

CLAY AND SAND DEPOSITS OF TASMANIA

There are in Tasmania mineral deposits of considerable magnitude and value which are at present either not being worked, or are being worked on a scale incompatible with their importance. This applies especially to some of the non-metallic minerals, such as clays and sands. As no extensive investigations have been carried out with regard to the foregoing, this report only deals with the matter in a superficial way.

CLAYS -

For the clay industry three main descriptions of clay will be utilised:-

- (a) The kaolinic or silico felspathic clay proper to the granite districts which are suited for the manufacture of china, granite ware, and fine pottery generally.
- (b) The next class for pottery work is the fireclay of the coal measures. It is silicious in nature, but not always refractory. This clay can be used for making firebricks and coarse pottery.
- (c) A third class of clay for manufactures is found in the Permian and Tertiary strata, in which beds of clay are worked for the manufacture of common bricks, tiles, drain-pipes, etc.

CLAY DEPOSITS -

1. A stratum of clay of the first mentioned type may be seen along the eastern shore of George Bay (east coast of Tasmania) exposed about high water level and a few feet above it.

Further inland are hills of drift and gravel, consisting of quartz wash and grit overlying beds of light drab felspathic clay similar to that exposed along the shore line. The light grey colour points to the absence of ferruginous impurities and crude tests show the product to be white after burning. It is dense and tenaceous, and the air shrinkage, it is thought, would be constant. It would appear to be quite suitable for high-class pottery, and could be utilised for more than one grade or variety of stoneware.

Several bore holes have been put down, the deepest being 32 feet 6 inches in pure clay of a uniform drab colour, and not bottomed. It seems clear that the clay is a horizontal bed, and does not rise with the hill, for bores and holes have been sunk high up on the hillside passing through wash and quartz drift down to the clay bottom.

In the granite country, of north eastern part of the State, deposits of similar clays are known, particularly those in the wash filling the channels of the ancient leads of the previous Ringarooma River and its tributaries.

2. In the second class a deposit of clay near Kingston, twelve miles south of Hobart, may be cited. This area is situated  $\frac{1}{2}$  of a mile south west of the Kingston Post Office, and is reached by means of the Tinderbox Road which deviates from the main Hobart-Margate road a little west of Kingston.

The land surface rises rapidly from the River Derwent and attains an altitude of 590 feet on the top of the hill, on the north western side of which the clay outcrops.

The clays here appear under two sets of geological conditions:-

- (a) Several strata of siliceous mudstones are found interbedded with sandstones of Triassic Period, and at the outcrop appear in the unconsolidated condition as white plastic clays.

Some of these clays are of a fine texture, while others again are of a gritty nature.

Above and below the white clays are beds of clay sand or softened sandstone formed by the partial disintegration of the sandstones in which they are formed. The actual extent of the clay and clay sand over the area has not been proved.

- (b) The subsoil throughout most of the district is represented by fine plastic clays which are coloured in different shades from yellow to brown and buff.

A number of bores have been sunk near the line of outcrop of the deposits, two examples of which are here tabulated:

Sample No.	Strata	Thick-ness	Depth
	Sandy soil	1'0"	1'0"
	Fairly white sand	1'6"	2'6"
	Yellow clay sand	1'9"	4'3"
No. 4	Stiff blue clay	4'0"	8'3"
	Yellowish red clay sand	0'6"	8'9"
No. 7	Light brown clay inter- persed with white	3'0"	11'9"
No. 6	Creamy white clay	2'0"	13'9"
No. 5	White Clay	1'0"	14'9"
	Yellow clay sand (not bottomed)	6"	15'3" total depth

Sample No.	Strata	Thick-ness	Depth
	Sandy soil	0'9"	0'9"
	Sand	0'9"	1'6"
	Hard cemented sand	0'9"	2'3"
	Yellow sand	2'0"	4'3"
No. 12	Gritty white clay	2'0"	6'3"
No. 11	White Clay	5'0"	11'3"
	Yellow clay sand (not bottomed)	3'0"	14'3" total depth

Analyses of a number of the clays have been made by the Chief Government Chemist and Assayer. The results of those showing sample numbers above are as follows:-

CONSTITUENTS	Per Cent.					
	Sample No.4	Sample No.5	Sample No. 6	Sample No.7	Sample No.11	Sample No.12
Silica	73.36	63.60	65.00	75.00	59.20	70.80
Ferric Oxide	3.60	1.91	1.78	3.07	3.86	2.71
Alumina	16.20	24.89	23.72	15.83	28.50	19.49
Titanium oxide	0.40	0.60	0.70	0.70	0.60	0.60
Lime	NIL	NIL	NIL	NIL	NIL	NIL
Magnesia	0.7	0.14	0.21	.14	0.07	0.07
Loss	6.50	5.80	5.60	5.00	6.00	6.90

For some years the clay sands from this area have been used for a number of different purposes. The chief use has been for the manufacturing of scouring bricks for cleaning woodwork and stained metal, and also for whitening door steps. Cold water paints, whitening, and blocks for cleaning white shoes have in the past been made from the white clays.

Pottery, earthenware, firebricks and other such like articles are other purposes that might be considered in dealing with some of the clays exposed in the bores put down.

3. Clays of the third type abound in Tasmania and are being used in all the main centres for brick making etc. The clays of the Launceston Tertiary basin are a good example embracing as they do every variety in quality from brick earth to pipeclay, and are spread over a wide area.

#### SANDS -

A systematic investigation of the sands of Tasmania has not been attempted but data relating to a few deposits which lie within easy reach of lines of transport have been collected and recorded.

1. Tamar Area - The area included in the investigation along the west banks of Tamar River, in the north of the State, reaches from Deviot to Beauty Point, a distance of 10 miles, and extends back from the river half to one mile.

The various unconsolidated materials which make up these deposits consist of white quartz sands and white clays. The thickness of these deposits has not been determined at many points. A large number of pits have been sunk through the uppermost layers of sands (6 to 22 feet thick) to the first bed of white clay, but exploration below the clay has not been attempted.

The sands consist of a fine white quartz interbedded with layers of coarse subangular to rounded quartz of average pea size; well assorted and containing little clayey material and organic matter.

In places the sand is partly cemented by oxides of iron and contains more clay than usual.

These sands are adjacent to Tamar River along parts of the terraces which mark a former level of the river before it had cut down to the present bed. The terraces (200 to 400 feet above sea level) are not continuous, furthermore they carry sand in a few localities only, therefore they are not very extensive and are not more than a mile wide and a few miles long.

The best examples of these alluvial sandcovered terraces are to be found at Deviot and between Beaconsfield

and Beauty Point.

A table of chemical analyses of sands taken from several points in the district is given hereunder:-

Texture of sand	Silica	Ferric Oxide	Alumina	Lime	Magnesia	Ignition Loss
Fine	96.88	1.08	2.08	NIL	trace	0.16
Medium grain	96.80	0.96	1.40	nil	trace	0.24
Coarse	96.64	1.56	1.64	nil	trace	0.12
Coarse to fine	95.84	1.86	0.46	nil	0.97	0.28

The following is a granulometric analysis of the same sands tabulated above:-

Mesh	Fine		Medium grain		Coarse		Coarse to fine	
	Per cent	Cumulative %	Per cent	Cumulative %	Per cent	Cumulative %	Per cent	Cumulative %
Retained on 10	1.76	1.76	17.2	17.2	36.8	36.8	50.0	50.0
" " 20	2.61	4.37	12.2	29.4	22.5	59.3	23.2	73.2
" " 30	2.61	6.98	6.5	35.9	6.7	66.0	12.4	85.6
" " 40	2.46	9.44	2.9	38.8	2.0	68.0	2.0	87.6
" " 60	18.73	28.17	15.2	54.0	6.4	74.4	2.36	89.96
" " 80	38.52	66.69	22.8	76.8	9.1	83.5	2.4	93.36
" " 100	4.58	71.27	2.0	78.8	1.9	85.4	0.76	94.12
" " 120	16.47	87.74	11.0	89.8	4.8	90.2	2.0	96.12
" " 200	12.21	99.95	9.6	99.4	8.2	98.4	3.88	100.00

The study of the sands available in this district makes it clear that they are quite suitable for use in concrete and other uses in the building trade. Some of the sands may be used for glass making, especially those of high silica content and of medium grain size.

Sands from these deposits have been used with success in foundries for moulds of castings, and articles for household use have been manufactured from them with the addition of other necessary ingredients.

2. Kingston Area - In places just under the surface soil are here found accumulations of fairly white sand. This has apparently been formed into banks of varying depths by the action of the wind, after disintegration from surrounding sandstones.

The largest sand deposit in this district extends over an area of  $3\frac{1}{2}$  acres. The depth varies a great deal at different points but as far as ascertained is never more than eight feet at any one point. The sand in question is very white in colour, of medium fineness and somewhat sharp in grain. The approximate reserve of economically workable white sand is 20,000 cubic yards. This sand is at present being used for a number of purposes in the building trade. Its pure whiteness makes it eminently suitable for plastering work.

For concrete and cement mixing the absence of salt in its content puts it in a class above beach sand.

Classified by the use of wire woven sieves the white sand gave the following results:-

	<u>Per Cent.</u>
Retained on 30 mesh sieve	0.40
" 40 " "	1.80
" 60 " "	31.50
" 80 " "	33.50
" 100 " "	14.10
" 120 " "	5.80
Through 120 " "	12.00

By analyses the white sand gave the following composition:-

	<u>Per Cent</u>
Silica	95.80
Ferric oxide	2.29
Alumina	0.31

3. Wynyard Area - In the Wynyard (North west Coast) Tertiary formation is a member consisting of even-grained glass sand of extreme fitness. The thickness of this bed has not been determined but it has been penetrated to a depth of five feet. The sand grains pass through a 65 mesh screen and the greater part through 100mesh.

Analyses show the following composition:-

	<u>Per Cent</u>
Silica	99.5
Alumina	0.12
Lime	0.06
Magnesia	0.03
Iron Oxide	0.05
Organic matter	0.32

4. Blythe Area - Silica deposits of recent origin have been found in several localities in Northern Tasmania, the best being the Blythe beach sands. These beds, 6 to 8 feet deep, are traversed by the North Western Railway. Their extent has not been determined by the Mines Department. The sands consist of sub-angular quartz grains, rounded grains of chert, rounded hardened clay, with also a little organic matter. The chemical composition of the sand is:-

	<u>Per Cent.</u>
Silica	96.52
Ferric oxide	1.42
Alumina	1.37
Lime	0.52
Magnesia	0.29
Organic Matter	0.16

Classified by the use of wire woven sieves, it was found that 44% was retained on 20 mesh sieve, 32% was retained on 30 mesh sieve, and 24% passed through the 30 mesh sieve. The sands are used for building and constructional purposes and it is considered that they are suitable for the manufacture of glass bottles.

CONCLUSION -

Up to the present no attempt has been made by the Mines Department to obtain statistics relating to the production of sands and clays. The total amount of sand used in building and other construction works is large, and last year a few hundred tons of sand was shipped to Melbourne from Beauty Point.

Sand is used here for mixing with cement in the manufacture of pipes for drainage purposes, in addition to its many other applications. Some years ago a glass factory was erected in Hobart, but the plant was not put into operation owing to industrial troubles.

Sands are distributed throughout all quarters of the island, the better known deposits being at Kingston, Derwent Valley, Deviot, Beaconsfield, Beauty Point, Blythe and Wynyard.

A company (Cementoid Construction Coy.) has been formed for the manufacture of cleansing materials from the Beaconsfield sands and at Kingston such articles have been manufactured for many years and considerable exports have been made to New Zealand.

The chief products of clay are bricks, tiles, pottery, drain pipes and sewer pipes. Manufacturers of those articles have works at all important centres, the production being limited to domestic requirements. Some of the most important beds of clay are members of the Tertiary formation; others, like the peculiar black clays of Cape Barren Island, are of recent age; and valuable fire-clays are interbedded with Trias-Jura coal seams. Crockery has been made of kaolin or china clay from the Tertiary Valley and other localities. The black carbonaceous clays of Cape Barren Island are worthy of careful investigation. On heating the carbonaceous matter disappears, leaving an almost pure white clay of very high fusion point.

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