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THE BAUXITE RESOURCES OF TASMANIA

by

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CONTENTS.

LIST OF PLATES.

(Plates 1 to 9 and 11 to 14 enclosed in separate folder)

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1. SUMMARY.

The presence of bauxite in Tasmania is noted in a monograph of the Imperial Institute "Bauxite & Aluminium", (Rumbold 1925, p.74) but it was not until 1941 that public interest in bauxite was aroused. Following further discoveries preliminary testing of several deposits was carried out by the Tasmanian Department of Mines during 1941 and 1942, and by the same Department in co-operation with the Bureau of Mineral Resources from May 1945 to December 1946. Towards the end of 1945 the Australian Aluminium Production Commission actively participated in the field and provided additional equipment and staff.

The results of testing the numerous occurrences of bauxite in central, eastern and northern parts of the State are set out in Tables 1 and II.

The accompanying map (Plate 1) shows eleven localities at which bauxite is known. In most instances each single numeral on the map indicates a locality in which several separate deposits occur within areas ranging from a few to a hundred square miles.

Sub-surface sampling was carried out by shaft-sinking and drilling in eight of the localities shown. Only two areas, Ouse and St. Leonards respectively, were found to have reserves sufficient in quantity and grade to permit economic exploration.

It was found that occurrences of bauxite were restricted to areas occupied by dolerite and basalt, and no bauxite derived from other rock types has yet been found.

TABLE 1.

RESERVES OF BAUXITE IN TASMANIA.

No. on Map (Plate 1)	Locality	Bauxite Long Tons (Dry Ore)	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Avail. Al_2O_3 %	Na_2O loss cwt.
1.	Ouse (a)	425,000	5.9	40.4	27.5	2.6	36.6	1.20
	(b)	202,000	5.6	38.4	30.0	2.5	35.3	1.04
		627,000	5.8	39.8	28.3	2.56	36.2	1.15
2.	St. Leonards							
	(c)	112,300	5.6	41.7	25.7	2.2	37.7	1.10
	(d)	30,200	7.1	40.9	27.4	2.2	36.5	1.47
		142,500	5.9	41.5	26.0	2.2	37.4	1.18

(a) Ouse No. 2 Area, Gladfield Estate
(b) Ouse No. 10, 11 and 12 Areas, Lachlan Vale Estate
(c) St. Leonards No. 1 Area
(d) St. Leonards No. 3 Area

TABLE 2.

Summarised details of Tasmanian Bauxite Deposits other than those at Ouse and St. Leonards are:

No. on Map (Plate 1)	Locality	Remarks
3	Myalla	(a) Wells deposit, 2 miles north of Myâlla containing 10,000 tons 46% "free alumina" (b) Bramich's, 3 miles north of Myalla containing about 180,000 tons 35% "free alumina".
4	East Tamar	(a) Hillwood-Leam. Small residual of ferruginous bauxite. Grade low, quantity very small. (b) Numerous small deposits of bauxite occur adjacent to the George-town road, notably at "Thorp" 1½ miles north-west of Dilston and near the 11 and 13 mile pegs. A similar deposit outcrops on Defence Department property near Mowbray, Launceston.
5	Launceston	Four bauxite bodies outcrop in the City area. Three of these, viz., at Cataract Gorge, Basin Road and Hill-side Crescent are small. The fourth exposed in a cutting in Connaught Crescent, West Launceston, may amount to 70,000 tons.
6	West Tamar	Small deposits are known at Beacons-field, Cormiston (4 miles & 5½ miles N.W. of Launceston), Rosevale and at 1½ miles north of Westbury. Reserves contained in these deposits are negligible.
7	White Hills	Residual boulders of high grade basaltic bauxite lie on the crest and slopes of a small hill 3 miles east of White Hills.
8	Fordon	Very ferruginous laterite overlies basalt at 13 miles north of Campbell Town. Grade of the deposits is low.
9	Lake River & Epping	Small residual deposits overlying dolerite occur on the south side of the Campbell Town-Cressy Road, 11½ miles from Cressy and at 600 yards west of Epping Railway Station.

No. on Map (Plate 1)	Locality	Remarks
10	Campbell Town	Residual bodies of highly ferruginous basaltic laterite cap low hills on Riccarton, Meadowbank and Rosedale Estates near Campbell Town. Similar material also occurs on the St. Mary's Road 4 miles east of Conara Junction.
11	Swansea	Doleritic bauxite has been quarried for road metal at 7 miles north of Swansea on the Tasman Highway. The deposit contains about 31,000 tons of 8.1% silica, 35.0% alumina, about 33% ferric oxide and 29.2% available alumina. Small bodies of similar material occur elsewhere in the locality.

It is considered that further discoveries of basaltic bauxite may yet be made, particularly in areas lying inland from the coast between Wynyard and Devenport.

INTRODUCTION.

PREVIOUS WORK & HISTORY OF INVESTIGATION.

Although bauxite was known in Tasmania previously (Rumbold 1925) it was not until August 1941 that interest was revived by discoveries in the vicinity of Ouse, and subsequently additional occurrences were found near Campbell Town in the Midlands, St. Leonards near Launceston, and Swansea, East Coast.

More recently bauxite of basaltic origin was located near Myalla, North-west Coast, in October 1944, and numerous minor discoveries of no economic significance have been made since, the latest in October 1949.

Before the end of 1941 testing of the deposits near Ouse was begun by the Tasmanian Mines Department. The results obtained from 4 shafts were considered sufficiently encouraging for systematic exploration of the largest outcrop area by shafts sunk on a rectangular grid at intervals of 200 feet. At the same time some sporadic shaft testing was conducted on the smaller deposits at Ouse and also at Campbell Town and Fordon.

The results of this work were recorded by Dickinson (1943) in a report to the Director of Mines, Tasmania. This report has been freely consulted by the writer and due acknowledgment of its value is made.

During 1945 the Tasmanian Mines Department carried out a scout-drilling programme at Myalla at first under the supervision of Dickinson, and later, on his resignation from the Department, under that of the writer. The results of this work are embodied in this present report.

In 1945 the Bureau of Mineral Resources (then the Mineral Resources Survey) acting in conjunction with the Tasmanian Mines Department initiated a campaign of drilling to supplement the previous shaft-sinking at Ouse and elsewhere and to explore the other deposits which had not up to that time been examined in detail. This work was started at Ouse towards the end of May 1945, moved to St. Leonards in the following April and was concluded at Swansea and Campbell Town in December 1946. During the course of the work at St. Leonards testing of minor deposits at Hillside, Cormiston and Rosevale was carried out by pit-sinking.

Towards the end of 1945 the Australian Aluminium Production Commission took an active part in the field work and provided additional staff and labour which permitted shaft-sinking to be conducted in addition to boring.

Methods/

METHODS OF PROVING.

The reserves were proved by boring or shaft-sinking at intervals of 100 feet on a rectangular grid. The holes were sunk through the bauxite into recognisable kaolinized bed-rock, except in a few instances where circumstances did not permit or warrant deepening of shafts. As mentioned previously most of the shaft-sinking at Ouse was carried out by the Tasmanian Department of Mines.

Two methods of sampling were used (a) vertical channel sampling in shafts and (b) by percussion drilling with drive pumps.

In the former method the shaft face to be sampled was cleaned by picking the surface to a depth of about ¼ to ½ inch over a vertical band 4 to 6 inches wide. A vertical channel sample was then cut from the cleaned strip with a hand sampling pick to yield as far as possible a uniform weight of sample per unit length of channel. The aim was to cut at the rate of one pound per foot of channel. No arbitrary length of channel was chosen for individual samples, but each sample was cut to conform with changes in the apparent nature of the bauxite. However, a maximum length for any one sample was fixed at five feet.

All channel samples were despatched to the laboratory without any crushing or reduction.

Bore samples were recovered by boring with a drive pump in a similar manner to that used in testing alluvial deposits. The holes were drilled with four-inch tools and cased with five-inch casing. When bauxite was encountered the casing was seated firmly by driving it a few inches into the bauxite and the hole was then pumped clean and flushed. Flushing and pumping was continued until clean water was returned in the pump barrel. Boring was then continued with the drive pump until the necessary length of sample (2 feet for the first and 5 feet for subsequent samples) had been obtained and deposited in a numbered drum. The casing was then driven to the bottom of the hole and the loose bauxite broken by the passage of the casing shoe was pumped out and added to the sample already collected.

The bore samples were recovered in varying degrees of moistness, but usually as a slurry which settled overnight, allowing some clear water to be decanted. The

wet/

wet slurry was dried in iron trays over wood fires with constant stirring to hasten drying and prevent local over-heating. Most of the samples were too bulky for despatch to the laboratory without reduction and this was effected by coning and quartering followed by division with a Jones sampler. Large lumps, which were fairly uncommon, were broken to about ¼ inch size with a hammer on an iron plate.

Comparison of the analytical results obtained from shaft and bore samples show no constant difference between two such sets of samples from the same area.

There are reasons for believing that boring is superior to channel sampling not only on account of the great disparity in costs of shaft-sinking and boring respectively. The bore recovers a large sample of uniform cross-sectional area whereas the cross-section of the shaft sample channel is only about one-twentieth that of the bore and it is not quite uniform. On the other hand there is no doubt that boring does not recover the full proportion of the hard limonitic bands which occasionally had to be penetrated with a chisel bit. Much of this hard material is driven into the sides of the hole and lost and it is not known whether the small amount recovered is representative of the whole. This short-coming could not introduce an appreciable error as the hard bands represent a very minor fraction of the whole ore body.

Quantity Calculations. The volume of bauxite contained in any of the deposits cannot be calculated to an equivalent weight of ore with exactness. The ore is porous and contains moisture ranging between 9 and 18 per cent in the samples tested. Density figures for the "green" or moist ore as it occurs in situ were obtained by direct measurement and by laboratory determination of moisture content and specific gravity, samples for this purpose being forwarded in air-tight containers. It is readily apparent that the moisture content of a porous rock lying at or very near the surface will show a wide range and also be subject to appreciable fluctuations in accordance with climatic conditions.

Any figure which is accepted for moisture content of the "green" ore is at best an approximation; nevertheless the deduction of an allowance for moisture content enhances the accuracy of the tonnage calculations.

At Ouse direct measurement by Dickinson (1943) indicated a density of 1.60 tons of moist ore by cubic yard, and a moisture content of 12 per cent, giving a conversion factor of 1.40 tons of dry ore per cubic yard has been accepted.

Moisture and specific gravity determinations conducted on samples from St. Leonards gave an average moisture content of 14 per cent and average specific gravity of dry ore of 2.3. These figures indicate a conversion factor of 1.30 tons of dry ore per cubic yard.

RELATIVE IMPORTANCE OF DEPOSITS.

There is little scope for discussion under this heading. Considered as sources of aluminium ore, only the two groups of bauxite deposits at Ouse and St. Leonards respectively have any economic significance.

The deposits at St. Leonards are relatively small and would be of doubtful value if in a less easily accessible situation. The residual deposits at Myalla and White Hills possess an indirect importance in that they reveal the presence of high grade bauxite derived from Tertiary basalt, and suggest that further discoveries of basaltic bauxite may yet be made.

Other readily accessible deposits have been or could be used as sources of road metal and building stone.

ACCESSIBILITY OF THE IMPORTANT DEPOSITS.

The deposits near Ouse lie to the west and south-west of the village and within a mile of the Lyell Highway or Tarraleah road respectively. The nearest point on the railway system is Macquarie Plains, 28 miles south-west from the deposits. Rail distances from Macquarie Plains to Hobart and Launceston are approximately 34 and 134 miles respectively.

The St. Leonards group of deposits lie at about 1 mile east of the village of that name and about 5½ miles by road south-east from Launceston. The distance by road to the alumina plant site at Bell Bay is 38 miles. With the exception of about 1 mile of access road to the deposit the roads are sealed or metalled and capable of carrying heavy traffic.

TENURE.

The Department of the Interior, on behalf of the Australian Aluminium Production Commission, has acquired the land at Ouse which embraces Deposits 2, 10, 11 and 12 and areas at St. Leonards which include Deposit 1 and portions of Deposits 3 and 4.

DEFINITIONS.

1. Laterite. All the bauxite deposits herein described are considered to be lateritic in origin, and would, in fact, be better described as laterite than as bauxite. For the purpose of this report laterite is defined as a residual product of rock weathering formed *in situ* by selective leaching of alkalies, alkaline earths and silica. The presence of "free" alumina, that is alumina not combined with silica, is a *sine qua non.*

2. (a) Bauxite. Herein the term bauxite is used in a general sense in reference to the lateritic material composing the deposits which were examined.

Two distinct zones in the bauxite deposits are usually recognisable; an upper ferruginous and pisolitic zone in which solution and re-deposition of iron and aluminium have taken place, and a lower horizon in which leaching has been the dominant agent. In turn the lower zone may be sub-divided into an upper band where some deposition of alumina from solution has taken place, and a lower band where only leaching has operated.

(b) Economic bauxite. The expression "economic bauxite" has a restricted meaning and signifies material containing not less than 30 per cent of available alumina which may be extracted by alkali solution without excessive consumption of alkali. The maximum permissible loss of alkali rises with the available alumina content in accordance with the following scale :

Available Al_2O_3 Per cent	Permissible alkali loss expressed as Cwt. (112 lbs.) of Na_2O per ton (2240 lbs.) of available alumina
30	1.20
32	1.41
34	1.56
36	1.70
38	1.83
40	1.95
42	2.05
44	2.15
46	2.24

3. Available Alumina. The amount of alumina which can be extracted by pressure digestion with alkaline solution containing sodium hydroxide and carbonate under conditions simulating those of the Bayer process is termed "Available alumina".

4. Soda loss or Na_2O loss. The figures given under this heading express the loss of alkali as Na_2O in hundredweights per ton of alumina extracted. This unrecoverable alkali remains in the insoluble matter ("red mud") left after digestion of the bauxite with caustic soda and is a measure of alkali-soluble silica present in the original ore.

5. "Free alumina" and "free silica." Some analyses of bauxite carried out by the Tasmanian Mines Department Laboratory give figures for "free" alumina and "free" silica. These determinations have been made by extracting the bauxite with boiling caustic soda solution under atmospheric pressure. The alumina and silica which dissolve in alkali solution under these circumstances are reported as "free alumina" and "free silica" respectively. The "free" silica so determined occurs in the ore mainly in combination as kaolin or as finely disseminated and opaline silica. Quartz, unless very finely divided, is not appreciably affected by hot caustic soda solutions,

MODE OF OCCURRENCE AND DESCRIPTION OF THE BAUXITE.

INTRODUCTION.

The bauxite, and in this section the term is used in its widest sense to include all lateritic and bauxitic material, may be considered as belonging to one of two types according to its derivation from Jurassic dolerite or Tertiary basalt.

Subdivision based on the mode of development of the laterite is also possible; some deposits which form a group are plainly remnants of a former continuous and widespread sheet, while other lenticular or pod-like bodies were formed in depressions with restricted horizontal extent. The doleritic bauxite at Ouse and the basaltic bauxite at Campbell Town, Fordon and Myalla are examples of the former type, while the small bodies of doleritic bauxite at Cataract Gorge, Basin Road and Cormiston have been formed on dolerite in narrow valleys at levels considerably below the crests of the interfluves. The deposits at St. Leonards are somewhat anomalous and present features of both types. The example of "secondary" or recemented bauxite near Beaconsfield is the only one known to the writer, but it is probable that a small outcrop of bauxite reported in the Kenmere valley about ½ mile west of, and some 400 feet below No. 2 deposit at Ouse is also "secondary" in origin.

The Doleritic Bauxite. Bauxite derived from Jurassic dolerite is best developed in the vicinity of Ouse where a total of 17 separate bodies are known. This total includes some very small outliers of larger bodies and also the more distant deposits at Father-of-Marshes, Cleveland and Lawrenny.

Twelve of the deposits are distributed along a line trending northerly for 4 miles from Thistle Hill (see Pl.2) and lie on the eroded surface of a wedge-shaped mass of dolerite which thins out on its eastern margin exposing the underlying Triassic sandstone to the east of No. 1 (the northernmost) bauxite deposit. The Triassic sandstone dips from 8 to 12 degrees to the South-east and it appears that the lower surface of the dolerite is concordant.

A few hundred feet to the south of the sandstone the dolerite and its superimposed bauxite passes under Tertiary lacustrine sediments consisting of sand and clay with ferruginous bands and some lignite. This relationship between dolerite and Tertiary cover is maintained to Thistle Hill which is capped with basalt and coarse agglomerate. The disposition of the bauxite bodies and their relatively constant dip to the east suggest strongly that at least Deposits 1 to 12 are remnants of an originally continuous sheet.

At Ouse the bauxite passes by increase in clay content to weathered dolerite the average thickness of economic bauxite being about 8 feet and the maximum thickness being 19 feet (No. 1] Deposit).

Three rather ill-defined and irregular zones may be recognised - (a) an upper zone from the surface consisting of hard coarse nodular bauxite brownish-red in color; (b) a zone of earthy textureless light brown bauxite; and (c) a lower zone of light brown to yellowish bauxite which retains the granular texture of the parent dolerite.

Commonly the granular bauxite horizon is missing at Ouse and the earthy zone becomes progressively more clay-like with depth until it passes into kaolinized dolerite. At St. Leonards the granular bauxite commonly passes directly to fresh dolerite but this sudden transition was not seen at Ouse.

The upper horizon of hard coarsely nodular to pisolitic bauxite usually contains rather more iron and less alumina than the earthy variety. Bauxite from this zone presents a fragmental appearance which falsely suggests that it may have been derived from a pyroclastic rock. Many of the nodules of which it is composed present angular outlines and show apparent differences in the relict doleritic texture of the cores due in part to irregular dissemination of minute areas of limonite and in part to greater or lesser porosity. The nodules generally are cemented together by dense dark brown limonitic material, but may occur in a relatively soft matrix of light brown earthy bauxite. The lowest horizon of granular bauxite usually shows a considerable increase in silica content, and generally is somewhat similar in appearance to the cores of the pisolitic or nodular bauxite just described. Petrological descriptions of the three main types mentioned above are quoted from Edwards (in preparation).

> "The pisolitic (nodular) bauxite consists essentially of pisolites and nodules, and in some instances fragments, or even blocks, of doleritic (granular) or earthy bauxite, in a dense iron-stained matrix which is often oolitic. -- In general they (the pisolites) are ovoid or spherical, though some have irregular or angular shape. They range in size from about 2 mm. up to 5 cm. in diameter, with occasional fragments or blocks up to 10 cm. across."
>
> "The larger pisolites or nodules generally have a large core of porous doleritic (granular) bauxite, earthy bauxite or limonite enclosed by several narrow concentric shells of aluminous limonite. ----- the porosity of the core varies inversely as the iron content."
>
> "Thin sections reveal that the minerals present are gibbsite, cliachite, kaolin, limonite, leucoxene and magnetite." ...
>
> "The earthy bauxite owes its distinctive appearance to the presence in it of irregular light-brown or pinkish-brown patches of cryptocrystalline gibbsite, flecked throughout with finely dispersed minute brownish-yellow spots and specks suggestive of gelatinous ferric hydroxide."
>
> "The doleritic (granular) bauxite consists in the main of felspar areas replaced by cryptocrystalline or microcrystalline gibbsite, in places showing colloform texture, interspersed with areas containing abundant limonite, commonly with colloform texture, marking the original pyroxene areas."

Chemical composition of the bauxite is shown in the following typical analyses of samples from St. Leonards:-

	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign.loss	Avail. Al_2O_3
	%	%	%	%	%	%
1.	5.7	31.7	37.4	2.4	20.0	29.2
2.	4.5	35.6	37.0	2.2	20.9	31.4
3.	3.9	42.2	26.2	1.9	25.2	36.6
4.	4.5	42.5	24.3	2.0	25.5	39.4
5.	15.8	35.1	24.2	1.9	21.1	25.0
6.	8.8	38.4	27.1	1.9	23.4	31.6
7.	5.0	33.8	38.1	1.7	22.2	29.3
8.	8.3	42.5	22.1	2.4	24.5	35.5
9.	15.3	38.4	22.4	2.0	21.4	25.3
10.	16.7	34.3	26.8	1.8	20.2	21.1

Analyses 1-5 from St. Leonards No. 1 Area, Shaft MD2.
Details as follow:-

1.	14' 3" - 15' 9"	Brown pisolitic bauxite, passing to earthy bauxite in lower 6 inches.
2.	15' 9" - 17' 9"	Brown earthy bauxite with ferruginous pisolites.
3.	17'9" - 19' 6"	Red-brown friable earthy bauxite becoming granular.
4.	19' 6" - 23'	Ditto becoming more granular and beginning to show doleritic texture.
5.	23' - 26'	Friable granular bauxite with doleritic texture.

Analyses 6-10 from St. Leonards No. 3 Area. Shaft 23.

6.	3' 6" - 4' 6"	Coarse pisolites with granular doleritic core in hard brown matrix.
7.	4' 6" - 8' 6"	Soft light-brown earthy bauxite with few pisolites, becoming more ferruginous below 5' 6".
8.	8' 6" - 10'6"	Hard nodular bauxite with dense matrix.
9.	10' 6" - 12'6"	Soft granular doleritic bauxite with seams of light brown clay.
10.	12' 6" - 14'6"	Ditto

<u>The Basaltic Bauxite.</u>

There is a marked difference between the basaltic bauxite at, on the one hand, Campbell Town and Fordon, and on the other hand at Myalla and White Hills.

The eastern deposits at Riccarton (Campbell Town) and those at Fordon are characterized by a dense hard ferruginous cap containing as much as 50.0% Fe_2O_3 and a small percentage of FeO, and a total silica figure ranging from 2 to 3 per cent. This ferruginous capping which has a maximum thickness of about 5 feet is composed of very dark brown pisolites set in a lighter brown matrix. The pisolites when fractured have a sub-metallic lustre and are strongly magnetic. Edwards (in preparation) has shown that the matrix consists of fine oolites with gibbsite encrusting the interspaces. In this respect the material is similar to the pisolitic ore from Ellsmore, Moss Vale N.S.W. described by the writer (1949) but it is harder and more ferruginous than the Ellsmore example.

Towards its base the pisolitic ore becomes less ferruginous and contains scattered nodules of finely granular bauxite surrounded by a shell of brown limonitic material. The ferruginous zone passes to earthy bauxite of lower iron and higher aluminium content. This zone is usually thin, rarely more than 3 feet thick, and is buff, light brown or greyish in color. It rests on denser and light colored clayey bauxite which by increase in clay content passes to kaolinized volcanic bed-rock. Analyses representative of this sequence at Area No. 15, Riccarton are given in a later section of this report (see page 37).

The bauxite deposits lying to the north-west of Campbell Town on Rosedale and Meadowbank Estates are of somewhat different character. The dense ferruginous capping is absent, but the deposits are capped by a less strongly marked ferruginous zone containing nodules of granular bauxite. At shallow depth the capping gives way to nodular bauxite consisting largely of rounded nodules of gibbsitic material embedded in clay. This clay is commonly red in color but contains greenish and yellow patches, while the hard nodules of bauxite are commonly red or white. Selected white nodules may contain over 50% Al_2O_3, but the red nodules are ferruginous and usually contain about equal proportions of Fe_2O_3 and Al_2O_3. No separate analyses of nodules and clay matrix have been made but it is apparent from the high proportion of "clay" and relatively low silica in some samples that the so-called clay approaches the composition of low grade bauxite.

Differences in the nature of the bauxite may be explained as a reflection of differences in parent rock. Exposure on the flanks of Areas 1 and 3 on Rosedale Estate show the bauxite to be lying on basaltic tuff and beds of fine ash, but on Riccarton the very ferruginous laterite and its associated bauxite horizon appear to immediately overlie massive basalt.

DESCRIPTIONS OF INDIVIDUAL DEPOSITS.

1. OUSE.

Results of the testing campaign at Ouse have been recorded in detail in a report of this series (Owen and Gardner 1947), therefore the following discussion of results takes the form of a summary of the earlier report.

Ouse is a village on the river of that name, in the Parish of Kenmere, County of Cumberland at the junction of the Lyell and Tarraleah Highways 55 miles by road north-west from Hobart, and about 25 miles north-west from Macquarie Plains, the nearest railway station.

In all 15 bauxite deposits are known in the locality, and two others rather more distant from the village are mentioned herein. (See Plate 2.)

Deposits 1 to 12 inclusive, numbered from north to south, lie along a line extending southwards from a point 2½ miles north-north-west of the village to 1½ miles south-south-west. Deposits 1 to 5 are grouped near the northern end of the line, and Nos. 6 to 12 towards the opposite end. The intervening gap of six miles between Deposits 5 and 6 is occupied by the valley of Kenmere Rivulet. The very small deposits numbered 13 and 14 lie 1½ and ½ mile south of the village respectively and No. 15 outcrops in the left bank of the River Derwent near Dunrobin Bridge, about 4 miles south-east of Ouse.

Deposits 1, 3, 4, 5, 7, 13, 14 and 15 were found to contain no useful quantities of bauxite and are not further discussed in this section of this report.

No. 2 Area, in Gladfield Estate contained five separate bodies of economic bauxite and is illustrated in Plates 3, 4 and 5.

The following table shows the proved reserves of bauxite of economic grade contained within No. 2 Area. The thickness of bauxite included in the reserves ranges from 4 feet to 25 feet and averages 7.7 feet. The greater part of the bauxite is exposed at the surface where the overburden consists of thin soil and weathered bauxite, but along the eastern margin the ore passes under Tertiary clays with a band or bands of concretionary ironstone and in a few places thin seams of lignite and lignitic clay.

TABLE 3.
Reserves No. 2 Deposit.

Tons (dry ore)	Acid Insoluble %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Ignition loss %
425,000	5.9	40.4	27.5	2.6	22.8

This reserve contains 322,000 tons of dry ore with an average Available Alumina figure of 37.8 per cent extracted with alkali loss equivalent to 1.00 cwt. Na_2O per ton of alumina.

Three samples made up to represent the economic bauxite yielded the following on analysis :-

	(a)		(b)	(c) (T)	
SiO_2	5.7	per cent	5.6	4.9	per cent
Al_2O_3	39.7	" "	40.7	41.4	" "
Fe_2O_3	27.4	" "	27.1	26.7	" "
TiO_2	2.9	" "	2.7	2.3	" "
Ign. loss	23.4	" "	24.4	24.8	" "
Available Al_2O_3	36.3	" "	-	-	
Na_2O loss	1.31	cwt.	-	-	

(a) A composite sample made up from assay samples.
(b) Composite sample made up from assay samples by Tasmanian Mines Department laboratory and analysed by The Dorr Co. Inc. N.Y.
(c) Portion of a 1200 lb. sample from 8 shafts on No. 2 Area.

Nos. 6, 8 and 9 Deposits, which lie near the South-eastern boundary of Leintwardine Estate, are three small occurrences which dip gently to the east in conformity with the topographic slope on which they lie. Nos. 6 and 8 deposits are lenticular in plan, each measuring about 500 feet long from east to west by 200 feet wide. No. 9 deposit is roughly circular in plan and 450 feet in diameter. The average thickness of ore in the respective deposits are 3.2, 3.5 and 3.5 feet. Reserves, which are almost negligible are given :-

TABLE 4. Reserves of Deposits 6, 8 & 9.

Deposit	Tons (dry ore)	Acid Insoluble %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Ign. loss %
6	5,000	5.8	42.1	25.2	2.1	24.7
8	3,600	6.7	39.1	29.4	2.1	22.6
9	3,600	5.2	38.1	30.3	2.0	22.6
	12,200					

		Available Al_2O_3	Na_2O loss
6	5,000	37.4%	1.16 cwt.
8	3,600	35.0%	1.47 "
9	3,600	36.5%	1.06 "

FOOTNOTE. (T) used throughout this report, indicates that the analyses was conducted at the Mines Dept. Laboratory, Launceston, W.St.C. Manson Chief Chemist and Metallurgist. Unless otherwise stated all other analyses by Development Laboratory of Aust. Aluminium Production Commission, R. A. Dunt, Chief Chemist.

Deposits 10, 11 and 12. (see plates 6, 7, 8 and 9) outcrop on the western and southern flanks of Thistle Hill which is on Lachlan Vale Estate. The bauxite bodies dip easterly into the hill and consequently pass under increasing overburden of Tertiary clay; also the bauxite appears to thin to the east but owing to its rapidly increasing depth in this direction it was not followed by drilling to its final limits.

Fairly substantial reserves were proved by drilling and shaft sinking which gave the following results:-

TABLE 5.

Reserves of Deposits 10, 11 & 12.

Deposit	Tons (dry ore)	Acid Insoluble %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Ignition loss %
10	10,100	5.6	42.5	25.7	2.5	23.6
11	60,500	5.6	40.4	28.7	2.1	22.4
12	131,400	6.1	38.6	30.2	2.2	22.3
	202,000 (1)	5.6	38.4	30.0	2.5	22.8

(1) Composition computed from analyses of composite samples.

Two composite samples made up from assay samples yielded on analysis:-

	(a) %	(b) %
$SiO2$	5.2	5.0
Al_2O_3	37.6	38.4
Fe_2O_3	30.4	30.1
TiO_2	2.7	2.8
Ignition loss	23.1	24.1
Avail AI_2O_3	34.6	-
Na_2O loss	0.98	-

(a) Composite made up and analysed by A.A.P.C.

(b) Composite made up by Tasmanian Mines Department Laboratory and analysed by the Dorr Co. Inc., N.Y.

The total economic reserves at Ouse, excluding the minor amounts in Deposits 6, 8 and 9 are 627,000 long tons of moist ore containing,, when dried:-

SiO_2	5.8 per cent
Al_2O_3	39.8 per cent
Fe_2O_3	28.3 per cent
TiO_2	2.56 per cent
Ignition loss	23.8 per cent
Available AI_2O_3	36.2 per cent
Na_2O loss	1.15 cwt per ton of available alumina.

The maximum permissible soda loss for bauxite of this grade is 1.68 cwt. Na_2O.

Two other occurrences of bauxite in the vicinity of Ouse have been mentioned. These are on Cleveland Estate and at Father-of-Marshes respectively.

The former, which lies ¾ mile north of a point on the Tarraleah road, 7¼ miles from Ouse and at an elevation of about 1,000 feet above sea level is a small lenticular body measuring 190 feet in length by a maximum width of 80 feet exposed in the southern bank of a creek. To the south the body appears to pass under Tertiary clays, including a band of concretionary ironstone, which are capped with basalt, but a pit sunk just outside the southern edge of the outcrop failed to reveal any concealed extensions of the bauxite.

At Father-of-Marshes about 12 miles north-west from Ouse and at an elevation of approximately 1,800 feet above sea level, two minor occurrences of bauxite are known. The southernmost consists of an area occupying a small saddle and measuring approximately 500 feet by 250 feet in which boulders and detached areas of bauxite a few feet across occur. The area occupied by bauxite is flanked on the east and west by dolerite and truncated at both north and south extremities by falling topographic slopes. One specimen of nodular bauxite from this locality was submitted to analysis with the following result (T):-

Insoluble matter	16.2	per cent
Alumina	37.9	" "
Ferric Oxide	20.8	" "
Titania	1.6	" "
Ignition loss	22.3	" "

The second deposit occurs about ½ mile north and is separated from the first by the swampy ground from which the locality takes its name. This occurrence of bauxite is described by Dickinson (1943) as:

> "a dipping formation overlying diabase (dolerite) and underlying basalt. The out-crop is indefinite and largely obscured by talus."

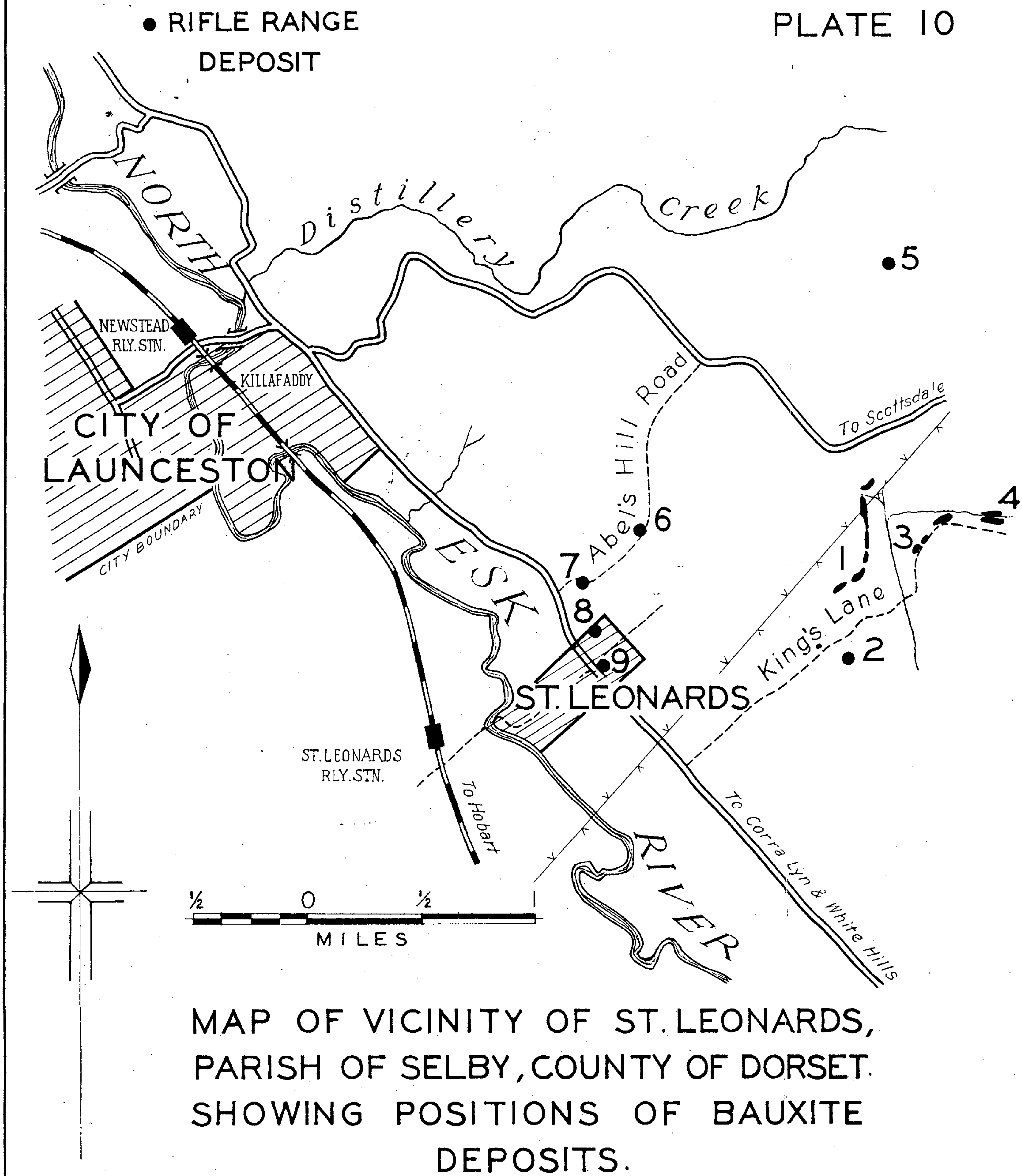
2. ST. LEONARDS : MAJOR DEPOSITS.

Both the important bauxite areas lie about 1½ miles east of the village of St. Leonards and on the northern side of a narrow right-of-way known as King's Lane which connects the Scottsdale and Corra Lyn roads.

No. 1 Deposit outcrops as a narrow bench following the contours along the western slopes of a valley trending south. The bauxite outcrop is continuous for 2,900 feet on the valley side and also appears in small exposures at the head of the valley. The several small discontinuous outcrops which constitute Nos 3 and 4 Deposits lie on the opposite side of the valley at a similar general elevation. It is probable that all these bodies are small remnants of a once continuous sheet of laterite which lay on a surface dipping gently to the south. (See plate 10).

The bauxite rests on dolerite and where the topography permits passes beneath a cover of Tertiary fresh water sediments with, on the eastern side of the valley, an intercalated basalt flow (or flows). The sediments are capped with flat lying basalt which gives a characteristic mesa-like appearance to the hills in this locality.

PLATE 10



MAP OF VICINITY OF ST. LEONARDS, PARISH OF SELBY, COUNTY OF DORSET. SHOWING POSITIONS OF BAUXITE DEPOSITS.

BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS. JUNE 50.

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No. 1 Deposit (See Plate 11) - Subsurface exploration shows that the bauxite formation is a relatively flat-lying sheet dipping gently west into the hill along the southern half of its length, and reversing the dip to a gentle easterly inclination from the transverse zero co-ordinate to 1,500' N. Both the upper and lower surfaces are undulating but erosion of the upper surface before deposition of the Tertiary clays has stripped many of the higher points rendering it more nearly plane than the base.

In a comparatively low grade deposit it is to be expected that ore bodies defined by assay boundaries are likely to be irregular. The results of testing show that No. 1 Area contains seven separate bodies of economic bauxite divided from each other by areas of low grade material. In some instances the intervening low grade bauxite is thin and overlies a high area of the underlying dolerite, suggesting that economic ore has been denuded. Reference to the section in Plate 12 will show that the high grade ore usually lies at the top or at least high in the existing bauxite profile. The thickness of ore averages 5½ feet which is approximately half the thickness of the whole bauxite formation.

Details of the 7 separate bodies of economic bauxite contained within No. 1 Area are given in order from south to north hereunder:-

Block	Lying between co-ordinates	Number of shafts & bores in block	Bauxite Av.thickness Feet	Bauxite Volume Cu.yds	Overburden Av.thick Ft.	Overburden Vol. Cu.yds.
1	1250S and 1150S	1	5	1,400	9	2,500
2	1350S and 650S	16	5.65	31,600	11	61,000
3	450S and 350S	1	7	2,600	23	8,500
4	250S and 150S	1	5	2,000	7	2,800
5	050S and 050N	1	6	2,400	5	2,000
6	250N and 1050N	15	5.3	30,000	9	51,000
7	1150N and 1550N	8	5.6	15,500	11	33,000
				86,500		160,800

	Long Tons "Green" ore	equivalent to dry ore	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Av.Al_2O_3 %	Na_2O Loss cwt.
1.	2,100	1,800	3.8	42.0	28.2	2.4	38.6	0.70
2.	47,400	41,000	5.9	41.7	25.4	2.0	37.0	1.24
3.	3,900	3,400	7.0	39.0	28.3	2.4	33	1.7
4.	3,000	2,600	4.9	38.0	31.7	2.0	33.0	1.22
5.	3,600	3,100	4.8	40.6	25.0	1.8	36.5	1.00
6.	45,000	39,000	5.5	41.4	26.4	2.0	37.6	1.11
7.	24,700	21,400	5.2	43.4	23.8	2.8	40.5	0.74
	129,700	112,300	5.6	41.7	25.7	2.2	37.7	1.10
		(a)	7.0	40.7	26.3	2.7	-	-

(a) Composite sample made up from assay samples by Tasmanian Mines Department Laboratory and analysed by the Dorr Co. Inc., N.Y.

The overburden consists mainly of clay with interbedded lenses of sand and pebbles or sandy clay. Towards the southern end of the deposit the overburden consists of smooth grey clay under a foot or so of gritty soil. This clay has a maximum thickness of 29 feet at Bore 26 (900S/100W) where it is nearly white in colour. Where intersected in shafts the clay was found to contain very sparsely distributed nodules of magnesite. As the clay appears to have some commercial value a sample from the shaft at 1100S/250W was submitted to analysis at the Mines Department laboratory with the following result:-

(T).	Per cent.
SiO_2	50.20
Al_2O_3	28.96
Fe_2O_3	2.77
MnO	trace
$_2O_5$	trace
TiO_2	1.40
CaO	trace
MgO	1.33
Na_2O	0.23
K_2O	0.16
H_2O at 105^oC	4.36
Ignition loss	11.10
	100.51

No. 3 Area. - (See plates 13 and 14) - Although presumably remnants of the single sheet of laterite of which No. 1 Deposit forms a part, the smaller and separated deposits of No. 3 Area were found to have a generally higher silica and iron oxide content. Consequently only a small proportion of the total bauxite present falls within the permissible limits of economic grade. Four small outcrops occur along a line trending north-easterly for a distance of 1,800 feet and the two areas of economic bauxite occur within the north-eastern half of the area.

A band of pale blue-grey clayey bauxite containing ferruginous pisolites was encountered at the top of the bauxite section in several shafts in this area. The following logs are two typical examples of this type of section:-

Log. Shaft 4. 600 S/100W

Feet		SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Ign. loss %	Av. Al_2O_3 %
0 - 2	Soil						
2-5.5	Soft bauxite; pale brown pisolites in grey matrix	18.0	46.4	12.1	2.3	22.9	28.9
5.5-9	Hard bauxite; brown pisolites in ferruginous matrix	13.4	28.9	38.2	1.7	18.1	20.0
9-12.5	Ditto	15.4	28.5	37.5	1.6	16.9	-
12.5-13.25	Soft gritty yellow bauxite)						
13.25-13.5	Brown nodular bauxite)						
13.25-13.5	" earthy bauxite)						
14.25-14.75	" nodular bauxite)						
		20.3	22.5	41.8	1.2	14.3	-
14.75-16	Yellow clay and weathered dolerite with ferruginous concretions)	Not sampled					
16-19	Yellow weathered dolerite)						

Log. Shaft 16 500N/00

Feet		SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Ign. loss %	Av. Al_2O_3 %
0-2	Brown clay						
2-7	Blue-grey clay with pockets of magnesite						
7-8.5	Soft bauxite; brown pisolites in grey and brown matrix)	14.3	45.3	13.1	2.8	24.5	35.2
8.5-12	Soft bauxite; pale brown gritty)	7.7	39.2	27.4	2.0	23.6	34.9
12-13.5	Hard bauxite; pale brown dense matrix with few dark brown pisolites)	11.9	36.9	27.4	2.0	21.9	27.5
13.5-16	Brown clay)	not sampled.					
16-19	Brown and grey weathered dolerite)						

The two areas of economic ore are divided by a narrow block measuring 100 feet wide and containing approximately 5,000 tons of low grade bauxite of the following composition:-

7.0% SiO_2, 37.1% Al_2O_3, 31.6% Fe_2O_3, 30.9% Available Al_2O_3, with soda loss about 3 cwt. Na_2O.

Details of the reserves contained in the two blocks of economic ore are:-

Block	Lying between co-ordinates	Number of Shafts or bores	Bauxite Av. thick. Feet	Bauxite Volume Cu. yds	Overburden Av. thick Feet	Overburden Volume Cu. yds.
West	250W and 150E	8	5.6	19,000	8.5	29,000
East	200E and 350E	2	4.3	4,300	9	9,000
				23,300		38,000

Block	Long Tons "Green" ore	Long Tons equivalent to dry ore	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Av. Al_2O_3 %	Na_2O loss cwt.
West	28,700	24,600	6.9	40.7	26.0	2.2	36.5	1.42
East	6,500	5,600	7.6	41.6	25.2	2.0	36.4	1.65
	35,200	30,200	7.1	40.9	25.8	2.2	36.5	1.47

The higher iron oxide and silica contents which increase the specific gravity of the dry ore are offset by a higher moisture content and accordingly, the same conversion factor as that used for No. 1 Area, namely, 1.30 tons of dry ore per cubic yard has been applied in computing reserves in No. 3 Area.

The thickness of the economic bauxite ranges between 5 and 8.5 feet and averages 5.3 feet. The overburden consists of clay, with thin pebble and boulder beds and ranges in thickness from a few inches to 19.5 feet averaging 9 feet.

TABLE 6.

SUMMARY OF RESERVES AT ST. LEONARDS.

Area	Long Tons (dry ore)	SiO_2 %	Al_2O_3 %	TiO_2 %	Av. Al_2O_3 %	Na_2O loss cwt.	Fe_2O_3 %	Overburden cu. yds
No. 1	112,300	5.6	41.7	2.2	37.7	1.10	25.7	160,800
No. 3	30,200	7.1	40.9	2.2	36.5	1.47	25.8	38,000
Total	142,500	5.9	41.5	2.2	37.4	1.18	25.7	198,000

In addition to the above figures 7,700 tons of bauxite proved by bores 43 and 26 and shaft C in area No. 1, containing 5.7 per cent SiO_2, 40.5 per cent $Al_{2}03$, 28.9 per cent Fe_2O_3, 2.0 per cent TiO_2 with 33.7 per cent Available Al_2O_3 and extractable with a soda loss equivalent to 1.13 cwt. Na_2O underlies 35,000 cubic yards of clay.

This has been excluded from the reserves because of the depth of overburden, but will become available if the overlying clay finds a commercial use.

Two small bodies of bauxite associated with No. 1 Deposit were also tested by drilling and shaft sinking. Neither contained valuable reserves. Their positions are shown on Plate 10 marked No. 1 East and No. 1 South respectively.

No. 1 East deposit showed in outcrop as a few boulders embedded in soil at the foot of a low terrace. The deposit contained a small quantity of very high grade bauxite disclosed in two adjacent shafts. The logs of these shafts are of considerable interest and one is given here with partial analysis of the bauxite. Two shafts 100 feet to the north penetrated low grade bauxite with high aluminium content offset by high silica.

Feet.	Log. Shaft 1.	Co-ordinates 00/00 SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Av. Al_2O_3 %	Na_2O Loss cwt.
0-4	Soil and brown clay with few boulders						
4-5	Pale grey textureless earth containing few brown pisolites	13.2	50.8	3.9	3.7	36.5	-
5-5.5	Ditto - increasing number of pisolites						
5.5-6.5	Brown pisolites in brown matrix	4.8	48.0	15.2	3.1	44.5	0.80
6.5-7	Hard ferruginous pisolitic bauxite						
7-8	Pale brown clay-like bauxite	2.2	52.7	13.9	1.9	52.6	0.02
8-10.5	Ditto - showing fine grain	9.2	48.7	13.4	1.7	42.2	1.80
10.5-14	Pink clay with granular texture	-	-	-	-	-	-
14-15	Grey clay	Ignition loss 12.6%					
15-17.5	Brown clay	Ignition loss 16.2%					
17.5-18.5	Grey weathered dolerite	-	-	-	-	-	-

The log of Shaft 2 at 00/100W is somewhat similar except that the pisolitic band is only 6 inches thick and overlies 3 feet of pale brown clay-like bauxite containing 1.7 per cent silica and 53.2 per cent Al_2O_3 with 52.4 per cent available Al_2O_3.

No. 1 South body is concealed and was discovered by drilling to test for the extension of No. 1 deposit which is indicated by a small outcrop in King's Lane. Only very low grade material was encountered in the five bores put down.

No. 2 Deposit. (See page 25).

No. 4 Deposit. The position of No. 4 Deposit which is an easterly extension of No. 3 is also shown on Plate 13.

The Deposit is divided by a narrow water-course into northern and southern bodies both of which have been exhaustively tested by pits and bores. To the south the bauxite passes under yellow and grey clay containing lenticular pebble and sand beds and with an intercalated narrow tongue of basalt. This sequence is capped with columnar basalt about 20 feet thick and lying 70 feet stratigraphically above the bauxite.

A plan and sections of No. 4 Area are shown on Plates 13 and 14 which also contain details of No. 3 Deposit.

Pit-sinking and boring disclosed small isolated areas sufficiently enriched in alumina and low enough in silica to come within or nearly within the definition of economic bauxite, but the great bulk of the bauxite contained 10 per cent or more silica.

Logs of two shafts with partial analyses of samples are given:-

Shaft No. 1 - CO-ORDINATES - 100N/500W.

Depth From	Feet To	Description	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	Ign. Loss %	Avail. Al_2O_3 %	Na_2O loss cwt.
0	1	Soil	-	-	-	-	-	-
1	3.25	Grey Clay	-	-	-	-	-	-
3.25	4	Clay and pisolites of bauxite	-	-	-	-	-	-
4	6	Brown granular and pisolitic bauxite with grey clay in joints.	6.5	38.9	26.3	23.9	35.0	1.43
6	8.5	Red-brown granular & earthy bauxite	5.3	41.4	24.6	25.4	38.5	0.93
8.5	10.5	Pale brown granular bauxite	7.9	40.9	24.1	24.4	33.9	2.04
10.5	12	Pale brown clayey bauxite	15.1	37.4	22.9	21.4	24.5	-
12	15	Ditto	13.6	37.3	24.4	22.1	26.7	-
15	17	Pale brown & grey granular clay (weathered dolerite	-	-	-	17.5	-	-

SHAFT No.15 - CO-ORDINATES 100N/100W.

0	1	Soil	-
1	2.75	Grey clay passing to weathered basalt	
2.75	5.3	Basalt	-
5.3	8	Boulders & Pebbles in clayey matrix	-

(continued on next page)

Depth	Feet	Description	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	Ign. loss %	Avail. Al_2O_3 %	MgO %
8	8.5	Brown nodules in hard dark matrix	17.3	39.4	17.3	21.2	26.0	1.97
8.5	9.5	Brown nodules in red-brown hard matrix	15.0	41.6	16.8	22.2	29.9	1.74
9.5	10.5	Brown earthy bauxite with few nodules						
10.5	12.5	Ditto	13.5	42.1	17.3	22.3	31.6	1.7 (a)
12.5	14.5	Ditto	11.9	40.8	20.3	22.8	31.4	pres.(b)
14.5	17.5	Hard pink-brown clay	16.6	34.5	26.2	19.4	20.6	-
17.5	20	Pale brown & red clay	-	-	-	-	-	-
20	20.5	Pale brown granular weathered dolerite	-	-	-	-	-	-

(a) Na_2O loss 3.96 cwt.

(b) Na_2O loss 3.35 cwt.

Reserves of economic ore in No. 4 Deposit are virtually negligible. Shaft 1 of which the log has been quoted above disclosed a thickness of 6.5 feet of ore averaging 6.5% SiO_2 40.5% Al_2O_3 25.0% Fe_2O_3. 2.4% TiO_2 with 36.1% available Al_2O_3 and soda loss of 1.43 hundredweight Na_2O.

Bore No. 1 on the 100S line revealed 6 feet of siliceous bauxite under 20 feet of overburden. This bauxite is somewhat unusual in its behaviour in that the soda consumption is relatively low considering the high silica content, as the following figures representing the total thickness of 6 feet of bauxite show,

10.1% SiO_2, 45.9% Al_2O_3, 16.5% Fe_2O_3, 24.5% Ignition loss, 39.9% Avail. Al_2O_3, and 1.69 cwt. Na_2O. loss.

Two adjacent shafts in the north-west corner of No. 4 Area showed a volume of bauxite totalling about 8,000 tons and containing 8.0% SiO_2, 35.3% Available Al_2O_3, with 1.75 cwt. Na_2O loss

MINOR AREAS AT ST. LEONARDS.

No. 2 Deposit. A low rounded hill lying 1200 feet south of the southern extremity of No. 1 Deposit is capped with brown lateritic soil containing boulders and small irregular patches of ferruginous bauxite. Dolerite outcrops on the lower slopes and around the base of the hill.

Pits, sunk on a line across the hill failed to disclose solid bauxite in situ although all the pits were carried down to dolerite.

No. 4 Deposit. (see Page 22).

No. 5 Deposit. A bauxite body which occurs $4\frac{1}{2}$ miles east of Launceston and $\frac{1}{2}$ mile north of the Scottsdale road was tested by Pit-sinking.

The deposit is oval in plan with the longer axis trending east and west and measuring 700 feet in length. The maximum width is rather less than 400 feet. The body dips westerly at a slightly lesser angle than the topographic slope with the result that the bauxite thins out on an indistinct western boundary. The deposit is surrounded by dolerite, but the southern boundary is partly obscured by Recent alluvium.

Of four pits sunk only one (B), which was 100 feet south from the middle of the northern edge of the deposit, disclosed economic bauxite.

Another pit 100 feet south of B would probably have shown similar results, but it was abandoned in the hard pisolitic capping when the limited extent of possible economic ore was realized.

Where penetrated in pit B the section showed 4 feet of pisolitic bauxite overlying 2.5 feet of granular yellow and brown bauxite with relict dolerite texture. By increase in clay content the granular bauxite passes downward into kaolinized dolerite.

The maximum reserves of economic bauxite which could be developed in this deposit are of the order of 15,000 tons containing 4.5 per cent SiO_2, 42% Al_2O_3, 25% Fe_2O_3 and 2.1% TiO_2 with 25.5% Ignition loss.

Four small occurrences of bauxite have been observed in close proximity to the village of St. Leonards. These are all too small for commercial exploitation, and in any event, the largest occurs within the village and could not be mined without payment of disproportionate compensation to property owners.

These deposits which have been numbered from 6 to 9 inclusive, are briefly described here for purposes of record.

No. 6 Deposit. Pisolitic bauxite of light color outcrops along the north-western side of Abel's Hill road at $\frac{3}{4}$ mile north-north-east of the village. The body extends northerly into adjoining grazing land and has maximum dimensions of 400 feet by 200 feet. Where exposed in the roadside it was channel-sampled, and the samples were submitted to analysis with the following results:-

Sample Depth-Feet Description	1. 0 - 2 Pisolitic.	2. 2 - 3 Granular, doleritic
SiO_2	10.1 per cent	9.1 per cent
Al_2O_3	38.0 " "	37.8 " "
Fe_2O_3	25.5 " "	27.4 " "
TiO_2	2.4 " "	2.0 " "
Ignition loss	23.0 " "	23.0 " "
Available Al_2O_3	33.1 " "	34.3 " "
Na_2O loss	1.97 cwt.	1.31 cwt.

<u>No. 7 Deposit.</u> A small narrow body of granular bauxite containing kernels of unweathered dolerite crosses Abel's Hill road at about 600 yards north of the village.

One specimen yielded the following on analysis (T):-

Insoluble matter ..	10.0 per cent
Al_2O_3	40.4 " "
Fe_2O_3	23.5 " "
TiO_2	2.1 " "
Ignition loss	24.2 " "
SiO_2 (soluble in NaOH)	4.6 " "
Al_2O_3 (" " ")	37.1 " "

<u>No. 8 Deposit.</u> A narrow body of pisolitic and nodular bauxite, passing downwards to granular material overlying dolerite, outcrops for a distance of about 600 feet along the bank of a small gully 600 yards north of the St. Leonards police station. No samples from this occurrence have been analysed.

<u>No. 9 Deposit.</u> A roughly circular body, of which the outline is somewhat obscured by buildings, outcrops at the rear of the "Village Inn" and to the east in nearby roads within St. Leonards village. The exposed surface is characteristic of the nodular and pisolitic capping seen at No. 8 and elsewhere in the locality. No analyses of this bauxite have been made.

3. MYALLA.

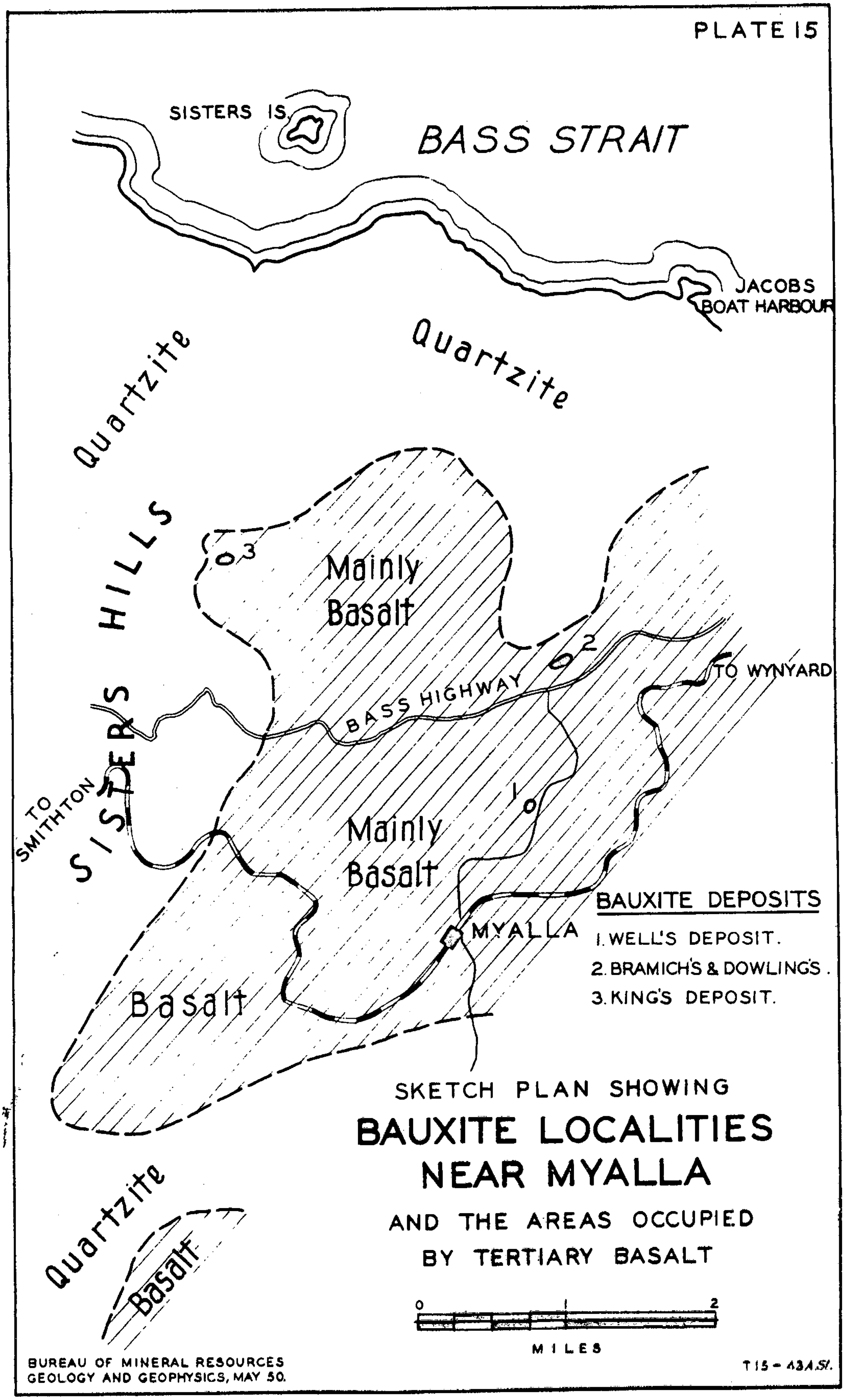
Myalla lies on the Stanley to Burnie railway 11 miles west of Wynyard and 3 miles south of the Bass Highway.

Bauxite of basaltic origin was first discovered in the locality in October 1944 on Lot 12029 about 2 miles north from Myalla railway station. Other occurrences were found soon after when the Tasmanian Mines Department investigated the original discovery.

Three areas, shown on Plate 15, and here referred to as No. 1 or Wells, No. 2 or Bramich's and Dowling's and No. 3 or King's, deposits respectively, were tested by the Mines Department by shaft sinking and scout drilling.

Major stratigraphic units present in the area are:-

3. Tertiary volcanics - basalt and basaltic tuff with associated bauxite.
2. Tertiary fresh-water or estuarine sediments.
1. Pre-Cambrian quartzite and slate.



SKETCH PLAN SHOWING
BAUXITE LOCALITIES NEAR MYALLA
AND THE AREAS OCCUPIED BY TERTIARY BASALT

The Pre-Cambrian rocks which form prominent hills ranging in elevation from 500 to 1500 feet above sea level, surround the lava field on the north, west and south, and less prominent inliers of quartzite occur within the area occupied mainly by the volcanics.

The Tertiary fresh-water and estuarine beds consist of gravel, sand and clay which is exposed where stream channels have cut through the overlying basalt.

Within the basalt area the land surface is mainly composed of rich agricultural soil but weathered and fresh basalt is exposed in road cuttings and in a few natural outcrops. The bauxite occurs on the flat crests of low hills which are remnants of a former more or less plane surface which sloped downwards gently to the north (towards the coast) at an inclination of some 80 to 100 feet per mile. Remnants of this former surface have elevations of some 800 feet at 2 miles south of Myalla and 400 feet at Nos. 2 and 3 deposits.

Three types of bauxite have been observed in the locality, first, a grey-blue material with the outward appearance of normal weathered, vesicular basalt. The vesicles are filled with blobs of white gibbsite, and veins of white, yellow or brown gibbsite also occur. These veins may be as much as one inch thick. This variety of bauxite is well developed in No. 1 Shaft on Wells' deposit. Secondly, nodular bauxite in which nodules of gibbsite are embedded in a clayey matrix occurs in the part of Wells' deposit which was tested by Shaft 2. This material bears a fairly close resemblance to the bauxite at Wade's deposit near Inverell N.S.W. (Owen 1949) and is not unlike the nodular bauxite at Telok Mas, Malacca and Pulau Kopok, Johore (Owen 1948). The third variety of bauxite seen is brown in color and largely consists of angular and subangular nodules of fine-grained gibbsitic rock embedded in a softer lighter matrix. In this respect it somewhat resembles the "pseudo-fragmental" doleritic bauxite at Ouse, St. Leonards and elsewhere in Tasmania. The whole rock is highly gibbsitic and contains 40-50 per cent "free" alumina and less than 2 per cent "free" silica.

<u>No. 1 or Well's deposit.</u> Here bauxite outcrops on the flattened crest of a small thickly wooded hill with an elevation of about 450 feet above sea level.

Two shafts were sunk about 150 feet apart on a north-south line and later two bores at 40 feet and 140 feet east of No. 1 (the northern) shaft. The two shafts and the nearer bore disclosed good quality bauxite with an average thickness of 7 feet. The second bore revealed only 1.5 feet of bauxite.

The following logs of the two shafts are quoted (slightly abridged) from an unpublished Tasmanian Mines Department report by D. R. Dickinson dated 12th January, 1945. Analyses of samples are by W. St. C. Manson.

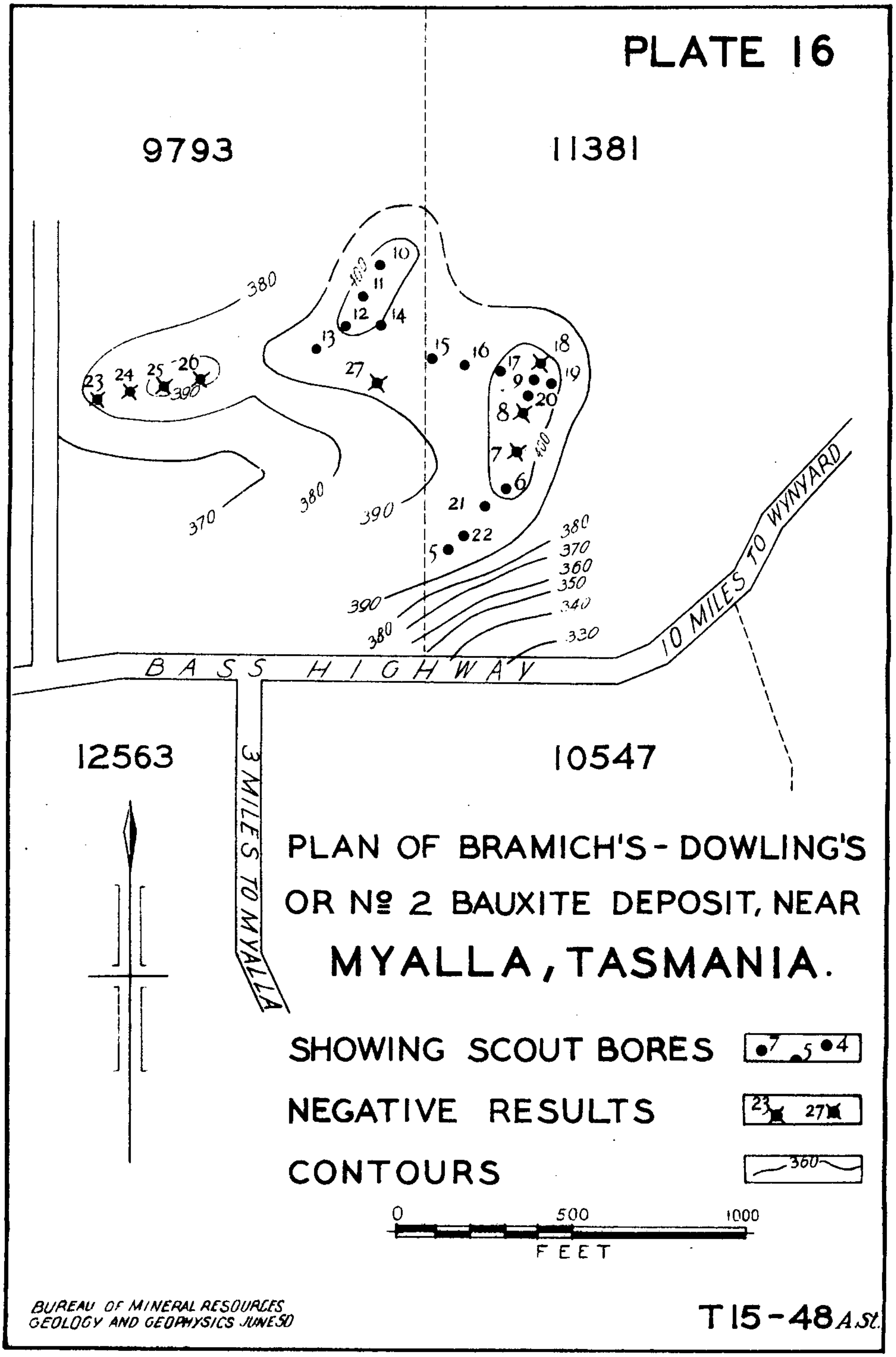
Depth From	Feet to	Description	Al_2O_3 %	SiO_2 %	Fe_2O_3 %
			Soluble in Caustis Soda.		
Shaft No. 1.			(T)		
1	3	Brown, hard; some earthy bands particularly towards base; blebs and seams of gibbsite	51.5	0.8	-
3	5		48.3	0.8	19.6
5	7		47.9	1.0	-
7	8.5	Brown, mixed hard and soft bands showing gibbsite	46.5	1.6	-
8.5	9.5		47.3	1.7	-
9.5	14.5	Soft, brown, sandy to clayey, with white veins and black carbonaceous patches.	22.6	9.9	-
14.5	20		18.3	12.1	
Shaft No. 2					
3	4.5	Mixed nodules in red soil	46.5	0.9	-
4.5	9	Red and green clayey formation with mixed nodules	30.5	3.1	-
ditto		Nodules free from matrix	40.2	0.7	29.0
9	11	Angular pale green nodules and larger concretions in green to yellow matrix.	43.1	3.4	-
ditto		Nodules and concretions without matrix.	53.4	1.7	-

From the results of shaft and bore sampling it has been computed that Wells' deposit contains a limited tonnage, probably not exceeding 10,000 tons of bauxite containing 48 per cent "free" alumina and 2 per cent "free" silica.

No. 2 (Bramich's & Dowling's) deposit. This area, occupying a low rounded ridge in Lots 9793 and 11381 has been prospected with 23 scout bores which have indicated the presence of bauxite with an average thickness of 8 feet over an area of about 40,000 square yards, equivalent to approximately 180,000 tons. (see Pl. 16). The grade of this bauxite has a wide range from 29.9 to 46.7 per cent "free" alumina and 8.0 to 1.4 per cent "free" silica.

The results of scout boring may be summarized as follows:-

PLATE 16



PLAN OF BRAMICH'S - DOWLING'S OR Nº 2 BAUXITE DEPOSIT, NEAR MYALLA, TASMANIA.

Bore No.	Thickness in Feet Overburden	Bauxite	(T) Soluble in Caustic soda Al_2O_3 %	SiO_2 %
5	-	13.5	39.0	4.8
6	16.5	2	38.4	4.6
7 & 8	-	Nil	-	-
9	8.5	7	41.8	4.8
10	4	8.5	46.7	1.4
11	9	7.5	35.1	6.2
12	4	5.5	42.0	3.4
13	5	3.5	40.0	3.4
14	5	4	35.4	4.9
15	19	2.5	34.8	5.0
16	5	7	42.4	4.0
17	9	4	29.9	8.0
18	-	Nil	-	-
19	4	7	38.2	4.3
20	3.5	9.5	41.4	4.3
21	7	14	30.9	5.4
22	8	8	37.7	2.8
23-27	-	Nil	-	-

More detailed analyses of several samples from No.2 deposit are given (T):-

	Insoluble matter %	"Free" SiO_2 %	Total Al_2O_3 %	"Free" Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Ignition loss %
(a)	7.4	4.6	47.4	45.0	17.4	2.6	24.5
(b)	30.7	11.8	29.0	14.2	21.6	3.4	14.4
(c)	18.6	5.8	36.9	27.0	20.1	6.3	19.0
(d)	14.0	8.2	16.7	12.2	51.8	3.7	13.1
(e)	13.0	7.9	11.4	10.5	57.8	5.4	11.2

(a) Bore 16; from 13 to 14 feet.
(b) " 18; " 7 " 9 "
(c) " 21; " 7 " 9 "
(d) " 23; " 3 " 5 "
(e) " 23; " 5 " 7 "

No. 3 (King's) deposit. Bauxite boulders were found distributed on the surface and in the soil over a wide area on the crest of a flat hill at this locality, but boring showed little or no bauxite in situ and most bores entered partially lateritized basalt beneath soil cover. Three adjacent bores from a total of ten penetrated bauxite with an average thickness of 6 feet and an average grade 32.5 per cent alumina and 4.8 per cent silica soluble in caustic soda solution. The range of composition of samples from these three bores is from 29.4 per cent "free" alumina with 6.6 per cent soda-soluble silica to 35.4 per cent alumina and 3.5 per cent soda-soluble silica, and the quantity indicated totals about 15,000 tons.

Of the three deposits tested only No. 2 has yielded results which indicate the possible presence of bauxite in commercial quantity, but it is improbable that it could be used economically unless the soda-soluble silica content can be reduced.

Geological reconnaissance of the area covered by the accompanying sketch map (Pl.15) failed to locate additional deposits of any significance, but the negative result of this search in the vicinity of Myalla does not necessarily mean that other deposits may not exist farther afield. It is possible that new discoveries may be made in the large areas occupied by Tertiary volcanic rocks extending south from the coast between Wynyard and Devonport.

4. EAST TAMAR.

(a) Hillwood. A small outcrop of ferruginous laterite which lies between Leam and Hillwood on the east bank of the Tamar was tested by pit-sinking and found to be too small and too low in grade.

Typical analyses of sub-surface bauxitic material from Hillwood are:-

	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Av. Al_2O_3	Na_2O loss
	%	%	%	%	%	cwt.
(1)	10.1	44.5	17.9	4.6	37.2	2.50
(2)	12.2	33.7	29.8	2.3	27.4	-

(1) Pit C. From 8 feet to 8.5 feet.
(2) Pit A. " 7 " " 11 "

(b) Thorp. Doleritic bauxite of granular texture outcrops on a ~~farm named~~ Thorp at about 1½ miles north-west of Dilston Post Office and ½ mile east of the Georgetown road. The bauxite, which is believed to be thin, wedges out against dolerite to the north, east and south, but may continue to the west where a small exposure is visible in highly improved land adjacent to the farmstead. The deposit is not sufficiently large to warrant interference with the farm property.

(c) Rifle Range. Light colored granular bauxite lying beneath thin remnants of ferruginous pisolitic laterite was revealed in practice trenches dug on Defence Department property 2 miles east of Invermay, Launceston. The deposit probably occupies an elliptical area measuring not more than 350 feet by 150 feet but boundaries are obscured by soil and buckshot gravel. Dolerite outcrops 300 feet to the south and 150 feet to the north-west of the probable margins of the bauxite.

The granular character of the bauxite indicates that it represents a low horizon in the normal lateritic sequence and is probably thin.

(d) Small deposits of bauxite have been noted at numerous places in the locality, notably near the 11 and 13 mile pegs on the Georgetown road, near Nelson's Hill on Windermere Promontory, and 1½ miles north-west of Mt. Direction. None of these deposits are of any value.

5. LAUNCESTON.

Three occurrences of bauxite are known within or partly within the city boundaries in West Launceston and Cataract Gorge picnic ground. These deposits are of no commercial importance being either too small or, as at Connaught Crescent, occupying a built-up residential area, but they have considerable bearing on questions of origin of the doleritic bauxite and are, therefore described in some detail. A geological plan showing their positions and topographic contours at vertical intervals of 50 feet is also given (pl.17).

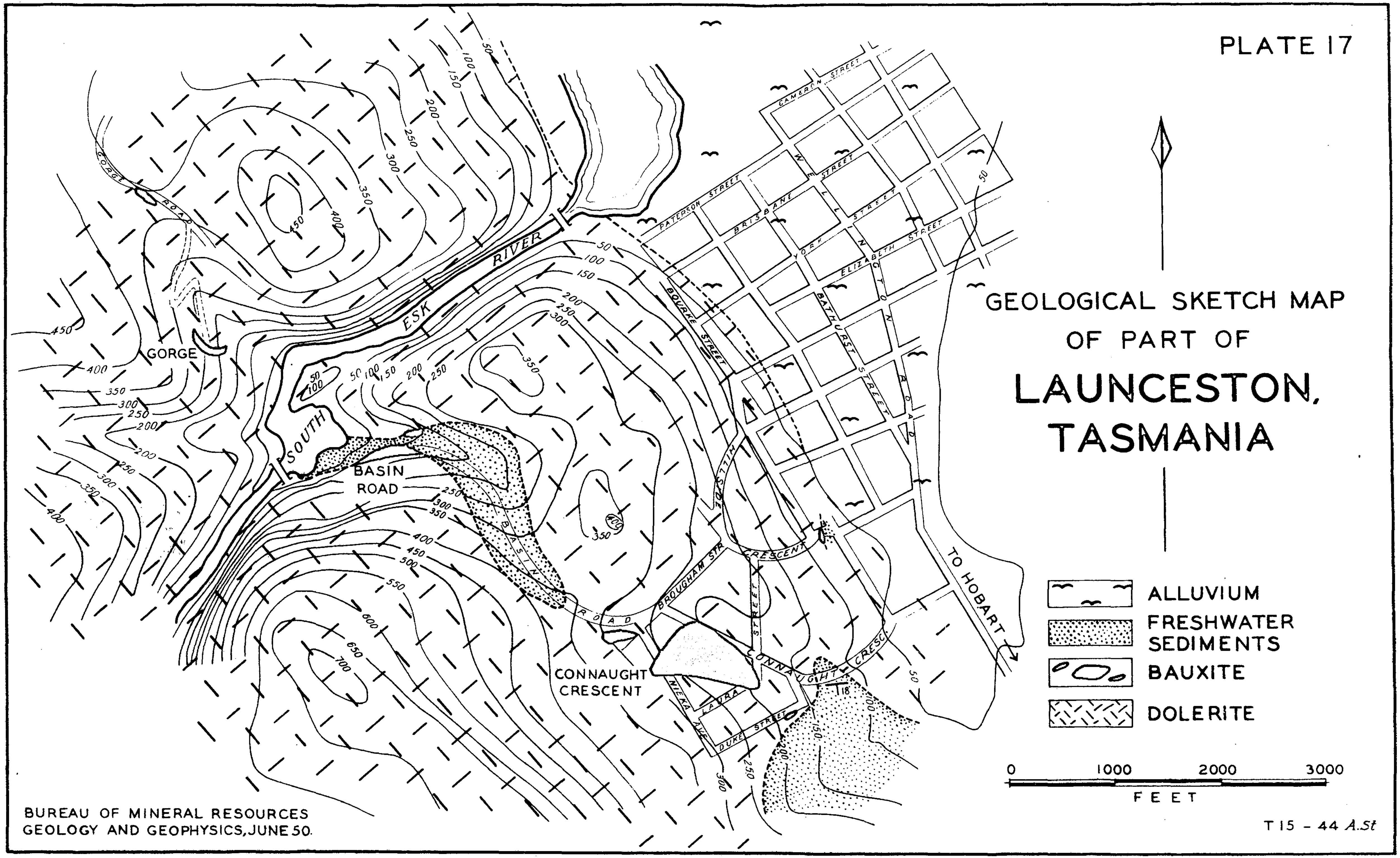


PLATE 17
GEOLOGICAL SKETCH MAP
OF PART OF
LAUNCESTON,
TASMANIA
ALLUVIUM
FRESHWATER SEDIMENTS
BAUXITE
DOLERITE
0 1000 2000 3000
FEET
SOUTH ESK RIVER
GORGE
GORGE ROAD
BASIN ROAD
CONNAUGHT CRESCENT
PATERSON STREET
BRISBANE STREET
YORK STREET
ELIZABETH STREET
CAMERON STREET
WELLINGTON STREET
BATHURST STREET
BOURKE STREET
BROUGHAM STR.
CRESCENT
NIEKA AVE
LAURA
DUKE STREET
TO HOBART
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS, JUNE 50.
T 15 - 44 A.St

In order of size the deposits are (a) Connaught Crescent (b) Gorge and (c) Basin Road.

(a) Connaught Crescent. This deposit is best exposed in a road cutting on the south side of Connaught Crescent between Brougham and Laura Streets. The bauxite rests directly on dolerite which outcrops near the intersection of Laura Street with the Crescent. Reference to Plate 17 will show that the deposit lies on a fairly steep slope to the north-east, formerly the flank of an old valley trending to the south-east.

The bauxite has a capping several feet thick of coarsely pisolitic material containing angular and rounded blocks of bauxite retaining the texture of the parent dolerite. This zone passes downward into soft earthy bauxite and thence into doleritic bauxite.

Small marginal outcrops of the pisolitic bauxite are exposed in Nicka Avenue and Laura Street to the east and west respectively of the exposure in the road cutting.

On the assumption that the body is continuous between these exposures it is probable that the deposit contains 100,000 tons of bauxite.

Small detached remnants of the Connaught Crescent deposit occur to the east and west and also at about ¼ mile north-north-east.

(b) & (c) The Gorge and Basin Road deposits may be considered together. Both occur on the walls of steep-sided valleys, lateral to the South Esk River, well below the summit of the dolerite, and both conform to the valley slopes and dip towards the South Esk River. Neither of the bodies is considered to be recemented detritus derived from a higher level, and it is believed that they were formed in situ. The Gorge deposit which lies about 200 yards north-west from the Tea Rooms in the picnic ground has a capping of nodular and pisolitic material passing to doleritic bauxite. It overlies dolerite which outcrops above and below the deposit, and the passage from doleritic bauxite to kaolinized dolerite is exposed in an excavation just outside the park gates. Some of the upper capping which is showing inside the park consists of a dense brown matrix with small ferruginous pisolites.

The smaller Basin Road deposit on the opposite bank of the South Esk River consists of pisolitic bauxite in the upper portion passing through earthy bauxite and bauxitic clay to weathered dolerite.

6. WEST TAMAR.

Under this heading several bauxite occurrences distributed over a fairly wide area from Beaconsfield to near Launceston and as far west as Westbury are discussed in the following order:

(a) Beaconsfield
(b) Cormiston East
(c) Cormiston West
(d) Rosevale
(e) Westbury.

(a) Beaconsfield. A fairly massive outcrop of pisolitic laterite occurs on a gentle slope 1 mile west-north-west from Beaconsfield, surrounded by grey sandy soil, clay and buck-shot gravel. Shallow road quarries about 300 feet south of the outcrop and 10 to 20 feet above it have disclosed brown sandy clay with pebbles and boulders of laterite to a depth of 4 feet.

At the outcrop the laterite has a thin capping of loosely coherent pisolites over dense ferruginous material with a few included quartz grains. It is apparent that this deposit consists of recemented detritus.

(b) Cormiston East. A small highly ferruginous body of laterite occurs on the southern slope of a low rounded hill on property owned by Thompson Bros. 4½ miles north-west of Launceston and ¾ mile west of the West Tamar Highway. Fresh dolerite outcrops immediately to the north of the laterite and at a higher elevation. Some years ago a misguided prospector had driven an adit in a northerly direction into the laterite. As the direction of the adit was up the dip of the laterite it passed into the underlying kaolinized dolerite at 25 feet from the portal and was abandoned at 35 feet. The maximum true thickness of laterite exposed by the adit is 10 feet. Six samples but from 4 vertical channels in the walls of the adit and its approach were analysed at the Mines Department laboratory with the following results (T):

Sample No.	Thickness feet	Insoluble matter	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Ign. Loss %
1	4.25	19.1	30.6	31.5	2.0	15.9
3	3	13.7	31.2	34.1	2.2	17.6
4	3.5	18.6	29.8	32.5	2.1	15.7
5	3	15.6	37.4	26.4	2.0	18.1
6	3	16.6	34.0	28.9	2.1	17.5
7	4	15.4	35.0	29.1	2.3	17.7
582	-	6.6	26.2	48.4	3.0	14.6

Sample 582 was chipped from the outcrop and was analysed at the laboratory of the A.A.P.C.

The deposit is small - a rough estimate of the quantity indicates a total of about 10,000 tons.

(c) Cormiston West. Doleritic bauxite was observed in the roadway and table drains of the Ecclestone road at a point 2½ miles west of the West Tamar Highway and 6 miles from Launceston. Search of the vicinity revealed discontinuous outcrops mainly on the northern side of the road, distributed over an area measuring ¼ mile wide by 1 mile long from east to west. Some of the outcrops are marginal to areas of sands and clay which overlie the dolerite, and it was considered possible that the bauxite would continue under the younger sediments. However, testing with shallow pits proved disappointing as it was found that the bauxite had been extensively eroded before the deposition of the clayey sediments and did not extend beyond the visible outcrops.

In brief the results of test-pitting showed that no appreciable thickness of bauxite remained west of pits 14 and 15 which are only 500 feet from the eastern extremity of the outcrops.

Logs of these pits are:

Depth-Feet From	To	Description	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Avail. Al_2O_3 %
Pit No. 14.							
0	1	Soil	-	-	-	-	-
1	2.5	Brown clay	-	-	-	-	-
2.5	4.5	Brown and white clay with pebbles of bauxite	Not sampled				
4.5	5.5	Ditto with bauxite predominant	-	-	-	-	-
5.5	8	Doleritic bauxite with clay	10.8	36.8	27.9	2.5	31.3
8	11	Red and white clay with low plasticity	- Ignition loss 13.1% -				
Pit No. 15.							
0	1	Sandy soil	-	-	-	-	-
1	4.25	Red-brown sandy clay and seams of brown clay	Not sampled				
4.25	6	Brown granular clay	-	-	-	-	-
6	8	Pale brown clayey pisolites in matrix of hard white clay	25.9	42.4	7.9	3.0	20.9
8	10	Ditto passing into clayey bauxite with small ferruginous pisolites	9.2	35.7	30.2	2.6	29.5
10	12.5	Red, non-plastic clay	26.9	29.8	27.4	1.5	-
12.5	17.5	White and pinkish-red non-plastic clay	-	Ignition loss 12.9%			
17.5	18.5	Ditto					

(d) Rosevale. Five outcrops of bauxite occur in the vicinity of the small village of Rosevale which lies 11 miles west of Launceston and 11 miles by road north of Hagley, the nearest railway station.

Three (Nos. 3, 4 and 5) of the five bauxite occurrences form a group 8 miles by road from Hagley and three miles south-west from Rosevale on the road to Selbourne. The remaining two (Nos. 1 and 2) deposits lie at 1 mile from the village in the north-west corner of the town reserve, and at 100 yards east of the main road in the village respectively.

Brief descriptions of the individual deposits follow:

No. 1 Area. No solid bauxite *in situ* is visible but large boulders and smaller fragments occur over a roughly circular area with a diameter of 900 feet. Dolerite bounds the area on the northern and eastern margins but no defined boundary was observed elsewhere. Most of the bauxite is finely granular with the texture of the parent dolerite partially preserved. It is evident that only residual boulders of a former solid body now remain embedded in clay and resting on dolerite.

No. 2 Area. This area comprises a very small showing of doleritic textured bauxite surrounded by dolerite. The deposit has no economic importance.

No. 3 Area. Bauxite occurs partly in solid outcrop and partly as scattered fragments in brown bauxitic soil in a narrow strip about 2,000 feet long with a maximum width of 150 feet occupying a shallow depression.

The deposit is completely surrounded by dolerite but there was a possibility of bauxite being concealed under alluvium near the centre of the deposit. This possibility was explored by a pit which passed through 3 feet of brown sedimentary clay into grey clay which is probably weathered dolerite. A second pit chosen at an apparently more favourable place revealed an irregular bauxitization of dolerite for about 3 feet and then entered red and white clay with relict texture of dolerite.

No further work was conducted on the deposit which is considered to be worthless.

No. 4 Area. At this deposit which lies 800 feet west of and sub-parallel to No. 3 the area occupied by bauxite and detritus is elliptical in plan about 1,400 feet long by a maximum width of 500 feet. Like No. 3 this deposit occurs in gently undulating country, and occupies a shallow depression in the dolerite surface.

Nine pits spaced 200 feet apart on a rectangular grid were sunk on No. 4 deposit with unfavourable results. Six of the nine shafts entered kaolinized dolerite at depths ranging from 3 to 5 feet after passing through soil and bauxite boulders or bauxite seamed with clay. Logs of the remaining three shafts with partial analyses of channel samples are given.

ROSEVALE NO. 4 AREA - SHAFT LOGS.

Depth From	Feet To	Description	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2	Avail. Al_2O_3 %
		Shaft No. 3.					
0	1.3	Soil					
1.3	2.5	Brown & grey Clay					
2.5	3	Hard nodular bauxite with fine texture	4.1	38.3	29.2	3.6	36.1
3	5.5	Nodular bauxite; large granular nodules in hard dense matrix					
5.5	8	Soft bauxite, both clay-like and granular; clay seams.	4.3	38.9	28.8	2.6	36.4
		Shaft No. 6 (West face)					
0	2	Boulders of bauxite in soil & clay	Not sampled				
2	8	Granular bauxite with seams of clay	10.8	38.7	25.0	1.7	30.3
8	9	Brown & grey clay and partly bauxitized dolerite	Not sampled				

Depth From	Feet To	Description	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Avail Al203 %
		Shaft No.6 (East face)					
0	2	Boulders of bauxite in soil and clay		Not sampled			
2	5	Brown & grey clay with bands of granular bauxite					
5	8	Granular bauxite with brown & grey clay	10.7	38.4	25.7	1.7	29.7
		Shaft No. 7					
0	1.5	Soil		Not sampled			
1.5	2.3	Yellow-brown pisolitic bauxite and grey clay					
2.3	3.2	Pale brown soft earthy bauxite and grey clay					
3.2	3.7	Dense granular red bauxite	9.0	41.5	22.3	2.8	35.0
3.7	4.7	Dull brown friable pisolitic bauxite					
4.7	8	Red-brown earthy bauxite with grey clay					
8	?	Pinkish brown clay		Not sampled			

Only the samples from Shaft 3 come within the definition of economic bauxite, and therefore the deposit is valueless as a potential source of aluminium.

No. 5 Area. Bauxite is exposed in a road drain about 500 yards west of the northern end of No. 3 Area and residual boulders of bauxite formerly in the soil have been gathered and stacked during cultivation. The resulting heaps of boulders are the only evidence of bauxite, and it is considered that the boulders are the final remnants of a deposit and little else remains now.

e. Westbury. Unusually light colored bauxite outcrops on the Frankford road about 1½ miles north of Westbury, and extends for a short distance into grazing land on either side of the road. To the west the deposit wedges out against dolerite from which it is probably derived. The deposit is too small to warrant sub-surface testing. One sample cut from a freshly exposed face of the outcrop was analysed with the following result (T):-

Insoluble matter	13.3%
Total alumina	40.7%
Ferric oxide	19.6%
Titanium dioxide	2.3%
Ignition loss	24.8%

7. WHITE HILLS.

Stiff red clay showing a faint relict texture and containing small residuals of grey deeply weathered basalt is exposed in a shallow road cutting 3 miles east of White Hills on the Upper Blessington road. The cutting has been made in the northern flank of a small hill with a flattened crest measuring about 200 feet in diameter, and lying at about 800' above sea level.

One specimen of pink altered basalt was submitted to partial analysis in the Mines Department laboratory at Launceston in 1946 and yielded 52% "free" alumina; a more comprehensive collection of specimens from residual boulders of bauxite lying on the flanks and crest of the hill was found to contain 43.8% Available Al_2O_3 extractable with a loss of alkali equivalent to 1.01 cwt. Na_2O per ton of alumina extracted.

Only a negligible quantity of bauxite of this composition is available in this deposit and its sole claim to importance lies in its high grade and basaltic origin.

A search of the locality failed to find any further bodies of this bauxite, or exposures of the parent basalt at a comparable elevation.

8. FORDON.

Three outcrops of ferruginous laterite occur on the York Park area of Fordon Estate at 7½ miles by road south-east from Nile village and 13 miles north of Campbell Town. The Tasmanian Mines Department sank 8 shallow shafts on the largest of the three bodies and no additional sub-surface work has been conducted.

> Dickinson states (1943) that the largest body "covers 40 acres and takes the form of a flat-topped ridge with a north-west to south-east trend .... 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 .... Ten samples averaged 31.1% Al_2O_3 and 1.7% SiO_2 "free" to caustic soda."

The smallest of the deposits forms a small conical hill, known as Viney's Sugarloaf, and overlies basalt from which it is derived. No basalt is disclosed beneath the other two bodies which overlie dolerite, but it is apparent that their origin is the same as Viney's Sugarloaf and that the immediately underlying basalt is obscured by detritus.

A sample chipped from the surface of one of the deposits was analysed at the laboratory of the Australian Aluminium Production Commission with the following result:-

	%
SiO_2	2.9
Al_2O_3	28.0
Fe_2O_3	50.0
FeO	1.1
TiO_2	4.7
Ignition loss	12.1
P_2O_5	0.10
V_2O_5	0.08
Cr_2O_3	0.04
	99.02

The preliminary testing by the State Mines Department, when considered in the light of experience gained on the similar deposits at Campbell Town, was considered to be sufficient to establish that the laterite at Fordon is too low in grade to be used as a source of aluminium under present conditions.

9. LAKE RIVER & EPPING.

(a) Lake River. A small deposit of doleritic bauxite occurs about 200 yards south of the Cressy-Campbell Town road 11½ miles south-east from Cressy. The outcrop trends north-westerly and is about 400 feet in length by a maximum width of about 40 feet. To the south-west the bauxite is flanked by fresh dolerite, and by grey sandy clay on the opposite side.

Extension beyond the visible outcrop is considered unlikely.

(b) Epping. A body of ferruginous bauxite shows in a shallow road cutting 600 yards west of Epping railway station where the road descends a small creek bank. Search of the locality failed to reveal further exposures.

10. CAMPBELL TOWN.

The numerous deposits in the vicinity of Campbell Town are here referred to by the numbers allocated to them by Dickinson (1941). Their relative positions and proximity to Campbell Town are shown on the accompanying plan (Plate 18).

Testing by the Mines Department generally gave unfavorable results, but it was considered that in view of the apparently large area covered by laterite some additional testing to provide conclusive results was warranted. Accordingly the Aluminium Commission sank a few shafts and put down a few bores on the larger areas to supplement the work which had been carried out previously by the State authorities. This more extensive work fully proved that the deposits had no economic value.

Notwithstanding the unfavorable conclusion the occurrences are not without interest and brief descriptions of several of the areas are given.

At Riccarton Estate on the north-eastern side of Campbell Town, the deposits retain a highly ferruginous pisolitic zone in which the ferric oxide exceeds alumina and may be as high as 43%. In very restricted places, as for example on Area 15 the ferruginous cap is underlain by 2 or 3 feet of moderately good bauxite.

On Rosedale and Meadowbank Estates at about 2½ miles to the north-west of Campbell Town the bauxite mainly consists of sparse gibbsitic nodules embedded in red and green clay. The upper ferruginous zone is represented by scattered ferruginous pisolites occurring in the overburden.

Throughout the area the bauxite, or at least such small remnants of it as now exist, passes into kaolinized volcanics, largely basalt but containing bands of fine earthy material which is probably ash. Some bores which were sunk to depths well below the lateritized zone encountered variegated clays beneath recognisable weathered basalt which suggest intercalated ash beds. One bore sunk on the Rosedale outcrop penetrated low grade bauxite to 15 feet, recognisable kaolinized basalt or basaltic tuff to 27 feet and thence brown and red clays to 65 feet followed by dominantly

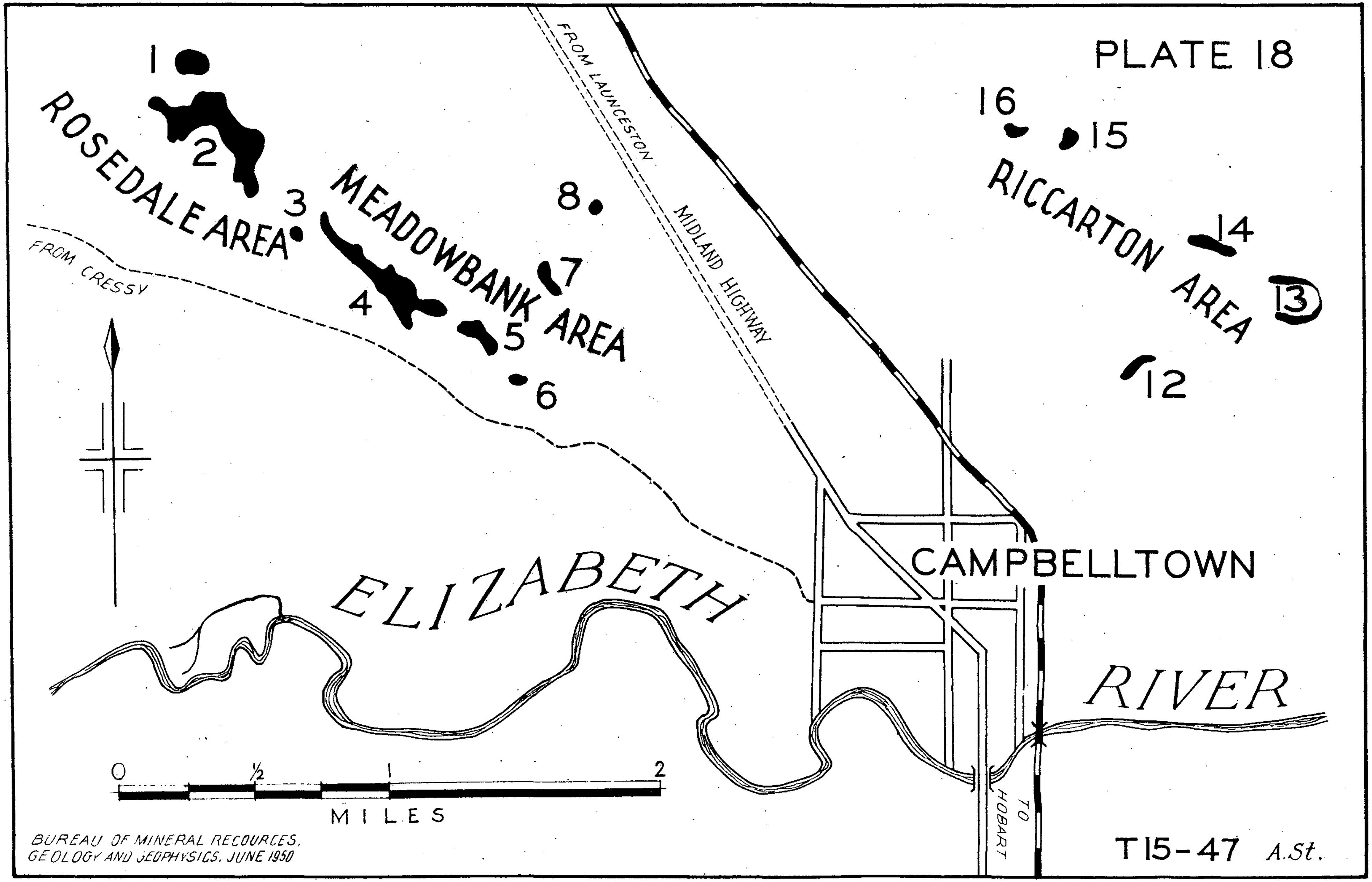


PLATE 18
1
2
ROSEDALE AREA
3
MEADOWBANK AREA
4
5
6
7
8
FROM LAUNCESTON
MIDLAND HIGHWAY
FROM CRESSY
16
15
RICCARTON AREA
14
13
12
CAMPBELLTOWN
ELIZABETH
RIVER
TO HOBART
0
½
1
2
MILES
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GEOLOGY AND GEOPHYSICS, JUNE 1950
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yellow clays to 85 feet at which depth a thin ferruginous band immediately overlaying dolerite was reported.

Summaries of the results of the testing of Deposits 1 and 2 on Rosedale, 4 on Meadowbank and 13 and 14 on Riccarton are given with a brief reference to No. 8 deposit.

Rosedale Estate.

There are three separate areas of which No. 3, which is a small residual of insufficient thickness or area to be of any commercial value, was not tested by either the State Mines Department or the Aluminium Commission.

The Mines Department shafts were, for the most part sunk from higher points on the gently undulating surface of the deposits, and consequently intersected a greater thickness of laterite than the holes later sunk at intermediate points. Results of both campaigns are given in tabulated form.

TABLE 7.

NO.1. DEPOSIT ROSEDALE ESTATE.

Shaft No.	Tasmanian Mines Department			Aluminium Commission			
	Thickness Feet	"Free" Al_2O_3 %	"Free" SiO_2 %	Thickness Feet Sampled	Thickness Feet Econ. Grade	Avail. Al_2O_3 %	Na_2O loss cwt.
1	6.3	23.3	7.9	5	Nil		
2	7.3	30.3	5.1	12	4	34.1	1.03
3	5.0	36.6	6.6	-	-	Not re-sampled	
4	4.0	44.7	3.7	-	-	Not re-sampled	
5	7.0	33.3	2.4 (1)	-	-	Not re-sampled	
6	6.2	28.8	5.5	6	1	36.5	1.44
7	4.5	44.7	3.8	10.5	3.5	43.0	0.65

Shafts or bores sunk by Aluminium Commission.

Shaft or Bore	Thickness Sampled Feet	Thickness of Economic Bauxite Feet	Avail. Al_2O_3 %	Na_2O loss Cwt.
R1	5.5	Nil	-	-
R2	Nil	-	-	-
R3 (B)	13	3	31.6	1.03
R4	Nil	-	-	-
R5 (B)	22	Nil	-	-
R6	10.5	Nil	-	-
R7	4	Nil	-	-
R8	4	Nil	-	-
R9 (B)	24	Nil	-	-
R10(B)	19	Nil	-	-
R11(2)	6	2	34.0	1.21

(1) Shaft 5. Some clay was rejected from the Mines Department sample before assay.

(2) Shaft R11 was sunk on No. 1 deposit, all the others on No.2 deposit.

(B) Signifies percussion bore.

Meadowbank Estate.

This property adjoins Rosedale on the east and the small No. 3 deposit lies across the boundary between the two properties. In addition there are five separate areas of outcrop, but only one of them, No. 4 is large.

The Mines Department sank 10 shafts at intervals ranging from 500 feet to 200 feet apart on No. 4 area, and a group of 20 shafts at intervals of 25 feet near the southern end of the same area.

Of the 10 shafts only three were deemed by the Mines Department to be worth sampling. One of these three and two others were re-opened and sampled by the Aluminium Commission, and 8 additional shafts were sunk. The results of this work are summarized below:-

TABLE 8.

NO. 4 DEPOSIT MEADOWBANK ESTATE.

Shaft No.	Tasmanian Mines Department			Aluminium Commission			
	Thickness Feet	"Free" Al_2O_3 %	"Free" SiO_2 %	Thickness Feet Sampled	Thickness Feet Econ. Grade	Avail. Al_2O_3 %	Na_2O loss cwt.
8	5	36.2	6.2	10.5	6	32.9	1.29
11	Not sampled			8	-	Nodules in red clay	
12	Not sampled			3.0	-	23.6	
16	2.5	33.3	2.1	-	-	Not re-opened	
17	4.2	37.1	6.0	-	-	Not re-opened	

Shafts sunk by Aluminium Commission

Shaft No.	Thickness Feet Sampled	Thickness Feet Economic bauxite	Avail. Al_2O_3 %	Na_2O loss cwt.
M1	3	Nil	-	-
M2	4.5	4.5	33.5	0.75
M3	Nil	-	-	-
M4	Nil	-	-	-
M5	3.5	1.2	33.7	1.31
M6	4	Nil		
M7	Nil	-	-	-
M8	5	5	40.8	0.97

Specimens of spoil from the two old shafts (22 and 23) on Area 8, a small flat-topped hill near the eastern boundary of Meadowbank Estate, gave a very high result on assay, viz:

1.0% SiO_2; 53.8% Al_2O_3; 12.8% Fe_2O_3; 2.3% TiO_2; 30.5% Ignition loss and 53.2% Available Al_2O_3. This is at variance with the logs given in the Tasmanian report which both showed the shafts to have penetrated - "earthy formation, no bauxite in section" to a depth of 8 feet.

Riccarton.

The deposits on Riccarton lie a mile to the north-east of the town and are much smaller than No. 2 and 4 on Rosedale and Meadowbank respectively. The two apparently larger bodies on Riccarton, No. 13 and 14, which were tested by the Aluminium Commission, consist of small narrow highly ferruginous bodies outcropping along a low ridge with a general trend slightly north of west. Drilling and shaft sinking at sites in close proximity to the outcrops showed that the bodies did not extend appreciably beyond the visible limits.

Four shafts sunk on No. 13 Area entered variegated basaltic clay at depths ranging from 3 feet to 6 feet 6 inches, without encountering solid bauxite.

On area 14 where the ridge exceeds ½ mile in length 10 bores were sunk, all with negative results.

A small but massive outcrop forms a prominent low bluff ½ mile north-east from No. 14. This deposit, known as No. 15, has been quarried for road gravel and presents a fairly good section for sampling. Three channel samples representing a vertical thickness of 10 feet from the surface were taken and analysed with the following results:

	1.	2.	3.
SiO_2	1.9 per cent	3.8 per cent	11.6 per cent
Al_2O_3	28.4 " "	41.0 " "	41.6 " "
Fe_2O_3	43.0 " "	21.7 " "	13.4 " "
TiO_2	4.5 " "	8.7 " "	8.3 " "
Ign.loss	16.9 " "	25.4 " "	24.1 " "
Avail.Al_2O_3	-	39.6 " "	33.5 " "
Na_2O loss	-	0.45 Cwt.	2.95 Cwt.

1. Surface to 4 feet. Dense pisolitic ferruginous capping.

2. 4 feet to 7 feet. Earthy bauxite.

3. 7 feet to 10 feet. Light-colored clayey bauxite with few ferruginous pisolites.

East of Conara Junction. Small and thin deposits of bauxite occur 4 miles east of Conara Junction at the road bridge crossing the St. Mary's railway and at one mile north from the road-railway crossing. At the former locality the bauxite is similar to the Riccarton laterite and overlies volcanics weathered to reddish-purple clay. North of the road the bauxite is yellowish brown and grey in color and bears a superficial resemblance to earthy doleritic bauxite such as that occurring at Ouse. The silica content is high.

None of the deposits in this locality are of sufficient size to be of any commercial importance.

11. SWANSEA.

Small deposits of bauxite occur north of Swansea on the east coast of Tasmania. The largest of these lies adjacent to the Tasman Highway, 7 miles north of Swansea, where shallow quarries have been opened for the supply of road surfacing material.

This deposit was selected for sub-surface testing with shafts on account of its relatively larger size, and because exposures in an old shaft indicated a reasonable thickness of bauxite containing up to 41.4% Al_2O_3.

Prospecting subsequently revealed that the body was smaller than at first believed and that much of the apparent outcrop consists of detritus.

The bauxite mainly consists of the granular type in which the texture of the parent dolerite is partially preserved. It rests upon kaolinized dolerite into which it passes with increase in silica content and decline in alumina as shown by the following figures.

	Feet From	Feet To	SiO_2 %	Al_2O_3 %
Shaft 200S/00	1.5	4.5	9.3	41.4
	4.5	9	7.3	31.2
	9	13.5	12.1	29.9
Quarry 500S/60E approx. 20 feet below shaft collar	-	-	24.0	23.2

The quantity of bauxite of economic grade revealed by shaft sampling is almost negligible. Shaft No. 1 at 100N/100E penetrated 4.5 feet of bauxite containing 5% SiO_2, 41.4% Al_2O_3, 25.8% Fe_2O_3, 3.0% TiO_2.

Thicknesses penetrated and compositions are given:-

Shaft No.	Thickness Feet	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Av.Al_2O_3 %	Na_2O loss cwt.
1	4.5	5.0	41.4	25.8	3.0	38.0	1.07
4	2	4.6	33.8	34.9	5.2	31.2	1.00
200S/00	3	9.3	41.4	19.9	4.2	-	-

The above figures represent a total tonnage of approximately 9,000 tons beneath 6,000 tons of overburden.

ORIGIN OF THE BAUXITE.

Discussion under this heading is directed more towards the mechanism of formation of bauxite than that of laterite generally, although it is conceded that it is impossible to discuss one without the other. It is a truism that laterite, by any definition includes bauxite which is merely a more aluminous variety. C.S. Fox (1932) gives the following analysis as that of a normal laterite:-

SiO_2	2.4 per cent
Al_2O_3	46.6 " "
Fe_2O_3	23.7 " "
Ign. loss	24.5 " "

This is less ferruginous and more aluminous than the "bauxite" at Ouse and St. Leonards.

It has been mentioned in Section III of this report that the Tasmanian bauxite occurs in three zones - (a) pisolitic or nodular, resting on (b) earthy bauxite, which in turn overlies (c) granular bauxite, in which the parent rock texture is preserved. These zones are in accord with the three zones of a typical laterite profile - ferruginous, mottled and pallid.

The earthy zone, by loss of iron upward to the nodular zone has become slightly enriched in alumina and constitutes the bulk of the economic bauxite. However the composition of each zone shows considerable range and the difference in composition between nodular and earthy bauxite is often found to be so small that much of the former also falls within the economic limits.

Notwithstanding solution and redeposition of alumina within the upper zones, the concentration of alumina is primarily due to removal of other constituents in solution.

The sequence of events in the conversion of dolerite to bauxite has involved a first stage in which (with or without an intervening stage of kaolinization) "doleritic" bauxite was developed containing 35-40 per cent Al_2O_3, 30-35 per cent Fe_2O_3 and 5-10 per cent SiO_2. Penetration of iron along joints and fractures with oxidation and precipitation near the surface gave rise to the pseudo fragmental appearance of this zone and raised the iron content to the range 40-50 per cent Fe_2O_3 and reduced the alumina content slightly. Continued withdrawal of silica in the bauxite immediately underlying the pisolitic zone caused the obliteration of any relict texture that had been preserved, thus developing the apparently textureless earthy band. The extreme case of the development of earthy bauxite is afforded by the clay-like grey bauxite near the base of the section at St. Leonards both in No. 1 and No. 1 East deposits. This material may be distinguished from clay only by the fact that it is not plastic when damp. One sample, described in the field as pale-brown non-plastic clay contained 1.6 per cent SiO_2 and 55.0 per cent Al_2O_3, and immediately overlay granular doleritic bauxite containing 5-10 per cent SiO_2.

Downward movement of iron in the Gippsland bauxites has been ascribed to secondary changes (Raggatt, Owen and Hills 1945), and leaching of iron from the pisolitic zone in Tasmania has been observed, particularly at St. Leonards where in the example quoted below iron leached from the upper 3.5 feet has been distributed downwards into the doleritic zone.

Log. Shaft 4. St. Leonards No. 3 Area.

Depth. Feet.	Description	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Ign. Loss %
2 - 5.5	Pale brown pisolites in soft grey matrix	18.0	46.4	12.1	2.3	22.9
5.5 - 9	Brown pisolites in hard ferruginous matrix	13.4	28.9	38.2	1.7	18.1
9 -12.5	Ditto	15.4	28.5	37.5	1.6	16.9

(Continued on next page)

Log. Shaft 4. St. Leonards No. 3 Area.

Depth. Feet.	Description	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	Ign.Loss %
12.5-14.7	Yellow gritty bauxite over brown nodular and earthy bauxite	20.3	22.5	41.8	1.2	14.3
14.7-15.7	Ferruginous concretions in yellow granular clay	-	-	-	-	-
15.7-16	Band of ferruginous concretions	-	-	-	-	-
16 -19	Yellow weathered dolerite	-	-	-	-	-

By increase in silica content and decrease of Available Alumina the bauxite grades downward to clayey weathered parent rock. There are few chemical analyses available to illustrate this passage to partially bauxitized parent material. The Tasmanian Mines Department laboratory reported "Insoluble matter" which is not in close agreement with the true silica content for ores containing more than about 5 per cent SiO_2. On the other hand the Aluminium Commission laboratory which reported true silica did not continue the analysis of samples which failed to exceed 18.5 per cent loss on ignition.

The following examples however are available.

Depth. Feet.	Field description	SiO_2 %	Al_2O_3 %	Avail. Al_2O_3 %	Combined H_2O %	Fe_2O_3 %
1. 38 -41	Hard bauxite	7.1	35.2	32.4	22.1	31.3
2. 41 -44	Soft clayey bauxite	13.6	38.4	29.2	21.0	23.8
3. 44 -49	Brown and grey clay	24.9	29.8	10.6	19.1	22.6
4. 33 -36	Pale brown clay	20.2	40.3	27.7	18.7	18.3

1-3 Bore 70, St. Leonards No. 1 Area. Underlying fair quality nodular bauxite.

4. Bore 11, St. Leonards No. 3 Area. Underlying fair quality granular (doleritic) bauxite.

The calculated mineralogical compositions of these four examples, computed on the assumption that all the available alumina is present as trihydrate (gibbsite), and the remainder as clay are expressed as percentages below.

No.	1.	2.	3.	4.
Gibbsite (Al_2O_3, $3H_2O$)	49.6	44.7	16.2	42.3
Clay (Al_2O_3, $2SiO_2$, $2H_2O$)	15.2	23.2	48.5	31.9
Excess SiO_2	Nil	2.8	2.3	5.3
Excess H_2O	2.8	2.3	6.8	-
Fe_2O_3	31.3	23.8	22.6	18.3

The presence of silica in excess of that required to satisfy the kaolin molecule strongly suggests that gibbsite has been formed at the expense of a kaolinitic decomposition product of the parent rock and that the silica set free by the breaking down of the clay mineral has not been completely removed but remains in part dispersed throughout the bauxite. The nodular variety of bauxite (pages 26-27) in which concretions of more or less pure gibbsite occur in a matrix of siliceous clay affords a more convincing example of the development of gibbsite at the expense of clay.

Veins and irregular patches of clay occur in the bauxite particularly near the southern margin of No. 2 Deposit at Ouse. In Shaft 26 at Ouse white clay extends downward through the bauxite into the underlying clayey horizon from which it is, however, sharply defined. At other places white clay forms sub-horizontal veins and patches, of which either the upper or lower surface may be against a limonitic band. Similar clay has also penetrated zones of weakness in the bauxite associated with minor faults and joint planes. Some of this clay may have been introduced mechanically into open spaces, but it is clear that this cannot be the explanation in many instances where it becomes apparent that resilication of the bauxite by introduction of silica, probably derived from overlying sediments, has occurred.

ACKLOWLEDGMENTS.

The writer is indebted to Mr. W. H. Williams, Director of Mines, Tasmania, for assistance and support during the drilling campaign at Ouse when the work was conducted by Mines Department drilling crews under the writer's supervision. Acknowledgment is also made of helpful discussions with Mr. D. R. Dickinson, at that time of the Mines Department.

All chemical determinations quoted in this report, with the exception of three analyses by the Dorr Company, Inc., and many hundreds of partial analyses of bauxite from which the average grades of reserves have been computed, were made by the Tasmanian Mines Department Laboratory at Launceston or at the laboratory of the Australian Aluminium Prod uction Commission, Glenorchy, Hobart.

The expedition with which the work was carried out, and the willingness of both Mr. W. St. C. Manson, Chief Chemist and Metallurgist of the Mines Department, and Mr. R. A. Dunt, Chief Chemist, Aluminium Commission to undertake additional work when asked are gratefully acknowledged.

H B Owen
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Senior Geologist.

CANBERRA.
April 1950.

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Plates 1-9

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The Bauxite Resources of Tasmania

By H.B. Owen

Plates 1-9

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Melbourne Building, City, CANBERRA.
5003.

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Department of Supply and Development,
Melbourne Building, City CANBERRA.
7064.

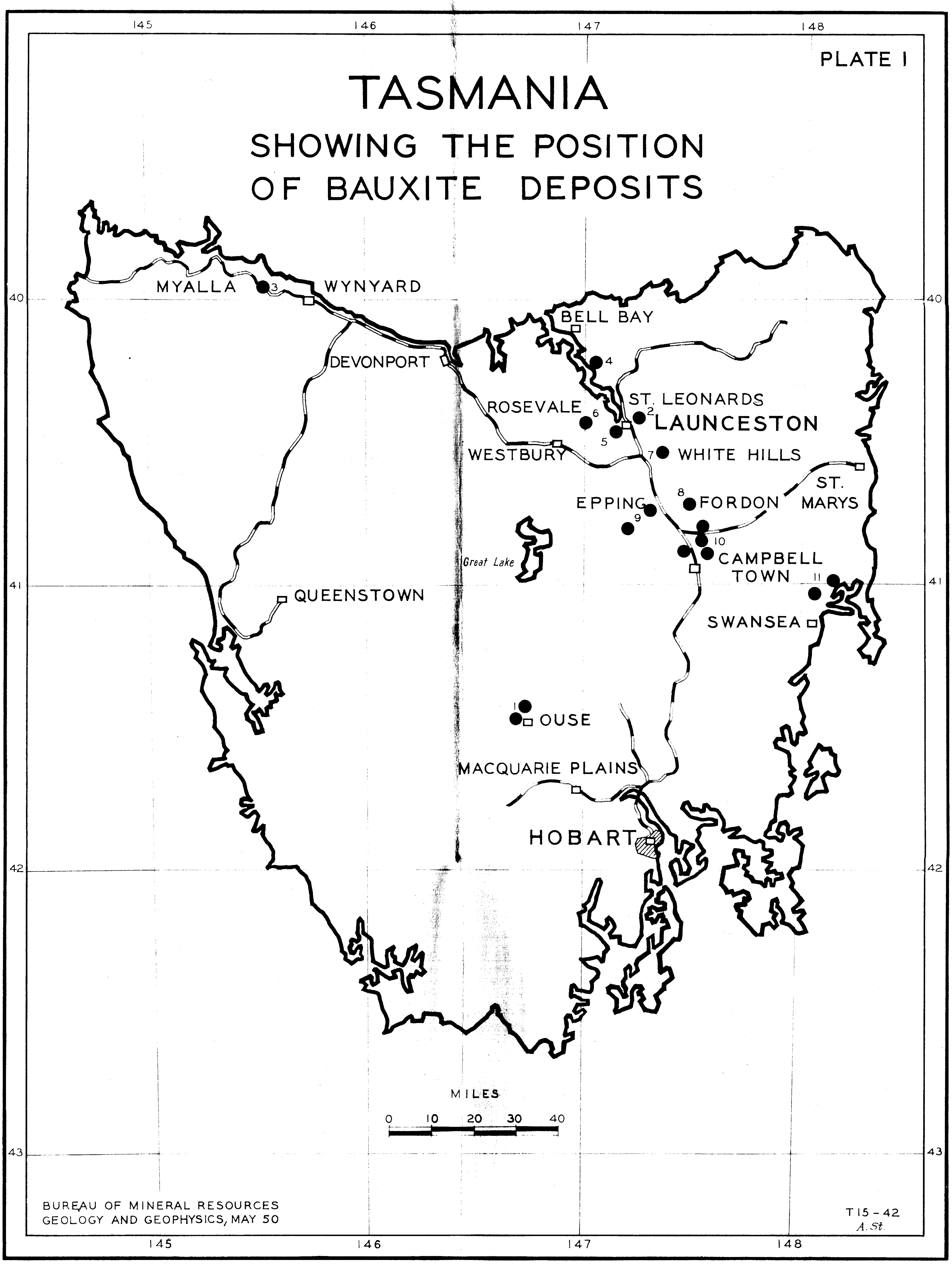

PLATE I
TASMANIA
SHOWING THE POSITION
OF BAUXITE DEPOSITS
145
146
147
148
40
41
42
43
MYALLA
3
WYNYARD
BELL BAY
4
DEVONPORT
ROSEVALE
6
ST. LEONARDS
2
LAUNCESTON
5
WESTBURY
7
WHITE HILLS
ST.
MARYS
8
FORDON
EPPING
9
10
CAMPBELL
TOWN
11
Great Lake
QUEENSTOWN
SWANSEA
1
OUSE
MACQUARIE PLAINS
HOBART
MILES
0 10 20 30 40
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FIG.2. GEOLOGICAL PLAN. ENLARGEMENT OF INSET. FIG.1.

0 1000 3000 5000 FT.

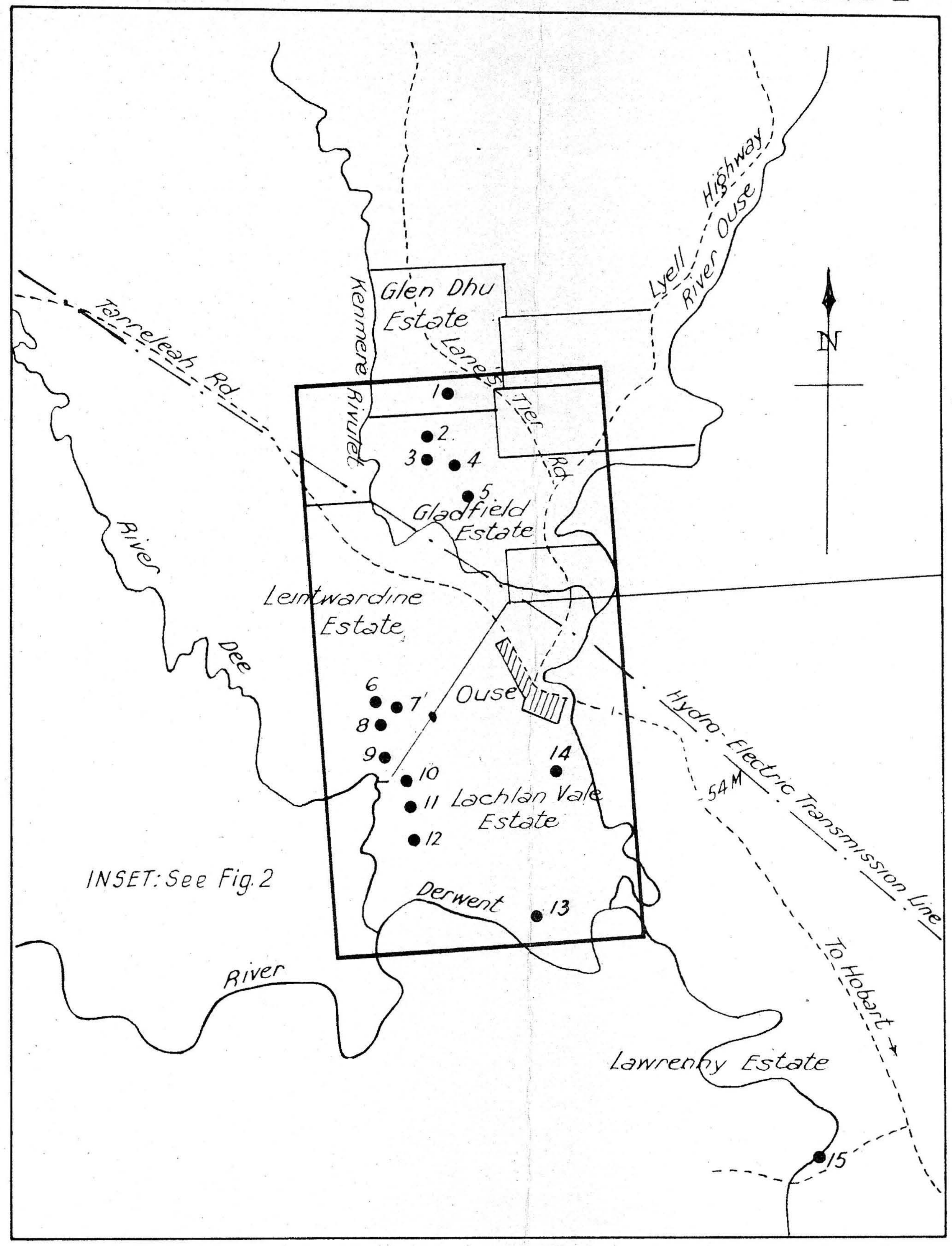

FIG.1. LOCALITY MAP

0 1 2 3 MILES

BAUXITE DEPOSITS NEAR TOWNSHIP OF OUSE, TASMANIA

- Recent alluvium
- River Terraces. Sands } Pleistocene
- Grits, boulder beds } Pleistocene
- Basalt and coarse agglomerate.
- Lacustrine sands & clays. Pliocene - Miocene (?)
- Bauxite. U. Oligocene (?)
- Dolerite. Jurassic
- Sandstones, shales. Jurassic (?) - Triassic.

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BUREAU OF MINERAL RESOURCES. APRIL 1947.


PLATE 3.
OUSE BAUXITE DEPOSITS
NO. 2. AREA
0 100 200 300 FT.
REFERENCE
PLAN SHOWING ALL BAUXITE, WHETHER ECONOMIC, OR NOT.
Bauxite Thickness 2·5'-5'
" " 5'-7·5'
" " 7·5'-10'
Bauxite Thickness 10'-12·5'
" " 12·5'-15'
" " Over 15'
10 Isopach Thickness of bauxite 10 feet
760' Topographic Contour approximately 760' above sea level
Shallow quarries in overburden
Shaft No 16. Thickness of overburden 5ft; thickness of bauxite 11ft.
Bore No 28 " " " 3ft; " " " 10ft.
N.B. Not bottomed
Lignitic clay at 52'
T.N.
M.N.
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1477.


PLATE 4
OUSE BAUXITE DEPOSITS
NO. 2 AREA
BAUXITE OF ECONOMIC GRADE OR BETTER
0 100 200 300FT.
1200W
800 W
400 W
00
400 E
800 E
400 N
00
400 S
800 S
REFERENCE
Bauxite Thickness 0' - 2·5'
" " 2·5' - 5'
" " 5' - 7·5'
" " 7·5' - 10'
Bauxite Thickness 10' - 12·5'
" " 12·5' - 15'
" " Over 15'
700 Contour of bottom of economic bauxite. Datum as in Plate 3
Bore Nº 54. Thickness of overburden 5ft; thickness of economic bauxite 10 Ft.
Shaft Nº 59. " " " 4ft; " " " 7·5Ft.
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1486.


PLATE 5
OUSE BAUXITE DEPOSITS
TRANSVERSE SECTIONS - NO. 2 AREA
SEE PLAN. PLATE 3
HOR. 0 100 200 300 FT.
VERT. 0 50 100 150 FT.
REFERENCE
Overburden
Bauxite of economic grade or better
Bauxite below economic grade
Dolerite
Bauxite boulders in clay
Topographic surface
B 62 Bore 62
S 35 Shaft 35
A - A
A
400N/300W
B17
B4
B3
B14
B27
B 29
S16
S 65
400S/500E
S 74
S 78
B63
B68
S 54
900S/1000E
S 56
A
200W
B60
B44
200S
B12
S 24
B10
S33
B4
S41
B 42
600E
B76
B65
B59
S78
S75
S77
200S
00
SK
SL
B58
B37
B43
200S
B34
B28
S21
B14
S32
B2
S58
B18
S62
800E
B79
B74
B68
B67
B83
400S
B51
200E
B61
500S
B52
B45
200S
B32
B 29
S72
B26
200N
B23
S57
B19
S14
Clay & bauxite
No sample
1000E
1000S
S56
S55
B72
600S
B85
400S
Clay, ironstone & bauxite
Not sampled
400E
B62
600S
S63
S64
S65
200S
B49
S66
00
S67
B38
S68
B21
S69
00
WESTERN BODY
B78
1000W
B77
S31
S30
500W
S29
B11
S24
Clay & bauxite
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1478.

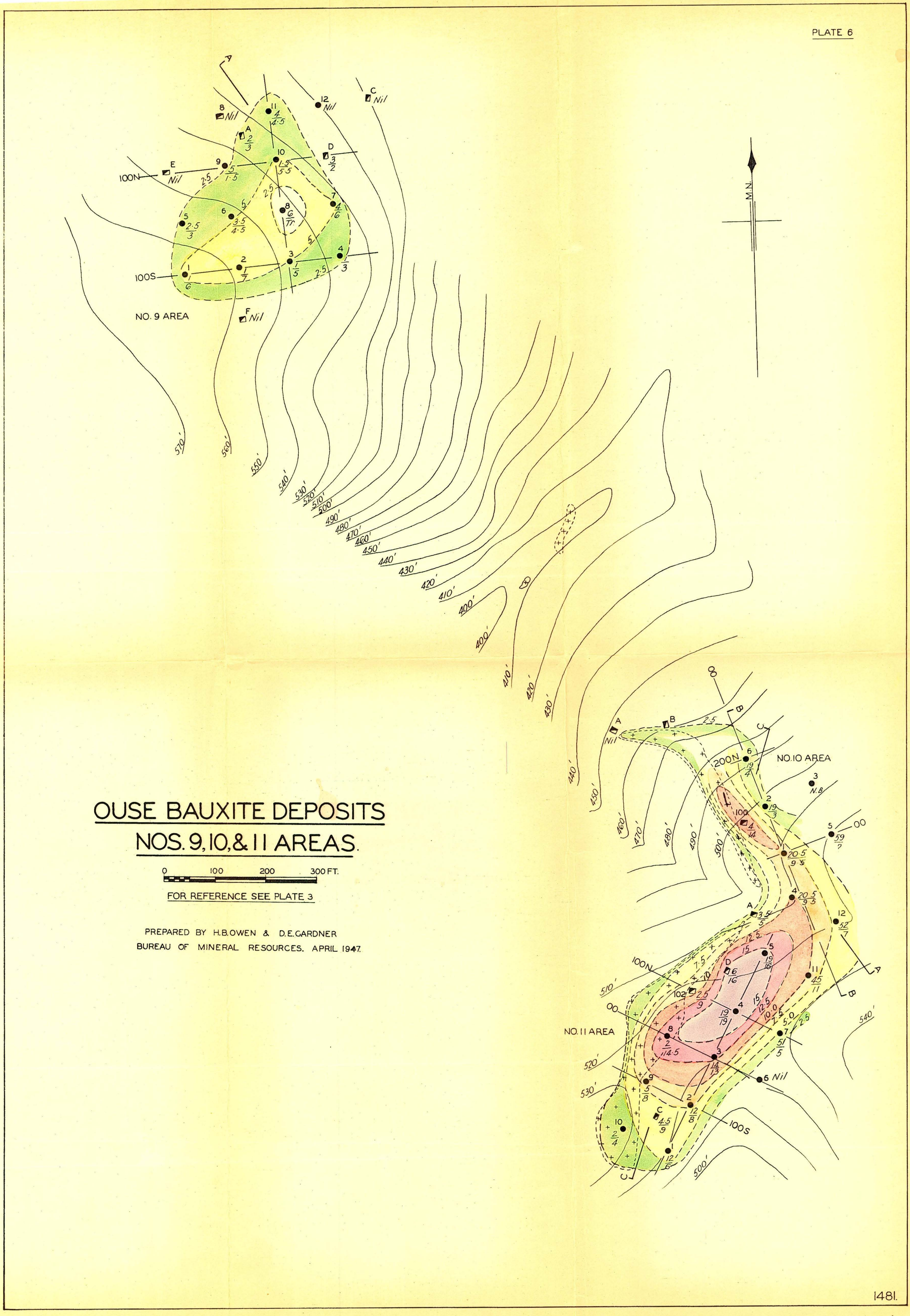
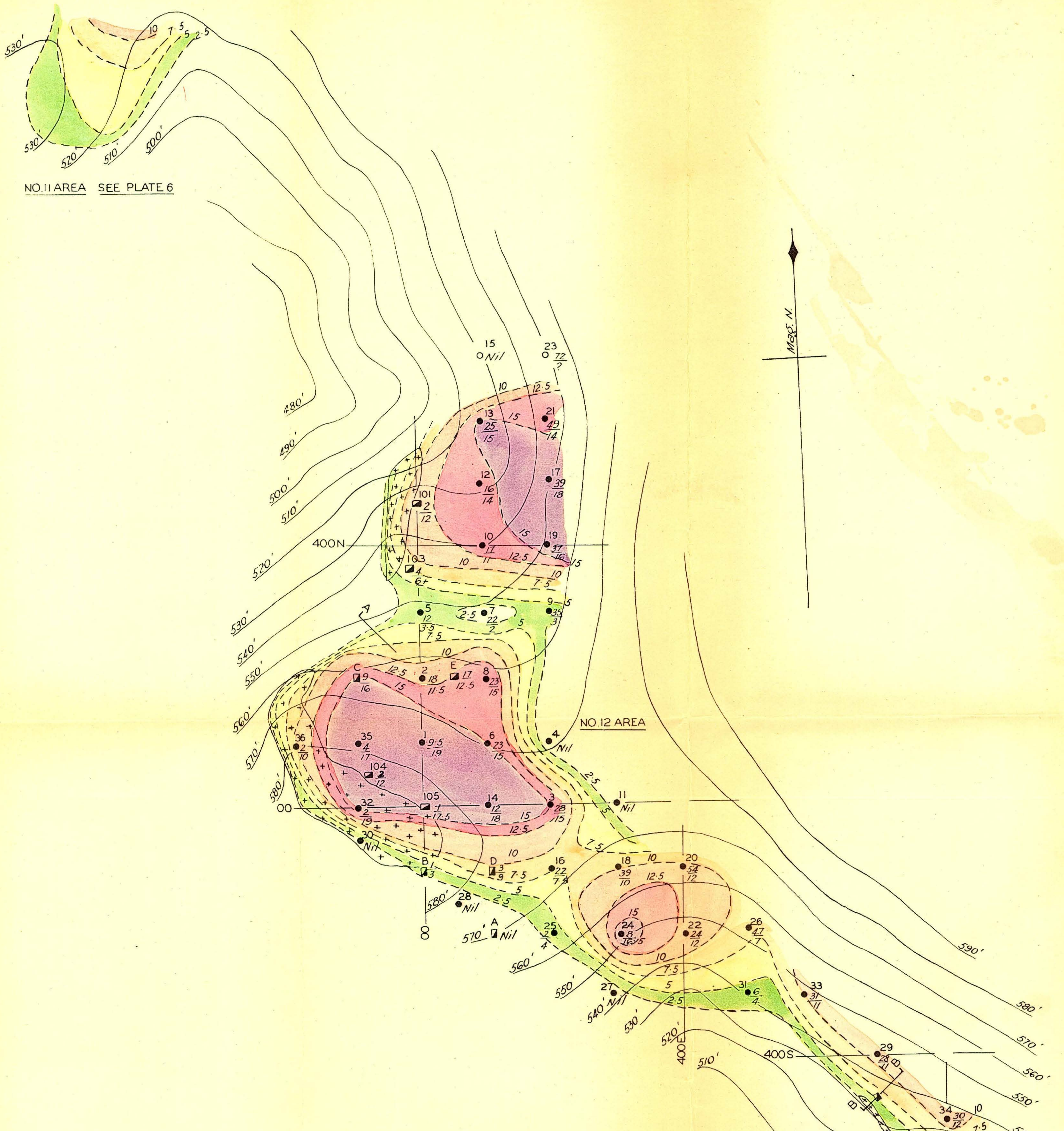


PLATE 6
OUSE BAUXITE DEPOSITS
NOS. 9, 10, & 11 AREAS.
0 100 200 300 FT.
FOR REFERENCE SEE PLATE 3
PREPARED BY H.B. OWEN & D.E. GARDNER
BUREAU OF MINERAL RESOURCES. APRIL 1947.
NO. 9 AREA
NO. 10 AREA
NO. 11 AREA
M.N.
100N
100S
200N
00
570'
560'
550'
540'
530'
520'
510'
500'
490'
480'
470'
460'
450'
440'
430'
420'
410'
400'
1481.



OUSE BAUXITE DEPOSITS

NO. 12 AREA

0 100 200 300 FT.

FOR REFERENCE SEE PLATE 3

Geology by H.B. Owen & D.E. Gardner

OUSE BAUXITE DEPOSITS
NOS. 6, 8, 9, 10, 11 & 12 AREAS

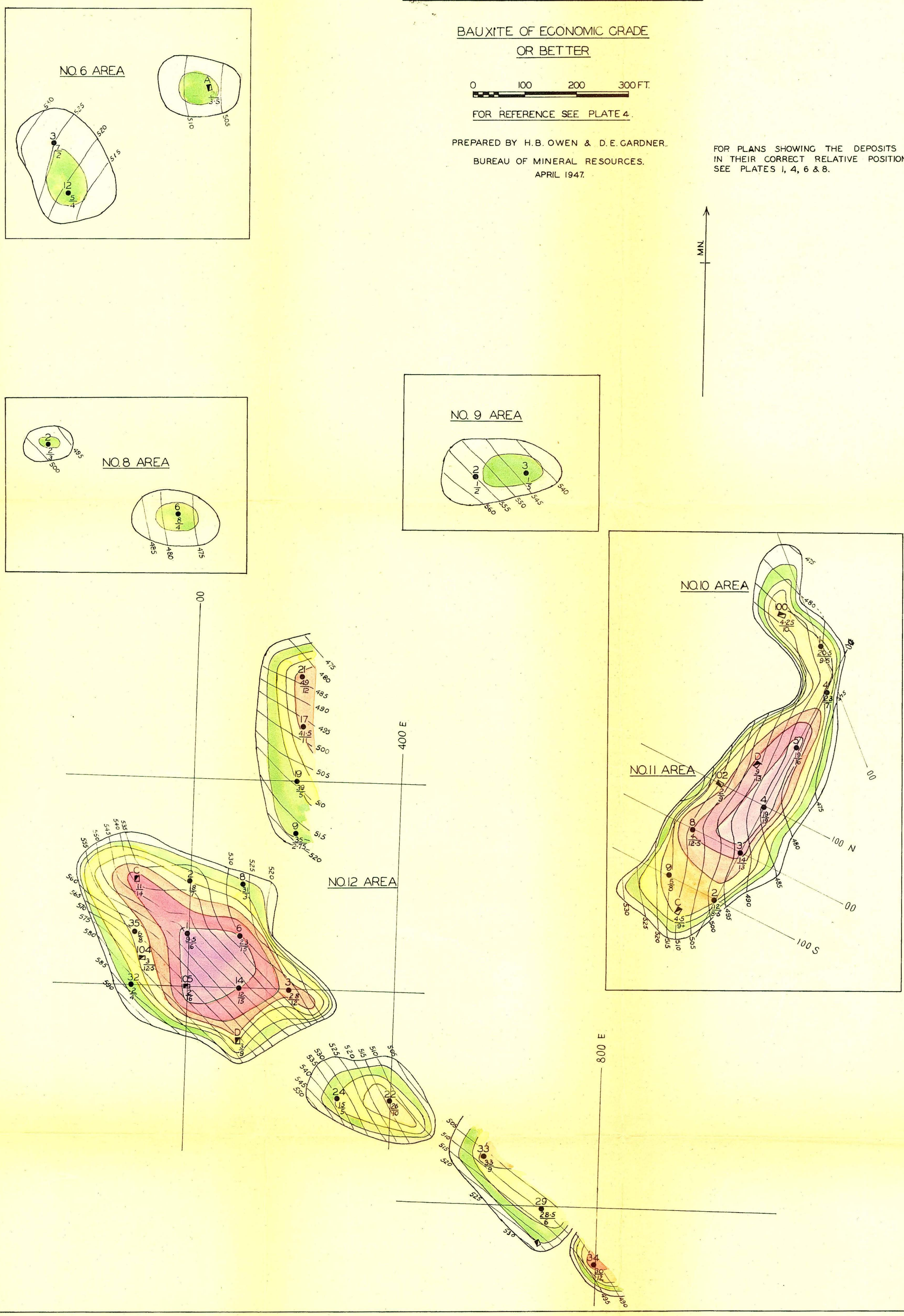
BAUXITE OF ECONOMIC GRADE OR BETTER

0 100 200 300 FT.

FOR REFERENCE SEE PLATE 4.

PREPARED BY H. B. OWEN & D. E. GARDNER.
BUREAU OF MINERAL RESOURCES.
APRIL 1947.

FOR PLANS SHOWING THE DEPOSITS IN THEIR CORRECT RELATIVE POSITIONS SEE PLATES 1, 4, 6 & 8.



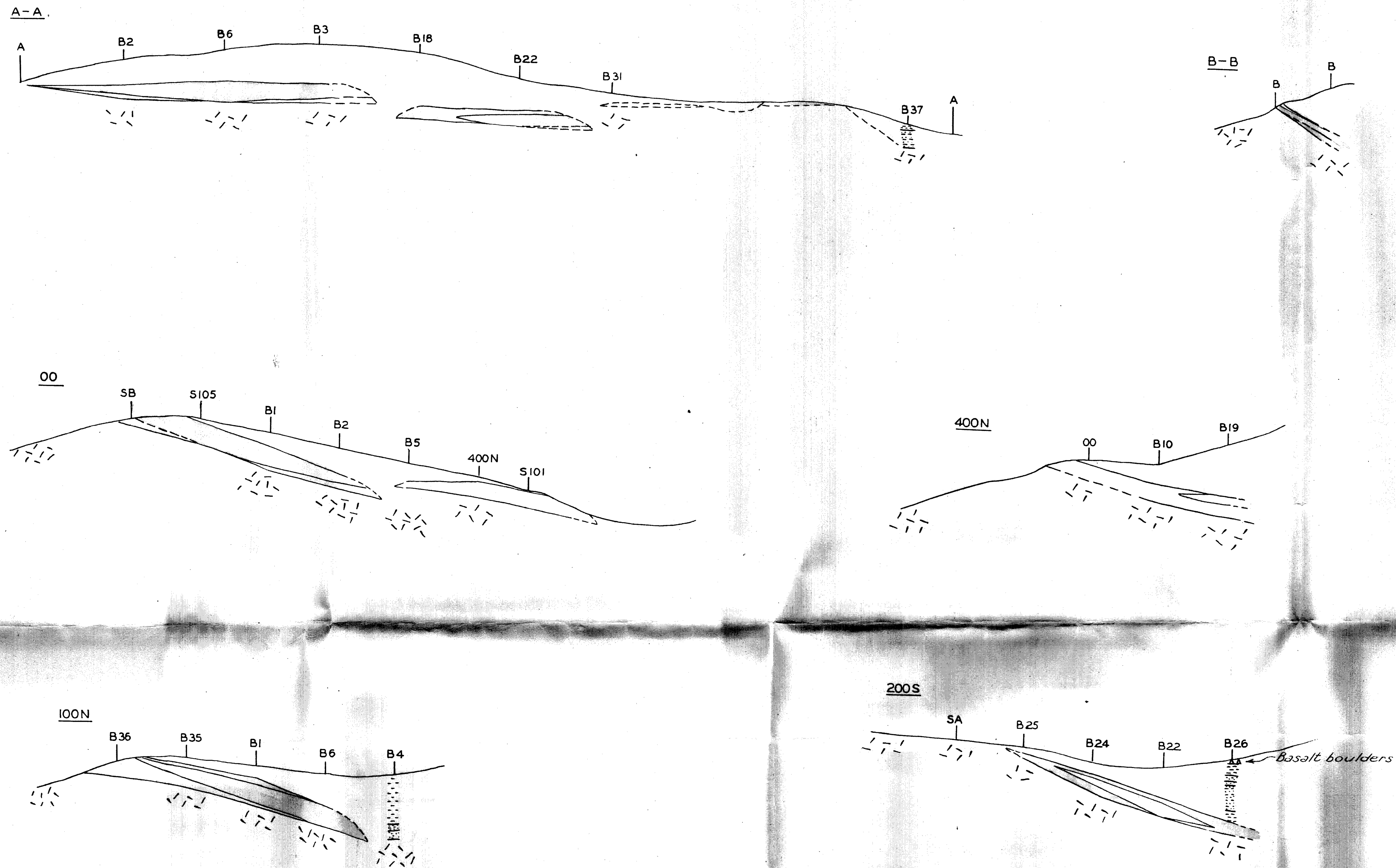
OUSE BAUXITE DEPOSITS

TRANSVERSE SECTIONS - NO. 12 AREA

HOR. 0 100 200 300 FT.
VERT. 0 50 100 150 FT.

FOR REFERENCE SEE PLATE 5

PREPARED BY H.B. OWEN & D.E. GARDNER
BUREAU OF MINERAL RESOURCES, APRIL 1947.



1950/9
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plates 11-14

On His Majesty's Service.

1950/9
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O.H.M.S.

RECORDS 1950/9

THE BAUXITE RESOURCES OF TASMANIA

by

H.B. OWEN

PLATES 11-14

FILE REF 87.T/1
DATE REF 14.9.50
~~Memo 2237 from C.G.~~

BUREAU OF MINERAL RESOURCES,
GEOLOGY and GEOPHYSICS,
Department of Supply and Development,
Melbourne Building, City, CANBERRA.
5003.

BUREAU OF MINERAL RESOURCES,
GEOLOGY and GEOPHYSICS,
Department of Supply and Development,
Building, City, CANBERRA:

PLATE II.


Bauxite Deposits at
St. Leonards, Co. of Dorset,
Tasmania.
Plan of No. 1 Area
Scale of Feet
100 75 50 25 0 100 200
Magnetic
Topographic contours above assumed datum, approximately a.s.l.
Contours on base of economic bauxite
Outcropping laterite and bauxite
Areas of calculated ore reserves
Bore; where 33 is number of bore, 8 is thickness of overburden, and 5 is thickness of bauxite, in feet
Shaft; details as above.
"Nil" indicates absence of laterite or bauxite
Where no results are shown shaft or bore revealed laterite below economic grade.
H.B. Owen.
Senior Geologist
Bureau of Mineral Resources
August 1940
Boundary of Acquired Area
Boundary Fence
H.T.L.
1000' N
00
1000' S
1000' W
Not sampled
Boundary of Acquired Area

Plate 12

Sections
BAUXITE DEPOSIT
No 1 Area. St Leonards, Tasmania
Hor. 0 50 100 200 Feet
Vert. 0 12.5 25 50 Feet
Reference
Soil
Boulders, pebbles, gravel
Bauxite, below economic grade
Do. of economic grade
Dolerite, partially bauxitized, kaolinized and incipiently weathered.
H.B. Owen.
Bureau of Mineral Resources, Geology & Geophysics.
November, 1949
1700 N
1500 N
1300 N
1100 N
800 N
700 N
500 N
300 N
100 N
300 S
700 S
900 S
1100 S
Longitudinal Section along base line.
Boundary fence
Grey clay
Yellow clay
Blue-Grey clay
Grey clay
Lignitic bands
White & grey clay
Red & grey clay
Brown clay
Grey & yellow clay
Red clay
Sand
Lignite
Grey soil with pebbles of quartz and dolerite
540'
525'
520'
530'
500'
450'
00

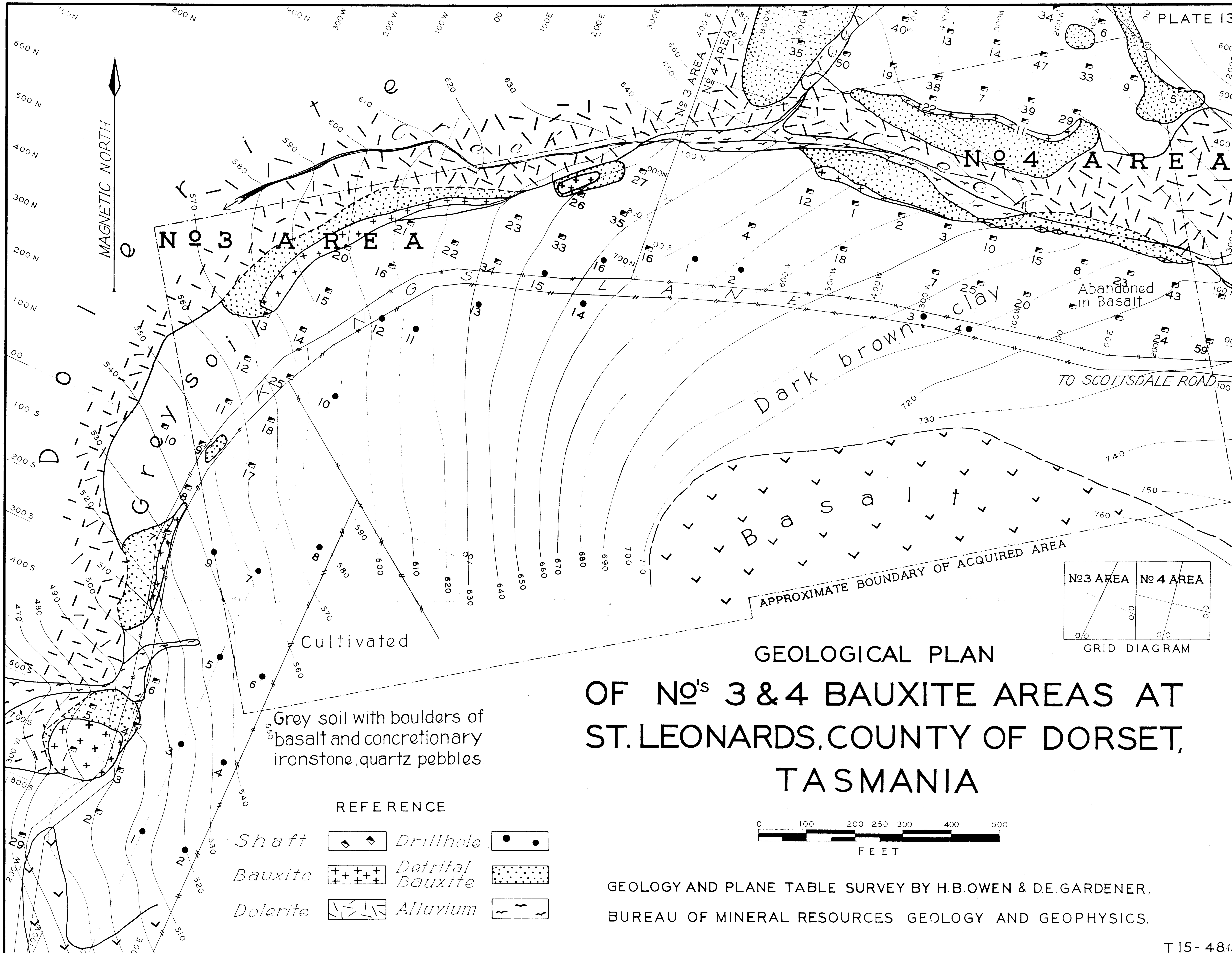
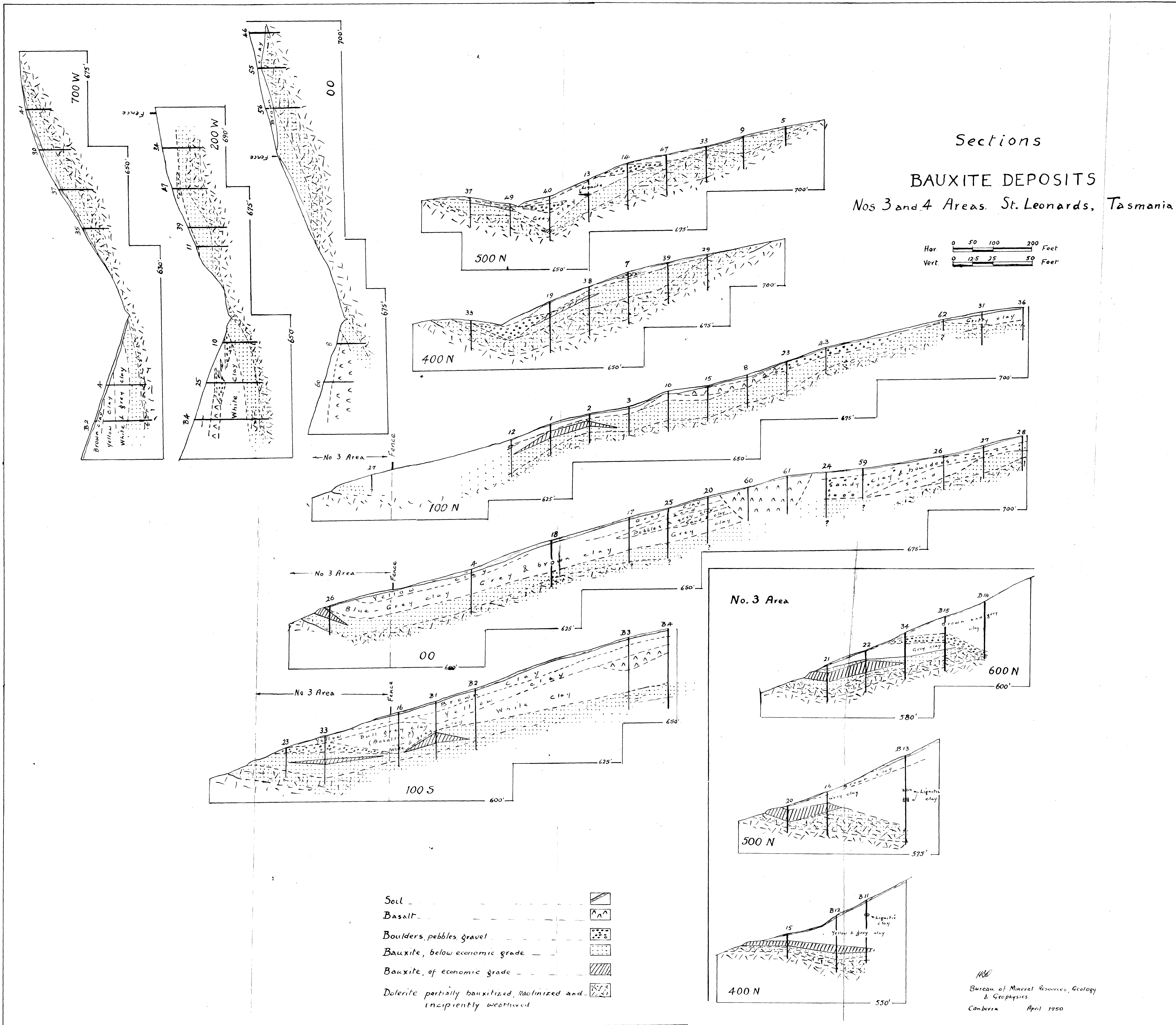


PLATE 13
GEOLOGICAL PLAN
OF Nos 3 & 4 BAUXITE AREAS AT
ST. LEONARDS, COUNTY OF DORSET,
TASMANIA
GEOLOGY AND PLANE TABLE SURVEY BY H.B. OWEN & D.E. GARDENER,
BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.
REFERENCE
Shaft
Drillhole
Bauxite
Detrital Bauxite
Dolerite
Alluvium
FEET
0 100 200 250 300 400 500
GRID DIAGRAM
No 3 AREA
No 4 AREA
No 3 AREA
No 4 AREA
MAGNETIC NORTH
Dolerite Creek
Grey soil
KINGS LANE
Dark brown clay
Basalt
Cultivated
Abandoned in Basalt
TO SCOTTSDALE ROAD
APPROXIMATE BOUNDARY OF ACQUIRED AREA
Grey soil with boulders of basalt and concretionary ironstone, quartz pebbles
T15-48

Plate 18



Sections
BAUXITE DEPOSITS
Nos 3 and 4 Areas. St. Leonards, Tasmania.
Hor. 0 50 100 200 Feet
Vert. 0 12·5 25 50 Feet
700 W
200 W
00
500 N
400 N
100 N
00
100 S
No. 3 Area
600 N
500 N
400 N
No 3 Area
Fence
Grey & brown clay
Blue Grey clay
Yellow clay
Brown clay
Yellow clay
White clay
Dull grey clay (Basalt?)
Sandy clay & boulders
Gritty clay
Grey clay
Pebbles
Lignite
Lignitic clay
Yellow & grey clay
Brown and grey clay
Soil
Basalt
Boulders, pebbles, gravel
Bauxite, below economic grade
Bauxite, of economic grade
Dolerite partially bauxitized, kaolinized and incipiently weathered
Bureau of Mineral Resources, Geology & Geophysics
Canberra April 1950