BAUXITE IN TASMANIA.

Bauxite was first recognised in Tasmania in August 1941. The initial discoveries were made in the Ouse district and subsequently outcrops were located at Campbell Town, St. Leonards and Swansea. The Tasmanian Mines Department has carried out the work of surveying the known outcrops, of systematically testing and sampling a block of ore comprising 500,000 tons of easily accessible bauxite on one of the areas, and of scout prospecting several other areas. The primary objective of the work was to show that Tasmania could supply commercial bauxite in commercial quantities, and to indicate the directions in which further prospecting could best be applied should a definite demand arise for the development of aluminium ore in this State.

The geological associations of the bauxite were carefully observed during all phases of the field work, and will be briefly described, since they form a useful guide to the prospecting and estimation of the deposits. The bedrock of the formations is almost invariably diabase (dolerite) of Trias-Jura age. This rock is of very widespread occurrence in Tasmania. In one locality a highly ferruginous bauxite was observed resting on Trias-Jura Sandstone, and in other instances there may be a small thickness of contemporary sediments separating the bauxite from the bedrock.

The bauxite formations are regarded as being derived from Early Tertiary accumulations of basaltic tuff, and are overlain by interbedded sands and clays with isolated areas of lignite. In most districts there has been a subsequent outpouring of basalt belonging to the Newer Volcanic series.

Deposits in the vicinity of Ouse generally give the impression of being preserved in basinal depressions in the diabase. Bedding planes are to be seen in many of the shafts penetrating the formations, and there is reason to believe that the majority of the material was originally water-sorted. Post-bauxite faulting is indicated by the variable dips prevailing both in the bauxite and in the overlying Tertiary sediments. Basalt cappings in the district are substantially flat-lying. As far as has been observed, geological conditions prevailing at St. Leonards are in every way similar to those encountered at Ouse. The Cressy Road deposit, 19 miles north-westerly from Campbell Town, also falls into the same category.

The formations near Campbell Town and Swansea have essentially the same associations as those in other parts of Tasmania, but there is a noticeable difference in the physical condition of some of the material. The deposits are also characterized by very flat dips, and in some places there is a strong suggestion that the original material was part of a flow rather than a water-sorted accumulation of fragmental nature.

The physical and chemical peculiarities of both the Ouse and Campbell Town types of bauxite are described in some detail under their respective sectional headings. The more important details regarding the nature and situation of the various deposits are also stressed, and a complete statement of prospect shafting results is made in the appendices.

The actual origin and mode of formation of the bauxite is more a matter for the expression of opinions than for the making of statements. Many and varied suggestions have been made as to the chemical processes by which silicate minerals can yield the hydroxides of aluminium and iron as a more or less silica-free residue, or as a transported deposit. It is generally agreed that carbonic acid and other solutions from decaying vegetable matter are active solvents of both iron and silica. At Ouse, lignitic formations occur in the overlying sedimentaries in close proximity to the bauxite, and it is feasible that, during the laying down of these lignites, conditions may have prevailed whereby decomposing solutions could have ready access to the waterlogged and porous volcanic tuff accumulations.

The iron and silica thus taken into solution would be transported as hydrosols and precipitated when circumstances became favourable. The ferric oxide would precipitate more readily than the silica, particularly if precipitation were dependent on the presence of electrolytes. This would explain the large proportion of the original iron content retained in the immediate vicinity of the bauxitic formations, as compared with the more complete removal of silica. It also provides a reasonable explanation for the numerous concretions of limonite found in the Tertiary sands immediately overlying the bauxite at Ouse.

The following ~~criteria~~ factors are suggested as having controlled the formation of the Tasmanian bauxites, and may be ~~invoked to account for~~ used as a basis for explaining the wide variations observed both in the depth and in the fluctuating alumina, ferric oxide, and silica contents of the various deposits :-

1. The precise nature of the original material (essentially volcanic tuff), particularly as regards its chemical composition, its thickness, and its permeability to solutions.

2. The presence of active disintegrating solutions, such as those derived from decomposing vegetable matter.

3. Conditions of drainage and their effect on the transport and precipitation of materials in solution.

4. Climatic influences, including the alternation of seasons.

OUSE DISTRICT.

By road, Ouse township is distant 55 miles in a north-westerly direction from Hobart. The principal bauxite outcrops lie in a belt extending from a point one and a quarter miles south-westerly to a point two and a quarter miles north-westerly of the township.

The typical ore bodies are markedly lenticular, and the bauxite is usually almost free from contamination by clayey matter in the central parts of the lenticles. In appearance, the ore varies greatly both as regards colour and texture. Pisolitic structures are common, particularly in the upper parts of the formations, but the bulk of the ore could better be described by the term "concretionary", as the segregations of banded limonite are often quite large in size, and are usually distributed rather sparsely through a brown mass of earthy texture in which alumina predominates over ferric oxide.

In many cases there is a hard and highly ferruginous capping, indicating the periodic precipitation of iron near the surface. Segregations of limonite are also prominent in the overlying sands, but are absent in the more impervious clayey bands which, however, are frequently stained, suggesting that there has been some passage of solutions carrying iron and manganese.

A typical section at Ouse would show a pisolitic zone close to the surface, passing gradually to a phase in which the ferruginous concretions are larger, but more widely separated. The pisolites are frequently rich in iron, but may carry alumina in excess of ferric oxide and sometimes comprise first grade ore. The underlying material of more earthy texture is the standard ore, and is generally very constant in average grade and in its freedom from clayey intrusions. Below this concretionary ore, there is frequently a dense, red layer of fine-grained, iron-rich bauxite resting on a band of clay. This basal concentration of iron may also take the form of thin inter-stratified bands of limonite, and more rarely of hematite. It appears to have been deposited from stagnant solutions trapped by the clay band.

Several shafts have been sunk well below the base of the commercial ore, and in some cases it is practicable to identify the wall rock, with reasonable certainty, as partially decomposed diabase. Between the recognisable bauxite and the recognisable diabase, there is a zone of varying vertical extent comprising material which is too siliceous to be called bauxite, but which may contain interlaminated bands of bauxite and clay. The actual transition point from the volcanic rock, with its associated clays, to the decomposed diabase, is usually indeterminate. Where a boundary line is shown on the sections it is to be regarded only as a probable mean position.

No shaft has yet penetrated normal unweathered diabase, although in some cases this may be seen to practically surround the depression in which the bauxite is preserved. From this it is inferred that the solutions responsible for breaking down the silicate minerals of the basaltic tuff also attacked the underlying diabase with, as would be expected, much less efficacy.

The outcrops included in the original survey were given numbers for convenient reference. Additional deposits have since been discovered and it is now more convenient to describe the occurrences under the heading of the estates on which they occur, rather than to adhere to the original numerical order.

GLADFIELD ESTATE -

This is the area on which the original discovery was made, and also the area on which most prospecting work has been carried out. The decision to thoroughly test a block of ore of commercial dimensions was made following the visit of the Commonwealth Copper and Bauxite Committee. This work was carried out at Gladfield for the following reasons :-

(i) It was obviously an area of very low overburden.
(ii) It was apparent that a large quantity of ore could be mined from one easily accessible block.
(iii) The area appealed strongly to members of the above Committee.

Area No. 2, on which the test block is situated, contains in actual outcrop some 220,000 square yards. To the north, west and south, the area is bounded by diabase, but on its eastern flank it passes under Tertiary clays and sands. As may be seen from the grid plan, the area delineated as containing 500,000 tons of ore omits the fringes of the outcrop, and takes in a section of ore lying under a thin covering of sand and clay. This selection of boundaries was designed to keep the grade of ore as uniform as practicable, and to present an area in which the percentage of contaminated ore would be kept to a minimum.

The actual volume of the test block has been calculated from sections drawn along the east-west grid lines. These are shown in detail on the plans. The ore body has been assumed to take the form of a series of prismoids lying between adjoining sections. The sectional areas are controlled by the thicknesses of useful ore intersected in the relevant shafts, interpolations being made where necessary.

In calculating the gross ore content of the test block at 500,000 long tons, a conversion factor of 1.6 tons per cubic yard was used. This figure was originally arrived at by rough displacement and weighing tests. It has since been confirmed by weighing the ore from a measured cubic yard, and while it is not put forward as an exact figure, it could probably only be improved upon by bulk weighing from measured excavations. No allowance has been made for the superficial moisture content, which is variable and may lie between ten and twelve percent. To obtain 500,000 tons on a "mined and dried" basis, it would, therefore, be necessary to include more of the fringe areas in the selected block.

In shafts within the defined area, 81 individual samples of commercial grade ore were cut from 344 feet of sample channel. These returned an average value per foot of sample of 41.2% "free" alumina and 3.2% "free" silica. Five of the samples, representing 24 feet of channel, exceeded 46% of alumina and averaged 47.2% Al_2O_3 and 3.0% SiO_2 "free" to caustic soda. From this it is apparent that smaller quantities of higher grade ore could be made available by selective mining. The bulk average of 41.2% Al_2O_3 represents a quantity of ore that could be quarried exceedingly cheaply, and is considered to be a fair average figure for the deposit as a whole. From 44 total analyses of Ouse bauxite, the average content of titanium dioxide is set at 2.17%. Area No. 2 has an average surface gradient of a little less than 6 degrees with a natural getaway for drainage. The overburden is generally less than three feet and rarely exceeds six feet.

It should be noted that the shaft grid on which the above calculations are based is not quite rectangular. This is due to a deviation of bearing in one of the first two lines to avoid the destruction of large trees. Subsequent lines of shafts were kept parallel to the original ones, but the deviation, which is less than three degrees, has no significant affect on the quantity determinations.

It is difficult to assess a tonnage rating for the portions of Area No. 2 outside the 500,000 tons zone. An extension of the bauxite into the unprospected areas at both ends of the eastern edge could materially improve the position, but the remainder of the fringe areas would be unlikely to provide more than 100,000 tons of ore, and the average grade of this would be somewhat lower than that of the central block. This deterioration of grade at the fringes of the deposit appears to be due to contamination with clayey material rather than to any major variation in the nature of the bauxite itself. It is, therefore, probable that washing, or some other beneficiation process, could bring the grade of much of the fringe ore up to that of the substantially clay-free central block.

There are three other small areas on Gladfield, Nos. 3, 4 and 5, on which no work has been carried out. From the originally surveyed areas of outcrop, and with due regard to the conditions found to prevail on Area No. 2, the combined probable yield from these small patches is now placed at 75,000 tons.

In some areas, it has been found that the grade of outcropping surface material is not a true indication of the average grade of the deposit. For this reason, it is not proposed to predict the average grades of large tonnages of ore which have been inadequately sampled. In the case of the minor areas on Gladfield, all that can be said is that the apparent physical nature of ore is similar to that on the major area, and that limited sampling indicated a similar grade of surface material in both cases.

GLEN DHU ESTATE -

Glen Dhu Estate adjoins Gladfield and the fringes of bauxite Area No. 2 actually cross the east-west boundary fence between the two properties. Area No. 1 is situated entirely on Glen Dhu and undoubtedly contains a considerable quantity of average ore, but the exposures are very variable and some of them are quite unattractive. For this reason, a depth factor of only 4 feet is applied to the surveyed area of 48,000 square yards, giving a probable content of approximately 100,000 tons. There has been no official shaft sinking on the area, but two shallow holes put down by Mr. J. Brock met with poor results. One encountered clay only and the other is described as Shaft No. 12, in Appendix No. 1. In view of the general lack of information little can be said regarding this area.

LENTWARDINE ESTATE -

Areas Nos. 6, 7, 8, and 9 are situated on Lentwardine Estate and for the most part conform to the Gladfield type, rather than to that of Lachlan Vale, both in the nature and the situation of the ore. With the exception of Area No. 7, the bauxite has a fairly uniform easterly dip coinciding with the surface slope, so that the overburden remains light throughout. On these areas also, there has been no official shaft sinking and estimates of quantity and grade necessarily lack solid foundation. Mr. Brock put down three holes which are described as Shafts Nos. 5, 6, and 7, Appendix No. 1. Surface samples on the areas were deliberately chosen as representing extreme types of material, and do not provide any useful indication of the average grade.

The combined surface areas of the outcrops total 66,000 square yards, and Area No. 7 may have an easterly extension under the Tertiary sands and clays. The areas are all easy of access, and in view of the uniformly low overburden could be easily prospected to provide an additional tonnage of proved ore. Assuming an average thickness of 9 feet, there would be 300,000 tons of ore available, and the grade is regarded as being about the average for the district.

LACHLAN VALE ESTATE -

Areas Nos. 10, 11 and 12 on Lachlan Vale Estate are the outcrops of formations dipping in an easterly direction at from 6 to 15 degrees, which is somewhat steeper than the prevailing dips in the other areas. The bauxite also acquires cover more rapidly because the dip is opposed to the surface slope. In texture, the ore is more typically pisolitic than that of the Gladfield area. There are also, in parts, very prominent concentrations of iron in the capping, giving rise to a type of ore in which ferric oxide predominates over alumina. Ore of this nature occurs at Gladfield also, but in that area apparently represents a lesser proportion of the whole.

Surface samples at Lachlan Vale ranged from 39.66% to 42.30% of total alumina, the corresponding silica contents being 3.36% and 4.22% respectively. Samples from shafts (Appendix No. 1, Shafts Nos. 100 to 106) showed for normal material, an approximate range of from 35% to 42% of *free* alumina, and from 2% to 4% of *free* silica. In local concentrations the ferric oxide content may reach 45% while in other places it may be as low as 25%. This wide variation in the iron content has made it impracticable to assess an average grade on the few results available.

Prospecting work on the Lachlan Vale deposits has consisted of the sinking of six shafts at intervals along the outcrops, and a seventh was set back 125 feet to test the continuity of the formation. This shaft penetrated 20 feet of clay and sand before reaching the capping, under which it passed through 14 feet of bauxite. The average thickness of the formation as sampled in these shafts was over 12 feet, but in view of the irregular distribution of the iron, it cannot be assumed that a uniform sheet of bauxite is available. The degree of persistence of the formations under overburden is also speculative, so that while it may be safely stated that 250,000 tons of ore are in sight, the determination of an average grade and the proving of further tonnages will depend on the results that may be obtained from more extensive prospecting work.

Approximately one mile easterly from Areas Nos. 10, 11 and 12 there is a further outcrop of bauxite in a cultivated paddock bordering the river flats. The potentialities of this outcrop do not appear to be very great, but it may persist below the surface to some extent.

The following deposits have been located on other estates in the district and are so situated that their extent can be determined only by shaft sinking or by boring.

LAWRENNY ESTATE. -

There is an outcrop of bauxite at the "Red Rocks", near Dunrobin Bridge. This is seen only as a section in the Derwent River cliffs, and the easterly dip prevailing elsewhere would carry the formation back under the flat pasture land.

KENMERE ESTATE. -

A small outcrop breaks through Tertiary sands in a paddock about midway between the homestead and the new Tarraleah road.

CLEVELAND ESTATE. -

A track, which leaves the new Tarraleah road at 7.2 miles from the West Coast road junction, runs northerly to a bauxite area about 1,100 yards away. The actual outcrop is approximately 6 chains by 4 chains, but the bauxite appears to pass under sands and clays, which in turn underlie basalt.

FATHER OF MARSHES. -

This area is reached by an old saddle pad which commences at Black Bob's River, a quarter of a mile upstream from the new Tarraleah road bridge. The track heads northerly for about 3 miles to a water divide south of the marshes. Here the bauxite occurs as a dipping formation overlying diabase and underlying basalt. The outcrop is indefinite and largely obscured by talus.

SUMMARY. -

The present position in the Ouse district is briefly that, at Gladfield, a block of ore has been proved to contain 500,000 tons of bauxite with an average grade of 41.2% of "free" alumina and 3.2% of "free" silica. Further blocks of ore, which have been thoroughly examined but not sufficiently prospected or sampled, occur on Gladfield, Lachlan Vale, Lentwardine and Glen Dhu estates. These are estimated to contain 825,000 tons of bauxite, but further prospecting is necessary to substantiate this estimate, and to provide a reasonable basis for calculating an average grade.

Further afield in the district, there are four more occurrences concerning which there is insufficient data to make useful estimates. There are also large tracts of country in which the geological conditions would permit of the occurrence of buried bauxite deposits, and if a demand for greater tonnages were to arise, favourable localities could be selected for scout boring.

With these considerations in mind it may be stated that the prospecting work carried out since the preparation of the original report has substantiated the belief expressed therein that the potentialities of the district should not be rated at less than 2,000,000 tons.

CAMPBELL TOWN DISTRICT.

The parent material of the bauxite deposits in the Campbell Town area is assumed to have been similar to that of the formations at Ouse, with the reservation that, in the former case, accumulation by flowage is prominent, while in the latter, water-sorting of fragmental material appears to have been more prevalent.

As far as has been observed, the alterational processes bringing about the desilication of the parent material have been less effective in the Campbell Town area, particularly as regards the vertical extent of the resultant bauxite. At Campbell Town there also appears to have been a more general tendency for the leached iron to be re-precipitated in the immediate vicinity, and this has resulted, over the bulk of the deposits, in the non-siliceous product being an intimate mixture of the hydroxides of iron and aluminium, the iron frequently being dominant.

This fact was not at first evident as the original surface samples were most encouraging, one reaching the grade of 51.3% Al_2O_3 , 1.76% SiO_2, 15.87% Fe_2O_3, 1.6% TiO_2, and 27.72% ignition loss. Several other samples were almost as good, and similar material may still be picked up along some of the outcrops. Sub-surface sampling, for the most part, revealed ore of a much lower grade, the solid formation being richer in iron and poorer in aluminium, although the silica percentage was found to be similarly low in both cases.

One type of enrichment in alumina may be illustrated by the section of Shaft No. 8 at Meadowbank, where Sample No. CC18 returned 36.2% of alumina and 6.2% of silica by the caustic soda method. The ore in this section consists of hard nodules in a softer tougher matrix. Selecting the hard nodules only, the assay result improved to 51.0% of alumina and 1.1% of silica. These nodules are apparently concretionary and have probably been deposited from colloidal solution about neuclei in the partially altered parent rock. The nodules themselves are fine grained, hard and brittle. Similar material also occurs in bands close to the surface, with little or no matrix, but under these circumstances there is usually a much higher proportion of ferric oxide and a lower alumina content. Substantial quantities of this ore could be isolated in bands up to 6 feet in thickness, but the average alumina content would probably not exceed 35%.

In zones of more complete alteration the distinction between matrix and nodules practically disappears, and the whole rock becomes a mottled heterogeneous mass, often quite friable and rotten. This is typically the best ore and provided the material of the higher grade surface samples, but it has only been located in narrow bands of limited areal extent. It is characterized by patches and cavity linings of pale green to iron-stained gibbsite, often exhibiting mammillary structure. Thin seams of limonite are common and small pockets of kaolin also occur. The outlines of large felspar crystals are sometimes perfectly preserved, and recognisable fragments of basalt leave little doubt as to the origin of the material.

As with the Ouse areas, the Campbell Town deposits have been named according to the estates on which they occur. They will be described in their order of discovery.

ROSEDALE - MEADOWBANK AREA -

Prospecting work in the Campbell Town area was commenced on a series of outcrops which extend for over a mile and a half across the boundary between Rosedale Estate and Meadowbank Estate and are situated about three miles north-westerly from the township.

The outcrops have a general north-west to south-east trend and are remarkably level for, from end to end, there is less than a foot difference in elevation between points recognisable as representing the top of the formation. The cross-fall is also negligible, although it is considered from the attitude of the diabase bed-rock that the south-westerly flank is the nearer to the margin of the volcanic accumulation from which the bauxite has been derived. This contention is supported by the presence of remnants of the formation occurring in an easterly direction, whereas to the west such traces are absent.

The formation was once continuous throughout its entire length, but erosion has broken it up into six outcrops with a total area of nearly 41 acres. Basal remnants continue on in a south-easterly direction, indicating that this was the longitudinal trend, and that the areas on Riccarton Estate, which lie about $2\frac{1}{2}$ miles to the east, represent the easterly flank of the same formation.

The first work carried out consisted of the sinking of a group of seven well spaced shafts on the Rosedale, or north-western end. These were all bottomed in clayey formation, which was reached at various depths, as may be seen from Appendix No. 2, which gives full details of the shaft sections with the relevant assay determinations.

The best result from this group was obtained in Shaft No. 7, where a 30-inch sample, analysed by the usual caustic-soda method, reached the grade of 49.0% Al_2O_3 and 1.9% SiO_2. The next two feet of ore deteriorated to 39.4% Al_2O_3 and 6.3% SiO_2, below which the formation became too clayey to be regarded as bauxite. Shaft No. 6, is only 260 feet away, and is similarly situated as regards surface indications, but failed to intersect any ore that could be termed commercial bauxite.

Shaft No. 5 cut through 7 feet of material averaging 33.3% Al_2O_3 and 2.8% SiO_2. In No. 4, four feet of bauxite returned 44.7% Al_2O_3 and 3.7% SiO_2, but the remaining shafts failed to reveal any useful formation except an 18-inch band in Shaft No. 2 which returned 36.6% Al_2O_3 and 2.3% SiO_2.

These shafts proved the existence of bauxite of similar quality to that selected in the higher grade surface samples, but they also indicated that such ore is only to be found in relatively thin layers. The inconstancy of these layers is demonstrated by the fact that it is impracticable to connect them up from shaft to shaft.

Two additional shafts, Nos. 20 and 21, were subsequently sunk on the most northerly outcrop on Rosedale. These shafts are apparently similarly situated and passed through corresponding strata. They are only 119 feet apart, but as was the case with Nos. 6 and 7, one shaft met good ore and the other showed a reversal in the relative proportions of alumina and ferric oxide, the average grade falling from 44% Al_2O_3 to 33% Al_2O_3. The silica was ~~too~~ low in both cases.

The north-westerly tip of the formation grades over a vertical interval of 60 feet from bauxite to weathered vesicular basalt, to decomposed volcanic tuff, to decomposed diabase and finally to fresh diabase. Samples were broken representing the various stages and the detailed petrology of the section will be undertaken as soon as opportunity offers.

On the Meadowbank end shaft sinking met with similar results. The first batch of 12 well spaced shafts failed to intersect any first grade ore that could be channel sampled. Samples exceeding 50% Al_2O_3 may be selected from some of the shafts and outcrops, but this grade of material was not encountered in a massive formation.

It was then decided to sink a group of shafts at 25-ft. intervals in an endeavour to isolate a definite area of solid bauxite. These shafts were set out on the strongest part of the formation and in an area where surface material of a 50% Al_2O_3 grade could be obtained. The 20 shafts in this group are designated by letters instead of numbers. No shaft was carried beyond 9 feet in depth so that a full section is not disclosed.

Only one shaft encountered ore containing more than 40% Al_2O_3, and the 14 samples cut averaged 34.5% Al_2O_3 and 1.5% SiO_2. The shafts were not completed to sufficient depths to enable a reliable estimate to be made of the extent of this class of material, but to a depth of 9 feet it would not exceed 3 feet in average thickness.

Shafts Nos. 22 and 23 were sunk on Outcrop Area No. 8, near the abbutal of Meadowbank on the main Hobart-Launceston road. A surface sample from the actual outcrop assayed 40.16% Al_2O_3 and 2.28% SiO_2, but the two shafts, which were 100 feet apart and located only a few feet from the outcrop, both reached a depth of 8 feet without meeting solid ore.

The summarized position as regards the Rosedale-Meadowbank area is that, although 50% Al_2O_3 ore exists in small pockets, a reasonably thorough shafting campaign has failed to locate either ore of this class, or any ore in excess of 40% "free" Al_2O_3, in quantities adapted to bulk mining methods. Ore of good quality could be won in small quantities by exploiting the higher grade patches. This would require extensive prospecting and careful, competent supervision of the actual extraction as the grade varies quickly with remarkably little change in the appearance of the formation. There is also a possibility that in some parts the higher grade nodules could be mechanically separated from the more siliceous matrix as a 50% Al_2O_3 concentrate. In the event of a definite demand arising, an investigation should be made into the available quantity and cost of production of both selectively mined and mechanically purified ore.

RICCARTON AREA -

The Riccarton deposits lie immediately to the north and east of the Campbell Town boundary. The outcrops have a general flat westerly to south westerly dip, but there are many isolated variations. For example, the southern flank of Area No. 13 dips a little to the west of north at 10 degrees, while the northern flank of the adjoining area has a pronounced southerly dip. These local variations in dip are suggestive either of small basinal structures or of slumping, such as occurs in the partially consolidated surface of a lava flow when there is a delayed withdrawal of molten material from below. Since basalt is known to occur beneath the bauxite in the Rosedale-Meadowbank area, and since the intervening country was once an extensive lava field, the latter explanation appears the more probable.

Surface material in the solid parts of the Riccarton outcrops has a strongly developed pisolitic structure and is obviously highly ferruginous. Prospect shafting was limited to opening up a few faces to test the grade of the ore, the hard capping of which proved to be richer in iron than that of the Rosedale-Meadowbank areas, while the underlying softer ore is apparently similar in both cases. Samples representative of the two classes of ore were cut from Shaft No. 1 on Area No. 14. These returned 32.2% Al_2O_3, 1.2% SiO_2(pisolitic capping) and 37.1% Al_2O_3, 2.1% SiO_2(soft ore) respectively. Check analyses were then made and the corresponding total values were shown to be:-

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Capping, - Al_2O_3 34.59%, SiO_2 1.75%, Fe_2O_3 39.93%, TiO_2 4.23%

Ignition Loss. - 18.99%

Soft Ore, - Al_2O_3 39.32%, SiO_2 2.43%, Fe_2O_3 31.18%, TiO_2 4.39%

Ignition Loss. - 21.71%

It is interesting to note that these titania percentages are higher than any recorded from the Ouse district, although one sample from Rosedale and one from Fordon exceeded 5% of titanium dioxide.

The other shafts on Riccarton revealed similar conditions but it was not practicable to prospect the whole of the area, particularly as the capping was difficult to break with hand tools. There are five outcrops having a total area within the adopted boundaries of 28 acres. The probable value of the formation as a whole may reasonably be assessed by analogy with the Rosedale-Meadowbank area, which is essentially similar except as regards the high grade surface material which is lacking at Riccarton, where the best assay result obtained was 43.16% Al_2O_3 and 3.68% SiO_2 "free" to caustic soda. This sample was broken in a shallow road gravel quarry on the northern tip of Area No. 15.

FORDON AREA -

On the York Park area of Fordon Estate, 13 miles northerly from Campbell Town, there are three outcrops of the bauxitic formation. The largest of these covers 40 acres and takes the form of a flat-topped ridge with a north-west to south-east trend similar to that of the Rosedale-Meadowbank area. The dip coincides with the direction of the ridge, being flat at the north-westerly end and steepening as the formation weakens to the south-east. There is no appreciable cross-fall. The bed-rock is diabase and Tertiary sands and clays occurring in the vicinity appear to have overlain the bauxite.

Eight shallow shafts were sunk and the material strongly resembles that encountered in the Rosedale-Meadowbank area, except that it is a little richer in ferric oxide, a little poorer in alumina, and lacks the higher grade patches near the surface. Ten samples averaged 31.1% Al_2O_3 and 1.7% SiO_2 "free" to caustic soda.

The shafts were not carried deep enough to test the whole of the formation, but the results are regarded as conclusive and place the material outside the present commercial range as a source of aluminium. The two smaller outcrops were not tested by shafts but may be considered to be of similar grade.

BASKERVILLE AREA -

Baskerville Estate is 7 miles westerly from Campbell Town, and was taken up as a bauxite area to prospect a formation outcropping in the vicinity of some road gravel pits. This formation certainly bears a superficial resemblance to other occurrences in the district and probably has a somewhat similar origin. A series of nine shallow shafts was sunk but all passed through highly siliceous material and no commercial bauxite was encountered, as may be seen from the shaft logs.

The material, where solid, resembles a hard, baked clay, and is fine grained and fairly uniform in texture, but is a mottled red and white in colour. Assays by the caustic soda method showed that only a low percentage of the material was taken into solution. A complete analysis revealed the following constituents :-

Al_2O_3 29.72%, SiO_2 50.60%, Fe_2O_3 1.85%, TiO_2 2.00%
P_2O_5 0.08%, FeO 0.38%, CaO 0.40%, MgO Trace, moisture 3.35%
Ignition loss 12.00%.

There are several possible explanations for the development of this deposit which occurs with geological associations similar to those of the bauxite, but since no part of the formation appears to bear any chemical resemblance to bauxite these need not be considered here.

Bauxitic formations typical of the district were also inspected near the road bridge over the Fingal railway, 7 miles northerly from Campbell Town, and on the Cressy Road, 19 miles north-westerly from Campbell Town. The former area would normally have merited prospecting with the other areas in the district, but since the land is occupied for military purposes, no work was carried out. At the Cressy Road locality bauxite of attractive appearance may be traced for a considerable distance on both sides of the road, but the outcrop offers no promise of providing ore for bulk quarrying. The material itself resembles ore from the Ouse district more closely than that of other formations near Campbell Town.

SWANSEA AND ST. LEONARDS.

Inspection surveys have also been made of bauxite occurrences at Swansea and St. Leonards. Preliminary reports were prepared and a few surface samples were analysed. Relevant extracts from these reports are quoted by the Director of Mines in his summary, "Bauxite in Tasmania", and need not be repeated here. These occurrences are of minor importance at present, but both areas offer scope for developmental prospecting and the proximity of the St. Leonards deposit to Launceston enhances its commercial potentialities.

SAMPLING DATA.

The appendices hereto set out in schedule form the formations passed through in each prospecting shaft. Appendix No. 1 deals with shafts in the Ouse district, and Appendix No. 2 includes all shafts in the vicinity of Campbell Town. The positions and numbers of all these shafts are shown on the appropriate plans.

The material of the bauxitic formations is essentially weathered rock in various stages of alteration. In describing the shaft sections it has not, therefore, been practicable to use precise petrological terminology. The terms used are intended to aid in the recognition of the type of material on inspection. After considerable experience in sampling the bauxite at Ouse, it has been found that a reasonable estimate of grade can usually be made from an examination of the appearance and texture of the clean rock as exposed on a shaft wall. Unfortunately, this does not apply to nearly the same degree in the Campbell Town area.

All official sampling of the Tasmanian bauxites has been carried out by the writer personally. The shaft walls were first cleaned down with a pick and the sample was then cut by hammer and chisel. Unless specifically stated to the contrary the sample in each case was cut straight down the wall of the shaft over the interval indicated, clay and other impurities being included with the sample.

The weight of sample was kept, as nearly as could be estimated, to one pound per foot of channel. The length of channel included in each sample was varied to conform with obvious changes of strata, but as far as circumstances permitted a standard length of 5 feet was adhered to.

All assay figures, unless otherwise stated, refer to determinations of "free" values by the caustic soda method, these being specified as "compounds soluble in 10% caustic soda solution digested at a gentle boil for three hours, one hundred cubic centimetres of solution being utilized for one gram of sample. Iron and titanium are not taken into solution. Spun iron crucibles are used for digestion to allow of the estimation of "free silica". Apparatus is used to prevent the alteration of original volumes of digestion solutions by condensation of steam."

(Sgd.) D. R. Dickinson,

EXTENSION OFFICER.

Mines Department,
HOBART.

18th January, 1943.

SCHEDULE OF BAUXITE PROSPECTING SHAFTS-OUSE DISTRICT.

N.B. All assay values, except where otherwise stated, refer to determinations by the caustic soda method. The term "concretionary bauxite" refers to sub-pisolitic bauxite carrying nodular concretions of iron minerals.

Shaft No. 1 ("Gladfield")

0'	- 1'0"	filling
1'0"	- 7'0"	clay with isolated boulders of bauxite
7'0"	- 13'3"	friable, variegated bauxite Sample No. C58, Al_2O_3 36.4, SiO_2 6.3
13'3"	- 14'6"	iron-rich, clayey bauxite
14'6"	- 16'6"	clay.

Shaft No. 2 ("Gladfield")

0'	- 2'0"	soil and bauxite boulders
2'0"	- 6'6"	friable, concretionary bauxite Sample No. C3, Al_2O_3 42.20, SiO_2 1.96 N.B. Sample channel cut in corner of shaft to avoid two thin clay seams.
6'6"	- 10'6"	friable, concretionary bauxite Sample No. C26, Al_2O_3 41.32, SiO_2 3.00
10'6"	- 13'6"	bauxite and clay mixture Sample No. C27, Al_2O_3 26.04, SiO_2 5.68
13'6"	- 18'0"	clayey bauxite with bands of clay Sample No. C28, Al_2O_3 20.36, SiO_2 20.68

Shaft No. 3 ("Gladfield")

0'	- 2'6"	soil with gravel and bauxite boulders (removed as road material).
2'6"	- 10'9"	pisolitic bauxite passing to concretionary bauxite Sample No. C1, Al_2O_3 47.12, SiO_2 1.92
10'9"	- 14'6"	concretionary bauxite Sample No. C5, Al_2O_3 41.07, SiO_2 2.82 N.B. Analysis by method "A" (total values).
14'6"	- 17'6"	bauxite, becoming dense, brown and iron-rich at base Sample No. C16, Al_2O_3 33.92, SiO_2 2.37 N.B. Sample channel extended from 12'6" to 17'6"
17'6"	- 18'0"	clay seam, dip 17° southerly
18'0"	- 24'0"	? decomposed diabase Sample No. S24, Al_2O_3 30.66, SiO_2 35.75 Fe_2O_3 16.55, TiO_2 1.57, Ignition Loss 14.58 N.B. Grab sample, method "A" analyses (total values).

Shaft No. 4 ("Gladfield")

0'	- 1'0"	soil with boulders of bauxite
1'0"	- 5'0"	yellow pisolitic bauxite, becoming clayey at base Sample No. C2, Al_2O_3 39.68, SiO_2 3.82

Shaft No. 5 ("Lentwardine")

0'	- 3'6"	soil and clay
3'6"	- 7'0"	hard, pisolitic bauxite.

Shaft No. 6 ("Lentwardine")

0'	- 1'0"	soil with boulders of bauxite
1'0"	- 11'0"	pisolitic bauxite, passing to ochreous bauxite and becoming clayey at base Sample No. S20 (Grab sample from 5'0") Al_2O_3 44.28, SiO_2 2.56 Sample No. C4 (Channel 4'6" - 10'6") Al_2O_3 39.11, SiO_2 12.64 (Method "A", total values).

Shaft No. 7 ("Lentwardine")

0'	- 6'0"	clayey soil with boulders of bauxite.

Shaft No. 8 ("Lachlan Vale")

0'	- 1'0"	soil
1'0"	- 8'0"	clay

Shaft No. 9 ("Lachlan Vale")

0'	- 3'0"	clay
3'0"	- 3'9"	sandy clay
3'9"	- 7'3"	clay
7'3"	- 8'9"	sand, current bedded, dip 19° at N65°E
8'9"	- 20'0"	fine, white clay, iron stained in parts. Shaft abandoned before reaching bauxite.

Shaft No. 10 ("Lachlan Vale")

Shaft not commenced.

Shaft No. 11 ("Lachlan Vale")

0'	- 1'0"	soil
1'0"	- 8'0"	white clay

Shaft abandoned before reaching bauxite.

Shaft No. 12 ("Glen Dhu")

0'	- 5'6"	yellow bauxite, finely pisolitic Sample No. S23, Al_2O_3 37.86, SiO_2 6.14 N.B. Grab Sample: (Method "A", total values).
5'6"	- 9'0"	yellow bauxite, sub-granular Sample No. C6, Al_2O_3 30.50, SiO_2 12.69 (Method "A", total values).

Shaft No. 13 ("Gladfield")

0'	- 2'6"	pisolitic bauxite.
2'6"	- 7'6"	pisolitic, passing to concretionary bauxite Sample No. C10, Al_2O_3 44.24, SiO_2 2.17
7'6"	- 12'6"	concretionary bauxite Sample No. C11, Al_2O_3 42.03, SiO_2 2.77
12'6"	- 17'6"	concretionary bauxite Sample No. C12, Al_2O_3 41.92, SiO_2 3.18
17'6"	- 19'0"	dense, iron-rich bauxite Sample No. C17, Al_2O_3 31.28, SiO_2 2.96
19'0"	- 21'0"	clayey bauxite Sample No. C18, Al_2O_3 26.28, SiO_2 8.80

Shaft No. 14 ("Gladfield")

0'	- 1'0"	soil with boulders of bauxite
1'0"	- 7'0"	yellow, pisolitic bauxite, clayey at base Sample No. C7 Al_2O_3 29.95, SiO_2 20.04 (Method "A" total values).

Shaft No. 15 ("Gladfield")

0'	- 1'0"	soil
1'0"	- 5'0"	yellow to purple pisolitic bauxite Sample No. C55, Al_2O_3 35.4, SiO_2 3.9
5'0"	- 6'0"	band of hematite
6'0"	- 9'0"	clay.

Shaft No. 16 ("Gladfield")

0'	- 2'6"	soil with boulders of bauxite
2'6"	- 7'6"	yellow, pisolitic bauxite Sample No. C14, Al_2O_3 45.87, SiO_2 6.27

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Shaft No. 16 Contd.

7'6" - 10'6" friable bauxite
Sample No. C15, Al_2O_3 43.50, SiO_2 5.10

10'6" - 12'6" concretionary bauxite
Sample No. C19, Al_2O_3 38.60, SiO_2 6.36

12'6" - 16'4" concretionary bauxite
Sample No. C20, Al_2O_3 43.52, SiO_2 6.08

16'4" - 16'6" clay seam
16'6" - 19'0" clayey mixture.
Sample No. C21, Al_2O_3 23.20, SiO_2 10.52

Shaft No. 17 ("Gladfield")

0' - 2'0" soil and gravel
2'0" - 20'0" white clay, iron-stained in parts.

Shaft No. 18 ("Gladfield")

0' - 1'0" filling
1'0" - 2'6" soil with small boulders of bauxite
2'6" - 5'6" pisolitic bauxite
Sample No. C22, Al_2O_3 40.80, SiO_2 2.64

5'6" - 8'9" pisolitic bauxite
Sample No. C13, Al_2O_3 43.22, SiO_2 5.25

8'9" - 11'9" bauxite with patches of clay
Sample No. C23, Al_2O_3 29.00, SiO_2 7.00

11'9" - 16'0" mixed bauxitic and clayey bands
Sample No. C24, Al_2O_3 14.76, SiO_2 14.72

16'0" - 21'6" sub-granular clayey mixture
? decomposed diabase
Sample No. C29, Al_2O_3 20.20, SiO_2 22.12

21'6" - 27'0" soft granular rock, ? decomposed diabase
Sample No. C30, Al_2O_3 16.80, SiO_2 20.52

Shaft No. 19 ("Gladfield")

0' - 3'0" soil and bauxite boulders
3'0" - 8'0" pisolitic bauxite
Sample No. C47, Al_2O_3 38.12, SiO_2 4.60

8'0" - 10'0" concretionary bauxite
Sample No. C48, Al_2O_3 33.3, SiO_2 3.6

10'0" - 14'0" clay with laminations of dense, iron-rich bauxite.

Shaft No. 20 ("Gladfield")

0' - 12'0" white to iron-stained clay, laminated at base.

Shaft No. 21 ("Gladfield")

0' - 2'6" filling, soil and bauxite boulders
2'6" - 3'0" pisolitic bauxite
3'0" - 8'0" pisolitic bauxite, passing to concretionary bauxite
Sample No. C38, Al_2O_3 44.76, SiO_2 5.60

8'0" - 13'0" concretionary bauxite
Sample No. C39, Al_2O_3 36.32, SiO_2 1.92

13'0" - 18'0" dense, red-brown formation with seams of limonite
Sample No. C40, Al_2O_3 23.60, SiO_2 9.04

18'0" - 21'0" clayey formation
Sample No. C41, Al_2O_3 13.84, SiO_2 13.80

21'0" - 21'6" clayey formation

Shaft No. 22 ("Gladfield")
0' - 2'0" soil and filling

Shaft No. 22 Contd.

2'0"	- 5'0"	clay with bauxite boulders
5'0"	- 8'3"	pisolitic bauxite Sample No. C42, Al_2O_3 36.36, SiO_2 5.04
8'3"	- 15'0"	formation, largely clay.

Shaft No. 23 ("Gladfield")

0'	- 2'9"	filling, soil and bauxite boulders
2'9"	- 7'9"	pisolitic bauxite Sample No. C45, Al_2O_3 42.64, SiO_2 5.28
7'9"	- 11'3"	concretionary bauxite Sample No. C46, Al_2O_3 37.84, SiO_2 3.68
11'3"	- 12'9"	dense, red-brown, iron-rich formation
12'9"	- 17'6"	clayey formation with iron-rich bands

Shaft No. 24 ("Gladfield")

0'	- 2'6"	filling, soil and gravel
2'6"	- 4'0"	clay with bauxite boulders
4'0"	- 6'0"	pisolitic bauxite
6'0"	- 17'0"	clay and bauxite mixture

Shaft No. 25 ("Gladfield")

0'	- 3'0"	filling, soil and bauxite boulders
3'0"	- 8'0"	bauxite, including clay seams Sample No. C50, Al_2O_3 33.0, SiO_2 5.2 N.B. Sample channel 6" short, ~~on account of~~ clay seams omitted.
8'0"	- 14'3"	clay and bauxite mixture

Shaft No. 26 ("Gladfield")

0'	- 2'6"	filling
2'6"	- 5'0"	soil and clay
5'0"	- 9'0"	clean bauxite Sample No. C49, Al_2O_3 35.9, SiO_2 5.5
9'0"	- 10'6"	dense, iron-rich, clayey bauxite
10'6"	- 15'9"	clay and bauxite mixture

Shaft No. 27 ("Gladfield")

0'	- 1'0"	filling
1'0"	- 3'0"	soil and bauxite boulders
3'0"	- 8'0"	pisolitic bauxite, passing to concretionary bauxite Sample No. C51, Al_2O_3 42.3, SiO_2 5.1
8'0"	- 13'0"	concretionary bauxite Sample No. C52, Al_2O_3 43.4, SiO_2 2.7
13'0"	- 15'0"	dense, red-brown bauxite Sample No. C53, Al_2O_3 41.8, SiO_2 5.7
15'0"	- 19'6"	clay and bauxite mixture.

Shaft No. 28 ("Gladfield")

0'	- 1'0"	filling
1'0"	- 3'0"	soil with bauxite boulders
3'0"	- 9'6"	bauxite boulders passing to solid bauxite
~~6'0" - 9'6"~~		Sample No. C56, Al_2O_3 38.9, SiO_2 5.0 (6'6" to 9'6" only)
9'6"	- 13'6"	clay and bauxite mixture

Shaft No. 29 ("Gladfield")

0'	- 2'6"	soil and filling
2'6"	- 13'6"	clay, traces of bauxite
13'6"	- 15'6"	bauxite
15'6"	- 19'6"	clay and bauxite mixture

Shaft No. 30 ("Gladfield")

0'	-	2'6"	soil and filling
2'6"	-	6'0"	clay with boulders of bauxite
6'0"	-	10'0"	bauxite Sample No. C54, Al_2O_3 37.2, SiO_2 4.7
10'0"	-	14'6"	clay and bauxite mixture

Shaft No. 31 ("Gladfield")

0'	-	2'0"	soil and filling
2'0"	-	7'0"	friable, concretionary bauxite Sample No. C59, Al_2O_3 44.3, SiO_2 4.4
7'0"	-	10'6"	clay and bauxite mixture
10'6"	-	12'0"	clay

Shaft No. 32 ("Gladfield")

0'	-	1'0"	filling
1'0"	-	6'0"	bauxite boulders with seams of clay
6'0"	-	11'0"	friable, concretionary bauxite Sample No. C74, Al_2O_3 40.8, SiO_2 2.5
11'0"	-	15'0"	friable, concretionary bauxite Sample No. C75, Al_2O_3 40.3, SiO_2 1.7
15'0"	-	17'6"	friable bauxite, becoming iron-rich at base Sample No. C88, Al_2O_3 38.1, SiO_2 3.1
17'6"	-	18'0"	iron-rich, clayey bauxite.

Shaft No. 33 ("Gladfield")

0'	-	2'0"	filling
2'0"	-	4'6"	bauxite boulders in soil
4'6"	-	9'6"	friable, concretionary bauxite Sample No. C71, Al_2O_3 48.4, SiO_2 3.6
9'6"	-	13'6"	friable, concretionary bauxite Sample No. C72, Al_2O_3 43.0, SiO_2 1.2
13'6"	-	16'0"	bauxite, becoming dense and iron-rich Sample No. C73, Al_2O_3 36.5, SiO_2 2.9
16'0"	-	16'3"	dense, iron-rich bauxite.

Shaft No. 34 ("Gladfield").

0'	-	3'0"	soil and filling
3'0"	-	5'0"	clay with boulders of bauxite
5'0"	-	10'0"	friable, concretionary bauxite Sample No. C60, Al_2O_3 46.5, SiO_2 3.5
10'0"	-	13'0"	friable, concretionary bauxite Sample No. C61, Al_2O_3 40.1, SiO_2 3.8
13'0"	-	15'0"	clay and bauxite mixture.

Shaft No. 35 ("Gladfield")

0'	-	1'6"	filling
1'6"	-	5'6"	soil and clay with bauxite boulders
5'6"	-	9'6"	soft, friable bauxite Sample No. C90, Al_2O_3 41.9, SiO_2 2.5
9'6"	-	11'6"	soft, friable bauxite, becoming dense and red at base Sample No. C100, Al_2O_3 37.6, SiO_2 4.0
11'6"	-	?	clay

Shaft No. 36 ("Gladfield")

0'	-	1'6"	filling
1'6"	-	2'6"	soil
2'6"	-	4'3"	clay and gravel with some bauxite
4'3"	-	4'6"	hard bauxite

Shaft No. 36 Contd.

4'6"	- 9'6"	yellow-brown, friable, concretionary bauxite Sample No. C98, Al_2O_3 43.6, SiO_2 1.7
9'6"	- 13'6"	friable concretionary bauxite, becoming laminated and richer in iron at base. Sample No. C99, Al_2O_3 38.0, SiO_2 2.9
13'6"	- 14'0"	fine-grained red bauxite, becoming clayey.

Shaft No. 37 ("Gladfield")

0'	- 1'0"	filling
1'0"	- 2'0"	soil
2'0"	- 5'0"	clay with boulders of bauxite
5'0"	- 6'6"	bauxite boulders, thin clay seams
6'6"	- 11'6"	friable bauxite Sample No. C89, Al_2O_3 44.2, SiO_2 5.6
11'6"	- 12'0"	clayey bauxite.

Shaft No. 38 ("Gladfield")

0'	- 2'6"	filling, soil and bauxite boulders
2'6"	- 3'6"	hard pisolitic bauxite
3'6"	- 8'6"	pisolitic bauxite, passing to friable concretionary bauxite Sample No. C84, Al_2O_3 36.8, SiO_2 1.9
8'6"	- 13'6"	friable bauxite Sample No. C85, Al_2O_3 43.9, SiO_2 1.7
13'6"	- 18'6"	friable bauxite Sample No. C86, Al_2O_3 38.2, SiO_2 1.00
18'6"	- 20'0"	dense iron-rich bauxite Sample No. C87, Al_2O_3 31.9, SiO_2 2.5
20'0"	- 20'6"	iron-rich bauxite, becoming clayey.

Shaft No. 39 ("Gladfield")

0'	- 1'6"	filling
1'6"	- 6'0"	soil with bauxite boulders
6'0"	- 11'0"	tough concretionary bauxite Sample No. C76, Al_2O_3 43.7, SiO_2 1.9
11'0"	- 16'0"	tough concretionary bauxite, becoming iron-rich at base. Sample No. C77, Al_2O_3 39.0, SiO_2 1.7
16'0"	- 16'6"	dense iron-rich bauxite.

Shaft No. 40 ("Gladfield")

0'	- 1'0"	filling
1'0"	- 4'0"	soil, clay, and bauxite boulders
4'0"	- 9'0"	friable concretionary bauxite Sample No. C108, Al_2O_3 43.3, SiO_2 1.3
9'0"	- 14'0"	friable concretionary bauxite, soft at base Sample No. C109, Al_2O_3 42.7, SiO_2 1.9
14'0"	- 16'0"	dense iron-rich bauxite, with some thin seams of clay.

Shaft No. 41 ("Gladfield")

0'	- 1'6"	soil
1'6"	- 4'6"	yellow, friable, concretionary bauxite
4'6"	- 7'6"	laminated bauxite and clay, passing to purple and white clay.

Shaft No. 42 ("Gladfield")

0'	- 1'0"	soil
1'0"	- 7'0"	clay and bauxite mixture, passing to iron-stained clay.

Shaft No. 43 ("Gladfield")

0' -	8'0"	clay with a few boulders of bauxite.

Shaft No. 44 ("Gladfield")

0' -	3'0"	gravelly soil
3'0" -	3'11"	friable bauxite
3'11" -	4'1"	clay seam
4'1" -	5'3"	friable bauxite
5'3" -	6'6"	clay and bauxite mixture.

Shaft No. 45 ("Gladfield")

0' -	8'0"	clay with a few boulders of bauxite

Shaft No. 46 ("Gladfield")

0' -	1'3"	soil with bauxite pebbles
1'3" -	3'3"	friable bauxite
3'3" -	3'9"	laminated bauxite and clay
3'9" -	5'3"	friable bauxite, passing to dense, iron-rich bauxite
5'3" -	5'9"	clay seam
5'9" -	6'6"	dense, iron-rich bauxite, passing to clay and bauxite mixture.

Shaft No. 47 ("Gladfield")

0' -	1'6"	soil with boulders of bauxite
1'6" -	2'3"	solid boulders of bauxite
2'3" -	5'6"	friable bauxite, seams of limonite and some clay. Sample No. C104, Al_2O_3 33.0, SiO_2 6.7
5'6" -	6'0"	dense, iron-rich bauxite, showing stratification and passing to clayey mixture.

Shaft No. 48 ("Gladfield")

0' -	1'6"	soil with boulders of bauxite
1'6" -	3'6"	friable bauxite with clay seams.
3'6" -	7'6"	friable bauxite, passing to dense, iron-rich bauxite. Sample No. C103, Al_2O_3 33.1, SiO_2 6.0

Shaft No. 49 ("Gladfield")

0' -	5'6"	soil and clay.

Shaft No. 50 ("Gladfield")

0' -	1'0"	filling
1'0" -	7'0"	clay with ironstone pebbles
7'0" -	8'3"	bauxite with clay seams
8'3" -	10'9"	tough, yellow bauxite. Sample No. C91, Al_2O_3 37.0, SiO_2 3.6
10'9" -	13'0"	bauxite, grey, sub-granular, with clay seams.

Shaft No. 51 ("Gladfield")

0' -	3'0"	soil and filling
3'0" -	8'0"	red clay, with small spherulitic concretions of iron. Sample No. C43, Al_2O_3 25.44, SiO_2 8.84
8'0" -	10'0"	clay and bauxite mixture
10'0" -	15'6"	clay.

Shaft No. 52 ("Gladfield")

0' -	2'0"	filling
2'0" -	15'3"	clay and bauxite mixture, passing to clay.

Shaft No. 53 ("Gladfield")

0' - 2'0"	filling, soil and bauxite boulders
2'0" - 3'0"	bauxite boulders with clay seams
3'0" - 6'0"	yellow, pisolitic bauxite Sample No. C57, Al_2O_3 37.0, SiO_2 5.2
6'0" - 10'6"	clay and bauxite mixture.

Shaft No. 54 ("Gladfield")

0' - 2'3"	filling, soil and bauxite boulders
2'3" - 5'3"	pisolitic bauxite Sample No. C63, Al_2O_3 39.8, SiO_2 1.5
5'3" - 11'6"	clay and bauxite mixture.

Shaft No. 55 ("Gladfield")

0' - 1'9"	soil and filling
1'9" - 5'3"	bauxite with seams of clay
5'3" - 9'3"	clean bauxite Sample No. C62, Al_2O_3 38.5, SiO_2 3.1
9'3" - 10'0"	clayey bauxite.

Shaft No. 56 ("Gladfield")

0' - 1'6"	filling
1'6" - 2'0"	pisolitic bauxite
2'0" - 7'0"	clean bauxite Sample No. C64, Al_2O_3 37.3, SiO_2 2.4
7'0" - 10'6"	yellow, sub-granular bauxite Sample No. C78, Al_2O_3 36.0, SiO_2 4.8

Shaft No. 57 ("Gladfield")

0' - 1'0"	filling
1'0" - 5'0"	clay with boulders of bauxite
5'0" - 10'0"	friable bauxite with heavy iron concretions and some soft patches Sample No. C110, Al_2O_3 43.2, SiO_2 4.0
10'0" - 15'0"	friable bauxite as above Sample No. C111, Al_2O_3 40.4, SiO_2 1.7
15'0" - 18'3"	friable bauxite, becoming dense and laminated at base. Sample No. C112, Al_2O_3 44.2, SiO_2 2.1
18'3" - 19'0"	dense bauxite becoming clayey.

Shaft No. 58 ("Gladfield")

0' - 1'6"	filling
1'6" - 5'9"	clay with gravel and small boulders of bauxite
5'9" - 10'9"	friable bauxite Sample No. C105, Al_2O_3 39.6, SiO_2 3.4
10'9" - 12'9"	friable bauxite, similar to Sample No. C105
12'9" - 14'9"	friable bauxite, passing to dense bauxite
14'9" - 15'3"	dense bauxite, becoming clayey.

Shaft No. 59 ("Gladfield")

0' - 1'0"	filling
1'0" - 4'0"	soil with bauxite boulders
4'0" - 9'0"	yellow, friable bauxite Sample No. C113, Al_2O_3 40.7, SiO_2 2.7
9'0" - 14'0"	yellow, friable bauxite with iron concretions Sample No. C114, Al_2O_3 41.5, SiO_2 3.8
14'0" - 16'0"	friable bauxite, passing to dense iron-rich bauxite, laminated at base. Sample No. C115, Al_2O_3 32.3, SiO_2 3.9
16'0" - 18'0"	clayey mixture.

Shaft No. 60 ("Gladfield")

0'	-	1'0"	filling
1'0"	-	3'0"	soil with small boulders of bauxite.
3'0"	-	8'0"	yellow, friable bauxite Sample No. C116, Al_2O_3 40.3, SiO_2 2.9
8'0"	-	13'0"	yellow, friable bauxite Sample No. C117, Al_2O_3 36.7, SiO_2 1.8
13'0"	-	15'6"	friable bauxite becoming dense at base Sample No. C118, Al_2O_3 36.2, SiO_2 2.6
15'6"	-	16'0"	dense, iron-rich bauxite.

Shaft No. 61 ("Gladfield")

0'	-	0'9"	soil
0'9"	-	2'0"	bauxite boulders
2'0"	-	7'6"	friable, yellow bauxite, passing to brown concretionary bauxite, dense at base Sample No. C106, Al_2O_3 35.2, SiO_2 3.2
7'6"	-	8'0"	dense bauxite, becoming clayey.

Shaft No. 62 ("Gladfield")

0'	-	1'0"	soil
1'0"	-	3'6"	clay with small boulders of bauxite
3'6"	-	7'0"	yellow, friable bauxite, clayey at base Sample No. C107, Al_2O_3 28.6, SiO_2 6.9

Shaft No. 63 ("Gladfield")

0'	-	6'6"	soil and clay
6'6"	-	11'6"	friable bauxite Sample No. C122, Al_2O_3 39.8, SiO_2 4.5
11'6"	-	15'6"	friable bauxite, passing to dense bauxite some clay. Sample No. C123, Al_2O_3 35.0, SiO_2 5.7

Shaft No. 64 ("Gladfield")

0'	-	4'6"	soil with small boulders of bauxite
4'6"	-	9'6"	pisolitic bauxite Sample No. C119, Al_2O_3 40.6, SiO_2 3.6
9'6"	-	14'6"	friable, concretionary bauxite Sample No. C120, Al_2O_3 43.2, SiO_2 2.1
14'6"	-	17'6"	dense, iron-rich bauxite Sample No. C121, Al_2O_3 37.2, SiO_2 3.4
17'6"	-	18'6"	dense, iron-rich bauxite.

Shaft No. 65 ("Gladfield")

0'	-	2'6"	soil and gravel
2'6"	-	6'0"	hard, red, pisolitic, iron-rich bauxite Sample No. C126, Al_2O_3 18.0, SiO_2 3.1
6'0"	-	11'0"	soft, red, pisolitic bauxite, passing to friable, variegated bauxite Sample No. C127, Al_2O_3 37.0, SiO_2 3.6
11'0"	-	16'0"	friable, variegated bauxite with concretions and soft patches Sample No. C128, Al_2O_3 43.8, SiO_2 3.5
16'0"	-	21'0"	dense, variegated bauxite Sample No. C131, Al_2O_3 37.3, SiO_2 4.9
21'0"	-	22'0"	bauxite becoming clayey.

Shaft No. 66 ("Gladfield")

0'	-	28'0"	white clay.

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Shaft No. 67 ("Gladfield")

0'	-	7'0"	clay.

Shaft No. 68 ("Gladfield")

0'	-	4'9"	soil and gravel with small boulders of bauxite.
4'9"	-	7'9"	highly pisolitic bauxite Sample No. C129, Al_2O_3 46.1, SiO_2 4.1
7'9"	-	12'9"	friable, concretionary bauxite Sample No. C130, Al_2O_3 43.5, SiO_2 1.6
12'9"	-	13'9"	dense bauxite
13'9"	-	14'6"	clayey bauxite

Shaft No. 69 ("Gladfield")

0'	-	4'6"	clay.

Shaft No. 70 ("Glen Dhu")

0'	-	6'6"	clay and gravel.

Shaft No.71 ("Glen Dhu")

0'	-	5'6"	clay.

Shaft No. 72 ("Gladfield")

0'	-	8'6"	clay.
8'6"	-	12'6"	friable, concretionary bauxite Sample No. C124, Al_2O_3 43.3, SiO_2 3.4
12'6"	-	15'6"	dense bauxite, clayey at base Sample No. C125, Al_2O_3 36.5, SiO_2 5.5

Shaft No. 73 ("Glen Dhu")

0'	-	6'0"	clayey formation.

Shaft No. 74 ("Gladfield")

0'	-	0'6"	filling
0'6"	-	6'0"	clayey overburden
6'0"	-	6'6"	broken, iron-rich pisolitic bauxite
6'6"	-	11'6"	blotchy, pink, white and brown bauxite Sample No. C132, Al_2O_3 44.0, SiO_2 3.4
11'6"	-	14'6"	blotchy, friable bauxite Sample No. C133, Al_2O_3 40.5, SiO_2 2.2
14'6"	-	17'6"	Dense, iron-rich bauxite Sample No. C134, Al_2O_3 37.6, SiO_2 4.5
17'6"	-	19'6"	dense bauxite, becoming clayey.

Shaft No. 75 ("Gladfield")

0'	-	9'0"	clay and gravel
9'0"	-	14'0"	pisolitic bauxite, passing to friable bauxite and becoming dense at base Sample No. C135, Al_2O_3 36.5, SiO_2 4.1
14'0"	-	17'0"	dense bauxite, becoming clayey.

Shaft No. 76 ("Gladfield")

0'	-	23'6"	white to iron-stained clay.

Shaft No. 77 ("Gladfield")

0'	-	6'3"	gravel and limonitic boulders in clay
6'3"	-	7'3"	highly pisolitic, brown bauxite Sample No. C136, Al_2O_3 37.3, SiO_2 6.3
7'3"	-	10'3"	hard, red, pisolitic bauxite with concretions of iron. Sample No.C137, Al_2O_3 42.0, SiO_2 4.3

Shaft No. 77 Contd.

10'3" - 13'6"	red and yellow, sub-pisolitic, friable bauxite. Sample No. C138, Al_2O_3 41.0, SiO_2 1.5
13'6" - 16'6"	sub-pisolitic bauxite, with clayey bands and ferruginous laminations.

Shaft No. 78 ("Gladfield")

0' - 8'0"	clay.

Shaft No. 79 ("Gladfield")

0' - 6'0"	clay.

Shaft No. 80 ("Gladfield")

0' - 6'9"	clay.
6'9" - 8'9"	highly pisolitic bauxite Sample No. C139, Al_2O_3 43.3, SiO_2 5.5
8'9" - 11'9"	yellow, tough to friable, concretionary bauxite Sample No. C140, Al_2O_3 47.7, SiO_2 2.9
11'9" - 16'0"	red and yellow, sub-pisolitic, blotchy, bauxite Sample No. C141, Al_2O_3 43.1, SiO_2 3.7
16'0" - 16'6"	clayey bauxite.

Shafts Nos. 81 to 84 ("Gladfield")

Not commenced.

Shaft No. 85 ("Gladfield")

0' - 2'6"	soil
2'6" - 7'6"	friable, concretionary bauxite Sample No. C143, Al_2O_3 41.4, SiO_2 1.2 N.B. Short sampled; shaft not completed.

Shaft No. 86 ("Gladfield")

0' - 4'0"	soil with small boulders of bauxite
4'0" - 10'0"	friable, concretionary bauxite Sample No. C142, Al_2O_3 39.6, SiO_2 3.3 N.B. Shaft not completed. Bauxite probably clayey below 10 feet.

Gap in numbers between No. 86 and No. 100

Shaft No. 100 ("Lachlan Vale")

0' - 4'3"	clay.
4'3" - 9'3"	pisolitic bauxite. Sample No. C65, Al_2O_3 38.2, SiO_2 2.5
9'3" - 14'3"	clean bauxite Sample No. C66, Al_2O_3 37.7, SiO_2 1.7
14'3" - 16'3"	bauxite, becoming clayey Sample No. C67, Al_2O_3 32.8, SiO_2 3.9
16'3" - 18'3"	dense, iron-rich, clayey bauxite
18'3" - 21'0"	clay.

Shaft No. 101 ("Lachlan Vale")

0' - 2'0"	clay.
2'0" - 7'0"	iron-rich, pisolitic bauxite Sample No. C68, Al_2O_3 31.0, SiO_2 5.5
7'0" - 10'6"	clean bauxite Sample No. C69, Al_2O_3 37.7, SiO_2 4.2
10'6" - 14'0"	concretionary, iron-rich bauxite Sample No. C70, Al_2O_3 35.4, SiO_2 4.0
14'0" - 14'6"	clayey bauxite.

Shaft No. 102 ("Lachlan Vale")

0'	-	1'6"	soil and filling
1'6"	-	2'6"	bauxite boulders in soil
2'6"	-	7'6"	concretionary bauxite Sample No. C79, Al_2O_3 41.8, SiO_2 3.5
7'6"	-	11'6"	concretionary bauxite Sample No. C80, Al_2O_3 40.4, SiO_2 2.4
11'6"	-	14'0"	dense, clayey, iron-rich bauxite.

Shaft No. 103 ("Lachlan Vale")

0'	-	2'0"	soil and filling
2'0"	-	3'9"	clay
3'9"	-	5'9"	hard, pisolitic, iron-rich bauxite. Sample No. C101, Al_2O_3 21.0, SiO_2 5.1
5'9"	-	10'9"	hard, pisolitic, iron-rich bauxite, passing to friable bauxite & becoming clayey at base. Sample No. C102, Al_2O_3 23.5, SiO_2 2.6

Shaft No. 104 ("Lachlan Vale")

0'	-	2'0"	soil and filling
2'0"	-	3'0"	hard, pisolitic bauxite
3'0"	-	8'0"	pisolitic bauxite Sample No. C81, Al_2O_3 38.2, SiO_2 2.1
8'0"	-	15'6"	pisolitic bauxite, passing to concretionary bauxite Sample No. C82, Al_2O_3 37.6, SiO_2 1.9
15'6"	-	19'6"	dense, red, iron-rich bauxite Sample No. C83, Al_2O_3 27.8, SiO_2 5.9
19'6"	-	22'3"	clay and bauxite mixture.

Shaft No. 105 ("Lachlan Vale")

0'	-	1'0"	soil and filling
1'0"	-	2'0"	tough, pisolitic bauxite
2'0"	-	7'0"	pisolitic bauxite Sample No. C92, Al_2O_3 41.4, SiO_2 3.2
7'0"	-	12'0"	friable, concretionary bauxite Sample No. C93, Al_2O_3 30.8, SiO_2 3.8
12'0"	-	18'0"	friable, concretionary bauxite Sample No. C94, Al_2O_3 34.8, SiO_2 2.7
18'0"	-	18'6"	clayey bauxite.

Shaft No. 106 ("Lachlan Vale")

0'	-	7'10"	clay
7'10"	-	11'3"	sand with clay
11'3"	-	13'9"	clay
13'9"	-	17'5"	sand
17'5"	-	20'6"	clay with sand
20'6"	-	21'0"	hard, iron-rich capping
21'0"	-	26'0"	hard, iron-rich, pisolitic bauxite Sample No. C95, Al_2O_3 35.2, SiO_2 5.5
26'0"	-	31'0"	tough to clayey, iron-rich bauxite Sample No. C96, Al_2O_3 36.4, SiO_2 5.6
31'0"	-	35'0"	soft, iron-rich bauxite Sample No. C97, Al_2O_3 39.8, SiO_2 3.9
35'0"	-	36'0"	dense iron-rich bauxite.

SCHEDULE OF BAUXITE PROSPECTING SHAFTS = CAMPBELL TOWN DISTRICT.

N.B. All assay values refer to determinations by the caustic soda method.

Shaft No. 1 ("Rosedale")

0'	-	2'8"	filling, soil etc
2'8"	-	9'0"	red and yellow mixture, friable to clayey Sample No. CC12, Al_2O_3 23.3, SiO_2 7.9
9'0"	-	12'0"	red and yellow mixture, becoming clayey
12'0"	-	16'6"	clay.

Shaft No. 2 ("Rosedale")

0'	-	3'3"	filling, soil etc.
3'3"	-	4'6"	red and green rubble Sample No. CC8, Al_2O_3 22.6, SiO_2 8.6
4'6"	-	9'6"	hard, red and green mixture Sample No. CC9, Al_2O_3 31.6, SiO_2 4.5
9'6"	-	11'0"	hard, red and green mixture Sample No. CC10, Al_2O_3 36.6, SiO_2 2.3
11'0"	-	20'0"	nodules in clay Sample No. CC11, Al_2O_3 28.5, SiO_2 7.1
20'0"	-	24'0"	nodules in clay.

Shaft No. 3 ("Rosedale")

0'	-	1'0"	filling
1'0"	-	4'6"	clay and rubble
4'6"	-	9'6"	hard red nodules in softer matrix, some white clay. Sample No. CC17, Al_2O_3 36.6, SiO_2 6.6
9'6"	-	14'6"	clay and bauxite rubble
14'6"	-	19'6"	clay with included bands of bauxite nodules at 15'6" and 18'6".

Shaft No. 4 ("Rosedale")

0'	-	1'0"	filling
1'0"	-	2'6"	soil
2'6"	-	4'0"	clay and rubble
4'0"	-	8'0"	red, green and yellow bauxite mixture including some hard red nodules Sample No. CC16, Al_2O_3 44.7, SiO_2 3.7
8'0"	-	10'0"	red, green and yellow mixture, becoming softer
10'0"	-	13'0"	clay with nodular bands
13'0"	-	17'6"	yellow clay.

Shaft No. 5 ("Rosedale")

0'	-	1'6"	filling
1'6"	-	3'0"	clay and rubble
3'0"	-	6'0"	nodular, hard, red to white bauxitic material with thin clay bands Sample No. CC13, Al_2O_3 34.8, SiO_2 1.4 N.B. clay excluded from sample.
6'0"	-	10'0"	nodular, hard red bauxitic material Sample No. CC14, Al_2O_3 32.2, SiO_2 3.1 N.B. Sample includes some clayey matrix.
10'0"	-	12'6"	red and green mixture, some clay Sample No. CC15, Al_2O_3 26.1, SiO_2 2.7
12'6"	-	15'6"	red and green mixture, clayey
15'6"	-	18'6"	yellow clay.

Shaft No. 6 ("Rosedale")

0'	-	2'6"	filling, soil etc.
2'6"	-	4'0"	pebbles etc. in clayey matrix Sample No. CC1, Al_2O_3 15.3, SiO_2 12.1

Shaft No. 6 (Contd.)

4'0"	-	7'0"	red and green mixture Sample No. CC2, Al_2O_3 31.4, SiO_2 3.8
7'0"	-	10'3"	soft, red and green mixture Sample No. CC3, Al_2O_3 26.3, SiO_2 7.1
10'3"	-	10'6"	limonitic band
10'6"	-	10'9"	white clay band
10'9"	-	15'9"	clay and rubble Sample No. CC4, Al_2O_3 19.2, SiO_2 11.2
15'9"	-	16'0"	limonitic band
16'0"	-	19'0"	red clay.

Shaft No. 7 ("Rosedale")

0'	-	3'0"	filling, including bauxite boulders
3'0"	-	5'6"	hard, red and green bauxite mixture Sample No. CC5, Al_2O_3 49.0, SiO_2 1.9.
5'6"	-	7'6"	red and green mixture, softer Sample No. CC6, Al_2O_3 39.4, SiO_2 6.3
7'6"	-	12'6"	red clay and rubble Sample No. CC7, Al_2O_3 20.6, SiO_2 7.6
12'6"	-	15'0"	red clay and rubble
15'0"	-	22'0"	limonitic yellow clay.

Shaft No. 8 ("Meadowbank")

0'	-	1'0"	filling
1'0"	-	3'0"	clay and rubble
3'0"	-	8'0"	hard, red to white bauxite in red, green and yellow clayey matrix Sample No. CC18, Al_2O_3 36.2, SiO_2 6.2 Sample No. CC19 (Matrix omitted) Al_2O_3 51.0, SiO_2 1.1
8'0"	-	11'6"	bauxite in matrix as above
11'6"	-	19'0"	sparse nodules of bauxite in clayey matrix.

Shaft No. 9 ("Meadowbank")

0'	-	1'6"	filling
1'6"	-	2'9"	soil
2'9"	-	9'0"	pebbly bauxite in hard clay
9'0"	-	17'0"	clayey red, yellow and green mixture.

Shaft No. 10 ("Meadowbank")

0'	-	1'0"	filling
1'0"	-	2'6"	soil
2'6"	-	16'0"	hard, red to white bauxite in clayey mixture. Hard at top, becoming soft at about 9 ft.
16'0"	-	16'6"	clay.

Shaft No. 11 ("Meadowbank")

0'	-	1'0"	filling
1'0"	-	2'6"	soil
2'6"	-	16'6"	red, yellow and grey clayey mixture containing a few nodules of bauxite.

Shaft No. 12 ("Meadowbank")

0'	-	1'0"	filling
1'0"	-	3'0"	soil and clay
3'0"	-	8'0"	nodular bauxite inter-laminated with clay.
8'0"	-	11'0"	red and green bauxitic mixture
11'0"	-	14'6"	red and yellow clayey mixture.

Shaft No. 13 ("Meadowbank")

0'	-	8'6"	clay.

Shaft No. 14 ("Meadowbank")

0'	-	1'0"	filling
1'0"	-	4'0"	clay and rubble
4'0"	-	7'0"	nodular bauxite with thin seams of clay
7'0"	-	16'6"	clayey mixture.

Shaft No. 15 ("Meadowbank")

0'	-	2'6"	clay and soil
2'6"	-	6'6"	nodular bauxite in clayey matrix
6'6"	-	9'0"	red and green clayey mixture.

Shaft No. 16 ("Meadowbank")

0'	-	1'6"	soil etc.
1'6"	-	4'0"	nodules of bauxite in grey matrix Sample No.CC25 (2'6" to 4'0") Al_2O_3 33.3, SiO_2 2.1
4'0"	-	6'6"	nodular bauxite with seams of clay.
6'6"	-	8'0"	red and green clayey mixture.

Shaft No. 17 ("Meadowbank")

0'	-	2'9"	clayey soil with bauxite boulders
2'9"	-	7'0"	nodules of bauxite in clayey red matrix Sample No. CC26, Al_2O_3 37.1, SiO_2 6.0

Shaft No. 18 ("Meadowbank")

0'	-	3'0"	soil with boulders of bauxite
3'0"	-	7'6"	red to white and green bauxitic mixture Sample No. CC27 (3'9" to 6'9") Al_2O_3 32.7, SiO_2 2.7

Shaft No. 19 ("Meadowbank")

0'	-	3'3"	soil with small boulders of bauxite
3'3"	-	5'9"	red, white and green bauxitic mixture Sample No. CC28, Al_2O_3 35.4, SiO_2 6.2
5'9"	-	6'6"	clayey mixture.

Shaft No. 20 ("Rosedale")

0'	-	2'3"	clay with small boulders of bauxite
2'3"	-	4'5".	hard, brittle, red to white and green bauxite Sample No. CC43, Al_2O_3 43.5, SiO_2 2.1
4'5"	-	4'7"	clay seam
4'7"	-	6'0"	hard, brittle, red to white, and green bauxite Sample No. CC44, Al_2O_3 44.2, SiO_2 1.9
6'0"	-	8'0"	inferior bauxite, becoming tough and clayey

Shaft No. 21 ("Rosedale")

0'	-	2'6"	soil with small boulders of bauxite
2'6"	-	4'0"	bauxite with clay seams
4'0"	-	5'9"	hard to friable, brittle, red and grey-green bauxitic mixture Sample No. CC41, Al_2O_3 32.8, SiO_2 2.5
5'9"	-	6'0"	clay seam, dip 20°E
6'0"	-	7'6"	hard to friable, brittle, red and grey-green bauxitic mixture Sample No. CC42, Al_2O_3 33.9, SiO_2 1.3
7'6"	-	8'0"	bauxitic mixture, becoming clayey.

Shaft No. 22 ("Meadowbank")

0'	-	8'0"	earthy formation, no bauxite in section

Shaft No. 23 ("Meadowbank")

0' - 8'0" earthy formation, no bauxite in section.

Shaft "A" ("Meadowbank")

0' - 5'0" soil and clay
5'0" - 8'0" earthy formation with occasional nodules of bauxite.

Shaft "C" ("Meadowbank")

0' - 0'6" soil
0'6" - 5'0" hard red nodules with sparse yellow interstitial material
Sample No. CC47, Al_2O_3 34.3, SiO_2 0.8
5'0" - 8'0" clay, with occasional nodules of bauxite
N.B. Western end of shaft sampled; bauxite interspersed with clay on eastern end of shaft.

Shaft "D" ("Meadowbank")

0' - 4'9" clayey soil, hard bauxitic formation showing in bottom.

Shaft "E" ("Meadowbank")

0' - 6'6" clay with small nodules of bauxite
6'6" - 8'0" friable, dull red and green bauxite
Sample No. CC53, Al_2O_3 36.3, SiO_2 2.7
8'0" - 8'6" friable, dull red and green bauxite.

Shaft "F" ("Meadowbank")

0' - 4'9" soil and clay
4'9" - 6'6" hard red bauxitic nodules in laminated clay.
6'6" - 8'0" friable, dull red and green bauxite
Sample No. CC54, Al_2O_3 42.2, SiO_2 2.6

Shaft "G" ("Meadowbank")

0' - 3'6" soil and clay
3'6" - 6'0" hard red bauxitic formation
Sample No. CC55, Al_2O_3 32.4, SiO_2 1.2
6'0" - 8'0" red and green bauxitic mixture
Sample No. CC56, Al_2O_3 37.9, SiO_2 1.0
8'0" - 8'6" soft bauxitic mixture.

Shaft "H" ("Meadowbank")

0' - 6'0" soil and clay

Shaft "J" ("Meadowbank")

0' - 3'6" soil and clay
3'6" - 7'6" mixed seams of bauxite and clay.

Shaft "O" ("Meadowbank")

0' - 4'6" soil and clay
4'6" - 5'9" bauxite with thin seams of clay
5'9" - 6'3" clay
6'3" - 9'0" bauxite nodules in tough red matrix with seams of clay.

Shaft "P" ("Meadowbank")

0' - 5'6" soil and clay
5'6" - 8'6" tough to brittle red bauxite nodules in dull green matrix. Sample No.CC45,$Al_2O_3$32.6,SiO_2 2.2
8'6" - 9'0" ~~Clayey~~ formation, becoming clayey.

Shaft "Q" ("Meadowbank")

0'	-	5'0"	soil and clay
5'0"	-	6'9"	small bauxitic pebbles in clay
6'9"	-	8'3"	iron-rich bauxitic nodules in dull green matrix Sample No. CC46, $Al_2O_3$30.2, SiO_2 2.2

Shaft "R" ("Meadowbank")

0'	-	5'3"	soil and clay
5'3"	-	8'6"	hard, dull red bauxitic nodules in yellow-green matrix; also four thin clay seams.
8'6"	-	9'0"	clayey formation.

Shaft "S" ("Meadowbank")

0'	-	3'6"	soil and clay
3'6"	-	7'6"	hard red bauxite with thin yellow seams Sample No. CC48, Al_2O_3 32.1, SiO_2 1.0
7'6"	-	8'9"	formation becoming clayey.

Shaft "T" ("Meadowbank")

0'	-	3'9"	soil and clay
3'9"	-	6'6"	hard red bauxite with thin yellow seams Sample No. CC49, Al_2O_3 34.6, SiO_2 1.8
6'6"	-	8'6"	hard red bauxite, yellow seams more prominent, softer at base. Sample No. CC50, Al_2O_3 34.9, SiO_2 1.9

Shaft "U" ("Meadowbank")

0'	-	3'0"	soil and yellow clay
3'0"	-	5'6"	hard red bauxite Sample No. CC51, Al_2O_3 34.8, SiO_2 1.2
5'6"	-	9'0"	hard red bauxite with yellowish seams; softer at base and becoming clayey.

Shaft "V" ("Meadowbank")

0'	-	2'6"	clay with buckshot gravel
2'6"	-	5'6"	hard red bauxite, some interstitial material Sample No. CC52, Al_2O_3 33.9, SiO_2 1.9
5'6"	-	9'0"	tough red bauxitic formation

Shaft "W" ("Meadowbank")

0'	-	4'6"	soil and clay

Shaft "X" ("Meadowbank")

0'	-	4'9"	soil and clay, hard bauxitic formation showing in bottom.

Shaft "Y" ("Meadowbank")

0'	-	3'0"	soil and clay
3'0"	-	3'6"	hard iron-rich capping
3'6"	-	5'0"	hard, red, brittle bauxite Sample No. CC57, Al_2O_3 30.8, SiO_2 2.0
5'0"	-	7'0"	tough red bauxite, Sample No. CC58, Al_2O_3 32.9, SiO_2 0.9
7'0"	-	9'0"	formation becoming clayey.

Shaft "Z" ("Meadowbank")

0'	-	3'6"	soil and clay
3'6"	-	9'0"	red bauxitic formation; hard and brittle at top, becoming tough and then clayey at base.

Shaft No. 1 ("Riccarton")

0'	-	1'0"	soil
1'0"	-	7'0"	hard, iron-rich, pisolitic bauxite. Sample No. CC20, Al_2O_3 32.2, SiO_2 1.2 N.B. Sample channel 2'6" to 7'0" only.
7'0"	-	9'0"	tough, sub-pisolitic bauxite Sample No. CC21, Al_2O_3 37.1, SiO_2 2.1

Shaft No. 2 ("Riccarton")

0'	-	2'0"	soil and gravel
2'0"	-	7'0"	hard pisolitic bauxite Sample No. CC22, Al_2O_3 32.7, SiO_2 2.5

Shaft No. 3 ("Riccarton")

0'	-	4'0"	soil and gravel
4'0"	-	6'0"	hard pisolitic bauxite

Shaft No. 4 ("Riccarton")

0'	-	4'0"	soil and gravel.

Shaft No. 6 ("Riccarton")

0'	-	0'6"	soil
0'6"	-	4'6"	hard, iron-rich pisolitic bauxite Sample No. CC23, Al_2O_3 22.9, SiO_2 1.8
4'6"	-	7'0"	tough, red and green bauxitic mixture Sample No. CC24, Al_2O_3 34.7, SiO_2 1.1

Shaft No. 7 ("Riccarton")

0'	-	1'0"	soil
1'0"	-	5'6"	hard, iron-rich, pisolitic bauxite passing to tough, red and green mixture.

Shaft No. 8 ("Riccarton")

0'	-	1'6"	soil
1'6"	-	4'6"	hard, iron-rich, pisolitic bauxite

Shaft No. 1 ("Fordon")

0'	-	0'6"	soil
0'6"	-	2'9"	hard, red, green and yellow mottled formation Sample No. CC29, Al_2O_3 30.9, SiO_2 2.8 N.B. Sample channel from 1'0" to 2'9" only.
2'9"	-	5'6"	red, green and yellow mottled formation, rather friable. Sample No. CC30, Al_2O_3 34.0, SiO_2 1.7
5'6"	-	7'6"	similar formation becoming softer Sample No. CC31, Al_2O_3 34.4, SiO_2 2.2
7'6"	-	8'3"	formation becoming clayey.

Shaft No. 2 ("Fordon")

0'	-	2'0"	soil
2'0"	-	4'3"	clay with small pebbles
4'3"	-	7'3"	hard, red, iron-rich bauxitic formation Sample No. CC32, Al_2O_3 26.2, SiO_2 1.2

Shaft No. 3 ("Fordon")

0'	-	2'0"	soil
2'0"	-	5'6"	clay with pebbles
5'6"	-	7'0"	hard, red, bauxitic formation Sample No. CC33, Al_2O_3 34.4, SiO_2 1.5

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Shaft No. 3 Contd.

7'0"	-	9'0"	hard, red bauxitic nodules in yellow-green mixture. Sample No. CC34, Al_2O_3 31.6, SiO_2 1.9

Shaft No. 4 ("Fordon")

0'	-	1'6"	soil
1'6"	-	3'6"	clay
3'6"	-	4'9"	hard, red bauxitic formation, with seams of clay.
4'9"	-	7'6"	red and green bauxitic mixture Sample No. CC35, Al_2O_3 28.2, SiO_2 1.8
7'6"	-	7'7"	limonitic band
7'7"	-	9'0"	red and yellow bauxitic mixture, clayey in base
9'0"	-	9'6"	band of hard bauxitic formation.

Shaft No. 5 ("Fordon")

0'	-	1'6"	soil
1'6"	-	5'0"	red and yellow clay with boulders of bauxitic material.
5'0"	-	7'3"	rubbly formation with boulders
7'3"	-	9'6"	red and grey clay.

Shaft No. 6 ("Fordon")

0'	-	1'6"	soil
1'6"	-	3'6"	hard red bauxitic formation Sample No. CC37, Al_2O_3 35.2, SiO_2 1.4 N.B. Sample channel 2'3" to 3'6" only.
3'6"	-	8'9"	tough, red and green bauxitic mixture Sample No. CC38, Al_2O_3 32.2, SiO_2 1.3

Shaft No. 7 ("Fordon")

0'	-	4'6"	clay with bauxitic boulders
4'6"	-	9'0"	soft, clayey rubble.

Shaft No. 8 ("Fordon")

0'	-	0'9"	soil
0'9"	-	3'9"	hard, red, yellow and green formation Sample No. CC36, Al_2O_3 27.8, SiO_2 1.6
3'9"	-	4'0"	clay seam, solid formation in bottom.

Shaft No. 1 ("Baskerville")

0'	-	5'0"	hard red and white mottled formation Sample No. CS8, Al_2O_3 12.6, SiO_2 17.8 N.B. See complete analysis and accompanying note.

Shaft No. 2 ("Baskerville")

0'	-	4'0"	soil and sandy clay
4'0"	-	5'6"	red pebbles in sandy clay Sample No. CC39, Al_2O_3 11.9, SiO_2 15.9

Shaft No. 3 ("Baskerville")

0'	-	1'6"	soil and buckshot gravel
1'6"	-	3'0"	brown clay
3'0"	-	7'6"	red pebbles in sandy clay, seams of white clay.

Shaft No. 4 ("Baskerville")

0'	-	2'0"	soil and buckshot gravel
2'0"	-	8'0"	pebbles in sandy clay Sample No. CC40, Al_2O_3 9.7, SiO_2 16.7 N. B. Sample channel 3'6" to 5'6" only.

Shaft No. 5 ("Baskerville")

0'	-	1'6"	soil and buckshot gravel
1'6"	-	5'6"	pebbles in sandy clay
5'6"	-	8'6"	brown and white clay.

Shaft No. 6 ("Baskerville")

0'	-	8'0"	gravel and sandy clay.

Shaft No. 7 ("Baskerville")

0'	-	8'6"	gravel and sandy clay.

Shaft No. 8 ("Baskerville")

0'	-	1'0"	soil and buckshot gravel
1'0"	-	8'0"	clay with ferruginous concretions

Shaft No. 9 ("Baskerville")

0'	-	1'0"	siliceous crust
1'0"	-	4'0"	clay.
