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DEPARTMENT OF MINES
SOUTH AUSTRALIA

# SECOND REPORT

# ON

# OCCURRENCE OF ACTIVABLE CLAY IN SOUTH AUSTRALIA.

by

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| No. | Title | Scale |
|---|---|---|
| 62-105 | Locality Plan | 4 miles to 1 inch |
| | Montmorillonite Clay Exploratory Holes, County Grey | |

# SECOND REPORT
# ON
# OCCURRENCE OF ACTIVABLE CLAY IN SOUTH AUSTRALIA

## 1. ABSTRACT

Results of laboratory tests on further clay samples are recorded. An analysis is made of all samples collected to date and recommendations made for more detailed work on clays associated with Cambrian marbles, where reserves will be small, and from the River Murray cliffs upstream from Loxton where large reserves exist.

## 2. INTRODUCTION

In a preliminary report in January, 1961*, six areas were indicated in which montmorillonitic clay might be expected to occur in South Australia. Four of these had been sampled prior to the preparation of the report and the remaining two were sampled by Student Geologist R. C. Haines in February, 1962. Several samples from other localities have been collected by the writer at various times since. The results of testing all samples taken since the preliminary report are recorded here.

The project has now reached the stage where clay deposits in all of the geological age groups represented in the State have been sampled. The second part of this report is devoted to an analysis of all the sample data obtained to date.

Logs of auger holes drilled in County Grey are attached as an appendix.

## 3. SAMPLE RESULTS

Samples were collected by R. C. Haines from the following areas:-

### 3.1 Lower South East

Two possible sources of montmorillonite were suggested in the preliminary report.

1) In association with the Cainozoic volcanic rocks, either as true Bentonite deposits or as a result of hydrothermal alteration of dolomite.

2) from sedimentary clay deposits overlying the Gambier Limestone.

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*Hiern, M.N., 1961. Preliminary Report on Occurrence of Activable Clay in South Australia. Mining Review 114 p.51

Six areas of extensive near surface clay accumulation were delineated by an office study of bore records in County Grey and in these fifteen sites were selected for sampling with a hand auger. Of the fifteen sites, only ten yielded clay samples and of the twenty-six samples taken, eighteen were submitted to the Australian Mineral Development Laboratories (A.M.D.L.) for testing. The results are shown in table 1 overleaf.

All of the samples examined contained a low clay fraction, the highest being 33% of material less than 15 microns. Activity relative to the Fuller's Earth standard was between 30% and 60%, the best being 63% in Section 445, Hd. Penola.

3.2 Mid North

Five samples were collected from phosphate quarries in County Light from which montmorillonite had been previously recorded. Details of these samples are shown in table 2, overleaf.

A sample from No.1 Quarry at the Koonunga Phosphate Deposit in Section 88 Hd. Belvidere, contained 72% of material less than 15 microns which possessed an activity of 84% relative to the Fuller's Earth standard. A second sample from the same pit contained 61% clay fraction but this was only 26% active relative to the standard. The remaining samples all had low activity.

The Koonunga Quarry was examined by the writer in September, 1962. A plan and description of the workings are given in Bulletin 7 on page 50 and 51. The pit is elongated in a NW-SE direction and has been excavated in decomposed argillaceous rocks, which display remnant bedding. Locally this is crumpled and contorted but overall the strike appears to be NW -SE parallel to the length of the pit and the dip steep to the north-east.

A thin band of ironstone conformable with the bedding is exposed along most of the south-west wall of the pit. Underlying this and exposed by irregularities in the pit wall is

greenish to yellowish brown clay and the sample showing 84% activity was taken from this band. Two additional samples were collected by the writer and these contained clay fractions of 46% and 41% which showed 69% and 79% activity relative to the standard.

There is no outcrop to the south-west of the quarry rim for 40' - 50' but beyond this, marble outcrops boldly. If the green clay extends to the edge of the marble outcrop, there are at least 1500 cubic yards of material containing above 50% of clay which has an activity of about 75% relative to the standard. The deposit may extend NW and SE along the strike.

The outcrop of trachyte mapped on the Truro 1 mile sheet was inspected by Haines, but no clay deposits were found associated with it.

3.3. Other Localities

Further samples have been collected from the Mid North, River Murray and Far North areas of the State. Of interest is a green clay from a limestone quarry near Stockwell which showed 35% clay fraction possessing 95% activity. No estimate of the volume of clay present has been made.

Clay from pockets associated with Tertiary limestone at Klein Point showed activities of 59% and 68%. This material is discarded, along with other unusable rock during the quarrying operations.

## 4. ANALYSIS OF RESULTS

In Table 4 all of the samples taken to date are grouped in geological age and as far as possible the environment under which the clay originated is indicated.

All samples showing activity of over 60% have been extracted and arranged in Table 5.

Of note are the consistently high results obtained from residual clays associated with limestones, particularly the Cambrian marbles from County Light.

The sedimentary marine rocks at Noarlunga and Willunga have been commercially tested with disappointing results.

Upstream from Loxton in the River Murray cliffs, the green clays reach a thickness of up to 30' in some places and generally there is little overburden.

Activities of about 70% are shown by clays from Yorke Peninsula but the samples represent thin bands below the surface which would not be economical to work.

Samples from the South-East containing a very low clay fraction are not worth further investigation.

## 5. SUMMARY & CONCLUSIONS

The survey has not disclosed any clays having outstanding detergent properties relative to the Fuller's Earth Standard. The sampling programme has covered a wide area of the State and included clays from all of the geological age Groups represented. It is concluded that it is not likely that large deposits of commercially useful detergent clays occur in South Australia.

Residual clays associated with limestones, particularly the Cambrian beds, show the best results. However reserves of clay in individual deposits will be small and erratically distributed.

Large reserves of clay, usually with little overburden, occur in the River Murray cliffs upstream from Loxton. Activity of this material is about the same as the Hackam clay which gave disappointing results when tested commercially.

M.N. Hiern
Geologist

7/2/63

TABLE I

Summary of Clay Samples collected in County Grey

| Hundred | Section | Bore No. | Depth | Description | Sample No. | % Clay fraction | % activity of clay fraction relative to Fuller's Earth standard |
|---|---|---|---|---|---|---|---|
| Penola | 535 | 1 | 2' -2'6" | Dark green clay | A122/62 | 20 | 56 |
| " | " | " | 5'2"-5'6" | Light green sandy clay | A123/62 | 10 | 44 |
| " | " | " | 5'9"-6'0" | Mottled yellow green clay | A124/62 | 14 | 50 |
| Penola | 445 | 2 | 3'6"-5'6" | Mottled grey and yellow sandy clay | A125/62 | 13.6 | 63 |
| Nangwarry | 140 | 3 | 4'0"-4'9" | Mottled red-yellow clays with ferruginous gravel | A126/62 | 16.0 | 37 |
| " | " | " | 6' -6'3" | As above | A127/62 | 16.6 | 28 |
| Mingbool | 400 | 4 | 3'3" | Mottled red and yellow clay | A128/62 | 12 | 54 |
| " | " | " | 4'0" | " " " " " | A129/62 | 13 | 59 |
| Mingbool | 383 | 5 | 4' -5' | Grey-yellow-red sandy clay | A130/62 | 14 | 60 |
| " | " | " | 5' -5'3" | Mottled red-yellow sandy clay | A131/62 | 10 | 57 |
| Blanche | 910 | 9 | 4'9" | Mottled red-yellow sandy clay | A132/62 | 20 | 32 |
| Blanche | 192 | 10 | 1'3"-2'3" | Mottled grey-brown-yellow clay | A133/62 | 20.8 | 54 |
| " | " | " | 4' -4'3" | Ditto | A134/62 | 36 | 51 |
| Young | 38 | 11 | 2'9" | Brown clay | A135/62 | 15 | 55 |
| " | " | " | 5'6" | " " | A136/62 | 18 | 46 |
| Hindmarsh | 228 | 12 | 4'6" | Black swamp clay | A137/62 | 32.8 | 50 |
| Riddoch | 104 | 13 | 2'6"-3'0" | Red-yellow mottled clay | A138/62 | 13.6 | 38 |
| " | " | " | 5'9"-6'6" | " " " " | A139/62 | 27 | 33 |

TABLE 2

Summary of Clay Samples collected in County Light

| Hundred | Section | Location | Sample No. | % Clay fraction | % activity of Clay fraction relative to Fuller's Earth standard |
|---|---|---|---|---|---|
| Belvidere | 1551 | St. John's Quarry. About 55' East of No.2 shaft on floor of small adit in quarry face. | A154/62 | 39 | 19 |
| Belvidere | 87.88 | Green's Phosphate Deposit, Koonunga No.1 Quarry. On SW wall of Quarry | A155/62 | 72 | 84 |
| Belvidere | 87.88 | Green's Phosphate Deposit. Koonunga No.1 Quarry. Southern wall of Quarry extension | A156/62 | 61 | 26 |
| Belvidere | 330.391 | St. Kitt's Phosphate Deposit. 175' south of No.1 shaft. | A157/62 | 25 | 24 |
| Belvidere | 330.394 | St. Kitt's Phosphate Deposit. Quarry floor | A158/62 | 48 | 37 |
| Belvidere | 88 | Koonunga No.1 Quarry. Check samples on south west wall of pit | A478/62<br>A479/62 | 46<br>41 | 69<br>79 |

TABLE 3

Summary of Clay Samples collected from various Localities

| Hundred | Section | Location | Sample No. | % Clay fraction | % Activity of Clay fraction relative to Fuller's Earth Standard |
|---|---|---|---|---|---|
| Mannanarie | 218 | Tertiary? clay underlying ferruginous gravels | A215/62 | 45 | 19 |
| Moorooroo | 207 | Cambrian Limestone Quarry, Stockwell | A268/62 | 35 | 95 |
| Mundoora | 449 | Murderoo Bay. Auger hole in gypsum swamp | A 54/61 | 35 | 15 |
| Dalrymple | 8 | Clay pockets in Tertiary limestone Adelaide Cement Co. Quarry — Red-clay | A427/62 | 41 | 59 |
| | | Green clay | A428/62 | 27 | 68 |
| Out of Counties | | River Murray Cliffs. Warakoo Station, N.S.W. Pleistocene clay | A260/61 | 76 | 48 |
| | | | A261/61 | 92 | 58 |
| | | | A262/61 | 90 | 31 |
| | | Wigan Military Sheet Lat.30°.29'30" Long. 136°44' Cretaceous? clay in dam. 2 m SW of Lake Blanche | A407/62 | 81 | 18 |
| | | Andamooka Military Sheet. Lat.30°42'20" Long.137°17' Weathered Cambrian shales, Willaroo Lagoon | A408/62 | 56 | 10 |
| | | Algebuckina Military Sheet, 20 miles SW Mt. Dutton Permian? shales. Collected by R. Heath | A419/62 | 66 | 16 |

TABLE 4

CLAY SAMPLES

1.

Samples from Pre-Cambrian - Palaeozoic Bedrock

| Age of Parent Rock | Source of Clay | Location Hundred | Section | % Clay | % Activity Rel. Fuller's E. |
|---|---|---|---|---|---|
| Proterozoic | Weathered Adelaide System Slates | Gilbert | 679 | 30 | 20 |
| " | " " " " | Tarcowie | 51 | 31 | 42 |
| " | " " " " | Kanyaka | 80 | 55 | 6 |
| " | " " " " | " | " | 37 | 24 |
| " | " " " " | Woolundunga | 86 | 26 | 12 |
| " | " " " " | Yackamoorundie | 201 | 36 | 13 |
| " | Weathered slates, Hesso Dam | Out of Counties | | 33 | 40 |
| " | " " Woocalla Clay | " " " | | 56 | 20 |
| " | " " Beda Creek | " " " | | 58 | 14 |
| " | " " " " | " " " | | 47 | 15 |
| " | " " Sunman Clay Deposit | Gillen | 9 | 49 | 24 |
| " | " " " " " | " | " | 54 | 16 |
| " | Hydrothermally altered? | Booleroo | 64 | 42 | 15 |
| " | Hydrothermally altered Jarvis white clay sep. | Talunga | 6397 | 23 | 21 |
| " | Weathered volcanic rocks, Depot Creek | Yarrah | | 23 | 10 |
| Cambrian | Weathered Kanmantoo Rocks | Monarto | 248N | 22 | 11 |
| Proterozoic | Weathered Slates Willaroo Lagoon | Out of Counties | | 56 | 10 |
| Cambrian | Clay pockets in limestone quarry | Moorooroo | 207 | 35 | 95 |
| " | Clay in St. Johns Phosphate Quarry | Belvidere | 1551 | 39 | 19 |
| " | Clay in Koonunga Phosphate Quarry | Belvidere | 88 | 72 | 84 |
| " | " " " " " | " | " | 61 | 26 |
| " | Clay in St. Kitts Phosphate Quarry | Belvidere | 330 | 25 | 24 |
| " | " " " " " " | " | " | 48 | 37 |
| " | Clay in Koonunga Phosphate Quarry | Belvidere | 88 | 46 | 69 |
| " | " " " " " | " | | 41 | 79 |
| Permian? | Weathered shales. Algebuckina | Out oc Counties | | 66 | 16 |

TABLE 4

CLAYS OF SEDIMENTARY ORIGIN (1)

| Age of Formation | Environment | Hundred | Section | Location | % Clay | % Activi |
|---|---|---|---|---|---|---|
| Permian | Glacial | Myponga | 84 | Bore 12 70- 80' Myponga Dam | - | 38 |
| | | | | " " 80-100' " " | - | 46 |
| | | " | " | Bore 5 75-135' " " | - | 41 |
| Permian | Glacial | Parawurlie | 70 | Green clays, Pt. Turton | 31 | 34 |
| | | | | | 32 | 38 |
| | | | | | 31 | 43 |
| Permian | Glacial | Dalrymple | 193 | Bed of salt swamp | 62 | 42 |
| Cretaceous ? | Shallow water, Marine? | OUT OF COUNTIES | | WIGAN MILITARY SHEET. Dam 2m. S.W. Lake Blanche | 81 | 18 |
| Tertiary | Marine | Noarlunga | 17 | Elutriated sample. Hackam clay | - | 75 |
| | | | | Selected shale | - | 46 |
| Tertiary | Marine | Curramulka | 101 | Coastal cliffs | 17 | 50 |
| | | | | | 25 | 50 |
| | | | | | 28 | 54 |
| Tertiary | Lacustrine | Yatala | 2146 | Yatala Vale Clay Pit | 38 | 15 |
| | | Yatala | 846 | Clay seam - Rosewall Sand Pit | 47 | 16 |
| | | | | " " " " " | 33 | 15 |
| | | Yatala | 5661 | Clay seam. Strahan's Sand Pit | 68 | 17 |
| | | Yatala | 5459 | Silt dam outlet - Denton's Sand | (64 | 36 |
| | | | | Washing plant | (84 | 33 |
| | | | | Clay seam - Denton's Sand Pit | 48 | 19 |
| Tertiary | Lacustrine | Mannanarie | 218 | | 45 | 19 |
| Quaternary ? | Lacustrine | Curramulka | 113N | May be Permian. E. & W.S. Tank site | 29 | 52 |
| " | " | Curramulka | 215 | Clay reworked | 21 | 53 |
| Quaternary ? | Lacustrine | Kilkerran | 60E | Tank site E.W.S. Bore 2 9'6"-10'. May be Permian | 54 | 71 |
| | | | | " " " 11'0"-12'6". Clay reworked | 58 | 49 |
| Quaternary ? | Lacustrine | Curramulka | 86W | 6'6" - 8'0" } May be Permian clay reworked | 47 | 71 |
| | | | | 8'0" - 8'9" } | 70 | 70 |
| Quaternary ? | Lacustrine ? | Kilkerran | B | Coastal cliffs | 23 | 61 |
| Quaternary ? | Lacustrine ? | Kilkerran | | Balgowan Jetty | 38 | 27 |

TABLE 4

Clays of Sedimentary Origin (2)

| Age of Formation | Environment | Hundred | Section | Location | % Clay | % Activity |
|---|---|---|---|---|---|---|
| Quaternary Recent | Lacustrine | Penola | 535 | Bore 1 2-2'6" | 20 | 56 |
| | | | | 5'2"-5'6" | 10 | 44 |
| | | | | 5'9"-6'0" | 14 | 50 |
| Quaternary Recent | Lacustrine | Penola | 445 | Bore 2 3'6"-5'6" | 14 | 63 |
| Quaternary Recent | Lacustrine | Mingbool | 400 | Bore 4 3'3" | 12 | 54 |
| | | | | 4'0" | 13 | 59 |
| Quaternary Recent | Lacustrine | Mingbool | 383 | Bore 5 4'-5' | 14 | 60 |
| | | | | 5'-5'3" | 10 | 57 |
| Quaternary Pleistocene | Lacustrine? | Blanche | 910 | Bore 9 4'9" | 20 | 32 |
| Quaternary Pleistocene | Lacustrine? | Nangwarry | 140 | Bore 3 4'0"-4'9" | 16 | 37 |
| | | | | 6'0"-6'3" | 17 | 28 |
| Quaternary Pleistocene | Lacustrine? | Blanche | 192 | Bore 10 1'3"-2'3" | 21 | 54 |
| | | | | 4'0"-4'3" | 36 | 51 |
| Quaternary Recent? | Lacustrine | Young | 38 | Bore 11 2'9" | 15 | 55 |
| | | | | 5'6" | 18 | 46 |
| Quaternary Recent | Lacustrine | Hindmarsh | 228 | Bore 12 4'6" | 33 | 50 |
| Quaternary Pleistocene? | Lacustrine | Riddock | 104 | Bore 13 2'6"-3'0" | 14 | 38 |
| | | | | 5'9"-6'6" | 27 | 33 |
| Quaternary Pleistocene | Marine | Willunga | 391 | Pt. Willunga Cliffs. 6'-18' | - | 59 |
| | | | | 18'-24' | - | 56 |
| | | | | 24'-30' | - | 54 |
| | | | | 30'-36' | - | 52 |
| | | Willunga | 390 | Pt. Willunga | 78 | 67 |
| Quaternary Pleistocene | Lacustrine? | Noarlunga | 566 | Amphitheatre 10-16 | - | 44 |
| | | | 567 | Heulitt Core 16-22 | - | 43 |
| | | | | 22-28 | - | 43 |
| | | | | 28-34 | - | 31 |

TABLE 4

Clays of Sedimentary Origin (3)

| Age of Formation | Environment | Hundred | Section | Location | | % Clay | %Activity |
|---|---|---|---|---|---|---|---|
| Quaternary Pleistocene? | Lacustrine | Murtho | 17 | River Murray Cliffs | | 46 | 90 |
| " " | " | Out of Counties | | Tilmy Dam - Chowilla Military Sheet | | 22 | 61 |
| " " | " | Paringa | 98 | River cliffs. 3 miles S.E. Lyrup | | 60 | 64 |
| " " | " | Paringa | 20 | " " | | 20 | 60 |
| " " | " | Murtho | 22 | " " | | 45 | 38 |
| " " | " | - | | Warakoo Station N.S.W. | | 76 | 48 |
| | | | | | | 92 | 58 |
| | | | | | | 90 | 31 |
| Quaternary Recent | Salt Swamp | Inkerman | 47 | 3" - 2'0" | | 44 | 24 |
| | | | | 6' - 7'6" | | 23 | 38 |
| Quaternary Recent | Tidal flats | Clinton | 72 | | | 26 | 27 |
| | | | | | | 16 | 24 |
| Quaternary Recent | Salt Lake | Out of Counties | | Arm of Lake Dutton | | 33 | 46 |
| " " | Clay pan | " | " | Yadlamalka MS. | | 45 | 36 |
| " " | Salt Lake | Copley | 204 | 1'6" - 4'6" | | 56 | 31 |
| | | | | 4'0" - 5'0" | | 46 | 20 |
| Quaternary Recent | Alluvial outwash | Davenport | 870 | Pt. Augusta Brickyard | | 32 | 27 |
| " " | " " | Napperby | 96 | Bore 12'-15' | | 19 | 52 |
| " " | Alluvial outwash | Mobilong | 114 | 0 - 30' | | 31 | 45 |
| Quaternary? | Clay pockets in Tertiary Limestone | Tickera | 1 | | | | Very high |
| Quaternary | Gypsum Swamp | Mundoora | 499 | | | 35 | 15 |
| Quaternary | Clay pockets in Tertiary Limestone | Dalrymple | 8 | Adelaide Cement C.Quarry. | Red clay | 41 | 59 |
| | | | | | Green clay | 27 | 68 |

TABLE 5

Summary of Clay Samples over 60% Active Relative to Fuller's Earth Standard

| Age of Formation | Environment | Hundred | Section | Details | % Clay | % Activi |
|---|---|---|---|---|---|---|
| Tertiary | Sedimentary Marine | Noarlunga | 17 | Hackam clay deposit. | - | 75 |
| Pleistocene | Sedimentary Marine | Willunga | 391 | Cliffs 6' - 18'. | | 59 |
| Pleistocene | Sedimentary Marine | Willunga | 391 | | 78 | 67 |
| Pleistocene? | Sedimentary Lacustrine | Murtho | 17 × | | 46 | 90 |
| " | " " | Out of Counties | | Tilmy Dam, Chowilla Military Sheet. | 22 | 61 |
| " | " " | Paringa | 98 × | Lyrup | 60 | 64 |
| " | " " | Paringa | 20 × | | 20 | 60 |
| Quaternary Pleistocene? | Alluvial | Kilkerran | 60E | 9'6" - 10' Tank Site } | 54 | 71 |
| " " | " | Curramulka | 86W | 6'6" - 8'0" " " } May be reworked | 47 | 71 |
| | | | | 8'0" - 8'9" " " } Permian Glacial Clay | 70 | 70 |
| " " | " | Kilkerran | B. | Coastal cliffs | 23 | 61 |
| Quaternary Recent | Sedimentary Lacustrine | Penola | 445 | 3'6" - 5'6" | 14 | 63 |
| " " | " " | Mingbool | 400 | 4'0" | 13 | 59 |
| " " | " " | " | 383 | 4' - 5' | 14 | 60 |
| Quaternary? | Residual clay pockets in Tertiary Limestone | Tickera | 1 | | | Very high |
| Quaternary? | Residual clay pockets in Cambrian Limestone | Belvidere | 88 | Koonunga Phosphate Quarry | 72 | 84 |
| | | | | | 46 | 69 |
| | | | | | 41 | 79 |
| Quaternary? | Residual clay associated with Cambrian marble | Moorooroo | 207 | Stockwell Quarry | 35 | 95 |
| Quaternary? | Residual Clay pockets in Tertiary Limestone | Dalrmyple | 8 | Adelaide Cement Co. Quarry | 41 | 59 |
| | | | | | 27 | 68 |

# APPENDIX

## Logs of Auger Holes drilled in County Grey.

HOLE NO. 1

DATE 13.2.62

Hd. Penola
Sect. 535

SITUATION: Eastern end of a swamp about an ½ of a mile North of the bitumen road out from Penola

| Depth | Description |
|---|---|
| 0' - 2' | Grey loam |
| 2' - 2'6" | Dark green clay |
| 2'9"- 3'6" | Light green clay slightly calc. |
| 3'6"- 5' | Light green slightly sandy clay |
| 5' - 5'2" | Siliceous L/S band |
| 5'2"- 5'6" | Light green sandy clay with some L/S nodules |
| 5'9"- 6' | Mottled yellow-green clay |
| 6' | Siliceous L/S |

End of hole at 6'

Logged by R. C. Haines

Samples taken

(1) 2' 2'6" [A 122/62]
(2) 2'9"-3'6"
(3) 3'6"- 5'
(4) 5'2"-5'6" [A 123/62]
(5) 5'9"-6' [A124/62]

## HOLE NO. 2

DATE: 13.2.62 Hd. Penola

Sect. 445

SITUATION In a slight depression on Northern End of open paddock enclosing the section.

| DEPTH | DESCRIPTION |
|---|---|
| 0' - 2'6" | Grey loam |
| 2'6" - 3'6" | Grey clayey loam |
| 3'6" - 5'6" | Mottled grey and yellow sandy clay tending to mottled grey-reddish-brown clay calc. in parts. |
| 5'9" - 6'3" | Calc. clay with siliceous L/S nodules |

End of hole at 6'3" Logged by R. C. Haines

Samples taken (1) 2'6" - 3'6"

(2) 3'6" - 5'6" [A 125/62]

HOLE NO. 3

DATE 13.2.62

Hd. Nangwarry

Sect. 140

SITUATION In firebreak between road and pine plantation on west side of section about 50 yards from the road.

| Depth | Description |
|---|---|
| 0' - 6" | Lateritic sands |
| 6" - 6' | Mottled red-yellow clays with some ferruginous gravel tending to slightly sandy mottled red-yellow clays. |
| 6' - 6'3" | Sandy mottled red-yellow clays |

End of hole at 6'3" still in sandy clay

Logged by R. C. Haines

Samples at (1) 6" - 3'

(2) 4' - 4'9" [A 126/62]

(3) 6' [A 127/62]

## HOLE NO. 4

DATE 13.2.62 Hd. Mingbool
Sect. 400

SITUATION 20 yds. inside the southern fence of the section

| Depth | Description |
|---|---|
| 0 - 1' | Grey sand |
| 1' - 2' | Grey-brown sand |
| 2' - 5' | Grey-brown sandy clay tending to Mottled red-yellow clay |
| 5' - 6' | Calcareous clay tending to merge into a rubbly L/S |

End of hole at 6' Logged by R. C. Haines

Samples at (1) 2'6"
(2) 3'3" [A128/62]
(3) 4' [A129/62]
(4) 4'9" - 5'

HOLE NO. 5

DATE

Hd. Mingbool
Sect. 383

| Depth | Description |
|---|---|
| 0' - 2'6" | Grey sandy soil |
| 2'6" - 5' | Grey-yellow-red sandy clay |
| 5' - 8'6" | Mottled red-yellow slightly sandy clay |

End of hole at 8'6" still in the same clay Logged by R.C.Haines

Samples at (1) 2'6
(2) 4' - 5' [A130/62]
(3) 5' - 5'6" [A131/62]

HOLE NO. 6

DATE: 13.2.62

Hd. Mingbool
Sect. 392

SITUATION: Just inside S.W. corner of the section

| Depth | Description |
|---|---|
| 0' - 7'6" | Red sand |

End of hole at 7'6" Logged by R. C. Haines

No Samples taken

REMARKS

This was dune sand and at the bottom of the hole there was no indication at all of clays appearing soon.

HOLE NO. 7

DATE 14.2.62. Hd. McDonnell

Sect. 74

| Depth | Description |
|---|---|
| 0 - 9"(average) | Grey slightly sandy soil |
| 9" (average) | Slightly weathered lava |

End of holes at depths varying from 6" to 1'

Logged by R. C. Haines

No Samples taken

REMARKS

7 Holes were sunk and all bottomed on the same lava which was too hard for the hand auger to penetrate. Local farmer on "Hillowie" H.S. said whole area was similar and that all bores in the vicinity went thru' this layer.

HOLE NO. 8

DATE 14.2.62

Hd. McDonnell

Sect. 822

| Depth | Description |
|---|---|
| 0' - 1'6" | Chocolate soil |
| 1'6" | Gambier L/S |

End of hole at 4'

Logged by R. C. Haines

No samples taken

REMARKS:

The L/S is very thick here as is shown in a large sink hole close to the North.

HOLE NO. 9

DATE: 14.2.62 Hd. Sect.

SITUATION: Close to western fence on the section

| Depth | Description |
|---|---|
| 0' - 4'9" | Brown slightly sandy soil. Very gradually merging into mottled red-yellow slightly sandy clay. |
| 4'9" - 6' | The clay merges into a L/S rubble |
| 6' | Massive L/S |

End of hole at 6' Logged by R. C. Haines

Samples taken (1) 4'9" [A 132/62]

HOLE NO. 10

DATE: 14.2.62

Hd. Blanche
Sect. 192

SITUATION: About 10 ft. to right of dirt road into Gambier L/S Quarries.

| Depth | Description |
|---|---|
| 0' - 1'3" | Grey sandy soil |
| 1'3" - 4' | Mottled grey-brown-yellow clays |
| 4' - 4'9" | Clay becomes darker and merges into Gambier L/S at |
| 5'3 | Gambier L/S |

End of hole at 5'3"

Logged by R. C. Haines

Samples taken (1) 1'3" - 2'3" [A133/62]
(2) 4' - 4'3" [A134/62]

HOLE NO. 11

DATE: 14.2.62

Hd. Young
Sect. 38

SITUATION: On floor of sand pit off the side of the road about 3' below surface level.

| Depth | Description |
|---|---|
| 0' - 2'6" | Brown sandy slightly clayey soil getting progressively more and more clay |
| 2'9" - 7'3" | Brown clay |

End of hole at 7'3" still in brown clay. Logged by R.C. Haines

Samples taken (1) 2'9" [A 135/62]
(2) 5'6" [A 136/62]

HOLE NO. 12

DATE: 15.2.62

Hd. Hindmarsh
Sect. 228

SITUATION: S. West corner of Section, about 15' from gate.

| Depth | Description |
|---|---|
| 0' - 2' | Grey-black slightly sandy soil |
| 2' - 4'6" | Black swamp clays |

End of hole at 4'6" where the clay was too wet to dig further.

Logged by R. C. Haines

Samples taken (1) 2'6" [Very organic]
(2) 4'6" [A 137/62]

HOLE NO. 13

DATE: 15.2.62.

Hd. Riddoch
Sect. 104

| Depth | Description |
|---|---|
| 0' - 2' | Grey-brown sandy soil |
| 2' - 8' | Red-yellow mottled clays |

End of hole at 8' still in same clays.

Logged by R. C. Haines

Samples taken (1) 2'6" - 3' [A 138/62]
(2) 5'9" - 6'6" [A 139/62]

## HOLE NO. 14

DATE: 15.2.62

Hd. Symon
Sect. 22

| Depth | Description |
|---|---|
| 0' - (6"-9") | Grey soil |
| (6"-9") - ? | Hard L/S |

End of holes on average at 6" - 9" Logged by R. C. Haines

No samples taken

REMARKS

6 Holes were sunk and all bottomed on the L/S which seems to underlie the topsoil over a large area in the vicinity.

HOLE NO. 15

DATE: 15.2.62

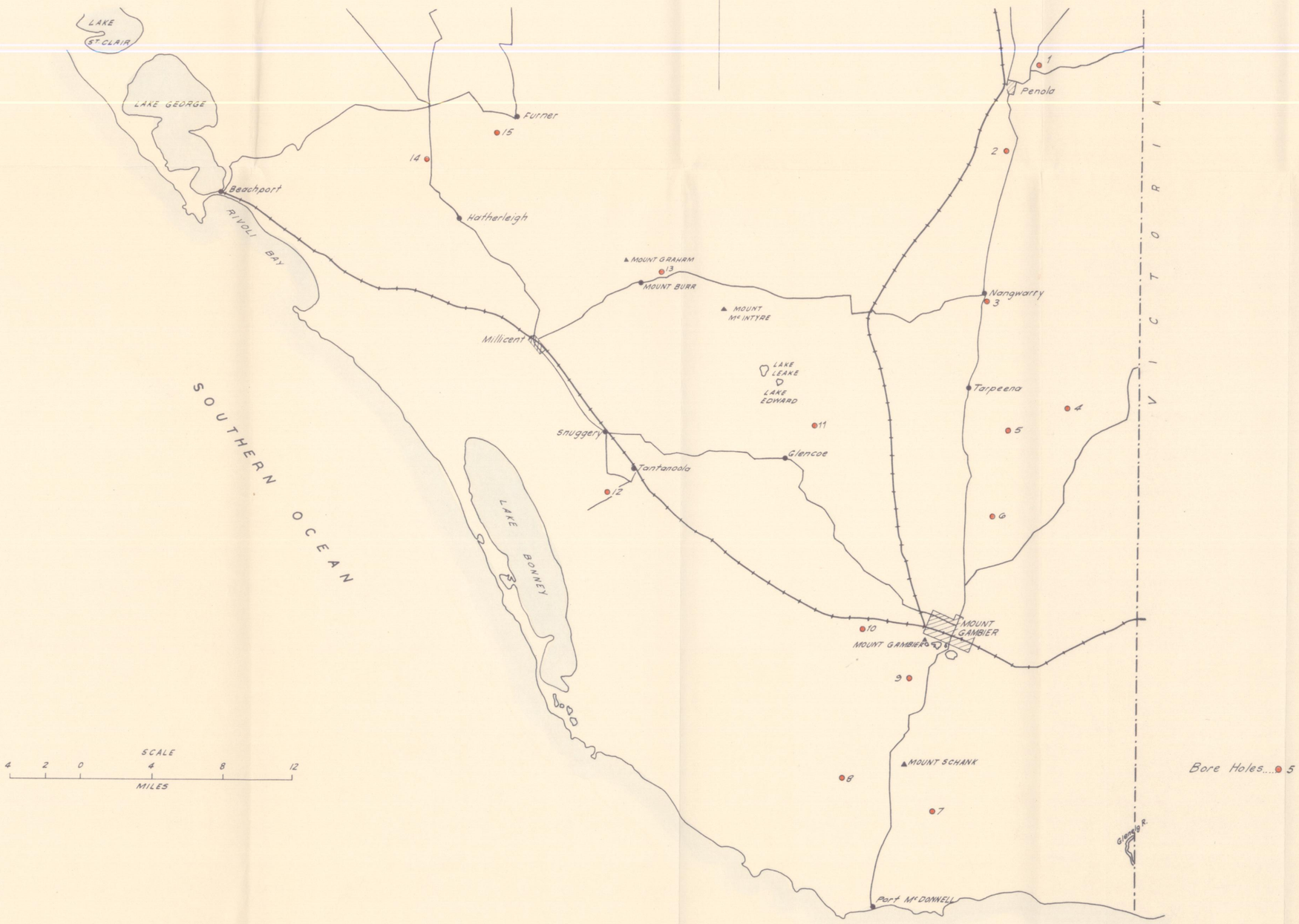
Hd. Kennion

Sect. 37

| Depth | Description |
|---|---|
| 0' - 7' | Red sand |

End of hole at 7' still in sand. Logged by R. C. Haines

No samples taken.




To accompany report by R.C. Haines

# S.A. DEPT. OF MINES

200—10.57 6987

## LOCALITY PLAN
## MONTMORILLONITE CLAY EXPLORATORY HOLES
## Co. GREY

| Associated Drawing | No. | No. | Amendment | Exd. | Date |
|---|---|---|---|---|---|
| | | | | | |

Req. No.
D.M.
Compiled from

| Approved | Passed | |
|---|---|---|
| | | Drn. |
| | | Tcd. A.O.W. |
| | | Ckd. R.R. |
| Director of Mines | | Exd. |

Scale 4 miles to 1 inch
62-105
Kd
Date 23-2-62