A. F U E L S

(1) COAL

Coal seams exist in many localities in Tasmania and occur in strata belonging to Permo-Carboniferous Triassic and Tertiary systems. The Permo-Carboniferous strata form the lower coal measures and coal seams occur in these strata at the Barn Bluff-Pelion, Preolenna and Mersey fields in the north and at Mt. Cygnet and Bruny Island in the south.

The Triassic strata form the upper coal measures, and coal seams are extensively developed in the eastern midland, and south-eastern portions of Tasmania. These seams constitute by far the greatest coal reserves of the State.

The Tertiary strata also contain coal-seams, but so far they have proved of no importance.

(a) BLACK COAL

The chief coal-mines are situated near St. Marys on the southern fall of the Mount Nicholas Range, about 600-900 feet above the general level of the Break O' Day Plain.

Access:

Access is provided by means of the Fingal branch of the State Railway system which connects St. Marys with the main Hobart-Launceston line at Conara. The distances of St. Marys from Hobart and Launceston by rail are 145 and 35 miles respectively. The mine workings are situated 2½ to 5 miles near the main centres than St. Marys. Sidings and branch lines have been constructed to the screening plants of the chief mines where the coal is loaded direct into railway trucks; self acting ground tramways, approximately one mile, in each case, transport the coal from the mine to the screens.

Type and Analyses:

The characteristics of the coal depend principally on the system of rocks from which it is derived. The Mount Nicholas coals (Triassic Age) are generally of one type, the semi-bituminous.

The range of analysis is Moisture 1 to 4 per cent; volatile matter 18 to 28 per cent; fixed carbon 42 to 60 per cent; ash 15 to 30 per cent; sulphur 0.2 to 0.6 per cent.

Calorific Value:

The calorific value is assumed to be typically 10,145 B.T.U; the value ranges from 9,100 B.T.U. to 12,133 B.T.U. (Gross).

Reserves:

The proved reserves include only small areas in the immediate vicinity of the mine workings. The actual amount of these is unknown and only can be regarded as small.

The probable reserves are large, the estimate being based upon all available information from mines bores and the geological structure, as well as on the assumption of continuance of existing economic conditions.

The total reserves based upon the scheme adopted by the Twelfth International Geological Congress 1913, are:-

Actual ..... 123,000,000 (metric) tons
Possible ..... Small to large
Probable 121,000,000

The total recorded production is nearly 4,000,000 tons valued at approximately £2,900,000. The present Annual production is about 100,000 tons, valued at £75,000 but operations have been seriously curtailed through frequent dislocations due to industrial troubles. The greatest development has taken place in the Nicholas area, where the principal mines are the Mount Nicholas and the Cornwall Coal Mines. The Cornwall Coal Mine, which produced over 60,000 tons last year, has contributed one third and with the Mount Nicholas mine one half of the total production.

The actual production is comparatively small considering reserves of coal in Tasmania but the position is due to the fact that production is solely for local markets, no attempt being made to export. Production could be greatly increased if markets were available.

(b) BROWN COAL AND LIGNITES

The Tertiary brown coals and lignites occur at numerous localities but their known thickness does not exceed 4 feet and little attention has been paid to them.

(2) OIL SHALES

Extensive deposits of oil shale occur in northern and north-western parts of Tasmania, as beds on the horizon of the Greta coal measures of the Permo-Carboniferous system. Tasmanite shale forms the greater part of these deposits and an estimate of the reserves of this shale is as follows:-

	Tons
Latrobe-Railton-Kimberley area . ..	.17,895,000
Beulah area.	. 2,346,750
Quamby Bluff area	. 3,750,000
Nook area	. 1,050,000
Chudleigh area	. 6,000,000
	31,041,000

The average yield of crude oil from these shales is estimated at 27 gallons per ton. Only a small amount of developmental work has been performed in connection with these shales and it has been mainly directed toward evolving a successful retorting method. In recent years attention has been given to the production of bitumen and although a small pilot plant was successfully operated

with a batch process, plans for a continuous process on a commercial scale have not yet been finalised.

Kerosene shales and cannel coals occur at Preolenna and pelionite in the Barn-Bluff-Pelion area, but the reserves of these materials are very small compared with those of Tasmanite.

B. MINERAL SUBSTANCES

I. MAJOR METALS

(1) **Copper:**

Copper deposits are restricted almost entirely to the western and north-western districts. The most important field is that at Mt. Lyell, while others occur at Jukes-Darwin, Heazlewood, Balfour and Scamander.

The Mt. Lyell Field: is situated adjacent to Queenstown in the western district and is distant 22 miles by rail from the port of Strahan.

There are two main types of deposits, viz (a) Lenticular Bodies of Pyrite; (b) Mineralised Bands of Schists etc.

The pyritic bodies include the Mt. Lyell and South Lyell deposits and the mineralised bands of schists, etc, include the ore bodies of the North Lyell (and adjacent Crown Lyell, Lyell Blocks, Royal Tharsis) Mine and the Lyell Comstock Mine.

Ore reserves at 30th September, 1939 were estimated to total 10,458,000 tons of an average assay value of 1.52 % copper, 0.11 oz. silver and 0.015 oz. gold per ton.

The detailed figures are as follows:

Mine	Tons	Copper %	Silver oz.	Gold oz.
North Lyell	111,000	4.00	0.50	0.015
Lyell Comstock	473,000	2.25	0.20	0.020
Royal Tharsis	2,250,000	2.00	0.10	0.020
West Lyell (Main Section)	4,225,000	1.50	0.10	0.015
West Lyell (Prince Sect.)	3,063,000	1.00	0.10	0.010
Crown Lyell	136,000	1.75	0.25	0.015
Lyell Tharsis	200,000	1.50	0.25	0.015

These figures show an increase of 406,000 tons in the reserves as estimated twelve months earlier, after deducting the ore tonnage mined during the period.

The deposits are highly developed by mining and diamond drilling and are now principally worked by open cut methods on an extensive scale.

The Mines are operated by the Mount Lyell Mining and Railway Company Limited and during 1939 production of electrolytic copper from the refinery amounted to 13,453 tons, being an increase of 753 tons over the previous year. Total production of copper since the inception of the Company to the end of 1939 amounts to 341,633 tons. The total output of ore for twelvemonths ending 30th September 1939 was 1,094,611 tons of an average assay value of 1.40 % copper, being an increase of 56,032 tons of ore and a decrease of 0.08 % copper in comparison with the figures of the previous year.

Possibilities for the immediate future of the Mt. Lyell field are bright.

Investigations regarding the possibilities of the occurrence of other ore bodies in the vicinity are now proceeding.

The Jukes-Darwin Field: is situated ten miles to the south of Mt. Lyell field from which it is accessible by a partly constructed road and tracks. The ore-bodies are similar to those at Mt. Lyell. The field has not been exploited to any extent owing to transport difficulties and absence of high-grade deposits. The Mt. Lyell Company is now investigating the possibilities of the field with regard to present economic conditions.

The remaining copper fields of the State are unimportant, the deposits are small and production has been very limited.

2. Zinc:

The Read-Rosebery Field: contains the important zinc deposits. The town of Rosebery is situated in the western district and is accessible by rail (Emu Bay Railway) in a distance of 68 miles from the port of Burnie, on the north-west coast.

Several tabular and lenticular ore-bodies of considerable extent occur at intervals over a length of six miles, the most important being the Rosebery lode at the north end and the Hercules and Mt. Read groups, at the south end.

The ore is a fine-grained one of massive sulphides composed chiefly of sphalerite, pyrite and argentiferous galena. The average composition of the zinc-lead sulphide ore is: zinc 21.3%, lead 6.4%, silver 8.5 oz. and gold 2.12 dwt. per ton.

The deposits are operated by the Electrolytic Company of Australasia Limited which estimated the known and probable ore reserves as 1,500,000 tons at June, 1939.

Ore bodies at Rosebery and Mt. Read are extensively developed by underground mining and diamond drilling. A modern treatment plant is in operation at Rosebery. During 1939, the Company recovered 25,021 tons of refined zinc by electrolytic process from 158,292 tons of Read-Rosebery ores, compared with 25,098 tons for the previous year. Total zinc production from 1924 to 1939, excluding the years 1931-1935 when operations were suspended amounted to

125,254 tons.

It appears certain that present production can be maintained for a great number of years and, under propitious conditions it is possible that this could be considerably increased.

Geological investigation followed by drilling in favourable areas is at present progressing.

3. Tin:

Tin ore is one of the most important mineral products of the State, the present annual production being 1,250 tons (metallic) with a value of £282,798. In the north-eastern district both primary and alluvial deposits occur, the greater production being from the latter. In the north-western and western districts both types occur, but the production has been chiefly from the primary deposits.

(a) Primary Deposits

Story's Creek field contains the most important primary deposits in the north eastern district. This is accessible by rail from the chief centres as far as Avoca in the valley of South Esk River. From the railway a road connects with the field in a distance of 16 miles.

The deposits consist of quartz reefs containing cassiterite and wolfram.

Aberfoyle, at Rossarden, is the principal mine. Average ore assays show 1.5% tin and..2% tungstic acid. Proved ore reserves at 30th June, 1939 were estimated as 61,616 tons and probable reserves at 130,000 - 140,000 tons. A policy of regular and systematic development of the reefs by underground mining and drilling has been undertaken by the operating company and during the year ended 30th June, 1939, 4,525 tons were added to positive ore reserves.

Since commencement of milling operations on 5th September 1938, to 30th June 1939 a total of 89,010 tons of ore has been mined and treated for a production of 1,863 tons of tin oxide concentrates, and 189,000 tons of wolfram. During 1939, 15,267 tons of ore were mined and milled for a recovery of 339.6 tons of tin oxide concentrates and 31 tons of wolfram.

The future of this mine is particularly bright in that recent development has proved at least 15 years of life for the mine, on present output figures.

At Storey's Creek Mine, within a short distance of Aberfoyle mine, the deposits are similar but wolfram is in excess of tin oxide, the average ore grade being 1.4% tungstic acid and 1% metallic tin. Ore reserves are considerable but present figures are not available. At the end of 1937 they were estimated at 154,000 tons but this has since been increased.

The deposits have been developed by underground mining over a length of 1000 feet and to a depth of 300 feet from the surface.

Production from 1937 to 1939 inclusive amounted to 71,505 tons of ore from which was concentrated 408 tons of tin oxide and 1,325 tons of wolfram (average 73% WO_3). During 1939, 12,271 tons of ore was mined

and milled for a recovery of 52 tons of tin oxide (20 tons more than 1938) and 197 tons (53 tons less than 1938) of wolfram.

The mine is conducted on a profitable basis and it is anticipated that a slightly increased production will be maintained for a great number of years.

The Anchor Mine, also in the north-eastern district, is operated under tribute from Tasman Tin No Liability Company. It is connected by road (18 miles) with Herrick, the terminus of the North-Eastern railway from Launceston (84¾ miles).

The deposits consist of tin bearing granites of an average grade approximately 0.2 % metallic tin. The quantity available of average grade ore is large but reserves of payable ore are unknown. Mining is undertaken by open cut methods and a limited amount of exploratory drilling has been carried out. Past production amounts to over 3,000 tons of tin oxide. In 1939, 26,204 tons of ore was treated and 34 tons of tin oxide (24.3 tons metallic tin) recovered.

Mt. Bischoff mine is situated in north-western district adjacent to the township of Waratah. The latter is connected by road and rail (48 miles) with the port of Burnie on Bass Strait.

The ore-bodies are of four types, viz. -

(i) Joint fillings and impregnations of slates and quartzites.

(ii) Mineralised porphyry.

(iii) Quartz veins.

(iv) Replacement deposits.

Mt. Bischoff Tin Mining Company worked nearly all the ore-bodies on the mountain by open cut methods of mining, and has produced some 82,000 tons of tin oxide from 5,400,000 tons of ore treated. During 1939 ore production amounted to 24,566 tons, (4,988 tons more than 1938) from which 199 tons (63 tons more than 1938) of tin oxide (135.5 tons metallic tin) was concentrated in the company's mill. Figures with reference to ore reserves and quality of material available are not procurable.

The mine has been let on tribute to small parties of miners for several years and little development work has recently been undertaken. Since 1929 the scale of operations has fluctuated with the price of tin and is now of limited extent. It is probable that the present rate of production will be continued for a limited period of years.

(b) Alluvial Deposits.

The principal alluvial deposits occur in the north eastern district.

By far the largest producing mine is the Briseis (Briseis Consolidated No Liability) at Derby to which access is gained by way of road (61 miles) and rail from Launceston.

Quantities of drift available for sluicing are very considerable, but actual figures are not available. Returns show that the ground worked during 1939 yielded at the rate of 1.5 lbs tin oxide per cubic yard, being a

reduction of .16 lbs. per cubic yard on that of the previous year.

The mine is well opened up and complete with modern equipment. Water supplies and head pressure are adequate for hydraulic sluicing and all treatment purposes.

The workings have yielded over 15,000 tons of tin concentrates (74% to 75% tin) in the past. Production during 1939 amounted to 505.4 tons (547.7 tons in 1938) of tin oxide (363.7 tons metallic tin) from the treatment of 740,000 cubic yards of drift.

With suitable conditions and favourable prices for tin it is reasonably certain that the present scale of production will be maintained for at least 12 years.

Endurance Tin Mining Company No. Liability operates the mine of that name at South Mt. Cameron. The locality is connected by road in a distance of 9 miles with Herrick, the terminus of North-Eastern railway line from Launceston (88¾ miles).

Total reserves of wash are given as 5,112,800 cubic yards containing 1,385 tons of tin oxide or 0.6 lbs. per cubic yard.

The mine is well developed and operated by modern hydraulic sluicing methods. Boring carried out during twelve months ended June 1939 proved an area containing 3,882,000 cubic yards of tin bearing ground averaging 0.6 lbs. of tin oxide per cubic yard (1,040 tons of tin oxide).

During 1939, 533,000 cubic yards of material was treated for a recovery of 116.2 tons of tin oxide concentrates yielding 85.9 tons of metallic tin. Production for the past five years amounted to 583.8 tons of tin oxide or 430.5 tons of metallic tin.

Under normal conditions there is every possibility of continued production on the present scale in the future. Reserves are sufficient for 12 years work.

Numerous other alluvial tin mines are operating in the North Eastern district, notably along the valley of Ringarooma River and its tributaries and in the vicinity of St. Helens.

4. Lead

Deposits of lead in the form of argentiferous galena and zinc-lead sulphides occur in the western and north-western districts of the State, but present production is confined to the former. Lead produced throughout Tasmania in 1939 amounted to 11,021 tons, and the total production from 1919 to 1939 was 102,801 tons.

The largest producing centre is that of Mt. Farrell near Tullah, where Farrell Mining Company is operating.

A narrow gauge tramway, six miles in length, connects Tullah with Farrell Siding on Emu Bay railway at 64 miles from the port of Burnie.

The ore-body is a tabular one consisting essentially of argentiferous galena, sphalerite, siderite and quartz. The quantity of ore available is considerable, but figures showing reserves are not available. Grade of ore mined

in 1939 averaged 17.2% lead and 18.2 oz. silver per ton.

The deposit is opened to 600 feet below surface and well developed by shaft, drives and crosscuts.

Total production from Mt. Farrell mines amounts to over 45,000 tons of lead and 4,500,000 oz. of silver. Production over the past five years was as follows:-

Year	Galena Concentrates Tons	Lead Tons	Silver
1935	1626	1201	137,066
1936	2365	1634.4	186,618
1937	2100	1466.6	157,467
1938	2253	1751	183,589
1939	3282	2365	249,721

There is no reason to suppose that any curtailment of the present scale of production will be necessary in the near future.

Particulars with reference to Read-Rosebery deposits have been dealt with above under the heading of Zinc. The ore from mines in that locality yields an average of 6.4% lead. The quantity of lead finally recovered from ore concentrated by flotation in the Rosebery mill over a period of three years is given in the table below:-

Year	Lead in Tons
1937	7492
1938	8576
1939	8515

Magnet (Magnet) and Montana-Western (Zeehan) silver-lead mines in the north-western and western districts respectively are not in production at present but it is likely that both will be so in the near future. The former has yielded large quantities of lead and silver in the past, but the ore-bodies at Montana-Western mine have only recently been developed.

5. Manganese

Important manganese deposits are unknown in Tasmania. Surface prospecting recently undertaken on a superficial deposit of ferruginous manganese at Dial Range, near Penguin in the north-western district, has revealed small quantities of low grade material.

II. MINOR METALS

1. Bismuth

Ores of bismuth have been mined to a small extent the total production to date being 81 tons. The S and M mine at Moina in the north western district has supplied the greater portion of the output and in 1939 produced

.6 of a ton. The ores as a general rule occur as accessory minerals in tin and wolfram lodes.

2. Cadmium

Small quantities of cadmium are produced as a bi-product in the electrolytic treatment of zinc concentrates from the ores of Read-Rosebery district by the Electrolytic Zinc Company of Australasia Ltd. Cadmium recovered during the years 1936 to 1939 is as follows:-

Year	Cadmium in tons
1936	33.64
1937	45
1938	49
1939	48
Total	175.64

3. Nickel

Only one deposit of possible commercial importance exists. This is situated in the western district, 5 miles from Zeehan and adjacent to Emu Bay railway. Small ore bodies occur in and along the walls of basic dykes in the form of massive copper-nickel sulphides. The average metal contents are: nickel, 9 to 12 %; copper, 5 to 6 %. Between the years 1927 and 1933 the quantity of nickel produced amounted to 203 tons, and in 1938, 19¾ tons. Mining ceased in 1938 but a boring campaign is now in progress to prove the extent of the deposits.

4. Titanium

A deposit of ilmenite occurs as black sand in a raised beach along the east coast near Naracoopa, King Island. A small amount of cassiterite is associated with the deposit which also contains garnet, zircon and possibly rutile. 36,000 cubic yards of sand have been proved by boring, while potential reserves are much greater. Results of calculations of the average contents of the bore holes showed 1514.8 lbs. per cubic yard of titanium oxide.

5. Tungsten

Between 1899 and 1903 the quantity of wolfram produced in Tasmania was 3820 tons. Production of scheelite from 1917 to 1939 inclusive amounted to 790 tons.

The principal centre for wolfram is that of Storeys Creek district, the deposits of which have been described above under the heading of tin.

The only scheelite deposit of commercial importance is that at Grassy on the east coast of King Island. The mine is accessible by road from the shipping and air port of currie on the west coast. It is operated by King Island Scheelite No Liability Company which is now treating 700 tons of crude ore weekly for five tons of high grade concentrates.

The ore bodies are five in number and consist of garnet with subsidiary amounts of quartz and about .8% scheelite. Ore reserves are estimated as under:-

Proved	50,000 tons
Probable	25,000 tons
Possible	100,000 tons

The deposits are developed to a considerable extent by underground workings and large open cuts and have been tested by diamond drilling.

Total production of scheelite from this mine corresponds with that from the whole State as quoted above. In 1939, 28,870 tons (9,705 tons in 1938) of ore was milled for a recovery of 170.7 tons (30.5 tons in 1938) of scheelite concentrates containing 123.1 tons of tungstic acid.

With a continuation of the present favourable market for tungsten the successful operation of this mine is assured for several years.

6. Zirconium

The only source of Zirconium in Tasmania is the mineral Zircon which occurs in small quantities at numerous localities in alluvial deposits. The deposit most likely to be of commercial importance is that at Sister's Hills to the west of Table Cape on the northern coast. It consists of shallow and narrow alluvial material along the course of small streams. The zircons are generally red in colour and range in size up to three eighths of an inch. The deposit is not being worked nor is it likely to be exploited in the absence of a favourable market.

III. PRECIOUS METALS

1. Gold

The total production of gold to date has been 2,026,351 ozs. This has been obtained from quartz reefs, copper and zinc lead ores, alluvial deposits, etc. In 1939 the gold production was 19,984 ozs.

The quartz reefs are chiefly confined to the north eastern district but at present there is little or no production. The principal reef worked was that at Tasmania mine (Beaconsfield) from which 854,600 ozs. of gold was obtained. The reef was worked to a depth of 1,500 feet, but the shoot became shorter and of lower value in depth. Ore reserves below this level have not been proved but a diamond drilling campaign is now in progress.

Small quantities of alluvial gold were won in all the goldfields of north eastern and western districts, but the most important alluvial field was that of Lisle (north east), from which at least 250,000 ozs. were obtained. Present production of alluvial gold is small.

The principal source of gold at present is that of the copper ore-bodies of Mt. Lyell and zinc-lead ore-bodies at Read-Rosebery, details of which have been given under the headings of copper and zinc respectively. Total gold production by Mt. Lyell Mining and Railway Company from the inception of the Company to end of 1939 amounts to 452,292 oz. and for the year 1939, 7,507 oz. The table below shows gold produced by Electrolytic Zinc Company of

Australasia Limited from Read-Rosebery ores in the past three years:-

Year	Gold (oz)
1937	10,522
1938	12,292
1939	11,713

2. Silver

Deposits composed chiefly of silver minerals do not occur, but small quantities are contained in the copper, silver-lead and zinc-lead-silver ores. The total production is estimated at over 60,000,000 oz. and that for 1939, 1,278,116 oz.

Details of the principal deposits are contained under the appropriate headings, viz. copper, lead, zinc.

The copper ore deposits of Mt. Lyell Company have yielded 15,145,422 oz. of silver since the inception of the company, the yield in 1939 being 70,412 oz.

At the Read-Rosebery Mines the Electrolytic Zinc Company of Australasia Limited produced the following quantities of silver in the past three years:-

Year	Silver (oz)
1937	794,264
1938	929,750
1939	937,264

The Mt. Farrell mines at Tullah have yielded over 5,000,000 oz. of silver and during 1939 production amounted to 249,721 oz.

3. Osmiridium

The production of osmiridium has been derived almost entirely from alluvial deposits. The fields include Bald Hill, Savage River, Mt. Stewart and Wilson River in the western and north western district, and Adamsfield in the southern district. The quantity of osmiridium won from 1910 to 1939 amounted to 29,288 oz. and for the latter year 283 oz. Production has declined progressively since the peak year, 1925, when 3,366 oz. was obtained.

Since its discovery in 1925, Adamsfield has been the principal field and at the present time almost the whole of the output is derived from that locality. It is situated 50 miles, West North West of Hobart, from which it is accessible by rail for 54 miles as far as Fitzgerald. A pack track connects the latter with the field in a distance of 25 miles. Production of osmiridium from Adamsfield totals 13,775 oz. to end of 1939. No large mines exist and the workings are operated by individuals and small working parties. The considerable rise in market price of osmiridium during the last twelve months has stimulated production slightly. The deposits are now much depleted and it is not anticipated that production will increase to any extent in the future.

IV RARE METALS

Small quantities of monazite occur in alluvial sands principally on the Stanley River and Yellow Band Plains in the Western district. Ores of other rare metals are unknown in Tasmania.

V FERTILISERS

Tasmania is plentifully endowed with deposits of limestone. These occur in numerous localities throughout the island. They are generally convenient to means of transport and occur under conditions favourable for cheap extraction. Limestones exist in the Lower Palaeozoic, Permo-Carboniferous and Tertiary rock systems. The Lower Palaeozoic limestones are dark grey types of high grade (Calcium carbonate content 80% to 97%) and occur in beds many hundreds of feet thick. They are found in western, northern and southern districts. In the north these limestones are burnt for quicklime at Beaconsfield, Flowery Gully, Railton and Melrose.

The Permo-Carboniferous stone is generally lighter in colour with a lower content of calcium carbonate and higher silica content than the above. They occur in the northern, eastern and southern districts in beds ranging in thickness up to 100 feet. They are burnt for lime in the southern district at Bridgewater and Berridale near Hobart.

The Tertiary limestones are of no great extent and are little utilised.

The quantity of limestone used and the quicklime produced therefrom during the history of the State represents considerable amounts, but unfortunately statistics have not been kept of this industry.

VI INDUSTRIAL PURPOSES

1. Asbestos

Asbestos occurs as veins in serpentine in the northern and western districts but is not being utilised at present.

At Anderson's Creek near Beaconsfield deposits are accessible by road within six miles of the port of Beauty Point on the River Tamar. They have been exploited in the past at various points over a distance of 50 chains and have been proved over 10 chains in width. In the principal deposits the bulk of the fibre occurs from $\frac{1}{8}$ to $\frac{3}{4}$ inch in length. The deposits have been investigated at numerous places by means of deep trenches and shafts; and opened up by quarries of considerable dimensions. Production from 1917 to 1919 amounted to 441½ tons of chrystoline asbestos obtained from the removal of 48,854 tons of rock and the milling of 4,414 tons of selected ore in the form of fibre-bearing rock. Thus marketable fibre represented about 1% of the rock extracted.

Deposits also occur at Asbestos Point on south-western shore of Macquarie Harbour. They are accessible by boat from the port of Strahan in a distance of 17 miles.

Cross fibre asbestos occurs in the form of short, irregular veins, varying in width from one sixteenth to $\frac{3}{4}$ of an inch. The deposit has been opened in various

places by prospecting trenches and asbestos veins proved to exist at numerous points over a distance of 45 chains and up to 5 chains in width. Approximately 266 tons of rock have been excavated and of this amount it has been estimated that 20 tons contained 19.5 % fibre and another 56 tons produced fibre at the rate of 5.2 %.

If the above proportions be proved over an appreciable extent of the serpentine the deposit is likely to be of commercial importance. Further work should be performed to verify these figures and test the serpentine over a larger area before it can be assumed that a deposit of commercial importance exists.

2. Barytes

Barite deposits, in the form of veins and tabular bodies, are restricted to western and north-western districts. It has been mined at several places on a small scale, the total production being 1926 tons. The last production occurred in 1937 when 76 tons were mined and exported to Victoria.

The deposits worked at Beulah and Harford in the northern district and at Madam Howard Plains near Queenstown in the western district have been operated principally owing to ease of access to near by ports. Reserves of ore have not been proved, and for various reasons they are considered to be commercially unimportant.

Of the remaining deposits, those distant from existing lines of transport, that on Mt. Jukes appears to be the most promising. This is situated eight miles south of Queenstown in the western district and consists of a lode 26 chains in length and ranging from 1 to 8 feet wide. Samples taken from prospecting trenches assayed up to 86% $BaSO_4$.

3. Limestone and Dolomite

Limestone of Lower Palaeozoic age (see details under Fertilisers) occur in various centres and are generally suitable for use in industry. Total recorded production of limestone in Tasmania amounts to over 2,500,000 tons. The largest quantity produced annually (296,432 tons in 1939) is that at Melrose in the north-western district, where the stone is shipped to Newcastle for fluxing purposes. Deposits at Ida Bay, south of Hobart are used in the manufacture of Carbide at Electrona for making lime-sulphur sprays; and in the metallurgical process of the Electrolytic Zinc Company at Riston (19,223 tons in 1938). The deposits at Queenstown in the western district are used (6,739 tons in 1939) as flux in the copper smelting operations of the Mt. Lyell Mining and Railway Company, and the Zeehan deposits were formerly used as flux in the lead-smelting industry.

Dolomite occurs in the form of sedimentary beds in the north-western, western and southern districts. Owing to inaccessibility of the two latter deposits those in the north western district only are important. They are situated in the valley of Duck River and vicinity near Smithton, and are accessible by road (62 miles) and rail from the deepwater port of Burnie. The best known deposit occupies a tract of country at least five miles long and 2½ miles wide and extends to a depth of many thousands of feet. The quantity is, therefore, inexhaustible. Numerous analyses show that the magnesia ranges from 19.2 to 22.2 % and lime from 28 to 31.6 %. Silica ranges up to 6.6% and other impurities are low. The purity of the

deposit is such that a company has undertaken tests with a view to manufacturing magnesium compounds and metallic magnesium. With the exception of several road metal quarries, the deposit is undeveloped.

There appears to be possibilities of establishing an industry to manufacture magnesium compounds to supply Australia and other nearby markets. The possibilities are not so good as regards the manufacture of metallic magnesium, as there is only a small demand for it in Australia at present. It might, however, be possible to establish it in a small way in association with the above chemical industry.

4. Silica

Small quantities of silica are utilised from deposits in Tasmania, the total production of which is not recorded. During 1939, 165 tons was exported to Victoria from deposits near Ulverstone, a port on the north coast. In the same year 6,969 tons of silica was used as flux in the copper smelting process at Queenstown by Mt. Lyell Mining and Railway Company.

5. Talc

The talc deposits are not of any great extent or commercial importance, the total production being 110 tons. The last production amounted to 3 tons in 1936.

At Gawler, near Ulverstone a narrow vein occurs up to two feet in width. The talc is fine in grain and nearly pure white in colour. This is the only deposit that has been worked.

At Razorback Mine, Dundas, a large body of talc occurs adjacent to a pyritic tin ore-body. It is fine grained and of a dirty white colour.

6. Sulphur

No deposits of native sulphur are known in Tasmania, but pyrite has been mined at several localities for its sulphur content. The largest deposit occurs at the Mt. Lyell Mine, where it is smelted for its copper, silver and gold contents and also shipped to Victoria for utilisation in the Company's superphosphate works. Reserves of pyrite in Mt. Lyell and South Lyell ore bodies are estimated at 1,620,000 tons with an average sulphur content of 44 %. Development consists of underground workings and large open cut. Production of pyrite concentrates from other ore bodies by Mt. Lyell Mining and Railway Company for the year 1939 amounted to 54,229 tons. From 1931 to 1939 inclusive production was 217,711 tons.

Chester Mine is situated 7½ miles north of Rosebery. It is connected with Emu Bay Railway (63 miles from Burnie) by one mile of tramway. The deposits consist essentially of pyrite in the form of numerous lenses. Reserves amount to 2,800,000 tons containing over 20% sulphur. Possible reserves are large. The deposits are developed by open cuts and adits, and they have been tested by diamond drilling. They were previously worked by Mt. Lyell Mining and Railway Company, the pyrite being shipped to Victoria for manufacture of sulphuric acid. Total quantity exported up to 1913 is given as 36,223 tons

with an average of 37.25% sulphur, the total number of units of sulphur being 1,349,412. Another company is now making investigations and it is probable that the pyrite will be mined in the near future for shipment to superphosphate works in Australia. High freight charges are a possible deterrent.

Large reserves of pyritic ore are contained in the ore-bodies operated by the Electrolytic Zinc Company of Australasia Limited at Mt. Read and Rosebery (see details under Zinc). The mill tailings consisting largely of pyrite are pumped to a residue dam and not utilised at present. Approximately 100,000 tons of residues averaging 23.6 % sulphur have accumulated to date. It is estimated that a like amount will be available each year in the future from which by a light additional treatment a pyrite concentrate could be obtained.

Numerous pyritic lodes occur at Renison Bell on Emu Bay Railway (78 miles from Burnie). They consist of pyrrhotite, pyrite and marcasite and carry a small content of tin oxide. Reserves are large and probably exceed 1,000,000 tons with a sulphur content of approximately 35%. In 1932 about 500 tons of ore was shipped for use in sulphuric acid manufacture.

The following summary indicated the potential reserves of sulphur contained in the deposits referred to above:-

	Sulphur in Tons
Mt. Lyell and South Lyell	712,800
Chester Mine	560,000
Read-Rosebery	350,000
Renison Bell	375,538
Total	1,998,338

VIII CLAYS

Many deposits of clay are known to exist but no investigations of these have been made. Bricks are manufactured from local clays at Hobart, Launceston, Railton and Dover. Tiles are made in both cities, coloured earthenware is also produced in Launceston, and agricultural pipes at Dover. Apart from these the best known deposits are those at George's Bay, Rosevale and Kingston.

Clays overlying the limestone deposits are used at Railton by Goliath Portland Cement Company in the manufacture of cement.

An investigation of clays near Beaconsfield for use in cement manufacture indicated amount available as approximately 4,200,000 tons. As a mix with limestone from the locality (Flowery Gully), the clay was considered suitable for the purpose.

The clay resources of the State are at present unknown and it is recommended that Geological investigation and boring be undertaken to determine the future possibilities.

ACTING GOVERNMENT GEOLOGIST

Mines Department,
HOBART

21st June, 1940