in this mine and commenced working on the lease full time in June. A good patch of specimen crocoite was uncovered and this encouraged further development. A rise from the adit level to the surface was completed at 75 feet. The rise was timbered from the top down to two sub-level drives which were commenced in lode material showing good crocoite. The producer value of specimens collected for the year was more than $10,000.

**Spray Mine, Zeehan**

The shaft was dewatered and all levels carefully examined by the geological staff of Minops Pty Ltd. Three diamond drill holes were then drilled on 5 Level. In one of these holes a thin lode of jamesonite was intersected. An examination of No. 6 Level did not locate the antimony ore, discussed in previous reports. No further work is contemplated on this prospect at present.

## 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 501 tons was valued at $17,034.

## 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 | | | |
| | | | Total | 13,487 | 81,408 |

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 665 lb, valued at $2,484.

## OSMIRIDIUM

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

## PYRITE

PYRITE: QUANTITY AND VALUE OF PRODUCTION

| *Year* | *Tons* | *Value* $ | *Year* | *Tons* | *Value* $ |
|---|---|---|---|---|---|
| 1915–1966 | 1,704,897 | 7,701,984 | 1968 | 42,504 | 255,024 |
| 1967 | 59,714 | 358,284 | 1969 | 28,535 | 171,210 |
| | | | Total | 1,835,650 | 8,846,502 |

The above pyrite concentrates were produced by the Mount Lyell Mining and Railway Company Limited, Queenstown, for export. Since 1969 production has been diverted to a domestic producer of sulphuric acid, North-West Acid Pty Ltd, Wivenhoe, and production is given under Sulphur.

## 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 8,092 tons, valued at $80,920. 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 7,380 tons of local Beaconsfield quartzite combined with slag from ferro-manganese production for a yield of 16,780 tons of silico-manganese valued at $1,911,782. 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, 1971

| *Producer* | *Source* | *Fine oz* | $ |
|---|---|---|---|
| E.Z. Co. of A/asia Ltd | Copper, lead and zinc concentrates | 1,551,417 | 2,016,052 |
| Mt Lyell M. & R. Co. Ltd | Refinery sludge | 118,076 | 156,351 |

SILVER: SOURCE, QUANTITY AND VALUE OF PRODUCTION

| *Year* | *From tin and other ores* | | *From silver-lead ore* | | *From copper ore* | | *From lead-zinc ore* | | *Total* | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Fine oz* | $ | *Fine oz* | $ | *Fine oz* | $ | *Fine oz* | $ | *Fine oz* | $ |
| 1919–1966 .... | 121,787 | 101,764 | 17,690,600 | 5,749,634 | 3,807,224 | 1,561,218 | 25,645,242 | 19,784,249 | 47,264,853 | 27,196,865 |
| 1967 .... .... | .... | .... | .... | .... | 75,384 | 111,699 | 1,427,970 | 2,113,558 | 1,503,354 | 2,225,257 |
| 1968 .... .... | .... | .... | .... | .... | 87,580 | 179,712 | 1,386,881 | 2,882,292 | 1,474,461 | 3,062,004 |
| 1969 .... .... | .... | .... | .... | .... | 76,030 | 123,116 | 1,379,716 | 2,223,832 | 1,455,746 | 2,346,948 |
| 1970 .... .... | .... | .... | .... | .... | 113,198 | 177,458 | 1,304,499 | 2,060,012 | 1,417,697 | 2,237,470 |
| 1971 .... .... | .... | .... | .... | .... | 118,076 | 156,351 | 1,551,417 | 2,016,052 | 1,669,493 | 2,172,403 |
| Totals .... | 121,787 | 101,764 | 17,690,600 | 5,749,634 | 4,277,492 | 2,309,554 | 32,695,725 | 31,079,995 | 54,785,604 | 39,240,947 |

## 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

| *Year* | *From zinc concentrates* | | *From pyrite concentrates* | | | *Total* | |
|---|---|---|---|---|---|---|---|
| | | | *Pyrite* | *Acid* | | | |
| | *Mono tons* | $ | *Tons* | *Mono tons* | $ | *Mono tons* | $ |
| 1957–1966 .. .... | 407,534 | 3,940,756 | .... | .... | .... | 407,534 | 3,940,756 |
| 1967 .. .... .... | 72,347 | 723,470 | .... | .... | .... | 72,347 | 723,470 |
| 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 | 889,262 | 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 |
| Totals .... | 708,071 | 8,676,498 | 254,867 | 435,417 | 6,620,902 | 1,143,488 | 15,297,400 |

**North-West Acid Proprietary Limited, Wivenhoe**

The major modifications commenced in 1970 have continued and include the complete replacement of the No. 1 roaster grate to bring it into line with No. 2.

The changes in materials used in the construction of the hot cyclone down-legs have still not given satisfaction and it appears that thick-walled mild steel may be the solution. While major repairs and modifications were required in the boiler cleaning system, and some improvement in cleaning has been obtained, the degree of wear experienced in the system is a cause for concern and further modification will be necessary. Interruptions to production resulting from spray blockages in the scrubber circuit have now been eliminated with the introduction of circulating liquor screening.

In the acid towers, brickwork repairs were completed during the annual shut-down but modifications and changes in technique in the acid coolers have only been marginally effective in combating corrosion. Corrosion problems also continued at the main blower motor but these have now been obviated by conversion to air cooling.

The problems previously encountered from dust in the control, switch and turbine rooms have been removed by the complete installation of a pressure ventilation system. Approximately 60% of the electrical isolation system has been equipped with whole current switches to bring it into line with Departmental requirements and the remainder should be completed in the ensuing year.

Considerable investigation and work has been carried out on noise attenuation with obvious benefit within the plant area. The overall reduction in noise level outside the plant area has however been extremely disappointing, particularly to the local residents who have shown admirable restraint while the company attempts to solve its problems. The number of complaints received by the Department has not been excessive and have been promptly looked into, resulting in co-operation between the company, the Department and the residents. Noise attenuation equipment and other modifications to the plant involved the company in a capital expenditure this year of $400,000 bringing the cumulative expenditure to date to $13,200,000.

## TIN

TIN: QUANTITY AND VALUE OF PRODUCTION

| *Year* | *Tons* | *Value* $ | *Year* | *Tons* | *Value* $ |
|---|---|---|---|---|---|
| 1873–1966 | 151,048 | 82,199,357 | 1969 | 4,776 | 15,817,361 |
| 1967 | 1,529 | 4,735,799 | 1970 | 4,939 | 16,927,602 |
| 1968 | 3,126 | 9,242,080 | 1971 | 6,071 | 19,854,601 |
| | | | Total | 171,489 | 148,776,800 |

**Aberfoyle Ltd, Rossarden**

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

| | |
|---|---|
| Underground | 126 |
| Surface, mill and other staff | 128 |
| Total | 254 |

This was an increase of twenty-two compared with 1970.

Production from the ore treated consisted of 486 tons of tin concentrate containing 329 tons of tin valued at $1,077,757 and 342 tons of wolfram concentrate containing 252 tons of tungstic oxide valued at $1,089,652.

| | *Tons* |
|---|---|
| Tonnage of ore milled | 97,691 |
| Tailings retreated | 19,134 |
| Sand fill placed in stopes | 35,260 |

| Underground development— | *Feet* |
|---|---|
| Driving | 948 |
| Cross-cutting | 165 |
| Rising | 992 |

Underground diamond drilling totalled twenty-five holes for a footage of 2,130 feet.

The following expenditure was incurred on capital works:—

| | $ |
|---|---|
| Mill modifications | 17,630 |
| Single men's quarters | 32,120 |
| Housing improvements | 26,413 |
| Total | 76,163 |

During the year the new tailings pumps were commissioned and are working satisfactorily. A weightometer was installed in the mill and an isotope analyser was obtained primarily for analysing mill samples. Present plans provide for the installation of an automatic lime dispenser in the tailings circuit and an automatic head sampler.

With the integration of mining operations at Storeys Creek and Aberfoyle the mill at Storeys Creek was closed down in November and all ore hoisted at Storeys Creek mine is now being transported by road for treatment at the Aberfoyle mill.

Ore reserves as published at 30 June 1971 were as follows:—

| | *Tons* |
|---|---|
| Indicated ore | 353,200 |
| Inferred | 65,250 |
| | 418,450 |

**B.M.I. Mining Pty Ltd, South Mount Cameron**

*Western Endurance:* Operations on this mine were restricted to further drilling of the lead to clarify an anomaly occassioned by a cross fault. Actual mining on the western end of the Clifton Lead was suspended during the year and efforts were concentrated on bringing the Monarch Mine to production. With the exception of the installation of the 16-inch gravel pump the Western Endurance is practically ready for a start in 1972. An average of four men were employed.

*Monarch Dam:* The original embankment was completely demolished and reconstructed to the design of a firm of consulting engineers. The by-wash was also redesigned and altered accordingly. Work of reconstructing the dam was completed by the end of the year.

*Monarch Mine:* Starting the year with one shift for the first quarter, a second shift was introduced in April and from the end of May until the end of the year operations were maintained on a three-shift basis. Average employment, including Frome Power Station operators, was twenty-two men.

To prevent pollution of the Little Boobyalla River by mine effluent via Vickary Creek a system of earthwork bunding was introduced to enable the tailings to be dewatered and the run off resettled before being allowed to escape.

A total of 146,678 cubic yards were treated during the year for a yield of 38.286 tons of concentrates containing 27.34 tons of tin valued at $89,153.

A Nissa-Menck scraper-dozer was acquired during the year to strip overburden.

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

P. Allan, Mining Engineer, Burnie, reports that there has been a further increase this year in the tonnage treated; 331,476 tons containing 0.808% Sn and 0.415% Cu, were treated. Recoveries were as follows:—

| | *Tons* |
|---|---|
| Tin concentrate | 2,827 |
| Tin content | 1,632 |
| Copper concentrate | 4,618 |
| Copper content | 910 |
| Tin content | 154 |

Capital expenditure for the year rose to $812,000 and included the purchase of a Wagner ST5A loading vehicle, a Wagner MTF ore carrier, a two-boom drilling jumbo, the construction of seven houses, a new tailings dam and a cassiterite flotation plant. Underground transport has been further augmented by the introduction of a Bedford personnel carrier and a Leyland truck.

In the mill, an attempt was made to replace the manganese steel liners in the 36-inch Symons tertiary crusher with Ni-hard liners but these broke up in less than half the normal life of the standard liners. In the 6 feet x 10 feet rod mill, Ni-hard liners were also installed and the wear rate is sufficiently encouraging to justify further tests. The 8 feet x 7 feet ball mill has had a set of Firestone liners in use for twelve months and these continue to give good service, being on their third set of lifter bars, and a fourth set will probably be installed. Some minor problems were encountered with clamp bolts, shell plates in the door area and some partial failures along shell plate lamination planes. It has been found advantageous to reduce the ball size from 3½ inches to 3 inches. In the two regrind mills the original Skega liners are still in service, seventy-four weeks in the 6 feet x 5 feet mill and sixty-eight weeks in the 6 feet x 7 feet mill. The grinding circuit in the table tailing regrind mill was modified by installing two 3-inch D.S.M. Rapifine screens to prescreen the closed circuit cyclone spigot product. The screen oversize returns to the mill feed while the undersize combines with the cyclone overflow as a final product. The initial screen slot size has been set at 0.2 mm.

Additional No. 18 Special Denver cells have been installed on the bulk rougher, bulk cleaner and copper rougher sets of cells, a density control installation was fitted on the bulk rougher cell delivery line, and a recording density indicator was fitted on the main media sump pump delivery line. Work was well advanced towards the end of the year on the construction of a new cassiterite flotation plant as an adjunct to the mill and this should come into operation early in 1972.

DEVELOPMENT

| *Level* | *Driving (ft)* | *Cross-cutting (ft)* | *Rising (ft)* |
|---|---|---|---|
| 3 (Khaki Lode) | 408 | 180 | .... |
| 4 | 357 | .... | .... |
| 5 | 206 | .... | .... |
| 7 | 1,787 | 113 | .... |
| 8 | 1,501 | 56 | .... |
| 9 | 2,799 | 281 | 57 |
| 10 | .... | 571 | 44 |
| Totals | 7,058 | 1,201 | 101 |
| Decline | 692 | | |

Total Development Footage—9,052

Ventilation has been a problem on the mine due to the numerous adits driven into the hillside from the Deep Creek valley, the temperature gradient in the valley causing the mine ventilation to reverse on occasion. With the extraction more or less completed in the upper levels it has been possible to brattice these off, and by bringing one surface fan down to 4 Level and retaining only 5 Level and 7 Level adits for access, the ventilation has been considerably improved. The expenditure of $14,164 on additional underground fans has greatly improved the underground distribution system.

Diamond drilling has become an important adjunct to the operation, the company completed 1,984 feet underground and contractors completed 6,112 feet underground and 9,532 feet on surface, 1,322 feet of the last being into the Khaki Lode which it is intended to develop next year. This diamond drilling was needed to define the complex ore bodies and obtain more reliable grade information. Sufficient information has already been gathered to establish adequate reserves in the Khaki Lode for development and mining to commence. In addition ore grade intersections to the south of the present mine workings have confirmed an extension.

With sixty men underground and 162 surface employees the company's accident record for the year can only be considered fair. One man was injured due to the mishandling of explosives, two were injured in overturning a personnel carrier, one man suffered a fractured back due to falling off a roof, and one man was injured when a tyre blew out in the workshops.

Ore reserves as published at 30 June 1971 were as follows:—

| | *Tons* |
|---|---|
| Indicated | 985,300 |
| Inferred | 2,714,200 |

**Renison Limited, Renison Bell**

Ore mined:—

| | *Tons* |
|---|---|
| Bassett | 336 |
| Colebrook | 12,015 |
| Upper Dreadnought | 115,855 |
| Federal | 64,071 |
| Murchison | 4,494 |
| Lower and Upper N. Stebbins | 240,186 |
| Miscellaneous development | 903 |
| | 437,860 |

Tin concentrates produced:—

| | |
|---|---|
| High grade | 5,663 |
| Low grade | 2,304 |
| | 7,967 |

| | *Tons* |
|---|---|
| Tin content | 3,787 |
| Recovery | 64% |

The Renison Decline advanced a further 1,020 feet to 9,193 feet from and 984 feet below the portal. In addition 7,338 feet of driving and cross-cutting and 1,202 feet of rising was completed. Included in the driving footage is 581 feet in the No. 2 adit which completed the second access and 672 feet of driving in the Colebrook Lode of No. 3 horizon. The primary function of the No. 2 adit is to serve as an additional intake airway but its 16 feet x 16 feet dimensions make it suitable for the access of equipment.

The 6-inch compressed air line in the Renison Decline was replaced by an 8-inch while a 2,300 cfm Centac compressor was added to the compressor availability. At the 5,950 level pump station two Thompson five-stage pumps were installed with a rated capacity of 500 gpm each against af head of 1,200 feet. A 10-inch rising main for these pumps has been installed to surface. An additional 3,300 v feeder cable has been installed and towards the end of the year work was nearing completion on the installation of a 250,000 cfm (5-inch/10-inch w.g.) centrifugal fan at the top of the No. 6 ventilation rise.

On the mine site a new change house has been constructed at a cost of $231,000 while the stores have been relocated, the metallurgical laboratory has been extended, the engineering workshops have been upgraded, the site access road has been relocated, and a detonator magazine constructed. In Zeehan the company has expended $358,000 on housing, single quarters, and services, bringing their total commitments to 178 dwelling units and accommodation for 120 single men. In addition $86,000 has been spent on supermarket premises and at Renison Bell $37,500 on a caravan park for use by contractors.

On 4 June Ray Batchelor was killed between two vehicles on the Renison Decline while attempting to assist in clearing a haulage vehicle which had become jammed against the wall.

Diamond drilling on the lease amounted to 3,828 metres which was confined to the No. 3 horizon in the Renison Bell Hill area and testing of the South Bassett and Murchison lodes, except for one hole into an I.P. anomaly at the old Karlson Riley workings on the south-east corner of the lease.

**Mount Cameron Tin Syndicate, South Mount Cameron**

This syndicate employed three men to mine and treat 51,500 cubic yards of material for the recovery of concentrates containing 14.466 tons of tin valued at $47,370.

**L. J. Groves and Palmer, Eastern Lead Mine, South Mount Cameron**

Employing contractors with heavy earth moving equipment this party dozed up 89,100 cubic yards of shallow tin-bearing surfacings which they sluiced and treated for a recovery of concentrates containing 15.200 tons of tin valued at $49,771. The two partners employed one man.

**R. L. Rainbow and Sons, Banca Mine, Winnaleah**

This party continued to mine both areas east and west of the road and treated 21,000 cubic yards for the recovery of concentrates containing 5.272 tons of tin valued at $17,297. Employment averaged four men.

**Star Hil Syndicate, Gladstone**

Operations on the Star Hill leases were suspended when an option was let to another mining company.

**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 7,820 cubic yards were treated for the recovery of 2 tons of concentrates, representing the improved value of 0.62 lb of cassiterite per cubic yard.

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

A summary of operations by this company shows increased activity compared with 1970—

| | |
|---|---|
| Yardage treated | 360,400 |
| Tons of concentrates | 21.750 |
| Tons of tin | 16.051 |
| Value of tin | $52,672 |
| Gold recovered (fine oz) | 13.33 |
| Average employment (men) | 12 |

Uneconomic values caused the closing down of the dredge on 27 March. During this period 360,400 cubic yards had been treated for a recovery of concentrates containing 8.456 tons of tin. Overall grade for the quarter was 0.07 lb of cassiterite per cubic yard. For this quarter thirty-six men were employed but all displaced personnel were subsequently absorbed into local operations.

During the remainder of the year tailings from the company's tin dressing shed were retreated for a recovery of 10.4 tons of cassiterite. In addition a boring programme was carried out on three of the company's leases to determine values with a view to sluicing but no payable gravel was found. For the nine months following the closure of the dredge employment averaged five men.

**Allied Mining Enterprises, South Mount Cameron**

This syndicate worked on its leases east of the Endurance Mine. Two pumps were installed, one an 8-inch to 8-inch K. & L. pressure pump driven by a 150 h.p. electric motor and the other a 5-inch to 6-inch Thompson pressure pump driven by a 65 h.p. electric motor. A storage dam was constructed and a tailing dewatering system of earthwork bunds was employed. The treatment of 78,600 cubic yards yielded concentrates containing 10.468 tons of tin valued at $34,145.

**V. Wood, Pioneer Mine**

Gravel pumping continued on the same pattern as in the previous year, ground broken on the upper level and the bottom face aggregating 329,400 cubic yards and yielding 14 tons of tin concentrates. This throughput represents an increase of 100,000 cubic yards over the previous year and an improvement in grade to 0.09 lb cassiterite per cubic yard. The value of the 10.321 tons of tin produced was $33,589. Improved yields are anticipated when the bottom layers of wash so far exposed are taken up. An accident occurred when a monitor with a 5-inch deflector tip got out of control. The head of 450 feet of water caused the monitor to swing full circle striking two of the bystanders. The action was arrested when a workman was able to shut off the main valve. The two victims suffered fractures and other injuries. Subsequently posts were erected on each side of the monitor to stay any possible uncontrolled swing.

**V. Wood, Musselroe Mine**

This mine operated for the first quarter only, diminished values forcing a closure of the mine at the end of March. Three men were employed in the treatment of 9,000 cubic yards for a return of concentrates with a tin content of 0.578 ton valued at $1,905.

**Queen Hill Mine, Zeehan**

Gippsland Minerals Pty Ltd in conjunction with Cominco Exploration Pty Ltd continued diamond drilling on this mine and the adjoining exploration licence. In all fourteen holes have been drilled of total footage 8,025.

**Oonah Mine, Zeehan**

The diamond drill programme commenced in 1970 was completed after eight holes had been drilled. Results to date indicate 300,000 tons of stannite over on the north side of the slide and probable ore at 200,000 tons on the south-west of the slide. A feasibility study is being undertaken to assess the possibility of establishing a central treatment plant capable of handling ore from this mine, St Dizier and the Razorback-Grand Prize Mines.

**St Dizier Mine, Heemskirk**

Work has proceeded on this property throughout the year. Ten diamond drill holes have been drilled and it is considered that 1,000,000 tons assaying 0.89% tin are proved. In view of the study mentioned above work has been temporarily suspended. The road situation has been discussed with representatives of the Hydro-Electric Commission with a view to possible future co-operation.

**W. J. Hodge, Razorback Mine, Dundas**

During the early months of the year Mr Hodge and his partner were engaged in negotiating the caved section of Placer No. 2 adit for the option holders, Gippsland Minerals N.L. Access was gained and geological mapping with further sampling carried out by Gippsland personnel.

In the latter months 230 tons of ore from the open cut in the northern end of the lode, supplemented by a small parcel from old underground workings were treated to yield 2.85 tons of concentrate valued at $5,038.

**Ringarooma Mining Pty Ltd, Waratah**

The above company worked throughout the year to provide access to their leases in North Valley below the old Mt Bischoff Mine. An all weather road was constructed and temporary plant erected for washing and sizing bulk samples. The plant effectively separated a deslimed—$\frac{3}{8}$-inch product for assay. Twenty-five 5 feet diameter shafts were sunk and the whole of the gravel produced was washed, screened and cycloned through the sample plant. Preliminary results have been sufficiently good to enable the company to proceed with the design and ordering of a concentrating plant. Concentrates produced contained 4.243 tons of tin valued at $13,777.

During December a refraction seismic survey was made to determine the bedrock contours and assist in the planning of the mining method.

**G. Machen, Waratah**

Mr Machen carried on sluicing operations in North Valley, producing concentrates containing 3.796 tons of tin valued at $12,473. An average of two men were employed.

**Hawkes Alluvial Tin Ltd, King Island**

This company changed their mining method from excavation of the alluvial ground by scraper loader, to sluicing during the latter half of the year. They were plagued by problems of water shortage and tree roots blocking the monitor and gravel pumps. The operation became marginal and there were some doubts on its ability to continue using sluicing methods. Concentrates produced contained 11.529 tons of tin valued at $37,877, and three men were employed.

**Naracoopa Rutile Pty Ltd, Naracoopa**

This company, reviewed under Titanium, produced 0.996 ton of concentrates containing 0.711 ton of tin valued at $2,300.

## 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 0.326 ton of tin valued at $1,081.

*T. H. Fitzallan* produced concentrates containing 0.037 ton of tin valued at $120.

### BRANXHOLM-DERBY

*D. L. and W. J. Mullins, Ruby Flats.* These brothers worked their Ruby Flats lease spasmodically during the year treating 700 cubic yards for a recovery of concentrates containing 0.363 ton of tin valued at $1,174.

*K. Banks, Ringarooma River Beaches.* Treating ground which averaged 2 lb $SnO_2$/cubic yard this operator recovered concentrates containing 0.733 ton of tin valued at $2,408.

*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 1,200 cubic yards for a recovery of 4.1 lb $SnO_2$/cubic yard. Concentrates produced contained 1.317 tons of tin valued at $4,288.

*K. Kerrison, Ringarooma River Beaches.* In the recovery of concentrates containing 2.358 tons of tin valued at $7,739 Mr Kerrison treated 1,692 cubic yards of river beach deposits. His equipment consisted of a portable pump set with a 1½-inch delivery, powered by a 3½- h.p. petrol motor, a 12-foot streaming box and a 2 cubic foot barrow by which he was enabled to keep an accurate record of his throughput. His knowledge of the river enabled him to select and mine rich beaches and his average ground value for the year was 5.4 lb $SnO_2$/cubic yard.

*Briseis Tin Mine, Derby.* A programme of pipe line preparation with a view to eventually opening up the old Briseis mine was entered into by an embryo company with headquarters at St Helens. Employment averaged four men. Work on the project was suspended, pending the floating of a company.

*Black Creek Tin Mining Syndicate, Branxholm.* This mine was at a standstill until the last three months of the year when 800 cubic yards were treated for a recovery of 0.376 ton of concentrates. The top layer of the face consists of 8 feet of old Arba mine tailings, under which is 22 feet of virgin loam and soil overlying a band of tin-bearing wash varying in thickness between 3 feet and several inches. This trial run indicates a recovered value of 1 lb $SnO_2$/cubic yard.

*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 1.060 tons of tin valued at $3,436 from 770 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 $SnO_2$/cubic yard. The tin contained was 1.579 tons valued at $5,134.

*Miscellaneous.*—C. Burr, R. Holloway, C. Hyde, S. T. Kerrison, T. Kincade, W. McWalters, J. Melville, R. J. Purcell and T. Merritt produced individually concentrates containing 1.081 tons of tin valued at $3,557.

### PIONEER-SOUTH MOUNT CAMERON-GLADSTONE

*B. Padgett, Campbell Creek, South Mount Cameron.* This miner treated 6,140 cubic yards of shallow ground in the vicinity of Campbell Creek on a 5-acre lease adjoining the Gladstone road. His return of 1.359 tons of concentrates represented a recovery of 0.5 lb $SnO_2$/cubic yard. Workable reserves were depleted in the third quarter.

*B. Padgett, Eastern Branch Creek, Gladstone.* With another, Mr Padgett constructed a dam and a ¾-mile long water race. While the water lasted he sluiced 1,500 cubic yards for the recovery of 0.672 ton of concentrates, the ground averaging 1 lb $SnO_2$/cubic yard.

*R. C. Lawry, Amber Hill, Gladstone.* Mr Lawry employed one man and constructed a dam and installed pumping plant to treat 16,900 cubic yards for the recovery of concentrates containing 4.706 tons of tin valued at $15,477. Other works involved the retention of tailings and the settling of run off water. Rising bottoms forced a closure of the venture at the end of the year.

*F. D. Richardson and Party, Drydens Creek, Gladstone.* This party treated 3,600 cubic yards of shallow ground adjacent to Drydens Creek for the recovery of concentrates containing 1.131 tons of tin valued at $3,670.

*H. Standage, Saw Pit Creek, Gladstone.* By permission of R. C. Lawry, lessee, this operator treated 1,500 cubic yards for the recovery of concentrates containing 0.333 ton of tin valued at $1,077.

*Miscellaneous.*—Messrs T. M. Bishop, A. A. Fenton, M. Fenton, G. Green, E. Kerrison, J. Kerrison, N. B. Moore and G. Selby produced, individually, concentrates containing 1.591 tons of tin valued at $8,207.

### MOORINA-WELDBOROUGH-ST HELENS

*T. Yaxley, Niagra Creek Mine, Weldborough.* Mr Yaxley treated 400 cubic yards for the recovery of concentrates containing 0.111 ton of tin valued at $367, the ground averaging 1 lb $SnO_2$/cubic yard.

*J. Lambert, Weldborough.* This operator produced concentrates containing 0.140 ton of tin valued at $455 from his Laffer Creek Mine. Production ceased with his sudden death.

*J. P. Reynolds, St Helens.* Mr Reynolds operated his mine in Saxelby Creek as the supply of water permitted and although no clean up was effected he treated 500 cubic yards of ground which prospected very well.

*Miscellaneous.*—Messrs A. D. Clifford, D. Kerrison, B. Lambert and D. Richards produced, individually, concentrates containing 0.487 ton of tin valued at $1,600.

### WARATAH

*M. G. Glozier* produced concentrates containing 0.815 ton of tin valued at $2,676 from his underground workings on Thompson's Lode.

*B. Housego* produced concentrates containing 0.069 ton of tin valued at $229.

*J. Housego* recovered 0.909 ton of tin in concentrates valued at $2,980 from tailings in the Waratah River.

*E. Kelly* recovered 0.388 ton of tin in concentrates valued at $1,277.

*D. Kenworthy* from a part-time operation at Pig Flat, produced 0.027 ton of tin in concentrates valued at $89.

*S. A. Tatlow* produced concentrates containing 0.176 ton of tin valued at $575 from his mine in North Valley.

*L. W. Wills,* working underground part time, returned 0.030 ton of tin in concentrates valued at $99.

#### WEST COAST

*C. D. King, Port Davey,* produced from the Melaleuca mine, concentrates containing 3.586 tons of tin valued at $11,728.

*Miscellaneous.*—Messrs L. J. Bayley, R. E. Clark, Colgan and Whyman, R. Davies and P. T. Griffiths produced, individually, concentrates containing 0.389 ton of tin valued at $1,282.

## TITANIUM

### Naracoopa Rutile Limited, Naracoopa

An average of thirty-eight persons was employed.

PRODUCTION OF MINERALS FROM 412,874 TONS OF SAND

| *Mineral* | *Concentrate (tons)* | *Titanium dioxide content (tons)* | *Value ($)* | *Mineral* | *Concentrate (tons)* | *Zircon or tin content (tons)* | *Value ($)* |
|---|---|---|---|---|---|---|---|
| Ilmenite .... .... | 23,789 | NA | NA | Zircon .... .... | 3,770 | 2,450 (Zr) | 217,378 |
| Rutile .... .... | 6,821 | 6,480 | 1,122,120 | Cassiterite .... | 0.996 | 0.711 (Sn) | 2,300 |

#### MINING

Mining operations were transferred from the high grade Milford beaches to the lower grade Lanherne beach early in the year. This required a change in mining methods; the sands being mined by front-end loader and dragline and dumped in a skid-mounted feed bin in the pit area. The bin is fitted with a 1-inch aperture screen. Screen undersize is pumped 500 feet by a Warman 6/4 pump to a ¼-inch aperture trommel over a 100-ton surge bin at the new rougher plant. The feed bin did not work efficiently and a larger and more robust bin incorporating a grizzley and trommel was introduced late in the year to ease the bottleneck caused by breakdowns when the bin became blocked at regular intervals. The tailings from the rougher plant are returned to the pit and dewatered in a cyclone. This is designed to permit reclamation of the mined area, but during the year no effort was made by the company to level off the tailings, replace the overburden and plant grasses. It is essential that this work be done and more attention be given to rehabilitation in the coming year.

#### TREATMENT PLANT

The treatment plant has been extended with the addition of a new rougher wet plant as distinct from the existing wet plant. This permits recycling of concentrated material in the existing plant and achieves a higher recovery grade. The rougher plant throughput is 150 tons per hour of beach material containing +4% heavy mineral. Sand from the bin is pumped by a variable speed 6/4 pump to the concentrator which contains three stages of pinched sluice trays (twenty-eight rougher trays, twenty scavenger trays and twelve cleaner trays). Concentrate containing 50-60% heavy mineral is pumped 800 feet to the existing wet plant. The plant has not achieved satisfactory performance due to problems in surging which results in severe blockages throughout the plant. Two Gill ten-pole wet magnets were installed to provide second stage wet magnetic separation required for an increased ilmenite content in the feed. A vacuum cone filter to dewater heavy mineral concentrate before drying was installed between the wet and dry plant circuit. Gravity drainage was found to be unsatisfactory in wet weather. A small Rotex screen is now used to remove the oversize contaminants from the zircon product. There has been an increase in contamination from limonite in the concentrates and it is hoped to be able to instal an attrition cell to remove limonite to improve the quality of the final product. Present recovery rate is 82% rutile and 75% zircon.

GRAVEL RESERVES

These are quoted at seven years for a production rate of 10,000 tons of rutile concentrates per year.

## TUNGSTEN (SCHEELITE)

TUNGSTEN (SCHEELITE): QUANTITY AND VALUE OF PRODUCTION

| *Year* | *Tons (Concentrates)* | *Tons ($WO_3$)* | *Value* $ |
|---|---|---|---|
| 1917–66 | 22,305 | .... | 42,823,250 |
| 1967 | 1,200 | 862 | 3,673,100 |
| 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 |
| Total | 29,150 | | 66,093,477 |

**King Island Scheelite (1947) Limited, Grassy**

Production statistics—

Treatment—

| | |
|---|---|
| Ore milled | 286,614 |
| Concentrate recovered (tons) | 1,585 |
| $WO_3$ content (tons) | 1,133 |
| Value | $5,130,809 |

Average number of persons employed—

| | |
|---|---|
| Open cut | 66 |
| Other | 271 |
| Total | 337 |

H. Murchie, Senior Mining Engineer, Burnie, reports as follows:—

MINE

The rate of overburden removal was increased to an average of 14.6 tons of waste to 1 ton of ore. This overburden removal has improved the shape of the open cut and provides safer conditions. In addition sufficient ore has been opened up to put the developed ore in a sound position. Open cut roads have been improved and are being regularly maintained. Decline roads are now designed on a 1 in 10 grade to ease the burden on the haul units. The open cut pumping system has been renewed with the installation of two Bethune 8/6 pumps in the pit bottom feeding an 8-inch pipe line. Long range plans, for the mining of all open cut ore, have been developed as well as short-term plans. A complete new system of preventative maintenance, fuelling and lubrication of open cut equipment has been rationalised. Truck tyre maintenance and records are now being carried out in a systematic manner.

MILL

In the medium crushing section an ore sorting plant has been built. This plant, developed by the Colonial Sugar Refining Co., is designed to sort out barren rock from scheelite ore. Sorting is based on the fluorescent properties of scheelite when illuminated with ultra-violet light. Although the machine has sorted rocks successfully in test runs, commissioning of certain sections of the computer system was not completed during 1971. It is hoped to have the plant on stream early in 1972. Testing of a Morgenson Desibi Sizer in the fine grinding section was continued throughout 1971. Wet screening efficiency on a 20 mesh Tyler split has been with with 98% —20 mesh in undersize but screen life has been low, averaging 350 hours per cloth when screening at 15 tons per hour. There were no changes in the grinding circuit of two primary mills and one combination secondary-regrind mill. Feed distributors and pipe circuitry

have been installed to make a change early in 1972. The new circuit will have one 8 feet x 6 feet primary mill and one 6 feet x 6 feet secondary mill both in closed circuit on 18 mesh Tyler screens, and one 6 feet x 6 feet combination secondary regrind mill close circuited on 35 mesh screens. The secondary component of the regrind mill feed will actually be —2 mm undersize from the ore sorter washing screen. All these changes are directed towards increasing mill throughput and minimising overgrinding of scheelite.

A bank of four No. 36 Agitair flotation machines has been added to the scheelite flotation section. Generally it has been used to supply additional cleaning capacity to the circuit when head grades are high. Higher grades will be realised with the ore sorter fully operational. A Leeds and Northrup pH Recorder has been installed with the electrode system immersed between the No. 1 and No. 2 flotation machine of No. 1 Rougher Bank. The pH at this point is held to about 10 by means of soda ash additions and, after initial teething troubles, the instrument has worked satisfactorily.

Drying and cooling problems in the concentrate cleaning section resulted in the testing of two machines on these applications. A Thermal Disk Drier was tried on the drying of gravity and flotation concentrates and on the cooling of gravity concentrates waste product. The machine performed well drying flotation concentrate, would not handle wet gravity concentrates and produced an objectionable reddish colour in cooled roaster concentrate due to the formation of very fine haematite particles. A Sandvik Band Cooler was tried on the cooling of the roaster product. This machine, essentially a metal belt passing along the surface of a water bath, cooled the roaster product at a satisfactory rate without discolouration. Neither of these machines have been included in the circuit to date as it is hoped to find one machine capable of handling all three tasks.

### NEW COMPLEX

A new complex is being built on the site of the Bold Head ore body comprising a store building, core shed, powerhouse and office block. The following capital expenditure has been defrayed in 1971:—

| | $ |
|---|---|
| Store building, partly completed | 101,449 |
| Core shed, partly completed | 17,349 |
| Powerhouse, partly completed | 125,581 |
| Roads, drainage and sewerage, partly completed | 148,711 |
| Security fence | 15,000 |
| Total | $408,090 |

### DIAMOND DRILLING

A total of 1,997 metres of diamond drilling was carried out on the island. Of this 1,519 metres was on ore body development and exploration drilling and 478 metres on field exploration drilling.

### ORE RESERVES

Ore reserves at the mine are given as 7,000,000 tons of ore of grade 0.75% tungstic oxide.

### NEW PORT

A new port is being developed at Grassy utilising the waste rock from the open pit to build an outer and inner breakwater and wharf facilities. The sum of approximately $800,000 is being spent on the contract to build the port which should be completed by May 1972 and provide roll-on roll-off facilities for cargo, a cargo shed, offices, workshops, cattle pens and a 20-ton crane on a wharf 500 feet long.

### PRODUCTION

| | |
|---|---|
| Ore mined and milled (tons) | 278,674 |
| Overburden removed (tons) | 4,087,695 |
| Total material mined (tons) | 4,366,369 |
| Derived mill head (% $WO_3$) | 0.603 |
| Tons of concentrates produced | 1,568 |
| Long ton units produced | 115,303.64 |
| % $WO_3$ in concentrate | 73.5 |

CAPITAL EXPENDITURE

| | $ |
|---|---|
| *Open cut equipment—* | |
| 2 Caterpillar D8 bulldozers | 170,267 |
| 2 Caterpillar 769B trucks | 144,345 |
| 1 Ingersoll-Rand Crawlmaster drill | 61,987 |
| 1 Caterpillar 988 front-end loader | 98,857 |
| 1 pumping system | 12,000 |
| 2 mine offices | 9,886 |
| 1 crib and change room | 11,846 |
| | 509,188 |
| *Mill—* | |
| 1 ore sorter | 225,000 |
| *General—* | |
| 5 houses | 63,393 |
| Township roads | 98,150 |
| Township, general | 13,381 |
| Power hack saw | 1,143 |
| Lathe | 10,944 |
| Trucks | 52,062 |
| | 239,073 |
| Total capital expenditure | $1,381,351 |

## TUNGSTEN (WOLFRAM)

TUNGSTEN (WOLFRAM): QUANTITY AND VALUE OF PRODUCTION

| *Year* | *Tons (Concentrates)* | *Tons ($WO_3$)* | *Value* $ |
|---|---|---|---|
| 1899–1966 | 15,932 | 377 | 20,435,372 |
| 1967 | 435 | 320 | 1,359,388 |
| 1968 | 484 | 347 | 1,358,093 |
| 1969 | 602 | 437 | 2,034,886 |
| 1970 | 896 | 649 | 4,428,708 |
| 1971 | 800 | .... | 2,695,463 |
| Total | 19,149 | | 32,311,910 |

**Aberfoyle Tin N.L., Rossarden**

Wolfram concentrate produced contained 252 tons of tungstic oxide ($WO_3$) valued at $1,089,652. This company is reviewed under Tin.

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

Average number of persons employed—

| | |
|---|---|
| Underground | 112 |
| Surface | 39 |
| Total | 151 |

Tonnage of ore milled was 57,046, a decrease of 29,012 tons over the previous year.

Production from the ore treated consisted of 458 tons of wolfram concentrate containing 330 tons of tungstic oxide ($WO_3$) valued at $1,603,699, and 29 tons of tin concentrate containing 20 tons of tin valued at $65,889.

Underground development comprised—

| | *Feet* |
|---|---|
| Driving | 1,842 |
| Cross-cutting | 155 |
| Rising | 2,157 |
| Total | 4,154 |

Sandfill placed underground amounted to 31,796 tons. Underground diamond drilling comprised forty holes giving a total footage of 5,183 feet. The following expenditure was incurred on capital works:—

| | $ |
|---|---|
| Mill modification | 11,626 |
| Mechanical ore handling equipment for underground use | 15,365 |
| Underground pumps | 28,445 |
| Underground ventilation | 621 |
| Underground power supply | 2,261 |
| Total | 58,318 |

During the year work proceeded on the new pump station on 11 Level and at the year's end the pump station was almost ready for commissioning. In November the mill at Storys Creek was closed down and all the ore hoisted is now being sent to the Aberfoyle mill for treatment. Total tonnage of ore sent to Aberfoyle mill for treatment amounted to 21,215 tons during the year.

Sand-fill for underground is being made from the old jig tailing dumps at Storys Creek. The rod-mill section of the mill is kept in operation for this purpose with the addition of a Holman table in the circuit to make a concentrate which is sent for further treatment to the Aberfoyle mill.

Discussions were held during the year regarding the diversion of Storys Creek above the bridge. The object of such a diversion is to protect the slimes dam from erosion by flash flooding and prevent the consequent deposition of slimes and tailings in the lower reaches of Storys Creek and the South Esk River.

Anti-pollution plans provide for the installation of an automatic lime dispenser in the mine water discharge system.

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

| | *Tons* |
|---|---|
| Indicated | 276,900 |
| Inferred | 100,250 |
| Total | 377,150 |

## ZINC

ZINC: QUANTITY AND VALUE OF PRODUCTION

| *Year* | *Tons* | *Value* $ | *Year* | *Tons* | *Value* $ |
|---|---|---|---|---|---|
| 1919–66 | 836,452 | 129,134,398 | 1969 | 41,121 | 12,795,905 |
| 1967 | 40,231 | 12,106,835 | 1970 | 37,723 | 12,335,394 |
| 1968 | 40,061 | 11,857,961 | 1971 | 41,183 | 14,829,575 |
| | | | Total | 1,036,771 | 193,060,068 |

**Electrolytic Zinc Company of Australasia Limited**

EXTRACTION FROM CONCENTRATES: RISDON

| | *Tons* |
|---|---|
| From other than Tasmanian ore— | |
| Zinc | 128,215 |
| Cadmium | 265 |
| Cobalt oxide | 28 |
| Superphosphate | 74,897 |
| From Tasmanian ore— | |
| Zinc | 35,246 |
| Cadmium | 77 |
| Cobalt oxide | 1.92 |
| Manufactured products— | |
| Aluminium sulphate | 3,637 |
| Ammonium sulphate | 28,419 |

The average number of men employed was 2,609.

WEST COAST DIVISION

Ore mined—

| *Mine* | *Pb* % | *Zn* % | *Fe* % | *Cu* % | *S* % | *Ag* oz/ton | *Au* dwt/ton | *Tons* |
|---|---|---|---|---|---|---|---|---|
| Rosebery | 5.52 | 16.76 | 14.70 | 0.75 | 22.97 | 6.53 | 3.20 | 298,168 |
| Hercules | 4.60 | 14.20 | 7.82 | 0.33 | 18.60 | 5.10 | 1.84 | 24,533 |
| Farrell | 14.11 | 6.91 | 9.30 | 0.23 | 8.57 | 14.28 | Nil | 2,014 |
| Total | 5.51 | 16.56 | 14.14 | 0.71 | 22.55 | 6.51 | 3.09 | 324,715 |

| Concentrate produced— | *Tons* |
|---|---|
| Zinc concentrate | 88,228 |
| Lead concentrate | 16,319 |
| Copper concentrate | 13,005 |
| Pyrite concentrate | 90,257 |

Recoverable quantity in ore mined—

| | |
|---|---|
| Zinc | 41,183 tons |
| Lead | 12,255 tons |
| Copper | 1,643 tons |
| Cadmium | 74 tons |
| Silver | 1,551,417 fine oz |
| Gold | 39,828 fine oz |
| Cobalt oxide | 1 ton |
| Manganese dioxide | 501 tons |
| Mercury | 665 lb |

Total value of production—$22,551,021.

| Average number of persons employed— | *Surface* | *Underground* | *Total* |
|---|---|---|---|
| Hercules Mine | 7 | 23 | 30 |
| Rosebery Mine | 443 | 465 | 908 |
| Farrell Mine | 7 | 14 | 21 |
| Total | 457 | 502 | 959 |

DEVELOPMENT

| Item | Rosebery (ft) | Hercules (ft) | Farrell (ft) | Prospects (ft) |
|---|---|---|---|---|
| Driving and cross-cutting | 2,422 | 24 | 538 | .... |
| Rising | 2,924 | .... | .... | .... |
| Diamond drilling | 15,166 | 3,074 | 881 | 8,292 |

*Rosebery Mine—No. 2 Main Shaft Project.* The electrical and mechanical contractors GEC-AEI continued commissioning the winders and materials handling stations during the year and on 25 October rock hoisting commenced in this shaft. Man hoisting, utilising the main cage winder, followed on 5 November. At the end of the year GEC-AEI were still carrying out modifications, and also commissioning work to the auxiliary man winder. When this shaft is operating at the planned capacity, the tight schedule for No. 1 Shaft should ease, permitting the necessary maintenance, particularly that of the lower section, to be programmed.

*Mine Ventilation.* Excavations for the Northern Upcast Airway were advanced with the completion of 118 feet of cross-cutting and 716 feet of rising. The 'alimak' rise is now complete to 8 Level and rising from 8 Level to the surface should be finished early in 1972. With the adoption of two shift stoping the inadequacy of the old ventilation system resulted in many delays to mining parties and the staggering of shifts and firing times. When the Northern Upcast Airway is completed and the fans installed a balanced positive ventilation system should be possible throughout the mine.

*Production.* During the year ore mined from all three mines amounted to 325,223 tons, an increase of 10% compared with 1970. It is expected that mine production will meet the increased mill capacity in June 1972. With the completion of the ore pass system from No. 2 Shaft Load Station to 15 Level some surge capacity ahead of the crusher is now available to the main producing levels, Nos. 13 and 14. Ore reserves for the three mines amounted to 9,084,901 tons at the end of 1971.

*General.* The trackless autoloader fleet, used in the cut and fill stopes for handling the broken ore, was increased by the addition of five new units making a total of fourteen units. The new units were used in the recently developed stopes on 15 Level. No. 15 Level was also equipped with two 5-ton battery locomotives and sixteen 110 cubic feet granby cars to handle not only No. 15 Level ore but also ore transferred from Nos. 14 and 13 Levels, to the ore pass system at No. 2 Main Shaft.

The load station on No. 7 Level was commissioned and ore is entrained to the surface by two 10-ton battery locomotives hauling sixteen 110 cubic feet granby cars. This train discharges into a surface ore pass delivering to No. 8 Level whence the ore is handled by the No. 1 Shaft transport system to the crusher.

*Farrell Mine.* The new headframe, ore and waste bins were commissioned during the year but the provision of a new winder, skips and cage was deferred. After pumping out the flooded section of the mine development on No. 10 Level was commenced, and by the end of the year the cross-cut from the shaft was within 30 feet of the lode.

*Ore Treatment.* The calculated head grade of the 332,509 dry tons treated was—

| Lead % | Zinc % | Copper % | Silver oz/ton | Gold dwt/ton |
|---|---|---|---|---|
| 5.51 | 16.56 | 0.71 | 6.51 | 3.09 |

During the year, the expansion programme to increase the mill capacity from 300,000 tons per annum to 600,000 tons per annum was completed.

Major additions to the plant were:—

1 10 feet x 7 feet ball mill
2 20–inch x 48–inch rolls
1 40–inch gyracone crusher
70 flotation cells
1 90 feet diameter thickener.

In addition extensive instrumentation (monitored from a central control room) was instituted throughout the mill.

*Engineering.* During the year the following projects were completed:—

A new building, providing change house facilities for the entire underground work force and mining staff and office accommodation for the Mining and Geological Departments.

Quarters and laundry facilities for 140 single men.

Dalmeny Housing Estate consisting of 146 houses.

A new pumping station at the Pieman River, consisting of two 600 hp six-stage Pomona Pumps, each capable of 150,000 gal./min. These pumps will supply the works and if necessary the town. The pump station is located sufficiently high above present river levels to allow for increases in height when the Hydro-Electric Commission constructs the Stringers Creek dam as part of the Pieman River scheme.

SAFETY

*Accidents*

| | |
|---|---|
| Exposure | 2,628,497 man hours |
| Frequency rate | 154 |
| Severity rate | 1,109 |
| Mean duration | 7 days |

These figures indicate an all round increase when compared to those of 1970. The introduction of two shift stoping with the consequent addition of underground workers lacking local experience may have contributed to this increase. In an effort to reduce accidents the company has started a mining school and has increased the number of supervisors in all sections of the mine.

*Incidents.* Two underground fires, one resulting in serious injuries to the underground magazine keeper, were investigated during the year. Five shaft incidents were also investigated and remedial action taken. Five miners were treated for the effects of fumes following four separate incidents.

RISDON WORKS

The major development work involving capital expenditure included:—

(1) Introduction of residue treatment plant for processing residue and associated facilities. The plant came on stream in the last quarter of the year.

(2) Introduction of No. 6 cell unit and up-rating of No. 5 cell unit.

(3) The completion of the new melting, casting and zinc products plant.

(4) The completion of the rehabilitation and strengthening of wharf berths and adjacent foreshore storage areas.

(5) Further improvements to solution purification and cadmium recovery sections.

(6) Introduction of anode cleaning machine.

(7) New data processing equipment and facilities.

### ZIRCONIUM

Naracoopa Rutile Limited, reviewed under Titanium, produced 3,770 tons of concentrates containing 2,450 tons of zirconium valued at $217,378.

## 2.— Non-Metallic Minerals

### CLAY

CLAY: QUANTITY AND VALUE OF PRODUCTION

| *Year* | *Cubic yards* | *Value* $ | *Year* | *Cubic yards* | *Value* $ |
|---|---|---|---|---|---|
| 1958–66 | 1,151,945 | 2,154,340 | 1969 | 158,121 | 366,537 |
| 1967 | 130,522 | 287,658 | 1970 | 136,787 | 350,495 |
| 1968 | 148,802 | 358,507 | 1971 | 147,441 | 384,447 |
| | | | Total | 1,873,618 | 3,901,984 |

CLAY: DETAILS OF PRODUCTION

| Company | Clay (cu. yd) | Value $ | No. of Men | Product |
|---|---|---|---|---|
| Agripipe Pottey Pty Ltd, Relbia | 700 | 700 | 4 | Pipes |
| Bones, I. M., Kingston* | 4,978 | 12,330 | 1 | Bricks |
| Campbell, John Pty Ltd, Launceston | 499 | 499 | 12 | Pipes |
| Goliath Portland Cement Co., Railton | 56,569 | 192,333 | .... | Cement |
| Hazell Bros, Margate* | 19,924 | 48,021 | 1 | Bricks |
| Hobart Brick Co., Granton | 8,155 | 9,955 | 46 | Bricks |
| Humes Ltd, Granton | 3,420 | 12,712 | 21 | Pipes |
| Humes Ltd, Prospect Vale | 3,024 | 6,108 | 10 | Pipes |
| Huttons Bricks, Launceston | 14,775 | 29,550 | 14 | Bricks |
| Machens Bricks Pty Ltd, Kings Meadows | 17,924 | 35,848 | 26 | Bricks |
| Noonan, J. E., Copping* | 4,114 | 9,873 | 1 | Bricks |
| Wise, G. R., Youngtown | 200 | 200 | .... | Pipes |
| Wynyard Brick Co., Wynyard | 5,555 | 11,110 | 5 | Bricks |
| Wunderlich Ltd | 3,429 | 6,858 | 23 | Tiles |
| Zolati and Son, Dulverton | 4,175 | 8,350 | 21 | Bricks |
| Total | 147,441 | 384,447 | 185 | |

* Suppliers to Hobart Brick Company

## DOLOMITE

DOLOMITE: QUANTITY AND VALUE OF PRODUCTION

| Year | Tons | Value $ | Year | Tons | Value $ |
|---|---|---|---|---|---|
| Prior to 1967 | 29,446 | 172,309 | 1969 | 1,515 | 9,104 |
| 1967 | 2,143 | 12,361 | 1970 | 3,341 | 20,045 |
| 1968 | 2,534 | 15,070 | 1971 | 2,518 | 14,406 |
| | | | Total | 41,497 | 243,295 |

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

This company, the sole producer, employed an average of one man and produced 2,518 tons, a decrease of 823 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

| Year | Manufacture of cement | | Manufacture of carbide | | Chemical and metallurgical | | Agricultural and other | | Totals | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tons | $ | Tons | $ | Tons | $ | Tons | $ | Tons | $ |
| 1919–66 | 4,912,802 | 6,723,827 | 718,437 | 1,959,376 | 4,186,471 | 4,944,093 | 633,956 | 1,527,339 | 10,451,666 | 15,154,635 |
| 1967 | 253,611 | 496,749 | 16,234 | 62,290 | 33,670 | 103,155 | 44,934 | 104,679 | 348,449 | 766,873 |
| 1968 | 409,642 | 806,995 | 23,686 | 105,510 | 32,239 | 98,410 | 30,244 | 71,914 | 495,811 | 1,082,829 |
| 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 |
| Totals | 6,816,300 | 10,470,853 | 835,428 | 2,779,767 | 4,365,056 | 5,593,012 | 816,384 | 1,955,380 | 12,833,168 | 20,799,012 |

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

This company quarried 29,050 tons of limestone at a cost of $290,500 at Ida Bay and used it for the production of calcium carbide at Electrona. Calcium carbide production was 12,491 tons valued at $1,964,309 and acetylene black production was 222 tons valued at $113,229. The average number of persons employed was 214 of whom twenty-six were at the quarry.

A grizzley was installed at the quarry towards the end of the year and a new lorry was obtained for general quarry use. Capital improvements at the Electrona works included a new spray booth, gas pump, fan and air compressor.

**Australian Newsprint Mills Limited, Maydena**

This company quarried 8,599 tons of limestone at a cost of $62,757. The limestone was burnt at their Boyer Mill and used in newsprint production. Six men were employed in the quarry throughout the year.

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

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

| | *Tons* | $ |
|---|---|---|
| Agricultural limestone | 2,233 | 5,258 |
| Limestone for chemical and metallurgical purposes | 19,175 | 47,500 |
| Burnt lime for various purposes | 40 | 1,320 |
| Total | 21,448 | 54,078 |

Twelve men were employed.

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

A total of 377,650 tons of limestone with a cost value of $743,970 was quarried and used in the manufacture of cement. An average of twenty-three men were employed in the quarry, for this production.

In addition to the above 11,532 tons of limestone (listed as 'other') and valued at $6,066 was produced for road construction within the confines of the quarry.

Production amounted to 308,701 tons of fine cement valued at $5,556,618. An average of 307 men were employed.

No new plant or machinery was installed during 1971.

A source of satisfaction was the year's safety record of one lost time injury in 632,000 man hours representing a frequency rate of 1.6.

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

Using a mobile crushing plant Mr Sulzberger crushed a total of 153 tons valued at $1,836.

**The Mount Lyell Mining and Railway Company, Limited, Halls Creek**

This company quarried 8,002 tons of limestone, valued at $33,342 for delivery to the works at Queenstown 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 14,098 tons of limestone, valued at $21,899, supplied by the Goliath Company.

**Wright Stephenson Pty Ltd, Pulbeena**

This company produced 7,393 tons of lime sand, valued at $62,840, compared with 8,434 tons in the previous year. Average employment was two men.

## OCHRE

OCHRE: QUANTITY AND VALUE OF PRODUCTION

| Year | Tons | Value $ | Year | Tons | Value $ |
|---|---|---|---|---|---|
| 1918–66 | 2,459 | 16,740 | 1969 | 79 | 1,191 |
| 1967 | 97 | 1,459 | 1970 | 41 | 595 |
| 1968 | 11 | 164 | 1971 | 70 | 982 |
| | | | Total | 2,757 | 21,131 |

### A. Pearson, Spalford and Deep Creek

Production of red and yellow ochre from these pits was 70 tons, valued at $982.

## PEBBLES

PEBBLES: QUANTITY AND VALUE OF PRODUCTION

| Year | Tons | Value $ | Year | Tons | Value $ |
|---|---|---|---|---|---|
| 1957–66 | 6,390 | 96,319 | 1969 | 1,023 | 19,036 |
| 1967 | 1,237 | 20,404 | 1970 | 1,642 | 31,943 |
| 1968 | 1,214 | 19,687 | 1971 | 1,486 | 29,246 |
| | | | Total | 12,992 | 216,635 |

### A. Pearson, Ulverstone

The collection of pebbles for grinding was continued on the beaches around Ulverstone. The output was 1,336 tons, valued at $25,196. An average of six men were employed.

### Industrial Sands Pty Ltd, Eagle Point

This company, reviewed under Silica, produced 150 tons of pebbles valued at $4,050.

## SILICA

SILICA: QUANTITY AND VALUE OF PRODUCTION

| Year | Tons | Value $ | Year | Tons | Value $ |
|---|---|---|---|---|---|
| 1936–66 | 179,599 | 258,147 | 1969 | 22,003 | 93,181 |
| 1967 | 8,557 | 23,360 | 1970 | 35,006 | 157,306 |
| 1968 | 8,878 | 30,126 | 1971 | 28,005 | 95,976 |
| | | | Total | 282,048 | 658,096 |

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

A total of 5,064 tons of silica sand, valued at $10,128, was produced for the manufacture of glass.

### Industrial Sands Pty Ltd, Eagle Point

This company continued to refine silica sands for various industrial purposes, producing 14,600 tons of sands in various grades and sizings valued at $73,000. An average of six men were employed.

An innovation during the year was the installation of a 15-inch hydrocyclone. In this new sand cleaning process crude material from the No. 1 pit was pumped direct to double deck screens and thence to a hopper below. The undersize was then pumped through a 4-inch x 3-inch pump to a 15-inch hydrocyclone, the overflow being stored for subsequent treatment due to the presence of 15-25% heavy minerals. The main or spigot product was sold for use as sand blasting material, water filtration beds and foundry sand.

### Mineral Supplies, Ulverstone

This firm supplied 22 tons of silica, valued at $370.

**H. K. Fielding Pty Ltd, Ulverstone**

This company quarried 8,319 tons of silica, valued at $12,478 for use by the Goliath Portland Cement Company.

# 3.– Construction Materials

## BUILDING STONE

BUILDING STONE: QUANTITY AND VALUE OF PRODUCTION

| *Stone* | *Cubic yards* | *Value* $ |
|---|---|---|
| Freestone | 1,025 | 36,666 |
| Other | 60 | 600 |
| Total | 1,085 | 37,266 |

**Etna Stone Pty Ltd, Pontville**

A total of 535 cubic yards of freestone were produced, valued at $24,820.

## CRUSHED AND BROKEN STONE

### Basalt

BASALT: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

| *Quarry* | *Men* | *Cubic yards* | *Value* $ |
|---|---|---|---|
| AFH, Surrey Hills | 2 | 13,815 | 41,445 |
| ANM, Maydena | 3 | 18,179 | 54,537 |
| Hobart Quarries, Bridgewater | 6 | 80,199 | 240,597 |
| Talisker Blue Metals, Relbia | 1 | 11,509 | 34,527 |
| Woodfield and French, Relbia | NR* | 11,173 | 33,519 |
| Others | .... | 1,260 | 3,780 |
| Total | 12 | 136,135 | 408,405 |

* See Gravel

### Dolerite

DOLERITE: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

| *Quarry* | *Men* | *Cubic yards* | *Value* $ |
|---|---|---|---|
| Devon Metal Supplies, Devonport | 10 | 24,235 | 72,705 |
| Electrolytic Zinc Co., Risdon | 2 | 27,263 | 81,789 |
| Forestry Commission | NR* | 15,732 | 47,196 |
| Glenorchy Quarries, Glenorchy | 6 | 24,170 | 72,510 |
| Hobart Quarries, New Town | 38 | 378,030 | 1,134,090 |
| Hydro-Electric Commission, Tarraleah and Poatina | 4 | 4,637 | 35,414 |
| Huon Council, Huonville | .... | 3,000 | 9,000 |
| C. R. Johnson, Mornington | 3 | 77,257 | 231,771 |
| Launceston Quarries, Mowbray | 15 | 89,000 | 267,000 |
| Pioneer Quarries, Flagstaff Gully | 10 | 120,376 | 361,128 |
| Public Works Department | NR* | 92,000 | 276,000 |
| Talisker Blue Metals, Relbia | 2 | 23,770 | 71,310 |
| Others | 1 | 1,241 | 3,780 |
| Total | 91 | 880,711 | 2,663,693 |

* See Gravel

**Hobart Quarries Pty Ltd, New Town**

A total of 378,030 cubic yards, valued at $1,134,090 was produced.

Capital expenditure on plant at the New Town quarry was:—

| | $ |
|---|---|
| Limestone crushing plant | 40,000 |
| Upgrading road metal plant | 60,000 |
| Wet mix plant | 4,500 |
| | $104,500 |

## Limestone

LIMESTONE: PRODUCER, QUANTITY AND VALUE OF PRODUCTION

| *Quarry* | *Men* | *Cubic yards* | *Value* $ |
|---|---|---|---|
| Weily, G. J., Glenorchy | 6 | 37,607 | 11,821 |

## Other Stone

OTHER STONE: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

| *Quarry* | *Men* | *Cubic yards* | *Value* $ |
|---|---|---|---|
| Forestry Commission | NR* | 35,030 | 105,090 |
| L. Hobden Pty Ltd, Rokeby | 3 | 22,545 | 67,630 |
| Hydro-Electric Commission, Scotts Peak | 8 | 304,010 | 912,030 |
| Hydro-Electric Commission, Strathgordon | 18 | 59,091 | 177,273 |
| Renison Ltd, Zeehan | NR† | 65,500 | 196,500 |
| Sorell Council, Sorell | 4 | 10,076 | 29,228 |
| Transport Commission, Launceston | 2 | 11,003 | 33,009 |
| Others | 1 | 21,375 | 65,517 |
| Total | 36 | 528,630 | 1,586,277 |

* See Gravel
† See Tin

## GRAVEL

GRAVEL: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

| *Pit* | *Men* | *Cubic yards* | *Value* $ |
|---|---|---|---|
| AFH, Surrey Hills | 2 | 67,139 | 67,139 |
| Beaconsfield Council | 2 | 21,811 | 21,811 |
| Broken Hill Pty Co. Ltd, Beaconsfield | NR* | 27,990 | 55,981 |
| Campbell Town Council | 1 | 9,093 | 9,093 |
| Circular Head Council | 2 | 20,435 | 20,435 |
| Deloraine Council | 2 | 43,340 | 51,975 |
| Devonport Council | 2 | 70,283 | 70,283 |
| Esperance Council | 2 | 20,090 | 20,090 |
| Evandale Council | 1 | 9,506 | 22,884 |
| Fielding, H. K., Flowerdale | 4 | 55,396 | 83,193 |
| Fingal Council | 1 | 10,055 | 10,055 |
| Flinders Island Council | 3 | 30,232 | 30,232 |
| Forestry Commission | 15 | 82,710 | 82,710 |
| George Town Council | 3 | 17,810 | 17,810 |
| Green Ponds Council | NR | 17,999 | 17,999 |
| Hamilton Council | 2 | 19,389 | 19,389 |
| Hobart Quarries, New Town | NR† | 18,298 | 22,000 |
| Johnson, C. R., Mornington | 1 | 17,990 | 17,990 |
| Jones, R. Pty Ltd, Wivenhoe | 4 | 8,034 | 16,068 |
| Latrobe Council | 4 | 13,145 | 13,145 |
| King, L. Pty Ltd | 11 | 8,752 | 19,063 |
| Lilydale Council | 2 | 9,500 | 16,625 |

| Pit | Men | Cubic yards | Value $ |
|---|---|---|---|
| New Norfolk Council | 1 | 22,720 | 22,720 |
| Oatlands Council | 1 | 25,758 | 25,758 |
| Portland Council | 7 | 22,675 | 22,675 |
| Public Works Department | 140 | 220,000 | 220,000 |
| Richmond Council | NR | 13,279 | 13,279 |
| Ringarooma Council | 2 | 26,614 | 26,614 |
| Scottsdale Council | 2 | 16,500 | 27,000 |
| St Leonards Council | .... | 11,943 | 11,943 |
| Ulverstone Council | 2 | 23,606 | 23,606 |
| Westbury Council | 1 | 22,096 | 22,096 |
| Woodfield and French, Beaconsfield | 34 | 86,268 | 146,675 |
| Others | 44 | 78,495 | 103,502 |
| Total | 298 | 1,168,953 | 1,371,838 |

* See Woodfield and French

† See Crushed and Broken Stone (Dolerite)

## SAND

SAND: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

| Pit | Men | Cubic yards | Value $ |
|---|---|---|---|
| Campbell Town Council | NR | 5,075 | 5,075 |
| Clark, S. J., Huonville | 1 | 2,138 | 7,482 |
| Cure, M. C., Claremont | 1 | 2,625 | 2,625 |
| Fielding, H. K., Calder | NR* | 3,040 | 4,561 |
| Grubb, R. V., Sandford | 1 | 4,153 | 4,153 |
| Hamilton Council | NR | 2,160 | 2,160 |
| Harrison, P. R., South Arm | 3 | 32,803 | 32,803 |
| Kenny, D. C., Kelso | 1 | 13,729 | 20,595 |
| Long, C. A., South Arm | 4 | 38,199 | 50,172 |
| Lutwyche, I. J., West Tamar | NR* | 3,004 | 7,874 |
| Males, G. L., South Arm | 3 | 12,910 | 24,880 |
| Turmine, C. G., Perth | 1 | 3,053 | 4,096 |
| Woodfield and French, West Tamar | NR* | 15,017 | 17,773 |
| Others | .... | 7,511 | 12,979 |
| Total | 15 | 145,417 | 197,228 |

* See Gravel

## OTHER ROAD MAKING MATERIAL

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

| Pit | Men | Cubic yards | Value $ |
|---|---|---|---|
| Cleveland Tin, Luina | ...* | 9,306 | 9,306 |
| Devon Metal Supplies, Devonport | ....† | 8,451 | 8,538 |
| Fielding, H. K., Ulverstone | ....† | 6,224 | 9,336 |
| Hydro-Electric Commission, Mersey Forth | 3 | 45,906 | 45,906 |
| Hydro-Electric Commission, Tarraleah and Poatina | ....‡ | 3,881 | 12,914 |
| Mt Lyell Mining and Railway Co., Queenstown | ....† | 53,864 | 107,728 |
| Savage River Mines | ....§ | 9,394 | 18,788 |
| Woodfield and French, Launceston | ....† | 38,864 | 41,677 |
| Zeehan Council | ....† | 6,439 | 6,439 |
| Others | 4 | 14,917 | 22,084 |
| Total | 7 | 199,246 | 282,716 |

* See Tin

† See Gravel

‡ See Dolerite

§ See Iron Ore

# 4.— Fuel Minerals

## COAL

COAL: QUANTITY AND VALUE OF PRODUCTION

| Year | Tons | Value $ | Year | Tons | Value $ |
|---|---|---|---|---|---|
| Prior to 1967 .... .... .... | 9,409,458 | 24,250,710 | 1969 .... .... .... .... .... | 115,933 | 519,373 |
| 1967 .... .... .... .... .... | 76,541 | 324,553 | 1970 .... .... .... .... .... | 124,499 | 617,565 |
| 1968 .... .... .... .... .... | 90,930 | 411,642 | 1971 .... .... .... .... .... | 121,965 | 600,140 |
| | | | Total .... | 9,939,326 | 26,723,983 |

W. R. Tindal, Mining Engineer, Hobart, reports that there has been a decrease in production of 2,534 tons. The number of employees decreased from fifty-eight to fifty-two, of whom thirty were employed underground. The production per man year increased from 3,891 to 4,065 tons for underground employees and from 2,147 to 2,345 overall.

**Duncan Coal Mine, Fingal**

Production by the Cornwall Coal Co. N.L., was obtained from an area to the left-hand side of the Main Heading off the slant road from 35 bord. An area of coal was encountered where the impure bands of coal floated off with the coal and resulted in a poor washed product. Another slant road was driven at right angles on the right-hand side of the first slant and had, at the end of the year, just met the end of the main heading. This slant road enabled production from an area where the impure bands were insufficient to cause washing problems. The cleaning up and dewatering of the main heading beyond 35 bord was continued and at the end of the year dewatering had been completed and the picking up would be completed early in 1972.

The continuous miner continued to function satisfactorily and conditions appear to be good. Production from the mine was 112,231 tons, an increase of 425 tons with a complement of forty-four employees, giving an increase in overall production per man/year from 2,282 to 2,551 tons.

**New Stanhope Coal Mine, Avoca**

Pillar extraction continued in No. 2 Adit and bad falls ultimately forced the abandonment of the workings. All material was withdrawn and reopening of the No. 1 Adit workings commenced so that pillars can be extracted. Production was 9,726 tons, a decrease of 1,663 tons, with an overall production per man/year of 1,389 tons, a decrease of 238. The average number of employees was seven.

**Sandfly Coal Mine, Kaoota**

Physical conditions caused the abandonment of the adit and prospecting work is in progress for a suitable site to open a new colliery. Production for the year was 8 tons as against 1,304 in the previous year.

# 5.— Foreign Ores

The total value of the metallurgical products of four large works treating foreign ores imported into Tasmania was approximately $111,892,092.

## ALUMINIUM

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

The achievement of over 1,000,000 man/hours exposure without lost time accidents was a source of satisfaction, although the severity rate was high at 2,429.

The second half of the No. 3 Pot Line was commissioned in the third week of January. This addition was reflected in an increase of 15,509 tons of aluminium over the previous years output.

In the production of 88,877 tons of aluminium, 147,987 tons of Weipa bauxite and 121,701 tons of imported alumina were processed.

Other products were: 6,635 tons of aluminium hydrates and 5,348 tons of alumina. Average employment was 1,253 men.

## FERRO-MANGANESE

**Tasmanian Electro-Metallurgical Co Pty Ltd, Bell Bay**

During the year 86,956 tons of manganese ore from Groote Eylandt was smelted to produce 61,584 tons of manganese alloys for the steel industry.

The alloys were 44,804 tons of high carbon ferro-manganese and 16,780 tons of silicon-manganese reported under Silicon.

## TITANIUM-DIOXIDE

**Australian Titan Products Pty Ltd, Heybridge**

Production of titanium dioxide pigment from imported Western Australian ilmenite has been consistent throughout the year but indications were appearing towards the close that the general downtrend in the economy might have some adverse effect on consumption in 1972, world production now being in excess of demand.

Capital expenditure for the year dropped by 17% to $253,151 the major part of this was for the installation of force-flow packing equipment, bulk liquid petroleum gas storage, an atomic absorption spectrophotometer and a building housing new HT switchgear. The last item has eliminated shut-down time resulting from the effects of local atmospheric conditions on the previous open-air installation. Bulk storage space was increased during the year with the completion of a new extension to the main bulk store and detailed planning having been finalised, work was commenced on the construction of a new Control Laboratory.

Advances in effluent control still continue to be sought, a new sea-bed drifter survey has been inaugurated, the results of which have still to be obtained. Some difficulties were experienced during the year with the rigid section of the off-shore 6-inch effluent line due to separation between the casing and the rubber lining. Consideration is being given to converting the entire line to a flexible installation with the use of alternative materials.

The use of fibre-reinforced plastic materials was extended: a rotary filter drum and several tank linings were installed.

Six minor accidents occurred during the first five months and the remaining seven months were accident free. With 440 employees this company ably demonstrates the effectiveness of an active programme in safety instruction.

## 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.**

For the first time for some years it is possible to report that the professional staff of the Geological Survey Branch has been supplemented by new appointments and that it is expected that in the near future the Branch will be up to full establishment. The recruitment of these geologists together with appointments which have been negotiated and are expected to be filled in the next few months, will allow the Branch to carry out its proper programme of systematic geological mapping as well as providing additional geological services in economic geology, engineering geology and hydrogeology.

As the Branch has been severely understaffed for some time the relatively sudden influx of geological staff has created some strain in other sections of the Branch's activities. In particular, the necessity for additional drafting services, field assistants, transport and library services have been immediately affected. In the longer term, the additional staff will generate more maps and publications so that editorial services and printing charges will be similarly affected.

Accommodation in the Davey Street office has been improved by alterations to the existing offices and the allocation of some additional space. However, the general standard of accommodation remains poor and the staff of the Branch is still split between the Davey Street and Salamanca Place offices which is a most unsatisfactory arrangement. The loss of basement library storage in the east wing of the building has created a serious problem for the proper and adequate storage of library material and no solution to this problem is in sight in the immediate future.

Plans have been formulated to provide sufficient space for all officers of the Branch in the Davey Street building during the coming year and in the longer term plans are being devised to provide the whole Department with up to date office accommodation in a few years' time.

The Regional Mapping Section has been brought up to near full strength, and it has been possible to recommence systematic geological mapping in several areas, after a period when such activities were virtually halted due to lack of staff. However, it will be about a year before the results of the revived programme become evident in the production of map sheets and explanatory reports. It is however pleasing indeed to report that this very important field of study is now being pursued effectively once again.

The Economic Geology Section was relieved of some of the excessive demands for data and information in the latter portion of the year due to the slowing down of the mineral exploration boom. However, a strong demand for such services still persists and occupies a good deal of the time of the Section. Despite this, important studies of the economic geology of various portions of the State were pursued whenever possible, and details of these activities are provided in the report of the Supervising Geologist in charge of this Section, later in this Report. The resignation of a geologist engaged upon an important project in mapping the granites of NE Tasmania with the object of determining the genesis and possible future tin resources of that area, was a serious blow to the Section. Nevertheless, this work and important aspects arising from it will be pursued further whenever possible.

The work of assessing the non-metallic mineral resources of the State and determining the quantity and quality of material available in various areas to meet the needs of the extractive industries will be continued and expanded where possible. In this connection legal problems of land ownership and problems associated with environment and conservation are becoming an important aspect in studies in this field. Thus the duties of geologists in this and many other fields are becoming increasingly concerned with such considerations. Whilst this considerably increases the work load and responsibilities of the geologists concerned, it is fully accepted that geologists in Government service have much to offer in the fields of conservation and environmental protection and such considerations are going to become a more important part of the studies carried out by the Branch.

The Engineering Geology and Groundwater Section has continued its programme of assessment of the groundwater resources of the State during the year. In addition to this, as reported last year, this Section is becoming increasingly involved in the studies of landslips, chiefly those in urban areas. A start has been made on mapping the landslip areas in the Tamar Valley, but the geologist concerned resigned in the latter part of the year. The work will be carried on by a new appointee who is expected to take up duties early in the New Year. Legal problems as to the liability of geologists providing advice on landslips in proposed subdivisions have arisen, and is the cause of some concern. This aspect of the geological work of this Section places a large element of responsibility upon the geologists concerned. Discussions are proceeding with officers of the Crown Law Department in order to clarify this matter.

During the year the Section carried out a number of engineering geology studies, which are detailed later, but an important project was the study of the geological conditions likely to be encountered along the Bell Bay rail link. As a result of this work, preliminary engineering designs were amended and significant economies effected. The final site investigations were carried out by the Consulting Engineers based upon a framework of geological information provided by members of this Section.

The use of geophysical methods of investigation in most aspects of the work of the Branch has continued to increase and the acquisition of a Wang Series 700B desk computer has materially assisted in the processing and interpretation of geophysical data. A number of new geophysical approaches to local geological conditions are being developed which give promise of providing additional very useful data to assist in the interpretation of the geology of the State.

The specialist officers in the Branch have continued to provide specialist advice on geochemistry, petrology and palaeontology to the various sections as well as conducting research into various problems within their field of expertise.

The questions of conservation, environmental protection, creation of new and enlarged national parks, urban geology and pollution are becoming the growing concern of the Geological Survey Branch. Geologists have a great store of expert information and training to offer toward the solution of the problems raised by these questions and it will become an increasing part of the duties of the officers of this Branch to advise the Government on such matters. The issues are vital ones for the future welfare of the State, they must be judged rationally by impartial, properly trained experts in various fields and not by uninformed emotional arguments.

I am sure that the officers of this Branch will play their full part in providing such advice as may be required during the vital years when decisions must be made which will have a long-term and lasting effect on the future of Tasmania.

## REGIONAL GEOLOGY

**Supervising Geologist E. Williams reports—**

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

The explanatory report for the Table Cape 1-mile Sheet was published. The reports for Quamby, Beaconsfield and Hobart have been compiled. The reports for Burnie, MacKintosh and Frankford 1-mile sheets are being prepared.

Beaconsfield 1-mile Sheet has been published.

Hobart 1-mile Sheet is in press.

Frankford 1-mile Sheet is in press.

Scottsdale 1-mile Sheet: Senior Geologist W. R. Moore continued mapping eastern areas. Geologists K. D. Corbett, E. B. Corbett and P. W. Baillie commenced mapping in the region.

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

Strahan 1-mile Sheet: Geologists K. D. Corbett, E. B. Corbett and P. W. Baillie continued the mapping.

Brighton 1-mile Sheet: Geologist D. Leaman continued mapping in this area.

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

Oatlands 1-mile Sheet: Geologist B. Abtmaier commenced mapping in this area.

## ECONOMIC GEOLOGY

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

The following studies were carried out during the year:—

### METALLIC DEPOSITS

(*a*) Investigations continued on detrital tin deposits in the north-eastern districts generally.

(*b*) Continuation of the investigation of granitic rocks and associated mineralisation in the eastern and north-eastern districts.

(*c*) Completion of detailed examination of the detrital mineral potential of the Cape Naturaliste-Eddystone Point-Mt William area and commencement of complimentary drill testing.

(*d*) Examination of gold prospects in the Mathinna and Mathinna Plains areas.

(*e*) Detailed examination of the Branxholm-Mt Paris area.

(*f*) Detailed mapping of the Cambria mine, Blue Tier district.

(*g*) A study of the mineragraphy and structure of the Spray Mine, Zeehan.

(*h*) Examination of the Queensbury mine—Henty River.

(*i*) Examination of detrital tin deposits on Cape Barren Island.

(*j*) Examination of the Wakefield tin mine, South Heemskirk.

(*k*) Continuation of exploratory diamond drilling at Fook's Lode, Waratah and at the Salisbury Goldfield, Beaconsfield.

(*l*) 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 and Sandfly coal mines and supervision of diamond drilling programmes at each mine.

#### NON-METALLIC MINERALS

(*a*) Continuation of studies of clay resources of the Longford, Launceston and Hobart areas.

(*b*) Continuation of regional studies of aggregate and construction materials in the Launceston and Hobart areas.

(*c*) Continuation of investigations of road materials for Government departments and local municipal authorities.

(*d*) Examination of stone reserves at the municipal quarry, Forcett.

(*e*) Detailed examination of sandstone reserves at Middleton and Pontville.

(*f*) Examination of silica deposits in the Forth district.

(*g*) Supervision of Proline sampling programme of superficial material in the Channel area, South Arm and Patrick River.

(*h*) Detailed examination of sand deposits and quarrying operations on South Arm.

(*i*) General advice as requested to the extractive industry throughout Tasmania.

#### GENERAL

(*a*) Examination of structure and sampling of granites on the Hunter Island group.

(*b*) Investigation of the coast line between Cape Portland and Musselroe Bay.

(*c*) Commencement of compilation information on metallic, non-metallic and other economic deposits in the Quamby, Burnie and Beaconsfield 1-mile geological map areas.

(*d*) Continuation of field mapping of host rocks of the Mt Lyell district.

(*e*) Commencement of a programme to assess suitability of XRD techniques for determinations of heavy mineral content in detrital deposits.

(*f*) Close liaison continued with active mineral exploration companies throughout Tasmania and examinations made of any significant mineralogical or geological developments.

(*g*) Senior Geologist D. J. Jennings attended the ANZAAS Congress in Brisbane and presented a paper entitled *Geochemical characteristics of bedrock in relation to prospecting for superficial tin deposits.*

## ENGINEERING GEOLOGY

#### STAFF

The Section at the beginning of the year consisted of the Supervising Geologist and five geologists. B. Abtmeier resigned in July and S. Elmer in September.

#### DAM SITES

Five dam site investigations have been completed. At Pipers River, Curries Creek and Nunamara mapping and geophysical work has been followed by drilling programmes and seven reports have been written. On the Blythe and Emu Rivers mapping and geophysical work has indicated the potential of the sites.

#### ROAD AND RAIL ROUTES

The planning of the Bell Bay railway route involved the section in intensive mapping and seismic work, several geologists being occupied over a period of eight weeks and the results are contained in four reports. A road route in Burnie on a potential landslip area was also examined.

### FOUNDATIONS

The Section was asked to advise on foundations in soft clays at Lampton Avenue, Glenorchy and in water-bearing clays at Prospect Vale. Cemetery sites were examined and augered at Milford, Clarence, Bridgewater and Howden for the Southern Metropolitan Master Planning Authority.

Mapping, magnetometer and seismic work and the supervision of drilling was required at the Rosny Matriculation College site, and three bore holes for foundations in Macquarie Street, Hobart were logged for consulting engineers.

### LANDSLIP SURVEYS

Landslips have been a major part of the Section's work this year with twenty-two reports written on the subject. Most have been estimates of the risk of slip on new subdivisions or house blocks. The Tamar landslip survey has been in progress continuously throughout the year and will continue and increase in importance.

### GEOPHYSICS

Dr D. E. Leaman attended a panel meeting on geophysical logging in unconsolidated aquifers and was co-opted on to the editorial sub-committee of the panel.

Geophysical reports for specific or general purposes have been written on work at Gladstone, Port Sorell, Dunalley, Forester River, Hopes Beach, Mt William and Scamander River. The use of geophysics continues to increase with improved facilities and thermistor probes for surface and borehole use have been constructed. A borehole flow meter is under development and a Wang 700B desk computer with 720 plotter has been acquired. Extensive interpretation programmes for gravity, resistivity and seismic studies have been written and are in routine use, as well as many minor programmes.

A deep borehole at Glenorchy was sited on geophysical evidence and has given much information both geologically and geophysically on dolerite intrusion and the basement of the Hobart area.

### UNDERGROUND WATER

The Longford survey field work was completed during the year and compilation and writing of the water supply papers and explanatory notes continues.

Reports have been written on groundwater prospects at Dunalley, Eaglehawk Neck, Sorell and Deloraine, on a town supply for George Town and for the cheese factory at Wynyard.

Five farm bores have been sited. A visitor from Melbourne University Law School enquired into the working of the Underground Water Act 1966. The Supervising Geologist attended the meeting of the Technical Committee on Underground Water in Perth in May, and visited the Lake Mackenzie catchment to advise on the siting of the hydrological station in the Representative Catchment programme.

## MAPPING AND ENGINEERING DRAUGHTING

**Senior Draughtsman J. Walch reports:—**

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

Beaconsfield Sheet 30: Printed in fourteen colours.

Hobart Sheet No. 82: Fair drawn, ready for proofing and expected to be printed early in 1972.

Frankford Sheet No. 38: Fair drawing proceeding.

The Geology of the Coal River Basin, was printed in seven colours, while the Hydrology of the Coal River Basin was printed in six colours.

Two multi-colour maps 'Gravity Survey—Tertiary Basins—Northern Tasmania', showing residual and total bouguer anomaly contours were also printed.

Work on the multi-colour map 'Geology of the Blue Tier Batholith' ceased due to the pressure of other work, but will be continued in 1972.

Approximately thirty-two graphs and ten one-colour maps were drawn for Geological Survey Bulletin 54. Three graphs and three diagrams were drawn for the Director of Mines Report (1970). Approximately fifty one-colour maps were prepared for Technical Report No. 16.

Two one-colour maps and three diagrams were drawn for the Quamby Explanatory Report.

Five one-colour maps were prepared for Brighton Explanatory Report.

The balance of time was used in drawing eighty geophysical, geological, palaeontological and engineering plans and diagrams related to normal field services.

## SURVEYING

**Surveyor G. Benn reports:—**

The following surveys were carried out during the year:—

(*a*) Surveying and levelling of diamond drill holes at Fingal, in the Mt Nicholas and Valley mine areas.

(*b*) Continuation of surveying and levelling in the Duncan and New Stanhope coal mines.

(*c*) Surveying and levelling at the Sandfly coal mine, Kaoota.

(*d*) Siting and levelling of drill holes at the Etna stone quarry, Pontville.

(*e*) Surveying of Cornwall mine adits, Mt Nicholas area at Fingal.

(*f*) Siting of proposed drill holes in the Duncan mine area at Fingal.

(*g*) Surveying and levelling of a landslip in the Tamar district.

(*h*) Surveying of drill holes at Nunamara for a proposed dam site.

(*i*) Siting and levelling of geophysical traverses in the following areas: Pipers River, Currie Creek, Nunamara, Blythe and Emu Rivers, Rosny Matriculation College, Hopes Beach and Mt William.

## MINERALOGY AND PETROLOGY

**Mineralogist and Petrologist G. Everard reports:—**

Specimens of core from the Chapel Street, Glenorchy diamond drill hole were examined as part of the investigation of a complete dolerite sill. Over fifty specimens were examined in thin section and their densities determined. This revealed minimum densities at the upper and lower contacts due to chilling and a third minimum 200 feet below the top of the 966 feet thick sill, resulting from gravitative differentiation. The drill hole was extended beyond the lower contact of the sill and several specimens of the basement rock examined in thin section and found to consist of various chlorite and sericite schists, not unlike the sheared basic volcanics of Lower Cambrian age found elsewhere in the State.

A suite of rocks from the Frankford quadrangle was examined in thin section together with a number of miscellaneous specimens from the Hobart area. Single specimens and small groups of specimens were examined from Ross, Middleton, Apsley, Woodbridge, Beaconsfield, Waratah, Arcadian and Grassy.

Core was examined from the Nudec oil rig drilling at Hagley. Specimens from King Island were determined for Geopeko Ltd. Cuttings from the bottom of the Sailfish bore in Bass Strait were examined in thin section. Particles of slag from a dump at Zeehan were examined in thin and polished section for Minops Ltd and fragments from the jaw crusher at the St Dizier mine were examined also in thin and polished section. A sample of concentrates from Table Cape was investigated under the microscope.

About fifty specimens of rocks, minerals, sands, gravels, clays and concentrates were examined for members of the general public.

## GEOCHEMISTRY

**Geochemist W. E. Baker reports:—**

Analytical work carried out during the year included the determination of aluminium, antimony, barium, bismuth, calcium, cobalt, copper, iron, lead, magnesium, manganese, nickel, silicon, tin and zinc in some 3,500 samples which included minerals, stream sediments, soils, vegetation, water and humic materials.

The area around Oliver Hill has been reserved and further investigations will be made to determine the origin of the anomalous lead found in soils of the area. Studies around the barite workings near Beulah have been completed and will be compiled for publication with the results of a regional survey currently being conducted around the slopes of Mt Roland.

Experiments designed to examine the activity of humic acids were continued during the year. In addition to having the capability of degrading minerals these substances also influence the migration characteristics of elements classically held to be immobile in the weathering environment.

X-ray diffraction equipment was installed about mid-year but due to electronic faults it was not commissioned for use until December.

Laboratory facilities are still inadequate for the provision of satisfactory geochemical services. Some modification of the initial layout in the drilling store has been made but this failed to improve the laboratory accommodation significantly.

## PALAEONTOLOGY

**Palaeontologist M. J. Clarke reports:—**

Great progress has been maintained in the fields of Permian macropalaeontology and biostratigraphy. The principal areas of investigation during the year have been the Beaconsfield, Frankford, Hobart and Kingborough Quadrangles, mostly in conjunction with the regional mapping programme.

The presence of an unbroken, continuously-exposed and continuously-fossiliferous sequence at Deep Bay, Cygnet constitutes the most important and significant discovery of the year. This sequence promises to solve what is to date, the most problematical portion of the Permian stratigraphical column not only in Tasmania, but also in New South Wales, Queensland and New Zealand. Diamond drilling at Cygnet, together with new information obtained from temporary exposures in tunnel sections associated with the development of the Hydro-Electric Commission Fisher Power Scheme, indicates that a pronounced, but hitherto unknown hiatus occurs in the Tasmanian sequence. It is suspected that this hiatus may be widespread.

Rich, well-preserved and diagnostic faunas are now known from the uppermost Permian Ferntree Formation at about a dozen localities in the Hobart area and provide conclusive proof of its detailed age and correlation with sequences elsewhere in eastern Australia.

Preliminary collections from the Musselroe Bay area, NE Tasmania, indicate a complex palaeogeographical situation.

Dr B. N. Runnegar, University of New England, Armidale, visited Tasmania for a fortnight in April to gain first hand knowledge of the local biostratigraphy. It is anticipated that I shall visit New South Wales and Queensland early next year to obtain similar information for the Sydney and Bowen Basins. Dr Runnegar, Dr J. M. Dickins, Bureau of Mineral Resources, Canberra, and myself are close to finalising a formal zone scheme for the Permian of eastern Australia which we hope to present to the International Gondwana Symposium in Canberra, 1973.

Palaeontological information has again been made available to the Hydro-Electric Commission, and information and fossil material has been provided to schools, nauralist clubs and other members of the general public.

Over 2,000 specimens have been added to the Departmental fossil collection during the year.

## LIBRARY

**Librarian Mrs W. Marriott reports:—**

During the year the Library was moved to larger quarters and approximately half the material previously stored in the basement was moved upstairs. The Australian serials have been reorganised and a complete record of stocks compiled with the help of Miss P. Gilbert of the State Library. Reorganisation and stocktaking of the British, Canadian and New Zealand serials is being undertaken but the remaining material (including many American serials which are frequently used) is poorly housed.

The additional area gained, however, has allowed the provision of a reading table and will ultimately allow serials to be displayed. The acquisition of a book trolley and approximately 1,500 pamphlet boxes has greatly assisted the reorganisation, however, there is a vast backlog of serials to be bound.

Thirty-five new monographs, several new serial titles, and a bibliography were added to the Library collection. Most of the serial titles are received through exchange agreements. More bibliographical tools are needed before full use can be made of the Library's resources.

Due to reorganisation and moving, little work has been done to the Tasmanian Geological Index although there is no longer a backlog of cards to be typed. There has been a steady increase in the demand for literature searches both by departmental personnel and mining companies. Weekly lists of serials received and relevant articles in them are sent to departmental staff.

## PUBLICATIONS

**Publications Officer E. L. Martin reports:—**

The following publications were printed during the year:—

Geological Survey Bulletin No. 51. Gravity survey of the Tertiary Basin in northern Tasmania.

Geological Survey Explanatory Report. Table Cape.

Geological Survey Record No. 11. Mineralogy of the mines and prospects of the Zeehan field.

Technical Reports No. 14.

Underground Water Supply Paper No. 7. The geology and groundwater resources of the Coal River Basin.

All the above publications have been produced in ISO B5 size (250 x 176 mm). The new format gives a 70% increase in the page area available for illustrations, and anticipated the changeover to international paper sizes made by the Government Printer which took effect on 1 January 1972.

The greatly increased number of manuscripts being received for publication, long delays during printing and high printing costs, led to a decision to change from letterpress to offset printing. An IBM Selectric 715 typewriter was purchased and installed on 1 July for use in copy preparation. The operator, Mrs B. Walters, has materially assisted in ensuring a smooth changeover to the new system. Four publications were prepared for printing in the new style, and two of these were printed by the end of the year.

### NON-DEPARTMENTAL PUBLICATIONS

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

LONGMAN, M. J.; LEAMAN, D. E.* 1971. Rapid numerical evaluation of two-dimensional gravity profiles. *Geophys. Prosp.* **19**: 265-273.

MCCONNELL, R. B.; WILLIAMS, E.* 1971. Distribution and provisional correlation of the Precambrian of the Guiana Shield. *Proc. 8th Guiana geol. Conf.*

# 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.**

TYPE AND NUMBER OF TESTS

| *Type of Test* | *Number* | | *Type of Test* | *Number* | |
|---|---|---|---|---|---|
| I. QUANTITATIVE— | | | Miscellaneous— | | |
| Elements— | | | Ash (coals) | 48 | |
| Aluminium | 134 | | Calorific value | 1 | |
| Antimony | 24 | | Combined water | 45 | |
| Arsenic | 111 | | Ignition loss | 32 | |
| Barium | 2 | | Insoluble | 15 | |
| Bismuth | 13 | | Moisture | 31 | |
| Boron | 1 | | Radicals and complexes | 3 | |
| Cadmium | 21 | | Total salts in bricks | 10 | |
| Calcium | 155 | | Volatiles (coals) | 6 | |
| Carbon (including $CO_2$) | 8 | | | —— | 191 |
| Chlorine | 12 | | Waters— | | |
| Chromium | 40 | | Deposit gauge tests | 159 | |
| Cobalt | 20 | | Complete analysis | 79 | |
| Copper | 359 | | Partial analysis | 240 | |
| Fluorine* | 8 | | | —— | 478 |
| Gold | 94 | | | | —— |
| Iron | 240 | | | | 6,410 |
| Lead | 123 | | II. QUALITATIVE | | 98 |
| Magnesium | 129 | | III. CERAMIC— | | |
| Manganese | 35 | | Fusion points | 26 | |
| Mercury | 1 | | Miscellaneous | 23 | |
| Molybdenum | 176 | | Moisture | 50 | |
| Nickel | 51 | | Clay determinations | 1,044 | |
| Niobium | 2 | | | —— | 1,143 |
| Phosphorus | 111 | | IV. METALLURGICAL— | | |
| Platinum | 1 | | Amalgam retorting | 1 | |
| Potassium | 10 | | Crushing and grinding | 2 | |
| Silicon | 128 | | Density | 1 | |
| Silver | 61 | | Flotation | 26 | |
| Sodium | 19 | | Hardness (Mohr) | 1 | |
| Sulphur | 177 | | Heavy Liquid Separation | 29 | |
| Tantalum | 2 | | Magnetic Separation | 50 | |
| Tin | 2,404 | | pH | 25 | |
| Titanium | 164 | | Sizing | 907 | |
| Tungsten | 548 | | Tabling | 90 | |
| Vanadium | 13 | | | —— | 1,138 |
| Zinc | 241 | | | | —— |
| Zirconium | 103 | | Total | | 8,789 |
| | —— | 5,741 | | | —— |

* In addition forty-nine samples were prepared for fluorine determination by the Government Analyst.

RESEARCH INVESTIGATIONS

| | | | |
|---|---|---|---|
| Tin | 7 | Chromite | 2 |
| Tungsten | 3 | Non-metallics | 1 |
| Copper | 1 | Ceramics | 1 |
| | | Total | 15 |

## SUMMARY OF INVESTIGATIONS

### Tin

**R.612**—Cornwall Coal Co. N.L., Royal George

Samples from exploration work on 3 and 4 Levels were composited into a sample which assayed 0.53% Sn, 0.11% Cu and 2.56% S. Concentration tests showed initial grinding to liberate the cassiterite could be between 355 and 150μm but no tailing coarser than 106μm should be discarded. Three-quarters of the tin was recovered in a final (55% Sn) concentrate.

**R.618**—K. Jaeger, Balfour

Four widely differing samples ranging from rock assaying 5.7% Sn through clayey sand assaying 0.96% Sn to sand assaying 1.0% Sn were examined and subjected to concentration tests which yielded concentrates assaying 38 to 48% Sn with recoveries ranging 77 to 87%.

**R.621**—Aberfoyle Ltd, Great Pyramid, Scamander

A composite sample from percussion drilling in the oxidised zone was submitted for preliminary metallurgical assessment. The sample assayed only 0.29% Sn. At minus 850μm gravity concentration was possible but tailing regrinding was necessary hence it would probably be better to begin concentration at minus 250μm. A tin recovery of 63% was obtained. In order to upgrade the tin concentrate magnetic separation is required and flotation may also be needed to remove the small quantity of sulphide present.

**R.629**—Gippsland Minerals N.L., Queen Hill, Zeehan

Pulverized assay samples from diamond drilling were submitted for preliminary concentration tests. Response to sulphide flotation was not good. The ore contains siderite hence high grade tin concentrates will not be easily achieved. The tin recovery (21.6%) in a concentrate assaying 33.1% Sn was very poor.

**R.631**—Gippsland Minerals N.L., Razorback Mill, Dundas

At the company's request the Senior Metallurgist visited the above mill to report upon it. The mill feed assayed about 1% Sn, mill recovery was about 45%. Attention was drawn to the poor performance of some equipment and suggestions for circuit improvements were made.

**R.634**—Ringarooma Mining Pty Ltd, North Valley, Mt Bischoff

Samples of tin nuggets from Machen's sluice box and sediment from the Waratah River were examined. The tin nuggets ranged in specific gravity from 4.5 to 6.3. The sediment assayed 0.51% Sn with 78% of this tin in the size fractions 300 to 12μm.

**R.636**—Messrs P. O'Connor and Cooney, Colemans Creek, Zeehan

Sample of tin concentrate assaying about 53% Sn was submitted for upgrading to 70% Sn. This could be done by high intensity magnetic separation which would eliminate the ilmenite and monazite.

## Tungsten

**R.625**—G. Gerke, Mt Horror

A sample of mixed jig and table concentrate was submitted for the determination of the wolframite and scheelite contents. The sample assayed 63.3% $WO_3$. The wolframite : scheelite ratio was 4 : 1.

**R.628**—Scamander Mining Corp. N.L., Mt Pelion

A sample of 5 tons from an exploratory adit was submitted for concentration tests. This assayed 1.03% $WO_3$. Concentration methods applied were hand sorting, heavy media separation, jigging and tabling. Recoveries obtained were:—

(1) Jigging alone—58%.
(2) Jigging plus tabling—70%.
(3) HMS, jigging and tabling—84%.

**R.633**—King Island Scheelite Ltd, Grassy

Two samples of gravity scheelite concentrate from the company's mill were submitted for tests to eliminate the sulphides that remained after sulphide flotation in the mill. It was found about 90% of the sulphides present could be eliminated by froth flotation using 0.3 lb/ton of potassium amyl xanthate. The resulting scheelite concentrate assayed 0.1% S.

## Chromite

**R.626**—Northern Chromite N.L., Barnes Hill Beaconsfield

A sample of chromite bearing sand from the company's sluice box was submitted for concentration tests which showed that—

(1) hydraulic cycloning was unsuitable;
(2) close sizing of table feeds would yield high recoveries of high grade chromite concentrate; and
(3) under suitable conditions froth flotation could produce results comparable with tabling.

**R.632**—Northern Chromite N.L., Barnes Hill, Beaconsfield

A large sample taken from a number of costeans was submitted as representative of the chromite exposed at the mine. It assayed 23.9% chromite. Froth flotation of the chromite yielded a recovery better than 90% with concentrate grade better than 55% $Cr_2O_3$.

### Copper

**R.627**—Scamander Mining Corp. N.L., Orieco Mine, Scamander

A sample of oxidized copper ore which assayed 3.3% Cu was submitted for leaching tests. Recoveries better than 90% were obtained with a sulphuric acid consumption of 80 lb/ton of ore. Part of the copper (16.7%) was water soluble.

### Non-Metallics

**R.635**—Industrial Sands Pty Ltd, Rubicon Estuary

The company submitted samples of its hydraulic cyclone products for appraisal and the determination of the heavy mineral content. The cyclone products sized and assayed similarly hence this machine was not making a separation. The cyclone feed contained about 0.4% heavy minerals half of which was chromiferous ilmenite. Rutile and zircon made up most of the remaining heavy mineral.

### Ceramics

**R.622**—Survey of brick production in 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 10,853, an increase of eighty. The number of men employed underground rose by 10% to 1,317. This increase was evenly spread over copper, tin and zinc mining operations, employment in coal mining remaining static. On the surface as expansion programmes approached completion fewer construction workers were employed, a decrease of fifty-three.

#### ACCIDENTS

Accidents were reported and recorded in accordance with Australian Standard No. CZ6, Recording and Measuring Work Injury Experience. By this departure from previous practice all disabling injuries causing the loss of one shift or more are recorded, instead of only those causing the loss of at least fourteen days. In calculating the rates, 155 employees in the total of 10,853 were disregarded because their employers do not submit accident reports.

The number of accidents was 1,061 in which 1,160 men were injured and four killed.

ACCIDENT STATISTICS (A.S. No. CZ6)

| *Employer* | *Exposure man-hours* | *No. of injuries* | *Frequency rate* | *Days charged* | *Severity rate* | *Mean duration* |
|---|---|---|---|---|---|---|
| Aberfoyle | 819,833 | 95 | 115.9 | 990 | 1,208 | 10 |
| BMI | 48,453 | 4 | 82.6 | 112 | 2,312 | 28 |
| Cleveland | 539,386 | 41 | 76.0 | 1,219 | 2,260 | 30 |
| EZ | 2,628,497 | 404 | 153.7 | 2,916 | 1,109 | 7 |
| King Island | 821,299 | 31 | 37.7 | 13 | 8,174 | 217 |
| Mt Lyell | 3,180,326 | 144 | 45.3 | 7,945 | 2,599 | 55 |
| Naracoopa | 129,960 | 5 | 38.5 | 370 | 2,847 | 74 |
| Renison | 841,972 | 63 | 74.8 | 6,793 | 8,068 | 108 |
| Savage River | 868,972 | 39 | 44.9 | 550 | 632 | 14 |
| Total Large Mines | 9,878,698 | 826 | 83.6 | 27,608 | 2,795 | 33 |

| *Employer* | *Exposure man-hours* | *No. of injuries* | *Frequency rate* | *Days charged* | *Severity rate* | *Mean duration* |
|---|---|---|---|---|---|---|
| Carbide .... .... .... .... | 326,700 | 69 | 211.2 | 698 | 2,136 | 10 |
| Comalco .... .... .... | 2,688,584 | 9 | 3.4 | 6,530 | 2,429 | 725 |
| EZ .... .... .... .... .... | 4,766,764 | 233 | 48.9 | 2,433 | 510 | 10 |
| Goliath .... .... .... .... | 631,233 | 1 | 1.6 | 20 | 32 | 20 |
| NW Acid .... .... .... | 267,734 | 4 | 14.9 | 14 | 52 | 3 |
| Savage River .. .... .... | 540,895 | 11 | 20.3 | 90 | 166 | 8 |
| Temco .... .... .... .... | 301,846 | 2 | 6.6 | 113 | 374 | 57 |
| Titan .. .... .... .... .... | 867,633 | 6 | 6.9 | 58 | 67 | 10 |
| Total Large Works | 10,391,389 | 335 | 32.2 | 9,956 | 958 | 30 |
| Other works .. .... .... | 224,337 | 9 | 40.1 | 38 | 169 | 4 |
| Collieries .. .... .... .... | 90,030 | 3 | 33.3 | 44 | 489 | 15 |
| Quarries .. .... .... .... | 158,997 | 11 | 69.1 | 98 | 616 | 9 |
| Total .... .... .... | 20,743,451 | 1,164 | 56.1 | 37,742 | 1,819 | 32 |

## DESCRIPTION OF FATAL AND SERIOUS ACCIDENTS

*Fatal*

H. A. Burgess, King Island: Struck by mast of overturning mobile crane.

W. A. Bates, Mount Lyell: Injured while unloading truck.

R. Batchelor, Renison: Crushed between two ore carriers.

V. A. Purcell, Comalco: Clothing caught in gear wheel.

*Serious*

M. Garcia, Savage River: Struck by fan blade; amputated finger.

Y. Guais, Savage River: Jack lowered onto foot; broken.

L. G. Blowfield, EZ Co., Risdon: Slab fell from conveyor onto foot; broken.

D. Long, EZ Co., Risdon: Leaking gas exploded by welding; extensive burns.

H. E. Latham, EZ Co., Risdon: Pinned against wall by tractor; broken back.

R. J. G. Wallner, EZ Co., Risdon: Tripped while walking backwards; broken wrist.

R. H. Mann, EZ Co., Risdon: Foot jammed by steel joist; broken.

J. Narolski, EZ Co., Risdon: Fell when steel brace gave way; broken hip.

A. J. Ingram, EZ Co., Risdon: Kicked gutter; broken foot.

R. Stewart, Naracoopa: Struck by rim blown off while pumping up tyre; broken ribs.

B. G. Unwin, Naracoopa: Moved electric motor onto foot; broken.

B. Thomas, Naracoopa: Truck ran backwards over leg; broken.

M. Brborovic, S. Kerkez, M. Grabovac, Mount Lyell: Struck by falling pipe fittlng in shaft sink; injured head, abrasions and shock.

C. R. J. Perry, Mount Lyell: Struck by fall of ground; broken hand.

K. J. Onions, Mount Lyell: Thumb jammed while coupling train; broken.

T. P. Taskinen, Mount Lyell: Thrown from runaway loader; broken pelvis and other injuries.

T. A. Oates, Mount Lyell: Struck by fall of ground; severe cuts to ankle.

H. J. Martin, Mount Lyell: Struck by falling plate broken away from weld; crushed foot.

D. J. Williams, Aberfoyle: Struck by falling mullock while barring down old rise; broken back.

A. W. Bird, Aberfoyle: Slipped and fell while closing valve; broken arm.

V. Lochner, Storeys Creek: Struck on leg by mullock while scraping; broken wrist.

W. H. Garth, Storeys Creek: Fell while walking down slope underground; broken arm.

W. A. Carsley, Comalco: Fork lift backed onto foot; broken.

G. Thomas, Comalco: Explosion occurred while sampling molten metal in furnace; burnt arm, shoulder, chest and stomach.

A. Thorpe, Comalco: Foot entered drain carrying caustic liquids; burnt.

J. W. Hergert, Comalco: Load fell off crane hook onto hand; broken finger, amputated finger.

K. Fisher, Renison: Tripped on stairway; broken collar bone.

C. J. Fairfield, Renison: Slipped while handling table deck; broken ribs.

R. Richardson, Cleveland: Struck by safety rim blown off while tyre being blown up; severe laceration of head and face.

L. Foster, Cleveland: Fell from roof; broken back.

G. Gough, Cleveland: Hand caught in rubbers; four broken fingers.

K. Clark, Cleveland: Fell off ladder; broken wrist.

B. Radford, Cleveland: Rock fell on hand; partial amputation of two fingers.

R. Allen, Cleveland: Tripped over hose; broken arm.

B. Tadic, EZ Co., Rosebery: Struck by box deflected by falling stone; many injuries to jaw and mouth.

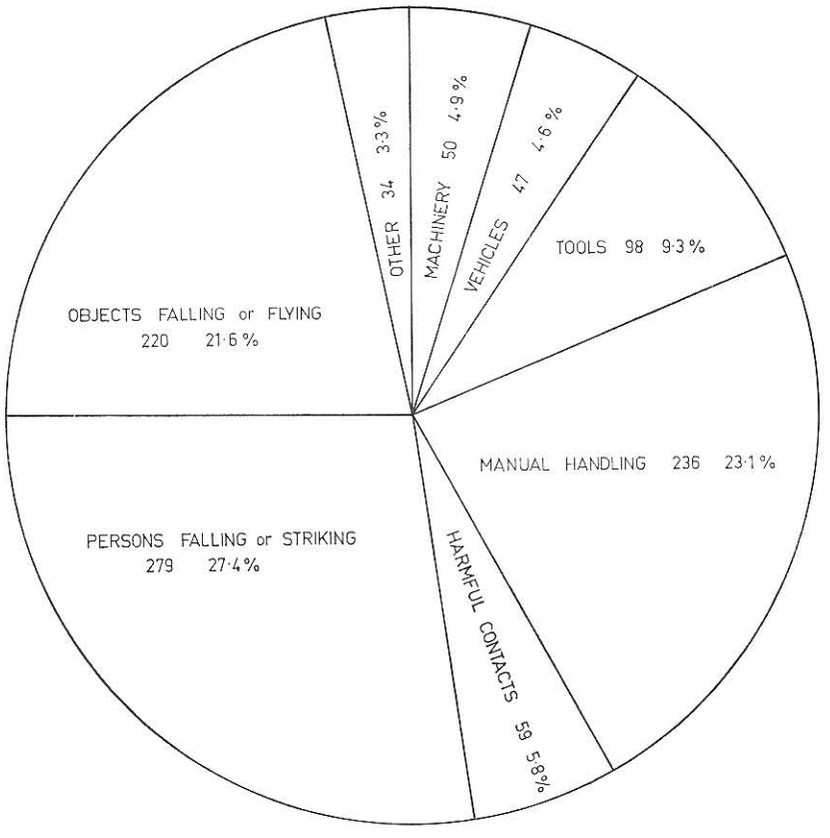
B. Czarnojanezyk, EZ Co., Rosebery: Dropped length of steel on foot; broken.

A. Gibbons, EZ Co., Rosebery: Struck by explosion of detonators while crimping; many blast injuries.

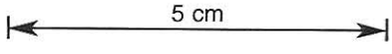
B. Butterworth, EZ Co., Rosebery: Arm trapped between return belt and snubber; broken.

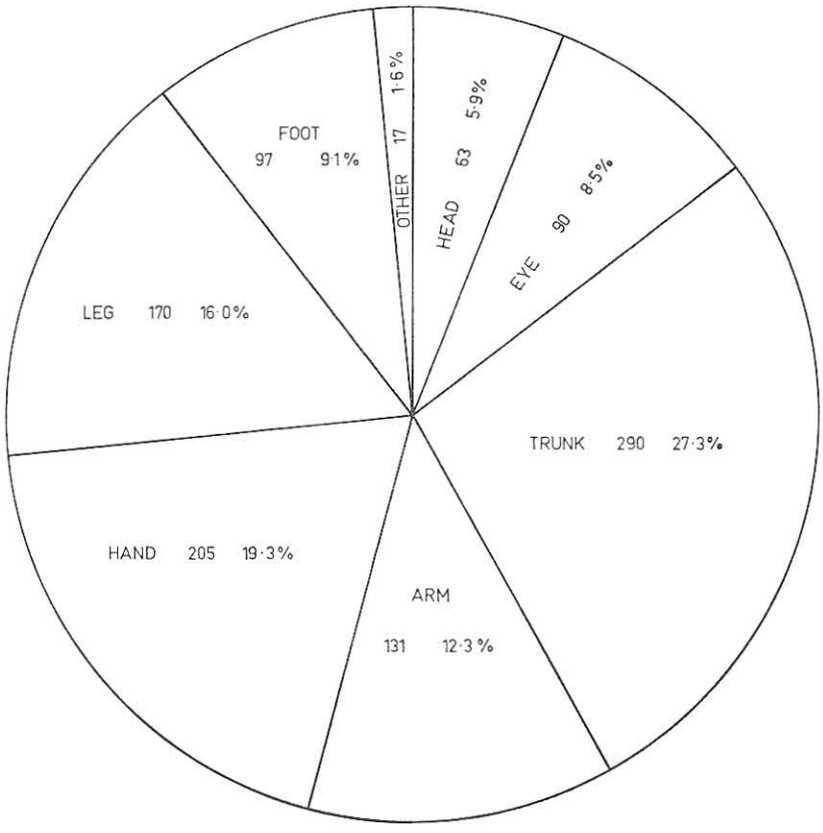
L. Sherrin, Temco: Both legs entered pool of molten metal when edges gave way; severe burns.

D. G. Dorloff, M. Steel, Commonwealth Carbide: Explosion in furnace; burnt foot.

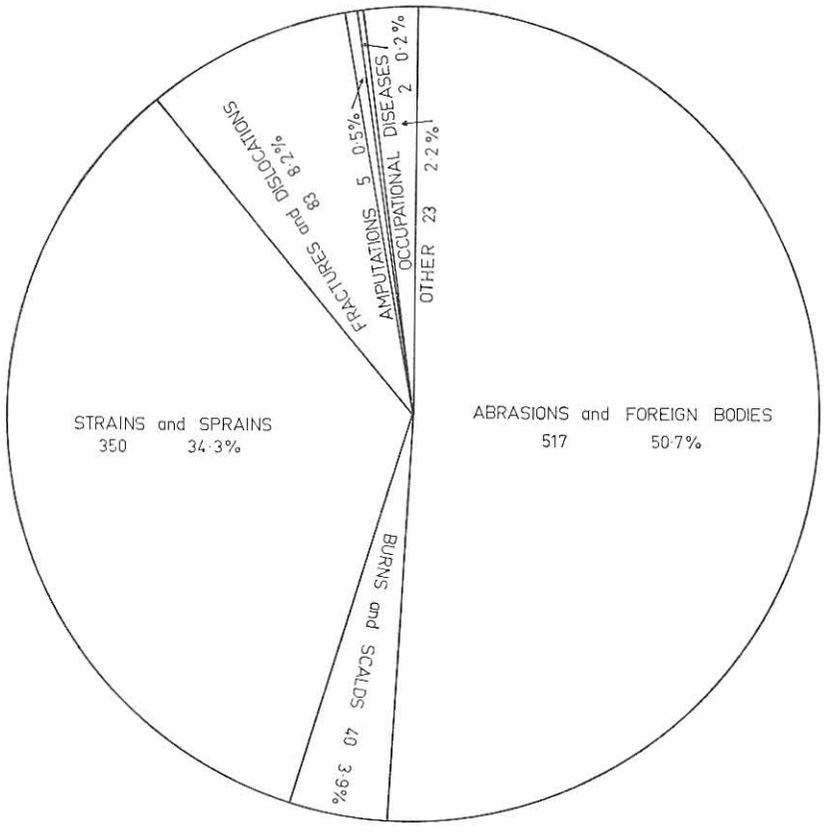



*Accident Factor*

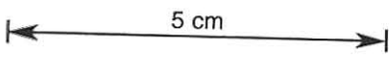





*Accidents: Location of Injury*




*Accidents: Nature of Injury*



## DANGEROUS GOODS

*The Explosives and Inflammable Liquids Acts*

IMPORTS OF EXPLOSIVES

| | Burnie | Hobart | Launceston | Naracoopa | Stanley | Strahan | Total |
|---|---|---|---|---|---|---|---|
| Nitro-compounds (lb) | .... | 800,851 | 531,900 | 236,500 | 164,500 | 1,866,600 | 360,035 |
| Detonators | .... | 423,099 | 431,000 | 1,500 | 39,000 | 367,100 | 1,261,699 |
| Explosives shipments (No.) | .... | 9 | 7 | 7 | 3 | 8 | 34 |
| Ammonium nitrate imported for use as an explosive (tons) | 1,271 | .... | .... | .... | 532 | .... | 1,803 |

The number of licences and permits issued were: Magazine Licences, 125; Other Licences, 466; Shot Firer's Permits, 85.

IMPORTS OF INFLAMMABLE LIQUIDS

| | Bell Bay | Burnie | Devonport | Hobart | Naracoopa | Total |
|---|---|---|---|---|---|---|
| Inflammable liquids imported in bulk (tons)— | | | | | | |
| Aviation gasoline | 1,273 | .... | .... | 2,083 | .... | 3,356 |
| Kerosene— | | | | | | |
| Aviation | 2,310 | .... | .... | 8,925 | .... | 11,235 |
| Lighting | .... | .... | 1,806 | 3,540 | .... | 5,346 |
| Power | .... | .... | 251 | 550 | .... | 801 |
| Motor spirit— | | | | | | |
| Premium | 39,979 | 15,759 | 37,418 | 78,184 | 295 | 171,635 |
| Regular | 16,184 | 7,541 | 10,742 | 27,761 | .... | 62,228 |
| LP gas | 1,231 | .... | .... | .... | .... | 1,231 |
| Total | 60,977 | 23,300 | 50,217 | 121,043 | 295 | 255,832 |
| Tankships (No.) | 14 | 7 | 12 | 16 | 1 | 50 |

Licences to keep, 2,153; Plans approved, 275; Exemptions granted, 23; Permits to import, 22.

## MECHANICAL INSPECTION

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

Machinery inspections were carried out during the year and certificates of competency to operate machinery were issued to sixty-seven persons.

*Electrolytic Zinc Co., Rosebery*

The friction-type skip and cage winders were installed on completion of shaft equipping and acceptance tests under operation were being carried out successfully at the end of the year.

*Mount Lyell Mining and Railway Co., Queenstown*

At the Prince Lyell shaft the skip winder was placed in operation for sinking and installation of the cage winder was commenced. This is a direct drive drum winder of 16 feet diameter, the cage having a capacity of more than 100 men.

## DRILLING

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

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

| | *Location* | *Purpose* | *No. of holes* | *Footage* |
|---|---|---|---|---|
| *Diamond* | | | | |
| | Nunamara | Dam investigation | 10 | 701 |
| | Gorge Bridge | Bridge foundation | 2 | 63 |
| | Fingal | Coal | 1 | 342 |
| | Pipers River | Dam investigation | 7.5 | 672 |
| | Macquarie Street | Foundation | 5 | 286 |
| | Margate | Stratigraphic | 2 | 169 |
| | Macquarie Street | Foundation | 3 | 131 |
| | Badger Head | Slip investigation | 1 | 61 |
| | Salisbury | Mineral | 0.5 | 169 |
| | NE Freeway | Road investigation | 23 | 656 |
| | Campbell Street | Foundation | 6 | 96 |
| | Flowery Gully | Limestone | 1 | 109 |
| | Kelso | Slip investigation | 1 | 69 |
| | Colebrook | Slip investigation | 4 | 160 |
| | Waratah | Tin | 2 | 1,176 |
| | Glenorchy | Stratigraphic | 0.5 | 380 |
| | Mt Nicholas | Coal | 1.5 | 833 |
| | Collins Street | Foundation | 2 | 40 |
| | Cygnet | Stratigraphic | 1 | 463 |
| | Macquarie Point | Pile foundation | 21 | 86 |
| | | | 95 | 6,644 |
| *Diamond/Auger* | | | | |
| | Pipers River | Dam investigation | 4 | 248 |
| | Selfs Point | Foundation | 7 | 208 |
| | New Norfolk | Bridge foundation | 4 | 155 |
| | Northern Outlet | Road investigation | 9 | 204 |
| | Nunamara | Dam investigation | 5 | 155 |
| | Lauderdale | Cemetery investigation | 13 | 117 |
| | Gorge Bridge | Bridge foundation | 25 | 689 |
| | Hobart District | Clay investigation | 62 | 1,266 |
| | | | 129 | 3,042 |
| *Churn* | | | | |
| | Scottsdale | Water investigation | 3.5 | 740 |
| | Scottsdale | Water investigation | 0.5 | 95 |
| | S Mt Cameron | Tin investigation | 9 | 1,395 |
| | Lochaber | Tin investigation | 16 | 580 |
| | Scottsdale | Water investigation | 5 | 800 |
| | Scottsdale | Water investigation | 2 | 270 |
| | Mt William | Mineral investigation | 11 | 605 |
| | | | 47 | 4,485 |
| *Rotary* | | | | |
| | Cressy | Water investigation | 2 | 920 |
| | Scottsdale | Water investigation | 14 | 4,087 |
| | Lefroy | Water investigation | 1 | 25 |
| | | | 17 | 5,032 |
| *Auger* | | | | |
| | Westbury Council | Cemetery | 4 | 147 |
| | Beaconsfield | Clay investigation | 42 | 1,417 |
| | Relbia | Clay investigation | 18 | 384 |
| | | | 64 | 1,948 |

SUMMARY OF DRILLING

| *Type of drilling* | *No. of drills* | *Feet drilled* | *Total cost* $ | *Cost per foot* $ | *Cost per shift* $ |
|---|---|---|---|---|---|
| Diamond | 4–5 | 6,644 | 68,354 | 10.28 | 64 |
| Diamond/Auger | 1 | 3,042 | 11,784 | 3.87 | 71 |
| Churn | 2–3 | 4,485 | 42,560 | 9.48 | 78 |
| Rotary | 1 | 5,032 | 17,405 | 3.46 | 73 |
| Auger | 1 | 1,948 | 1,387 | 0.71 | 58 |

DIAMOND DRILLING

Four plants operated during the first half of the year and five in the latter.

*Coal*

One plant continued to operate in the Mt Nicholas area where drilling was still difficult owing to the cover of dolerite scree. The new Edeco machine was moved into the Fingal area in the latter half of the year and was 340 feet into dolerite, apparently scree although of very large blocks, at the end of the year.

*Mineral Investigation*

Very little mineral investigation drilling was carried out as the greater part of Tasmania is covered by exploration licences and any likely areas are being drilled by the holders of these. Drilling continued during the summer in the exempt areas at Waratah and Salisbury near Beaconsfield. At Salisbury the sandstones are so soft that they not only run into the casing but exert very high pressure on the outside, making both placing and removal extremely difficult. One hole was drilled for Associated Forest Holdings to test the quality of a limestone area at Flowery Gully.

*Foundation Testing*

This provided the greater part of the work for the Section, drilling being done on bridge, building and dam sites. Most of the work was for Government and semi-government authorities and included the Public Works Department, the Commonwealth Department of Works, the Rivers and Water Supply Commission, the Launceston City Council and the Hobart Marine Board. One small job was done on a private building site and several holes were drilled near Colebrook on an area where the railway line was sinking.

*Geological Investigations*

The Glenorchy hole was continued to its final depth of 2,014 feet and provided very useful information to the Department of Geology at the University as well as to the Department. Stratigraphic holes were also drilled at Margate and Cygnet to assist in the interpretation of the geology of the Channel and Huon areas. A start was made on a series of holes to be drilled between the Tamar and Rubicon estuaries in connection with slip investigations.

AUGER/DIAMOND DRILLING

This drill was used mainly on bridge foundation and dam investigation work but also did some work on the clay resources programme.

ROTARY DRILLING

The testing of the Longford-Cressy area was finally completed with the sinking and pump-testing of two adjacent 460-foot holes in Cressy. One hole was gravel packed and developed over a long period. The rig then moved to the Scottsdale area and continued on similar work.

CHURN DRILLING

*Mineral Investigations*

Drilling for tin was carried out in the South Mt Cameron area for the holders of an exploration licence and on the Lochaber lead near Gladstone for the holder of a mining lease. In the latter case a portion of the cost was paid for under Aid to Mining. Drilling was carried out for the Department in the Mt William area, as nothing had been done here in the past. Only traces of tin and other heavy minerals were found.

*Water Investigation*

For the first time no water boring was done on farms although in some cases bores put down for investigation were handed over to a farmer for the cost of the casing. Water boring contractors with rotary and down-the-hole hammer equipment are now operating in Tasmania and their costs are fixed irrespective of the type of rock. The churn drills operated by the Department are much cheaper in sands and gravels but become very expensive in hard rock. Two churn drills operated on water investigation work for most of the year but areas for which they are suitable are becoming rare, and it is hoped to be able to convert one to down-the-hole hammer, for hard rock drilling to 200 feet.

AUGER DRILLING

The Proline drill operated for a few weeks only on clay investigation work for brick-making and other industries, and also for testing cemetery sites for soil type and water level. The drill was also used for blast holes in connection with seismic testing.

## 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.IM.M.**

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

EXPLOSIVES AND INFLAMMABLE LIQUIDS

A Public Works Department Shotfirers' Course was conducted in Ulverstone from 2-5 November 1971, and it is hoped that shotfiring procedures will improve from the knowledge gained by the shotfirers who attended the course. Particular emphasis was placed on the correct storage, handling and usage of explosives.

The storage of ammonium nitrate in Burnie was found to be far from satisfactory. Large quantities were being illegally stored in unsuitable premises in close proximity to houses. This situation has been remedied and a tight control exercised over approved storage areas.

The accident in which an employee of the Electrolytic Zinc Co., Rosebery was seriously injured and the underground magazine subsequently burnt out, was investigated and a report submitted. It appeared that one or more detonators exploded during the crimping operations causing the fire in which a bath of inflammable waterproofing compound was involved.

There has been an increase in the number of explosives destroyed this year. The explosives destroyed numbered 92 sticks and 300 detonators. The explosives were old and were found during the cleaning up of rubbish on properties that had changed ownership.

During the year three incidents involving the mishandling of explosives in town areas were investigated:—

(*a*) Blasting in the town area of Queenstown. A warning was issued to the shotfirer.

(*b*) Blasting in the town area of Rosebery. Assistance was given to the police in this matter who later prosecuted two employees of the Hydro-Electric Commission.

(*c*) An explosion in the primary crusher at the works of the Electrolytic Zinc Company at Rosebery. The manager took appropriate action to prevent a similar occurrence.

*Thefts*

Assistance was given to the police in identifying and disposing of explosives recovered following illegal action by children or adults. Two separate breaking and entering of magazines occurred at small mines in Zeehan, and two thefts from magazines on the lease of the Electrolytic Zinc Company were investigated. Appropriate police action was taken in each case.

*Inflammable Liquids*

Following several complaints about the parking of road tankers in the main streets of Queenstown, the matter was satisfactorily resolved with the co-operation of the police and Council Clerk. K. Honan of Queenstown was prosecuted for the illegal storing of inflammable liquids and a conviction recorded under the Inflammable Liquids Act.

## GENERAL

An accident at the Cleveland Tin Mine highlighted the dangers associated with working on large vehicle tyres. The keys which lock the rim rings into position can be exploded off the tyres with a killing force if they are not locked correctly or maintained according to the manufacturer's safety procedures. Inspections are made to ensure that safe procedures are followed within the district.

Mr Leyland represented the Department at the First Australia-New Zealand Geomechanics Conference in Melbourne in August. The conference was professionally stimulating and of great practical value.

In the field of environmental control, regular samples were taken to monitor the South Esk, Whyte, Savage and Pieman River systems. Progress on the solution of the North-West Acid noise problem was inspected and recorded. Particular attention was paid to leaks in milling circuits and the design and maintenance of tailings dams. Messrs Murchie and Allan attended a seminar on 'Progress—Mining and Environment', where many valuable ideas were gained and knowledge of the approach to the problem widened.

## EXPLORATION

*King Island Scheelite Ltd*

Exploration continued within the four exploration licences held by the company, comprising a total area of 272 square miles. Work consisted of regional geological mapping and auger drilling for geological and geochemical purposes. Detailed prospecting work continued concurrently with the regional work and consisted of drilling programmes for geochemical data and geophysical surveys. A total of 5,162 metres of auger drilling was carried out during the year and three prospects were tested by diamond drilling.

*Renison Ltd*

On the company's special prospector's licence area at South Dundas 615 metres were drilled to test the economic viability of an asbestos deposit.

On the exploration joint venture with Mount Lyell and CGFA, geological, geochemical and geophysical surveys were followed up with 1,755 metres of drilling in nine holes. On the joint venture with Mount Lyell, CGFA and ACI north and south of the Pieman River field crews are carrying out geological mapping, geochemical sampling and ground geophysical surveys after the completion of an aeromagnetic survey and a colour photographic project.

*Mt Lyell Mining and Railway Co. Ltd*

In 1971 the company carried out exploratory investigations on four exploration licence areas (E.L. 8/65, 41/71,10/69 and 9/66) and one special prospector's licence (S.P.L. 94).

S.P.L. 94. A detailed auger sampling programme was conducted over the exposed portion of the King River Delta in Macquarie Harbour in order to assess the pyrite content of the sands. A minimum of 300,000 tons of contained pyrite was indicated, however the decreased demand for pyrite concentrates has resulted in a curtailment of these investigationa. During the year the licence area was reduced from 9.2 to 5 square miles.

E.L. 8/65. Detailed geological, geochemical and diamond drilling programmes were carried out on E.L. 8/65 during 1971. Three holes totalling 2,826 feet were drilled in the Shepherd and Murphy Mine area, and two holes totalling 1,340 feet were completed in the Olivers Hill area.

Geological mapping, soil geochemical and ground magnetometer surveys were conducted over skarn bodies in the Stormont and Iris Rivers-Ti Tree Creek areas to evaluate the bismuth potential of the skarn. The licence area was reduced from 110 to 28 square miles during the year.

E.L. 41/71. This E.L. (31 square miles) was granted on 4 August 1971 and since that date a detailed geological mapping programme has been in progress.

E.L. 10/69. Detailed geological mapping has been carried out in the Lake Dora-Lake Spicer area and the Mount Huxley-Mount Owen area. In the latter area a grid of 53,000 feet of traverse lines has been established, and the access road extended 4 miles to the northern slopes of Mount Huxley.

The first part of a photogeological study was completed and resulted in the relinquishment of 8 square miles of the area.

E.L. 9/66. Exploration activities involving combined geological, geochemical and geophysical (I.P. and magnetometer) programmes were concentrated in the Lake Selina-Lake Rolleston, Red Hills, Gooseneck, and Howard's Anomaly areas. Nine diamond drill holes, totalling 6,811 feet were completed to test some of the anomalous zones outlined. An extensive programme of geological mapping is currently in progress as part of a broader plan to resolve the geology of the Mount Read volcanics between Mount Huxley and the Mount Murchison-Mount Read area. During the year the licence area was reduced from 83 to 67 square miles.

## NORTH-EASTERN DISTRICT

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

Of interest during the year was the development of a limestone crushing, burning and hydration plant at Mole Creek. The installation was not complete at the end of the year but it is anticipated that this new industry will provide employment for fifteen workers.

Interest also centred on chromite deposits in the vicinity of Barnes Hill, Beaconsfield, where a company acquired a ten-cell Sala flotation system and associated equipment for the treatment of chromite sands. In the Lisle-Nabowla area the increased gold price stimulated some local activity and a number of gold leases were acquired and operated in a very small way by prospectors.

### EXPLORATION

*All States Exploration N.L.*

E.L. 33/71. A geological and drilling campaign involving a detailed evaluation of chrysotile asbestos reserves was continued. Operations were suspended at the end of the year.

E.L. 7/69. Drilling on the Tasmania mine was discontinued at 3,250 feet without intercepting the reef. This was the first deflection hole, and a second deflection was lost and abandoned.

*Ringarooma Mining and Exploration Co.*

E.L. 15/68. The original area of 62 square miles formerly held by H. T. Reardon was reduced to 28 square miles and some mining leases were taken up on Bells Hill.

*BMI Mining Pty Ltd*

E.L. 19/70. At the beginning of the year this licence covered an area of 214 square miles in the vicinity of Gladstone. Lease options were exercised during the year and the area was reduced to 138 square miles. An average of ten men were employed in prospecting this tin-bearing area of Tasmania. Areas probed by BMI included the East Banca section and Monarch marshes.

E.L. 18/70. Comprising the whole of Cape Barren Island this licence of 250 square miles was investigated during the last quarter of the year in the light of investigations by former licence holders. Some check boring was carried out but results did not warrant a continuation of the licence. Six men were employed, two drill rigs being used.

*Texins Development Pty Ltd*

E.L. 6/68. With a geological prospecting team ranging between four and eight men this company carried out geological and geophysical surveys and also engaged in drilling and sampling work on this 220 square mile licence. The area was reduced during the year from 295 square miles.

*Rockford Pty Ltd*

S.P.L. 81. Some check boring was carried out on this 17 square mile coastal strip.

*Industrial Sands Pty Ltd*

E.L. 13/71. This company continued prospecting and sampling this licence during the first half of the year but then allowed it to lapse.

S.P.L. 67. Sampling of the river limesands deposit was continued up to mid-year and the licence was then allowed to lapse.

*R. L. and T. G. Rainbow*

S.P.L. 48 and 55. Options were taken over these areas by BMI Mining Pty Ltd and a geological investigation and some drilling was carried out. The licences were allowed to lapse.

*J. S. Cox, Ringarooma*

S.P.L. 82. A party of four carried out drilling and other exploratory work on Mt Maurice which is located on this licence. Interest centred around a narrow quartz lode containing chalcopyrite and other minerals but results were inconclusive.

*B. Padgett*

S.P.L. 80. Mr Padgett used mechanical equipment to prospect and sample this area of 210 acres near Gladstone and exercised his right to lease portion of the area.

*E. K. King*

S.P.L. 86. Prospecting work on this S.P.L. (5 square miles near Gladstone) was of a desultory nature, the holder of the licence being handicapped by injuries received in an accident.

*R. C. Lawry*

S.P.L. 77. This area was let on option to BMI Mining Pty Ltd which drilled the eastern section near the Musselroe River. The S.P.L. was allowed to lapse.

## 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

During the year Pearson Bridge Pty Ltd commenced shaft sinking operations for the Hydro-Electric Commission at the Gordon River Power Scheme. The intake shaft of 31 feet diameter was sunk to the final depth of 444 feet below collar and concrete lined to 412 feet. Work then commenced on the sinking of the Bus-bar shaft of 36 feet diameter, and at 31 December 1971 the shaft bottom was 250 feet below collar. The average number of persons employed on the contract was thirty underground, five on surface and five on staff.

# Report of the Mount Cameron Water Race Board for the year ended 31 December 1971

THE HONOURABLE THE MINISTER FOR MINES

We submit the Report of the Mount Cameron Water Race Board for the year ended 31 December 1971.

Production of tin concentrates was 5.5 tons as compared with 13.42 tons for 1970 and the quantity of water supplied declined from 845 sluiceheads to 542 sluiceheads.

Revenue received from the sale of water amounted to $1,170 as compared with $3,348 for 1970 and expenditure was $9,512 as compared with $8,643 in 1970. The revenue reflects the serious position which has developed in the demand for water. Of the two major users, one ceased operations in February 1971 and the other was closed down from May until early in July. The only other consumer of Fixed or Cash Scale water finished mining on 1 May 1971. One party only worked on a small scale with water charges on the basis of a royalty on the proceeds of tin produced. Expenditure has increased due to necessary increases in wages of employees.

The Board has considered the future uses of the race system and considers that a number of prospects under active exploration would be users of water. However, it is unlikely that the position can be finally determined until exploration is completed and the mines brought into production. This could involve a lapse of twelve months.

The race system has been maintained in good order and due to excellent rainfall water supplies exceeded demand. Further maintenance work and race cleaning is required, but this is being deferred until the demand for water improves.

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

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 1971

| *Receipts* | $ | *Payments* | $ |
|---|---|---|---|
| Sale of water— | | Salaries and wages, including pay-roll tax | 9,171.69 |
| Fixed on cash sale | 829.80 | Insurance | 208.45 |
| Royalty scale | 92.94 | Maintenance | 81.87 |
| Domestic use | 248.00 | Miscellaneous | 4.60 |
| Balance (loss) | 8,295.87 | | |
| | $9,466.61 | | $9,466.61 |

## MOUNT CAMERON WATER RACE

STATISTICS FOR THE YEAR ENDED 31 DECEMBER 1971

*Registered Rainfall*

| | |
|---|---|
| Great Musselroe | 55 inches 97 points |
| Little Musselroe | 48 inches 90 points |

*Production*

| Tin oxide produced— | *Tons* |
|---|---|
| Royalty scale | 0.25 |
| Fixed scale | 5.284 |
| | 5.534 |

*Water Services*

| | |
|---|---|
| Average number of claims supplied per week | 2 |
| Greatest number of claims supplied in any one week | 3 |
| Sluiceheads supplied— | |
| Fixed scale | 452 |
| Royalty scale | 90 |
| | 542 |

*Employment*

| Average per week— | |
|---|---|
| Royalty scale | 1 |
| Fixed scale | 2 |
| | 3 |

# Report of the Ringarooma and Cascade Water Board for the year ended 31 December 1971

THE HONOURABLE THE MINISTER FOR MINES

We submit the Report of the Ringarooma and Cascade Water Board for the year ended 31 December 1971.

The Cascade Dam is in good order and the Mt Paris Dam is empty. The proposal to enlarge the Cascade Dam for use for irrigation purposes at Winnaleah which was examined by the Rivers and Water Supply Commission was considered to be uneconomic and the work was not proceeded with. There were no developments in plans to re-open the old Briseis Mine at Derby using water from the Cascade Dam. It is probable that there may be further developments when capital for mining enterprises becomes more freely available through the stock market.

The loss of $1,132.34 for the year consisted of caretaking of the dam and interest paid to the Treasury on the capital cost of the system when it was acquired in 1947.

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 1971

| *Receipts* | $ | *Payments* | $ |
|---|---|---|---|
| Balance (loss) | 1,132.34 | Caretaking | 150.00 |
| | | Interest on capital cost | 982.34 |
| | $1,132.34 | | $1,132.34 |

T. J. HUGHES, Government Printer, Tasmania.