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(No. 28)



1969

PARLIAMENT OF TASMANIA

DIRECTOR OF MINES

REPORT FOR YEAR ENDED 31 DECEMBER 1969

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

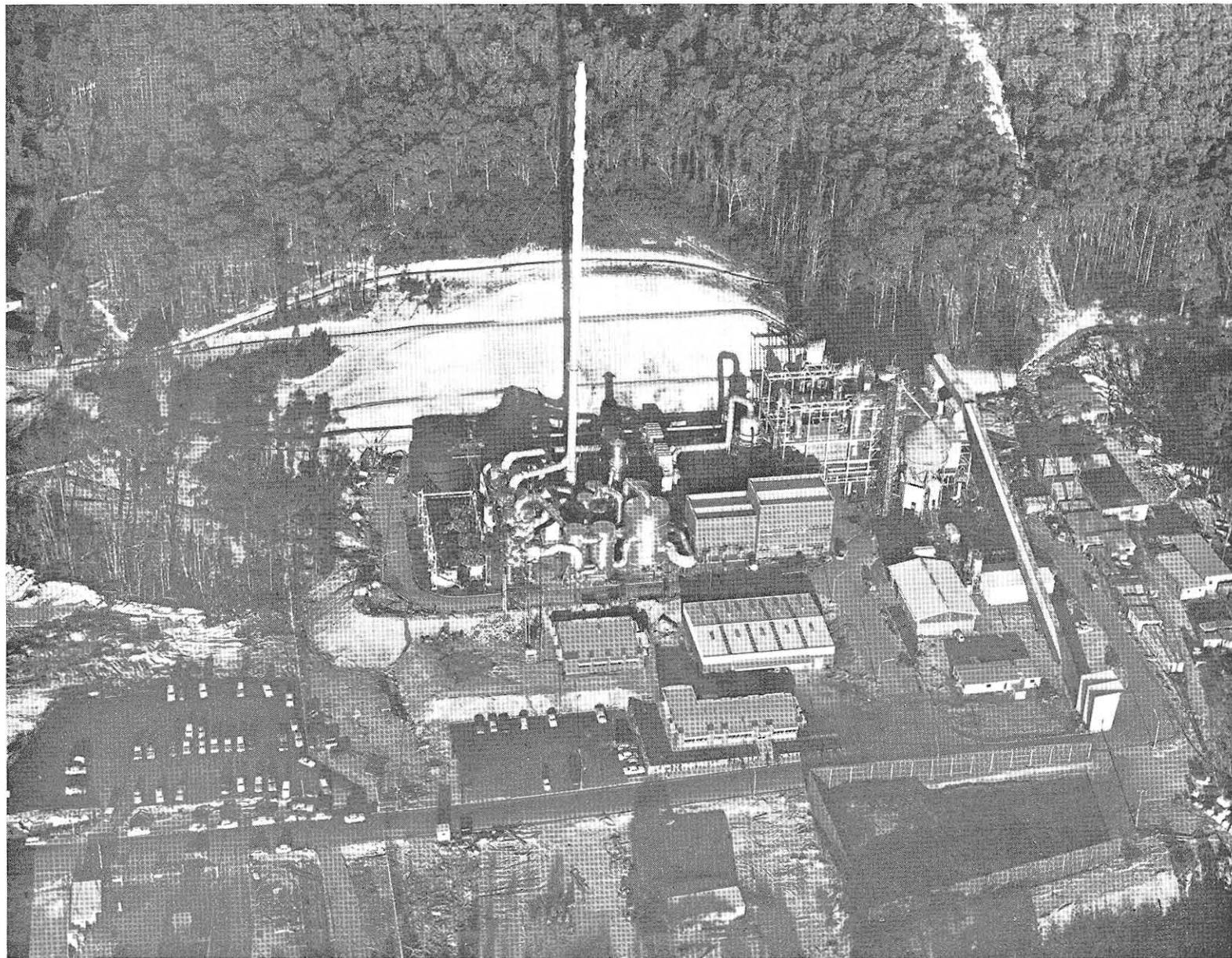
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North-West Acid Pty Ltd. Wivenhoe, Burnie. This new sulphuric acid plant is the largest in Australia. The acid is produced from pyrite concentrates produced by the Mount Lyell Mining and Railway Co. Ltd, Queenstown, and the Electrolytic Zinc Co. of Australasia Ltd, Rosebery.

[Photo: Vern Reid]

REPORT OF THE DIRECTOR OF MINES

Department of Mines

Hobart, 19 June 1970

THE HONOURABLE THE MINISTER FOR MINES.

I have the honour to present my report on the mining industry for the year ended 31 December 1969.

The value of metals and minerals produced was \$194,170,435 consisting of \$104,150,500 from Tasmanian ores and \$90,019,935 from metallurgical production from imported ores.

The most significant increase was in the production of iron ore pellets which rose from 760,083 tons valued at \$9,650,636 in 1968 to 1,908,215 tons valued at \$24,084,702 for 1969. The output of copper increased from 15,942 tons valued at \$17,521,393 in 1968 to 17,299 tons valued at \$23,671,713; tin from 3,126 tons valued at \$9,242,080 to 4,776 tons valued at \$15,817,361; wolfram and scheelite in the form of tungstic oxide from 1,401 tons valued at \$5,485,637 to 1,529 tons valued at \$7,119,644, and zinc from 40,061 tons valued at \$11,857,961 in 1968 to 41,121 tons valued at \$12,795,905 in 1969.

Production of gold showed a slight increase but lead and silver recorded small declines. These minerals result from the treatment of copper and zinc-lead ores and the small decreases can be accounted for by varying grades of ore being mined.

The metallurgical processing of bauxite, ilmenite, manganese ore and zinc concentrates imported into the State are an important addition to the State's mining industry. The value of these products rose by \$22 million in 1969 as compared with the previous year.

The record production of 1968 was exceeded by more than \$54 million in 1969. Production from local ores was responsible for an increase of \$32 million. These record figures result from greater production arising from programmes of exploration and development undertaken by the major mines in the 1960s and which continue to add to productive capacity of the mines. Development plans in progress and under investigation together with active programmes of exploration provide a firm basis for the future prosperity of the industry.

NEW DEVELOPMENTS

The year 1969 was noteworthy for the progress made in projects for development of the major operating mines to achieve higher production targets.

The Mt Lyell Mining and Railway Co. Ltd at Queenstown which is the second largest producer of copper in Australia has completely re-organised and re-vitalised its operations as a result of the discovery of new ore-bodies during the past few years which form the basis for re-establishment of large scale underground mining. In addition to reserves of over 5 million tons of ore assaying 0.78% copper at the West Lyell open-cut the reserves to be developed by underground mining total a further 34 million tons making total reserves 39.5 million tons averaging 1.416% copper and bearing 0.06 oz silver and 0.0085 oz gold per ton. Capital expenditure of approximately \$30 million has been devoted to the purchase of new equipment for underground mining, the sinking of a new concrete-lined circular shaft 25 feet in diameter and 2,125 feet deep below the West Lyell open cut, a new surface crushing plant, extensive additions to the flotation section of the concentration plant, additional mine buildings and the erection of houses and flats for the increased labour force which is expected to involve an additional 500 men when the present expansion is completed in 1972. It is planned to increase production from 15,393 tons of copper in the current year to 25,000 tons by 1973.

Smelting operations which began more than 70 years ago ceased in December 1969 and copper concentrates are being transported by road to Melba Siding and thence by the Emu Bay Railway Company to Burnie from where 20,000 tons will be shipped each year to the port Kembla works of the Electrolytic Zinc Refining and Smelting Company and the balance sent to the Mitsubishi Metal Mining Co. of Japan under a contract to purchase concentrates in excess of 20,000 tons a year for a period of ten years from 1 January 1970.

The transfer of smelting activities to overseas and interstate locations is most regrettable and it is important that such a trend be arrested. It is most likely that when capital becomes available a new smelter will be constructed at the mine, but existing commitments are such that this will be some time in the future.

The Mt Lyell Company has entered into a joint venture with Electrolytic Zinc Industries Ltd to establish a sulphuric acid plant at Burnie and will be supplying a total of 300,000 tons of pyrite per year which will be transported by road and rail to Burnie.

The use of road and rail transport for movement of copper concentrates and pyrites to Burnie marks the end of an era for the port of Strahan which has been the outlet for the copper and pyrite from Mt Lyell ever since mining was established at the beginning of this century.

The Electrolytic Zinc Company operates three mines at Rosebery, Williamsford and Tullah and the whole of the output is treated at Rosebery where zinc lead and copper concentrates are produced. These concentrates are transported to Burnie by the Emu Bay Railway, which is owned by the Company, from where the zinc concentrates are sent to Risdon for recovery of the zinc and associated minerals. The lead and copper concentrates are marketed overseas, mainly in U.S.A. The Company is expending \$4 million in sinking a new shaft at the Rosebery mine. It will be circular, with a diameter of 22 feet and a depth of 2,420 feet. Production in 1969 consisted of 41,120 tons of zinc, 11,730 tons of lead, 1,380,000 oz of silver, 26,186 oz of gold, 1,337 tons of copper, and 39 tons of cadmium valued at \$24 million.

Ore reserves of over 9 million tons ensure a continuity of operations. The mine employs 750 men.

The large scale programme of expansion to develop and produce from ore bodies located for exploration over several years was commenced by Renison Limited in 1965. New mining and milling plant was installed and the mine is now the principal producer of tin in Australia. Production in 1969 was 2,640 tons of tin and concentrates valued at nearly \$9 million and the rate of growth is illustrated when it is seen that production in 1968 was 1,745 tons. A total of 288 men are employed and the company has developed a modern housing site at Zeehan. Ore reserves have been assessed at 17 million tons averaging 0.82% tin. A feasibility study has been made to increase the ore throughput from 1,000 tons to 3,000 tons a day. Pilot plant work with cassiterite flotation has proved effective and a commercial plant is to be installed to treat 10,000 tons of fine tailing per month. This is unlikely to be available immediately but when in operation will produce substantial tonnages of low-grade concentrates for which a market is available. Production by Renison will reach higher levels and within a few years could amount to 9,000 tons of tin annually.

The Cleveland Tin Mine at Luina near Waratah has grown to become one of the principal tin mines in Australia. Concentrates containing 1,510 tons of tin and 569 tons of copper were produced in 1969. Reserves have been assessed at 2.5 million tons averaging 1.2% tin and 0.4% copper. The mine employs 213 men who reside at the new township of Luina constructed by the Company. An active programme of exploration is being maintained and ore reserves can be expected to increase with a consequent growth in production.

Production of iron ore pellets at Port Latta from ore mined at Savage River has progressively increased since the first shipment of pellets was made to Japan in April 1968. In 1969 a total of 1,908,215 tons of pellets valued at \$24,084,702 was produced and the production rate has now reached the target of 2.25 million tons annually. During the year a total of 31 shipments was made from Port Latta.

The rapid growth of the iron ore industry and its impact on our economy is illustrated by the fact that 760,000 tons of pellets were produced in 1968 valued at \$9,650,636 and in 1969 the value had grown by 250%. It is of interest to record that in 1969 iron ore pellets replaced copper as the major mineral produced in terms of value.

In May 1969, King Island Scheelite (1947) Ltd was acquired by Peko-Wallsend Ltd. This company has undertaken a vigorous programme of exploration and expansion of productive potential. Ore reserves have been increased to 6 million tons averaging 0.8% tungstic oxide and further additions may be expected as the results of exploration activities are assessed. Plant capacity is to be increased to treat a greater output of ore.

Aberfoyle Tin N.L. which produces tin and wolfram at Rossarden changed its name to Aberfoyle Ltd; Mineral Securities Australia Ltd has acquired a large share holding. Attention was given to increasing production by adding to the through-put of ore. This applied particularly to wolfram concentrates in order to take advantage of favourable market prices. Production of tin rose from 392 tons in 1968 to 402 tons in 1969 and tungstic oxide from 100 to 134 tons.

The Storeys Creek Tin Mining Company N.L. which is a wholly owned subsidiary of North Australian Uranium Corporation N.L. in which Aberfoyle Ltd has a 50% interest increased its production of tungstic oxide from 247 tons in 1968 to 303 tons in 1969. A fall in tin was recorded because of a decline in the tin content of the ore treated. Ore reserves in these mines did not alter significantly.

Beach sand minerals were first produced in Tasmania by Naracoopa Rutile Ltd at King Island in April 1969. Production for the year consisted of 5,239 tons of rutile concentrates valued at \$775,086 and 6,096

tons of zircon concentrates valued at \$340,535. Ilmenite concentrates were stock-piled for possible future treatment or sale. Inadequate port facilities at King Island made it necessary to ship concentrates in 3 ton capacity bags to Stanley where facilities are available for handling by bulk carriers.

The development of port facilities at Grassy, King Island will prove of value in both the operations of Naracoopa Rutile Ltd and Peko-Wallsend Ltd.

Alluvial tin mining operations in the State was mainly confined to the north-east where the Dorset Tin Dredge owned by the Storeys Creek Tin Mining Co. N.L. was the principal producer. Operating in the Black Duck area in the Gladstone district the Dredge produced 1000 tons of tin and 132 oz of gold. Hawkes Alluvial Ltd which has mined tin alluvials in the Sea Elephant area at King Island produced 12 tons of tin. A number of small parties continued to operate in the north-east, west, north-west and south-west of the State.

The Mt Cameron Water Race Board constructed a dam at Chum Creek to ensure regular water supplies during extended periods of low rainfall, but the response by producers did not reach expectations.

In 1969 coal production recorded a further increase to 115,933 tons as a result of the contract let by Australian Newsprint Mills at Boyer for the supply of 70,000 tons of coal a year for five years. This contract has maintained the coal mining industry in the State which but for the use of coal by Australian Newsprint Mills would have declined almost to the point of extinction.

NEW PROJECTS

No new mining ventures were opened in 1969 but as discussed in the previous section of this Report planned developments by major mines are of tremendous importance in the continued growth of mining in this State.

Construction of the sulphuric acid plant at Burnie jointly by the Mt Lyell Mining and Railway Co. Ltd and Electrolytic Zinc Industries Ltd at a cost of \$14 million was nearing completion at the close of the year. The plant will produce 420,000 tons of acid a year using 300,000 tons of pyrite concentrates to be supplied equally by the Electrolytic Zinc Company at Rosebery and the Mt Lyell Company, Queenstown. The Electrolytic Zinc Company is installing a new pyrite flotation plant to recover pyrite from current mill tailings and existing tailings dams. The operating company is North-West Acid Pty Ltd. Production is scheduled to commence in mid-1970. A long-term contract has been entered into with a Mainland fertilizer manufacturer and Tasmanian consumers will also be supplied.

The Electrolytic Zinc Company at Risdon has developed a process for treating a huge residue dump and it is planned to install plant at a cost of \$6.3 million. About 350 tons per day of residue will be processed consisting of 205 tons from current production and 145 tons from the dump. The residue dump contains 22.8% zinc, 5.2% lead, 0.52% cadmium and 6.6 oz silver per ton. Zinc production will increase by 70 tons a day. The lead extracted will be shipped to Port Pirie for processing.

A fully automated cement mill which will be the largest in Australia is being installed at the Goliath Portland Cement Company, Railton and is designed to replace all existing mills.

METAL PRICES

During 1969 base metal prices on the London market rose to the highest level for many years and this situation has been a contributing factor together with increased output for the record level of the value of production of the mining industry for 1969.

Copper.—The Australian price of copper which is fixed by the Copper Producers Association ranged between a low of \$1,187 per ton in February and March to a high of \$1,590 per ton at the end of December. The average for the year was \$1,368. These prices generally follow the movements in the quotations on the London Metal Exchange where prices ranged between \$509 and \$746 per ton with an average of \$621.

Lead.—The Australian price which was \$230 per ton at the beginning of the year rose to \$250 per ton in April, \$275 per ton in August and \$290 per ton in November. This remained the ruling price at the end of the year.

Tin.—The export control scheme introduced by the International Tin Council in September 1968 in order to support falling tin prices was maintained during the whole of 1969. Australia, which has moved from its position of an importer of tin to an exporter, agreed to limit its exports to the same degree as the producer members of the Council. However, domestic consumption of primary tin in Australia for 1969 estimated at 4,300 tons, accounts for the greater proportion of the total of about 7,300 tons of tin produced

and the balance available for export was well within the quota limit and did not affect the growth in production. This aspect is of considerable importance to Tasmania because of the greatly increased production during 1969 which amounted to 4,776 tons as compared with 3,126 tons in 1968 and the development of greater productive capacity, particularly by Renison Limited.

The Australian price rose steadily from \$3,038 per ton at the beginning of the year to \$3,613 per ton in December. This price, which is based on the landed price of imported tin, varies daily with the Straits quotation which reflects movements in the price of tin on the London Metal Exchange. In 1969 these prices ranged from a low of £S1,348 to £S1,646 per ton.

Market observers report that the prime cause behind the steep rise has been the artificial stimulus provided by the export quota scheme. The fall in consumption which resulted in export quotas being imposed in 1968 is now building up and it is reported that the world supply/demand position is now in reasonable balance. This will lead to export quotas being abandoned and prices will be determined by normal market forces with the International Tin Council acting as may be necessary through its Buffer Stock to keep prices within the limits of the ranges agreed to by the Council.

Tungsten.—The price of this metal did not fluctuate to the same extent as in previous years and ranged between a low of \$37.23 per long ton unit to a high of \$64.22. The average for the year of \$45.91 compares with \$39.11 for 1968. The stability of the market and the higher price offering has led to increased production of wolfram concentrates by the Storeys Creek Tin Mining Company and Aberfoyle Limited, and of scheelite concentrates by the King Island Scheelite Company.

Zinc.—The Australian price of zinc recorded only four movements throughout the year. In May the market price rose from \$264 per ton which was the ruling level since March 1968 to \$274.80 per ton, in June to \$278 per ton, in September to \$283.40 per ton and in October to \$295 per ton which was the ruling price at the end of the year. The prices quoted in the following table and which are used for calculations elsewhere in this report relate to production at Risdon and include a differential of \$40 per ton.

AVERAGE AUSTRALIAN PRICES, 1966-1969 (\$A)

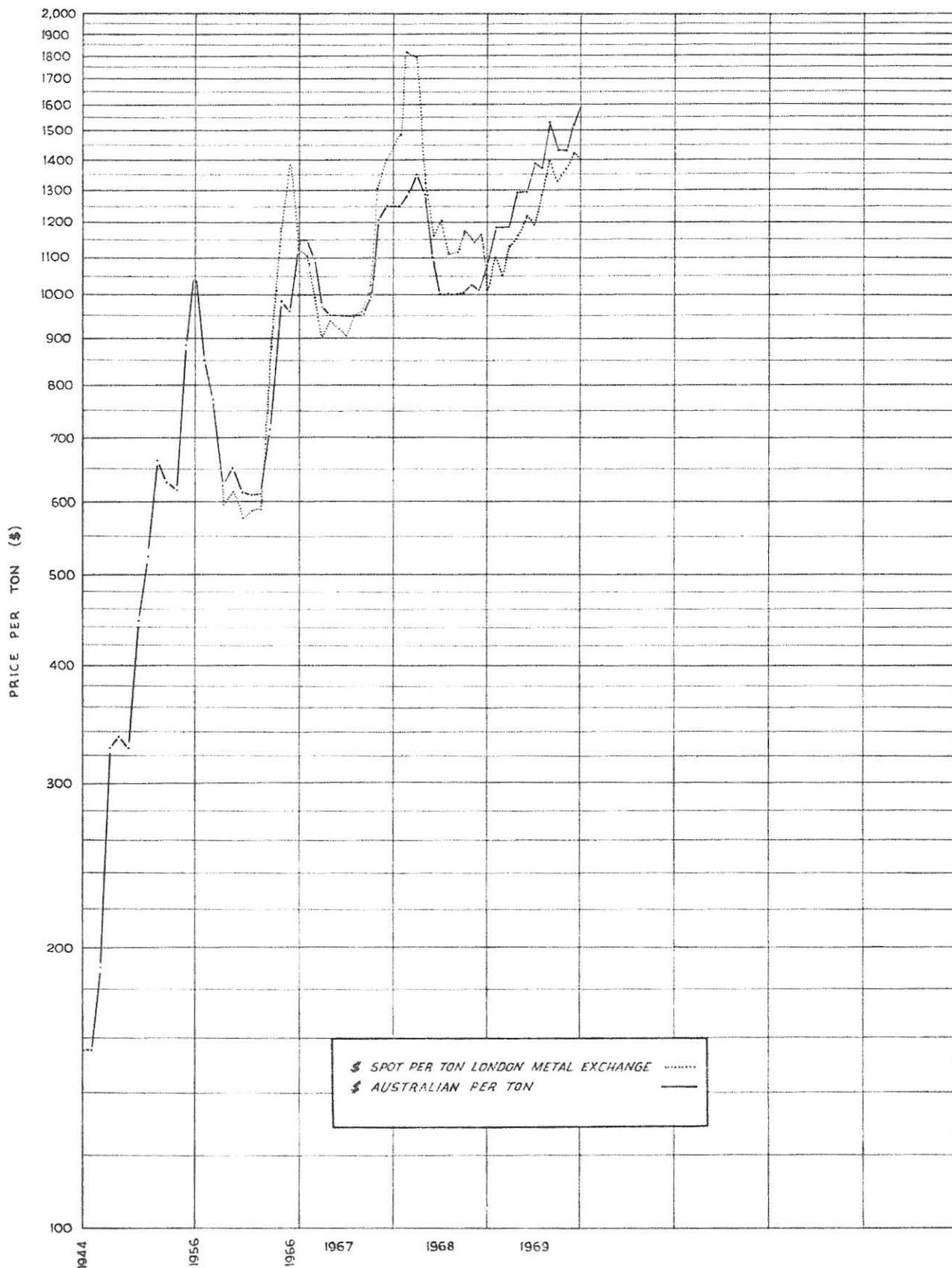
Commodity	Unit	1966	1967	1968	1969
Copper	ton	961.67	1,062.49	1,098.83	1,368.31
Gold	fine oz	31.25	31.25	33.71	36.69
Lead	ton	247.08	216.25	218.33	262.67
Silver	fine oz	1.17	1.47	2.07	1.62
Tin	ton	3,322.83	3,100.49	2,943.83	3,292.33
Tungsten	unit WO ₂	36.30	42.49	39.11	45.91
Zinc	ton	309.33	301.00	296.00	310.99

EXPLORATION

Exploration of the mineral resources of the State continued to be on a high level and with the exception of old goldfields most areas of potential interest are held as exploration or special prospector's licences. Many enquiries have been received from exploration companies desiring to operate in this State.

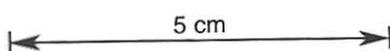
After a period to allow general investigation of areas the Department is requiring licence holders to reduce areas to localities of special interest so that land will be available for other interested companies. At the end of 1969 there were 82 exploration and special prospector's licences in force covering an area of 16,410 square miles and in addition eleven exploration permits to search for oil in off-shore areas covering 2,314 graticular blocks equivalent to about 58,000 square miles were held. It is estimated that more than \$1.5 million was expended in investigations on areas held under licence. Existing mining companies have engaged in extensive exploration within the boundaries of their mine leases.

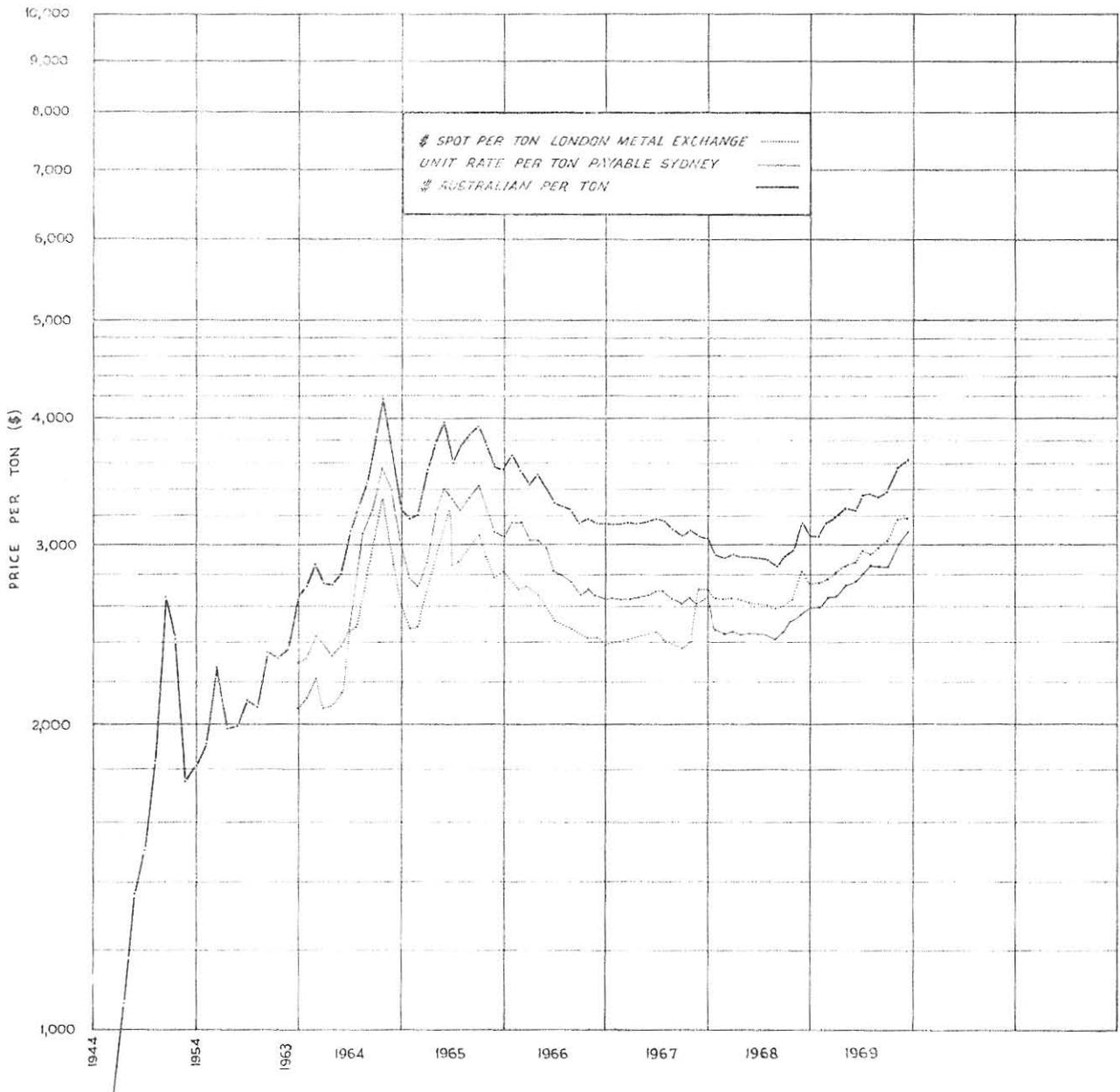
Companies engaged in mineral exploration outside mine leases consist of Aberfoyle Tin N.L., A.C.I. Operations Pty Ltd; Allstate Explorations N.L.; Alstergren Pty Ltd; Associated Pulp and Paper Mills Ltd; Australian Paper Manufacturing Ltd; Broken Hill Pty Company Ltd; Cleveland Ltd; Comstaff Pty Ltd; Eastern Tin N.L.; Electrolytic Zinc Company; Hawkes Alluvial Ltd; Heazlewood Nickel Prospecting Syndicate; Hoods Pty Ltd; Inland Explorations Pty Ltd; Industrial and Mining Investigations Pty Ltd; Industrial Sands Pty Ltd; King Island Scheelite Company; McIntyre Mines Aust. Pty Ltd; Milstern (Beechcroft) Pty Ltd; Mineral Development Pty Ltd; Mineral Supplies; Mount Lyell Company; Naracoopa Rutile Ltd; Pickands Mather and Company; Quest Exploration Pty Ltd; Renison Limited; Scamander Mining Corporation; Storeys Creek Tin Mining Co. N.L.; Sub-Oceanic Mining Company; Tasmanian Mineral Development; Tasminex N.L.; Texins Development Pty Ltd. In addition several exploration companies which operate in other States are engaged in investigations in Tasmania under options or other arrangements with individual licence holders and mining lessees.



COPPER PRICES

YEARLY AVERAGES 1944-1966, MONTHLY AVERAGES FROM 1967

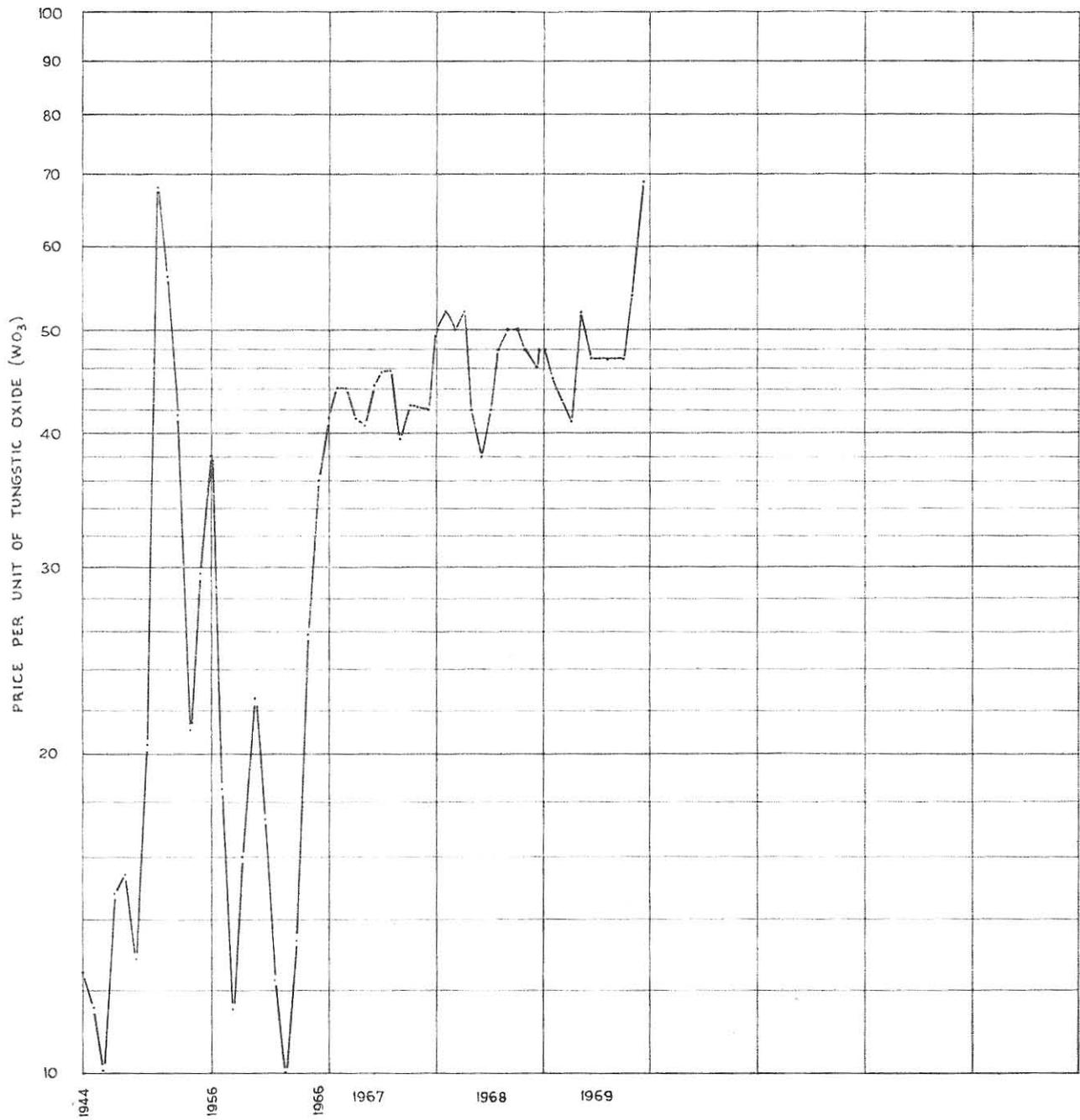




TIN PRICES

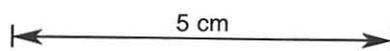
YEARLY AVERAGES 1944-1963, MONTHLY AVERAGES FROM 1964

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TUNGSTEN PRICES

YEARLY AVERAGES 1944-1966, MONTHLY AVERAGES FROM 1967



During the year two permits in respect of off-shore areas have been granted to Magellan Petroleum Southern Pty Ltd adjoining permits already held adjacent to the west coast and the north-east coast. A permit has also been issued to Amoco Australia Exploration Co. in respect of south-eastern waters adjoining the Tasmanian coastline.

The Department of Mines has maintained its programme of regional geological investigations and with economic, hydrological and engineering geological surveys. The results of this work are published and are available for the use of exploration companies and other interested persons. The services of the Department are in constant demand to assist enquirers and to provide information and to discuss the mineral potential of particular areas.

Drilling plants owned by the Department, when not engaged in boring for hirers, are employed in testing mineral deposits. Information gained is available to enquirers and any discoveries are made available to companies to develop.

The Tasmania Gold Mine at Beaconsfield which was bored by the Department has been granted under an exploration licence to Allstate Explorations Pty Ltd to further investigate the potential of the old mine for the establishment of productive operations, and the Company is currently engaged in drilling.

At the end of the year, the Department's drilling plants were engaged in boring tin alluvials in the Gladstone district, lode tin deposits at Waratah, gold reefs at Alberton, coal deposits at Mt Nicholas, water investigations in the Longford and Scottsdale districts, testing of clay deposits in the Launceston area and in foundation testing at Launceston.

IRON ORE

Production of iron ore pellets at Port Latta from ore mined and concentrated at Savage River totalled 1,908,215 tons valued at \$24,084,702 and towards the end of the year the output reached the designed capacity of 2.25 million tons a year. The value of the industry to the State is emphasised by the fact that in the first full year since making the first shipment of pellets to Japan in April 1968 the value of production became the highest for any single mining product in the State.

The State received \$317,489 in revenue from the prescribed 15 cents per ton royalty on pellets exported.

The pellet industry occupies portion only of the iron ore deposits at Savage River; E. R. Hudson the promoter of the industry continues to hold the balance of the area as an exploration licence. Drilling operations have been continued to add to the existing knowledge of the volume and grade of the deposits. Discussion and investigations which have been pursued by Mr Hudson over a number of years directed to the establishment of an integrated steel industry continued with overseas interests. No finality has been reached but the feasibility of establishing a steel industry is still being actively pursued.

The Armco Company which announced its intention to construct steel works in Australia were invited by the Government to consider the Savage River deposits and data provided will be evaluated by the Company in making a decision as to the source of iron ore and plant location.

Iron ore deposits on the north-west coast at Blythe and Hampshire are under investigation by a Mainland group and by a local company; diamond drilling has been undertaken. The economies of establishing an industry for the export of iron ore are being examined by the Companies in consultation with likely consumers.

OIL

Boring was continued in Bass Strait on exploration permits held by Hematite Petroleum Pty Ltd. Clam No. 1 well located 51 miles SSE of King Island and 22 miles west of the north-west tip of Tasmania was sunk to 5,323 feet and Bluebone No. 1 sited 20 miles to the north of Flinders Island was abandoned at 1,984 feet. In neither case was there any discovery of significant hydrocarbons. Studies of data obtained from geophysical surveys is continuing and further bores will be put down in areas considered favourable for the occurrence of oil. The other permit holders have undertaken geophysical surveys and when results are evaluated a decision on drilling targets will be made.

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

EXPLORATION PERMITS UNDER PETROLEUM (SUBMERGED LANDS) ACT

<i>Title No.</i>	<i>Title Holder</i>	<i>Area (blocks)</i>	<i>Expiry Date</i>
T/1P	Magellan Petroleum Australia Ltd	41	4.7.74
T/2P	Magellan Petroleum Australia Ltd	117	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/7P	Esso Exploration & Production Aust. Inc.	147	6.9.74
T/8P	Esso Exploration & Production Aust. Inc.	400	6.9.74
T/9P	Magellan Petroleum Australia Ltd	17	11.4.75
T/10P	Magellan Petroleum Australia Ltd	27	11.4.75
T/11P	Amoco Australia Exploration Co.	112	11.4.75

EXPLORATION LICENCE UNDER MINING ACT 1929

<i>Title No.</i>	<i>Title Holder</i>	<i>Area (sq miles)</i>	<i>Expiry Date</i>
E.L. 18/65	Esso Exploration & Production Aust. Inc.	230	17.9.70
E.L. 19/65	Esso Exploration & Production Aust. Inc.	60	17.9.70
E.L. 15/67	Nudec Petroleum Pty Ltd	349	9.4.70

LEGISLATION

Mines Inspection Regulations 1969

The new Regulations were prepared following the enactment of the Mines Inspection Act 1968. Both the Act and Regulations became effective on 15 March 1969.

Inflammable Liquids Regulations 1969

Amendments to the Inflammable Liquids Regulations 1966 were made under Statutory Rules 1969, No. 128, which provided as follows:—

- (a) An alteration in the flashpoints of inflammable liquids classified as Class B liquids respectively and the prescription of the method of determining the flashpoints of inflammable liquids.
- (b) Precautions relating to the escape or discharge from a vessel of ballast water and water mixed with inflammable liquids into the waters of harbours.
- (c) Alterations in the provisions relating to the loading and unloading of inflammable liquids and dangerous commodities on and from vessels and the extension of those provisions to the conveyance of those liquids and commodities and the conveyance, loading, and unloading of cargo adjacent to those liquids and commodities.
- (d) Precautions to be observed in the handling of portable tanks containing dangerous commodities and certain inflammable liquids.
- (e) Alterations in the provisions relating to the maximum quantities of substances liable to spontaneous combustion, etc., which may be conveyed on vessels in harbours at ordinary and special berths.
- (f) Provisions relating to the approval of fixed tanks on vessels at berths and limitations on loading and unloading from fixed tanks.
- (g) Alterations in the requirements for hoses used for pumping inflammable liquids in bulk to and from vessels.
- (h) Alterations in the provisions relating to the loading and unloading of inflammable liquids in bulk at night.
- (i) Provisions relating to the conveyance and construction of portable tanks containing dangerous commodities and certain inflammable liquids.
- (j) A prohibition against the driving of loaded and partly loaded tank vehicles conveying inflammable liquids on to or on the Tasman Bridge from Monday to Friday between 7.00 a.m.-9.30 a.m. and 4.00 p.m.-7.00 p.m.

POLLUTION

The Department has been actively concerned in problems of control of pollution.

The Mining Act 1929 contains provisions to prohibit the deposition of tailings in any river or stream and producers are required to impound tailings and to take such other steps as considered necessary to

prevent pollution of streams. Most of the larger mines have been required to duplicate existing tailings dams to ensure that in the event of some untoward happening alternative facilities are available.

Under the provisions of the Underground Water Act 1966 provision is made for the prevention of contamination of underground water supplies and for the establishment of an Underground Waters Contamination Advisory Committee. Development of the underground water resources has so far been limited to shallow farm bores and the question of contamination has not arisen.

The Inter-Departmental Committee on Industrial Hygiene comprising representatives of the Mines, Health and Labour and Industry Departments was asked by the Government to investigate problems of environmental pollution. The main activity has been the monitoring of the atmosphere at selected sites and some 19 stations in six different towns are regularly examined. These gauges indicate that there are problems in some parts of the State but the investigation has not been proceeding for sufficient time for sufficient data to be collected upon which recommendations may be based.

A survey is being undertaken in association with the Sea Fisheries Division of the Department of Agriculture and the Health Department of environmental factors in order to assess the effects of the proposed dumping at sea of effluent from the North-West Acid plant at Burnie. This study is in progress.

Officers of the Department gave evidence before the Senate Select Committee on Water Pollution.

The Department is conscious of the problems of pollution and Mining Engineers are giving the matter close attention in the course of inspectorial duties at mines and works under the jurisdiction of the Mines Inspection Act 1968 and other legislation administered by the Department.

WIRE ROPE COMMITTEE OF THE AUSTRALIAN MINERAL INDUSTRIES RESEARCH ASSOCIATION LIMITED

A Wire Rope Committee was set up by the Australian Mineral Industries Research Association Limited in December 1961. It has the support of the Commonwealth and State Governments and of industry who make financial contributions towards the cost of wire rope research.

The aim of the project is to develop a reliable technique and the necessary equipment for the non-destructive testing of wire ropes and to present evidence of its reliability so that it will be accepted throughout the mining industry in place of the existing wasteful destructive testing procedure.

The Department has contributed \$2,000 spread over the last three years. The Committee aims to complete its objectives over the next three years. These are—

- (a) the acceptance of non-destructive testing by all Australian Mines Departments;
- (b) the development of a non-destructive instrument that will overcome the deficiencies of all available instruments, particularly the ability to detect the onset of metal fatigue in wire ropes; and
- (c) the completion of work conducted over many years for the development of more sensitive 'search coils' for use with non-destructive test instruments.

The present rate of contribution from sponsors is insufficient and requires to be doubled to enable the foregoing objectives to be achieved.

It has been agreed to increase the Department's contribution to \$4,000 spread over the next three years.

The Director of Mines is a member of the Committee.

The work of the Wire Rope Committee is extremely important and will have far-reaching effects on mine safety, mining legislation and operating economics. Several mines in Tasmania use wire ropes which are subject to inspection by the Department under the Mines Inspection Act 1968. Periodic testing of ropes in our mines has been carried out by the Project Scientist employed by the Committee in association with Mining Engineers of the Department of Mines.

AUSTRALIAN MINERALS COUNCIL

As reported last year an Australian Minerals Council consisting of the Minister for National Development and the Minister for Territories of the Commonwealth and the Ministers for Mines of all the States was formed to facilitate discussion on matters relating to the mineral resources of Australia.

The Council met on two occasions. The major issue has been concerned with off-shore minerals and the stated intention of the Commonwealth to introduce legislation to govern exploration and exploitation of off-shore minerals. The States are of the opinion that a co-operative scheme extending to both territorial waters and the continental shelf and a pooling of legislative competence is desirable in the National interest.

The State Ministers believe that the broad principles of the arrangement between the Commonwealth and the States relating to petroleum in off-shore areas should be applied to minerals. Under this arrangement the titles are issued by the States in the name of the Commonwealth and the State concerned. No attempt has been made to define the rights of the Commonwealth or any State.

No legislation had been introduced into the Parliament of the Commonwealth at the end of the year under review and the States were expecting further consultations with the Commonwealth before any such legislation was introduced.

REVENUE

REVENUE COLLECTED DURING THE YEAR ENDED 31 DECEMBER 1969

<i>Head of Revenue</i>	\$
Public Works and Services—Mines Department	54,252
Rent and Fees of Auriferous and Mineral Lands	99,971
Royalty on Iron Ore Pellets	247,559
Survey Fees	7,792
Fees under the Explosives and Inflammable Liquids Act	36,138
TOTAL	445,712

COMPARATIVE STATEMENT OF REVENUE FROM MINES, BEING RENTS, FEES, STORAGE OF EXPLOSIVES, ETC., PAID TO THE TREASURY DURING THE YEARS 1964 TO 1968

<i>Year</i>	\$	<i>Year</i>	\$
1964	119,398	1967	161,892
1965	125,606	1968	205,941
1966	135,350	1969	445,712

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 1969

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (Acres)</i>	<i>Sluiceways</i>
Barytes	1	40	
Coal	1	1,657	
Copper	1	34	
Easements	2	531	
Gold	11	375	
Gravel	2	81	
Lead	2	68	
Minerals	2	2,187	
Osmiridium	5	876	
Shale	1	37	
Silica	3	227	
Stone	7	255	
Tin	8	4,347	
Water licences	3	....	5
Wolfram	2	2,156	
TOTAL	51	12,871	5

TOTAL NUMBER OF LEASES AND LICENCES IN FORCE ON 31 DECEMBER 1969

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (Acres)</i>	<i>Sluiceways</i>
Antimony	1	80	
Bauxite	6	475	
Barytes	2	80	
Clay	11	416	
Coal	11	3,751	
Copper and gold	6	1,288	
Copper-nickel	3	120	
Dolomite	4	309	
Easements	63	2,215	
Feldspar	2	15	
Gold	22	861	
Granite	3	25	
Iron ore	8	5,640	
Kaolin	2	80	
Limestone	22	1,615	

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (Acres)</i>	<i>Sluiceways</i>
Mica	1	20	
Minerals	47	11,293	
Ochre	2	8	
Osmiridium and chromite	7	2,096	
Nickel	1	80	
Sand and gravel	26	1,314	
Precious stones	1	356	
Scheelite	6	476	
Silica	10	1,403	
Silver-lead	15	1,632	
Stone	52	943	
Tin	230	14,451	
Uranium	1	50	
Wolfram	6	2,331	
Water licences	118	1,007	952
TOTAL	1,120	53,528	952

NUMBER AND AREA OF LEASES AND LICENCES APPLIED FOR DURING THE YEAR ENDED
31 DECEMBER 1969

<i>Leases and Licences</i>	<i>Number</i>	<i>Area (Acres)</i>	<i>Sluiceways</i>
Cassiterite	3	215	
Copper	1	3,933	
Easements	4	550	
Gold	6	250	
Iron	2	130	
Minerals	4	245	
Osmiridium	17	1,235	
Slate	1	20	
Tin	64	3,035	
Talc	2	160	
Wolfram	4	174	
Water	6	....	53
TOTAL	114	9,947	53

TOTAL NUMBER AND AREAS OF ALL TYPES OF PROSPECTING RIGHTS HELD AS AT 31
DECEMBER 1969

<i>Mining tenement</i>	<i>Number</i>	<i>Area</i>
Permits to enter and search on private land, including owner's consents	27	134,537 acres
Exploration licences	58	16,186 square miles
Special Prospectors' licences	24	223 square miles
Miners Rights	129	64 acres
Prospectors' Licences	223	11,150 acres
Authorities to prospect under the Aid to Mining Act 1927	1	28 square miles
Permits to explore for petroleum under the Petroleum (Submerged Lands) Act 1967 ..	11	2,314 graticular blocks (58,000 square miles)

EXPLORATION LICENCES AND SPECIAL PROSPECTORS' LICENCES IN FORCE AT 31 DECEMBER 1969

<i>Licence No.</i>	<i>Holder</i>	<i>Address</i>	<i>Area (sq miles)</i>	<i>Situation</i>	<i>Expiry Date</i>	<i>Mineral</i>
E.L. 4/61	Industrial & Mining Invest- igations Pty Ltd	Australia Square, Sydney	147	Savage River	23.8.70	All minerals
E.L. 5/61	Industrial & Mining Invest- igations Pty Ltd	Australia Square, Sydney	450	East Coast	24.8.70	Coal and lime- stone
E.L. 1/62	Electrolytic Zinc Co. of A/asia Pty Ltd	Rosebery	49	Rosebery	22.7.70	All minerals
E.L. 2/62	Electrolytic Zinc Co. of A/asia Pty Ltd	Rosebery	10	Dundas	12.9.70	All minerals
E.L. 1/63	Cleveland Tin N.L.	505 St Kilda Road, Melbourne	27	Mt Cleveland	11.8.70	All minerals
E.L. 2/63	Aberfoyle Tin N.L.	505 St Kilda Road, Melbourne	87	Mt Lindsay	1.4.70	All minerals

PARTICULARS OF EXPLORATION LICENCES, ETC.—*continued*

<i>Licence No.</i>	<i>Holder</i>	<i>Address</i>	<i>Area (sq miles)</i>	<i>Situation</i>	<i>Expiry Date</i>	<i>Mineral</i>
E.L. 5/63	Comstaff Pty Ltd	60 Market Street, Melbourne	374	West Coast	30.4.70	All minerals
E.L. 8/65	Mt Lyell Mining and Railway Co. Ltd	Queenstown	110	Devon	12.5.70	All minerals
E.L. 12/65	Pickands Mather & Co. International	Port Latta	74	West Coast	21.6.70	All minerals, except coal and oil
E.L. 13/65	Broken Hill Pty Co. Ltd	500 Bourke Street, Melbourne	985	SW Tasmania	21.6.70	All minerals
E.L. 15/65	Broken Hill Pty Co. Ltd	500 Bourke Street, Melbourne	310	Sheffield	2.1.70	All minerals, except coal and oil
E.L. 18/65	Esso Exploration Production Aust.	Box 4249, Sydney	230 (internal waters)	W & SW Coast	17.9.70	Petroleum, oil and gas
E.L. 19/65	Esso Exploration Production Aust.	Box 4249, Sydney	60 (internal waters)	East Coast	17.9.70	Petroleum, oil and gas
E.L. 9/66	Mt Lyell Mining and Railway Co. Ltd	Queenstown	83	Mt Tindall	5.8.70	Metallic minerals
E.L. 13/66	Naracoopa Rutile Ltd	King Island	27	Wayanna, King Island	19.4.70	Tin and associated minerals
E.L. 14/66	Naracoopa Rutile Ltd	King Island	18	Bingaree, King Island	19.4.70	Tin and associated minerals
E.L. 15/66	King Island Scheelite	King Island	22	King Island	24.4.70	Metallic minerals
E.L. 7/67	King Island Scheelite	King Island	31	King Island	17.5.70	Metallic minerals
E.L. 11/67	Storeys Creek Tin Mining Co. N.L.	Rossarden	22.5	Rossarden	21.7.70	Metallic minerals
E.L. 15/67	Nudec Petroleum Pty Ltd	C/o C. G. Sulzberger, Brisbane St, Launceston	349	Longford	19.4.70	Oil
E.L. 1/68	Comstaff Pty Ltd	C/o Anglo-American Corp., Aust. Ltd	220	West Coast	30.4.70	Metallic minerals
E.L. 4/68	J. Curtain	King Island	63	King Island	11.7.70	Alluvial minerals
E.L. 5/68	Quest Exploration Pty Ltd	100 Collins Street, Melbourne	100	Smithton	31.7.70	Chromite
E.L. 6/68	Texins Development Pty Ltd	C/o Geophoto Resources Consultants, 30 Herschel Street, Brisbane	650	Branxholm	23.8.70	Metallic minerals
E.L. 7/68	Texins Development Pty Ltd	C/o Geophoto Resources Consultants, 30 Herschel Street, Brisbane	124	Dundas	23.8.70	Metallic minerals
E.L. 8/68	Electrolytic Zinc Co. of A/asia Ltd	Rosebery	60	Strahan	23.8.70	Heavy minerals
E.L. 9/68	D. Pearson	Ulverstone	40	Mawbanna	16.3.70	Non-metallic minerals
E.L. 11/68	A. E. Bailey	Victoria Street, Hobart	15	Catamaran	25.3.70	Heavy minerals
E.L. 13/68	D. W. Hinkley	Brighton Beach	2	Cuprona	7.4.70	All minerals
E.L. 14/68	E. H. MacDonald	Australia Square, Sydney	1	Natone	7.4.70	All minerals
E.L. 15/68	H. T. Reardon	Bothwell	62	Ringarooma	25.4.70	Metallic minerals
E.L. 16/68	A.C.I. Operations Pty Ltd	110 Gormanston Road, Moonah	220	West Coast	4.5.70	Metallic minerals
E.L. 17/68	Tasminex N.L.	93 York Street, Launceston	234	Black Range	4.5.70	Metallic minerals
E.L. 18/68	Hawkes Alluvial Tin Ltd	100 Collins Street, Melbourne	24	King Island	11.7.70	Alluvial minerals
E.L. 19/68	Comstaff Pty Ltd	C/o Anglo-American Corp., Aust. Ltd, 60 Market St, Melbourne	14.6	NW Coast	30.4.70	Metallic minerals
E.L. 1/69	Tasminex N.L.	93 York Street Launceston	190		10.2.70	All minerals
E.L. 2/69	Sub-Oceanic Mining Corp. N.L.	C/o Mr M. C. Forster, 150a Collins Street, Hobart	125	S.E. Tasmania D'Entrecasteaux Channel	26.2.70	Sand, gravel and associated heavy minerals
E.L. 4/69	King Island Scheelite (1947) Ltd	King Island	35	NW King Island	14.9.70	All minerals
E.L. 5/69	King Island Scheelite (1947) Ltd	King Island	116	W King Island	14.9.70	All minerals

PARTICULARS OF EXPLORATION LICENCES, ETC.—*continued*

<i>Licence No.</i>	<i>Holder</i>	<i>Address</i>	<i>Area (sq miles)</i>	<i>Situation</i>	<i>Expiry Date</i>	<i>Mineral</i>
E.L. 6/69	A. R. Dodson	401 Collins Street, Melbourne	75	Zeehan	30.3.70	Metallic minerals
E.L. 7/69	Allstate Exploration N.L.	C/o A. H. Dickens & Co., 291 George Street, Sydney	5,300	Beaconsfield	21.4.70	Metallic minerals
E.L. 8/69	Tasminex N.L.	93 York Street, Launceston	49	Neasey Plains Arthur River	12.5.70	All minerals
E.L. 9/69	Naracoopa Rutile Ltd	291 George Street, Sydney	15	Sea Elephant Bay	21.5.70	All minerals
E.L. 10/69	Mt Lyell Mining & Railway Co. Ltd	Queenstown	40	Queenstown	5.6.70	All minerals
E.L. 11/69	Hood's Pty Ltd	157 Macquarie St, Hobart	1,150	NW Tasmania	19.6.70	Metallic minerals
E.L. 12/69	K. L. Burns	33 Cranston St, Dural, N.S.W.	1,180	Blue Tier	8.7.70	Metallic minerals
E.L. 13/69	S. E. Shaw	4 Gladstone Pde, Lindfield, N.S.W.	35	Ben Lomond	8.7.70	Metallic minerals
E.L. 15/69	Pickands Mather & Co.	68 Pitt Street, Sydney	5	Smithton	17.7.70	Limestone and dolomite
E.L. 18/69	Milstern (Beechcroft) Pty Ltd	30 Glen Street, Milsons Point, Sydney	112	Upper Forth	2.3.70	Metallic minerals
E.L. 19/69	Associated Pulp & Paper Mills Ltd and David Mitchell Estate Ltd	Burnie	32	Mole Creek	3.3.70	Limestone
E.L. 20/69	John Hood Pty Ltd	157 Macquarie St, Hobart	460	W Coast-Interview River	15.9.70	Metallic minerals
E.L. 21/69	Sub-Oceanic Mining Corp. N.L.	150a Collins St, Hobart	100	SW Tasmania	29.3.70	Beach sand and associated minerals
E.L. 23/69	King Island Scheelite (1947) Ltd	Grassy	55	King Island	16.4.70	All minerals
E.L. 24/69	Industrial Sands Pty Ltd	P.O. Box 502, Devonport	20	Port Sorell	11.5.70	All minerals
E.L. 25/69	Inland Explorations Pty Ltd	P.O. Box 1000, Launceston	70	Port Sorell	23.6.70	All minerals
E.L. 27/69	Australian Paper Manufacturers	P.O. Box 63, Geeveston	16.5	New River	9.6.70	All minerals
E.L. 28/69	Milstern Beechcroft Pty Ltd	30 Glen Street, Milsons Point, Sydney	280	NE Tasmania	16.6.70	Alluvial minerals
E.L. 29/69	Milstern Beechcroft Pty Ltd	30 Glen Street, Milsons Point, Sydney	80	Scamander	16.6.70	Alluvial minerals
S.P.L. 3	Electrolytic Zinc Co. of A/asia Ltd	Rosebery	10	Tullah	6.7.70	All minerals
S.P.L. 20	Renison Ltd	Renison Bell	3	Ringville	16.8.70	Metallic minerals
S.P.L. 22	Electrolytic Zinc Co. of A/asia Ltd	Rosebery	22.5	Trial Harbour	9.6.70	Minerals
S.P.L. 24	Alstergren Pty Ltd	Box 4505, Melbourne	21	Cox Bight	19.7.70	Tin
S.P.L. 27	Renison Ltd	Renison Bell	5	South Dundas	19.7.70	All minerals
S.P.L. 37	Heazlewood Nickel Prospecting Syn. N.L.	C/o A. McCormick, 104 Regent Street, Sandy Bay	6	Heazlewood	7.5.70	Metallic minerals
S.P.L. 39	H. Meerding	Blackmans Bay	2	Friendly Beaches	7.6.70	Alluvial tin and associated minerals
S.P.L. 46	McIntyre Mines (Aust.) Pty Ltd	8-12 Bridge Street, Sydney	19	Dundas	30.4.70	Metallic minerals
S.P.L. 48	R. L. Rainbow	Winnaleah	3	N Scottsdale	6.7.70	Tin and associated minerals
S.P.L. 53	Electrolytic Zinc Co. of A/asia Ltd	Rosebery	3	Marrawah	7.7.70	Heavy minerals
S.P.L. 54	R. W. Carter	43 Fairthorne Rd, Launceston	5.5	Mt Remus	16.7.70	Metallic minerals
S.P.L. 55	T. G. Rainbow	Winnaleah	1	N Scottsdale	10.8.70	Tin and associated minerals
S.P.L. 56	B. A. Farquhar	Scottsdale	25	Takone	10.8.70	Metallic minerals
S.P.L. 60	W. St C. Manson	Cormiston Road, Riverside	1	Gladstone	24.3.70	Tin and associated minerals
S.P.L. 61	Eastern Tin Pty Ltd	114 Collins Street, Hobart	3.75	Coles Bay	24.3.70	Metallic minerals
S.P.L. 62	A. R. Smith	Longford	25	Professor Range	2.4.70	Metallic minerals

PARTICULARS OF EXPLORATION LICENCES ETC.—*continued*

<i>Licence No.</i>	<i>Holder</i>	<i>Address</i>	<i>Area (sq miles)</i>	<i>Situation</i>	<i>Expiry Date</i>	<i>Mineral</i>
S.P.L. 67	Industrial Sands Pty Ltd	C/o O. E. Harvey, P.O. Box 502, Devonport	2	Port Sorell	24.6.70	All minerals
S.P.L. 68	Sub-Oceanic Mining Corp. N.L.	C/o M. C. Forster, 7 Crelin Street, Battery Point	4.5	Louisa Bay	15.7.70	Beach sands, etc.
S.P.L. 69	D. H. Bessell	1 Esk Street, Launceston	0.5	Pipers River	5.8.70	Non-metallic minerals
S.P.L. 70	D. M. Lewis	Swansea	11	Mt Maud	14.4.70	Metallic minerals
S.P.L. 71	B. A. Youl	Symmons Plains	16	Loddon Range	21.4.70	Metallic minerals
S.P.L. 72	Scamander Mining Corp. N.L.	81 Cameron Street, Launceston	5	Scamander	13.5.70	Metallic minerals
S.P.L. 73	Cornwall Coal Co.	P.O. Box 62, Launceston	25	Gardens- St Helens	9.6.70	Kaolin and ceramics
S.P.L. 74	F. C. Bardenhagen	Lilydale	3.5	Mt Stronach	19.7.70	Metallic minerals

Exemptions

No exemptions from the labour covenant of leases were granted.

WARDENS' COURT

J. D. Murray v. West Coast Enterprises Pty Ltd. The application for forfeiture of lease 47M/57 which was adjourned *sine die* last year was settled out of Court by a sale of the lease to the plaintiff.

A. N. Allen v. J. D. Harris. Application for forfeiture of lease 424P/M at Ulverstone. The action was heard by the Warden of Mines, Devonport, who awarded forfeiture to the plaintiff.

Hobart Brick Co. v. Non-Metallic Minerals Syndicate N.L. Application for the forfeiture of leases 11M/41 and 7M/60 Surges Bay. The application was heard by C. Brettingham Moore, Registrar of the Supreme Court, who was acting as Deputy for the Warden of Mines for the South-Western Mining District. The case was dismissed but later a mutual settlement was made by the parties.

Australian Commonwealth Carbide Co. v. O. B. McDougall. Application to Warden to determine compensation in respect of an application for a tramway easement 4W/69 at Ida Bay. The application was heard by C. Brettingham Moore, Deputy Warden of Mines. A settlement was reached between the parties out of Court.

Objections by land owners to granting of an Exploration Licence applied for by Investment Trust Ltd. In my last Report it was stated that an appeal had been lodged in the Supreme Court against the decision of the Warden of Mines that the marking out of the land by the Company was invalid. The case has not been listed for hearing and as a result the land applied for has been 'tied-up' for the last twelve months. This position is considered to be contrary to the interests of the mining industry and an examination is being made as to procedures which may be applied to having a determination made. A further complication has been introduced by the lodgement of a new application by Investment Trust Ltd for an Exploration Licence covering the land applied for under the first application together with additional adjoining land. The property owners concerned in the objections to the first application immediately lodged objections to the second application. These have been forwarded to the Warden of Mines at Launceston in accordance with the provisions of the Mining Act 1929, for hearing. No date for the hearing has yet been fixed.

MINE MANAGERS' CERTIFICATES

During the year the Board of Examiners issued Metalliferous Mine Managers' Certificates of Competency to Peter Allan, Kenneth John Fooks, Geoffrey Richard Morris, and Brian Rutherford Sheppard.

VALUE OF TASMANIAN MINERALS IN RECENT YEARS WITH AUSTRALIAN METAL PRICES

<i>Year</i>	<i>\$</i>	<i>Year</i>	<i>\$</i>
1960	26,774,520	1965	43,755,904
1961	26,758,954	1966	51,180,693
1962	30,874,136	1967	55,252,710
1963	32,206,272	1968	71,919,344
1964	40,013,378	1969	104,150,500

MINERAL PRODUCTION SINCE 1880

QUANTITY AND VALUE OF MINERAL PRODUCTION AS AT 31 DECEMBER 1969

<i>Mineral</i>	<i>Total Quantity</i>	<i>Value \$</i>
METALLIC MINERALS		
Antimony (tons)	3	2,034
Bismuth (tons)	84	59,288
Cadmium (tons)	1,787	5,502,553
Cobalt oxide (tons)	22.04	47,900
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)	515,550	226,530,527
Crocoite (specimens only)		3,902
Gold (fine oz)	2,799,692	37,077,763
Ilmenite (tons)	550	2,512
Iron ore pellets (tons)	2,668,298	33,735,338
Iron oxide (including hematite, limonite and mag- netite) (tons)	146,051	434,988
Lead (from 1919) (tons)	411,903	57,242,452
Manganese (tons)	1	6
Manganese dioxide (from 1957) (tons)	3,337	108,491
Mercury (lb)	9,977	62,758
Monazite (tons)	33	1,214
Nickel (tons)	233	81,036
Osmiridium (oz)	31,100	1,418,771
Pyrite (tons)	1,835,650	8,456,502
Rutile (tons)	1	36
Rutile (concentrates) (tons)	5,239	775,086
Scheelite (tons)	26,495	55,708,672
Silica for silicon alloy production (tons)	30,285	263,424
Silicon as silicon alloys (tons)	44,628	5,062,904
Silver-lead ore to 1918 (now shown under Silver and Lead) (tons)	1,083,898	12,858,582
Silver (from 1919) (fine oz)	51,698,414	34,831,074
Sulphur as sulphuric acid (from 1957) (mono tons)	598,794	7,158,606
Tin (tons)	160,479	111,994,597
Wolfram (tons)	17,453	25,187,739
Zinc (tons)	957,865	165,895,099
Zinc sulphate (from 1957) (tons)	3,108	314,397
Zircon (concentrates) (tons)	6,096	340,535
NON-METALLIC MINERALS		
Asbestos (tons)	3,980	34,284
Baryte (tons)	2,205	16,478
Clay (from 1958)—		
Brick (cubic yards)	1,261,922	2,406,059
Tile (cubic yards)	41,004	55,909
Other (cubic yards)	2,861,464	705,074
Dolomite (tons)	35,638	208,844
Graphite (tons)	40	214
Kaolin (tons)	111,086	883,018
Limestone—		
Agricultural and other (tons)	750,398	1,792,736
Carbide (tons)	781,040	2,290,458
Cement (tons)	6,024,693	8,911,387
Chemical and metallurgical (tons)	4,289,869	5,282,158
Ochre (tons)	2,646	19,554
Pebbles (from 1957) (tons)	9,864	155,446
Sand (Moulding) (tons)	850	9,550
Silica (tons)	219,037	404,814
Talc (tons)	333	2,154
FUEL MINERALS		
Coal (tons)	9,692,862	25,506,278
Shale (tons)	41,572	62,462
Peat (tons)	279	15,876
CONSTRUCTION MATERIALS		
Building stone—		
Freestone (cubic yards)	6,829	88,207
Granite (cubic yards)	5,978	85,153
Other (cubic yards)	8,829	25,546

<i>Mineral</i>	<i>Total Quantity</i>	<i>Value \$</i>
Crushed and broken stone (from 1958)—		
Basalt	(cubic yards) 1,761,312	4,143,197
Dolerite	(cubic yards) 6,949,654	20,885,899
Limestone	(cubic yards) 275,480	706,758
Sandstone	(cubic yards) 45,365	80,331
Other	(cubic yards) 1,599,826	3,549,876
Gravel (from 1958)	(cubic yards) 14,346,658	15,474,410
Sand (from 1958)	(cubic yards) 1,405,938	1,929,766
Other road materials	(cubic yards) 2,498,558	2,820,585
		<u>\$918,741,539</u>

STATISTICS RELATING TO THE MINERAL INDUSTRY

<i>Mineral</i>	<i>Year ended 31 December 1968</i>		<i>Year ended 31 December 1969</i>	
	<i>Total Quantity</i>	<i>Value \$A</i>	<i>Total Quantity</i>	<i>Value \$A</i>
METALLIC MINERALS—				
Cadmium	(tons) 74	390,642	39	255,267
Cobalt oxide	(tons) 1.11	4,683	1.03	4,594
Copper	(tons) 15,942	17,521,393	17,299	23,671,713
Crocoite	Specimens only	2,516	Specimens only	320
Gold	(fine oz) 33,526	1,135,108	36,705	1,338,817
Iron ore pellets	(tons) 760,083	9,650,636	1,908,215	24,084,702
Iron oxide	(tons) 12,780	79,030	11,117	71,791
Lead	(tons) 11,754	2,568,982	11,730	3,081,475
Manganese dioxide	(tons) 265	8,215	213	6,714
Mercury	(lb) 2,147	14,406	3,626	23,707
Osmiridium	(oz) 12	1,709	.....	.....
Pyrites	(tons) 42,504	255,024	28,535	171,210
Scheelite	(tons) *	*	5,239	775,086
Silica for silicon alloy produc- tion	(tons) 4,360	43,600	5,857	58,570
Silicon as silicon alloys.....	(tons) 14,870	1,654,972	16,036	1,763,960
Silver	(fine oz) 1,474,461	3,062,004	1,455,746	2,346,948
Sulphur as sulphuric acid	(mono tons) 65,157	1,335,718	53,756	1,158,662
Tin	(tons) 3,126	9,242,080	4,776	15,817,361
Tungsten as tungstic oxide	(tons) 1,944	5,485,657	1,529	7,119,644
Zinc	(tons) 40,061	11,857,961	41,121	12,795,905
Zinc sulphate	(tons) 87	9,656	107	11,565
Zircon (concentrates)	(tons) .....	.....	6,096	340,535
<i>Value of Metallic Minerals</i>		64,323,992		94,898,546
NON-METALLIC MINERALS—				
Clay—				
Brick	(cubic yards) 106,736	227,642	110,086	220,296
Tile	(cubic yards) 3,500	7,700	3,213	5,611
Other	(cubic yards) 38,566	123,165	44,822	140,630
Dolomite	(tons) 2,534	15,070	1,515	9,104
Limestone—				
Agricultural	(tons) 30,205	71,210	37,560	84,825
Carbide	(tons) 23,686	105,510	22,683	163,282
Cement	(tons) 409,642	806,995	448,638	883,816
Chemical and metallurgical	(tons) 32,239	98,410	37,489	136,500
Other	(tons) 39	704	3,704	3,979
Ochre	(tons) 11	164	79	1,191
Pebbles	(tons) 1,214	19,687	1,023	19,036
Sand (moulding)	(tons) 850	9,550	.....	.....
Silica	(tons) 8,878	30,126	22,003	93,181
<i>Value of Non-Metallic Minerals</i>		1,515,933		1,761,451
FUEL MINERALS—				
Coal	(tons) 90,930	411,642	115,933	519,373
Peat	(tons) 128	7,420	151	8,456
<i>Value of Fuel Minerals</i>		419,062		527,829

* Included under Tungsten as Tungstic oxide

STATISTICS RELATING TO THE MINERAL INDUSTRY—continued

Mineral	Year ended 31 December 1968		Year ended 31 December 1969	
	Total Quantity	Value \$A	Total Quantity	Value \$A
CONSTRUCTION MATERIALS—				
Crushed and broken stone—				
Basalt (cubic yards)	277,259	822,807	259,212	777,636
Dolerite (cubic yards)	605,680	2,092,905	636,496	2,021,072
Limestone (cubic yards)	17,728	53,184	24,153	74,610
Sandstone (cubic yards)	3,440	7,470	2,000	6,000
Other (cubic yards)	150,000	450,565	93,854	299,011
Building stone—				
Freestone (cubic yards)	363	4,902	1,073	15,219
Granite (cubic yards)	10	30	50	150
Other (cubic yards)	4,184	12,437	2,329	6,987
Gravel (cubic yards)	1,448,117	1,737,792	1,428,938	1,705,556
Sand (cubic yards)	211,919	287,578	237,807	341,553
Other road material (cubic yards)	148,497	190,687	1,618,294	1,714,880
<i>Value of Construction Materials</i> .....	.....	5,660,357	.....	6,962,674
<i>Total Value with Australian Metal Prices</i> .....	.....	71,919,344	.....	104,150,500
METALLURGICAL PRODUCTION FROM OTHER THAN TASMANIAN ORES—				
Alumina	}	68,080,187	}	90,019,935
Aluminium				
Aluminium hydrates				
Aluminium sulphate				
Cadmium				
Cobalt oxide				
Ferro-manganese				
Titanium dioxide				
Zinc				
<i>Value of Mining and Metallurgical Production</i> .....	.....	139,999,531	.....	194,170,435
Average Number of Men Employed	10,040		10,407	

AID TO MINING

During the year several applications were received from operators engaged in alluvial tin mining for financial assistance for the purchase of mechanical equipment to enable increased quantities of tin bearing ground to be handled and to improve recoveries by the use of jigs. The capital cost of equipment is high when compared with the traditional methods of hydraulic sluicing, but where there are proved reserves of ground of economic grade the use of mechanical equipment is more efficient, results in higher recovery of tin and enables more profitable operation.

Two parties were assisted to purchase front-end loaders and in addition one party was financed to purchase jigs. Another party received assistance towards the purchase of pumping equipment and finance was provided for another party to acquire a tractor and spares, mining pipes and materials for fabricating jigs. A lease holder who has been active in investigating lode tin deposits was assisted to purchase a portable rock drill.

Repayments have been received from assisted parties from the proceeds of minerals produced. The amounts are credited to the Mining Trust Fund and are available to finance other projects where after investigation by a Department geologist or mining engineer it is considered that reasonable prospects exist upon which economic mining can be established. The reserve covering the Old Mt Bischoff Mine, Waratah, and the vicinity continued to be held under an Authority to Prospect under the Aid to Mining Act 1927, by Comstaff Pty Ltd and exploration activities were undertaken through Anglo-American Corporation (Australia) Ltd. The Department has granted tributes to several small parties who operate on alluvial tin deposits within the reserved area. A small royalty on the proceeds of tin produced is credited to the Fund.

Mining Plant: Equipment was hired to a lessee engaged in investigating gold reef deposits at Lefroy.

STATEMENT OF RECEIPTS AND PAYMENTS OF THE MINING TRUST FUND FOR THE YEAR ENDED
31 DECEMBER 1969

<i>Receipts</i>	<i>\$</i>	<i>Payments</i>	<i>\$</i>
Balance at 1 January 1969	25,446.46	Assistance	26,151.60
Repayment of loans	8,728.01	Maintenance—	
Interest on loans	747.86	Tribute area Mt Bischoff	39.75
Tribute royalty	504.52	Mining plant	151.99
Hire of mining plant	828.80	Miscellaneous	5.25
Authorities to prospect .....	.....	Balance to next account	9,907.06
	\$36,255.65		\$36,255.65

STAFF

The following were the staff movements during the year:—

<i>Name</i>	<i>Position</i>	<i>Remarks</i>	
Wadsley, M.	Chemist	Commenced	9.1.69
Mulder, H.	Librarian	Commenced	17.2.69
Jones, Miss C. A.	Typist	Commenced	20.3.69
McNamara, Miss J.	Typist	Resigned	26.3.69
Stanley, C. E.	Drilling Superintendent	Commenced	9.4.69
Barnett, Mrs A. E.	Typist-in-Charge	Resigned	16.4.69
Stuttard, Miss E.	Records Clerk	Retired	2.5.69
Piontek, Miss L.	Assistant	Resigned	2.5.69
Knox, B.	Surveyor	Resigned	7.5.69
Martin, E. L.	Publications Officer	Commenced	15.5.69
Johnstone, Miss C.	Assistant	Commenced	20.5.69
Murtagh, Mrs W. H.	Typist-in-Charge	Commenced	22.5.69
Brown, L. C.	Clerk	Resigned	4.6.69
Saunders, Miss H.	Records Clerk	Commenced	12.6.69
Legge, P.	Geologist	Resigned	24.6.69
Bravo, G.	Geologist	Resigned	27.6.69
Harris, S.	Field Assistant	Commenced	3.7.69
Pitcher, J. G.	Geologist	Died	16.7.69
Stephens, S.	Field Assistant	Commenced	24.7.69
Oates, I. G.	Clerk	Commenced	18.8.69
Allen, P.	Mining Engineer and Inspector of Explosives	Commenced	26.8.69
Dawe, A. J.	Laboratory Assistant	Retired	10.10.69
Flounders, J. L.	Senior Chemist	Resigned	4.11.69
Pike, G. P.	Geologist	Resigned	14.11.69
Cromer, W. C.	Technical Assistant	Commenced	28.11.69

SCHOLARSHIPS

Geology Scholarships were awarded to S. Cox, A. Cotton, S. Forsyth and G. Rowbottom and a Mining Engineering Scholarship was awarded to R. A. Frazer.

OVERSEAS VISIT

During the year the Director of Mines attended the Ninth Commonwealth Mining and Metallurgical Congress, held in London, as the official Tasmanian delegate.

He visited mining operations in Cornwall and at Sheffield during the course of the Congress and mining operations in Sweden as part of a post-Congress tour. Prior to the Congress he visited mines and mining administrations in Canada and in the United States of America.

CONCLUSION

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

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

J. G. SYMONS, Director of Mines

OPERATIONS AND PRODUCTION

1.—Metallic Minerals

CADMIUM

CADMIUM: QUANTITY AND VALUE OF PRODUCTION

Year	Tons	\$	Year	Tons	\$
1924-65	1,525	4,132,402	1968	74	390,642
1966	75	341,111	1969	39	255,267
1967	74	383,131			
			Total	1,787	5,502,553

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 1.03 tons of cobalt oxide of value \$4,594 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	\$
1919-1965 ..	339	248,582	13,174	7,447,974	436,933	145,604,234	404	21,162	450,850	153,321,952
1966 .....	.....	.....	1,214	1,168,996	13,944	13,519,861	.....	.....	15,158	14,688,857
1967 .....	.....	.....	1,220	1,300,541	15,081	16,026,071	.....	.....	16,301	17,326,612
1968	169	173,213	1,303	1,433,063	14,470	15,915,117	.....	.....	15,942	17,521,393
1969	569	787,851	1,337	1,837,597	12,799	19,499,587	2,594	3,546,678	17,299	23,671,713
Total	1,077	1,209,646	18,248	13,188,171	493,227	208,564,870	2,998	3,567,840	515,550	226,530,527

The Mount Lyell Mining and Railway Company Limited, Queenstown

	Tons
Mining—	
Overburden removed	1,463,089
Ore mined—	
Prince Lyell	4,172
West Lyell	1,864,731
Crown Lyell	119,615
Cape Horn	157,387
Lyell Tharsis	24,297
Limestone delivered to works	8,587
Silica	1,314
Reduction—	
Concentrates smelted	48,314
Crown Lyell ore smelted	5,754
Precipitate smelted	61
Blister copper produced	12,916
Containing—	
Copper (tons)	12,799
Silver (fine oz)	63,378
Gold (fine oz)	8,683
Copper concentrate produced	9,710
Containing—	
Copper (tons)	2,594
Silver (fine oz)	12,652
Gold (fine oz)	1,704
Pyrite concentrate shipped	28,535
Total value of production	\$21,717,947

Average number of men employed—

Mining—	
Open cut	277
Underground	207
Other	1,210
	<hr/>
Total	1,594
	<hr/>

Production from the inception to 31 December 1969—

Copper (tons)	655,835
Gold (fine oz)	650,155
Silver (fine oz)	16,433,403

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

Operations this year have been characterised by an increased tempo. With the plan to transmute from an open-cut to an underground operation adopted by the Company, planning and underground development has proceeded at a rapid rate. By the end of the year development of a large sub-level open stoping operation at Crown Lyell and a sub-level caving operation at Cape Horn were well advanced with some production of stoped ore being realised. Access to the Prince Lyell orebodies at the main haulage horizon was advanced and the design of the new shaft for this area finalised.

With the cessation of smelting operations on 23 December 1969, a chapter in Tasmanian mining history has been closed, copper concentrates now being produced for shipment interstate and overseas.

Mining. Development footages achieved were as follows:—

<i>Orebody</i>	<i>Driving (feet)</i>	<i>Rising (feet)</i>	<i>Shaft Sinking (feet)</i>	<i>Stripping (tons)</i>
Crown Three	7,277	3,267	21	....
12 West	307	7	36	....
Prince Lyell	2,709	....	....	....
Cape Horn	671	....	....	....
Exploration	112	29	....	11,763
	<hr/>	<hr/>	<hr/>	<hr/>
Total	11,076	3,303	57	11,763
	<hr/>	<hr/>	<hr/>	<hr/>

Capital Expenditure. Major items were the construction of—

1. Eighty-six houses, 45 flats and twelve single staff units.
2. A new concentrate filter plant and storage facilities, Queenstown.
3. A concentrate transfer station, Melba Flats Siding.
4. A new change house and mine office.
5. A new crushing plant for underground primary ore.

And the purchase of—

1. Ten International DCF 400 trucks for concentrate transport.
2. Six Asea LGBT9 locos and 44 type OK mine cars.
3. Eight Eimco 915 L.H.D. units and three I.R. MJM-3 jumbos.
4. One Hagglund shuttle bar train.
5. Two I.R. XLE 1300 cfm compressors.

Reserves. Sixty-nine diamond drill holes were completed for a footage of 25,010.

Ore reserves, as published 30 June 1969, were:—

	<i>Tons</i>
West Lyell Open Cut	5,399,000
Prince Lyell	26,604,000
Lyell Tharsis	553,000
Crown Lyell No. 2	10,000
Crown 3	3,662,000
12 West Orebody	49,000
Cape Horn	3,200,000
	<hr/>
Total	39,477,000
	<hr/>

Assays indicate 1.42% copper, 0.06 oz silver per ton, and 0.008 dwt gold per ton.

Cleveland Tin N.L., Luina

This company, reviewed under Tin, produced 3,303 tons of copper concentrates containing 569 tons of copper valued at \$787,851.

Electrolytic Zinc Company of Australasia Limited, Rosebery

This company, reviewed under Zinc, produced 12,901 tons of copper concentrate containing 1,337 tons of copper valued at \$1,837,597.

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

<i>Year</i>	<i>Fine oz</i>	<i>Value</i> \$	<i>Year</i>	<i>Fine oz</i>	<i>Value</i> \$
Prior to 1966	2,662,129	32,499,718	1968	33,526	1,135,108
1966	32,655	1,020,453	1969	36,705	1,338,817
1967	34,677	1,083,667			
			Total	2,799,692	\$37,077,763

Happy Valley Mining Co. Ltd, Lefroy

A. W. Dick continued sampling work underground, sinking the shaft to 50 feet and putting in a short cross cut. Underground operations were discontinued in the second quarter of the year and a programme of surface costeaning for sampling purposes was undertaken using a bulldozer.

The Mount Lyell Mining and Railway Company Limited, Queenstown

This company recovered 10,387 fine oz, valued at \$377,356, from sludge in the electrolytic copper refinery.

Electrolytic Zinc Company of Australasia Limited, Rosebery

Concentrates produced by this company contained 26,187 fine oz, valued at \$956,640.

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

From the tin concentrate of this dredge, reviewed under Tin, 132 fine oz of gold, valued at \$4,827, was recovered.

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

L. M. Morris, Senior Mining Engineer, and P. Allan, Mining Engineer, Burnie, report as follows:—

Savage River—		<i>Tons</i>
Overburden removed		6,252,587
Ore mined		4,021,632
Concentrate to Port Latta (dry)		1,962,849
Port Latta—		
Pellets produced (dry)		1,908,215
Value of production		\$24,084,702
Average number of persons employed—		
Mining		78
Other		622
		—
Total		700
		—

At Port Latta the pellet plant produced 1,908,215 tons of pellets and 48,912 tons of chips, while 1,824,326 tons of pellets, 28,032 tons of chips and 29,455 tons of off-grade product were shipped during the year.

Port Latta is developing into a port of some importance with thirty-one shipments averaging 60,704 tons per vessel going out, and six oil tankers discharging a total of 32,926 tons of fuel oil during the year.

With a total complement of 674 employees, 337 at Savage River and 297 at Port Latta, the company is now the third biggest employer in the north-western mining area.

The open cut was developed down to the sixth lift and towards the end of the year was reaching the stage where drainage could be improved and mining could proceed unidirectional. Haulage conditions were considerably improved by the surfacing of all mine roads with chert road metal produced by Cleveland Tin N.L. as a by-product.

Work was started on a new emergency tailings dam below the mill at Savage River while considerable capital works were carried out, including a combination security and first aid building, large capacity flocculant pump, three Ford F100 trucks, emergency water supply, facilities for lime handling, additional workshop heating, 1,900 feet of mine road sealed, townsite curbing and fencing, and the construction of two tennis courts.

Accidents for the year totalled 33, four of these being serious involving burns from exploding inflammable liquid, a fall between floors at Port Latta, a rock fall in the quarry, and a conveyor accident.

IRON OXIDE

IRON OXIDE: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>Value</i> \$	<i>Year</i>	<i>Tons</i>	<i>Value</i> \$
Prior to 1966	111,491	241,134	1968	12,780	79,030
1966	2,797	7,903	1969	11,117	71,791
1967	7,886	35,130			
			Total	146,051	434,988

Iron Cliffs Mine, Penguin

A. Pearson continued to work the secondary ore at the Iron Cliffs Mine and supplied a cement works with 11,055 tons of hematite valued at \$70,864 and 62 tons of limonite valued at \$927. Employment averaged five men.

LEAD

LEAD: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>Value</i> \$	<i>Year</i>	<i>Tons</i>	<i>Value</i> \$
1919-1965	364,327	46,019,450	1968	11,754	2,568,982
1966	12,162	2,994,513	1969	11,730	3,081,475
1967	11,930	2,578,032			
			Total	411,903	57,242,452

Electrolytic Zinc Company of Australasia Limited, Rosebery

This company, reviewed under Zinc, produced 13,596 tons of lead concentrate and the total content of lead in the lead, zinc and copper concentrates was 11,730 tons valued at \$3,081,447.

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 213 tons was valued at \$6,714.

MERCURY

MERCURY: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Pounds</i>	<i>Value</i> \$	<i>Year</i>	<i>Pounds</i>	<i>Value</i> \$
1967	4,204	24,645	1969	3,626	23,707
1968	2,147	14,406			
			Total	9,977	62,758

This is recovered at the Risdon Works of the Electrolytic Zinc Company of Australasia Limited from the roaster gases in the calcining of zinc concentrates. The ore containing the mercury is mined at the company's mines on the West Coast. Recovery was first made early in 1967. Production for the year was 3,626 lb, valued at \$23,707.

OSMIRIDIUM

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

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

<i>Year</i>	<i>Tons</i>	<i>\$ Value</i>	<i>Year</i>	<i>Tons</i>	<i>\$ Value</i>
1915-65	1,636,820	7,293,522	1968	42,504	255,024
1966	68,077	408,462	1969	28,535	171,210
1967	59,714	358,284			
			Total	1,835,650	8,486,502

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

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

This company mined 5,857 tons of silica, valued at \$58,570, for export to Newcastle for the manufacture of silicon alloys.

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

This company smelted slag from ferro-manganese production with 4,159 tons of silica from Beaconsfield to produce silicon as silicon-manganese. The quantity of alloy produced was 16,036 tons, valued at \$1,763,960. The average number of employees was 143.

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 1969.

<i>Producer</i>	<i>Source</i>	<i>Fine oz</i>	<i>\$</i>
E.Z. Co. of A/asia Ltd	Copper, lead and zinc concentrates	1,379,716	2,223,832
Mt Lyell M. & R. Co. Ltd	Refinery sludge	76,030	123,116

SILVER: SOURCE, QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>From tin and other ores</i>		<i>From silver-lead ore</i>		<i>From copper ore</i>		<i>From lead-zinc ore</i>		<i>Total</i>	
	<i>Fine oz</i>	<i>\$</i>	<i>Fine oz</i>	<i>\$</i>	<i>Fine oz</i>	<i>\$</i>	<i>Fine oz</i>	<i>\$</i>	<i>Fine oz</i>	<i>\$</i>
1919-65	121,787	101,764	17,690,600	5,749,634	3,747,346	1,491,148	24,197,699	18,090,206	45,757,432	25,432,752
1966	.....	.....	.....	.....	59,878	70,070	1,447,543	1,694,043	1,507,421	1,764,113
1967	.....	.....	.....	.....	75,384	111,699	1,427,970	2,113,558	1,503,354	2,225,257
1968	.....	.....	.....	.....	87,580	179,712	1,386,881	2,882,292	1,474,461	3,062,004
1969	.....	.....	.....	.....	76,030	123,116	1,379,716	2,223,832	1,455,746	2,346,948
Totals	121,787	101,764	17,690,600	5,749,634	4,046,218	1,975,745	29,839,809	27,003,931	51,698,414	34,831,074

SULPHUR AS SULPHURIC ACID

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

SULPHURIC ACID: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Mono Tons</i>	<i>\$</i>	<i>Year</i>	<i>Mono Tons</i>	<i>\$</i>
1957-65	342,521	3,290,626	1968	65,157	1,335,718
1966	65,013	650,130	1969	53,756	1,158,662
1967	72,347	723,470			
			Total	598,794	7,158,606

North-West Acid Pty Ltd commenced construction of a sulphuric acid plant at Wivenhoe to produce acid from pyrite supplied by the Mount Lyell Company, Queenstown, and the Electrolytic Zinc Company of Australasia Ltd, Rosebery. The plant is expected to be in production in the early months of 1970.

TIN

TIN: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>\$</i>	<i>Year</i>	<i>Tons</i>	<i>\$</i>
1873-1965	150,017	78,780,204	1968	3,126	9,242,080
1966	1,031	3,419,153	1969	4,776	15,817,361
1967	1,529	4,735,799			
			Total	160,479	111,994,597

Aberfoyle Tin, N.L., Rossarden

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

Underground	144
Surface	125
Staff	
Total	269

Production from the ore treated consisted of 599 tons of tin concentrate containing 402 tons of tin valued at \$1,323,309 and 185 tons of wolfram concentrate containing 134 tons of tungstic oxide valued at \$611,886.

	<i>Tons</i>
Tonnage of ore milled	93,848
Tailings retreated	40,312
Sand fill placed in stopes	56,665
Underground development—	
	<i>Feet</i>
Driving	1,504
Cross cutting	142
Rising	1,569
Underground development: Lutwyche Project—	
	<i>Feet</i>
Driving	755
Rising	241

The Lutwyche Project was suspended on 6 September 1969. Underground diamond drilling totalled 48 holes with total footage of 7,869.

The following improvements were carried out at the Reduction Works—

- Stockpile feeders
- Impact crusher
- Cyclosizer for sub-sieve sizing
- 30" x 54" rod mill
- Griez permanent magnetic belts.

Cleveland Tin N.L., Luina

Details of production are as follows:—

	<i>Tons</i>
Ore milled	281,432
Tin concentrate	2,308
Tin content	1,350
Copper concentrate	3,303
Copper content	569
Tin content	160
Total value	\$5,770,036
Average employment—	
Surface	168
Underground	45

Additional income was obtained from the sale of 32,062 cubic yards of chert by-product as road metal and railway ballast.

Total capital expenditure for the year amounted to \$208,658 and included works on the township of Luina and the construction of a building to house a winding engine.

Development underground continued at the pace set last year was 5,068 feet of driving, 474 feet of cross cutting and 149 feet of rising completed. The main decline being established below 7 level advanced 796 feet to 8 level.

Underground exploration work has been greatly increased for closer geological mapping of the ore bodies and more accurate assessment of the ore reserves. Total footage drilled amounted to 15,848; 5,916 feet were carried out by the company and the remainder on contract.

The company employed an average of 213 persons throughout the year. One man was killed when the vehicle he was driving slipped off the mine road in icy conditions. With one other serious accident involving a conveyor and 25 minor accidents, 27 accidents occurred on the property during the year.

Cornwall Coal Co. N.L., Royal George

Sinking of the shaft continued a further 47 feet. No. 3 level crosscut was advanced 67 feet to the hanging wall of the lode. No. 4 level crosscut was driven 73 feet to the hanging wall. This level was driven in a southerly direction in lode on the hanging wall for a distance of 114 feet. Two crosscuts were driven to the footwall of the lode at 50 and 100 feet respectively from the main crosscut. The first crosscut was driven 28 and the second 26 feet. The ore has been stockpiled for future bulk testing.

Endurance Mining Corporation N. L., South Mount Cameron

Endurance Mine.—Work throughout the year was of a non-productive nature consisting of the following:—

1. The dismantling of the plant at the eastern end of the Clifton workings.
2. Rehabilitation of power station and reconditioning of column and concrete pressure box at head of pipe column.
3. The boring of 30 sample holes on the western end of the Clifton lead.
4. Replacement of power line from Frome Power Station to the mine due to changeover from 6,000 to 22,000 volts. The section between the station and Pioncer was completed and the remaining section to Endurance was re-routed to shorten the distance, but is not yet complete.

The open cast is now flooded and this will constitute a water reservoir. A bywash was commenced at the eastern end of the workings.

Monarch Mine.—An earth fill dam which was constructed on the Little Boobyalla River was completed early in July. Due to heavy rains an earth slip developed in the bank of the dam, and the bywash was lowered immediately to below half the capacity of the dam. The capacity of the dam is estimated at 1,100 acre feet. A pumping dam was constructed approximately one mile below the main dam, to serve as a reservoir from which to pump to the Monarch race (constructed in the early part of this century), approximately one mile long. A further holding dam was constructed to maintain a reserve of water at the end of the race. The intake of the pressure column commences at this dam, consisting of 28-inch pipes reducing to 12-inch over a length of one mile. A pressure pump was installed along the column to act as a booster when required.

A 10 inch x 8 inch Warman gravel pump was installed to pump into a sluice box, jigs being installed at the end of the sluice box. Power is supplied by the Hydro-Electric Commission.

Eleven sample holes were bored on the Monarch Flats before heavy rains made further progress on the marshy flats impossible. Active face development was commenced in October, and 9,600 cubic yards of overburden were removed before the end of the year. No production resulted therefrom. Employment averaged five men.

L. J. Groves & Son, South Mount Cameron

This partnership operating formerly as Probert & Groves treated dozed-up surfacings on their 5-acre lease at the eastern end of the Endurance leases with reasonable success. Transferring their operations to the Eastern lead, south of the Endurance, this party engaged a contractor to doze up into heaps tin bearing surfacings which they sluiced into concentrating boxes. The concentrates produced contained 7 tons of tin valued at \$24,987. An average of three men were employed.

Hawkes Alluvial Tin Limited, King Island

This company commenced sluicing operations during the year producing 16 tons of concentrates containing 12 tons of tin which returned \$39,151. Four men were employed in this sluicing of 36,022 cubic yards.

During the year the Company changed its method of mining from a sluicing operation to earth moving and stockpiling followed by feeding to a revolving trommel, the undersize from which is pumped to three rougher jigs.

W. J. Hodge, Dundas

Mr Hodge and his partner milled 838 tons from the Razorback mine, producing concentrates containing 4 tons of tin valued at \$12,831. The mine is under option to a company which has carried out some bulk sampling and geological survey work.

G. Machen, Waratah

Mr Machen carried on sluicing operations in North Valley, producing 13 tons of concentrates containing 9 tons of tin valued at \$30,039. An average of three men were employed.

Mt Cameron Tin Syndicate, South Mount Cameron

Early in the year this syndicate under the management of R. C. Lawry opened up a block of ground at Lark Creek near the Edina Flats. This entailed the building of a dam and the installation of a 15-inch column. Nozzle and blower were used but low values forced a removal to leases at South Mt Cameron. For use on this location the syndicate invested in an H.D.16 bulldozer which was a vast improvement on the smaller dozer previously used. Water was pumped from the Ringarooma River into a storage dam where a second pump of 125 h.p. delivers to the hydraulic elevator. Nozzle water is pumped by a 5 inch/6 inch pump powered by a 100 h.p. diesel.

Production was 6 tons of tin valued at \$19,382 from 23,500 cubic yards of gravel; three men being employed.

R. L. Rainbow & Son, Banca Mine

As in past years a prolonged dry spell precluded a resumption of productive operations until May. During this period opportunity was taken to prepare a new face for sluicing. To this end a new 4-inch/5-inch pump was procured and coupled to a 125 h.p. diesel and an engine shed built. The tail race was deepened and productive operations till the end of the year yielded 4 tons of tin valued at \$11,426 from 11,100 cubic yards of gravel. Three men were employed.

Renison Limited, Renison Bell

This company mined a total of 402,618 tons of ore of which 4,600 tons came from the Dalcoath open cut and 24,800 tons from the Battery mine up to its closure in February.

The main decline was advanced 1,055 feet while 7,055 feet of driving and cross cutting were completed together with 1,101 feet of rising, giving greatly increased accessibility to and development of the individual lodes.

Diamond drilling increased 40% over last year with 10,933 feet drilled underground for operational, and 2,854 feet drilled for exploratory purposes. Surface exploratory drilling totalled 13,088 feet while further drilling targets are expected to appear in areas of interest in the South Dundas prospecting lease, where the basic geological mapping programme was completed, with geochemical and magnetic surveys over areas of particular interest.

The concentrating plant produced 4,855 tons of high grade (60% Sn) and low grade (20% Sn) concentrates containing in all 2,641 tons of tin valued at \$8,772,058.

The pilot plant commissioned at the end of last year for the recovery of fine cassiterite by selective flotation operated successfully and work is in hand to install equipment capable of treating 10,000 tons of material per four-week period. This plant, at an estimated cost of \$900,000, is expected to be completed by June 1970.

As a result of a feasibility study consideration is being given to increasing the treatment rate of ore from 400,000 tons to 1,000,000 tons per year. A considerable amount of work was started on enlarging the tailings disposal areas and preparatory works were carried out for the construction of a new fresh water dam on the Argent River.

The company employed 74 persons underground and 288 on the surface. One man was seriously injured when he accidentally walked into a blast, while another sustained serious hand injuries in the laboratory when a detonator and electric battery were brought together. With a further 36 minor accidents reported the total for the year was 38.

Capital expenditure for the year totalled \$1,618,400, made up as follows and including approximately \$10,000 donated to various organisations in Zeehan for improvements in town amenities:—

	\$
Housing and quarters for single employees	288,300
Mining equipment	237,700
Treatment plant	140,700
Residue disposal	117,500
Workshops	29,000
Water supply	125,000
Mine development	401,500
Exploration	199,500
Sundries	79,200

Star Hill Syndicate, Gladstone

This syndicate moved from the Garfield area early in the year to the old Star Hill face, last worked some 20 years ago. Values at this site were 0.5 lb cassiterite per cubic yard, but the mineral was very fine and presented much difficulty in concentrating. The syndicate was forced to cease work temporarily pending the construction of jigs with which to save the fine mineral. Islands of virgin ground in the old workings were then worked with profit.

Concentrate produced from the 53,500 cubic yards sluiced amounted to 7 tons with a tin content of 5 tons valued at \$17,431. Three men were employed.

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

Operations by this company may be summarised as follows:—

Acres dredged:	21.
Yardage treated:	1,577,400.
Average depth:	43 feet.
Tons of concentrates:	134.
Tons of tin:	100.
Value of tin:	\$332,029.
Gold recovered:	132 fine oz.
Average employment:	40 men.

Seven weeks of operating time was lost when the dredge was silted in, caused by collapse of the power line during a flood.

Three closed circuit television cameras were installed on the dredge with the receiver units assembled in the winch room. This permitted the release of one man from each shift for the boring plant and shore gang. It also enabled the winchman to keep an eye on different sections of the dredge without leaving the winch. In development 64 holes were drilled ahead of the dredge proving gravel reserves of average depth 44 feet and grade 0.15 lb of cassiterite per cubic yard.

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

This company, reviewed under *Tungsten*, produced 55 tons of concentrate containing 38 tons of tin, valued at \$124,905.

V. Wood, Pioneer

Mussel Roe Mine.—Mr Wood stated that a long run of disappointingly low values on the up-river end of the lease forced him to set up lower down. After removing overburden and lowering the elevator it was found that values were still unpayable. A second move was made to the eastern side of the river where economic values were encountered. The production of 14 tons of concentrates from 28,400 cubic yards of gravel contained 10 tons of tin valued at \$33,263. The average number of men employed was three.

Pioneer Mine.—Routine mining operations conducted by Mr Wood resulted in the recovery of concentrates containing 7 tons of tin valued at \$22,129 from 61,000 cubic yards of gravel. An average of seven men was employed.

After one clean-up yielding 36 bags of tin the entire plant had to be shifted closer to the working face. This move took three weeks and normal sluicing was then resumed on shallow ground. By September the edge of the deep lead was encountered and a hydraulic elevator was installed to level off a position for the gravel pump. Jigs were also installed.

A channel eight feet wide and one mile in length was cut to divert water from Bradshaws Creek around the northern side of the mine. Another channel, $\frac{1}{2}$ mile in length was cut to divert water from Race Course Creek around the southern side of the mine. This permitted a start to be made on the de-watering of the old Pioneer open cast. A 16-inch pump with a 125 h.p. motor was installed and pumping was commenced in December.

Production by Small Workers

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

EAST COAST

A. B. Counsel, St Helens, produced concentrates containing 0.255 ton of tin of value \$897 from shallow alluvial workings.

L. D. McRae, Coles Bay, produced concentrates containing 0.188 ton of tin of value \$645 from his workings in Saltwater Creek.

Miscellaneous.—A. C. Cowan, T. Fitzallan, M. Richards and M. Robson produced individually concentrates containing 0.417 ton of tin valued at \$1,438.

AVOCA

Messrs Brinkman and Dicker, Mount Rex, mined and milled tin ore to produce concentrates containing 0.839 ton of tin valued at \$2,712.

Messrs Hayes and Sutcliffe, Gipps Creek, mined and milled tin ore to produce concentrates containing 0.058 ton of tin valued at \$204.

A. D. Cowdery produced concentrates containing 0.264 ton of tin valued at \$820.

RINGAROOMA-BRANXHOLM-DERBY

T. Merritt, Ringarooma River Beaches, in an area known as the Mutual worked river beaches as river levels permitted and treated 2,807 cubic yards for a recovery of concentrates containing 1,086 tons of tin valued at \$3,573.

M. Kerrison, Ringarooma River Beaches; working beaches upstream from Mr Merritt, Mr Kerrison produced concentrates containing 2.215 tons of tin valued at \$7,331.

D. L. and W. J. Mullins, Branxholm. Failure of their water supply caused this party to suspend operations on their main face and to transfer their attention to some tin bearing leader country near Branxholm Creek. A considerable quantity was dozed up ready for sluicing into concentrating boxes but had not been treated by the end of the year. Their total production of concentrates for the year contained 0.293 ton of tin valued at \$1,031. The two-man party worked weekends.

Messrs Targett and Bonner, Branxholm. Little progress was made by this party who travelled from Launceston at weekends to work this show. Work consisted mainly in the pumping out of old tailings from the Arba workings to expose some faces of virgin ground known to contain economic values. A bridge was built across Black Creek. In addition a contractor was hired to remove approximately 1,000 cubic yards of overburden and old tailings. Productive mining can be anticipated in 1970.

Miscellaneous.—K. Banks, D. Butler, R. Holloway, E. J. Holmes, J. G. Holmes, J. Maumill, J. Melville, A. A. Quinn, G. Rayner, H. C. Walker, K. Walker and N. R. Wheeler produced individually concentrates containing 2.296 tons of tin valued at \$7,699.

GLADSTONE

E. King, Mt Cameron Creek, operated spasmodically during the year alternating sluicing with earth moving contracts for neighbouring mines. During the year heavy flooding washed away the foundation of his boxes causing some to collapse. Production was 0.570 ton of tin in concentrates valued at \$1,898.

H. Standage. Lack of water compelled this operator to transfer from Amber Creek to another site above the Lark Dam. Water was obtained from R. C. Lawry, Amber Creek dam. Mr Standage produced concentrates which contained 0.976 ton of tin valued at \$3,134.

In addition an old dam on Amber Hill was reconditioned to retain a split of water from the newly installed syphon and this will enable Mr Standage to work a greater area of ground along Amber Creek and above the road than was hitherto possible.

R. C. Lawry, Amber Hill. Operations consisted mainly of prospecting for values and obtaining and preparing equipment. Equipment procured and set in readiness for a start in 1970 consisted of 1,500 feet of 12-inch pipes and a 300 h.p. diesel coupled to a 10 inch/12 inch pump. In addition a long and deep tail race was cut in readiness. Production was 0.108 ton of tin in concentrates valued at \$368.

K. D. and F. R. Richardson, Deep Creek Mine. This mine is situated in Drydens Creek and is on a lease owned by R. C. Lawry, by whose permission the Richardsons operate. The face of some 40 feet is broken by head water running over the face and a small capacity nozzle is used to break it up and concentrate it in the race. Concentrates produced contained 1.541 tons of tin valued at \$5,234.

N. B. Moore, North Mt Cameron, produced concentrates containing 0.075 ton of tin valued at \$247.

A. Green, Moores Farm, produced concentrates containing 0.135 ton of tin valued at \$475.

Miscellaneous.—B. G. R. Groves, R. Harmon, L. Vernesy and T. Wilcox produced individually concentrates containing 0.411 ton of tin valued at \$1,390.

MOUNT CAMERON-PIONEER

H. Summers, Sapphire Creek. Work on this show was hampered by a breakaway in the wall of the earthwork dam although repairs were effected. Total production of concentrates containing 0.089 ton of tin valued at \$280. Two men were employed part time.

J. and M. J. Kerrison continued to sluice remnants of virgin ground left by early Chinese tin miners on the Garibaldi section. Production amounted to 1.582 tons of tin in concentrates valued at \$3,885. The mine was abandoned and all equipment removed.

MOORINA-WELDBOROUGH

R. H. Hyde purchased a tractor and pump for use on his Ringarooma River claim about one mile above the bridge at Moorina. Unfortunately delays in delivery of the pump prevented him from assembling the plant before the onset of the rainy season. River flooding prevented him from working the beaches he had tested. Later in the year his show was sold and he transferred his equipment to Emu Flats near Weldborough, where he produced concentrates containing 0.607 ton of tin valued at \$1,928.

A. J. Stevenson and Mullins Bros, Weldborough. Continuing to sluice heavily timbered ground on the Red Hills show this party produced concentrates containing 2.093 tons of tin valued at \$7,011.

M. and J. Lambert, Weldborough. Operations of a desultory nature in Laffer Creek yielded concentrates containing 0.163 ton of tin valued at \$552.

H. Moses, Blue Tier, working shallow ground in the upper reaches of the Wyniford River near Mt Michael, Mr Moses obtained tin concentrates containing 0.709 ton of tin valued at \$2,313. Work was of an arduous nature under fairly severe climatic conditions.

Miscellaneous.—K. Banks and F. Coombes, N. Boon and Messrs Grose and Kidd produced concentrates containing 0.722 ton of tin valued at \$2,541.

WARATAH

C. Housego produced concentrates containing 0.073 ton of tin valued at \$245.

M. G. Glozier produced concentrates containing 0.102 ton of tin valued at \$331 from his underground working on Thompson's Lode.

J. Housego recovered 0.632 ton of tin in concentrates valued at \$2,085 from tailings in the Waratah River.

E. Kelly returned 0.227 ton of tin in concentrates valued at \$782.

D. Kenworthy from a part-time operation at Pig Flat, produced 0.077 ton of tin in concentrates valued at \$244.

L. W. Wills, working underground part time, returned 0.027 ton of tin in concentrates valued at \$83.

S. Richardson, Thompson's Lode, produced concentrates containing 0.150 ton of tin valued at \$484.

R. Barker produced concentrates containing 0.067 ton of tin valued at \$236.

WEST COAST

R. E. Clarke, Grand Prize, produced 0.228 ton of tin in concentrates valued at \$718.

C. D. King, Port Davey, produced from the Melaleuca Mine, concentrates containing 1,367 tons of tin valued at \$4,494.

Miscellaneous.—Messrs Barnett and Mace, E. J. Bayley, D. Dunkley, P. T. Griffiths and G. C. Kingston produced individually concentrates containing 1.714 tons of tin of value \$5,632.

TITANIUM

Naracoopa Rutile Limited, Naracoopa

This Company completed its beach sands beneficiation plant and commenced production in January. Satisfactory concentrates of rutile and of zircon have been shipped via Stanley, while concentrates of ilmenite and of cassiterite are being stockpiled for future upgrading and sale. An average of 26 persons was employed.

PRODUCTION OF MINERALS FROM 58,000 TONS OF SANDS

Mineral	Concentrate (tons)	Titanium		Mineral	Concentrate (tons)	Zircon content (tons)	Value (\$)
		dioxide content (tons)	Value (\$)				
Ilmenite	22,616	NA	NA	Zircon	6,096	5,965	340,535
Rutile	5,239	4,932	775,086				

TUNGSTEN (SCHEELITE)

TUNGSTEN (SCHEELITE): QUANTITY AND VALUE OF PRODUCTION

Year	Tons (Concentrates)	Tons (WO ₃)	\$
1917-65	20,994	.....	39,046,388
1966	1,311	945	3,776,862
1967	1,200	862	3,673,100
1968	1,460	1,054	4,127,564
1969	1,530	1,092	5,084,758
Total	26,495	.....	55,708,672

King Island Scheelite (1947) Limited, Grassy

Production statistics—

Treatment	
Ore milled	304,407 tons
Concentrate recovered	1,530 tons
WO ₃ content	1,092 tons
Value	\$5,084,758
Average number of persons employed	
Opencut	25
Other	200
Total	225

During the year several new houses were built and older houses renovated. Chief capital expenditure was a start on installation of a new 60 inch x 45 inch primary crusher and the purchase of a 'clean-up' bulldozer and a 5 cubic yard front-end loader for the open cut.

A new mill to double the present mill capacity is under consideration. There has been a significant increase in ore reserves during the year.

TUNGSTEN (WOLFRAM)

TUNGSTEN (WOLFRAM): QUANTITY AND VALUE OF PRODUCTION

Year	Tons (Concentrates)	Tons (WO ₃)	\$
1899-1965	15,422	.....	19,067,668
1966	510	377	1,367,704
1967	435	320	1,359,388
1968	484	347	1,358,093
1969	602	437	2,034,886
Total	17,453	.....	25,187,739

Aberfoyle Tin N.L., Rossarden

Wolfram concentrate produced contained 134 tons of tungstic oxide (WO_3) valued at \$611,886. This company is reviewed under Tin.

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

Average number of persons employed—

Underground	72
Surface	52
Total	124

Tonnage of ore milled was 50,873, an increase of 8,822 tons over the previous year.

Production from the ore treated consisted of 416 tons of wolfram concentrate containing 303 tons of tungstic oxide (WO_3) valued at \$1,423,000, and 55 tons of tin concentrate containing 38 tons of tin valued at \$124,905.

Underground development comprised—

	<i>Feet</i>
Driving	2,655
Cross-cutting	184
Rising	961
Total	3,800

Underground diamond drilling comprised 72 holes giving a total footage of 9,997.

The new slimes dam was built above and away from the creek but was not commissioned. The slimes dam at the side of the creek was breached in the flooding of May and several hundred tons of tailings were swept down river. Complaints were received from farmers about pollution following the floods and after investigations, measures were taken to tighten the control over the waste products discharged by the mine.

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

<i>Year</i>	<i>Tons</i>	<i>\$</i>	<i>Year</i>	<i>Tons</i>	<i>\$</i>
1919-65	795,548	116,485,840	1968	40,061	11,857,961
1966	40,904	12,648,558	1969	41,121	12,795,905
1967	40,231	12,106,835			
			Total	957,865	165,895,099

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

From other than Tasmanian ore—	<i>Tons</i>
Zinc	119,621
Cadmium	288
Cobalt oxide	23
Superphosphate	101,245
From Tasmanian ore—	
Zinc	38,217
Cadmium	68
Cobalt oxide	1.03
Manufactured products—	
Aluminium sulphate	2,629
Ammonium sulphate	32,822
The average number of men employed was 2,691.	

WEST COAST DIVISION

Ore mined—	<i>Pb</i> %	<i>Zn</i> %	<i>Fe</i> %	<i>Cu</i> %	<i>S</i> %	<i>Ag</i> oz/ton	<i>Au</i> dwt/ton	Tons
<i>Mine</i>								
Hercules	4.3	14.6	11.5	0.31	18.8	4.42	1.86	22,712
Rosebery	5.33	16.2	15.7	0.65	23.9	5.68	2.19	258,718
Farrell	13.4	6.5	9.47	0.24	7.82	14.1	Nil	2,004
								283,434

Concentrate produced—	Tons
Zinc concentrate	84,255
Lead concentrate	13,596
Copper concentrate	12,901
Total	110,752

Recoverable quantity in ore mined—	
Zinc	41,121 tons
Lead	11,730 tons
Copper	1,337 tons
Cadmium	39 tons
Silver	1,379,716 oz (fine)
Gold	26,187 oz (fine)
Cobalt oxide	1 ton
Manganese dioxide	213 tons
Zinc sulphate	107 tons
Sulphur as sulphuric acid	53,756 mono tons
Mercury	3,626 lb

Total value of production—\$20,312,330

Average number of persons employed—	<i>Surface</i>	<i>Underground</i>	<i>Total</i>
Hercules Mine	6	25	31
Rosebery Mine	373	327	700
Farrell Mine	8	10	18
Total	387	362	749

ROSEBERY, HERCULES AND FARRELL MINES

Development—	<i>Rosebery</i> (feet)	<i>Hercules</i> (feet)	<i>Farrell</i> (feet)	<i>Prospects</i>
Shaft sinking	1,047	.....	138	.....
Driving and cross cutting	5,341	.....	256	.....
Rising	2,780	41	99	.....
Winzing	115	.....	.....	.....
Diamond drilling	17,456	.....	.....	1,124

No. 2 Main Shaft Project. The shaft sink advanced from a depth of 82 feet to 1,129 feet during the year. The unloading station, haulage level plat, and the 14 and 15 level plats were excavated. The main haulage cross cut advanced to completion from 34 feet to 3,005 feet with a further 171 feet being driven in the plat deviation cross cut; 1,200 cubic yards were excavated in the plat area for servicing.

Rosebery Mine Ventilation Development. A total of 1,416 feet of horizontal and vertical development was achieved for the year and this system should be completed in 1970.

Farrell Mine. Shaft stripping from 7 level to 9 level was completed and sinking was continued to 138 feet below the 9 level.

General

Mining. Ore reserves for the Rosebery and Hercules ore bodies increased to 9,500,000 tons as at the end of June 1969.

A total of 17,476 feet of diamond drilling was carried out at the Rosebery mine, of which 5,540 feet was exploratory.

Trackless autoloading continued to prove their worth in the cut and fill stopes and at the end of the year the number in use had been increased to nine.

Ore Treatment. Nearing completion is a pyrite flotation section planned to produce 150,000 tons of concentrate annually. Feed will be supplied from current zinc rougher tailings plus material from the old residue storage dam. A new filtration and loading plant is due to be commissioned early in 1970 to handle the copper, lead, zinc and pyrite concentrates. An X-ray auto-analyser for closer filtration control was commissioned in October.

Construction. Barracks to accommodate sixty men with appropriate additions to ablution blocks, cafeteria etc., together with a further twenty-four houses were completed during the year. Houses throughout the town were connected to the sewerage system.

The 4.76 MW diesel power station and a fully automatic compressed air station delivering 25,000 lb/hr operated satisfactorily during the year.

RISDON WORKS

Production of zinc was a record figure and output of other products was higher than for the previous year when power restrictions were in force.

Capital expenditure for the year amounted to \$4.2 million and included:—

1. The fluid bed concentrate roaster commissioned in March 1969.
2. The capacity of No. 5 electrolytic cell unit was increased by the addition of an extra rectifier and cooling tower. Completion of pallet and rack type stores.
3. A change house, crib room and office building at Superphosphate Division. New system for handling and storage of zinc dust precipitate. An acid storage tank of 9,000 tons capacity.
4. Work is in progress on the installation of the residue treatment plant scheduled for completion at the end of 1970, and the new plant for zinc smelting, alloying and casting which is scheduled to begin operation in mid-1970.
5. Dredging and wharf extensions to provide additional accommodation for larger vessels and acid tankships is in progress.

ZINC SULPHATE

This is a by-product from the treatment of zinc concentrate by the Electrolytic Zinc Company of Australasia Limited. The quantity produced was 107 tons of value \$11,565.

ZIRCONIUM

Naracoopa Rutile Limited, reviewed under Titanium, produced 6,096 tons of concentrates containing 5,965 tons of zircon valued at \$340,535.

2. Non-Metallic Minerals

CLAY

CLAY: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Cubic yards</i>	<i>\$</i>	<i>Year</i>	<i>Cubic yards</i>	<i>\$</i>
1958-65	992,997	1,828,852	1968	148,802	358,507
1966	158,948	325,488	1969	158,121	366,537
1967	130,522	287,658			
			Total	1,589,390	3,167,042

CLAY: DETAILS OF PRODUCTION

<i>Company</i>	<i>Clay (cu. yd)</i>	<i>Value (\$)</i>	<i>No. of Men</i>	<i>Product</i>
Campbell, John Pty Ltd, Launceston	1,146	1,146	14	Pipes
Fenton, E. V., Kingston*	5,786	14,166	1	Bricks
Goliath Portland Cement Co. Ltd, Railton	34,567	117,528	2	Cement
Hazell Bros, Margate*	14,041	35,104	1	Bricks
Hobart Brick Co., New Town and Granton	7,245	18,114	44	Bricks
Humes Ltd, Granton	12,450	31,125	14	Bricks
Humes Ltd, Granton	4,710	15,342	18	Pipes

<i>Company</i>	<i>Clay (cu. yd)</i>	<i>Value (\$)</i>	<i>No. of Men</i>	<i>Product</i>
Humes Ltd, Launceston	1,846	4,061	25	Pipes
Humes Ltd, Prospect Vale	11,599	5,799	9	Bricks
Huttons Bricks Pty Ltd, Prospect	13,210	26,420	13	Bricks
Luck Brick and Pipe Pty Ltd, Dulverton	12,809	19,213	17	Bricks
Machens Brick Pty Ltd, Kings Meadows	17,426	34,852	24	Bricks
Wells, D. S., Blackmans Bay*	8,325	20,813	1	Bricks
Wise, G. R. & Son, Relbia	2,553	2,553	1	Bricks
Wunderlich Pty Ltd, Loira and Launceston	3,213	5,611	24	Tiles
Wynyard Brick, Wynyard	7,195	14,390	6	Bricks

* Suppliers to Hobart Brick Company

Humes Ltd, Granton

In December the brick section was sold to the Hobart Brick Company and the work force was reduced to 20 employed in the pipe section. Production will now be concentrated on pipe manufacture.

Hobart Brick Co. Ltd, New Town

A new cutter has been installed to increase production of wire-cut bricks. The machine is manufactured by George Willy AG, Switzerland, and is capable of producing 56,000 bricks per day. The old quarry floor has been levelled off and drained thus removing the hazard of deep water pools.

DOLOMITE

DOLOMITE: QUANTITY AND VALUE OF PRODUCTION

<i>Year</i>	<i>Tons</i>	<i>\$</i>	<i>Year</i>	<i>Tons</i>	<i>\$</i>
Prior to 1966	26,840	157,212	1968	2,534	15,070
1966	2,606	15,097	1969	1,515	9,104
1967	2,143	12,361			
			Total	35,638	208,844

Circular Head Dolomite and Trading Co. Pty Ltd, Smithton

This company, the sole producer, employed an average of one man and produced 1,515 tons, a decrease of 1,019 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 11,086 tons, valued at \$883,018.

LIMESTONE

LIMESTONE: QUANTITY AND VALUE OF PRODUCTION, AND USAGE

<i>Year</i>	<i>Manufacture of cement</i>		<i>Manufacture of carbide</i>		<i>Chemical and metallurgical</i>		<i>Agricultural and other</i>		<i>Totals</i>	
	<i>Tons</i>	<i>\$</i>	<i>Tons</i>	<i>\$</i>	<i>Tons</i>	<i>\$</i>	<i>Tons</i>	<i>\$</i>	<i>Tons</i>	<i>\$</i>
1919-65	4,660,409	6,229,390	689,219	1,845,320	4,157,982	4,855,110	599,322	1,444,262	10,106,932	14,374,082
1966	252,393	494,437	29,218	114,056	28,489	88,983	34,634	83,077	344,734	780,553
1967	523,611	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
Totals	6,024,693	8,911,387	781,040	2,290,458	4,289,869	5,282,158	750,398	1,792,736	11,846,000	18,276,739

Addison and Coates, Cooee

This firm produced 2,500 tons of limestone valued at \$6,000.

Australian Commonwealth Carbide Company Ltd, Ida Bay and Electrona

This company quarried 22,683 tons of limestone at a cost of \$163,282 at Ida Bay and used it for the production of calcium carbide at Electrona. Calcium carbide production was 9,469 tons valued at \$1,218,458 and acetylene black production was 206 tons valued at \$98,475. The average number of persons employed was 202, of whom 20 were at the quarry.

Capital works during the year included—

Two Tyree Transformers 6600V/100V with busbar connections and cable trough for the high tension supply, with supporting trolleys for the transformers and a shed to house them.
A 6600V/85V transformer for the calcine furnace.

The I.R. compressor was replaced by a reconditioned Kelly and Lewis compressor.

The materials handling system in the electrode factory was improved by the addition of—

An elevator to the ball mill feed hopper.

Feed hoppers, conveyor belt, scale and dry mixer to feed wet mix plant. A hammer mill 15 inch x 8 inch to replace chilean mill for medium size anthracite, 1½ inch to ¼ inch.

Extensions to the dust extraction system.

Australian Newsprint Mills Limited, Maydena

This company quarried 9,081 tons of limestone at a cost of \$63,090. 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—

	<i>Tons</i>	<i>\$</i>
Agricultural limestone	2,609	9,116
Limestone for chemical and metallurgical purposes	19,771	47,449
Burnt lime for various purposes	40	1,320
	<hr/>	<hr/>
Total	22,420	57,885
	<hr/>	<hr/>

Nineteen men were employed.

Goliath Portland Cement Co. Ltd, Railton

Limestone quarried and used in the manufacture of cement totalled 448,638 tons, at a cost of \$883,816. Employment in this quarry, for limestone for cement manufacture only, averaged 24 men.

Cement production totalled 329,591 tons valued overall at \$5,932,638. This production was all fine cement. Average employment was 325 men.

Quarry. During the year the company converted in the quarry from electrical shovel operation to the use of the Caterpillar 988 front-end loader. It is claimed that economy of operation is being achieved with significant benefits derived from the mobility of the unit.

Works. Early in the year the Company entered into a contract with an engineering firm to manufacture, install and commission a very large mill. Installation was completed by the end of the year. A 350-foot-long clinker retrieval tunnel was constructed under the length of the clinker storage hall. The metal shell of the mill weighs 90 tons, contains over 200 tons of steel balls, is rotated by an electric motor rated at 3,300 h.p. and will produce 70 tons or more of cement per hour. The mill operates in conjunction with a Wedag classifier. The cement which discharges from the mill is not transferred directly to storage but passes through this classifier which separates the final cement product of correct particle size. The reject fraction is returned in closed circuit. The company's present plant has a capacity of over half a million tons per year, compared with the productive capacity of the original plant of 25,000 tons per year installed in the 1920s.

R. K. Sulzburger, Flowery Gully, Launceston

The operator dismantled and removed his crushing plant from its rented position in Forster Street to a new site off Finger Post Hill on the Lilydale Road. The quantity crushed prior to dismantlement was 225 tons valued at \$970.

Re-erection of the plant at the new site was not complete at the end of the year.

Mineral Supplies, Ulverstone

Sales of stocks on hand by this firm amounted to 12 tons, valued at \$122.

The Mount Lyell Mining and Railway Company Limited, Halls Creek

This company quarried 8,587 tons of limestone, valued at \$25,761, for delivery to the works at Queens-town from the quarry at Halls Creek. The limestone was used as flux in the blast furnace or burnt to produce lime for use in the flotation plant.

Railton Lime Works, Railton

Two men were employed at this works to crush and mill 23,493 tons of limestone, valued at \$42,575, supplied by the Goliath Company.

Wright Stephenson Pty Ltd, Pulbeena

This company produced 8,781 tons of lime sand, valued at \$26,343, compared with 5,375 tons in the previous year. Average employment was two men.

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

<i>Year</i>	<i>Tons</i>	<i>\$</i>	<i>Year</i>	<i>Tons</i>	<i>\$</i>
1918-65	2,394	15,732	1968	11	164
1966	65	1,008	1969	79	1,191
1967	97	1,459			
			Total	2,646	19,554

A. Pearson, Spalford and Deep Creek

Production of red and yellow ochre from these pits was 79 tons, valued at \$1,191.

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

<i>Year</i>	<i>Tons</i>	<i>\$</i>	<i>Year</i>	<i>Tons</i>	<i>\$</i>
1957-65	5,495	81,136	1968	1,214	19,687
1966	895	15,183	1969	1,023	19,036
1967	1,237	20,404			
			Total	9,864	155,446

A. Pearson, Ulverstone

The collection of pebbles for grinding was continued on the beaches around Ulverstone. The output was 1,023 tons, valued at \$19,036.

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

<i>Year</i>	<i>Tons</i>	<i>\$</i>	<i>Year</i>	<i>Tons</i>	<i>\$</i>
1936-65	174,585	247,886	1968	8,878	30,126
1966	5,014	10,261	1969	22,003	93,181
1967	8,557	23,360			
			Total	219,037	404,814

Australian Glass Manufacturers Ltd, South Arm

This company obtained 5,956 tons of silica sand, valued at \$12,258, for the manufacture of glass.

Industrial Sands Pty Ltd, Eagle Point

This company, which commenced operations in 1968, produced 14,600 tons of silica valued at \$73,000. Part of the silica was used by the Goliath Portland Cement Co. in the manufacture of asbestos cement sheets. An average of six men was employed.

Scope of production was widened to include processed sand blasting materials in a variety of different screen sizes to meet varied requirements by foundry and metal working concerns. Special drying, screening and conveying plant was installed for this purpose.

Mineral Supplies, Ulverstone

This firm supplied 133 tons of silica, valued at \$3,324.

The Mount Lyell Mining & Railway Company Limited, Queenstown

This company, reviewed under Copper, quarried 1,314 tons of silica, valued at \$4,599, for use as a flux.

3. Construction Materials

BUILDING STONE

BUILDING STONE: QUANTITY AND VALUE OF PRODUCTION

Stone	Cubic yards	\$	Stone	Cubic yards	\$
Granite (red)	50	150	Other	2,329	6,987
Freestone	1,073	15,219			
			Total	3,452	22,356

Etna Stone Pty Ltd, Pontville

Whereas the production of freestone in recent years has only been carried out for the purposes of facing or paving stone this company has commenced operations for the production of freestone in the form of bricks for building purposes. The brick shapes are cut by diamond circular saws out of the sandstone *in situ*. Problems were met in the initial stages until the quarry area had been properly prepared, and production commenced towards the end of the year. Three hundred and sixty cubic yards of freestone were produced.

CRUSHED AND BROKEN STONE

Basalt

BASALT: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

Quarry	Men	Cubic yards	\$
A.F.H., Surrey Hills	2	34,457	103,371
A.N.M., Maydena	5	35,281	105,843
Bonney Bros, Mooreville	6	123,720	371,160
R. Jones, Round Hill	2	14,726	44,178
Savage River Mines	NR*	17,853	53,559
G. J. Weily, Bridgewater	3	14,871	44,613
Others	7	18,304	54,912
Total	25	259,212	777,636

* See iron ore

Dolerite

DOLERITE: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION

Quarry	Men	Cubic yards	\$
Clothier, St Leonards	3	3,976	11,928
Devon Metal Supplies, Devonport	5	22,933	68,799
Electrolytic Zinc Co., Risdon	1	20,478	61,434
Forestry Commission	NR*	5,668	17,000
Glenorchy Quarries, Glenorchy	3	17,932	53,796
Hobart Quarries, New Town	39	291,193	873,579
Holloway, Burnie	1	9,437	28,311
Launceston Quarries, Mowbray	15	81,546	244,638
Pioneer Quarries, Flagstaff Gully	13	86,389	259,167
Public Works Department	88	75,371	330,791
Rouse, St Leonards	2	6,787	20,361
Others	9	14,786	51,268
Total	179	636,496	2,021,072

* See gravel

Pioneer Quarries Pty Ltd, Flagstaff Gully

The capacity of the crushing plant has been increased by the installation of an additional tertiary gyratory crusher in parallel with the impactor. A start has been made to install additional storage bin capacity for the finished products and this will enable a greater range of sizes to be made. A third bench has been started and road works are in hand for a fourth bench.

Hobart Quarries Pty Ltd, Bridgewater

Drilling was commenced to start off the new quarry in basalt and excavation for foundations commenced for the crushing and handling plant.

Limestone**LIMESTONE: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION**

<i>Quarry</i>	<i>Men</i>	<i>Cubic yards</i>	<i>\$</i>
Weily, Glenorchy	5	23,985	69,255
Mt Lyell Co., Queenstown	NR	1,068	5,355
Total	5	24,153	74,610

Sandstone**SANDSTONE: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION**

<i>Quarry</i>	<i>Men</i>	<i>Cubic yards</i>	<i>\$</i>
Queenstown Council	1	2,000	6,000

Other Stone**OTHER STONE: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION**

<i>Quarry</i>	<i>Men</i>	<i>Cubic yards</i>	<i>\$</i>
Devon Metal Supplies, Devonport	5	23,876	71,628
Devonport Marine Board	1	4,600	13,800
Hobden, Rokeby	1	2,909	8,727
King Island Scheelite, Grassy	NR*	8,470	25,410
Sorell Council	3	5,244	15,732
Transport Commission, Commonwealth	5	16,679	50,037
Others	17	32,076	113,677
Total	32	93,854	299,011

* See Tungsten (Scheelite)

GRAVEL**GRAVEL: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION**

<i>Pit</i>	<i>Men</i>	<i>Cubic yards</i>	<i>\$</i>
Associated Forest Holdings	4	118,861	118,861
Beaconsfield Council	2	26,494	26,494
Bonney Bros, Mooreville	6	34,200	68,400
Bothwell Council	2	23,947	23,947
Deloraine Council	2	23,280	23,280
Devonport Council	2	45,080	45,080
Fielding, Flowerdale	11	60,177	60,177
Flinders Council	3	40,891	40,891
Forestry Commission	12	101,812	101,812
H.E.C., Mersey-Forth	7	75,540	190,140
Johnston, Cambridge	2	22,283	22,283
Crown Land Licensees	9	42,621	42,621
Oatlands Council	2	23,835	23,835
Pioneer, Mersey Lea	6	120,195	120,195
Public Works Department	45	156,000	156,000
Richmond Council	NR	122,798	126,240
Ringarooma Council	4	24,280	24,280
Westbury Council	1	23,032	23,032
Woodfield & French, Beaconsfield	29	60,717	182,151
Others	58	282,895	285,837
Total	207	1,428,938	1,705,556

SAND**SAND: PRODUCERS, QUANTITY AND VALUE OF PRODUCTION**

<i>Pit</i>	<i>Men</i>	<i>Cubic yards</i>	<i>\$</i>
Bonney Bros, Cooee	4	32,700	65,400
Devonport Marine Board	2	64,500	64,500
Fielding, Calder	1	8,323	8,323
Grubb, Sandford	2	5,509	15,987
Kenny, Kelso	2	19,260	30,860
Long, South Arm	5	47,504	64,902
Males, South Arm	2	9,416	20,957
Pioneer, Mersey Lea	NR	18,021	18,021
Turmine, Perth	NR	4,737	5,241
Others	7	27,837	47,362
Total	25	237,807	341,553

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

<i>Pit</i>	<i>Men</i>	<i>Cubic yards</i>	<i>\$</i>
Cleveland Tin, Luina	NR	35,467	35,467
Devonport Council	NR	14,002	14,002
Hay, Currie	2	4,683	17,741
Holloway, Burnie	2	15,447	16,803
H.E.C., Mersey-Forth	25	1,398,335	1,398,335
Jones, Round Hill	1	15,963	15,963
King, Devonport	2	28,530	29,733
Mt Lyell Co., Queenstown	6	54,972	125,773
Woodfield & French, Beaconsfield	5	31,232	34,632
Zeehan Council	2	3,805	3,805
Others	4	15,858	22,626
Total	49	1,618,294	1,714,880

4. Fuel Materials**COAL****COAL: QUANTITY AND VALUE OF PRODUCTION**

<i>Year</i>	<i>Tons</i>	<i>\$</i>	<i>Year</i>	<i>Tons</i>	<i>\$</i>
Prior to 1966	9,326,794	23,897,472	1968	90,930	411,642
1966	82,664	353,238	1969	115,933	519,373
1967	76,541	324,553	Total	9,692,862	25,506,278

W. R. Tindal, Mining Engineer, Hobart, reports that there has been an increase in production of 25,003 tons. The number of employees decreased from 61 to 59, of whom 34 were employed underground. The production per man year increased from 2,755 to 3,410 tons for underground employees and from 1,491 to 1,965 overall.

The prime cause of the increase has been the increased demand by the Australian Newsprint Mills at Boyer.

Duncan Coal Mine, Fingal

The extraction of coal was completed in the right-hand panel and after the first working was completed in the left-hand panel by the continuous miner, the extraction of pillars in that panel commenced.

The creep that has been evident for a long period began to accelerate and finally forced the company to withdraw all equipment from the Duncan mine. Whilst the withdrawal was taking place the abandoned Fingal mine was reopened and prepared for production so that the company was able to maintain production from both mines. Finally the whole production was being won from the Fingal mine. Production ceased from the Duncan adit in October 1969. The whole of the output was cleaned in the washery.

There was some doubt concerning the size of the product from the Lee Norse Continuous Miner but experience has shown that the size of the product has been satisfactory, inconveniencing neither the consumer nor the supplier.

Production from the Duncan and Fingal mines was 100,557, an increase of 25,258 tons with a complement of 50 employees giving an increase in overall production per man year, from 1,475 to 2,011 tons.

New Stanhope Coal Mine, Avoca

The area that this company is working in ahead of No. 2 Adit is very complex. The fault that had been predicted died out and other anomalies were found. Current working is in an area to the right of No. 2 Adit below the previous right hand workings, which had to be abandoned due to poor coal. For no apparent reason the quality improved. No change has been made in the method of working or cleaning of the coal.

Production was 13,577 tons gross, a decrease of 375 tons, with an overall production per man year of 1939 tons, a decrease of 54. The average number of employees was 7.

Sandfly Coal Mine, Kaoota

Coal from this mine is semi-anthracitic and is used in hop kilns, for household purposes and in lime kilns. Extraction of pillars has continued throughout the year with no change in working. Production was 1,799 tons, an increase of 120 tons for the year, with two employees giving an overall production per man year of 839 tons, an increase of 279 tons.

5. Foreign Ores

The total value of the metallurgical products of four large works treating foreign ores imported into Tasmania was approximately \$90,019,935.

ALUMINIUM

Comalco Aluminium (Bell Bay) Ltd, Bell Bay

Operations by this company showed an increase of 19,393 tons of aluminium over the previous year.

Other products were: aluminium hydrates, 5,696 tons; and alumina, 3,544 tons.

In all 71,307 tons of aluminium were extracted from 142,389 tons of bauxite from Weipa and 81,715 tons of imported alumina. Average employment was 1,129.

During 1969 the plant produced at its rated capacity of 73,000 tons per annum. Operations were of a routine nature with no significant changes. In December the decision was made to complete the second half of No. 3 Pot Line. The installation of the additional 88 furnaces with supporting equipment will have a capital cost of approximately \$9,000,000 and will increase the capacity of the plant to 94,000 tons per annum. This new project is scheduled for completion during the first quarter of 1971.

BENTONITE

Savage River Mines, Port Latta

This company imported 20,535 tons of bentonite from the United States of America, and 500 tons from New Zealand for use as a bonding agent in the manufacture of iron ore pellets.

FERRO-MANGANESE

Tasmanian Electro-Metallurgical Co. Pty Ltd, Bell Bay

During the year 125,483 tons of manganese ore from Groote Eylandt was smelted to produce 65,793 tons of manganese alloys for the steel industry.

The alloys were 49,757 tons of high carbon ferro-manganese and 16,036 tons of silicon-manganese reported under Silicon.

The company won the 1969 Safety Award of the Australian Council of Employers' Federations.

TITANIUM DIOXIDE

Australian Titan Products Pty Ltd, Heybridge

This plant imported 47,803 tons of Western Australian ilmenite from which was produced 23,412 tons of titanium dioxide pigment. The average number of employees remained at 466.

Capital expenditure was \$296,670. This amount included purchase and installation of an additional 435 cfm compressor driven by a 100 hp motor, \$40,000 on a retaining dam and other anti-pollution works to mitigate discolouration of water and beaches.

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.

Several factors combined to place severe strains on the work of the Branch during the year. The increased tempo of mineral investigations created greater demands for technical services, supervision of exploration activities, the provision of data and the recording of information received.

Accommodation for the Branch remained unsatisfactory throughout the year and the expected additional space for the Survey has not yet become available. No definite proposals have been formulated for the future accommodation of the Branch.

The wide disparity in salary levels between industry and government had resulted in a number of resignations of technical staff and by the end of the year the Branch had seven unfilled vacancies, almost 30% of the establishment. This situation is particularly serious as recruitment has been at a particularly low level for the past two years. An attempt has been made to rectify the position by the reclassification of officers and by increasing the number of geological scholarships but it seems clear that no long-term solution to the problem can be expected until salaries and conditions are brought more closely into line with those in industry.

The Regional Mapping Section suffered most severely from staff shortages and whilst good progress was made during the early part of the year with the systematic mapping programme, by the end of the year only one field geologist remained in the section. As a result, this most vital part of the Branch's activities had almost ceased to function by the year's end.

The Engineering Geology and Groundwater Section has been fully occupied in an endeavour to carry out the programme of systematic investigation of the groundwater resources of the State, as well as dealing with an increasing number of engineering geology investigations. The latter enquiries were mainly concerned with dam site investigation and landslip problems. However, due to staff shortages the Section has found great difficulty in coping with routine investigations and a number of very important basic studies have had to be deferred until additional staff become available.

The Economic Geology Section has been greatly affected by the increasing mineral exploration activities of private companies. A great deal of information has been provided to companies and the Departmental geologists have provided advice and information as required on past and current Departmental geological studies. In spite of these pressures the Section has carried out a great number of individual investigations into various aspects of the mineral resources of this State. The main areas of study being pursued at present are the examination of the granites of North-East Tasmania and their related mineralization; the distribution, genesis and exploration of the alluvial tin resources of North-East Tasmania; exploration of the coal resources of the Fingal Valley, and a continuation of the examination of the clay resources of the State.

Specialist services in petrology, mineralogy, geochemistry and palaeontology have been maintained and good progress has been made in all of these fields. It is pleasing to report that the positions of Librarian and Publications Officer were filled during the year and this has eased the pressures on other professional officers who have been carrying out part of these duties. Draughting services have been particularly strained throughout the year due to heavy Departmental commitments and to the demand for records and plans from exploration companies. Additional staff will be required to deal with the expected work load of this Section during the coming year.

Geologist D. Groves received his Doctor of Philosophy degree during the year and returned to the Department to take up full-time duties. His thesis on the cassiterite-sulphide deposits of Western Tasmania is an outstanding contribution to this field of study. Geologist D. Leaman continued his Ph.D. studies on the structure of the dolerite intrusions in the Brighton-Hobart district at the University of Tasmania throughout the year and his work at the year's end was substantially complete.

The year has been an especially difficult one for all members of the Geological Survey Branch and considerable credit is due to members of the staff in achieving such worthwhile progress under the prevailing conditions. In the short term it does not appear likely that any significant improvement can be expected in the field of recruitment or accommodation and pressures from industry are likely to continue for the foreseeable future.

REGIONAL GEOLOGY

Supervising Geologist E. Williams reports—

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

The explanatory report for the Pipers River 1-mile Sheet is in press. Reports for Table Cape, Burnie, and Quamby have been compiled, and those for Noland Bay, Mackintosh, Beaconsfield and Hobart 1-mile Sheets are being prepared.

Pieman Heads 1-mile sheet has been published.

Quamby 1-mile Sheet is in press.

Beaconsfield 1-mile Sheet is in press.

Hobart 1-mile Sheet has been completed by D. Leaman.

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

Strahan 1-mile Sheet: Senior Geologist A. B. Gulline and Geologists A. P. Bravo, R. D. Gee, P. J. Legge and G. P. Pike commenced mapping in this area.

Scottsdale 1-mile Sheet: Geologist G. P. Pike started mapping the regional geology in this area where Senior Geologist W. R. Moore is carrying out a groundwater survey.

Renison Bell Mine. Supervising Geologist E. Williams visited the area to advise on the survey of faulting in the mine.

Macquarie Island. Geologist R. D. Gee joined a geological party to carry out preliminary investigations.

ECONOMIC GEOLOGY

Supervising Geologist A. J. Noldart reports—

The following studies were made during the year:—

METALLIC DEPOSITS

- (a) Investigations continued on detrital tin deposits in the north-east with emphasis on areas east and north-west of Gladstone currently under review for release for agricultural purposes.
- (b) Examinations were made of detrital tin deposits in the Mt Stronach east district.
- (c) Brief examinations were made of the tinfields on Flinders and Cape Barren Islands.
- (d) Examinations were made of the detrital chromite deposits, Montagu Swamp district, on behalf of Quest Exploration Pty Ltd, and of detrital tin deposits in the Blue Tier district on behalf of H. Moses and on the Frome River, Moorina, on behalf of R. G. Hyde.
- (e) Continuation of the investigation of granite rocks and associated mineralization in the east and north-east, and a preliminary examination of a portion of the Scottsdale granite in association with W. R. Moore.
- (f) Continuation of the study of mineralization in the Scamander district, particularly oxidation studies in the Orieco mine.
- (g) Completion of the study of trace element distribution in sulphides in eastern Tasmania and the compilation of a report in association with Geochemist, W. E. Baker.
- (h) Completion of the studies of Mt Rex and Mt Bischoff ore deposition and preparation of reports in association with personnel of the University of Tasmania.
- (i) Continuation of exploratory diamond drilling in the Alberton goldfields; Fook's Lode, Waratah; St Pauls Tin prospect, Royal George, and completion of drilling of South Lode, Tasmania Mine, Beaconsfield.
- (j) Continued supervision of Royal George tin mine exploration for Cornwall Coal Co.
- (k) Examination of scheelite mine and surrounds at Grassy, King Island, with company personnel.

FUEL MINERALS

- (a) Continuation of the exploratory diamond drilling programme for coal in the Fingal Valley, and studies of the New Stanhope and Duncan coal mines.
- (b) Mapping programmes commenced on roof and seam structures in the 'Cat' and 'Kitten' coal mines, Fingal.

NON-METALLICS

- (a) Continuation of the clay resources study of the Hobart area and compilation of a report on cream clay deposits at Kingston for Hobart Brick Company.
- (b) Examination and completion of report on clay resources at Dulverton for Luck Bros.
- (c) Continuation of studies of clay resources of the Launceston area and of kaolin resources of north-east and eastern Tasmania.
- (d) Investigation of roadmaking materials for the Kingborough and Scottsdale municipalities; dolerite at Old Beach on behalf of the estate of the late F. Fouche; basalt on 'Parkholme' Estate on behalf of Hobart Quarries Pty Ltd; limestone deposits of the Mole Creek district on behalf of A.P.P.M., and reserves of roadmaking gravels, P.W.D. quarry, Cape Portland road, on behalf of Department of Lands and Surveys.
- (e) Examination of asbestos, talc and associated minerals at Port Sorell on behalf of Industrial Sands Pty Ltd.
- (f) Examination of dolomite reserves in the Smithton district on behalf of Mineral Suppliers Pty Ltd.

GEOPHYSICS

- (a) A Jalander magnetometer reconnaissance survey was carried out over a magnetically anomalous area of basalt capping at the Sideling, Tasman Highway.

SURVEYING

- (a) Survey and levelling of diamond drill holes at the following localities: Tasmania mine, Beaconsfield; St Pauls tin mine, Royal George; Briseis mine, Derby; Anchor mine, Blue Tier; Mt Nicholas and Duncan areas, Fingal Valley.
- (b) Survey and levelling of Proline auger holes, Longford district.
- (c) Continuation of mine level survey Duncan coal mine and extensions to the adjoining 'Cat' and 'Kitten' mines, Fingal.
- (d) Survey of geochemical sampling grid at Olivers Hill.
- (e) Survey of Kingston dam site and surrounds.
- (f) Siting and levelling of seismic traverses in the following localities: Kingston dam sites; Supreme Court site, Salamanca Place, Hobart; Scottsdale district; by-pass road, Devonport; Wrest Point Hotel, Hobart.

GENERAL

- (a) Percussion drill programme commenced Lower Boobyalla River area to elucidate the nature of the pre-Tertiary topography, to determine the depth of sediment and to verify geophysical work previously carried out in the district.
- (b) Examination of Friendly Beaches limestone deposits in conjunction with Palaeontologist, M. J. Clarke to clarify the Permian succession, and sampling of granites on Flinders, Cape Barren and Clarke Islands for age determination and correlation with the granite studies of north-eastern Tasmania.
- (e) Dr D. I. Groves presented a paper on the 'Metallogenic History of the Lachlan Geosyncline' at the 41st ANZAAS congress, held at Adelaide.
- (d) Preparation of Hobart Trades Fair Exhibit.
- (e) Several investigations were carried out to determine mineral potential of areas under application for purchase from the Crown.
- (f) Close liaison was maintained with active exploration companies throughout Tasmania and examinations made of any significant mineralogical or geological developments.

ENGINEERING GEOLOGY AND GROUNDWATER

Supervising Geologist P. C. Stevenson reports—

The section has been staffed by three geologists during the year. Another geologist continued his Ph.D. studies at the University of Tasmania and there is one vacancy.

An increased amount of engineering geology investigations occupied 69% of the section's time: this comprised geological mapping, geophysical surveys and the supervision of drilling and test pittings in connection with the siting of dams, buildings and roads.

The Metropolitan Water Board's dam site at Whitewater Creek, Kingston, has occupied one geologist for over six months: other dam sites at Bradys Creek, Triabunna; Ulverstone; Patersonia, Meander, Quamby Brook; Bracknell; Smithton and Prosser River, Orford were also examined, tested and reported on. Building foundation conditions have been investigated at Wrest Point and at the Supreme Court building site in Hobart.

Road foundations have been examined at Kingston, Devonport and Wynyard.

Landslip investigations have been made at Deviot, Beauty Point, Lawrence Vale, Launceston and Burnie.

The groundwater work of the section has been dominated by the Longford Basin and Scottsdale-Bridport regional groundwater surveys which together have occupied 45 man weeks by geologists and field assistants. Smaller scale investigations have been carried out on the groundwater potential of such coastal sand areas as Nine Mile Beach and Saltwater River. Development has been assisted by the location of groundwater in the former area.

The demand for siting of farm bores has continued at a low level. The Supervising Geologist has twice appeared on ABC programmes on farm water supplies.

The Supervising Geologist represented the Department on the Technical Committee on Underground Water of the Australian Water Resources Council and acted as a supervisor on its research project: The Geophysical Logging of Bores in Unconsolidated Sediments. Work continued on the Tasmanian section of the Groundwater Map of Australia.

Geologist D. E. Leaman has nearly completed his detailed gravity survey of the Brighton, Hobart and Kingborough Quadrangles, a study to determine the nature of dolerite intrusions in the area. The intrusions are thought to have considerable bearing on the distribution of groundwater in their vicinity. He will be returning to the Department in 1970.

MAPPING AND ENGINEERING DRAUGHTING

Senior Draughtsman P. B. Nankivell reports—

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

Pieman Heads Sheet No. 42: Printed in nine colours.

Quamby Sheet No. 46: Fair drawn, proof checked, will be printed early in 1970.

Beaconsfield Sheet No. 30: Base map and geology drawn, colour separation proceeding.

Hobart Sheet No. 82: Base map commenced.

Brighton Sheet No. 75, and Kingborough Sheet No. 88: Base map material supplied to Regional Geology Section.

OTHER MATERIAL PREPARED FOR PUBLICATION

Two multi-colour maps, 'Geology of the Coal River Basin' and 'Hydrology of the Coal River Basin', have been drawn ready for publication.

Thirty-three monocolour maps, sections and diagrams and one 2-colour map were drawn for Technical Reports No. 13.

Sixteen monocolour diagrams were drawn for Geological Survey Record No. 10.

Three graphs were drawn for the Director of Mines Report for 1968.

The demand by Exploration Licence holders for out of print and unpublished material increased and was fulfilled by various reproduction methods.

A large amount of material was prepared for the departmental exhibit at the Hobart Trade Fair.

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

MINERALOGY AND PETROLOGY

Mineralogist and Petrologist G. Everard reports—

Petrological descriptions were made of a suite of rocks from Quamby-Golden Valley district, basalts from the Winnaleah-Warrentinna area, bore cores from Whitewater Creek Damsite and sandstones from Pontville. Thin sections of various rocks from Mt Nassau, Alberton bore, Coles Bay, Hellyer Gorge and Olivers Hill were also described.

Beach sands and concentrates were examined from Louisa Bay, Ketchem Bay, New Harbour, Window Pane Bay, Cox Bight, Southport Lagoon Spit, the bay north of the Images and the southern part of Recherche

Bay. A number of tailings and slime samples from tailings dams were examined, together with soils, sands, and gravels from the South Esk and flooded farm paddocks as part of an investigation into pollution.

Various rock and mineral specimens and samples of concentrates received from the Chief Chemist and Metallurgist were examined. Over seventy rock and mineral specimens and samples of concentrates and clays and bore core were identified for the general public and mining interests.

Early in the year a display stand was set up in the Hobart City Hall for the Tasmania 69 Exhibition.

Collections of rocks, minerals and fossils with some microscopic sections were provided for the Hobart Teachers College and High Schools.

The Departmental rock and mineral collection was augmented by over four hundred new specimens.

PALAEONTOLOGY

Palaeontologist M. J. Clarke reports—

Good progress has been maintained in the field of Permian macropalaeontology. The systematic description and comparison of strophalosiid faunas from the Quamby Quadrangle was completed and published. Preliminary investigations of Lower Permian Faunas from the Burnie, Sheffield and Beaconsfield Quadrangles are in progress. The detailed placement of certain faunas from the Mersey Great Bend area near Latrobe is now known with certainty following excavations associated with A.P.P.M. pipeline installations. Detailed description of very rich Middle and Upper Permian faunas from the Friendly Beaches area, the Beaconsfield area, and the Malbina A of the Mt Nassau section has been commenced. Results obtained to date promise not only a much fuller understanding of the Tasmanian sequence, but also the establishment of a standard applicable to the whole of Eastern Australia.

Preliminary investigations of Siluro-Devonian faunas from the Strahan Quadrangle reveal important differences from their counterparts in the Zeehan area. Further work may have important palaeogeographical implications, and may allow a more detailed comparison of the Lower Gordon River and Zeehan areas.

Palaeontological information has again been made available periodically to the Hydro-Electric Commission, and information and fossil material have been given to schools and various other interested parties.

Over 400 specimens were added to the Departmental fossil collection during the year.

GEOCHEMISTRY

Geochemist W. E. Baker reports—

Geochemical investigations initiated during 1968 were continued within the limitations imposed by the restricted laboratory facilities available at Derwent Park.

The study of nickel and cobalt content of pyrite, pyrrhotite and arsenopyrite was completed and will be published with D. I. Groves in Technical Reports No. 14. It was found that the nickel and cobalt distribution was of limited use in the recognition of the various types of mineralization in the north-east of the State.

Development of a method of analysis of sub-ppm gold in clays and its application to the Lefroy Goldfield has had to be temporarily suspended. The method will involve the use of highly toxic organic solvents and further investigations will have to await the provision of facilities which will allow safe use of such materials.

A detailed geochemical exploration programme was undertaken in the vicinity of Oliver Hill, S.W. of Sheffield. This has resulted in the delineation of a substantial lead anomaly over a distance of about a mile. Details of this study will appear in Technical Reports No. 1. The company holding the area is following up the Departmental investigations with geophysical surveys prior to the selection of drilling sites.

A soil survey has been commenced by W. Cromer in the vicinity of the old Barrington Copper Mine south of Forth.

LIBRARY

Librarian H. Mulder reports—

As the Library had been without a full-time Librarian for several years, it was necessary to devote some time at the beginning of the year to bringing up to date the shelving and cataloguing of publications. Binding was recommenced and a complete set of each of some of the most frequently used journals was bound.

Work was also begun on a new card system which will form a detailed index to all publications and Departmental reports on Tasmanian geology, mining and mineral resources. The cards are arranged by subject and by quadrangle. The index will eventually comprise more than 40,000 cards, 20,000 of which have already been prepared and put to use.

Thirty-nine new books were added to the Library during the year, together with large numbers of publications from many of the 250 centres with which the Department has exchange agreements. Twelve new bays of shelving have been acquired to help store the increasing number of items.

PUBLICATIONS

Publications Officer E. L. Martin reports—

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

Technical Reports No. 13, 1968.
Occurrences of Gemstone Minerals in Tasmania.

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

Geological Survey Record No. 8. The Geology of the Lower Gordon River — particularly the Devonian Sequence.

Geological Survey Record No. 9. Catalogue of the Minerals of Tasmania.

Geological Survey Record No. 10. Tasmanian Strophalosiidae.

Geological Survey Report No. 11. The metamorphic and structural Sequence in the Precambrian of the Cradle Mountain Area.

Occurrences of Gemstone Minerals in Tasmania.

Technical Reports No. 13, 1968.

NON-DEPARTMENTAL PUBLICATIONS

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

GROVES, D. I.*, SOLOMON, M., 1969. Fluid inclusion studies at Mount Bischoff. *Trans. Instn Min. Metall.* 78 B: 1-11.

LOFTUS-HILLS, G. D., GROVES, D. I.*, SOLOMON, M., 1969. The Selenium content of some Tasmanian sulphides. *Proc. Australas. Inst. Min. Metall.* 232: 55-65.

VARNE, R., GEE, R. D.*, QUILTY, P. J., 1969. Macquarie Island and the cause of oceanic linear magnetic anomalies. *Science* 166: 230-233.

WILLIAMS, E.*, 1969. The repeated development of identical joint patterns, north-east Tasmania. *Geol. Mag.* 106: 362-369.

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—		Niobium	1
Elements—		Phosphorus	110
Aluminium	234	Potassium	73
Antimony	18	Silicon (including silica)	200
Arsenic	69	Silver	132
Barium	1	Sodium	65
Bismuth	10	Sulphur (includes sulphate)	167
Boron	6	Tantalum + Niobium	3
Cadmium	17	Tin (includes soluble tin)	1,262
Calcium	197	Titanium	164
Carbon (including CO ₂)	86	Tungsten	186
Chlorine	27	Vanadium	17
Chromium	62	Zinc	190
Cobalt	6	Zirconium	22
Copper	559		
Fluorine	33	Miscellaneous—	
Gold	137	Ash (coals)	22
Iron (includes acid soluble)	525	Calorific Value	1
Lead	165	Coal (complete analysis)	10
Lithium	10	Deposit Gauge Tests	217
Magnesium	161	Ignition Loss	46
Manganese	118	Insoluble	47
Mercury	10	Moisture	227
Molybdenum	11	Radicals and Complexes	24
Nickel	71	Suspended Solids	9
			5,125

Type of Test	Number	Type of Test	Number
Miscellaneous— <i>continued</i> —			
Water (complete analysis) ...	71	Magnetic Separation ...	249
Water (limited examination)	27	Panning ...	3
	701	pH ...	35
II. QUALITATIVE ...	118	Sizing (includes sedimentation) ...	647
III. CERAMIC ...	72	Solution Make up ...	2
IV. METALLURGICAL—		Sorting (hand) ...	2
Amalgam Retorting ...	1	Tabling ...	117
Crushing and Grinding ..	5		1,140
Density ...	18		
Flotation ...	18		
Hardness (Mohr) ..	6		
Heavy Liquid Separation ...	36	Total ...	7,156
Jig ...	1		

RESEARCH INVESTIGATIONS

Tin ...	4	Coal ...	1
Pyrite ...	1	Non-metallics ...	5
Beach Sand ...	1	Ceramics ...	5
		Total ...	17

SUMMARY OF INVESTIGATIONS

Tin

R.559—Aberfoyle Ltd, Mining Division, Rossarden

A sample of slime table feed from the company mill was submitted for cassiterite flotation tests which showed that the following collectors were worthy of further investigation:

- Cyanamid, R.710
- Albright & Wilson phenyl ethylene phosphonic acid.
- Albright & Wilson isohexyl phosphonic acid.

Further work is being done as part of a study of cassiterite flotation generally, R.581.

R.568—Cornwall Coal Company N.L., Royal George Mine, Royal George

A composite sample was made from samples taken underfoot on No. 2 Level of this mine. This sample assayed 0.84% Sn.

Preliminary tin recovery tests indicate that about three-quarters of the tin is recoverable in a gravity concentrate.

R.584—Newmount (Australia) Pty Ltd, Razorback Mine, Dundas

A composite sample, made from sulphide ore samples previously supplied by Placer Prospecting Pty Ltd, was used for tests to determine the tin recovery to be expected. Tests showed that two-thirds of the tin is recoverable in concentrates assaying 50% Sn.

R.597—Mr D. M. Lewis, Coles Bay

Seven samples representing the various alluvial tin deposits at Coles Bay were submitted for tin recovery tests by jiggling. The samples varied widely in tin content and nature. The cassiterite was coarse (> 36 mesh) with rutile, zircon and ilmenite also present.

Pyrite

R.586—Mr B. A. Farquhar, Keith River Exploration Area

A sample of pyrite was submitted for preliminary concentration tests to determine the sulphur recovery. Tests showed a better grade from flotation than jiggling. A high sulphur recovery is possible.

Beach Sand

R.601—Mr H. T. Reardon, Eddystone Point Exploration Area

This large sample of beach sand contained 24% heavy minerals. The economic minerals with the recovered head grades were:

Cassiterite—0.31% Sn
 Rutile—0.24% Ti
 Zircon—1.16% Zr
 Monazite—0.11% monazite
 Ilmenite—12.8% ilmenite (containing 30% Ti and 0.4% Cr).

Coal

R.596—Cornwall Coal Company N.L., Duncan Washery, Fingal

A sample of 'coal slurry', a washery waste product, was submitted for testing for conformance with a Hydro-Electric Commission specification for 'fly ash', and for its suitability in porous pipe production (R.573).

While conforming chemically the ash was too coarse to meet the 'fly ash' specification.

Flotation tests showed a product containing less than 20% ash could be made from this slurry.

Non-Metallics

R.583—Industrial Sands Pty Ltd, Rubicon Estuary

Tests were made to see what release of shell from sand occurred during pumping through a pipeline. Later a test was made using the sand plant pumping equipment. The tests showed pumping did not sufficiently free the shell of sand.

R.589—Ocean Mining A.G., Seabed Samples from W of Tasmania

Samples obtained during Ocean Mining A.G. exploration of the seabed in 1966 and 1967 were analysed before starting phosphorus concentration tests. None of the samples contained sufficient phosphorus to justify further work.

R.598—Goliath Portland Cement Co. Ltd, Railton

Flotation tests to remove siliceous and other impurities from limestone showed this was not possible.

R.600—Industrial Sands Pty Ltd, Marshalls Creek

A sample submitted for tests to determine its suitability for use as a paper filler showed the sample to be 76% talc. Bleaching tests were unsuccessful.

R.603—Hydro-Electric Commission, Gordon River Dam

Rod mill grinding tests were made on quartzite samples from a Commission crusher to obtain a suitably sized product.

Ceramics

R.573—University of Tasmania, Department of Mechanical Engineering

This project aimed at making porous pipes of specific permeability for a University experiment. The effects of firing temperature and carbon added to the clay were studied. The process would make use of coal waste products.

R.585—Humes Ltd, Vitrified Clay Division, Launceston

Tests showed shrinkage on firing to be related to the water and sand contents of the extruded clay. By postulating a water content of 20%, and a sand content of 30%, variations from these would give predictable results.

R.588—Lucks Brick & Pipe Pty Ltd, Dulverton

The effect of manganese dioxide on the colour of bricks was studied.

R.592—Department of Mines, Permeability of Brickwork

Brick walls even when made from bricks which had a high water absorption transmitted water either through the mortar, or at the mortar/brick interface rather than through the bricks themselves.

The effect of firing temperature on the initial rate of absorption was studied on one manufacturer's bricks.

R.599—Lucks Brick & Pipe Pty Ltd, Dulverton

Samples obtained from drilling the Bush Pit area showed the deposit to be heterogeneous. The implications of this on mining and final product were noted.

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 and Works Regulation Act 1915

EMPLOYMENT

The average number of persons employed in the mining, metallurgical and quarrying industry was 10,407, an increase of 367. Of this increase, 141 occurred in underground employment reflecting the transition from open cut to underground mining at Mount Lyell. For the second year in succession the increase in underground employees was 16 per cent. The increase of 226 persons employed on the surface occurred mainly in metallurgical works.

ACCIDENTS

The number of registered accidents was 162 in which 155 men were injured and seven killed. In calculation of the rates per thousand, 154 employees in the total of 10,467 were disregarded because their employers do not submit accident reports.

LOCATION OF ACCIDENTS

Section of the Industry	UNDERGROUND Number of Persons				SURFACE Number of Persons				TOTAL Number of Persons			
	Employed	Killed	Injured	% Injured	Employed	Killed	Injured	% Injured	Employed	Killed	Injured	% Injured
Coal	34	....	1	2.9	25	....	....	....	59	....	1	1.7
Copper	206	....	16	7.8	1,388	3	21	1.7	1,594	3	37	2.5
Iron .....	....	....	....	....	705	....	3	0.4	705	....	3	0.4
Silver-lead-zinc	439	1	20	4.8	410	....	3	1.0	849	2	23	2.9
Tin and tungsten	335	....	12	3.6	906	1	12	1.4	1,241	1	27	2.3
Quarries, works, prospecting, etc.	3	....	....	....	5,802	1	64	1.1	5,805	1	64	1.1
Total	1,017	1	52	5.2	9,236	6	103	1.2	10,253	7	155	1.6
Not reported .....	....	....	....	....	154	....	....	....	154	....	....	....
					9,390				10,407			

DESCRIPTION OF FATAL AND SERIOUS ACCIDENTS

Fatal

- J. Vojnovic, Mount Lyell Co.: Struck by train at ore bin.
- R. Ceric, Cleveland Tin: Driving vehicle which skidded off icy road over bank.
- A. A. Smith, Electrolytic Zinc Co., Rosebery: Struck by fall of ground while barring down in stope.
- M. Pryzlato, Electrolytic Zinc Co., Rosebery: Struck by drill steel which disintegrated while being cut by friction saw, caused by explosive in the water hole.
- M. Head, Mount Lyell Co.: Jumped from lorry he was driving when brakes failed.
- W. J. Farrow, Mount Lyell Co.: Struck by bar while levering tractor frame spring.
- T. J. Britten, Tasmeco Plant Hire: Apparently struck by unguarded drive wheel of crusher.

Serious

- R. J. Smith, Goliath Co.: Fell from unstable drum; broken leg.
- J. W. McInnes, Electrolytic Zinc Co., Risdon: Sprayed with hot metal when block exploded; severe burns to arms, back and chest.
- M. C. Dobson, Storeys Creek: Struck by timber and dislodged from seat while driving locomotive; broken leg.
- J. R. Vallis, Aberfoyle Tin: Struck by timber falling from cage during unloading; broken pelvis.
- S. W. Stevens, Electrolytic Zinc Co., Rosebery: Jammed against timber by scraper hoist being relocated under power; broken leg.
- B. McCallum, Renison: Struck by flyrock from stope blast; ruptured stomach.
- V. Gubiani, Electrolytic Zinc Co., Rosebery: Struck by fall of ground while boring adit face; broken leg.
- W. F. McSorley, Savage River Mines, Savage River: Hand jammed against steel frame by conveyor tail pulley while bearing being changed; broken hand and wrist and severe lacerations.

- M. T. Somers, Mount Lyell Co.; Running new knocker line which became wrapped around hands; multiple breaks, both hands.
- R. McMillen, Mount Lyell Co.: Fell through fibro-cement roof of smelter into slag paddock; broken arms and ribs, punctured lung, haemorrhage.
- A. Kowalewski, Electrolytic Zinc Co., Risdon; Struck by falling timber during demolition work; broken leg.
- J. Bajgar, Electrolytic Zinc Co., Rosebery; Struck by crane hook; broken head.
- S. J. Henley, Mount Lyell Co.: Struck by fall of ground in adit; broken leg.
- R. Brown, Comalco: Fell from roof while fixing roofing; broken arms, leg and jaw.
- B. C. Craig, King Island Scheelite: Operating cutting wheel which disintegrated: lacerations to face, possible loss of eye.

RATES PER THOUSAND KILLED OR INJURED

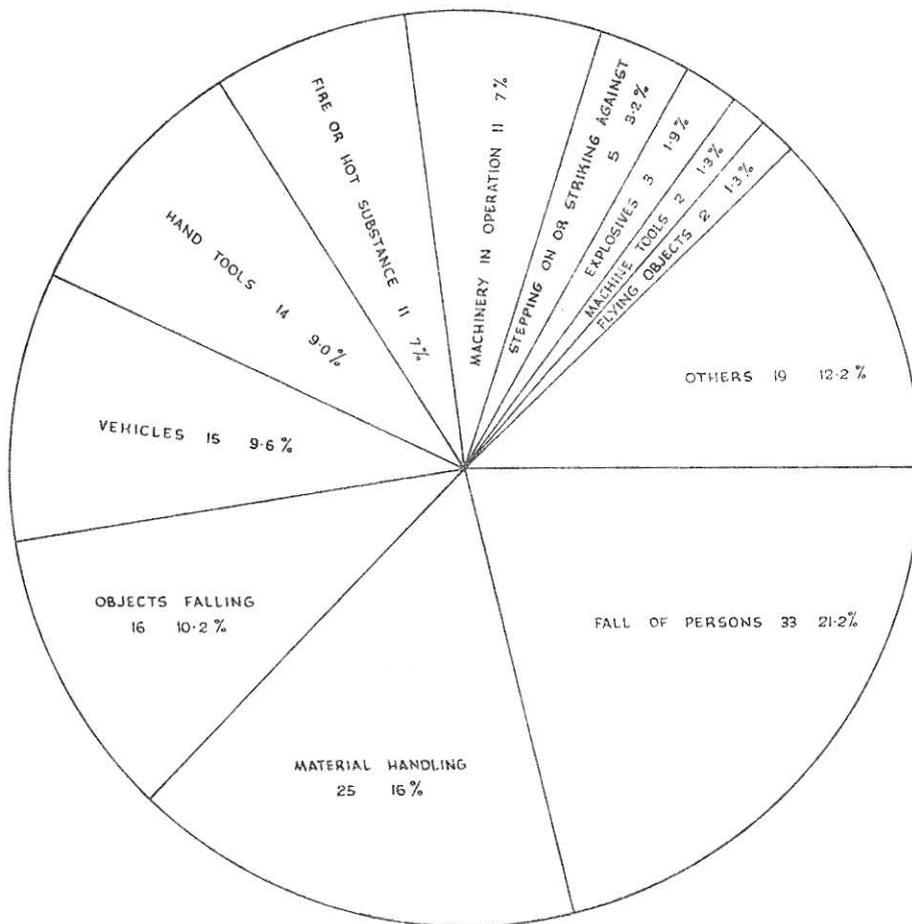
Period	No. of Persons employed	No. of accidents	Number of persons			Number per thousand		
			Killed	Injured	Total	Killed	Injured	Total
1892-1930 (a)								
1931-1940 (b)								
1941-1950 (c)								
1951-1960 (d)								
1961	8,493	108	1	107	108	0.119	12.720	12.839
1962	8,708	68	2	66	68	0.234	7.726	7.961
1963	8,836	86	4	83	87	0.461	9.575	10.037
1964	8,815	68	5	63	68	0.581	7.316	7.897
1965	9,038	93	4	89	93	0.465	10.342	10.808
1966	10,122	82	8	74	82	0.825	7.636	8.461
1967	10,538	146	6	141	147	0.583	13.711	14.294
1968	10,040	126	6	120	126	0.608	12.151	12.759
1969	10,407	162	7	155	162	0.683	15.117	15.800

(a) See Report of Director of Mines, 1954
 (b) See Report of Director of Mines, 1956.

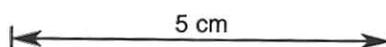
(c) See Report of Director of Mines, 1960
 (d) See Report of Director of Mines, 1964

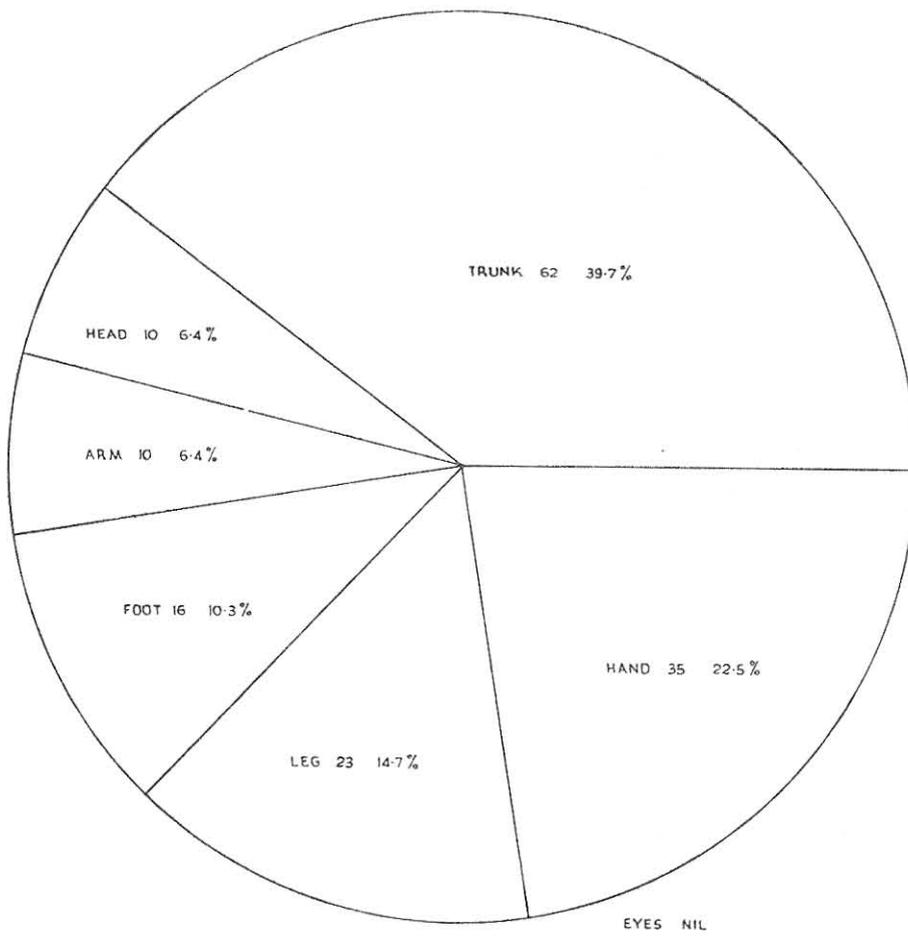
INSPECTION

P. Allan, Mining Engineer and Inspector of Mines, Burnie, commenced duties in August.

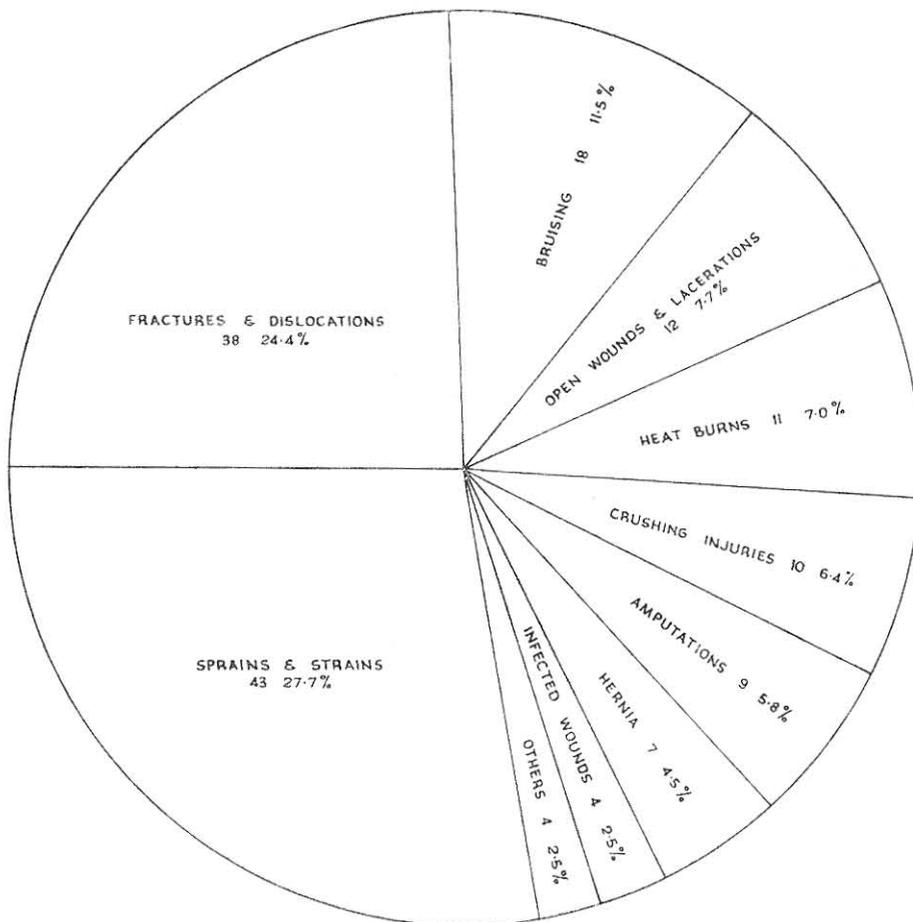


Accident Factor





Accidents: Location of Injury



Accidents: Nature of Injury

5 cm

DANGEROUS GOODS*The Explosives and Inflammable Liquids Acts***EXPLOSIVES****IMPORTS OF EXPLOSIVES**

	Burnie	Devonport	Hobart	Launceston	Naracoopa	Stanley	Strahan	Total
Nitro compounds (lb) .....	.....	.....	.....	993,100	63,500	919,900	850,900	2,827,250
Detonators .....	.....	.....	.....	743,450	29,000	358,550	358,550	1,601,112
Explosives shipments (No.) .....	.....	.....	.....	9	3	7	10	29
Ammonium nitrate (imported for use as an explosive (lb))	504,000	336,000	520,320	1,310,640	.....	1,891,760	.....	4,562,720

The number of licences and permits issued were: Magazine Licences, 116; Other Licences, 497; Shot Firer's Permits, 118; Total, 731.

EXPLOSIVES AUTHORIZED DURING THE YEAR

1. Class 2 Nitrate mixture—Molanite
2. Class 2 Nitrate mixture—Molanal—re-defined.
3. Class 3 Nitro-compound Div. 2—Metabel.

IMPORTATION AND INSPECTION

Nitro-compounds imported were inspected and found to be in good condition. Imports of fireworks decreased during the year and all consignments were inspected and tested, and with one exception, approved for sale within the State.

STORAGE

New public magazines, two for explosives and two for detonators were completed at Howden and the first shipment is expected early in 1970.

BLASTING COMPLAINTS

Numerous investigations were made into complaints, some of which were unfounded, but in all cases action was taken to improve blasting practice.

The permits of four shot-firers were cancelled during the year.

INFLAMMABLE LIQUIDS

Inflammable liquids imported in bulk (tons)—

	Bell Bay	Burnie	Devonport	Hobart	Naracoopa	Total
Aviation Gasoline	670	.....	.....	2,737	.....	3,407
Kerosene—						
Aviation	1,358	.....	.....	6,266	.....	7,624
Lighting .....	.....	.....	1,504	1,750	.....	3,254
Power	708	4,026	892	459	.....	6,085
Motor Spirit—						
Premium	34,806	24,168	32,208	65,632	1,000	157,814
Regular	11,308	7,805	11,779	23,767	700	55,359
L.P. Gas	283	.....	.....	.....	.....	283
Total	49,133	35,999	46,383	100,611	1,700	233,826
Tankships (No.)	11	9	14	24	.....	60

Licences to keep, 2,116; Plans approved, 243; Exemptions granted, 38; Permits to import, 26.

ACCIDENTS

A liquid oxygen tanker exploded at M.T.M. Industries, Mowbray, in April, causing the death of three men. A seven-day hearing failed to establish a definite cause of the explosion although a recommendation was made that pumps on liquid oxygen tanks should be fitted to the outside of the tank and not submerged in the liquid.

A semi-trailer tank waggon jack-knifed, apparently when the driver applied the brakes. Petrol escaped from one of the compartments and poured over the windscreen of the prime-mover obscuring the driver's vision. Police cordoned off the area while firemen hosed away the spilt petrol. The tanker was tilted back to normal using two cranes, and was later driven away attached to another prime mover.

A 500-gallon petrol tank exploded when a spark from an electric welder ignited fumes within the tank: the operator was killed.

DRILLING

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

	<i>Number of holes</i>	<i>Total footage</i>	<i>Object</i>
<i>Diamond</i>	10	319	Bridge foundations, New Norfolk
	13	597	Bridge foundations, Devonport
	1	310	Gold exploration, Beaconsfield
	1	209	Stratigraphic, Longford
	1	10	Stratigraphic, Scottsdale
	5	74	Bridge foundations, Little Swanport
	2	993	Gold exploration, Alberton
	3	1,700	Coal exploration, Fingal
	3	1,119	Mineral exploration, Waratah
	5	514	Dam foundations, Patersonia
	2	735	Tin exploration, Royal George
	3	175	Bridge foundations, Launceston
	13	296	Dam foundations, Kingston
	62	7,051	
<i>Churn</i>	24	2,641	Tin testing, S. Mount Cameron
	2	635	Tin exploration, Boobyalla
	8	1,300	Water investigation, Longford
	5	1,633	Water investigation, Scottsdale
	2	45	Bridge foundation, New Norfolk
	5	121	Bridge foundation, Little Swanport
	1	15	Mineral exploration, Lake Margaret
	47	6,390	
<i>Rotary</i>	1	910	Gold exploration, Beaconsfield
	14	5,340	Water investigation, Longford
	15	6,250	
<i>Auger</i>	11	371	Bridge foundations, Devonport
	5	61	Dam foundations, Patersonia
	10	171	Geological investigation, George Town
	5	121	Sand exploration, Devonport
	37	590	Dam foundations, Kingston
	11	210	Sand exploration, Ulverstone
	28	960	Clay exploration, Port Sorell
	20	504	Dam foundation, Smithton
	237	6,183	Clay exploration, Northeast
	16	371	Clay exploration, Hamilton
	20	600	Clay exploration, Launceston
	10	138	Bridge foundation, Launceston
	13	176	Clay exploration, Kingston
	423	10,456	

DRILLING EXPENDITURE

<i>Type of drilling..</i>	<i>Number of drills</i>	<i>Feet drilled</i>	<i>Total cost (\$)</i>	<i>Cost per foot (\$)</i>	<i>Cost per shift (\$)</i>
Diamond	4	7,051	58,521	8.30	64
Churn	3	6,390	41,272	6.46	69
Rotary	1	6,250	16,120	2.58	67
Auger	1	10,456	11,710	1.12	49

DIAMOND DRILLING

Four plants operated continuously and the fifth, a combination auger and diamond drill was brought in to use towards the end of the year.

At Fingal coal investigations proceeded as before. On completion of the hole in the Fingal area the drill was moved to the north of the Mt Nicholas area. All holes were continued into the Permian series to assist in correlation of the geology of the area.

The drill at Alberton was changed to the wire-line system and while it gave greatly increased footage in broken ground, deviation increased to such an extent that the rods were jamming.

At Beaconsfield the hole passed the possible target area without showing any signs of the second lode.

Two more holes were drilled at Royal George but the results were not encouraging. Three holes were completed at Waratah during the summer months and work will be continued there after the winter.

Granite core was obtained from the bottom of a deep churn drill hole at Scottsdale to assist in correlating the seismic work in connection with water investigations and a 500-foot hole was started near Cressy to obtain cores in the water-bearing sands of the area.

Foundation work included investigations for bridges, buildings and dams, and the combination auger-diamond plant proved most satisfactory for vertical holes in certain types of ground where the auger was used through overburden and a core obtained from bedrock.

CHURN DRILLING

One drill was occupied for most of the year on the evaluation of a known alluvial lead for a mining company and then moved to a new area to test leads indicated by gravity and seismic surveys. The other two plants were used on foundation work and water investigations. Very little drilling of water bores for farmers was carried out but some of the test bores were left as permanent water supplies.

ROTARY DRILLING

Rotary drilling continued on water investigations in the Longford area for most of the year but one hole was drilled for the start of a deep diamond drill hole in the Beaconsfield area.

AUGER DRILLING

Most of the year was spent drilling along roads on a general evaluation of the clay resources of the State but some foundation work was also done. Several small sand and clay investigations were also carried out for private firms.

SOUTHERN DISTRICT

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

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

EMPLOYMENT

The average number of persons employed was 3,473, a decrease of 1,515 on last year. The Mount Lyell Mining and Railway Company Ltd, Queenstown, was returned to the North-West District during the year: this accounts for the decrease in employment.

ACCIDENTS

There were ten serious and forty-seven minor, reportable accidents; a total of fifty-seven registered accidents.

There has been a noticeable reduction in the number and seriousness of accidents at the Electrolytic Zinc Company's works, Risdon. A great deal of effort has been made to improve safety performance and the Company is to be congratulated on the results achieved. Burn injuries have decreased with the introduction of new techniques. Hernia and other injuries due to manual handling still account for a large proportion of the accidents and employers are encouraged to eliminate manual handling wherever this is feasible.

NORTH-EASTERN DISTRICT**L. F. Egan, A.M.Aust.I.M.M., Launceston****ACCIDENTS**

Of the 25 accidents reported for the year seven were of a serious nature and eighteen minor. There were no fatalities.

Distribution of accidents was as follows:

- Cement works—10 accidents (2 serious, 8 minor)
- Aluminium smelter—13 accidents (4 serious, 9 minor)
- Manganese smelter—1 accident (serious)
- Dredge—1 accident (minor).

In general a high standard of preventative safety was maintained on all works.

BLASTING IN BUILT-UP AREAS

A number of complaints regarding excessive ground vibration, and in one instance fly rock, resulting from blasting operations were investigated.

Blasting operations at Garden Island in the Tamar River, where a shipping channel improvement scheme involving removal of portion of the Island is in progress, were a source of numerous complaints. These were investigated with W. R. Tindal, using seismic pick-ups for testing ground vibrations. As a result of these measurements it was possible to set an upper limit on explosive loading to keep vibrations within safe limits.

Trenching operations by a firm of contractors carrying out council sewerage works at George Town were another cause of complaint and effective controls were exercised. Fly rock from blasting in a quarry in the St Leonards area resulted in an order being issued under Sections 17 and 18 of the Mines Inspection Act 1968, prohibiting further blasting in the quarry. Operations at the quarry have since been suspended.

EXPLORATION

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

No exploratory work was carried out on this 144 square mile kaolin licence during the year and the licence was not renewed after 18 December.

Storeys Creek Tin Mining Co. N.L., Gladstone. S.P.L. 34

Twelve square miles on the Great Musselroe River. Not operated and allowed to lapse in October.

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

This licence of 31 square miles in the vicinity of Beaconsfield was relinquished in November. Two men were engaged in geological mapping in the first and last quarters of the year.

T. K. Shadforth. E.L. 2/68

An area of 2,080 square miles on Flinders Island was the subject of geological examination by two men extending over the first half of the year. The licence was allowed to lapse in November.

E. G. McRae. E.L. 12/68

An area of 1,575 square miles on Cape Barren Island was geologically examined and prospected but the licence was not renewed in September.

J. C. Rudge. S.P.L. 45

Employed an average of eight men in prospecting for half a year on his 15 square mile Franklin River area. The licence was relinquished and operations discontinued in the second half of the year.

R. W. Leftwich. E.L. 6/68

Listed in the latter part of the year as Texins Development this licence of 650 square miles was the subject of an intensive geological survey and subsequently a sophisticated aerial geophysical search of favourable areas revealed by the ground parties. Average employment was 14 men.

Quest Exploration Ltd. S.P.L. 43

Allowed to lapse in May.

H. T. Reardon. E.L. 15/68

Sixty-two square miles. Mr Reardon employed between two and nine men in a vigorous prospecting programme of tin bearing leaders in the greisen areas of Bells Hill and Star of Peace. Mechanical earth moving equipment also was used.

Rockford Pty Ltd. S.P.L. 65

This licence, comprising a narrow coastal strip in the vicinity of Eddystone Point, was energetically prospected. A back-hoe was used for costeaning. Employment is shown under H. T. Reardon, E.L. 15/68.

K. C. Burns. S.P.L. 43

Some geological field work and a considerable amount of interpretation and appraisal was carried out by this licensee on the Anchor Mine area near Lottah.

Scamander Mineral Development. S.P.L. 38

An area on which is located the old Orieco copper prospect was the subject of a sampling campaign in which a small precipitation plant was constructed and a small quantity of copper sludge collected. Roads were constructed and some diamond drilling carried out. Employment varied between one and five men.

O. E. Harvey. E.L. 10/68

Branch Creek area, 20 square miles. Investigations were completed in the first quarter of the year and option of leasing was exercised.

O. E. Harvey. S.P.L. 36

Of 1,600 acres comprising the lime sand deposits of the Port Sorell inlet was systematically sampled and reserves assessed. Applications for leases have been processed.

R. L. and T. G. Rainbow. S.P.L. 48 and 55

Scout boring on both of these areas was carried out jointly by both holders using their own drilling equipment.

G. Gerke and Lloyd Davis

Using mechanical equipment this party exposed a series of wolfram bearing leaders at Mt Horror and during the currency of their prospecting licence exercised the right to lease.

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

The Heazlewood 1 well near Hagley was sunk to 1,770 feet (uncompleted) on this licence to explore for petroleum.

Industrial Sands Pty Ltd. E.L. 24/69

This company took up the balance of E.L. 10/68 held formerly by O. E. Harvey. Three men were employed on surface prospecting during the second half of the year defining serpentinite and other ultrabasic zones.

D. H. Bessell. S.P.L. 69

Mr Bessell prospected 300 acres for clay in the vicinity of Pipers River.

Allstates Exploration Pty Ltd E.L. 14/69, 7/69

These areas were the subject of systematic prospecting by surveying, geological mapping and drilling. This latter consisted of 495 feet of rotary drilling followed by 1,158 feet of diamond drilling at the Tasmania Mine. Auger drilling: 2,332 feet.

EASTERN DISTRICT

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

The coal industry employed 59 men, a decrease of two. Thirty-four men were employed underground and 25 on surface. The quarrying industry employed 44 men and one man was employed in tin mining.

NORTH-WESTERN DISTRICT

L. W. Morris, A.W.A.S.M., M.Aust.I.M.M

E. C. Leyland, A.W.A.S.M., A.M.Aust.I.M.M.

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

EXPLOSIVES AND INFLAMMABLE LIQUIDS

Shipments of explosives into Strahan and Stanley were supervised throughout the year and all magazines inspected. A quantity of 130 lb of deteriorated explosives was destroyed.

The discharge of tankships at various ports was inspected on 69 occasions. The introduction of bulk handling of L.P. gas by road-tanker has led to increased storage and usage. A road tank-wagon carrying petrol was involved in a collision which caused rupture of the compartments.

EXPLORATION

King Island Scheelite (1947) Limited. E.L. 15/66, 4/68, 4/69, 5/69, 23/69.

Geopeko Limited, the Peko-Wallsend group exploration organisation, has been very active in regional geological mapping and geochemical sampling with auger drills. Diamond drilling was principally employed on the No. 3 orebody at Bald Head where 18,407 feet was drilled in 39 holes. In addition 3,566 feet in eight holes was drilled on anomalies. Considerable investigatory work was carried out in an area near the aerodrome. Employment was 23 persons.

Pickands Mather and Co. International. E.L. 12/65, 15/69

At Basin Lake a percussion drill was able to penetrate the glacial deposit of sand and boulders and the underlying strata to a depth of 215 feet. From that point diamond drilling is proposed. On an area near Smithton geological mapping and sampling was carried out in a search for limestone.

Electrolytic Zinc Co. of Australasia Limited. E.L. 1/62, 2/62, 8/68; S.P.L. 3, 22, 53

At Tullah 99 feet of diamond drilling was carried out to complete a hole in the northern section. One hole was drilled to 325 feet at Trial Harbour. Two holes totalling 700 feet were drilled into the Jupiter mine near Williamsford.

D. D. Pearson. E.L. 9/68

Mr Pearson carried out an appraisal of the quantity of silica sand available using an auger drill for sampling.

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

A resident geologist and a drill crew have been based on Savage River. On the North Savage iron ore deposit one diamond drill hole was sunk 2,289 feet and another taken to 100 feet, uncompleted.

The Mount Lyell Mining and Railway Co. Limited. E.L. 8/65, 9/66, 10/69; S.P.L. 20

E.L. 8/65. During the year investigations continued to concentrate on previously outlined aeromagnetic and geochemical anomalies. Work consisted of follow-up ground magnetometer and electromagnetic surveys, geochemical soil sampling and geochemical mapping along cleared traverse lines over areas of interest. Approximately 125,500 feet of traverse lines were cut over aeromagnetic anomalies in the Dove River and Lea-Iris River areas, and over geochemical anomalies in the Fletcher's Adit-Shepherd and Murphy-All Nations mine area in the Olivers Hill area.

E.L. 9/66. During the year twelve and a half miles of road were constructed on this area. Two grids were established and reconnaissance electromagnetic, ground magnetometer, geochemical soil sampling and geological mapping were commenced with detailed geophysical work being carried out over Howards anomaly. Two base camps have been established on the exploration licence.

E.L. 10/69. Preliminary reconnaissance geological mapping, soil, stream sediment and rock sampling has been carried out in this area.

S.P.L. 20. Traverse lines and bush tracks have been cut to enable detailed geological mapping of the northern half and reconnaissance surveying of the southern half to be performed. Ground magnetometer surveying and geochemical soil sampling covered all existing traverse lines. A detailed examination was made of an anomaly in the northern part of the lease.

Renison Ltd. S.P.L. 27

Geological mapping has been completed and geochemical and magnetic surveys carried out.

Texins Development Pty Ltd. E.L. 7/68

This company has been active in the silver-lead province at Dundas, and diamond drilled 4,647 feet in six holes on the Comet-Kosminsky line. Average employment was 15 persons.

Minops Pty Ltd. 13/68, 14/68 and 6/69

Surface mapping around the Oonah mine has been completed preparatory to diamond drilling. At Blythe River three holes of total footage 1,319 were drilled in the iron ore deposit, together with uncompleted percussion drilling at Natone.

A. R. Smith. E.L. 6/69

This area is under option to Minops who constructed a road into the area to carry a bulldozer and diamond drill.

B. A. Farquhar S.P.L. 56.

Mr Farquhar has bridged the Arthur River and carried out a considerable amount of road building and costeaning by bulldozer.

Tasminex N.L. E.L. 17/68, 1/69, 8/69

Much work has been done, by way of geological mapping, road making, costeaning and magnetometer surveying, which has led to the drilling of 31 percussion holes for a total footage of 1,705. This drilling was mainly in the Kara iron ore deposit.

R. W. Carter. S.P.L. 54,*Aberfoyle Ltd.* E.L. 2/63, 2/70

Geological and geochemical reconnaissance was carried out on the S.P.L. 54 and E.L. 2/70 areas by Aberfoyle. In the Mount Lindsay area six diamond drill holes of total footage 2,546 were put down.

A.C.I. Operations Pty Ltd. E.L. 16/68

This company investigated the Balfour district preparatory to setting up on drilling targets.

Comstaff Pty Ltd. E.L. 5/63, 1/68, 19/68, 7AP/AM

A considerable amount of geochemical sampling (102,553 feet of streams sections and 95,700 feet on cut lines) has been done and regional geological work has been extended. A considerable amount of sub-surface geological work at Mount Bischoff has been completed together with a general sampling campaign. Some thousands of feet of costeans and trenches have been dug and in places sampled. During the summer season up to 39 persons have been employed.

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

This area had been under option but it is understood the option was abandoned, after which no activity seems to be taking place. Average employment during the option period by Amax was five men, when 2,783 feet of diamond drilling in four holes was carried out.

Cleveland Tin N.L. E.L. 1/63

Magnet Prospect. Diamond drill holes Nos 2 and 3 were completed for a total footage of 1,365 feet. No work has been done since.

Badger Prospect. Line cutting, surveying and geological mapping prior to geochemical, magnetometer and self-potential surveying, was completed. A magnetic anomaly has been tested by costeaning.

S.W. Cleveland Area. One hundred thousand feet of line cutting on strike extensions of the Cleveland and Washington Hay mines was completed. Geological mapping and magnetometer and geochemical surveying was continuing at the close of the year.

Report of the Mount Cameron Water Race Board for the year ended 31 December 1969

THE HONOURABLE THE MINISTER FOR MINES

Sir,

We have the honour to submit the report of the Mt Cameron Water Race Board for the year ended 31 December 1969.

Production of tin concentrates was 22.59 tons as compared with 18.9 tons for the previous year when severe drought conditions limited water supplies during the summer months.

The average rainfall was almost six inches greater than in 1968 but there was a decline in the number of sluiceways of water supplied from 1,622 in 1968 to 1,509 in 1969. This was principally due to a re-organisation of operations at the Mussel Roe Mine which is the major consumer of water.

The operational loss was \$5,139, expenditure being \$9,130 and revenue \$3,991; as compared with expenditure of \$6,849 and revenue of \$5,511 in the preceeding year. The increased expenditure resulted from the payment of an allowance in lieu of long service leave to the retiring Manager and to wage adjustments. The fall in revenue reflects the decline in water supplied and also some water charges which accrued in 1969 were not received until after the end of the year.

The construction of the Chum Creek dam from loan moneys which was approved last year was completed at a cost of \$7,362. It was also decided to replace the Amber Creek syphon to supply the Amber Hill Mine and another producer. The work had not been completed at the end of the year.

The Race system and dams have been maintained in good order and condition which has enabled maximum flows of water to be maintained.

The Manager (H. Green) reached the retiring age during the year after having served the Board first as a Channel Keeper and then as Manager for almost 30 years. The Board desires to record its appreciation of his services. He was succeeded by N. Petrie as Manager in May 1969.

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

We have the honour to be, Sir,

Your obedient servants,

J. G. SYMONS, Chairman

H. K. TURNER, Member

V. WOOD, Member

MOUNT CAMERON WATER RACE SUSPENSE ACCOUNT

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 DECEMBER 1969

<i>Receipts</i>	\$	<i>Payments</i>	\$
Sale of water—		Salaries and wages including pay-roll tax	8,812.26
Fixed on cash scale	3,704.60	Insurance	155.33
Royalty scale	31.74	Car allowance: Manager	107.61
Domestic use	195.00	Maintenance	18.66
Hire of pipes	60.00	Miscellaneous	36.90
Balance (loss)	5,139.36		
	\$9,130.70		\$9,130.70

MOUNT CAMERON WATER RACE
 STATISTICS FOR THE YEAR ENDED 31 DECEMBER 1969

<i>Registered Rainfall</i>		<i>Production</i>				
Great Mussel Roe	37 inches 39 points	Tin oxide produced—				
Little Mussel Roe	37 inches 15 points		Tons	cwt	qr	lb
<i>Water Services</i>		Royalty scale .....	...	1	2	10
Average number of claims supplied per week	2	Fixed scale	22	10	0	41
Average number of claims supplied in any one week	2		—	—	—	—
Sluicheads supplied—			22	11	3	23
Fixed scale	1,509	Employment average per week—	—	—	—	—
Royalty scale	30	Royalty scale				1
		Fixed scale				6
						7
	<u>1,539</u>					<u>7</u>

Report of the Ringarooma and Cascade Water Board for the year ended 31 December 1969

THE HONOURABLE THE MINISTER FOR MINES

Sir,

We have the honour to submit the report of the Ringarooma and Cascade Water Board for the year ended 31 December 1969.

Since the closure of the Race system in 1962 the Board has functioned for the preservation of the Paris and Cascade dams so that the water storages will be available for future requirements in the district. Requests have been made for use of the Cascade dam for irrigation purposes but no firm proposal was submitted to the Board for examination. The Board is conscious that future development of tin mining in the vicinity of Mt Paris and the Briseis Mine at Derby will depend to a large extent on availability of water supplied from the dams. Exploration activities have been in progress in the district over the past few years and boring operations were undertaken at the Briseis Mine. The Board is hopeful that its policy of maintaining the two dams in good repair will assist in the development of mining activities and in the establishment of an irrigation scheme.

The deficit for the year was \$1,079.76 consisting of caretaking of the dams and interest on the capital cost of the System. In accordance with the provisions of the Ringarooma and Cascade (Water) Agreement Act 1947 the loss is met from Consolidated Revenue.

We have the honour to be, Sir,

Your obedient servants,

J. G. SYMONS, Chairman

H. K. TURNER, Member

N. P. EDWARDS, Member

RINGAROOMA AND CASCADE (WATER) SUSPENSE ACCOUNT

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31 DECEMBER 1969

	<i>Receipts</i>	\$	<i>Payments</i>	\$
Balance (loss)		1,079.76	Ringarooma Race: Wages	160.00
			Interest on capital cost of Ringarooma and Cascade water system	919.76
		\$1,079.76		\$1,079.76