INTRODUCTION

The following account of the Mineral Resources and the Mining Industry of Tasmania has been prepared by the Mines Department at the request of the State Commission, and is intended for distribution in pamphlet form at the British Empire Exhibition, Wembley, England. It is necessarily brief, and should be read in conjunction with the display of Tasmanian minerals, ores, etc., contained in the Australian Mineral Exhibit, and the "spot" maps, photographs etc., used to illustrate that exhibit.

The Mineral Exhibit contains specimens of practically all the minerals, ores, rocks, and other substances referred to in this report. The "spot" maps show at a glance the locality of the mineral deposits and mining fields described herein, and from which specimens have been obtained and are exhibited.

It will be observed that Tasmania possesses deposits of a large number of minerals, ores, rocks, etc., and that the Mining Industry is a valuable one and one which has played a large part in the settlement and development of the State. The industry did not attain any great dimensions until the "seventies", but its initiation occurred at a period of depression through out the State, and its great services have not been fully appreciated.

The principal deposits are distributed as follows:- Copper, silver-lead, zinc-lead, iron and tin (lode) ores occur on the west coast and in the north-western districts; gold and alluvial tin ores are restricted to the north-east; oil-shales occur only in the north west; coal and sandstones are found in the south-east, midland, east, and north-western parts.

Although the production has been greater in the past, and more mines were working, this is the experience in every mining country, and the position of the industry at present does not compare very unfavourably with the past. Some mines have been worked out, while others have proved unprofitable under present economic conditions, but others remain to be found. The principal mines etc. operating at present are - Mt. Lyell (copper); North Mt. Farrell, Magnet, and Round Hill (silver-lead); Mt. Bischoff and Mt. Bischoff Extended (tin); in the west and north-west; Briseis, Endurance, Monarch, and Pioneer (tin); New Bonanza (Lisle) and Golden Gate (gold); in the north-east; Mt. Nicholas, and Cornwall (coal) on the East coast. Numerous other small mines are working, while several large enterprises will commence in the near future.

The State Government has always assisted the industry by the provision of a geological staff, aid-to-mining grants, etc., and more recently by the equipping of an assay laboratory.

The principal officers of the Mines Department staff are:-

Secretary for Mines	W.A. Pretyman
Chief Clerk & Accountant	A.B. Bryan
Government Geologist	A. McIntosh Reid
" "	P.B. Nye M.Sc., B.M.E.
Chief Inspector of Mines	J.O. Hudson
Government Chemist & Assayer.	W.D. Reid (Launceston)

The Mines Department offices are situated in Hobart and correspondence and inquiries should be directed to the Secretary for Mines, Mines Department, Hobart. The most complete information available is given in answer to requests for same.

A large amount of valuable information is contained in the reports and publications of the Geological Survey, copies of which are available at the above address, and also at the office of the Agent-General for Tasmania, Australia House, London.

THE MINERAL RESOURCES AND THE MINING INDUSTRY of TASMANIA

The island of Tasmania contains a large number of minerals and rocks, many of which form deposits of great economic importance. The development and exploitation of these deposits has resulted in the establishment of the mining industry of the State. This industry has proved to be one of the most important and has been mainly responsible for the State's prosperity and development in the past. The total production of minerals, metals etc. since the commencement of the industry amounts to nearly £48,000,000, but this does not include limestone, pyrites, and building stones.

The following table (No. 1) shows the annual production from 1880 to 1922 inclusive:-

TABLE NO. 1

Year	Value	Year	Value
1880	554,031	1903	1,354,044
1881	602,723	1904	1,379,204
1882	556,306	1905	1,729,129
1883	560,873	1906	2,257,147
1884	468,302	1907	2,277,159
1885	518,885	1908	1,650,027
1886	489,966	1909	1,574,995
1887	593,256	1910	1,432,193
1888	616,733	1911	1,349,497
1889	504,718	1912	1,493,502
1890	444,210	1913	1,415,700
1891	528,388	1914	1,007,038
1892	526,909	1915	1,225,575
1893	627,909	1916	1,521,050
1894	732,764	1917	1,584,290
1895	575,692	1918	1,750,574
1896	662,058	1919	1,301,090
1897	1,006,140	1920	1,421,104
1898	1,071,084	1921	822,851
1899	1,660,622	1922	1,013,415
1900	1,888,695	Unenumerated Prior to 1894	31,988
1901	1,763,896		
1902	1,378,406		£47,924,138

The production reached a maximum of £2,277,159 in 1907, and has decreased almost steadily until 1921. However, it began to increase during 1922, and the near future should show a still greater revival.

The total value of the individual minerals and metals produced is given in the following table (No. 2):-

TABLE NO. 2

Mineral or Metal	Value
Gold	£ 7,526,479
Silver-lead Ore	7,109,296
Blister Copper	15,815,600
Copper Matte	133,736
Copper Ore	579,204
Tin	14,243,898
Iron Ore	25,701
Wolfram	173,317
Coal	1,480,894
Osmiridium	278,638
Barytes	6,893
Bismuth	23,052
Asbestos	7,105
Shale	4,633
Iron Pyrites	67,179
Zinc	168,292
Scheelite	112,468
Carbide	135,509
Ochre	256
Unenumerated prior to 1894	31,988
Total	£47,924,138

Copper. The total production of copper ores, matte and metal, amounts to £16,528,540 and exceeds that of any other individual mineral or metal produced within the State. The greater portion of this production has been in the form of blister copper.

The principal deposits of copper ores are those near Mt. Lyell in the West Coast district. These deposits are worked by the Mount Lyell Mining and Railway Company Limited, who treat their ore locally and produce blister copper. The present reserves are given as follows:-

	Tons (Dry)	Copper %	Silver Oz. per Ton	Gold Oz. per Ton
North Lyell Mine	1,000,046	6.0	1.33	0.015
Mt. Lyell & South Lyell	1,647,122	0.5	1.5	0.04

The ore of the North Lyell mine consists of veins and splashes of bornite and chalcopyrite in schist. This deposit has been followed to a depth of 1100 feet, where it is at present being stoped. The Mt. Lyell ore consists of pyrite with low copper, but high gold and silver contents.

Copper ores also occur at the Jukes-Darwin field (adjacent to Mt. Lyell), the Mt. Balfour field, in north-western Tasmania, and the Scamander district, on the East Coast.

The production from these fields has, however, been small; and little or no work is being performed at present.

Tin. The production of tin was formerly greater than that of any other mineral or metal, but in recent years it has fallen below that of copper, silver, and lead. The total production to date is £14,243,898, and this is exceeded only by one other metal, viz., copper.

Tin ore is obtained from two principal sources in Tasmania - primary deposits (including fissure lodes, replacements, etc.) and secondary or alluvial deposits. Cassiterite is the principal mineral occurring in both these types of deposits. Stennite occurs to a much less extent, the principal deposit being that at the Oonah Mine, Zeehan.

Tin lodes occur chiefly in the west and north-western districts of Tasmania. The most important tin field is that of Mt. Bischoff, the principal mine being the world-famous Mt. Bischoff. The deposits here are of the following types - fissure veins, replacement-fissure deposits, greisen veins, and splite dykes. The Mt. Bischoff mine has treated 4,528,689 tons, from which has been obtained 75,979 tons of tin oxide, valued at £5,284,667, out of which £2,539,500 has been distributed in dividends. The richest lodes in the Mt. Bischoff Mine represent replacement deposits in dolomitised pyrozenites.

Other mines in this district are the Mt. Bischoff Extended, Cleveland Mine, and several recently opened in the South Bischoff area.

Other fields on the West Coast are those at Stanley River, Heemskirk, North Dundas, (Renison Bell Mine), and X River.

Lode mining has also been performed in the north-eastern districts, some of the principal mines being the Anchor, Story's Creek, Royal George, etc.

Extensive deposits of alluvial tin ore have been worked in the north-eastern districts. The most important of these are located along the Ringarooma Valley, where they represent Tertiary sediments formed along the course of a former river, and which are overlain, in places, by thick flows of basalt. The principal mines operating along this deep lead have been the Briseis, Arba, Ringarooma, and Pioneer Mines; while large amounts of tin ore have been obtained by smaller companies and parties in the Gladstone District. No figures are available for the district as a whole or for individual mines, but it is certain that about half (£7,000,000) of the total tin production has been obtained from these deposits.

Alluvial deposits are also being worked on the East Coast in the vicinity of St. Helens.

Iron. Tasmania possesses deposits of iron ore of a varied nature in different parts of the island. Very little development of these has, however, taken place and the total production amounts to only £25,701. Many factors, such as the lack of transportation and other facilities, have operated against their development, but with the improvement of these and the extension of the hydro-electric power facilities of the State, a much greater use in the future is probable.

The reserves of iron ore, as computed in 1919, are:-

Blythe River	17,000,000	tons
Dial Range & Penguin	700,000	"
Beaconsfield & Anderson's Creek	1,300,000	"
Long Plain	20,000,000	"
Zeehan District	2,900,000	"
Nelson River	unknown	
	41,900,000	tons

Since the above calculation was made it is reported that the reserves in the Zeehan district have been considerably increased.

The Zeehan and Long Plains (Rio Tinto) deposits consist of magnetite, and the other deposits principally of haematite. The Rio Tinto is probably the most valuable, but is greatly hampered by lack of transport facilities. The Zeehan and Blythe River deposits are next in importance, and are better situated as regards transportation.

In addition, the Hampshire magnetite deposits, recently discovered, and the Paradise and Rocky River bodies, in the western district, contain very large reserves of high grade ore at present not capable of indication by figures.

Zinc. (1) Zinc Ores: Pure zinc ores are not common in Tasmania, but are generally in association with those of lead. The largest reserves of zinc ores are those contained in the Read-Rosebery zinc-lead sulphide deposits which are described below. In addition to the Read-Rosebery deposits, zinc blende is found associated with argentiferous galena in the silver-lead mines of Tasmania, but little or nothing has been done to save the zinc products from these ores. This blende is generally of the black, ferriferous variety (marmatite). At the Swansea Mine, Zeehan, resin blende occurs as an independent vein alongside galena, and contains two per cent. of cadmium.

(2) Zinc-lead Sulphide Ores: Large deposits of these ores exist in the Read-Rosebery district, on the west coast of the island. They occur as a fine-grained and intimate mixture of galena and sphalerite (zinc blende) representing metasomatic replacements of schistose, calcareous beds in the Reid-Rosebery schist series by these minerals. The schist series has been folded by earth movements and two series of folds occur with axes at right angles to each other. The ore-bodies follow the folds and occur as a series of irregular domes and basins.

The reserves are shown in the following table:-

	Amount	Metallic Contents			
	Tons	Gold Oz. per Ton	Silver Oz. per Ton	Lead %	Zinc %
Proved Ore	1,680,000	0.127	9.6	7.4	27.3
Probable Ore	915,000				

There are also possibilities of "prospective" reserves, but these cannot be expressed in figures.

It is probable that development work carried out since the above estimation, has increased the amount of reserves.

The output from these deposits amounts to only 295,737 tons, with a value of £383,416. The slow development of the deposits has been due to transportation difficulties, lack of rich oxidised ores, and difficulty of metallurgical treatment. The Electrolytic Zinc Company of Australasia Limited now own these deposits and experimental work is being undertaken with regard to the metallurgical treatment of the ores, and in the near future their utilisation should commence.

The principal mines which have been operated in the past are the Hercules, Primrose, Tasmanian Copper and Mount Read: of these the Hercules produced 60% of the total output.

(3) Metallic Zinc: The Electrolytic Zinc Company have established a metallurgical plant for the extraction of zinc from its ores by electrolytic processes. Up to the present, the concentrates and calcines used have been brought from Broken Hill, New South Wales, but experimental plants are now being erected at Zeehan to test the Read-Rosebery ores, with a view to their utilisation.

During the past 6 years 28,799 tons of zinc valued at £903,923 has been produced. The plant has recently been enlarged to produce 120 tons per day of metallic zinc, and utilises 30,000 horse power provided by the State Hydro Electric Department.

Lead. The lead deposits of Tasmania consist of argentiferous galena and are largely developed throughout the west and north-western districts. The total production of silver lead ore amounts to £7,109,296 (to which lead and silver have contributed approximately equal proportions) and is fourth on the list among the ores of Tasmania.

The most important fields are those of Zeehan, Dundas, Mt. Farrell, Waratah, and Sound Hill. The Zeehan field was, in the past, the most important producer - the principal mines being the Zeehan-Montana, British Zeehan, Oonah, Zeehan Queen, Mt. Zeehan, Zeehan Western, Florence, Silver Queen Extended, South Comstock, etc. The field contained numerous small, but rich, lodes, none of which, however, persisted below 1000 feet. The principal mine at Dundas was the Comet, while some of the Read-Rosebery Mines, such as the Hercules, produced quantities of silver-lead ore. In the Mt. Farrell and Waratah districts, the largest producers have been the North Mt. Farrell and the Magnet Mines respectively; and, at the present time, these are the two most important silver-lead mines in Tasmania. The Round Hill Mine is the principal mine in that district.

The Magnet lode consists of argentiferous galena, sphalerite, and manganosiderite, representing replacement of an ultra basic dyke, and is being worked at present 1000 feet from the surface. The total production to 1922 is 143,750 tons of ore containing 25,937 tons of lead and 5,923,711 ounces of silver, valued at £1,277,079. Individual productions for other mines and districts are not available.

Silver. No ores of commercial importance containing silver alone have been discovered in Tasmania, but large quantities of silver have been obtained from lead and copper ores. The value of that contained in the silver-lead ores probably exceeds £3,000,000. The Mt. Lyell copper has contained silver with a value of approximately £1,000,000; so that the total production exceeds £4,000,000.

Gold. Gold occurrences are restricted almost entirely to the north-eastern districts where it occurs in both lodes and alluvial deposits. In the past it has been one of the principal mineral products and stands third on the list as regards total production, which amounts to £7,526,479. Gold mining has, however, fallen off in recent years, and the total production will soon be exceeded by that of silver-lead ore.

The most important lode mining districts were Beaconsfield, Lefroy, and Mathinna, others being Mangana, Tower Hill and Mt. Victoria. The Tasmania Mine at Beaconsfield produced 1039,248 tons of ore containing approximately 819,000 ounces of gold, with a value of £3,008,000. The New Golden Gate was the most important mine in the Mathinna district and treated approximately 290,000 tons of ore for 246,000 ounces of gold valued at £950,000. Many mines were successfully operated in the Lefroy district, but the gold values did not extend below 400 feet.

The most important alluvial field has been the Lisle Valley from which it is estimated that approximately 250,000 ounces of gold have been won. Quantities of alluvial gold have also been obtained at Mangana, Mathinna, Lefroy and Back Creek, and the Savage River.

In addition to these, the gold production has been largely augmented by that contained in the Mt. Lyell copper.

Osmiridium. Tasmania has, in recent years, been the largest producer of "free" osmiridium in the world. The total production has been 12,462 ounces, with a value of £278,638. The maximum annual production was reached in 1920 with 2,009 ounces of a value of £77,114, and the present production is below these figures.

Up till the present, the production has been almost exclusively derived from concentrations in alluvial and detrital deposits along the courses of present streams. The source of this osmiridium is deposits occurring in structural planes in serpentine. The particular variety of serpentine in which they occur is that derived from peridotites composed of olivine and bronzite rich in alumina. Very little development has taken place in the mining of osmiridium in these rock formations.

The principal fields are situated in the portion of the West Coast district between Waratah and Dundas, the particular areas being located around Bald Hill, Mt. Stewart, Savage River, and Wilson River.

Nickel. Deposits of copper-nickel ores occur in the North Dundas district on the West Coast, and are the only ones in Australia from which nickel ore has been produced. The ore consists of pyrrhotite, pentlandite and chalcopyrite, and occurs in association with narrow dykes of basic and ultrabasic rocks. The Dundas Cuni Mining Company has produced 1189

tons valued at approximately £60,000. From the Melbourne Copper Nickel Mine 2849 tons of a value of £14,346 has been produced.

Other deposits are known at and near Trial Harbour, Mt. Dundas, Ring River, and Heazlewood.

Titanium. Alluvial deposits containing rutile occur near Abbotsham, Forth, and Arthur Rivers in north-western Tasmania. Ilmenite occurs in similar deposits at Upper Arthurs Lake and at localities around the coast of Tasmania. No development of these deposits has taken place.

Molybdenum. Molybdenum occurs in small quantities at several localities. A small amount has been produced from Mt. Stronach, and from the Squib Mine at Moina, but no deposit of economic importance has been proved, so far, to exist.

Arsenic. Arsenopyrite occurs plentifully in the ore deposits of Tasmania, but not in sufficient quantity to warrant its extraction. Larger deposits are known to exist at Dundas, Mt. Horror and Scamander, but have not yet been proved to be of economic importance. Cassiterite is associated with the Dundas deposit. This is likely to prove the most important of the known deposits. Gold and tin ore are common associates of arsenopyrite deposits.

Sulphur, (Iron Pyrites). 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 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. Cupriferous pyrite has also been mined at the Chester Mine in the North Pieman district. Other producers have been the Susanite and Kynance Mines, Comstock. All the pyrites produced has been exported to the superphosphate works in Victoria. There is also the possibility in the future of the low grade pyritic-cassiterite deposits being utilised for their tin and sulphur contents. Pyrrhotite and marcasite in enormous quantities occur with cassiterite at Renison Bell and Mt. Bischoff.

The production is recorded from 1915 to 1922 as 56,411 tons of a value of £67,179, but the total production probably greatly exceeds this figure.

Tungsten. Both scheelite and wolfram deposits have been located in Tasmania. Scheelite occurs at only one locality - King Island. This deposit was worked between 1917 and 1920 and produced 589 tons with a value of £112,468, but the enterprise had to finally close down owing to the decreased price of tungsten. Wolfram occurs in the Avoca and Middlesex districts. The Story's Creek mine is situated in the Avoca district and produces both wolfram and tin concentrates from the mixed ore by electro-magnetic and other procedures. The principal mine at Moina is the S. & M. Mine, from which tin, wolfram, and bismuth are obtained. Electromagnetic separation is also employed with this ore. Other mines are the Squib, All Nations, Iris, Mt. Pelion, etc. The total production of wolfram amounts to 1267 tons with a value of £173,317.

Bismuth. Bismuth is obtained from the tin-wolfram mines in the Middlesex district. The total production is 74 tons with a value of £23,052. Enormous deposits, but of very low grade, occur at Mt. Ramsay, and fairly rich ore is found at Heemskirk and North Dundas.

Antimony. Stibnite is known to occur near Cox's Bite, Southern Tasmania, and a parcel of many tons has been reported as having been obtained. No deposit of large size is known, but very little attention has been paid to this part of the island. Antimony is a very common associate of lead in the sulphide bodies of Zeehan and Ringville.

Monazite. Monazite occurs in alluvial sands on the Stanley River and on the east coast; also at Yellow Band Plains and other places on the West Coast and at Fraser River, King Island.

Zircon. Zircon occurs in alluvial deposits, the most important being those at Sisters Creek and near Penguin, north-western Tasmania, and near the mouth of the Arthur River.

Gem Stones. Topaz is found in the alluvial tin deposits and also on Flinders Island, the stones from the latter locality being particularly large ones. Sapphires are also found at the former locality, but not in any great number. A few diamonds have been found in the western districts, but no deposits of value have been proved to exist.

The large and good grade zircons are used for gems.

Coal. Coal seams exist in many localities in Tasmania and occur in strata belonging to the Permo-Carboniferous, Trias-Jura, and Tertiary systems. The Permo-Carboniferous strata form the lower coal measures of Tasmania, 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 Trias-Jura 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 reserve of the State.

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

The following statement explains the variation in character and composition of the coal found in the above systems:-

Permo-Carboniferous

Greta Coal Measures:	Kerogenites and Humic-kerogenites
Tomago Coal Measures:	Sub-anthracties and non caking humic.

Trias-Jura

Sub-anthracties and non-caking humic.

Tertiary.

Brown Coals and Lignites.

The total production of coal is somewhat in excess of 2,000,000 tons with a value of approximately £1,600,000. The present annual production is 69,238 tons valued at £61,016. The greatest development has taken place in the Mt. Nicholas area on the East Coast where the principal mines are the Mt. Nicholas Mine and the Cornwall Coal Mines. The Cornwall Coal Mine has contributed one third, and with the Mt. Nicholas Mine, one half of the total production.

The coal reserves calculated on the basis of existing economic conditions, amount to 134,398,000 tons. On the basis adopted by the International Geological Congress, the "actual" reserve is 124,980,000 tons, and the "probable" reserve 123,013,000 tons, with a still further, unknown, "possible" reserve.

The following figures show the analysis, evaporative power, and calorific value of the average Tasmanian coal (Trias-Jura):-

Moisture	4.36 per cent
Volatile Hydro-carbons	21.27 per cent
Fixed Carbon	51.84 per cent
Ash	22.64 per cent
Sulphur	0.60 per cent
Evaporative Power	10.49 per cent
Calorific Value	(5636 calories) (10,145 B. T. U.)

Oil Shale. Extensive deposits of oil shale occur in the 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 a recent estimate of the reserves of this shale is as follows:-

Latrobe-Railton-Kimberley Area	30,000,000 tons
Beulah Area	3,000,000 "
Quamby Bluff Area	3,000,000 "
Nook Area	800,000 "
Oonah Area	6,000,000 "
	42,800,000 "

The average yield of crude oil from these shales is estimated at 40 gallons per ton, and the oil reserve therefore amounts to 1,771,200,000 gallons. Only a small amount of development work has been performed in connection with these shales and it has been mainly in the direction of experimental tests in connection with various types of retorts for distillation purposes.

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.

Limestone. Beds of limestone occur in strata of the Ordovician, Silurian, Permo-Carboniferous and Tertiary systems. The Ordovician limestone is of exceptionally good quality, and is used for a variety of purposes. At Ida Bay, south-eastern Tasmania, it is utilised in the manufacture of calcium carbide by the Hydro Electric Power & Metallurgical Company. At Railton, north-western Tasmania, it is

burnt for the production of quicklime, and is also to be used in the manufacture of cement in the immediate future. At Melrose, also in the north-west, it is quarried and exported to Newcastle, New South Wales, by the Broken Hill Proprietary Company for use as a flux in their iron works.

Silurian limestone occurs in the west and north-western districts, but its sole use so far has been for fluxing purposes at Mt. Lyell and Zeehan. Permo-Carboniferous limestone occurs in the north-east, east, and south-eastern districts. At Maria Island, the National Portland Cement Company are erecting cement works and will use the limestone of this age occurring there. At Bridgewater it is burnt for quicklime.

Tertiary limestone occurs at Table Cape in the north-west and at Geilston Bay in the south-east. The Geilston Bay limestone is utilised by the Electrolytic Zinc Company in their metallurgical processes.

No records of the production are in existence.

Clay. Many deposits of clay are known to exist, but no investigation of these has been made. They are mainly of Tertiary to Recent age, but beds also occur in the Trias-Jura system. Bricks are manufactured from local clays in both Hobart and Launceston; tiles are made in both cities, and coloured earthenware is also produced in Launceston. Apart from these, the best known deposits are those at George's Bay, Rosevale, and Kingston.

Cement Materials. The essential materials for making cement - limestone, clay and fuel - have been described above. These often occur in close proximity to each other, and the conditions are therefore suitable for cement manufacture. Plants for this purpose are in course of erection at Maria Island and Railton.

Asbestos. Asbestos deposits occur at Anderson's Creek near Beaconsfield in northern Tasmania, and consist of veins of asbestos in serpentine. They have been developed by means of quaries and open-cuts, and a quantity of rock and fibre are obtained. The total production is recorded as 3,565 tons with a value of £7,105.

Barytes. Barytes deposits occur in the Jukes-Darwin field near Queenstown on the West Coast, and at Alma, Beulah, and Mt. Roland on the north-west. Barytes has been mined at Queenstown, at Jukes and Beulah and the total production to date is 1,799 tons valued at £6,893. But the largest deposits occur at Mount Block, six miles to the east of Guildford station on the Emu Bay Railway: they are, however, undeveloped.

Slates. Slates of commercial value occur in the Cambro-Ordovician system in at least two localities in Tasmania - Bangor and Arthur River. Bangor is situate 15 miles to the north of Launceston and slates were obtained both by open-cut methods and also underground mining and considerable quantities placed on the market. The other locality is on the east bank of the Arthur River, 12 miles north of Waratah, where slates of value were reported but have not yet been developed owing to the lack of transportation.

Sandstones. Sandstones suitable for many purposes occur in the Ross series of the Trias-Jura system, which are largely developed in the north-eastern, eastern, midland and south eastern parts of the state. These sandstones are specially suitable for building, constructional, and monumental purposes, grindstones, etc. They have been extensively quarried throughout the above districts for the building of houses, particularly in the earlier days of the settlement. In the cities of Hobart and Launceston and the townships throughout the country, the public and other large buildings are chiefly constructed of these sandstones.

They have also been used for bridges, as at Ross, Richmond and Pontville. At Ross these sand stones are specially adapted for grindstones and large numbers of these are exported to Australia. In addition, these sandstones are the principal rocks used for tombstones, headstones, monuments etc.

Granite. Granite outcrops at many localities in Tasmania, but has not been utilised for any purpose. Black and white, or grey, granite exists at most of these outcrops, but pink and red varieties occur at Heemskirk and Gladstone.

Some of the deposits are well situated as regards transportation facilities, and should be capable of being used for building and ornamental purposes.

Paint Materials; Deposits of oxide of iron suitable for the manufacture of paint materials occur at Mowbray, near Launceston; at Abbotsham, near Ulverstone; and near Beaconsfield. The material from these localities has been used successfully by the Serpentine Paint Company and others in the production of paints.

Other possible sources are the calcined residues obtained in the roasting of low-grade pyritic tin ores.

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GOVERNMENT GEOLOGIST.

Hobart, 13th December, 1923.