

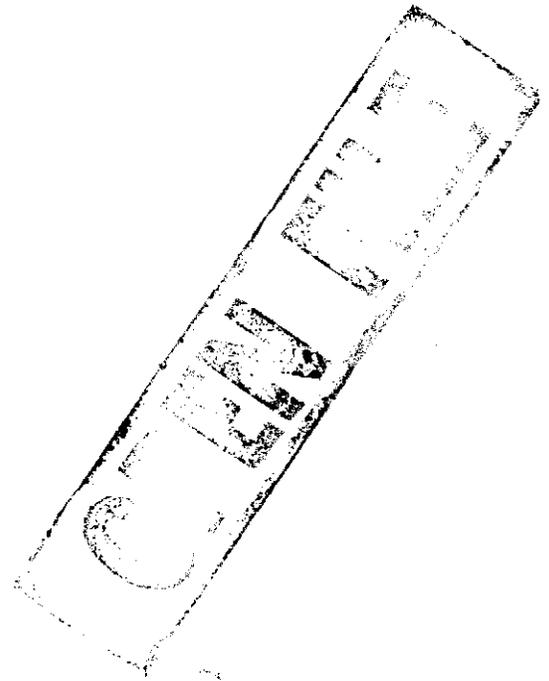


870001

SEMESTER REPORT ON EXPLORATION

WESTERN JUNCTION EL 4/76

81-1632



TASMANIA DEPARTMENT OF MINES

870c.

Sept 1/00  
Semester Report on Exploration Licence Western Junction EL 4/76

granted on 8th March, 1976 and expiring 5th September, 1976.

Licence Holder: J.C. van Moort

7 Crelin Street,

BATTERY POINT 7000.

Condition of Licence: to explore for non-metallic minerals (in this case kaolin)

Location: immediately east of Launceston airport, at Breadalbane

Schedule: Land District of Cornwall - Vicinity of Western Junction  
6 square kilometres

Commencing at the northern corner of part of 130 ac located to G. Jubb thence 850 metres southwesterly and 850 metres southeasterly to the southern corner of 100 acres located to E. Wooley 600 metres again south westerly and 800 metres again southeasterly to the southern corner of 280 acres granted to J. Atkinson and H. Jennings thence 2200 metres again southeasterly in two bearings to the western corner of 38 acres granted to J. Aitkens and others, 625 metres northeasterly and 275 metres again southeasterly to the eastern corner of 38 acres aforesaid, 1875 metres again north easterly to the Lower White Hills Road and 3600 metres or thereabouts generally northwesterly by that road to the point of commencement. (see also fig. 1)

Joint Effort: much fieldwork was done together with Mr. P.J. Davis, 49 Fitzroy Crescent. Mr. Davis did all the ceramic testing.

Choice of Licence Limits:

To the west of the area is a basalt plateau, to the east the clays are too sandy, to the north they are too rich in lime and to the south they are too rich in lime or too rich in sand, or covered by Tertiary overburden.

Maps:

Longford A2, (1949) Scale 1: 15840. The Longford map is one of the most detailed regional maps ever produced in Tasmania. The mapping branch of the Lands Department has unfortunately thrown out the ageing original material and the map is no longer available. I possess one of the few remaining copies.

Geological Map: Longford, sheet 47 of the Geol. Survey map of Tasmania, 1 inch to the mile. (F. Blake, geologist)

Air Photographs: Lands Department Project F403, Film T634, Neg. No. 55, Enlarged by 5.0 x. Resulting scale about 1: 7500. (South Esk, Run 6, T496, 72/73)

Farmers potentially involved: Taken from Title Map Cornwall 3A and Evandale Municipality ratepayers list.

CORNWALL 3A

- 118 Kirkdale Lodge - Hogarth, William, Stuart Estate
- 120 Springvale - Chugg, Frank and Leslie
- 121 Trafalgar - Hart, H.G.
- 121A Willowdene - Francombe, R.W.
- 126
- 131 Glenard - Gee, Edwin Albert

- 132 Everton - Mann, Bruce David
- 133 Glenand - Chugg, Allan Richard Aubrey and George John and T.R. Chubb
- 134 Everton - Gardner, Reginald Edward
- 135 Barbrook - Lindsay, David Archibald
- 136 - Chapman, Oliver Charles and Jean Tasme
- 137 Burn Bree - Lindsay, David Archibald and Patricia Michel
- 138 Talisker and Trafalgar - Gee, Maurice Thomas and Else Elaine
- 139 Sunnyside - Chugg, Richard John and Mavis Isobell
- 140 - Summers, R.K.
- 141 Cowley - Richardson, Kenneth
- 142 Clairville - Cameron: Hugh Cathcart Estate
- 145 The Springs - Hughes, Maxwell Lindsay and Richard Affleck
- 145A - Hughes, Maxwell Lindsay and Richard Affleck, Naney Dorothy
- 149 Raeburn - Sulzberger, Mervyn Henry
- 150 West Lynne - Chugg, Vernon Hold and Queenie Victoria
- 151 Talisker - AI GEE BEE Pty. Ltd., (Bezette, Ian George)
- 152 Part of Lenna - Kaye, Archie Vernon John
- 153 Part of Corra Linn - Chugg, Edwin Vernon
- 154 Corra Linn - Chugg, David Richard
- 154A Part of Corra Linn - Chugg, David
- 155 Springfield - Gardner, Alan Charles
- 155A - Gardner, Alan Charles
- 156 Mount Oriel - McGrath, Harold Thomas and Clem
- 157 - Le Fevre Colin Roy
- 158 Marchington - Marchington Pty. Ltd.,
- 159 - Gardner, Charles, Leopold
- 160 Part of Stornoway - Stornoway Holdings, Pty. Ltd.,
- 161A - Chung Gon, Estate of James
- 161 - Chung Gon, Estate of James
- 162 - Barwick
- 163 - Talbot, David John DEvere and Leanne Joan
- 164 - Spink: Tasman Lyle and Gwendolyn Mabel
- 165 - Dixon, Walter, William

Relation with Farmers

The Evandale community is old and well established. I found the farmers cooperative and interested in the exploration project. As they dread the potential destruction of a peaceful and hidden little world they do not particularly like the idea of mining activity, unless a generous compensation could be given. My personal relations with the farmers are good.

Methods of fieldwork

The only field work undertaken was the systematic search for fresh outcrop in rivulets and in railway cuttings of the area. Samples were taken with a spade and more rarely with an (unsuitable) soil auger. Careful attention was given to the morphology of the area, which betrays to the trained eye the presence of clay.

I borrowed soil augers from the Geography and Geology Departments of the University of Tasmania and found them suitable for sands but not heavy clays. Later arrived the efficient slender type Edelman augers (made by Eykelkamp B.V., Rivierweg 1, Lathum, the Netherlands), as used by the United Nations agencies like F.A.O. and many government services. Because of the advanced season they have not been used in the Western Junction area. See figure 2. They can be used up to a depth of 4.5.m if used in connection with the accompanying extension rods.

As surface outcrop is limited in the area and digging excluded because of the heavy nature of the soils nothing much could be done without suitable auger equipment.

Field work was consequently restricted to about a fortnight.

Samples were taken from all fresh outcrop and extensively analysed and tested.

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Nature of deposit

Among the clays, sands and their organic admixtures is a certain amount of blue-white or white pure kaolin. These clays are very fine. Such secondary to fine kaolins are officially called ball-clay.

General Geology of the Area

The area, morphologically situated in the upper reach of Rose Rivulet, is geologically part of the ancient "Tamar" graben between the Hummocky Hills - Breadalbane horst in the west and the Ben Lomond horst in the west (Carey, 1947). The horst consists largely of Jurassic dolerite and some Permian, the graben is filled with Tertiary clayey and sandy sediments and lignites. Pollen dating indicates Palaeocene to Eocene clays for the clays (Banks and Gill, 1956). Basalts which are now deeply weathered and partly lateritised are unconformably overlying in patches both the horst rocks as the sediments. They are probably Oligocene or perhaps Eocene in age (Sutherland, 1971). Prebasalt topography indicates presence of a rather narrow and steep valley, near the Talisker farm. The basalt is not affected by faulting. See figure after Sutherland. The considerable relief in the area is caused by selective erosion rather than by faulting. The clayey sediments are older than the sediments from "Lake Tamar" described by Carey (1947), in which lake, was caused by the damming of the ancient Tamar. Apparently earlier basin formation has occurred.

Depth of deposit

A first indication of the depth of the deposit was given by Johnston(1888) whose description of the railway cutting at Mt. Field Point 2 is given below. The depth of his lowermost zone was inferred by evaluation of the distance between the railway line and the rivulet below:

Big Cutting Breadalbane:- One of the most interesting sections of the Tertiary formation is exposed on the railway at this place, on the higher slope of the plateau, of which the following is a description in descending order:-

1. Superficial chocolate soil..... 3' 0"
2. Basalts more or less consolidated and columnar, underlaid by tuffs more or less regularly stratified by water.....60' 0"
3. Conglomerate, composed of waterworn fragments of basalt, mixed with waterworn silicious pebbles..... 4' 0"
4. Series of beds of whitish clays and hard bands of greyish sandstone, full of leaf impressions.30' 0"
5. Lignite and ligneous clays, including compressed trunks and branches of conifers, and other trees with large porous vessels..... 4' 0"
6. White and greyish arenaceous clays, becoming soft and soapy where permeated by water, and thus causing immense landslips along the slopes (Depth not ascertained, though supposed to be 200 or 300 feet deep. of the valley.....

03  
Johnston continues: "The leaf beds and lignites here as in other places, are shown to have been deposited prior to the eruption of the basalt, and therefore belong to the Lower Zone as defined. From observations made lower down the valley, it is most probable that the whitish and greyish clays are several hundred feet thick, in which it is also probably that beds of lignite of limited extent recur."

My estimate of the depth of the clay deposit at this railway cutting at the railway cutting near the "Springs" rivulet is 25 m, at the Claireville cutting at least 15 m and at Springvale 30 m, all estimates being based on differences in height of clay outcropping at railway level and in the valley immediately below.

Such estimates are substantiated by the logs for some bore holes at "9½ mile Western Line", which is still another name for the site of the Breadalbane = Springs = Observation Point 2 railway cutting. This site is suffering from severe landslides caused by undercutting of an already unstable slope by railway workings. Maunsell and Partners drilled several holes for the Tasmanian Government Railways. Their data (see appendices I ) indicate nevertheless 12 m of clay under basalt capping. These drill holes stopped however at a depth of 18 m, and there might be much more kaolin at depth.

#### Size of deposit

The very fine blue grey and white ball clays have only been observed in the Western part of the exploration area. Admittedly this is the steeper part and the flatter eastern part of the area may be the location of more ball clays hidden under river flat deposits. Even this would involve the removal of considerable overburden when mined.

No geologist since Johnston appears to have noticed in this area the ball clay and industrial ceramists R. Campbell and G. Springer from Launceston were not aware of the occurrence of the deposit.

I have checked with several farmers in the neighbourhood, who knew of course the clay occurrence. With reasonable certainty it can be assumed that all the ball clay is in the western part of the area, between West Lynn - Springvale (on maps erroneously called Springfield) - the house between the new Trafalgar (near Barbrook) and the old Trafalgar.

Excluding the areas covered with weathered basalt and Quaternary or late Tertiary gravels this still amounts to 3 km<sup>2</sup>. Assuming 10% of all sediments up to a depth of 20 m to be rather pure kaolin the reserve would be 6 x 10<sup>6</sup> m<sup>3</sup>. I estimate the overburden at 3 m. An unlimited amount of brickmaking clay is present.

#### General Consideration on Tasmanian Clay Deposits

Before reporting on laboratory investigations and market-probing it may be useful to summarise the Tasmanian kaolin deposits, see also the table I for general information (modified after Threader, 1974). Beyond Twelvetrees remarkably detailed publication in 1904 ( of which a copy is enclosed and Threader's 1969 publication on the clay resources of the Hobart area) no comprehensive treatment of Tasmania clay resources exist. Threader's 1974 report at the Clay Resources Conference was unfortunately never published.

Threader (1974) does not mention the Western Junction and St. Helens ball clays. Both bodies are several square kilometres large, and consist of a mixture

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| China clay | <p>(I) Kaolinised Devonian granite in N.E. area Tonganah, South Mt. Cameron, Pioneer.</p> <p>(II) Weathered Cretaceous syenite in Surges Bay and Cygnet area.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Ball Clay  | <p>(I) Tertiary river and lake deposits in Launceston Basin (Western Junction)</p> <p>(II) Tertiary river and lake deposits near St. Helens.</p> <p>(III) Tertiary drifts overlying tin gravels in N.E.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Fireclay   | <p>(I) Precambrian clayey siltstone in Mawbanna area, N.W. Tasmania.</p> <p>(II) Tertiary drifts overlying tin gravels in N.E.</p> <p>(III) Tertiary kaolin at Forcett.</p> <p>(IV) Associated with coal measures (Dulverton, Sandfly)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Brick clay | <p>(I) <u>Tertiary</u> brick and pipe manufacture from Tamar sedimentary basin sandy clay, and pipe manufacture from plastic clay in Derwent Valley.</p> <p>(II) <u>Triassic</u> mudstone used in southern Tasmania for brick manufacture (e.g. Kingston)</p> <p>(III) <u>Permian</u> mudstone used in Launceston area for tile manufacture and has been used for bricks at Wynyard (L. Permian varved clay and Quamby mudstone) Dulverton (Quamby mudstone and fire-bricks from Mersey coal measures), Dover (Grange mudstone = Cascades Group correlate, and Woodbridge Glacial Formation = Malbina correlate).</p> <p>(IV) Older Palaeozoic and Precambrian available but not used.</p> |
| Bentonite  | <p>No economic deposits but:</p> <p>(I) montmorillonite veins in Jurassic dolerite are common,</p> <p>(II) clay interlayers in Berriedale limestone,</p> <p>(III) possibly Quaternary lunettes at Swansea.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

of very fine secondary (= well transported sedimentary) kaolin mixed with fine sand, and at Western Junction with lignite. Both kaolin bodies are of Tertiary age and deposited in elongated basins, presumably in blocked river arms. The similarity of both bodies with the English ball clays (as described by Mather in (1967) is striking.

These sticky, very fine kaolins are very different from the primary (= residual) kaolins, which are the so called china clays, like mined at Tonganah. The china clays, are very much coarser and rather powdery.

Ball clays, although very much more common than china clays, are a useful commodity in the ceramic industry and as paper coater (provided sufficiently bright). They are also extensively used in the brick industry as an admixture, because of their superior extruding quality. For further technical applications see Lafond (1975).

The exhausted Launceston ball clay at Campbell's pottery has been used for the fabrication of Bristol ware. The real nature of the known St. Helens clay (Twelvetrees) and the rather obscure Western Junction ball clay has not been recognised in the past.

The ball clays are, like the china clays, derived from granites, but the clay has weathered much more and has been transported. These processes are essential for the development of stickiness: the Tertiary drifts like at South Mount Cameron and the old river deposits at Pioneer are not real ball clays. These clays are rather powdery in behaviour, and have china clay qualities.

Provided that they are sufficiently free of alkalis, alkaline earths and iron, ball clays can sometimes be used as raw material for refractories. Ball clays are extensively used in the ceramic industry. Neither pure china clay nor pure ball clays are suitable materials for the ceramic industry when used on their own.

Mixtures of china clay (right composition, but too coarse and powdery) ball clay (right composition but too fine and sticky), quartz (to give body) and some potash feldspar (lowering firing temperature) are ideal for stoneware bodies.

The origin of the Western Junction clay has largely been the Ben Lomond and Royal George granites. The quality of the clay decreases down stream the South Esk - Tasman system, presumably because of contamination, in particular with the weathering products of dolerites.

The St. Helens ball clay is somewhat purer, but is largely covered with dunes.

Grain size Determination on Western Junction Clay

Most granulometric analysis of the ball clays indicated >68% clay particles <2µm. The grain size distribution of the prototype analysed (samples from locality 2) is extremely fine.

|           |        |
|-----------|--------|
| >45µm     | 0.063% |
| 45 - 20µm | 5.00%  |
| 20 - 5µm  | 4.91%  |
| 5 - 2µm   | 9.27%  |
| < 2µm     | 80.92% |

Mineralogy

As determined by X.R.D. (Brown method, 1963) kaolin, some goethite, virtually no quartz.

Goethite problem

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The goethite causes mottling of the stoneware after 1300°C firing. It remains invisible in the biscuit. This is unsightly.

There are several ways out, by defloculation, selective settling and refloculation. I spent most of my time in the laboratory on developing efficient physico-chemical means for iron removal and succeeded. The technical details are far beyond this report. See Rebinder 1967.

Magnetic removal might be just possible. Samples are being tested for this (see below).

It is useful to ball mill the clay mixtures beforehand (china clay, ball clay etc.). Thus homogenization of the clay and destruction of the goethite particles can be obtained in 2 hours ball milling. This procedure is rather inexpensive and suitable for a daily production of up to about 1 tonne only (pers. com. P. Davis). See further all references on clay technology on page 11.

Comment on the chemistry and occurrence of the clays

I had analysed at the request of several potters some clays, for either glazing purposes or as raw material purposes.

Data have not yet been fully assessed. It is useful to look at the analyses 44520 and 44526-44533, the bulk of raw materials suitable for industrial use.

The popular (but very gritty) Bendigo clay (44529) and the Kingston clay both come chemically close to being clays which can be used without additive (they need both some potash feldspar and quartz) because of their relatively high  $K_2O$  content. The Kingston clay (44526) however is remarkably high in iron and iron minerals.

The resulting stoneware of the Kingston clay has a warm character and is extensively used. The Kingston deposit is however variable and is unsuitable for the production of a homogenous raw material on a large scale.

The Tonganah clay 44531 and a clay from South Mt. Cameron are typical china clays although the iron contents are still too high. For porcelain it is better to have iron contents of less than 0.5% total.

Table 2: CERAMIC MATERIALS TESTED

| <u>Geology Department No.</u> | <u>Rock Type</u>       | <u>Locality</u>     | <u>Collected By</u> | <u>Field No.</u> |
|-------------------------------|------------------------|---------------------|---------------------|------------------|
| * 44501                       | aplite                 | Bluestone Bay       | Van de Vusse        | 1                |
| * 44502                       | loess                  | Limekiln Point      | Van de Vusse        | 2                |
| * 44503                       | marl                   | pit                 | Van de Vusse        | 3                |
| 44504                         | marl                   | Reid damsite        | Van de Vusse        | 4                |
| 44505                         | epidote granite        | Parangana quarry    | Van de Vusse        | 5                |
| * 44506                       | feldspathic sandstone  | " "                 | Van de Vusse        | 6                |
| 44507                         | syenite                | Cygnnet Regatta     | Van de Vusse        | 7                |
| * 44508                       | Forcett clay           | Forcett             | Van de Vusse        | 8                |
| 44509                         | epidote granite        | Parangana           | Van de Vusse        | 9                |
| 44510                         | garnet wollastonite    | Moina               | Van de Vusse        | 10               |
| 44511                         | syenite dyke           | Holland's quarry    | Van de Vusse        | 11               |
| 44512                         | aplite                 | Parangana           | Van de Vusse        | 12               |
| 44513                         | slate                  | Gordon River Road   | Van de Vusse        | 13               |
| 44514                         | granophyre             | ?                   | Van de Vusse        | 14               |
| 44516                         | slush                  | APFM                | Van de Vusse        | 16               |
| * 44517                       | pipeclay               | Pipeclay Lagoon     | Coombs              | 17               |
| 44518                         | clay                   | Dodges Ferry        | Coombs              | 18               |
| 44519                         | clay                   | Macs                | Coombs              | 19               |
| * 44520                       | kaolin                 | South Mt. Cameron   | Coombs              | 20               |
| 44521                         | clay                   | Scotts Peak Road    | Coombs              | 21               |
| 44522                         | feldspar               | Eddystone Point     | Davis               | 22               |
| * 44523                       | marl                   | Hamilton            | Davis               | 23               |
| 44524                         | clay                   | Ouse                | Davis               | 24               |
| * 44525                       | marl                   | Teatree Road        | Davis               | -                |
| * 44526                       | clay (processed)       | Kingston            | Davis               | -                |
| * 44527                       | clay (processed)       | Bendigo             | Davis               | -                |
| * 44528                       | ball clay              | Western Junction    | van Moort           | 1                |
| * 44529                       | ball clay              | Western Junction    | van Moort           | 2                |
| * 44530                       | ball clay (processed)  | " "                 | van Moort           | 1                |
| * 44531                       | china clay (processed) | Tonganah            | van Moort           | -                |
| * 44532                       | ball clay              | St. Helens          | van Moort           | -                |
| * 44533                       | Italian clay           | Italy               | Dept. of Trade      | -                |
| * 44534                       |                        |                     |                     |                  |
| * 44535                       | fretted stone          | Major Reef Back Cr. | van Moort           | -                |
| * 44536                       | ball clay (processed)  | Western Junction    | van Moort           | 2                |
| * 44537                       | <10µm pit              | St. Helens          | van Moort           | -                |

\* chemically analysed by P. Robinson, Analyst, Geology Department, University of Tasmania.

Five ball clays were analysed, of which three previously processed:

Western Junction 1 (44528) a very common siliceous kaolin; bulk sample  
 Western Junction 2 (44529) the grey blue ball clay; bulk sample  
 Western Junction 1 (44530) as 1, but sieved at 120  $\mu$ m  
 St. Helens (44532) processed T.C.A.F. Launceston  
 St. Helens (44537) Fe analysis only; collected in "sandpit"

Comparison with the processed and unprocessed English and American ball clays (Grimshaw, 1971; Singer and Singer, 1963; McMeekin, 1967), is not favourable with respect to the iron content. Tasmanian clays like most Australian clays are plagued with iron (doubtlessly dolerite derived). The St. Helens ball clay is relatively the best ball clay as far as the iron content.

Ceramically the iron content does not matter if fine. The few coarse goethite can readily be removed, the finer ones don't matter. The fired material is buff in colour. The high iron content will probably preclude use as a paper filler. The chemistry of the clays is otherwise standard for ball clays.

St. Helens is rather high in  $K_2O$  (being near to granites). Western Junction remarkably poor in alkalis (possibly interesting for refractories). The somewhat elevated MgO content of Western Junction has still to be explained.

Ceramic testing (for stoneware, bristol ware, etc.)

All tests done by P.J. Davis. Previously good results have been reported on the mixture 40% K37 china clay: 40% Western Junction Ball clay (<120 mesh): 10% silica: 10% potash feldspar. (Attempt A)

Attempts have been made to increase the ball clay content (ball clay is cheap).

| Attempt B                      |       | Attempt C                      |       |
|--------------------------------|-------|--------------------------------|-------|
| 50% W.J. ball clay (<120 mesh) |       | 60% W.J. ball clay (<120 mesh) |       |
| 30% K 37 china clay            |       | 20% Tonganah china clay        |       |
| 10% silica 72 mesh             |       | 10% silica (<120 mesh) 72 mesh |       |
| 10% potash feldspar            |       | 10% potash feldspar            |       |
| dry shrinkage                  | 6-6½  | dry shrinkage                  | 7-7½  |
| firing shrinkage 1300°C        | 14.5% | firing shrinkage 1300°C        | 14.5% |
| throwing quality               | good  | throwing quality               | good  |
| plasticity                     | good  | plasticity                     | good  |
| handles                        | good  | handles                        | good  |

Remark: not completely homogenised by plunging.

Remark: this basalt was ball milled for 2 HOURS. Completely homogenised.

It should be noticed that in spite of the dry shrinkage being more than 5% the handles do not come off. Either recipe gives a good result. Lots are forwarded separately. Final colour white, slightly buff.

#### Testing for brick making

As most quality clay pits have an enormous spoil of not less than 20% it would be interesting to use the more quartz rich parts for brick making. Clifton bricks, the company in Launceston with headquarters in Melbourne intends to build in some years time an extruded brick factory in Longford. The company has shown a definite interest and consequently I sent them, in April, two truck loads for testing. According to the manager Mr. K. Wadley, these tests have been successful. In spite of my condition that a detailed report had to be sent to me no written report has been received.

#### Testing for Refractories

5 kg sample has been forwarded to Australian Refractories Ltd. in Sydney.

#### Iron removal in wet state by magnetic processes

5 kg samples of Western Junction and St. Helens ball clays have been sent for testing to Messrs. Frantz, manufacturers of industrial magnetic separators. To my surprise the company is testing the material for free.

#### Iron removal by chemical treatment

I am in casual correspondence with the Georgia Kaolin Company. This company removes the iron by sulphuric acid treatment. I have seen this process in operation in Spain. It is less complex than one would expect.

#### Miscellaneous contacts

The directorate of Industrial Development and Trade, Tasmania and some private businesses have been approached.

#### Clays for adult education classes, schools, potters and amateurs

A market exists already on the mainland and in Tasmania for fully prepared clay. This may be a profitable business and I have looked in Sydney for second-hand processing equipment.

#### Money spent on exploration in the period March to April, 1976.

The actual capital outlay by myself has been limited:

|                          |                 |                      |       |
|--------------------------|-----------------|----------------------|-------|
| Running cost and camping | \$400           | Outstanding orders   | \$100 |
| Equipment                | 100             | Mr. P.J. Davis spent | 200   |
| Contractor fees          | 76              |                      |       |
| Maps etc.                | 70              |                      |       |
|                          | <u>        </u> |                      |       |
|                          | \$656           |                      |       |

The chemical analyses could however be done free at the University of Tasmania, the ceramic tests were done by Mr. Davis.

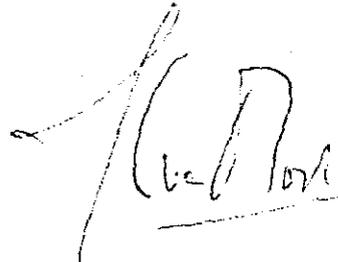
#### Future work

It is necessary to evaluate more accurately the occurrence of the ball clay in the western part of the exploration area. Hand drilling with the Edelman augers will suffice. It is not possible to do so unless it is dry and summer.

The ceramic testing has been promising. Cost evaluations remain to be done on the opening of a pit and the proper methods of iron comminution (ball milling) or removal. The refractory aspects have to be followed up.

More mineralogical work is needed, particularly to disprove beyond doubt the presence of halloysite.

Particular attention has to be paid to bleaching tests, particularly in respect to the use of the clay as paper coater.



J.C. van Moort

17/9/76

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TABLE III

## CERAMIC MATERIALS (L)

| Reference                      | 44501 | 44502 | MARL<br>44503 | 44506 | 44508 | 44517  | 44518  | 44520  | MARL<br>44523 | 44524  | MARL<br>44525 | 44526  | 44527 |
|--------------------------------|-------|-------|---------------|-------|-------|--------|--------|--------|---------------|--------|---------------|--------|-------|
| SiO <sub>2</sub>               | 75.09 | 68.40 | 29.18         | 66.26 | 74.27 | 57.04  | 69.34  | 47.50  | 21.67         | 51.78  | 22.01         | 62.68  | 66.52 |
| Al <sub>2</sub> O <sub>3</sub> | 14.10 | 16.45 | 4.69          | 14.97 | 14.22 | 28.12  | 18.27  | 37.26  | 5.20          | 22.34  | 0.45          | 21.61  | 20.58 |
| Fe <sub>2</sub> O <sub>3</sub> | 0.27  | 6.16  | 2.11          | 3.71  | 1.22  | 1.56   | 1.19   | 0.80   | 3.16          | 2.41   | 0.55          | 2.58   | 0.81  |
| FeO                            |       |       |               |       |       |        |        |        |               |        |               |        |       |
| MgO                            | 0.0   | 2.35  | 4.00          | 1.45  | 0.31  | 0.70   | 0.92   | 0.00   | 3.53          | 2.84   | 1.92          | 0.60   | 0.55  |
| CaO                            | 0.31  | 3.18  | 28.26         | 2.32  | 0.00  | 0.13   | 0.05   | 0.00   | 30.29         | 3.60   | 39.07         | 0.04   | 0.01  |
| Na <sub>2</sub> O              | 5.90  | 1.12  | 0.14          | 2.76  | 0.42  | 0.23   | 0.57   | 0.00   | 0.16          | 0.35   | 0.00          | 0.20   | 0.24  |
| K <sub>2</sub> O               | 4.11  | 1.65  | 0.22          | 2.50  | 4.16  | 1.16   | 3.69   | 0.45   | 0.20          | 1.02   | 0.04          | 3.65   | 2.27  |
| H <sub>2</sub> O+              | -     | 2.45  |               | 2.69  | 3.11  | 8.66   | 4.01   | 13.27  |               | 7.87   |               | 4.67   | 5.17  |
| H <sub>2</sub> O-              | -     | 1.79  | 3.71          | 1.49  | 0.79  | 2.84   | 1.03   | 0.75   | 3.94          | 2.80   | 1.03          | 2.59   | 1.30  |
| TiO <sub>2</sub>               | 0.01  | 0.86  | 0.13          | 0.67  | 0.52  | 1.09   | 0.85   | 0.72   | 0.14          | 0.88   | 0.00          | 1.00   | 1.86  |
| P <sub>2</sub> O <sub>5</sub>  | 0.0   | 0.05  | 0.02          | 0.19  | 0.04  | 0.02   | 0.04   | 0.03   | 0.04          | 0.03   | 0.02          | 0.18   | 0.05  |
| MnO                            |       | 0.09  | 0.02          | 0.05  | 0.00  | 0.01   | 0.00   | 0.00   | 0.03          | 0.05   | 0.01          | 0.00   | 0.00  |
| SO <sub>3</sub>                |       |       |               |       |       |        |        |        |               |        |               |        |       |
| S                              |       |       |               |       |       |        |        |        |               |        |               |        |       |
| FeO <sub>2</sub>               |       |       |               |       |       |        |        |        |               |        |               |        |       |
| CO <sub>2</sub>                |       | 0.82  | high          | 0.22  | 0.02  | 0.06   | 0.04   | 0.00   | high          | 4.12   | high          | 0.00   | 0.00  |
| Organic                        |       | 0.14  |               | 0.52  | 0.20  | 0.26   | 0.16   | 0.00   |               | 0.40   |               | 0.53   | 0.70  |
| By<br>difference               |       |       |               |       |       |        |        |        |               |        |               |        |       |
| Ignition<br>loss               | 0.25  |       | 27.97         |       |       |        |        |        | 31.06         |        | 34.43         |        |       |
| TOTAL                          |       | 99.51 | 100.45        | 99.80 | 99.28 | 101.84 | 100.16 | 100.78 | 99.42         | 100.49 | 99.53         | 100.33 | 99.56 |
| Total<br>Carbon                |       | 0.36  | 6.45          | 0.58  | 0.21  | 0.28   | 0.17   | 0.00   | 6.62          | 1.92   | 8.37          | 0.33   | 0.70  |

870015

TABLE III  
 CERAMIC MATERIALS (2)

| Reference                      |        |        |       |        |        | Light | Dark Band | St. Helens |       |       |
|--------------------------------|--------|--------|-------|--------|--------|-------|-----------|------------|-------|-------|
|                                | 44528  | 44529  | 44530 | 44531  | 44532  | 44533 | 44535     | 44535      | 44536 | 44537 |
| SiO <sub>2</sub>               | 61.81  | 51.55  | 51.65 | 45.51  | 57.99  | 68.96 | 81.36     | 80.69      |       |       |
| Al <sub>2</sub> O <sub>3</sub> | 23.03  | 29.40  | 29.20 | 38.25  | 26.66  | 12.57 | 11.29     | 11.06      |       |       |
| Fe <sub>2</sub> O <sub>3</sub> | 2.07   | 2.04   | 2.10  | 0.89   | 1.45   | 1.64  | 0.83      | 0.83       | 2.32  | 1.14  |
| FeO                            |        |        |       |        |        |       |           |            |       |       |
| MgO                            | 0.52   | 0.66   | 0.65  | 0.00   | 0.29   | 1.42  | 0.59      | 0.60       |       |       |
| CaO                            | 0.07   | 0.27   | 0.25  | 0.00   | 0.02   | 1.67  | 0.00      | 0.00       |       |       |
| Na <sub>2</sub> O              | 0.20   | 0.35   | 0.32  | 0.25   | 0.11   | 0.75  | 0.24      | 0.23       |       |       |
| K <sub>2</sub> O               | 0.34   | 0.49   | 0.38  | 0.91   | 1.54   | 1.31  | 2.75      | 2.77       |       |       |
| H <sub>2</sub> O+              | 7.72   | 10.17  | 10.07 | 11.89  | 7.29   | 3.11  | 2.01      | 1.74       |       |       |
| H <sub>2</sub> O-              | 2.29   | 3.83   | 3.41  | 0.87   | 2.08   | 7.12  | 0.25      | 0.24       |       |       |
| TiO <sub>2</sub>               | 1.43   | 1.13   | 1.17  | 0.38   | 1.78   | 0.14  | 0.50      | 0.48       |       |       |
| P <sub>2</sub> O <sub>5</sub>  | 0.01   | 0.01   | 0.02  | 0.10   | 0.12   | 0.05  | 0.00      | 0.00       |       |       |
| MnO                            | 0.02   | 0.00   | 0.00  | 0.00   | 0.00   | 0.06  | 0.00      | 0.00       |       |       |
| SO <sub>3</sub>                |        |        |       |        |        |       |           |            |       |       |
| S                              |        |        |       |        |        |       |           |            |       |       |
| FeS <sub>2</sub>               |        |        |       |        |        |       |           |            |       |       |
| CO <sub>2</sub>                | 0.07   | 0.10   | 0.11  | 0.00   | 0.00   | 0.47  | 0.00      | 0.00       |       |       |
| C organic                      | 0.54   | 0.37   | 0.24  | 1.15   | 1.49   | 0.69  | 0.28      | 0.88       |       |       |
| By difference                  |        |        |       |        |        |       |           |            |       |       |
| TOTAL                          | 100.12 | 100.37 | 99.97 | 100.20 | 100.82 | 99.96 | 100.10    | 99.52      |       |       |
| Total Carbon                   | 0.56   | 0.40   | 0.27  | 1.15   | 1.49   | 0.82  | 0.28      | 0.88       |       |       |

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14  
1/

## MARLS

Shapiro method inaccurate due to large volumes of  $\text{CO}_2$  produced. Not all gas passes into side arm. Small samples (50 - 100 mg needed) also give poor reproduction. Sample not homogeneous e.g.

|       |       |       |                                     |
|-------|-------|-------|-------------------------------------|
| % CaO | 28.26 | 44503 | 17.95, 20.51, 19.07 % $\text{CO}_2$ |
|       | 30.29 | 44523 | 21.63, 22.97 % $\text{CO}_2$        |
|       | 39.07 | 44525 | 14.31, 23.71, 15.12 % $\text{CO}_2$ |

Note: acid insoluble (1:1 HCl) residues:-

|                |       |       |
|----------------|-------|-------|
|                | 44503 | 48.0% |
|                | 44523 | 48.5% |
|                | 44525 | 23.6% |
| TOTAL CARBON:- | 44503 | 6.45% |
|                | 44523 | 6.62% |
|                | 44525 | 8.37% |

2/

44517

Pipeclay Lagoon had a very high salt content. It was washed several times with distilled water before analysis. Final  $\text{Na}_2\text{O}$  content:- 0.23%

- 15
- I Industrial classification of Tasmanian clays. (Modified after Throther 1957)
  - II Ceramic materials tested
  - III Chemical analysis
- Figure I Location of Exploration Area
- 2 Edelman soil augers
  - 3 Prebasalt topography (after Sutherland, 1971)

- Appendix I Field Observation Map
- II Maunsell drill hole description

Substantiating material (see page 8 for details) in the form of pots made by P.D. Cook

- Attempt A Note iron staining
- Attempt B Iron removed by defloculation and flocculation. Note mottling through insufficient mixing with china clay.
- Attempt C Better mixing obtained by ball milling and iron comminuted. A satisfactory product.

Enclosure: W.H. Twelvetrees (1904) Report on deposits of clay at George's Bay and elsewhere. Unpublished report Tasmania Department of Mines, Hobart.

16  
SANCTUARY  
For Birds under  
Animals & Birds  
Protection Act 1928  
Gaz 3446  
RIVER

880 0 0  
Granted to  
Alexander Rose

116 0 0  
Granted to  
Thomas Lantale

915 0 0  
Granted to  
Alexander Rose

1074 0 0  
Granted to  
Theodore Bryant Bartley

215 0 0  
Granted to  
C Campbell

207 0 0  
Granted to  
Alexander Rose & James Reley Kerworthy

175 1 12  
Granted to  
P Adams

100 0 0  
Granted to  
Soleman

612 0 0  
Granted to  
Cott Campbell

100 0 0  
Granted to  
E Stanley

492 0 0  
Granted to  
I B Bartley

738  
Granted to  
J B Thom

280 0 0  
Granted to  
Albinston & J Jennings

282 2 0  
Granted to  
C Bower

410 0 0  
Granted to  
Andrew Barclay

330 0 0  
Granted to  
A Barclay

324 acres  
Granted to  
Thomas Galt

500 0 0  
Located to  
Andrew Barclay

500 0 0  
Granted to

192 2 26  
Granted to  
Joseph Kirby

806  
Granted to

Granted to  
Buchanan

378 0 0  
Granted to

Scale 1/2 mile (1:31680)

5 cm

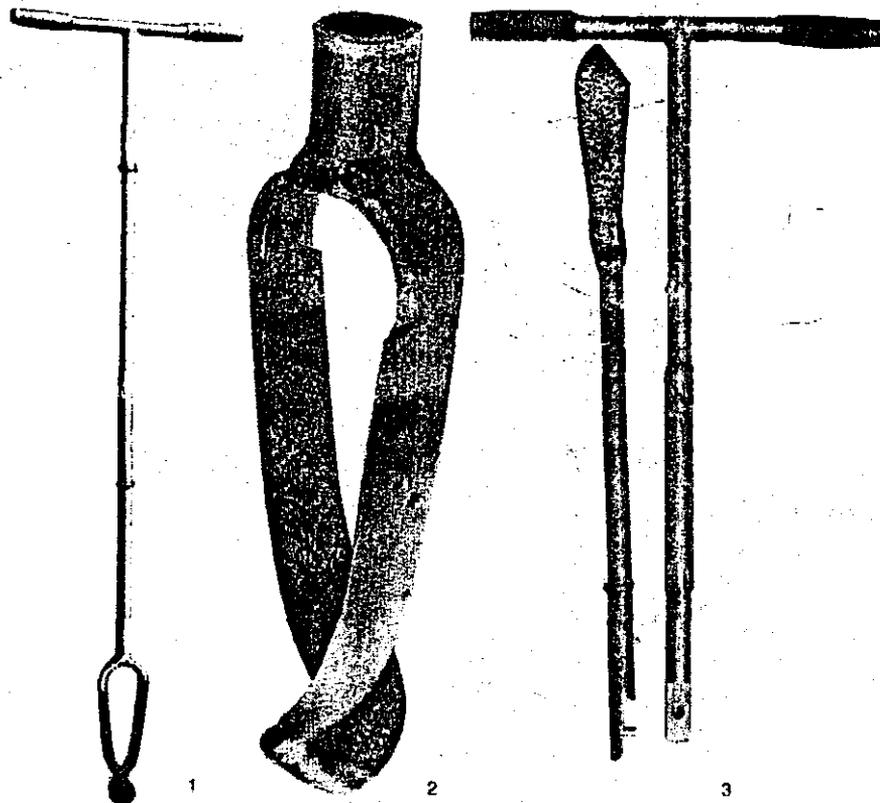


FIG. 2: Edelman augers.

**General:**

The augers are forged in three types viz. for sand, clay and a combination of these types.

Delivery as per descriptions given or if desired according to drawing or model supplied.

**Standard length of the soil augers:**  
1.25 m. diam. 7 cm.

Connections of augers and extensions in four types:

- a. coupling sleeve with bayonet
- b. screwthread
- c. bolt joint.
- d. cone screw thread.

1. Auger one-piece model.

2. Auger-body with screw socket: screwthread  $\frac{1}{2}$  inch.

3. Bi-partite auger with coupling sleeve (bayonet)

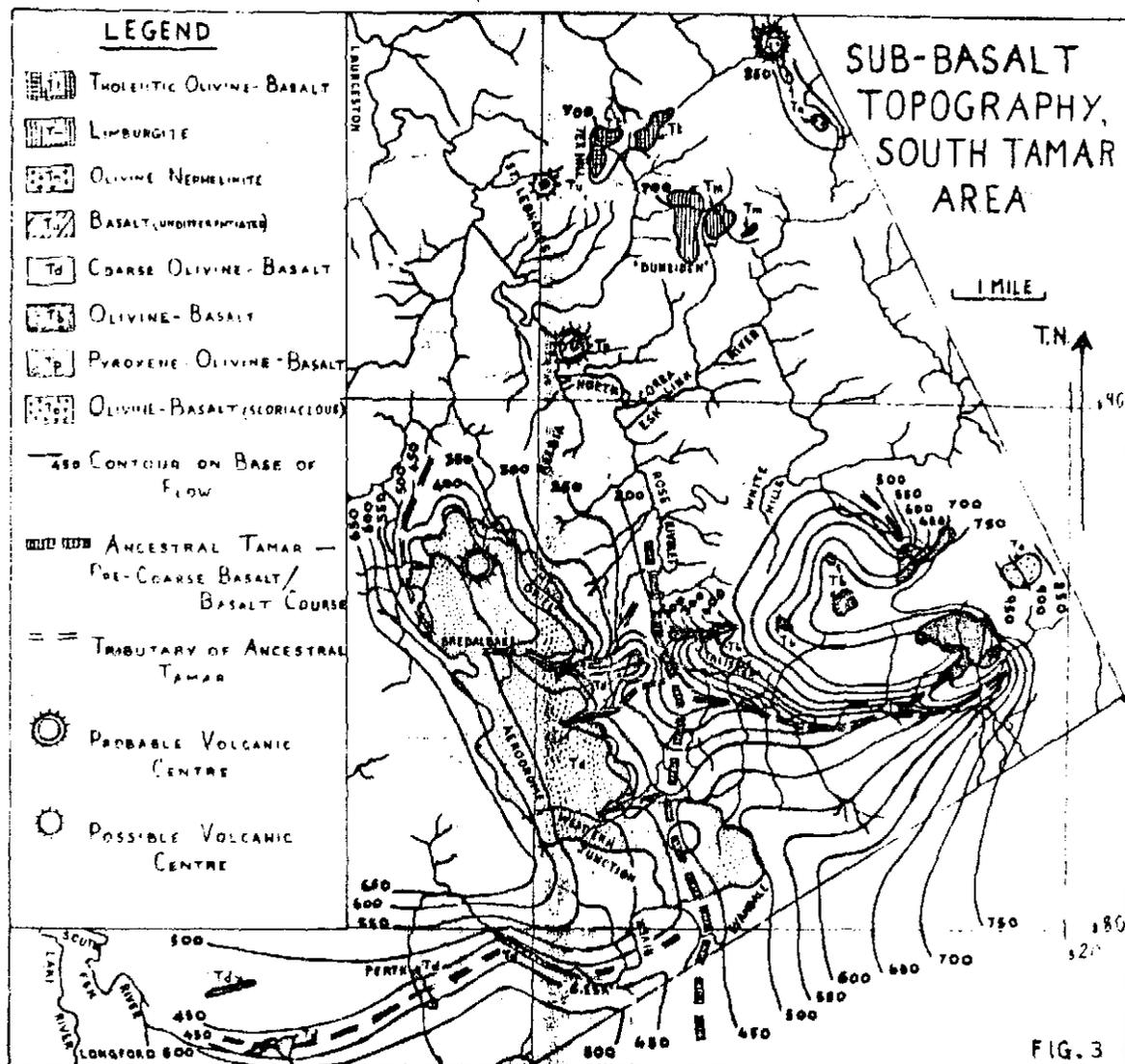


Fig. 3 Map of basal contours on basalt, South Tamar area.

5 cm