

PAINT MATERIALS PROCURABLE IN TASMANIA

Consideration of the materials used in the production of paint shows a very wide range, in which are included the following, produced or occurring within the State:-
Ochres, Barite and Titanium minerals.

1. Ochres are clayey oxides of iron ranging in colour from buff through brown and brick red to deep red. The largest deposits are decomposition products of basalt, dolerite, and magnetite-rich serpentines. In some places the decay of hematite leads to the formation of ochres; in others rich red ochres are derivatives of pyrite, which, altering to iron sulphate, is ultimately converted into hydrous oxides of iron.

Ochres are sold at £3 to £4 per ton delivered into trucks at the nearest railway station. They are excavated in open-cuttings as a rule.

Red and yellow ochres occur at several localities in Tasmania, and information in connection with each of these is given below:-

Mowbray - This deposit occurs about 3½ miles north of Launceston and is exposed near the top of Paint Mine Hill north of Mowbray. The hill is a flat topped one, and the surface seems ochreous for a width of from 300 to 400 yards from east to west. If we assume that the ore body is continuous from the summit to the northern end of the hill, its horizontal dimensions would be about ½ mile long by, say, 300 yards wide. Enough work, however, has not been done to enable the superficial area of the deposit to be estimated properly, nor is its thickness known. It is highly probable that it does not extend vertically to the horizon of the base of the hill (150 feet), but follows a contour of hard rock at a certain depth below the surface. A few hundred feet of trenches and other excavations have been cut at the top of the hill, exposing red and yellow ochres of workable quality, but no cuttings are deeper than 5 or 6 feet.

Taking the evidence of all these trenches together, it may be said that they indicate the existence of a more or less continuous body of ochre within the limits above mentioned. From all appearances there is sufficient to supply the requirements of works for many years (W.H. Twelvetrees 1917).

Samples treated in the Geological Survey Laboratory gave the following results:-

	Red Ochre %	Yellow Ochre %
Iron Sesquioxide	45.28	42.46
Alumina	13.72	8.78
Silica	32.40	39.52
Magnesia	1.84	1.50
Lime	0.90	2.28
Water	5.60	5.80

The specific gravity was 2.76 in the sample which was examined, this will vary slightly with the varying composition of the pigment.

With a specific gravity of 2.76, the weight of a cubic

yard of the ochre will be approximately 2 tons, dry.

The quality of the material naturally varies from point to point, but the general composition is considered by paint experts to be such as will absolutely satisfy manufacturers' requirements.

This statement has been borne out by the fact that the Serpentine Paint Company drew a large proportion of their supplies from this deposit. All the opinion which can be gathered up to the present goes to indicate that the Mowbray deposit is composed of ochreous oxides, which are both chemically and physically suitable for making paste and mixed paints of the highest degree of excellence.

Abbotsham - At Abbotsham several miles to the south of Ulverstone red oxide derived from basalt occurs. It is stated to be of good quality and considerable quantities of the material have been forwarded to the Serpentine Paint Coy., Launceston, who have used it in the manufacture of their products.

Beaconsfield - The Serpentine Paint Coy. hold a 20 acre mineral lease in the Andersons Creek district, on Scotts Hill, to the west of Beaconsfield. The hill consists of soft red and yellow limonite, resting on and derived from serpentine rock. The oxide forms a bedded or blanket deposit of essentially the same nature as that present on Mt. Vulcan to the south.

An open drive has been cut from the west side line of the 20 acre section in a south-easterly direction into the hill a length of 250 feet. The maximum depth attained in the course of this drive is 25 feet, and the deposit has been tested to a further depth of 14 feet, making about 40 feet thickness proved. In driving further into the hill this thickness will increase. As the deposit is a bed, and not a lode, its width is not limited to the width of the cutting, and far greater quantities will be obtainable than are likely to be required by the present enterprise.

The variety of permanent oxide colours in the material is striking, for yellow, red, green and brown are elements of the colour scheme presented by the components of this bed. These metallic oxides form the basis of the iron pigments of commerce. Among the chocolate and dark red varieties are to be found some of the most stable types of ferric oxide. Native oxides unlike manufactured or calcined materials, possess the character of permanency, and, with suitable blending lend themselves to the preparation of pigments with any desired degree of opacity and staining power.

The following is an analysis of the raw oxide from the cutting:

Ferric oxide	75.78	<u>Per Cent.</u>
Alumina	4.95	
Silica	5.25	
Chromic oxide	3.62	
Sulphur	0.09	
Phosphorous	trace	
Loss of ignition	<u>9.96</u>	
	<u>99.84</u>	

Queenstown - A reward claim was granted for ochre a short distance to the south of Queenstown. The material is a brownish red colour and appears to be a heavily stained product rather than a pure oxide of iron. Further investigation of the material would be necessary to determine its suitability for paint. This section is not leased at present.

2. BARITE -

No barite has been produced in Tasmania since 1922, the main reason being the high cost of transport to mainland markets. Inquiries, however, have been received of late from paint manufacturers in Sydney and Melbourne.

The principal uses of barite (barium sulphate) are in the manufacture of pure white pigments such as lithopone, a mixture of 70 per cent barium sulphate and 30 percent zinc sulphide, which is used extensively as an inside paint, as a filler in rubber goods, linoleum, oil cloth, window shades, and paper. Pure barite is put to similar uses. Barite has recently come into use in the manufacture of titanox, an intimate mixture of barium and titanium compounds, which has uses similar to those of lithopone. The pigment combining barite with titania (TiO_2) is produced in two strengths, one containing 25% TiO_2 and 75% $BaSO_4$ and known as standard titanium white, the other containing a lower proportion of $BaSO_4$ and known as extra titanium white. Its hiding power is much greater than any other known white pigment, being twice that of white lead of good brightness. It is also non-toxic and is not readily absorbed into the system.

The old method of refining barite was by roasting it with charcoal, thereby reducing the sulphate to the sulphide condition, then dissolving in hydrochloric acid, and precipitating with sulphuric acid.

A new process, described in the Engineering and Mining Journal Dec. 1927, has of late been evolved, which, it is claimed, is superior to the old method, and is, therefore, thought to be worthy of record. It depends on the property of molten sodium chloride (common salt) of dissolving and holding barium sulphate in solution to the exclusion of other minerals. The barium sulphate is then separated from the salt by the simple operation of dissolving out the salt in water, which leaves a pure and incidentally white precipitate and in the finest desired physical condition. This results in the most desired product. All the tests made with various grades of ore, including those contaminated with galena and sphalerite, yield uniformly good results and a product better than that obtained by any other process. Incidentally no grinding, acid treatment, nor any other operations are required on the product after precipitation, washing in clean water and drying. Estimates on the cost of production include a considerable saving over other methods of producing finished barite from ores of inferior grades.

All the barite deposits of Tasmania are contained in the so called porphyroid intrusives of Ordovician age.

The most important of the known deposits are those of the following areas:-

Mt. Block - Extensive deposits of barite are reported at this locality. No known development work has been performed and no information as to quality etc. is available. These deposits are situated some 8 miles south-east of Guildford station.

Alma - Alma is situated seven miles to the south of Leith on the north coast. Describing the Alma mine in 1909 Mr. Twelvetees (Geological Survey Bulletin No.5) states -

"A good deal of barite exists on the property. About 100 yards up the creek from the Devonport tunnel a broad belt of slate is exposed in the bed of the stream carrying bunches and veins of barite for an aggregate width of over half a chain. Much of this appears to be crystalline and pure. In other parts it is stained superficially by iron bearing solutions percolating from the creek banks. About 100 feet up the hill to the east a cut for 10 feet has been put across a rather solid outcrop of barytes, a little discoloured by iron oxides, but not sufficient to spoil it for exploitation. A sample assay in the Government Laboratory showed the iron contents to be only 0.9 per cent."

Jukes-Darwin District - This deposit is situated on the Inter-colonial Spur between Mounts Jukes and Darwin. It consists of a vertical lode varying in width from 1 to 8 feet and averaging $3\frac{1}{2}$ feet over a length of 26 chains. Picked samples assay up to 97% BaSO_4 and bulk samples average 80% to 86%.

This deposit was last worked by the Electrolytic Zinc Company, but the lease is not held at present.

Queenstown - An 80 acre section was granted as a reward claim for barite at a distance of $1\frac{1}{2}$ miles North West of Queenstown. It was worked by the Colonial Barium Company and later the Tasmanian Barium Company during 1916 to 1920, the total production being 908 tons which realised £2673. The lode is stated to be 5 to 6 feet wide. The section was last held at 4016/M but is now vacant.

Mt. Roland - This deposit is situated close to the Sheffield-Paradise road on the northern foothills of Mt. Roland. The barite is almost pure white in colour, though in parts there is a slight brownish discolouration. Tests made show that it contains very little impurities. The ore occurs in bands up to 1 foot thick in a lode formation 5 to 6 feet wide. Very little development work has been carried out; therefore it is impossible to estimate the value of the prospect.

It is reported that another barite outcrop has been discovered at the base of Mt. Roland, half a mile to the south west. This is undeveloped and appears to be a parallel lode.

There are here all the facilities required for cheap production. The lode may be operated by tunnelling; there is an abundance of mining timber; and it is easily accessible; therefore it should be possible to deliver the ore at the market at a cheap rate.

Minnow - Barite occurs 1 mile east of Minnow township. The lode was 7 to 16 inches wide at the surface and is stated to be $3\frac{1}{2}$ feet at its widest portion. The ore is dense crystalline barite with a small amount of sulphides, the pure barite assaying 97% BaSO_4 . A small amount of mining work was performed some years ago and 50 tons sent away.

Harford - Barite has also been found at this locality, but as far as known the quantity is small.

Other barite deposits have been reported from Linda Valley, Frankford, Francombe's property near Beulah,

Pinnacles Hills and Higgins Creek near Huskisson River.

3. TITANIUM BEARING MINERALS -

Ilmenite, an oxide of titanium and iron, is coming into more extensive use in the manufacture of paints and of cements. Titanium oxide is produced from ilmenite or rutile (TiO_2) by the following process:

The ore is pulverised to 200 mesh, mixed in equal proportion with sulphuric acid, and heated to a temperature between 120° and $250^{\circ}C$. During the heating a violent reaction occurs and a basic sulphate of titanium and iron are formed. On cooling the mass sets to a hard cake which is crushed and treated with water. The iron in the resulting solution is reduced to the ferrous state and the titanium oxide precipitated by hydrolysis. The oxide is then washed and calcined.

Before the solution is hydrolysed it is customary to add an extender, which usually consists of finely divided barium sulphate and is added as a wet pulp. The titanium oxide precipitates into the barium sulphate and becomes intimately mixed with the grains. On heating and dehydrating the mixture is found to be uniform and it is suggested that the pigments so produced consist of inter-crystallised TiO_2 and $BaSO_4$, or that titanate and other compounds have been formed.

TITANIUM BEARING CONCENTRATES - Concentrates containing titanium are not produced in Tasmania at the present time.

RUTILE DEPOSITS - The two most important localities are Claytin Rivulet in the north, and the Lewis and Hudson River valleys near Low Rocky Point on the West Coast. Other localities are Browns Plains (north west), Rocky Cape and Penguin River, (north) Moorina (north east) and Lymington (south).

In the northern, north western, and western districts, the rutile is found in alluvial deposits. Pre-Cambrian schists occur in the immediate vicinity of the alluvial deposits and the rutile appears to have been derived from these schists. In the Lewis and Hudson River Valleys the rutile occurs in quartz sands associated with smaller amounts of cyanite and almandite. The value of the sands is not known but an analysis of clean rutile concentrates gave a result of 99.2% titanium dioxide.

ILMENITE DEPOSITS - Ilmenite occurs at many localities in Tasmania. It is found almost entirely in alluvial deposits associated with other metallic minerals such as cassiterite, chromite, picotite, magnetite etc. At the Mount Ramsay bismuth Mine, it was stated to occur fairly abundantly in a horn blende rock. The chief localities are Naracoopa, (King Island), Blue Tier, Denison and Georges Bay (north east), and Blythe River and Mt. Claude (north), Dundas and Heazlewood (North west), Arthurs Lake (central) and Lymington (south).

The Naracoopa Deposits occur at the mouth of the Fraser River and contains ilmenite, cassiterite, gold, monazite, molybdenite, etc. the ilmenite and cassiterite being the most plentiful minerals.

This deposit was worked for tin being known as the British Flag Tin Mine. J.B. Scott in 1927 reported as follows:

"The deposit consists of a mixture of sea sand, ilmenite and zircon sand in varying proportions with which is associated small quantities of tin oxide and gold. On the sea shore to the north side of the mouth of the Fraser River ilmenite sand shows up prominently along the beach for approximately a distance of a mile. It is most abundant near the mouth of the river, diminishing in quantity in that direction. The distribution of the ilmenite sand in the sea sand is irregular but is most abundant along the inner portion of the low terrace above described. The enriched portion appears to be about half a chain in width lessening towards the sea shore. The depth of the deposit varies slightly, its average being about 8 feet. The surface is but six feet above high water mark. The highest assay in TiO_2 from the most finely divided material of the magnetic product of the sand is 44.88%. The results of some tests carried out on the black sand are appended below."

	<u>Magnetic Product</u>	<u>TiO₂</u>	<u>Fe</u>
On 60 mesh	3.12%	11.80%	6.93%
" 80 "	29.68	30.16	14.10
" 100 "	34.37	43.52	21.53
" 120 "	20.32	44.56	26.23
Through 120 mesh	12.51	44.88	33.66

The land is held under lease 9620/M at present in the name of J. McK. Bowling.

The Arthur's Lake deposit consists of ilmenite and quartz sand and is situated to cover the floor of the upper lake. An analysis of a clean ilmenite concentrate yielded 25.75 titanium.

The other deposits generally occur as alluvial ores along the courses of the present streams.

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