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NON-METALLIC MINERALS OF TASMANIA

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Production of non-metallic minerals in Tasmania up to the end of 1959 is shown in the following table:—

	Quantity	Value £A
Asbestos (tons)	3,980	17,142
Barytes (tons)	2,205	8,239
Clay (from 1958)—		
Brick (c.yds)	199,132	160,577
Other (c.yds)	47,894	14,219
Dolomite (tons)	16,146	47,599
Graphite (tons)	40	107
Kaolin (tons)	108,284	426,782
Limestone—		
Agricultural and other (tons)	462,087	527,678
Chemical and Metallurgical (tons)	3,978,041	2,123,425
Carbide (tons)	525,606	624,480
Cement (tons)	3,359,713	1,882,679
Ochre (tons)	2,068	5,686
Pebbles (from 1957) (tons)	1,987	15,154
Silica (tons)	155,991	99,540
Talc (tons)	333	1,077

Fuel Minerals:

Coal	(tons)	8,040,414	9,065,569
Oil shale	(tons)	41,572	31,231

Construction Materials:

Building Stones—

Granite (red)	(c.yds)	1,966	33,474
Freestone (from 1958)	(c.yds)	418	2,809
Gravel (from 1958)	(c.yds)	1,317,300	604,066
Sand (from 1958)	(c.yds)	34,942	28,328

Crushed and Broken Stone (from 1958)—

Basalt	(c.yds)	37,722	40,237
Dolerite	(c.yds)	801,801	1,477,962
Limestone	(c.yds)	44,429	57,572
Sandstone	(c.yds)	4,286	1,511
Other	(c.yds)	137,330	122,967

Other Road Materials	(c.yds)	1,000	1,200
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INTRODUCTION

Ever since the first settlements of the Colony, men have quarried and mined to obtain materials from the earth to help to build and develop this country. The early convicts fashioned bricks from clay; burnt limestone to provide their mortar; hewed sandstone and dolerite for buildings, roads and bridges; and deep below the surface mined coal for the citizens of Hobart Town. As the State has grown, so the utilization of these materials has increased and today Tasmania is almost self-sufficient in coal supplies and can export some limestone products.

COAL AND SHALE

Coal is known to occur in rocks of Permian, Triassic and Tertiary age.

In the Permian, coal occurs at two horizons. The Cygnet Coal Measures, near the top of the Permian, probably correspond to the Tomago of New South Wales and bear the fossil plants *Gangamopteris* and *Vertebraria australis*. There are two main seams with indications of two others and the uppermost seam of three feet thickness has been mined to a limited extent in the Cygnet district. The coal is a low volatile type of only fair quality.

The lower coal measures of the Permian, corresponding to the Greta of New South Wales, are better developed in the northern part of the State. In the Mersey Valley where coal is at present mined at the Illamatha Colliery, two seams are represented of which the lower is the more important. The seam is very narrow, sometimes less than two feet but has a very low ash, though high sulphur content. A typical analysis of this coal is:—

	%
Moisture	13.5
Volatile matter	36
Fixed carbon	46
Ash	4.5
B.Th.U.	11,000

Fossil plants in associated shales include *Glossopteris browniana*, *G. ampla*, *G. indica*, *Gangamopteris angustifolia*, *G. cyclopteroides* and *Noeggerathiopsis hislopi*. At Preolenna, at least four seams have

been noted, all of narrow width and dipping at high angles (up to 20°). Because of this there has been no appreciable production, although the ash content is low, and the B.Th.U. value is over 12,000. Sulphur content in this coal is high.

The principal commercial coal supplies, however, are obtained from a series of felspathic sandstones and shales of the Triassic. This series has been variously named the Felspathic Sandstones and New Town Coal Measures and occurs near the top of the Triassic in Tasmania. The chief exploitation of the coal has been in the east of the State in the St. Marys-Fingal-Avoca District but development has also taken place at Seymour, Coles Bay, Schouten Island and Buckland in the east, York Plains and Colebrook in the midlands and Hamilton, Sandfly and Esperance in the south. The earliest operated mines were on Tasman Peninsula and at Hobart. Collieries at present operating are:—

Cornwall Colliery, St. Marys
 Fingal Colliery, Fingal
 Duncan Colliery, Fingal
 Barbers Colliery, Fingal
 Merrywood Colliery, Avoca
 Stanhope Colliery, Avoca
 Seymour Colliery, Seymour
 Llangloh Colliery, Hamilton
 Sandfly Colliery, Kaoota.

Attempts have been made to correlate the various seams and eight have been named in the St. Marys District, but great variations in thickness and in included bands and in roof materials have been noted in individual collieries and faulting and rolling are prevalent so that correlation is difficult. Recent identification of seams by spore analysis may elucidate the seam pattern. Because ash content often exceeds 20% several collieries have recently installed washing plants to reduce this ash content. The coal is generally non-coking, but a seam recently opened by the Stanhope Company yields coal with semi-coking qualities. The general composition of the Triassic coals is:—

	%
Moisture (at 105°C)	2 — 4
Volatile matter	20 — 28
Fixed Carbon	45 — 55
Ash	18 — 27
B. Th.U.	About 10,000

but at Sandfly a low volatile coal contains up to 63% fixed carbon.

Tertiary brown coals occur in the Launceston Basin, in the Upper Derwent region and at Macquarie Harbour but none have been exploited.

In the central-north of the State, principally in the Latrobe-Railton District, a bed of oil shale named "Tasmanite" occurs in rocks of Lower Permian age. These beds are below the Lower Marine and not far above the basal Permian beds. The shale seam averages five feet in thickness and was worked intermittently from 1910 to 1935. Frequent faulting of the seam made mining operations difficult.

LIMESTONE

The principal limestone deposits of the State occur within the Ordovician, Permian and Tertiary Systems and of these, the Gordon Limestone of the Ordovician is the one most widely used commercially. This is a well-bedded rock dark blue to dark grey in colour and usually of high quality, productive beds normally containing more than 90% CaO. The thickness of the formation varies from place to place with a maximum of about 5000 feet. This limestone is used for different purposes in different parts of the State. At Railton in the north, cement is manufactured and, in 1959, 171,000 tons of limestone were used. At Ida Bay in the south, 22,000 tons were quarried in 1959 for the manufacture of calcium carbide. At Flowery Gully in the north, limestone is quarried for use in the aluminium and paper-making industries. For the manufacture of bleach liquor, the Australian Newsprint Mills obtain limestone from the Florentine Valley. From their own quarries at Queenstown, the Mt. Lyell Mining and Railway Company produce about 5000 tons annually for use as a flux in smelting and as burnt lime in their flotation plant. Limestone from quarries once worked by the B.H.P. at Melrose, is crushed for agricultural purposes. Gordon Limestone is still burnt in small kilns at various localities for the production of CaO.

Permian limestones, although widely spread over the eastern part of the State, are not largely used commercially because of their poorer quality. A quarry operates near Hobart for the production of road metal and aggregate; cement was once manufactured from Permian limestone at Maria Island, and this limestone has been burnt in various localities. Although limestone occurs at three different horizons in the Permian its greatest development occurs in the Berriedale Limestone where a maximum thickness of 250 feet may be obtained. The CaCO₃ content of the limestone may reach 80% but generally it is low and very variable from bed to bed.

Tertiary limestone is more limited in extent, occurring mainly in the Bass Strait Islands and the Far North-West. In the latter locality, there is a large percentage of magnesium carbonate and the beds range up to 100 feet in thickness. On King Island, the beds are thin but high in CaCO₃. On Flinders Island, where limited quantities have been used for agriculture the beds are thicker but very variable in CaCO₃ content.

On King Island, Recent lime-sands are used for agricultural purposes, while near Smithton, a deposit of fine friable calcium carbonate, probably deposited from hot springs, is used for agricultural lime.

At Smithton, dolomite of Precambrian age is crushed for use in agriculture.

ASBESTOS

Asbestos deposits occur in many parts of the north and west, but little production has taken place and some 4000 tons have been produced from two localities, Dundas and Beaconsfield. The principal variety of asbestos is crysotile occurring in serpentine of Cambrian age.

BRICK-MAKING MATERIALS AND CLAY

In Tasmania bricks are manufactured from crushed rock rather than clay and several rock types are suitable. In Hobart, shales of the Knocklofty Series of the Triassic are used, but experiments with Permian siltstones have proved satisfactory. At Burnie, a weathered basic intrusion of probable Cambrian age and at Dulverton weathered Permian siltstones are used. In the Launceston area, however, bricks, tiles and pipes as well as pottery are manufactured from Tertiary lacustrine clays. The Goliath Portland Cement Company utilizes the clay overburden of the limestone deposits for cement manufacture.

Fine white kaolin is used in paper manufacture at Burnie. Until recently a large proportion of this clay came from the Endurance Mine in the north-east and Surges Bay in the south, but the latter works have now closed. The kaolin from Endurance is from weathered Devonian granite while the Surges Bay deposit consists of a Tertiary alkali syenite, weathered in situ.

SILICA

The Mt. Lyell Company obtains silica for use as a flux from its quarries in Silurian quartzites at Queenstown. Some years ago, ferro-silicon was manufactured at Electrona from Precambrian quartzites obtained at Hastings. Good deposits of these quartzites also occur at Forth in the north.

BAUXITE

During the early and mid forties, preliminary testing of bauxite deposits at Ouse and St. Leonards revealed deposits of the order of 800,000 tons averaging 40% Al_2O_3 . Minor deposits are also located at Swansea, Campbell Town and Myalla. This bauxite has been derived from Tertiary basalt or Jurassic dolerite. No production has yet taken place.

GROUND WATER

Underground water supplies may be obtained from practically any rock in the wet western portion of the State. In the dry midlands and south-eastern areas the best aquifer is Triassic sandstone. One artesian bore at Spreyton, near Devonport, yielded water at the rate of 360 gallons per minute from gravel beds covered by 400 feet of Permian mudstone.