COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF SUPPLY AND SHIPPING.

MINERAL RESOURCES SURVEY.

REPORT No. 1943/63.

(Revised 6th March, 1944).

Plan Nos. 978-985, 1046.

SUMMARY OF OIL-DRILLING ACTIVITIES IN AUSTRALIA AND NEW GUINEA.

- By -

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The first draft of this report was completed on 18th November, 1943. Since then additional information has come to hand from the Australasian Petroleum Company, the Papuan Oil Development Company and Shell (Queensland) Development Pty. Limited. Amendments and additions have also been suggested by the Mines Departments of Queensland, Victoria and South Australia.

Regarded only as a summary, the report may now be considered complete.

This summarised account of oil-drilling activities in Australia and New Guinea is given in two parts:

1. Summary of Past Operations.

2. Status of Investigations.

Part 1. is almost entirely factual. The object has been to present a summary account of actual drilling operations, the results obtained and the expenditure incurred therein. Part 2. states briefly the position we appear to have reached in the search for oil and summarises any present activity.

The notes are given by States and Territories commencing with New Guinea and thence in clockwise order. "New Guinea" means the island of New Guinea and includes the Mandated Territory section of the island as well as Papua.

PART 1. SUMMARY OF PAST OPERATIONS.

New Guinea.

(See Plates 1 and 2 for locality maps)

A. NOTES ON DRILLING OPERATIONS. (Expenditure where known is mentioned under this heading but is also summarised for each territorial division).

1. Commonwealth Government and Anglo-Persian Oil Company. The following account is based partly on the report of the Anglo-Persian Oil Company on the operations it conducted for the Commonwealth Government during 1920-1929, notes supplied by private companies and information available from official files. One of us (H.G.R.), has spent six months in the Mandated Territory on Oil work in 1925 and has paid one visit to the Oiapu area in Papua. Because many of the investigations have been made currently in Papua and New Guinea and it is therefore difficult to apportion costs between these territories no attempt has been made to give separate accounts for each. It may be noted, however, that by far the greatest amount of work has been done in Papua. The only drilling done in the Mandated Territory has been limited to shallow wells at Matapau.

(a) 1912-1919. The existence of oil seepages near the Vailala River in Papua was first reported in 1911 and from 1912 onward exploration work was conducted by the Commonwealth Government as a national undertaking. It is estimated that during this period a sum of £141,534 was spent.

(b) 1919-1929. The Anglo-Persian Oil Company became associated with this enterprise in July, 1919, when an agreement was signed whereby the Australian and British Governments undertook each

to provide a sum of £50,000, and the Company to supply and direct, as agents for the two Governments, the technical staff necessary for geological exploration, selection of sites for test-drilling, and conduct of boring operations.

Field work under this agreement commenced in March, 1920. The site of a test well was selected at Popo and drilling commenced in March, 1922. This well was carried to a depth of 1,775 feet without much difficulty, but after many attempts to deepen it, was abandoned at 1,825 feet. The second well 1,100 feet from the first was also abandoned because of drilling troubles, at a depth of 888 feet and a third hole commenced alongside it. This bore likewise was abandoned at a depth of 2,707 feet owing to failure to handle the swelling and caving formations met with.

The demands of geological exploration, and the necessity for purchasing and installing new drilling equipment and engaging new personnel for the Popo test well had, by the end of 1921, exhausted the £100,000 provided by the agreement of 1919. The British Government thereupon announced its withdrawal from the enterprise. After a good deal of discussion, the Australian Government took over the British Government's share for the sum of £25,000; and the Anglo-Persian Oil Company was authorised to continue operations, as agents of the Australian Government alone, by a succession of temporary arrangements, more or less based on the general terms of the original agreements.

In July, 1923, the Australian Government approved an arrangement whereby the boring operations were to be continued on the Government's behalf, subject to certain conditions. This arrangement persisted until the middle of 1926, when operations at Popo were suspended owing to the failure of No. 3 Well to reach the depth that was regarded as necessary.

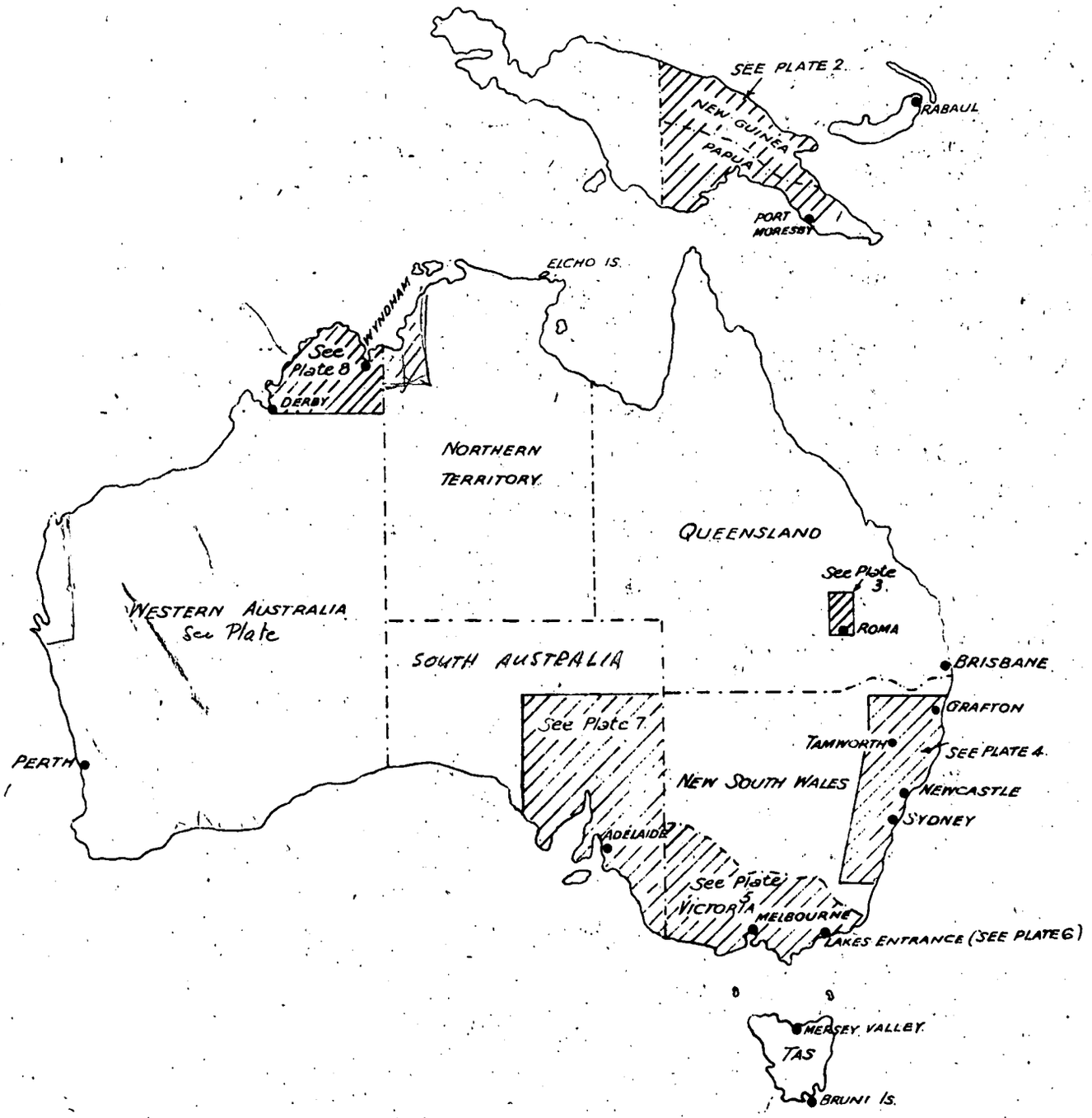
Expenditure under the joint agreement had at this time reached a total of £227,256.

The position then was that the Australian Government had thrown open the bulk of Papua and New Guinea to private enterprise, retaining only a block of country from Popo to Yule Island as a Government reserve. Three test wells had been drilled at Popo, but in spite of the most persistent effort, had not attained the depths required by the geological reports. The company's drilling and geological staffs were of the opinion that a further attempt was justified; and a fourth location, where, it was hoped, some of the drilling difficulties would be eliminated, was suggested. At the request of the Australian Government, Dr. Arthur Wade's opinion was solicited. He agreed with the recommendation of the Anglo-Persian Oil Company, the Australian Government accepted the recommendation and No. 4 Test Well was started at Popo.

After a further consideration of the oil problem by the Australian Government, the Anglo-Persian Oil Company was requested to arrange for extended geological work in the area and, as a result, field work was commenced again towards the end of 1927 and continued until October, 1929.

The No. 4 well at Popo, drilling of which commenced in August, 1927, was abandoned at a depth of 895 feet. No. 5 well was commenced 1000 feet away from it in February, 1928, and was abandoned at 1,348 feet. Considerable difficulty had been experienced in drilling this well, similar to that experienced with the other holes, but, owing to the termination of the agreement by the Australian Government, operations ceased before further remedial measures proposed by the company's most experienced drilling engineer could be tried.

Expenditure for the period 1926-1929 amounted to £121,526 making a total of £490,296 for the period 1918-1929. It should be noted also, that all the technical direction and advice provided by the Anglo-Persian Oil Company under these agreements was given without fee.



AUSTRALIA AND NEW GUINEA

KEY MAP

Substitute maps for p116 of Davies Notes.

2. Relatively Small Private Companies. From 1923 to date private companies have spent considerable sums of money in New Guinea on geological and geophysical work, and scout boring. A limited amount of test drilling has also been done.

Amongst the smaller companies which did some drilling in Papua and New Guinea, are the Ormildah Oil Development Company, which, in 1926, drilled a well at Marienberg in New Guinea, to a depth of 2,595 feet and the New Guinea Oil Co. Limited, which sank 7 scout bores near Hohoro in Papua, during 1923 to 1926, and in 1926 drilled a deeper hole to the depth of 1,157 feet in which gas and oil were reported. Geological reconnaissances were made by Pacific Island Investment Company, and Mandated Development Limited. It is probable that these four companies spent approximately £100,000 in their search for oil.

Of the other smaller companies, Oriomo Development, Oil Search Limited, and Papuan Apinaipi Petroleum Co. Limited, may be specially mentioned. Between them the first two spent £180,000 on geological work in Papua and New Guinea, and Oil Search Limited carried their investigations to a stage where two of the major oil companies became interested (See under 3). Oriomo Oil Limited operated in the Western Division, Papua, where it drilled four bores. The Maremosab Bore reached a depth of 1,580 feet, No. 1 Bore, Wohomul, 1,260 feet, No. 2 Bore, Wohomul, 1,320 feet and a bore at Oriomo, 890 feet. Gas, bitumen and paraffin wax were reported from the Maremosab and Wohomul bores.

The Papuan Apinaipi Petroleum Co. Ltd. which was formed in April, 1937, carried out geological work in the Oiapu district and put down five scout and two deeper holes on a well-defined structure. The footage of scout drilling done was 5,418 feet and of deeper drilling, 4,855 feet. This company has expended £116,194, including £14,277 by way of subsidy from the Commonwealth.

3. Papua Oil Development Pty. Ltd. This company, a subsidiary of the Shell Company of Australia Limited, operated during 1936 to 1939, on ten permit areas in the Western, Delta and Central Divisions of Papua. These permits covered an area of 22,700 square miles and extended along a narrow coastal strip of the Gulf of Papua, the Bamu and lower sections of the Fly and Strickland Rivers. Extensive investigations were carried out including aerial geological and geophysical surveys, and core drilling. Fifteen scout holes were drilled with a total footage of 20,176 feet, but no test well was put down. Of the scout holes, four were in the Bamu area, one at Kikori, nine in the Purari and one at Rorona. The details of the depths of these holes are as follows:

	Well.	Depth in feet.
Bamu	1	2,138
	2	1,228
	3	1,901
	4	1,140
Kikori	5	2,502
Purari	6	2,551
	7	1,012
	8	1,037
	9	909
	10	778
	11	1,035
	12	797
	13	376
	13a	1,050
Rorona	1	1,222
Total	15	20,176 feet.

The total expenditure by this Company amounted to £111,000.

4. Australasian Petroleum Company Pty. Ltd. and Island Exploration Company Pty. Ltd. Although originally independent these two companies, have operated conjointly since 1940.

(a) The Island Exploration Co. Pty. Ltd. was engaged in Papua from November 1936 to December 1939 and in New Guinea from January, 1937, to December, 1939. Their activities in Papua extended from the Turama and Kikori rivers in mid-western Papua to the Dutch Border in Western Papua and included geological reconnaissance over 11,300 square miles, aerial survey of 8,900 square miles and geophysical survey of 15,000 miles. No deep scout bores were drilled but several shallow holes were put down for geological information. No test well has been drilled.

In New Guinea, the Company's permit is in the Madang area, between the Ramu and Markham Rivers and the coast. Geological reconnaissance has been carried out over approximately 8,000 square miles, and aerial survey over 2,370 square miles. No test well has been drilled.

The total expenditure by the Company to June, 1943, was £370,782.

(b) The Australasian Petroleum Company Pty. Ltd., operated in Papua from October 1938 to February 1942. In 1938 the company took over areas previously held by Oil Search Limited and at the end of 1939 amalgamated with Island Exploration Co. Limited. In Papua their activities included geological reconnaissance over 6500 square miles, aerial survey of 10,315 square miles, and geophysical survey of 3,000 miles. Operations extended from the Gulf to the Delta and Western Divisions. A few scout bores were drilled on Yule Island for geological information only. The company was engaged in drilling a deep test well at Kariava on the Vailala River in Papua when operations were suspended in January 1942 because of the War. The well had reached the depth of 5,400 feet. Small gas shows were reported between 2,725 and 2,874 feet.

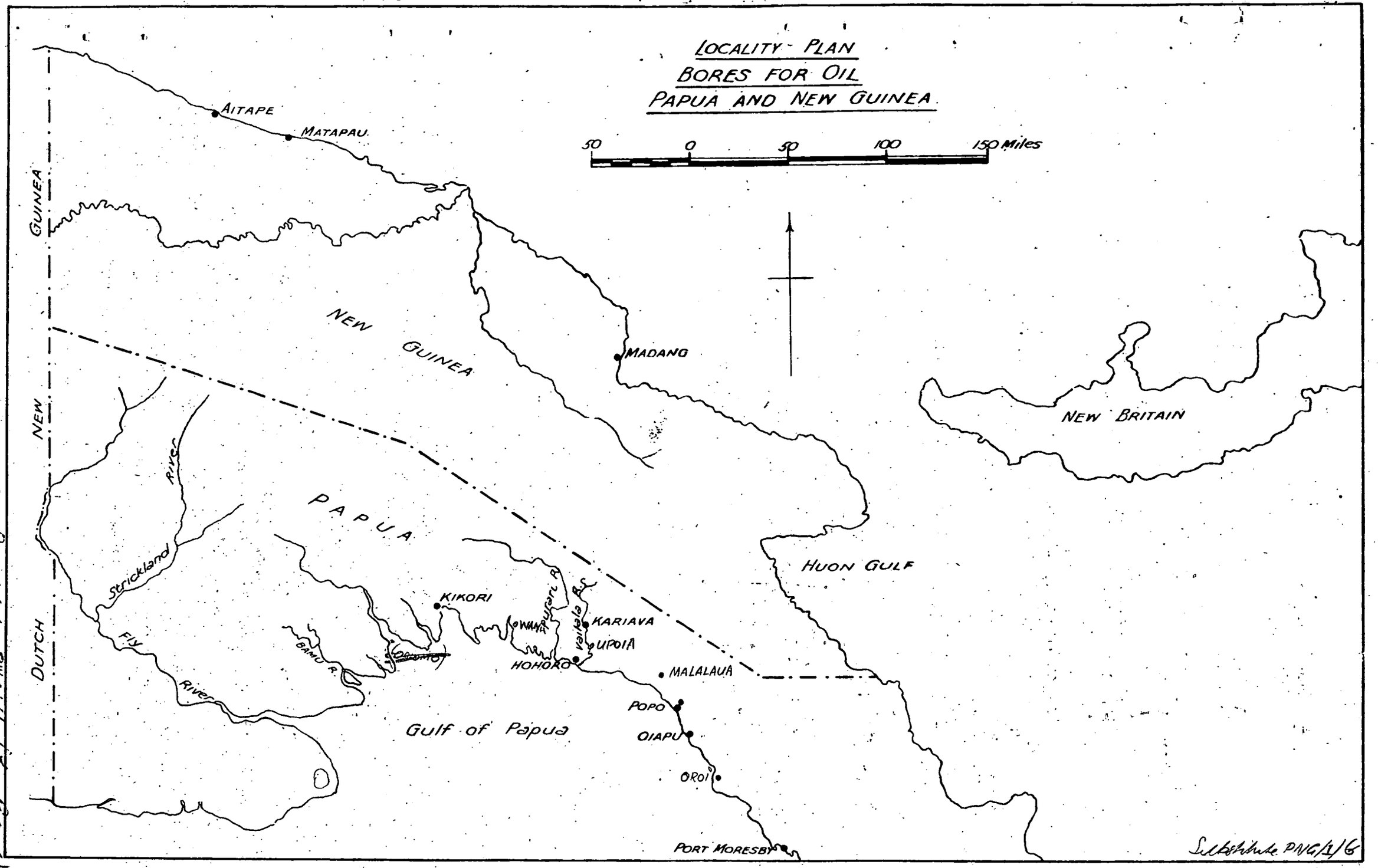
In New Guinea, the Company operated in portion of the Sepik District. Approximately 6,500 square miles were covered by geological reconnaissance and 7,422 miles by aerial survey. No test well was drilled.

The company's total expenditure to June 1943 was £906,831.

B. EXPENDITURE.

	British Government. £	Commonwealth Government. £	Companies. £
1. By Commonwealth Government.			
(a) On its own account 1912-19		141,536	
(b) Under Anglo-Persian Agreement - i. 1919-1926		227,256	
ii. 1926-1929		121,526	
2. By British Government 1919-1926	25,000		
3. By Companies			
i. Papua Oil Dev. Ltd.			411,000
ii. Oil Search Ltd. & Oriomo Ltd.			180,000
iii. Papuan Apinaipi Petroleum Co. Ltd.		14,277(a)	101,827
iv. Sundry small Companies, 1923-1926		9,062(b)	100,000
v. Australasian Petroleum Co. & Island Exploration Co.			1,277,613
4. Total expenditure amounts to £2,609,097 made up as follows:	25,000	513,657	2,070,440

(a) Subsidy. (b) Subsidy to New Guinea Oil Co. Ltd.


LOCALITY PLAN
BORES FOR OIL
PAPUA AND NEW GUINEA
50 0 50 100 150 Miles
AITAPE
MATAPAU
NEW GUINEA
MADANG
NEW BRITAIN
DUTCH NEW GUINEA
PAPUA
Strickland River
Fly River
Bamu R.
KIKORI
Kumusi R.
Vanapa R.
Vailala R.
KARIAVA
UPOIA
HOHORO
MALALAUA
POPO
OIAPU
OROI
PORT MORESBY
HUON GULF
Gulf of Papua
Substitute PNG/1/6

Queensland.

(See Plate 3 for locality map)

The greater part of the information given concerning drilling activities in Queensland has been obtained from Queensland Geological Survey Publication No, 247, the Annual Reports of the Under-Secretary for Mines, Queensland 1914-1936 and the Queensland Government Mining Journal for 1914-1936. Information from Departmental files and from reports supplied by some of the companies including Oil Search Limited, Roma Blocks Limited and Shell (Queensland) Development Limited has also been used.

A summary of results obtained from the principal wells, (prepared for the Department of Supply and Shipping by H. Temple Watts) is given in an appendix to this report.

Experience in the locality is limited to one short visit by one of us, (H.G.R.) to the Roma district.

A. NOTES ON DRILLING OPERATIONS.

1. Roma-Arcadia. In 1900 the Roma town water bore No. 2, when being deepened to increase its artesian flow, struck at 3,683 feet, (about 2000 feet below the principal artesian aquifer), a flow of natural gas measured as 39,400 cubic feet per day. This gas blew-off freely for 4 years. In 1904 the flow of gas was measured as 70,000 feet per day. In 1906 a gasometer was erected to collect the gas from the bore, the town was reticulated, and the streets were lit for 10 days. The gas flow then suddenly diminished and the lighting scheme had to be abandoned. In 1907 the Roma Mineral Oil Co., with Government assistance, drilled a new bore known as Roma No. 3, 250 feet south of No.2. In 1908 gas was struck in this bore at 3,702 feet and caught fire. The fire was extinguished with great difficulty after it had beenburning for six weeks. The bore was abandoned at a depth of 3,713 feet with 3 sets of tools in the hole.

At this stage the Queensland Government sought the advice of a number of petroleum technologists in Great Britain and the United States and after considering their advice decided to drill further deep bores.

A Californian Standard Percussion drilling rig was brought from the United States and an American driller, Mr. Whaley, began in January 1916, to drill the bore known as Roma No. 4 for the Queensland Government, on a site chosen by W.E. Cameron of the Queensland Geological Survey 400 feet west-southwest of the Roma Mineral Oil Company's bore (Roma No. 3). The chief purpose of the bore was to test beds below the gas sands for oil. Many mechanical difficulties were experienced in drilling this hole and progress was slow. The total depth reached was 3,709 feet in 1919. The hole was finally abandoned in 1922. Gas was met with below 3,610 feet. A test made in a mineral seal oil absorption apparatus in 1920 gave a yield of 1.22 pints per 1,000 cubic feet.

In 1923 new petroleum legislation providing for the issue of prospecting permits up to 10,000 acres and leases up to a like amount was introduced, but a rectangular area of 3,600 square miles around the Roma bores was withheld as a Government Oil Reservation. A licence was, however, granted to Lander Oilfields of Australia near the centre of the Reservation at Orallo.

Between 1923 and 1929 this company drilled three holes near Orallo to depths of 2,840, 2,625, and 3,670 feet and one near Roma to a depth of 4,158. feet. Small oil and gas shows were reported from the first three and gas from the fourth was tested to yield about 2.5 pints of gasoline per 1000 cubic feet.

In September 1927, Roma Oil Corporation Limited No.1 Bore, drilled with a rotary plant, struck a flow of 600,000 cubic feet of gas per day at 3,703 feet, and in October 1928 a Braun gas absorption plant was installed to recover the petrol content of the gas which varied from 1.2 to 1.6 pints per thousand cubic feet.

R.O.C.L. No.1 Bore was deepened in 1929 and light oil was found at 3,704 feet. This well is said to have produced 3,100 gallons of natural oil of dark to light colour in the first 15 months. The gas yield at this time was estimated at 1,277,000 cubic feet per day, and was accompanied by some water. The absorption plant continued in operation for several years, treating the gas from R.O.C.L. No.1 Bore. The total amount of petrol thus extracted until 1932, when the supply of gas failed, was approximately 30,000 gallons.

Roma Oil Corporation No.2 was commenced in March 1928 on a site west of earlier activities on Hospital Hill. "Edge" conditions were found to exist and basement was encountered without any notable discovery of gas or oil.

Builders Limited was registered in December 1927 to correlate the geological information from the various deep bores and to carry out subsurface prospecting by scout drilling and pit sinking in the vicinity of Roma. Between June 1928 and July 1929 this company put down 158 scout bores with an average depth of 240 feet.

Roma Oil Corporation limited No.3 was drilled on the eastern side of Hospital Hill and yielded considerable water and only moderate amounts of gas. It was abandoned.

Between 1927 and 1932 several deep bores were drilled in the surrounding district but the only bores with noteworthy indications of petroleum or gas were those at Blythdale and the one at Mount Bassett (Roma Blocks Oil Co.No.1 or Block 16) where the gas will still burn at the casing head. The latter bore was drilled to 3447 feet and gave a yield of light oil of 10 gallons per day. This bore was later carried to granite bedrock at 3561 feet. A bailing test in 1937 confirmed the original yield. The Roma Blocks Oil Company later (1938-1941) drilled three other wells in the Mount Bassett area in all of which petroliferous gas and/or oil was obtained.

In 1934 the deepest well in the district was drilled at Wallumbilla to a depth of 4,968 feet without reaching bedrock.

From June 1933 to September, 1934, Oil Search Limited drilled 78 scout bores in the vicinity of Roma. Based on the data so obtained a deep test was commenced in March 1934 at Warooby Creek six and one-half miles east of Roma. This reached basement rock at 3764 feet in August of the same year. Total depth reached was 3794 feet. Gas was encountered at two or three horizons. The main flow from a depth of 3629 feet to 3660 feet was tested and estimated at 650,000 cubic feet per day. The well was subsequently plugged, pending the results of further activities to the north by the same company.

In August and September 1935 Oil Search Limited put down a scout bore to a depth of 442 feet on Arcadia Dome, 85 miles north of Roma. Traces of oil and gas were met between 195 and 300 feet. At the beginning of 1936 Drillers Limited, a subsidiary of Oil Search Limited commenced a deep test on this structure. Drilling was suspended in September 1939 when the bore was 6,036 feet deep. A normal type of natural gas was met with at 1187 feet which tested at 250,000 cubic feet per day, and between the depths 2,487 and 2,900 feet other gas horizonswere cut. The gas from the lower horizons gave a flow test over a period of several months of about 3,000,000 cubic feet per day. This gas is about 70 per cent, carbon dioxide. Reference to recent tests of this gas carried out by the Department of Supply and Shipping are given later in this report.

Drillers Ltd. started a test well on Hutton Creek Dome, 60 miles north of Roma in October 1935.

The bore entered steeply dipping and sheared sediments at a depth of about 4,080 feet and was abandoned at a depth of 4,688. Opinion has been divided as to whether the high-dipping beds represent pre-Permian bedrock (vide appendix page 4) or a fault zone in the Permian. To the authors the evidence seems conclusive in favour of the fault hypothesis. Since 1939 a subsidiary of the Shell Company, Shell (Queensland) Development Pty. Ltd., has been engaged in a geological, aerial and geophysical survey of Central, Southwestern and Western Queensland. Approximately 32,200 square miles have been covered by geological mapping and reconnaissance, 192,000 square miles of geophysical survey and 7,800 square miles by aerial photography. No drilling has been done. Total expenditure to date is £180,000.

Other companies including Commonwealth Oil Refineries and Superior Oil Company have made geological reconnaissances in Southern Queensland.

2. Longreach. At Longreach, small quantities of an impure paraffin wax have been flowing for some years from a bore which supplies the town with water. Similar material was met with in a neighbouring bore, drilled by the Longreach Oil Wells Limited for oil. Petroliferous gas is known to occur in the same district.

B. EXPENDITURE.

An estimate of the expenditure by individual companies is not easy to compile.

1. To 1931 inclusive. L.C. Ball (1932) estimated that (approximately to the end of 1931) the following sums had been expended in the search for oil in Queensland:-

	£	£
Geological	5,000	
Geophysical	20,000	
Scout Boring	20,000	
Drilling (59,000 feet percussion, 50,000 feet rotary)	750,000	
		795,000

2. 1932-1943.

	£	£
(a) Oil Search Ltd. and subsidiary (Drillers Ltd.)		
Geological and administrative	43,543	
Drilling (incl. plant £31,088 and Commonwealth subsidy £31,485)	98,223	
		141,766
(b) Roma Blocks Oil Company Drilling (incl. Commonwealth subsidy £10,142)		35,000
(c) Shell (Queensland) Development Co. Ltd. Geological, geophysical and aerial surveys		180,000
3. Total		£1,151,766

New South Wales.

(See Plate 4 for locality map)

Leo J. Jones reviewed the history of prospecting for oil in New South Wales up to 1921 in Mineral Resources No.31, Geological Survey, N.S.W. and additional notes prepared by one of us (H.G.R.) were published in 1932. These reports have been drawn upon but it has also been necessary to abstract information from official files and company records (chiefly Oil Search Limited) to bring this account up to date.

Attention has been paid mainly to the Permo-Triassic basin of central-eastern New South Wales. The authors are well acquainted with this area and one of us (H.G.R.) has spent many field seasons in geological mapping therein.

A. NOTES ON DRILLING OPERATIONS are given under three headings: 1. Hunter River district, 2. Sydney-Gosford district, and 3. Other localities.

1. Hunter River District. Two scout bores and three test wells have been drilled as follows:

(a) Loder Dome. Oil and Gas Investigations Ltd. put down a bore to a depth of 2391 feet in 1926-1927 on a well defined structure in the Upper Marine series of the Permian. The bore was discontinued after penetrating 352 feet into the Lower Marine series. Only slight gas shows were noted. It is estimated that expenditure in this venture amounted to approximately £20,000 including a Commonwealth subsidy of £2,260.

(b) Belford Dome. In 1927-1928 Belford Dome Limited drilled two core holes to depths of 1550 and 1,664 feet respectively and carried a test well to a depth of 1,498 feet using a cable tool rig. The structure had been adequately defined by geological mapping. The sequence proved is much the same as at Loder Dome. Small gas showings were reported. This company spent about £48,000 of which approximately half is represented by the cost of actual drilling.

(c) Farley Bore. The Farley Bore, drilled by W.J. Maskell, was suspended at a depth of 5,364 feet in 1936. The site is not well chosen and the bore has been in steeply-dipping Lower Marine sediments throughout. Small gas showings have been reported. A sum of about £12,000 has been spent on drilling at this site.

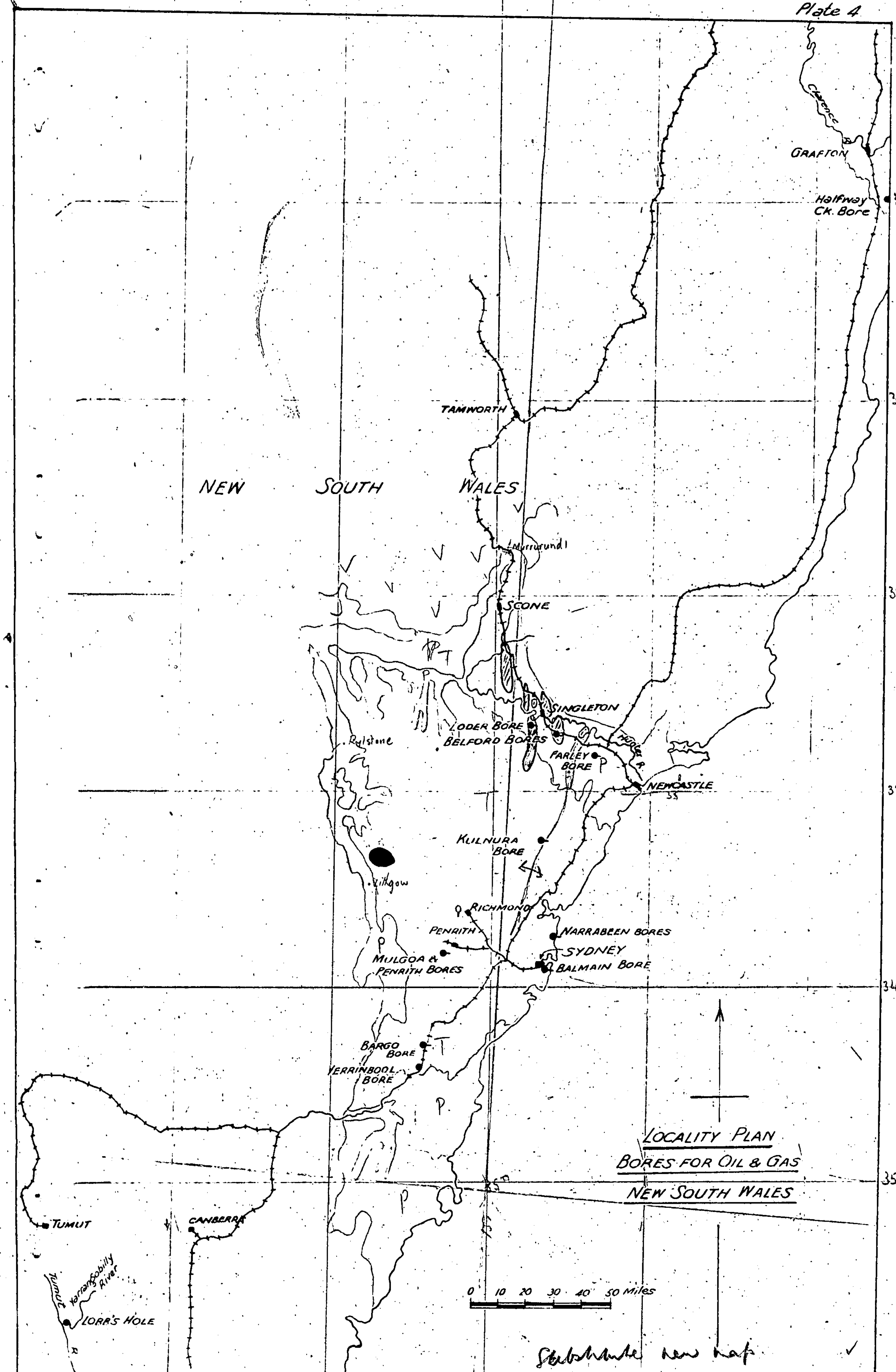
2. Sydney-Gosford District. All the bores listed under this heading have commenced in the Triassic and penetrated to or through the Upper Coal Measures in the Permian.

(a) Kulnura Bore. The Kulnura Bore was drilled by the Kamilaroi Oil Co. Limited, a subsidiary of Oil Search Limited, in 1935-38, to a depth of 6,293 feet. Small gas shows were logged. It is estimated that the expenditure on this enterprise was £50,000 including £17,000 Commonwealth Government subsidy.

(b) Richmond Bores. Three bores were put down at Redbank near Richmond in 1910-1916, the deepest of which reached a depth of 877 feet. A trace of crude oil of paraffin base was reported from No.3 Bore.

(c) Penrith Bore. This bore was drilled to a depth of about 2,700 feet in 1918-1920. Gas was met with, but owing to the poor technique employed in drilling, the flow could not be adequately tested.

(d) Mulgoa Bore. This bore was put down by Gas Drillers Ltd., a subsidiary of Oil Search Limited on a sharply folded structure with a faulted and jointed crest. The bore reached a depth of 3,125 feet. Numerous gas showings were encountered over a wide vertical range. Estimated expenditure was £27,000 including £2,800



Add geol. boundaries

(d) Mulgoa Bore - continued.

Commonwealth subsidy.

(e) Narrabeen Bores. Two bores were sunk at Narrabeen to a depth of 1,200 feet and 2,015 feet both of which struck gas flows at 700 feet. (Top of Narrabeen)

(f) Balmain Bore. A bore drilled in 1932-1937 by Natural Gas and Oil Corporation Limited from the bottom of the Balmain coal shaft (itself 2,937 feet deep) reached a depth of 4,937 feet. A small yield of gas was obtained between the depths of 4,180 feet and 4,530 feet. (Upper Coal Measures) Gas is being drawn off from the sealed colliery workings at the rate of 120,000 cubic feet per week and is being used in cylinders and bags as a petrol substitute in motor vehicles.

(g) Yerrinbool Bore. In 1921-1922 the Yerrinbool Oil Prospecting Syndicate drilled a hole to a depth of 2,238 feet. There is no record indicating whether or not any oil or gas showings were encountered.

(h) Tyler's Bargo Bore. Few details are known concerning the bore put down by Mr. Tyler a few miles west of Bargo. It had reached a depth of 3,550 feet when operations were suspended in 1935. Some gas was noted during drilling. Reached Finished in Branxton Stage

3. Grafton District. Some interest attaches to the drilling near Grafton in the North Coast district of New South Wales. Attention was directed to this locality when gas was reported from a bore put down for water on the Grafton Racecourse between 1897 and April 1902. About 1933, the Clarence River Oil Prospecting Company put down a bore for gas and oil, about 2½ miles south of Halfway Creek, which is 18 miles southeast of Grafton on the main Grafton-Woolgoola road. The bore was drilled to 2,580 feet, was cased throughout and cored in part. No mapping or field investigation of any kind was done. No gas was noted during drilling but it was found later that if the holes were plugged for a few days, gas containing 5% ethane would accumulate and burn for two minutes. The last test was made three years ago and the hole is still plugged.

4. Other Localities. Most of the drilling done outside the central eastern Permo-Triassic basin and the Grafton district has little economic significance. In 1917 a bore was drilled to a depth of 763 feet at Rawine in the vicinity of the Lobb's Hole copper mine, Yarrangobilly district. This bore was drilled because inflamable gas had been observed issuing in the workings of the copper mine. There has also been some drilling done in the Tamworth and Scone districts but the total footage involved in both localities is small.

B. EXPENDITURE.

	£
Loder Bore (including Commonwealth Government subsidy of £2,260.)	20,000
Belford Bores	48,000
Farley Bore (estimated)	12,000
Kulnura Bore (incl. Commonwealth Govt. Subsidy)	50,000
Richmond Bore (estimated)	5,000
Penrith Bore (estimated)	7,000
Mulgoa Bore (incl. Commonwealth Government subsidy of £2,800)	27,000
Narrabeen	10,000
Balmain Bore (excluding colliery experiment estimated)	6,000
Yerrinbool Bore (estimated)	7,000
Tyler's Bargo Bore (estimated)	7,000
All others (estimated)	30,000
	229,000

Victoria.

(See Plates 5, 6 and 6A for locality maps)

The principal sources of information on bores for oil in Victoria are the publications of the State Geological Survey (See list following tabulated statement re Lakes Entrance), a booklet on Gippsland East issued by the Victorian Mines Department in 1936 and records of various companies, chiefly South Australia Oil Company, Austral Oil Drilling Syndicate and Oil Search Limited.

Drilling for oil in Victoria dates from 1914, but the principal activity has been since 1924, when a bore put down at Lake Bunga by the Lakes Entrance Development Co. (No. 50 on Plate 6) on a site recommended by the State Geologist, struck a flow of artesian water with trades of petroleum and a flow of natural gas at 1,070 feet. Since that date many companies have been formed to carry on operations in various parts of the State. One of us (I.C.) has examined cores and cuttings from nearly every bore mentioned herein and we have both kept in touch with recent drilling activities at Lakes Entrance and Nelson.

A. NOTES ON DRILLING OPERATIONS.

Drilling has been done in several districts in Victoria and is summarised hereunder: 1. East Gippsland, (a) Lakes Entrance, (b) Bairnsdale-Sale. 2. Port Phillip. 3. Western Victoria.

1. East Gippsland.

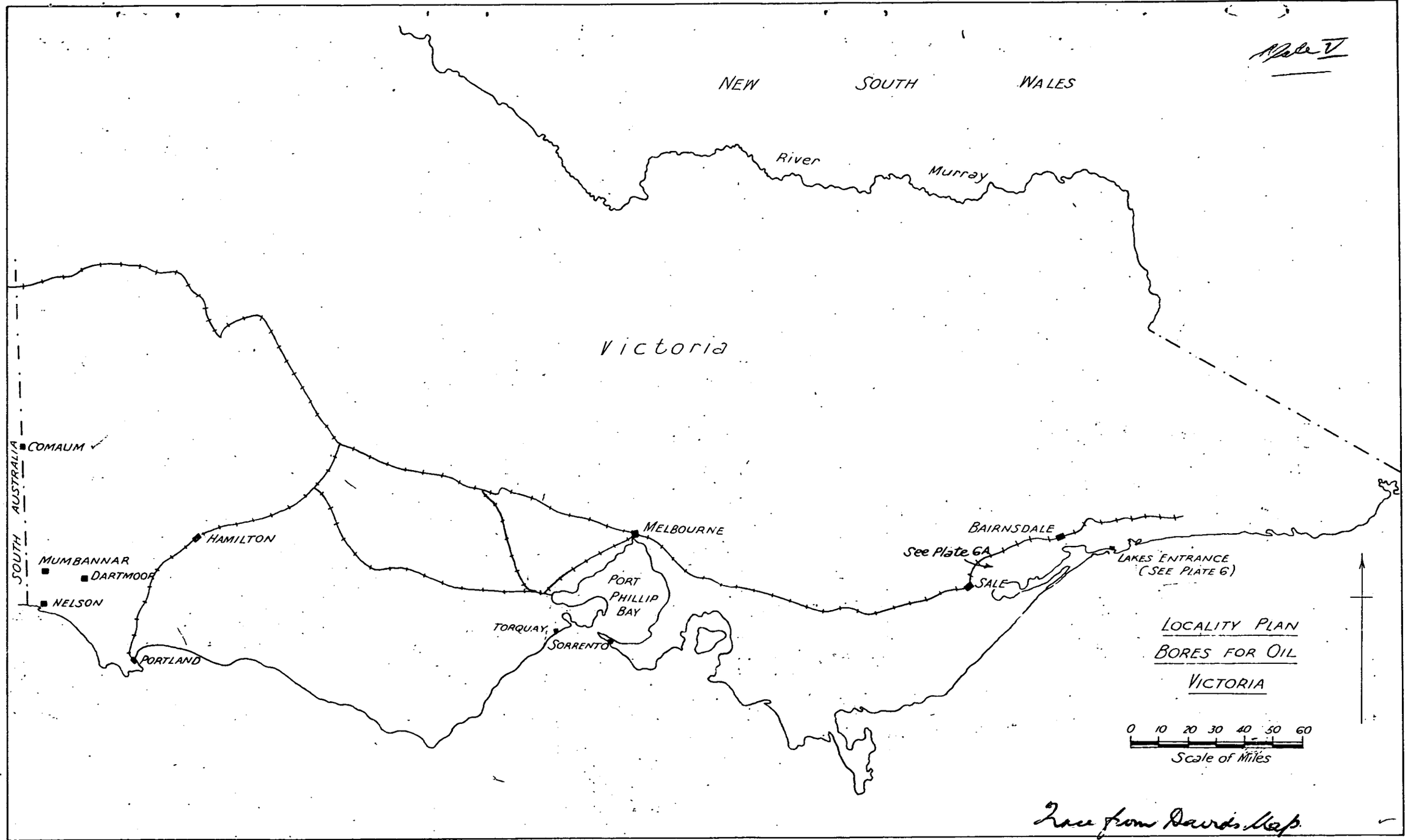
(a) Lakes Entrance. (Refer to Plates 5 and 6). Fifty-two bores have been put down in the search for oil in the Lakes Entrance area. Of these three were drilled by the Victorian Mines Department, nine jointly by the Victorian and Commonwealth Governments and the remainder by the following companies: Lakes Entrance Development Company, Point Addis Oil Wells Company, Tanjil No.1 Company, Tanjil No.2 Company, Cobden's Lakes Entrance Oil Trust, Kalimna Oil Company, Lake View Oil Company, Mac's Lakes Entrance Oil Wells Ltd., Texland (Houghton's) Oil Company, Gippsland Oil Company, Midfield Oil Company, Mid West Oil Company, South Australian Oil Company, Oil Search Limited, and Austral Oil Drilling Syndicate. Particulars concerning these bores are set out in a tabulated statement following page 12 of this report. (The co-operation of the State Mines Department in compiling this statement is gratefully acknowledged).

The total footage drilled in the area amounts to 69,339 feet. The drilling has served to delineate an area of at least eight square miles within which oil occurs in a glauconitic sandstone of Middle Miocene age at an average depth of about 1,200 feet. The companies engaged in the area have reported a production of 107,129 gallons of oil for the period 1930 to July 1941, and Messrs. Ramsay and Treganowan state that they have purchased approximately "100,000 gallons of dehydrated crude oil" from producers at Lakes Entrance.

It is proposed to develop this area by horizontal drilling from a circular shaft (see page 19).

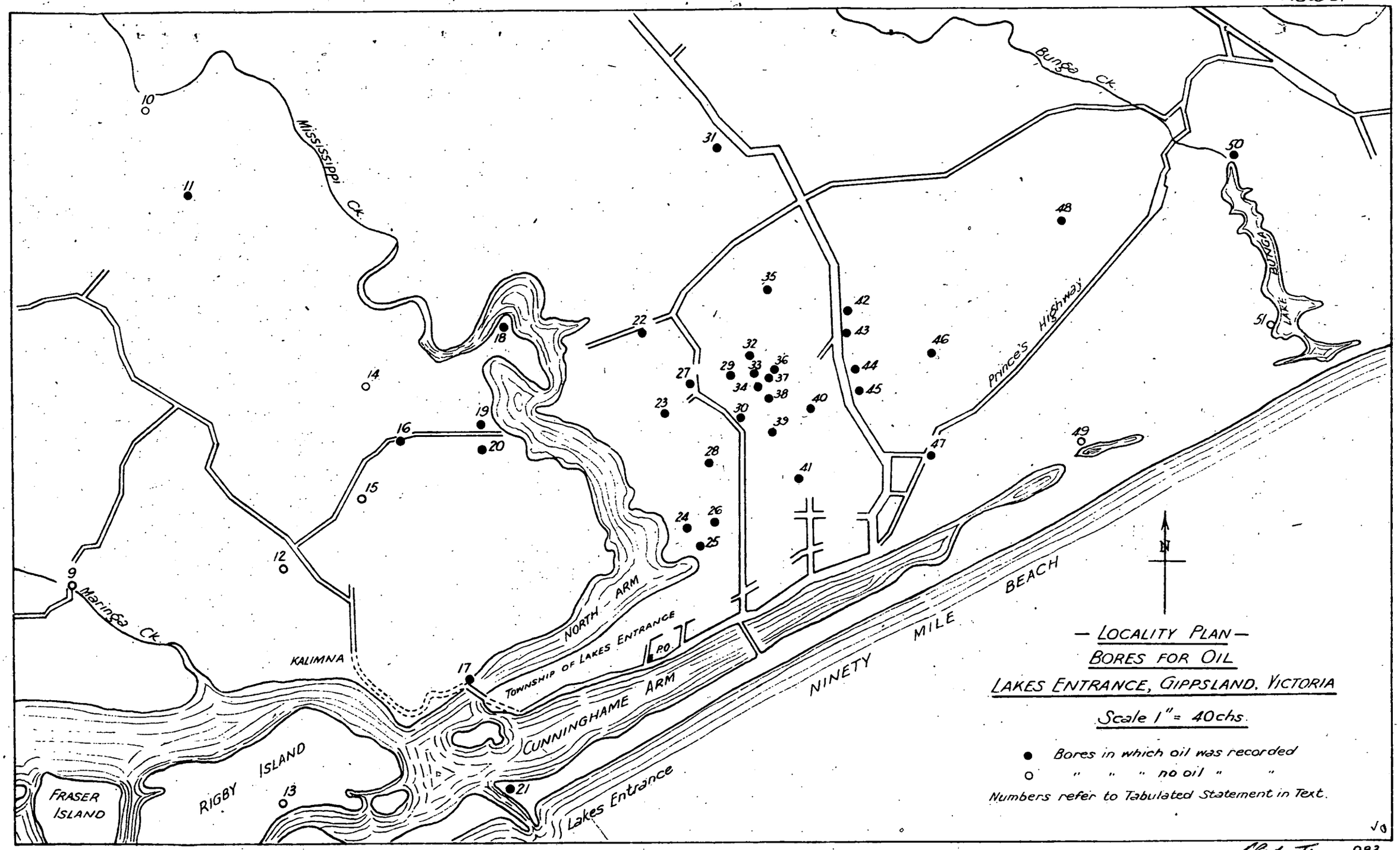
(b) Bairnsdale-Sale. (Refer to Plates 5 and 6A). Of the 50 bores listed in the following table 15 were put down by private companies. These companies included Oil Search Limited, Texland Oil Company, Lake Wellington Oil Wells, Amalgamated Oil Syndicate, Signal Hill Oil Exploration Company, Valve Oil Wells, Tanjil-Pt.Addis Company, and Midfield Oil Company. In the following table, the numbers of the bores refer to Government bores, unless otherwise stated.

Plate V



Trace from Dowds Map.

Add sedimentary basins.


Bunga Ck.
Mississippi Ck.
Prince's Highway
Lake Bunga
Marinoa Ck.
KALIMNA
NORTH ARM
Township of Lakes Entrance
P.O.
CUNNINGHAME ARM
NINETY MILE BEACH
Lakes Entrance
RIGBY ISLAND
FRASER ISLAND
N
— LOCALITY PLAN —
BORES FOR OIL
LAKES ENTRANCE, GIPPSLAND, VICTORIA
Scale 1" = 40chs.
● Bores in which oil was recorded
○ " " " no oil " "
Numbers refer to Tabulated Statement in Text.

Parish.	Name or Number .	Depth in Feet.
Bairnsdale	3 (Cobbler's Creek)	866
	4 (Forge Creek)	1,410
	5 (Eagle Point)	1,541
Moormurng	1	1,021
Coongulmerang	1	945
	2	640
	3 (Tom's Creek)	1,200
Oil Search Ltd.	1 (Bravo Plant)	282
	2 (Bravo Plant)	306
	3 (Steam Drill)	1,446
Nindoo	1	530
Yeerung	1	1,340
Meerlieu	1	1,200
Nuntin	1	1,452
	2 (Lake Kakydra)	3,560
Stratford	1	561
Bundalaguah	1	575
	2	650
	3	552
Wurruk Wurruk	1 (Sale)	3,214
Glencoe	2	947
	3	214
	4	340
	5	532
	6	605
	7	1,380
	8	1,406
Texland Oil Co.	1	1,085
Lake Wellington Oil Wells	1	2,217
Glencoe South	2	927
Tanjil-Pt.Addis Co.	1	1,400
	2	2,760
Midfield Oil Co.	1	960
Wulla Wullock	2	1,420
Stradbroke	14 (Monkey Creek)	1,505
	15	640
	16 (Merriman's Creek)	1,476
Darriman	3	1,207
	4	1,245
Woodside	5	312
	6	137
Bengworden (Oil Search Ltd)	1	924
	2	1,087
Bengworden South	1 (Holland's Landing)	4,004
Boole Poole	1 (Sperm Whale Head)	3,110
Valve Oil Wells	1 (Pelican Point)	2,309

Parish	Name or Number.	Depth in Feet.
	Bt/Fwd.	57,~~640~~ 440
Goon Nure	1 (Romawi)	3,244
Amalgamated Oil Syndicate	1	2,890
Seacombe	1	1,570
Dulungalong	1	1,616
Signal Hill Exploration Co.	1	2,295
Giffard	14	1,600
	Total:	70,~~855~~ 655

2. Port Phillip. (refer to Plate No.5)

The drilling done on both sides of Port Phillip is summarised hereunder -

	Feet.
Sorrento Bore (Govt)	1,696
Torquay Bores (Pt.Addis Co.) No. 6	842
No. 7	922
Torquay Oil Wells (five bores)	4,552
	8,012

3. Western Victoria. (refer to Plate No.5)

The following bores have been put down -

	Feet.
Hamilton, Ph.Yulecart, (Govt)	~~4~~,252
Comaum Bore (Pt.Addis Co.)	1,171
Ph. Dartmoor (24 Govt. Bores)	3,085
Mumbannar No.1 Bore (Mersey Valley Oil Co.)	1,100
Portland (Producing Oilfields)	2,835
Nelson, Ph. Glenelg (Govt.)	5,708 *
(Western Petroleum)	1,000
Ph. Palpara (Point Addis Co.)	850
	16,001

*Depth when drilling was temporarily suspended in December, 1943.

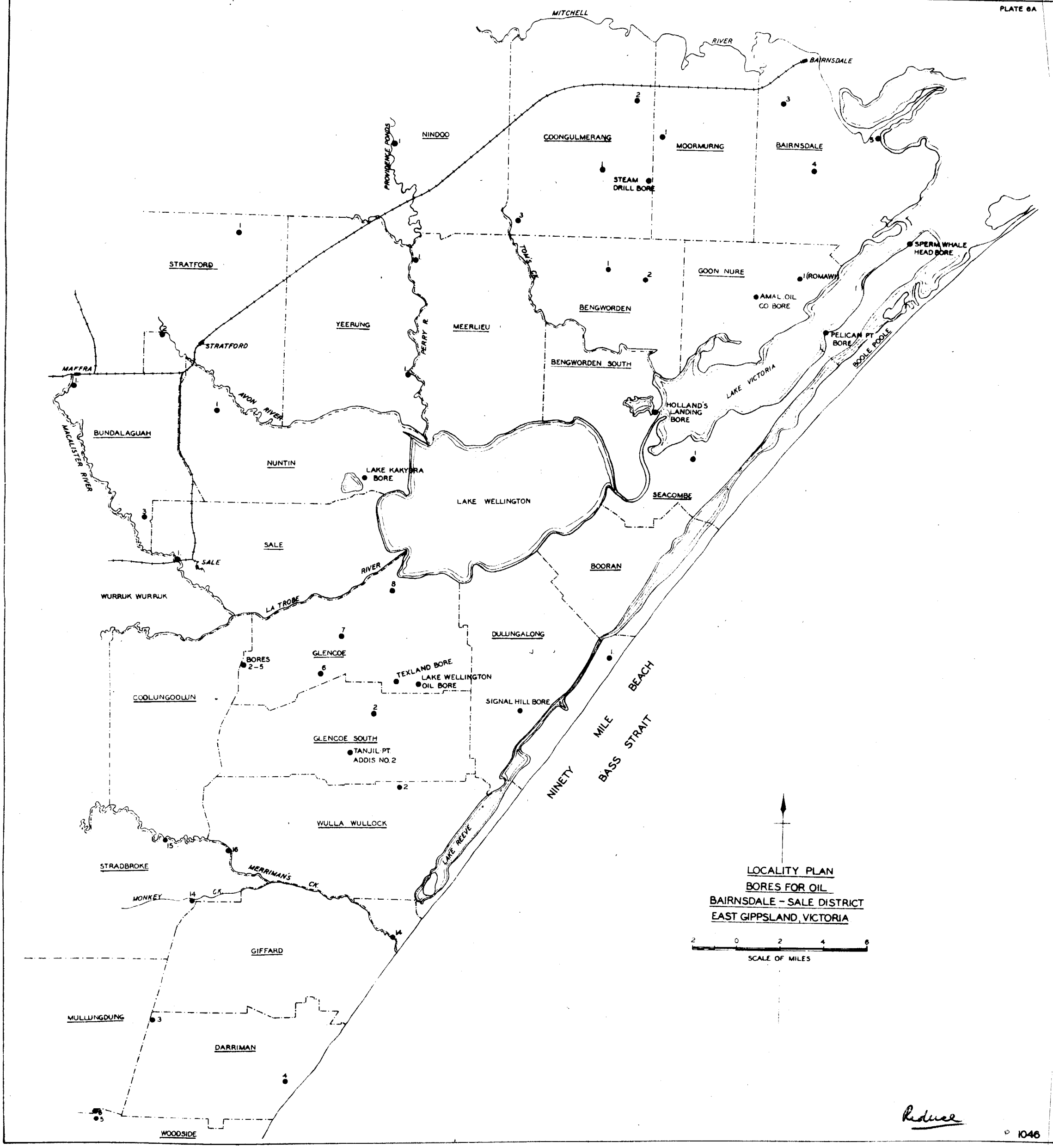
The Commonwealth and State Governments are jointly drilling the Nelson Bore, which is being put down to prove the Tertiary sequence in the area. This bore has reached a depth of 5,708 feet and has been in Middle Miocene sediments throughout. The thickness of these sediments proved to date is much greater than expected.

B. EXPENDITURE.

1. Lakes Entrance and Sale-Bairnsdale.

	£.
Victorian Government (1924-32 and 1935-41)	35,000
Commonwealth Government (1935-1941)	19,000
Oil Search Limited Test Wells	9,700

PLATE 6A



LOCALITY PLAN

BORES FOR OIL

BAIRNSDALE - SALE DISTRICT

EAST GIPPSLAND, VICTORIA

2 0 2 4 6

SCALE OF MILES

Reduce

1046

No.	Bore	Surface Level	Depth	Glauconitic Sandstone	Basement at	Basement Rock	Bottom Water	Oil	Reference & Notes
28.	No.3, Lake View Co.	85	1285'	≥30' @ 1255'				?20 gal/day.	
29.	No.2, Midwest Co.	131	3400'	28' @ 1227'		Granite		Company's bailing test 1937, 114 days: average 18.3 gal/day.	(11) W.
30.	Imray Bore, Austral Oil Syndicate.	135	1274'	≥21' @ 1253'				5 gal/day over extended period	(6) (7, p.163) W.
31.	No.11, Ph. Colquhoun	200	1238'	84½ @ 1149'	1238	Granite		Present. No test. Hole water flooded.	
32.	No.4, S.A. Oil Co.	140	1255'	≥33' @ 1222'				7 months pumping: average 6½ gal/day (Co.'s figures).	
33.	No.6, S.A. Oil Co.	97	1255'	34' @ 1186'	?1255'	?Granite		Present	
34.	No.7, S.A. Oil Co.	88	1255'	29' @ 1193'				7 months pumping: average 15 gal/day. (Co.'s figures)	
35.	No.1, Tanjil No.1 Co.	196	1269'	≥31' @ 1238'				10 gal/day. (Co.'s figures)	Oil Search Ltd.
36.	Houghton's Bore, Texland Co.	164	1274'	≥29' @ 1245'				Present	O.
37.	No.2, S.A. Oil Co.	151	1305'	38' @ 1245'				Present	(3) W.O.
38.	No.8, S.A. Oil Co.	144	1278'	≥28' @ 1250'				Co.'s figures: Pumping Dec.1932 to May 1934, average about 2 gal dry oil/hr.	
39.	Foster's Bore, Austral Oil Syndicate.	93	1260'	≥31' @ 1229'			Fair quantity.	100 gal/day (pumping).	(7) p.163.
40.	No.10, Ph.Colquhoun	140	1382'	44' @ 1255'	1362	Granite	Small quantity @ 1294' 4	7.6 gal/day.	W.
41.	No.3, Pt.Addis Co.	28	1241'	38' @ 1202'			1' water sand @ 1239'6" (in glauconitic bed) approx.23 gal/day bailed.	686 gal. bailed in 88 days = 7.8 gal/day.	(8, p.137) (15, p.7)
42.	No.1, Tanjil No.2 Co.	231	1360'	31' @ 1290'		?Granite		Present	
43.	No.1, Midfield Co.	199	1305'	≥33' @ 1272'				Present	
44.	No.2, Midfield Co.	173	1308'	≥28' @ 1280'				Present	
45.	No.2, Lake View Co.	177	1341'	≥39' @ 1302'				Present	
46.	No.1, Oil Search Ltd.	132	1276'	42' @ 1232'			Small quantity at 1271.	Very small amount.	
47.	No.2, Lakes Entrance Development Co.	31	1275'	61' @ 1209'	1270	Granite	60 gal/hr.	1 pint/day.	W.G.O. (8, p.69) (1, p.561) (2, p.646).
48.	No.1, Lake View Co.	141	1207'	37' @ 1170'	?	? Slate		Present	
49.	No.9, Ph. Colquhoun.	7	1244'	40'6" @ 1186'	1242	Hornfels	Artesian 93 gal/hr. at 700'.	Nil	
50.	No.1, Lakes Entrance Development Co.	9	1215'	(4) 16' @ 1084' (8) 31'6" @ 1080.	1210	Slate	1200 gal/hr.	Trace	W.G.O. (8, p.24)
51.	No.7, Ph. Colquhoun	5	1221' 6"	35' @ 1185'	1221	Slate		Nil	(10) W.
52.	Cobden's Bore	20	1507'	Absent	?	?Granite	1354'-1480'; water rising to 10' from surface.	Nil	Log does not specify granite as bedrock.

W = Water analyses made at Mines Dept. Laboratory.
G = Gas " " " " " "

O = Oil analyses made at Mines Dept. Laboratory.
≥ = Full thickness of glauconitic sandstone not penetrated.

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- TABULATED STATEMENT - OIL BORES, LAKES ENTRANCE, VICTORIA -

Note: See Plate 6 for bore locations (Nos.1-8 and 52 not included)

No.	Bore	Surface Level	Depth	Glauconitic Sandstone	Basement at	Basement Rock	Bottom Water	Oil	Reference & Notes
1.	No.1,Ph.Bumberrah	5	1226'6"	32'6" @ 1194'	-	-	1500 gal/hr. at 1180'.	Nil	(9,p.7) Not checked against driller's log.
2.	No.2,Pt.Addis Co.	5	949'	Absent	934?	Schist	1440 gal/hr.at 803' increasing 2800 at 933'.	? See "Notes" column.	(8,p.135) Driller reports traces of oil 850' to 864' in fine white sand.
3.	No.2,Gippsland Oil Co.	225	1106'						(,p.163) Drilling suspended in micaceous beds. W.G.
4.	No.3,Gippsland Oil Co.	220	1461'	43' @ 1380'					
5.	No.1,Gippsland Oil Co.	255	1766'	16' @ 1446'	1484'	Shale	Small sub-artesian flow at 1462'	Trace	(7,p.161) W.G.
6.	No.1,Pt.Addis Co.	2	1474'	36' @ 1396'			120 gal/hr.at 1354; 20,000 gal/hr. at 1432'	Nil	(8,p.116) (4) W.G.
7.	No.3,Ph.Colquhoun	5	1454'	≠20' @ 1434'				Nil	(10) (7) p.159-160.
8.	No.1,Ph.Colquhoun North.	100	660'	Absent				Nil	(8) p.117 (4)
9.	No.5,Ph.Colquhoun	10	1255'	≠1228-1249'				Nil	(10) (7) p.161 W.
10.	No.2,Ph.Colquhoun	60	974'3"		974?	Granite	Artesian flow @ 700',967' & 974'	? See "Notes" column.	(8,p.136) Driller reports traces of oil at 835'.
11.	No.1,S.A. Oil Co.	187	1250'	29' @ 1150'	1250'?	? Granite		Present	Records unreliable O.
12.	No.6,Ph.Colquhoun	175	1458'	23' @ 1401'	1457'	Granite		Nil	(10)
13.	No.1, Kalimna Oil Co.	4	1474'	31' @ 1387' 6".	1472'	Schist	Between 1414' and 1418'6".	Nil	(8,p.117) (5)
14.	No.5, S.A. Oil Co.	139	1320'	?58' @ 1261'	?1320	? Granite		Nil	Depth records doubtful.
15.	No.2, Kalimna Oil Co.	163	1406'	34' @ 1370'	1406?	? Slate		Nil	W.
16.	No.3, S.A. Oil Co.	165	1350'	35' @ 1313'				10 gals/day. short tests. Over 3 gal/day for 216 days. Both bailing.	
17.	No.1,Ph.Colquhoun	9	1404'6"	41½ @ 1331'	1404'	Granite	1800 gal/hr. @ 1358' increasing to 10,000.	1 pint/day.	(8,p.89) (4) (2,p.646) W.O.
18.	No.8,Ph.Colquhoun	6	1165'	44' @ 1050'	1155'	Granite	100-300 gal/hr 1056'-1104' 1300 gal/hr @ 1122'.	Up to 13 gal/day.	W.G.
19.	No.2,Oil Search Ltd.	142	1319'	≠36' @ 1283'				Pumping test: 2 barrels/day = 70 gal/day. (Co's figures).	
20.	No.3,Oil Search Ltd.	117	1310'6"	34' @ 1276'			Pumping 128 gal/hr.	Pumping test: 2 gal/hr. = 48 gal/day. (Co's figures)	Oil at base of reservoir bed. 1308'-1310'. Water sand 1310'-1310'6".
21.	No.4,Ph.Colquhoun	15	1509'9"	23' @ 1421'	1508'	Granite	At 1455'	Trace	(10) (7,160-161).
22.	No.2,Tanjil No.1 Co.	177	1264' (See "Notes")	36' @ 1228'		?Granite		10 gal/day.	Co.'s records 1271. Oil Search Ltd.
23.	No.4,Pt.Addis Co.	201	1348'6"	≠38' @ 1310' 6".				106 gals.bailed in 18 days = 5.8 gals.per day.	(9, p.7)
24.	No.3,Mac's Oil Wells	30	1310'	At 1250'			Artesian	Present	
25.	No.2,Mac's Oil Wells	50	1297'	≠35' @ 1262'			Artesian	110 gal/day bailing (Oil Search Ltd.)	Well still flowing. Water & oil yield can be measured. O.
26.	No.1,Mac's Oil Wells	41	1308'	≠48' @ 1260'				Present	
27.	No.1,Midwest Co.	183	1320'	30' @ 1280'				Present	

Geology, geophysics and scout drilling	11,000	
Austral Oil Drilling Syndicate	40,000	
Other Oil Companies (including South Australian Oil Wells)	100,000	
	214,700	

2. Port Phillip and Western Victoria.

Victorian Government (estimated in part)	13,000	29,000
Private companies (estimated in part)	5,000	7,600
Commonwealth Government	10,000	
	28,000	36,600

3. Total Expended in Victoria. 242,700

Tasmania.

(See Plate 1 for locality map)

A. NOTES ON DRILLING OPERATIONS.

No drilling has been carried on for oil in Tasmania since 1932 when Mr. P.B. Nye sumnarised the work done.

The only locality where any extensive amount of drilling has been done is the Mersey Valley district, where two companies have between them drilled 21 holes at an approximate cost of £60,000. The Mersey Valley Oil Co. Ltd. drilled 9 holes totalling 5,781 feet and the Adelaide Oil Exploration Co. drilled 12 holes with an aggregate depth of 8,507.

A hole has also been drilled to a depth of 430 feet (in 1915) on Bruny Island, and some shallow drilling has been done elsewhere.

B. EXPENDITURE.

The total expenditure on oil drilling in Tasmania is about £100,000.

South Australia.

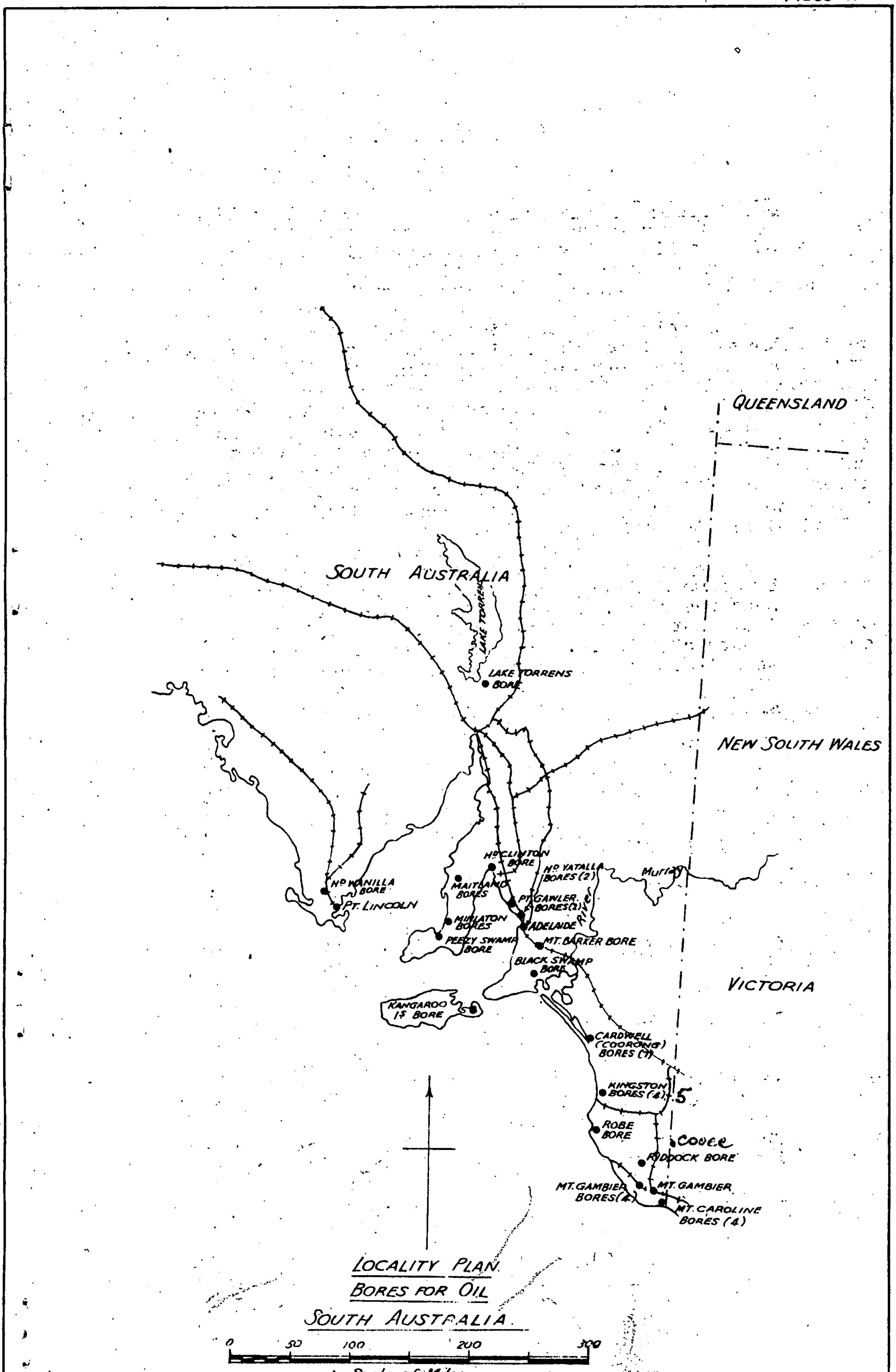
(See Plate 7 for locality map).

A. NOTES ON DRILLING OPERATIONS. The notes on drilling activity in South Australia have been compiled from various reports in the South Australian Mining Reviews and information given on a map showing the position of bores put down for oil in South Australia which has been supplied by the Director of Mines, South Australia.

The table hereunder lists and gives the depths of bores drilled for oil in South Australia. Most of them call for little comment as they were put down at locations which even the most optimistic geologist would regard as hopeless. The main interest attaches to the southeast corner of South Australia and particularly the Mount Gambier district. The depth to bedrock in the Mount Gambier district has never been determined but as sedimentation in that area was continuous with adjoining areas across the border in Victoria, the Nelson Bore, which is now in course of being put down by the State and Commonwealth Governments, will serve to prove the geological section for both States.

It may be noted that very small traces of free oil were recorded by Cosmo Newberry from the No.2 bore hole put down to test the coal measures at Leigh Creek. The Director of Mines has commented, also, that "possibly some oil was found in the 180 foot bore hole south of Lake Torrens, but, after the early report, attempts to collect even a few drops of oil were unsuccessful".

Locality	Number of Bores	Depth in Feet.
Coorong, Hd.Cardwell	6	922 931 650 656 701 606
Amalgamated Oil Wells (Kingston)	1	1,365
Kingston (Enterprise Oil Co.)	3	470 466 204
Southern Ocean Oil Co.	2	1,170 (Kingston) 2,660 (Kingston)
Robe, Hd.Waterhouse (South Australian Oil Wells)	1	4,504
Mt. McIntyre, Hd. Riddoch (Adelaide Oil Exploration)	1	1,045
Hd. Hindmarsh (South Australian Oil Wells)	1	1,532



LOCALITY PLAN
BORES FOR OIL
SOUTH AUSTRALIA

Add geology (trace from David. 1932)

Locality	Number of Bores	Depth in Feet.
	Bt/fwd	17,882
Mt. Gambier, Hd. Blanche	3	
(Associated Oil Corporation)		2,110
(Producers Oil Wells)		1,220
(Oil Search Limited)		2,013
Hd. Caroline	4	
(South Australian Oil Wells)		1,226
		1,824
		1,561
		839
Maitland, Yorke Peninsula	2	404
		1,509
Minlaton, Yorke Peninsula	3	1,800
		315
		1,942
Peezy Swamp, Yorke Peninsula	1	1,132
Hd. Wanilla	1	150
Hd. Yatala	2	1,354
		305
Pt. Gawler (Hallion's)	1	603
N.E. of Pt.Gawler	1	543
Hd. Clinton	1	133
Mount Barker	1	407
Black Swamp	1	352
Kangaroo Island	1	961
South of Lake Torrens	1	180
Total footage		~~40,865~~ 40,765

B. EXPENDITURE.

It is difficult to give an estimate of the money which has been expended on drilling in South Australia. Dr. L. Keith Ward, Director of Mines, suggests that the amount is not less than £200,000. In 1932 he reported that the South Australian Oil Wells Company had spent approximately £100,000 on drilling in South Australia. Oil Search Limited incurred an expenditure of £8,714 on drilling at Knight's Dome.

Western Australia.

(See Plate 8 for locality map).

A. NOTES ON DRILLING OPERATIONS.

The following account is based largely on a report by R.A. Hobson published in the Annual Progress Report of the Geological Survey of Western Australia for the year 1935. This account has been supplemented by notes taken from a minute kindly supplied by the Government Geologist of Western Australia and from sundry papers listed by Hobson. One of us, (H.G.R.) spent two field seasons in the North-west Division, one alone and one in company with K. Washington Gray. He also has some personal knowledge of parts of the Fitzroy area which was visited, in October 1941, in company with the Government Geologist of Western Australia and the geologists of Caltex Limited, who were at that time engaged in mapping the area.

1. Kimberley Division. (a) Ord River area, (b) Fitzroy River area.

(a) Ord River Area. In 1919 Walter Oakes reported the finding of glance pitch in Basalt near the junction of the Negri and Ord Rivers. The discovery was confirmed by Blatchford (1921) and a description published. As a result the Oakes-Durack Company was formed and the area geologically examined by D.J. Mahony (1922).

Mahony considered that the bitumen found in the basalt at Oakes' find had been derived from the limestone of the Negri Series. Blatchford (1921), after his first examination, considered that this bitumen had been derived from the series underlying the basalt. Wade agrees with Mahony that the bitumen found in the basalt has come from the limestone above, and considers that any oil originally present would have escaped along the junction of the limestone and basalt. He considers that there is no chance of oil being present in commercial quantities.

Following Mahony's work in 1922, a bore (Oakes-Durack) was drilled to 1,196 feet. This bore was located on the east side of the Ord River about 30 miles south of the Ord-Negri junction. From 788 feet onwards this bore passed through basalt. Gas, petroliferous and sulphurous odour were reported to be noticeable when the bore was 788 feet deep.

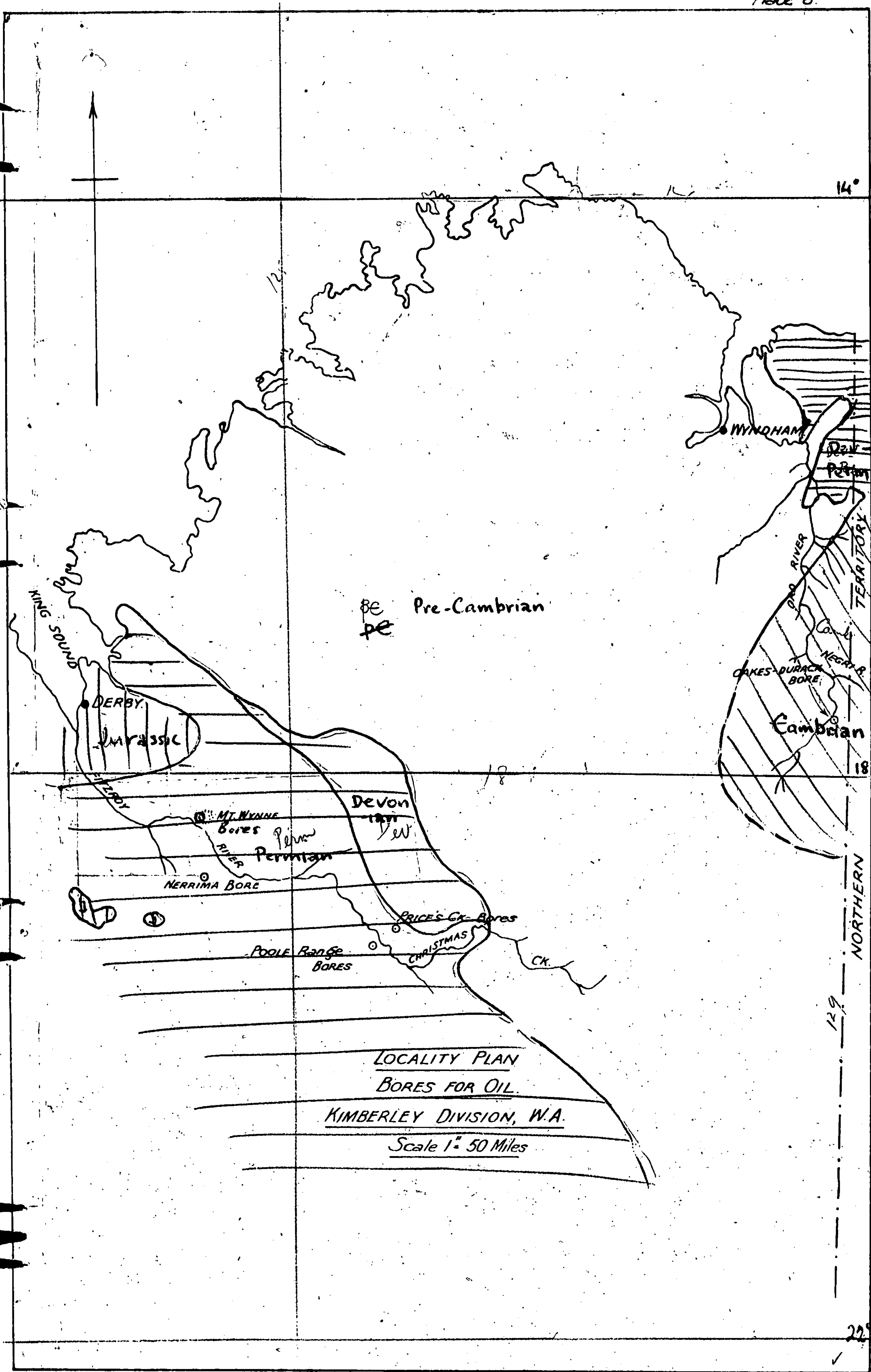
(b) Fitzroy River Area.

i. Prices Creek. In 1919, Harry Price, a well-sinker, reported (Blatchford, 1927) that he had recognised traces of oil in a bore being sunk in search of water on Gogo Station, Kimberley Division. This discovery was confirmed by Blatchford (1921) and a description published. Thus attention was drawn to the Kimberley Division and geological work followed immediately on behalf of the Freney Kimberley Company.

Subsequently, four holes were drilled ranging in depth from 340 to 1,008 feet. Numbers 1 (1,008 feet), 2 (340 feet) and 3 (809 feet), sunk in the vicinity of Price's original bore, all showed traces of oil but number 4 (444 feet), two miles to the west, showed no indications. Numbers 1, 2 and 3 all penetrated limestones of Lower Carboniferous age throughout their entire depth; number 4 did not reach these until 444 feet deep.

ii. Mount Wynne. Following early geological work by Blatchford and Talbot, a drilling site was selected and drilling commenced, using a Calyx drill, about the middle of 1922. The first hole was carried to a depth of 894 feet, when it was decided to change to percussion drilling. It was found that the hole was crooked, and it was abandoned. Asphaltum was recorded at several depths, 109 feet, 118 feet 6 inches and 121 feet 6 inches, 225 feet and 274 feet (?). Samples obtained at a depth of 120 feet were examined by Simpson (1922) and were considered to be true petroleum residues.

Plate 8.



14°
Pre-Cambrian
KING SOUND
DERBY
Jurassic
FITZROY
RIVER
MT. WYNNE Bores
Permian
Devonian
NERRIMA BORE
PRICE'S CK. Bores
POOLE Range Bores
CHRISTMAS
CK.
WYNDHAM
ORD RIVER
NEGRI R.
OAKES-DURACK BORE
Cambrian
NORTHERN TERRITORY
18°
22°
LOCALITY PLAN
BORES FOR OIL
KIMBERLEY DIVISION, W.A.
Scale 1" = 50 Miles

985

A second hole was carried to a depth of 2,154 feet. The log of this bore is given in Bulletin 93 of the Geological Survey of Western Australia. The log shows that globules of oil were noted at various depths between 524 feet and 1,886 feet. Bitumen was also recorded between these depths and also shallower. A water shut-off was attempted at 2,084 feet but failed owing to the shale band being thin and underlain by a friable sand containing water. Drilling was stopped in September, 1925, at a depth of 2,154 feet.

iii. Poole Range. Following Dr. Wade's visit of inspection in 1924, and work by Blatchford and Talbot at the Poole Range, drilling was commenced. A pilot hole was drilled to a depth of 1,000 feet.

In the main hole 10 inch casing was carried to 1,683 feet (Blatchford 1928), and all top waters were cemented off at this point. Soon after continuing drilling in an 8 inch hole, water entered the hole and rose to within 127 feet of the surface. It is not certain where this came from - whether the cement had failed or a water sand had been struck below 1,683 feet. Drilling was continued in a wet hole. At 2,085 to 2,115 feet and at 2,117 feet to 2,131 feet, shows of oil were obtained. Oil was noticed coating the cable and floating on the water. Drilling was suspended at 2,131 feet and the hole mudded up.

An attempt was made to shut off the water at 2,078 feet and test for the oil which had showed from 2,085 to 2,131 feet. After drilling through the cement bridge, water entered the hole and rose to within 242 feet of the surface. Blatchford (1929), considered that this water was coming from the oil sands which had been partially flooded.

Drilling was continued (File 218/21, G.S.W.A.) in a six inch hole to 2,605 feet, when a brown shale band was struck. It was decided to attempt to cement off the 5 inch casing at 2,616 feet still in the brown shale. This was only partially successful, water was reduced to 300-400 gallons per hour.

Drilling was again continued, using 4 inch casing. At 3,138 feet there was a showing of gas with minor quantities of a light oil (Blatchford, G.S.W.A. File 27/30). Cementing was again attempted and was this time successful. The hole remained dry until 3,200 feet was reached, when it was again flooded with water, thought to be coming from another water-bearing stratum.

Drilling was continued to 3,264 feet when the tools were lost owing to the rope breaking and the hole was subsequently abandoned.

It is considered that the best showings of oil were obtained at 2,085 feet to 2,115 feet (Blatchford, G.S.W.A. File 27/30). Following further considerations of the original mapping of the area, a change in drilling site was proposed. The drawing of structure contours disclosed an apparently suitable structure east of the original drilling site (Blatchford, G.S.W.A. File 27/30).

Drilling was undertaken on a new site to a depth of 1,543 feet and then suspended.

iv. Nerrima. Following geological mapping by Wade on behalf of the Freney Kimberley Oil Co., the Nerrima Bore was commenced in 1939. The bore had reached a depth of 4,271 feet when operations were suspended (because of the War situation) in February 1942. No oil or gas showings have been reported. The total expenditure under headings i. - iv. inclusive has been about £215,000.

v. General. In the two years up to the outbreak of war with Japan, Caltex Oil Development Pty. Ltd., had carried out geological work in the Fitzroy Valley, generally covering the area mentioned above, but their work had not reached a stage where the company's geologists would have had sufficiently comprehensive information upon which to base a drilling recommendation.

Caltex Oil Development Pty. Ltd. have spent £37,500 on their geological programme.

2. Other Areas. A considerable amount of geological work has been done in the Northwest Division where particular attention has been paid to rocks of Permian, Cretaceous and Tertiary age. Expenditure in this work has amounted to about £16,000. No oil drilling has been done in the Division.

A small amount of drilling for oil has been done in the Southwest Division.

B. EXPENDITURE.

The following figures cover the major expenditures on oil drilling exploration in Western Australia.

	£
1. Freney Kimberley Oil Company (including State and C'wealth subsidies).	215,000
2. Oil Search Limited	12,000
3. Caltex Oil Development Pty. Ltd.	37,500
4. All others say	10,500
	£275,000

Northern Territory.

Bitumen-glance occurs in some of the ancient rocks of the Northern Territory but they are so highly altered that there is little likelihood of commercial accumulations of oil being found. Some boring was done on Elcho Island (see Platel) in 1924-1926 but the expenditure incurred is not known.

PART II. STATUS OF INVESTIGATIONS.

Expenditure which can be accounted for in the search for oil in Australia is divided among the States and Territories as follows:

New Guinea	2,609,097
Queensland	1,151,766
New South Wales	289,000
Victoria	242,700
Tasmania	100,000
South Australia	200,000
Western Australia	275,000
	£4,807,563.

No doubt the actual expenditure exceeds this figure.

A. New Guinea. Oil and gas seepages are common in the island and considerable thicknesses of Tertiary sediments are developed there. There is no doubt that New Guinea offers the best prospects for discovery of oil in commercial quantities in the region covered by this report. A great deal of geological and some geophysical work has been done. Most of the drilling done to date has been inconclusive.

Following a most extensive geological programme a well is being drilled by the Australasian Petroleum Company at Kariava on

the Vailala River. This well had reached a depth of 5,400 feet when operations were suspended owing to its nearness to a danger area during present hostilities.

Similarly work has been suspended in the Oiapu area. A problem still to be solved at this locality is the relationship of the volcanic rocks to the sediments.

Approximately £2,600,000 has been expended in the search for oil in New Guinea.

B. Queensland. A large area extending chiefly north and west from Roma has been proved to be oil and gas-bearing. Most of the boring has been done in Mesozoic rocks and further drilling on a properly planned basis is warranted. It may be doubted whether an adequate closed structure has yet been located in this area. Compaction folds and stratigraphic traps are likely to be present.

The Arcadia prospect (in the Permian) is encouraging and should be followed up. The Commonwealth Government recently spent £4,000 in bringing this well into production again, and in carrying out tests to see whether petrol could be stripped from the gas. It was found that earlier statements regarding the amount of gasoline which could be stripped from the gas could not be substantiated and work was suspended. The Arcadia structure is a large one and would be a valuable source of gas if it were near a centre capable of industrial development.

Shell (Queensland) Development is still engaged in geological and geophysical work in southwestern Queensland. No drilling is in progress.

Approximately £1,150,000 has been spent on the search for oil in Queensland.

C. New South Wales. There seems little ground for believing that petroleum will be found in commercial quantities in New South Wales, but the prospects for the discovery of valuable gas fields near industrial centres are good.

The only present activity in this State is that at the Balmain Colliery where methane gas is being abstracted from the workings.

About £229,000 has been expended in drilling for oil and gas in this State.

D. Victoria. A shaft is being put down at Lakes Entrance under the joint direction of the Commonwealth and State Governments. The shaft had reached a depth of 676 feet on 3rd March, 1944. The depth to the objective horizon is approximately 1200 feet. The shaft is a circular concrete one, 10 feet inside diameter. It is proposed to develop the oil sand by horizontal drilling following the method developed by Mr. Leo Ranney.

A bore at Nelson has reached a depth of 5,708 feet and is still in Middle Miocene sediments. This is an unexpectedly great thickness and though the lithology of the section is monotonous the area must now receive further attention. Drilling of a proved structure would be warranted.

Excluding expenditure on the shaft at Lakes Entrance £242,700 has been spent on the search for oil in Victoria.

E. Tasmania. There is little prospect of finding oil, though small gas fields may be present.

F. South Australia. From the point of view of petroleum prospects

the Mount Gambier district should be considered along with Western Victoria (see reference to Nelson Bore). Elsewhere in the State gas fields may be found but the chances of finding petroleum are remote.

G. Western Australia. The presence of a considerable thickness of undeformed sediments and of oil residues, indicate that the most favourable areas should be properly tested. The most favourable areas are the Kimberleys and the Northwest basin. In the Kimberleys the basal Permian and the unconformable contact of the Permian and Devonian are the objective horizons. The markedly sandy lithology of the Permian is, however, an unfavourable feature. The Nerrima bore has been suspended at a depth of 4,271 feet and has not yet entered the prospective oil horizons.

In the Northwest basin, the Tertiary, Cretaceous and Permian are well developed and suitable structures for the accumulation of oil exist. There are considerable thicknesses of shale in the section which would serve as adequate seals for oil accumulation. Some deep tests in this area would be well warranted.

(H.G. Raggatt)
Director.

(Irene Crespin)
Commonwealth Palaeontologist.

Mineral Resources Survey,
CANBERRA.
15th March, 1944.

APPENDIX.

BRIEF SURVEY OF PRINCIPAL OIL PROSPECTING BORES IN QUEENSLAND, GROUPED IN AREAS.

By H. Temple Watts.

HOSPITAL HILL.

P = petroliferous. Figures represent flow in cubic feet per day.

Roma Town No.2 P.Gas (44,000) drowned out by upper artesian water. Drilled with percussion tools.

" " " 3 P.Gas (heavy flow, unmeasured), ditto

" " " 4 P.Gas (estimated 10,000,000) and some condensate, drowned out by upper artesian water. Drilled with percussion tools.

R.O.C. " 1 P.Gas (1,300,000), and condensate, with bottom saline water. Drilled with rotary tools.

" " 2 P.Gas (22,000), ditto

" " 3 P.Gas (160,000), ditto

L.O.F.A. " 4 Showing of gas and oil, no bottom water. Operators suspected Roma gas sand shut off behind casing through inaccurate correlation. Drilled rotary.

The Hospital Hill principal gas and oil shows commenced about 170 feet above the granite basement.

BLYTHDALE.

A.R.O. No.4 Little gas, low petroliferous content, little oil, with bottom saline water. Drilled with rotary tools.

" " 5 ditto

" " 8 ditto

" " 4 Little gas, non-petroliferous, little oil, with bottom saline water.

E.R.O. " 1 Little gas, low petroliferous content, little oil, with bottom saline water. Drilled with percussion tools.

A.R.O. " 14 Little gas, reported "rich", no reports of water. Bore drilled by rotary, with very heavy mud.

The Blythdale oil and gas shows were obtained at, or immediately above, the granite basement.

BLOCK 16 AND MOUNT BASSETT.

R.B.O. No.1 Some oil, little gas, slightly petroliferous, with bottom saline water. Drilled by rotary.

" " 2 Very little gas or oil, probably with bottom saline water contaminated by upper subartesian water. Drilled by rotary.

Block 16 (Cont.)

R.B.O. No. 3 Gas (60,000) slightly petroliferous. Small show of bottom saline water. Drilled by rotary.

" " 4 Little oil, very little gas, slightly petroliferous with bottom saline water. Drilled by rotary, with very heavy mud.

A.R.O. " 14 (See under Blythdale)

The gas and oil shows noted in these wells commenced about 100 feet above the granite basement.

WAROOBY.

Drillers. No. 1 P.Gas(600,000), some condensate, probably with bottom saline water contaminated with upper artesian water. Drilled by rotary.

The gas producing horizons in the Warooby Bore cannot be exactly determined; they may have commenced 140 feet above the granite, or only 34 feet above.

SOUTH OF ROMA - SOUTH BLOCKS.

R.O.S.B. No. 1 Testing data poorly recorded, but apparently neither oil nor gas was obtained. Water was obtained during the tests, but was not analysed. Drill by percussion tools to 3,735, and finished by rotary.

Slate basement was entered about 4,108 feet.

NORTH OF ROMA - MACKS GULLY, MINKA AND EUTHULLA.

A.R.O. No. 3 Slight showing of oil, without gas, at 3,210 feet, and slight showing methane gas at 3,160 feet. Bailing tests proved hole free of water, below casing shoe, but artesian water subsequently broke in. Granite basement entered at 3,128 feet. Drilled by rotary.

M.M. No. 1 Stopped drilling before reaching the Roma gas sands. Water flooding obscured evidence from lower section of hole. No reports on water analyses. Drilled by percussion tools.

I.M. & P. No. 1 ditto

The small gas and oil shows in A.R.O. No. 3 were apparently obtained in the granite basement.

MOOGA.

Stewart's Mooga No gas or oil showing in lower part of bore. Hole frequently tested by bailing after seating casing, but water flooding occurred intermittently. No reports on water analyses. Slate basement entered at 3,220 feet (Ball) or 3,540 (Jensen) Drilled by percussion tools.

Mooga (Cont.)

Roma Mooga	No.1	Showing of oil obtained at 3,579 feet. Water flooded the bore during all tests, but there are no records of analyses. Bore started with percussion tools and finished by rotary. Jensen states basement not reached, but a reference in the files shows basement at 3,586 feet.

ORALLO AND GUBBERAMUNDA.

L.O.F.A.	No.1	Full reports not found. Believed to have had slight showings of oil. Possibly entered basement rocks. Drilled by rotary.
"	No.2	Full reports not found. Believed not to have had appreciable showings of oil or gas. Possible entered basement rocks. Drilled by rotary.
"	No.3	Drilled adjacent to No. 1, to prove reported oil showings therein. Slight showings of gas and oil obtained at various depths, which were not considered to be worth testing. Basement entered at 2,659 feet drilled by rotary.
Roma Orallo	No.1	Small showings of gas at top of basement, during bailing tests, but hole flooded by water during drilling. No reports of water analyses. Drilled by percussion tools. Basement entered at 2,835 feet (Jensen)
A.R.O.	No.2	Slight gas showing at 2,734 feet. Hole flooded by sub-artesian water during drilling, and was bailed dry only while drilling in basement from 2,773 to 2,853 feet. Drilled by percussion tools.
Q.R.O.	No.1	Slight gas showing at 2,780 feet, but water flooding occurred during both drilling and testing. Drilled by percussion tools, and entered basement at 2,828 feet.

HUNTERTON, ALICKER, CORNWALL & GUNNERWIN.

A.R.O.	No.1	Slight gas showings from brown shale; but water flooding occurred while drilling. No record of testing. Drilled by percussion tools. Granite entered at 2,414 feet.
Roma Dome	No.1	No showings of gas or oil obtained, but water flooding occurred throughout. Drilled by percussion tools. Granite entered at 2,210 feet.
Roma Alicker	No.1	Boring suspended at 912 feet.
Roma Cornwall	No.1	No oil or gas shows were recorded. Bore was drilled from 300 feet by rotary, and bailing tests proved flooding by water. Basement slates were penetrated at 2,132 feet.
Kayenta	No.1	Slight gas showings in shale while drilling, but none during tests. Water flooding occurred while drilling, and fluid bailed only to 750 feet while testing. Drilled by percussion tools. Basement entered at 2,050 feet.

HUTTON CREEK.

Drillers No. 1 Gas (13,000) presumably non-petroliferous at 2,325 feet, and two very slight oil shows. Dry hole conditions while drilling from 1,814 to 3,715 feet with percussion tools. Minor gas shows while drilling with rotary below that depth. Tests below 3,715 feet made with formation packer and were negative. Bore passed out of the Permian into Devonian (?) strata at about 4,000 feet, the latter dipping steeply. (This view now revised, see p. 7, H.G.R. & I.C.) Bore bottomed at 4,688 feet, with rotary tools in use from 3,715 feet.

ARCADIA.

Drillers No. 1 Gas shows aggregating 3,000,000 odd cubic feet of gas daily, principally carbon dioxide. Dry hole conditions while drilling to 4,110 with percussion tools. Tests below 4,110 feet were made with formation packer andwere negative. Bore bottomed at 6,035 feet, with rotary tools in use from 4,110 feet, Lower Bowen volcanics were entered in the last few feet of drilling.

WALLUMBILLA.

A.R.O. No.19 Gas shows logged at 4,849 feet and below were tested by swabbing. Samples of petroliferous gas were obtained, but artesian water flooded out the shows. Drilled by rotary, the bore reached 4,968 feet, the lower formations presumably being Permian. Ball considered that the relatively high chlorine content of the water suggested that the flow included saline water from bottom, plus upper artesian water.

DALBY

A.R.O. No. 20 Drilled to 3,506 feet with rotary tools, the records do not show any references to oil or gas.

WELLINGTON POINT.

W.P.O.W. No. 1 Numerous shows of gas and oil were recorded while drilling dry hole to 2,735 feet with percussion tools. Below 2,735 the hole was flooded by water. The bore bottomed at 3,859 feet in schist. Samples of gas were mainly methane and hydrogen. Oil showings were possibly from tools.

LONGREACH.

L.O.W. No. 1 Numerous small shows of oil and gas, the gas being non-petroliferous. The oil was principally wax, and apparently migrated along porous strata from Town Bore 2 (Ball). Drilled by percussion tools, the bore bottomed at 3,351 feet; granite was entered about 3,256 feet. Bore was flooded with water to 3,204 feet.

MILES

Murilla No. 1 Numerous minor shows of gas and oil recorded. Analyses of the gas showed ethane and higher homologues ranging from 35.4% (Bone and Wheeler) down to 0.3% (low temperature fractionation).

Murilla continued.

Bore was still drilling on 8.8.42 at a reported depth of 4,771 feet under extremely unfavourable conditions. Water flooded the formations throughout. Bore is being drilled with percussion tools.