

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA



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21st August, 1925.

REPORT

FROM THE

JOINT COMMITTEE OF PUBLIC ACCOUNTS

UPON THE

EXPENDITURE ON OIL EXPLORATION, DEVELOPMENT,
REFINING, ETC., IN THE COMMONWEALTH AND PAPUA.

PART I.—COMPRISING—

INTRODUCTION.
COMMITTEE'S PROCEEDINGS.
OIL EXPLORATION WORK IN PAPUA.
OIL EXPLORATION WORK IN AUSTRALIA.

MEMBERS OF THE COMMONWEALTH PARLIAMENTARY JOINT COMMITTEE
OF PUBLIC ACCOUNTS.

(Fourth Committee.)

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JAMES EDWARD FENTON, Esquire, M.P., Vice-Chairman.

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JOHN EDWARD WYSE, Esquire, M.P.

* Appointed 5th July, 1922. † Retired 20th June, 1923. ‡ Resigned 23th June, 1923. § Discharged from attendance 29th August, 1924.
¶ Discharged from attendance 16th October, 1924. || Discharged from attendance 9th July, 1925. ** Appointed 20th August, 1924. †† Appointed
16th October, 1924. ‡‡ Appointed 5th July, 1925.

JOINT COMMITTEE OF PUBLIC ACCOUNTS.

REPORT ON THE EXPENDITURE ON OIL EXPLORATION,
DEVELOPMENT, REFINING, ETC., IN THE COMMONWEALTH
AND PAPUA.

PART I.
INTRODUCTION.

The Joint Committee of Public Accounts, having noted the heavy expenditure being incurred in regard to oil exploration work in the Commonwealth and Papua, and the amount of public money being spent on the development of the oil industry and in the refining of oil, instituted in September, 1924, an investigation of the expenditure of the Commonwealth on these various activities. Recognizing the importance of adequate and regular supplies of oil being available, if possible, within Australia for industrial and defence purposes, the Committee, concurrently with the investigation concerning Commonwealth expenditure, made inquiries as to the steps being taken to achieve the desirable object of rendering Australia less dependent on outside sources for its requirements of motor spirits, fuel and lubricating oils, and similar commodities.

To indicate the extent to which Australia uses petroleum products and the rapid rate of increase in their consumption, the following statistics of imports into the Commonwealth are quoted:—

Country of Origin	Kerosene and other refined Petroleum, Burning Oils		Petroleum Spirit, including Benzine, Benzolene, Gasoline, Fuel-oil, Petrol, and Naphtha, n.e.c.		Petroleum Crude		Mineral Lubricating Oils	
	Gallons.	Value.	Gallons.	Value.	Gallons.	Value.	Gallons.	Value.
United Kingdom		£		£		£		£
British Borneo	579,176	14,089	2,316	169			51,322	6,629
British Malaya			1,040	51	6,720	123		
Netherlands East Indies	7,260,820	182,548	42,128,801	2,163,952	32,283,765	382,334	68,771	4,981
United States of America	17,068,370	865,067	47,226,271	3,210,270		40	9,271,773	851,119
Persia					9,487,778	117,209		
Belgium							1,713	124
Russia							17,326	1,341
Other countries							963	308
Total, 1921-25	24,898,374	861,704	89,659,428	5,374,472	41,834,334	500,499	9,411,808	861,532
Total, 1919-20	16,625,778	761,534	21,801,031	2,401,311	10	2	3,972,513	325,289
Percentage Increase in last five years	50.3		260.2		418,343,340		206.3	

The production of oil within Australia from local material has been confined practically to (a) crude shale oil, totalling approximately 13,000,000 gallons, from which the following products were obtained by refining locally, viz., gas oil, kerosene, motor spirit, grease oil, paraffin wax, pitch, and axle oil; with the exception of less than 200,000 gallons, the whole of this oil was produced at Newnes, in New South Wales, during the years 1917 to 1922, (b) motor spirit, known as "Denzol," manufactured from coal by the Broken Hill Pty. Co. Ltd. at Newcastle amounting to approximately 1,500,000 gallons per annum; and (c) power alcohol for departmental purposes manufactured from Queensland molasses by the Commonwealth Government Acetate of Lime Factory at Brisbane and amounting in 1924 to 125,000 gallons representing half the capacity of the plant.

COMMITTEE'S PROCEEDINGS.

To acquaint itself with the various phases of the subject-matter of its investigation, the Committee made the following inspections:—

- The area at Popo, in Papua, where oil exploration work is being carried on by the Anglo-Persian Oil Co. Ltd. as agents for the Commonwealth Government;
- The refinery of the Commonwealth Oil Refineries Ltd. at Laverton, Victoria, the receiving dépôt at Spotswood, and the distributing dépôts at Berry's Bay and Geary's Wharf, Sydney, and at Bulimba, Brisbane;
- The Commonwealth Government Acetate of Lime Factory, Cannon Hill, Brisbane;
- The steel works and benzol plant of the Broken Hill Pty. Co. Ltd. at Newcastle;
- The shale mine and oil refinery of the Commonwealth Oil Corporation Ltd. (John Fell and Co. Ltd.) at Newnes, New South Wales.
- The works of the Australian Gas Light Company at Mortlake, New South Wales;
- The experimental plant of Power Alcohol Limited at Sydney for the production of power alcohol from prickly pear;
- The shale mine, crushing plant, cement, and oil works of the Tasmanian Cement Co. Ltd. at Latrobe and Railton, Tasmania;
- The works of the Southern Cross Motor Fuels Co. Ltd. at Latrobe, Tasmania;
- The model of the Bronder retort in Sydney; and
- The experimental retort at the Laboratory of the Mines Department of Victoria.

During the course of the inquiry the following witnesses were examined:—

- Ball, Lionel Clive, Deputy Chief Government Geologist, Department of Mines, Queensland.
- Baragwanath, William, Director of Geological Survey and Chief Mining Surveyor, Department of Mines, Victoria.
- Bird, Walter Loraine Wilberforce, Managing Director, Commonwealth Oil Refineries Ltd., and Australian representative of the Anglo-Persian Oil Co. Ltd.
- Board, Archibald Vyvyan, representing the International Sugar and Alcohol Company of London.
- David, Sir Tannett William Edgeworth, K.B.E., C.M.G., D.S.O., Professor of Geology, University of Sydney.
- Dolton, Frank Lewis Edward, prospector, Cape Vogel, via Samarai, Papua.
- Fell, John Wilson, Managing Director, Commonwealth Oil Corporation Ltd., and John Fell and Co. Ltd., 119 George-street, Sydney.
- Garran, Sir Robert Randolph, K.C.M.G., Solicitor-General and Secretary to the Attorney-General's Department, and Director of the Commonwealth Oil Refineries Ltd.
- Gibson, Sir Robert, K.B.E., Chairman of Directors, Commonwealth Oil Refineries Ltd.
- Gillespie, Andrew, Controller of the exploratory work being carried out by the Anglo-Persian Oil Co. Ltd. in Papua.
- Greenway, Thomas John, F.I.C., M.I.M.M., Australian representative of the Anglo-Persian Oil Co. Ltd. and Director of the Commonwealth Oil Refineries Ltd.
- Griffin, Daniel Martial Counsel, Consulting Mining and Carbonizing Engineer, Forrest-road, Trevallyn, Launceston, Tasmania.
- Hartwell, Robert Dunlop, member of the Sydney Stock Exchange and Acting Chairman of Directors of the New Guinea Oil Co. Ltd.
- Haynes, Reginald Joseph See, General Manager of the New Guinea Oil Co. Ltd., Hohoro, Vailala River, Papua.
- Herman, Hymán, D.Sc., Engineer in Charge of Briquetting and Research Work, State Electricity Commission of Victoria.
- Hills, Loftus, D.Sc., formerly Director of Geological Survey, Tasmania.
- Jensen, Harald Ingemann, D.Sc., Consulting Geologist, George-street, Brisbane, Queensland.
- Jones, Leo Joseph, A.S.T.C., Geological Surveyor, Department of Mines, New South Wales.
- Knibbs, Sir George Handley, K.B., C.M.G., Director of the Institute of Science and Industry.

- Langford, Walter Gilbert, M.Sc., M.M.B., F.G.S. (London), A.M.J.P.T., M.Aust.I.M.M., Commonwealth representative on the Papuan oil-fields, and Manager in Papua for the Anglo-Persian Oil Co. Ltd.
- Leighton, Arthur Edgar, F.I.C., Controller-General of Munitions Supply, and Chairman of the Munitions Supply Board, Department of Defence.
- Lewis, Essington, General Manager, Broken Hill Pty. Co. Ltd., Melbourne.
- Lightfoot, Gerald, M.A., Chief Officer, Institute of Science and Industry, Melbourne.
- Lyne, Henry Stephens, B.A., A.I.M.E., Consulting Petroleum Geologist, 400 Glen Eira-road, Caulfield, Victoria.
- Macandie, George Lionel, C.B.E., Secretary to the Naval Board, Department of Defence.
- Mazalan, Paul, Drilling Manager in Papua for the Anglo-Persian Oil Co. Ltd.
- McLaren, John Gilbert, C.M.G., Secretary to the Home and Territories Department.
- McPherson, Alexander Walter, Manager, Southern Cross Motor Fuels Co. Ltd., Latrobe, Tasmania.
- Meudell, George Dick, Accountant and Sharebroker, 7 St. James' Buildings, William-street, Melbourne.
- Morrison, Malcolm, Geological Surveyor, Department of Mines, New South Wales.
- Morry, Arthur, Architect and Oil Borer, Brereton-street, South Brisbane, Queensland.
- Murphy, James Francis, Accountant, Home and Territories Department, Melbourne.
- Oakley, Robert McKeeman, C.B.E., Comptroller-General of Customs, Department of Trade and Customs.
- Reid, Alexander McIntosh, Senior Government Geologist, Department of Mines, Tasmania.
- Richards, Frank, Chairman of Directors, Railton-Latrobe Oil Co., and Director of the Tasmanian Cement Co. Ltd., Latrobe, Tasmania.
- Rodda, George Angostine, Metallurgical Engineer, 39 Latimer-road, Rose Bay, Sydney.
- Sinclair, William Malcolm, M.B., B.S., Director of Power Alcohol Ltd., Macquarie-place, Sydney.
- Skeats, Ernest William, D.Sc., A.R.C.Sc., F.G.S., Professor of Geology and Mineralogy, University of Melbourne.
- Smith, the Honorable Miles Staniforth Cater, Commissioner for Lands, Director of Mines, Director of Agriculture, and Commissioner for Surveys, Papua.
- Stone, Edward Giles, Engineer and Managing Director of the Tasmanian Cement Co. Ltd., Latrobe, Tasmania.
- Thompson, William Henry Halford, Patrol Officer, Papuan Constabulary.
- Thomson, Hayburn, Clerk, Commerce Branch, Department of Trade and Customs, Melbourne.
- Thwaites, Robert Ernest, M.A., Research Chemist, State Electricity Commission of Victoria.
- Wade, Arthur, D.Sc. (Lond.), M.I.P.T., M.I.M.M., A.R.C.Sc., F.G.S., F.G.S. (America), Petroleum Technologist, Adviser to the Commonwealth Government, and formerly Commonwealth Director of Oil-fields in Papua.
- Wauchope, John Andrew, Engineer for the Mersey Valley Shale Oil Co., Latrobe, Tasmania.
- White, Harold Pogson, Chief Analyst and Assayer, Department of Mines, New South Wales.
- Wilkinson, William Percy, F.I.C., Commonwealth Analyst, Melbourne.
- Wilson, Andrew, Chief Engineer, The Australian Gas Light Company, Sydney.

During the inquiry there arose certain matters which appeared to the Committee to be of such an important and urgent character that they should receive immediate attention. On such occasions the Committee considered it desirable to convey its views to the Prime Minister, the Right Honorable S. M. Bruce, in order that the Government might avail itself of the earliest opportunity of taking action. The questions so dealt with are referred to under their respective headings in this Report.

The various subjects dealt with by the Committee during this inquiry may be divided into the following main headings:—

- (a) Oil Exploration Work in Papua,
- (b) Oil Exploration Work in Australia,
- (c) Shale Oil,
- (d) Liquid Fuels, Power Alcohol, &c.
- (e) Commonwealth Oil Refineries Ltd.,

which it is proposed to present to Parliament in the following Parts:—

Part I.—comprising—

Introduction,

Committee's Proceedings,

Oil Exploration Work in Papua,

Oil Exploration Work in Australia.

Part II.—comprising—

Shale Oil,

Liquid Fuels, Power Alcohol, &c.

Commonwealth Oil Refineries Limited.

OIL EXPLORATION WORK IN PAPUA.

(i) BY THE COMMONWEALTH GOVERNMENT.

The operations of the Commonwealth in its search for oil in Papua from their inception in 1912 to the end of June, 1917, formed the subject of a report by the Joint Committee of Public Accounts dated 17th January, 1918—Parliamentary Paper No. 33 of 1917-18. It is not considered necessary, therefore, in this Report to enter into much detail concerning the early stages of this work.

The history of operations on the Papuan oil-fields dates back to 1911, when some planters discovered indications of petroleum near the Vailala River, which runs into the Gulf of Papua, about 180 miles west of Port Moresby. The area throughout which, at scattered intervals, indications were found comprised a coastal belt some 10 miles wide stretching almost from Yule Island to the Purari Delta, and containing nearly 2,000 square miles. The indications were subsequently confirmed by geological examinations by the then Papuan Government Geologist (the late Mr. Eyan R. Stanley), as well as by the then Assistant Government Geologist for New South Wales (the late Mr. J. E. Carne), whose report was published by the Department of External Affairs in Bulletin of the Territory of Papua No. 1 of 1913, entitled, "Notes on the Occurrence of Coal, Petroleum, and Copper in Papua."

To ascertain the potential oil resources of Papua, it was intended at the outset to permit exploration and development by private enterprise, but subsequently the Commonwealth Government determined to conduct operations as a national undertaking. Drillers with exploratory boring plants were sent to Papua, and operations were commenced at Upoia, on the west bank of the Vailala River, about 25 miles from its mouth, and later on the opposite side of the river at Orévi.

In 1913 it was decided to obtain the services of a geologist specially trained in the search for petroleum to examine the geological features of the oil-bearing areas in Papua, and to report as to the method of development which should be adopted. The High Commissioner in London, after consultation with leading authorities in Great Britain, selected Dr. Arthur Wade, who arrived on the Upoia field in October, 1913. After carrying out a geological survey of the likely oil-bearing areas, Dr. Wade submitted his report to the Government in 1914—Parliamentary Paper No. 61 of 1914-17. He considered that the indications justified an energetic developmental policy, and recommended, *inter alia*, the continuance of operations on the Vailala River and the commencement of exploratory boring in other localities. With regard to the policy to be adopted for the development of the fields, Dr. Wade pointed out that, as the declared policy of the Commonwealth was to reserve the oil-fields for Government exploitation, their development would necessarily be slow for financial reasons, and that in the case of success no great output could be expected for a considerable time. As the oil indications extended over a wide area, however, the Government could throw open portion of the field to private enterprise. Such action, he considered, would mean rapid development simultaneously in several places, as the object of such companies would be to secure an early return for their capital. He added that if private enterprise were to be admitted it should be done in the early stages, otherwise should the results of the Government exploratory work fall short of expectations difficulty would be experienced in raising capital. The liquid character of oil and its known ability to migrate from beds in which it originates sometimes made it an elusive material to find in quantity. All experts regard oil exploration work as a gamble.

Shortly after the submission of his report Dr. Wade was appointed by the Commonwealth Government as Director of the Oil-fields in Papua. He took charge in May, 1915, and continued in active control until 1919, when arrangements were made for the operations in Papua to be placed under the management of the Anglo-Persian Oil Co. Ltd.

The pioneering work carried out during the early period was conducted under arduous and unhealthy conditions, which cannot be realized without actual experience. The climate was damp and malarial, and the country unexplored and practically unknown. Swampy valleys and deep ravines had to be crossed; tracks had to be cut through dense tropical jungle and clearings made; accommodation had to be provided and stores transported. To enable the surveyors to connect their inland mapping with definite objects on the coast-line, 150 miles of

the shore had to be traversed and mapped. Whilst the geological survey work was proceeding boring was continued. But the early plants were found to be quite unsuitable for the work, and even when, after much delay, more powerful machinery was obtained to probe greater depths, trouble was experienced both in regard to the plant itself and the running muds and gas pressures encountered during drilling operations. Particulars of the actual bores which were sunk whilst the Commonwealth had direct control of the work are as follows:—

Bore Number.	Dated.	Depth Reached.	Results and Remarks.
		feet.	
1	16.1.13	242	A little oil obtained at 224 feet
2	8.4.13	133	Gas only
3	2.4.13	460	Gas found at 87 feet and a little oil at 316 feet. Well abandoned at 460 feet, owing to soft running mud
4	18.2.14	302	Gas only. Boulders of sandstone and mudstone forced up by mud under pressure, and well had to be abandoned
5	6.7.14 (Redrilled in May, 1916)	395	A small quantity of oil was found at 240 feet, about 100 gallons weekly which diminished to 8 gallons, and then ceased to flow
6	28.9.16	500	A little oil at 297 feet
7	28.10.16	1,800	About 20 gallons of oil per day were obtained at 180 feet, but it had to be ceased off to permit deeper boring
8	4.2.19	540	A slight show of gas and oil between 216 and 244 feet. Work suspended, pending further geological examination
9		183	Bore finished at 183 feet, pending further geological examination

Bores Nos. 1, 2, 5, 6, 7, and 9 were situated at Upoia, on the west side of the Vailala River and Nos. 3, 4, and 8 at Orévi, on the east side.

The quantity of oil obtained from the Upoia area totalled about 2,000 gallons, and, although inappreciable as a commercial proposition, it was sufficient to give fair indications of quality. A sample has been described in a report received from the Director of the Imperial Institute, London, as a particularly valuable type of crude oil owing to the high proportion of light petroleum and kerosene it contained, and the purity of the fractions yielded on distillation, which bore a great resemblance to those obtained from crude Sumatra oil. The sample also contained about 2 per cent. of paraffin wax.

The expenditure on the field prior to transfer of control to the Anglo-Persian Oil Co. Ltd. was—

	£	s.	d.
1912-13	9,139	2	8
1913-14	17,908	12	9
1914-15	11,139	11	0
1915-16	11,827	3	4
1916-17	14,940	12	7
1917-18	20,714	15	8
1918-19	19,980	7	11
1919-20	19,800	8	5
1920-21 and 1921-22*	5,583	18	2

*Adjustment of expenditure incurred prior to May, 1920.

Total

131,034 12 6

made up as under—

Salaries and wages	46,381	17	5
Plant and machinery	30,425	10	1
Travelling and fares	3,905	1	8
Miscellaneous	2,790	11	5
Insurance and freight	3,258	17	10
Maintenance of scow	10,990	18	5
Medical	464	4	3
Stores and rations	19,825	17	5
Native labour	6,555	9	8
Survey, Port Romilly	3,009	19	11
Reward for discovery	500	0	0
Printing of reports	369	19	3
Housing	1,297	11	7
Hire and charter of vessels	1,258	13	7

131,034 12 6

During 1918 advances were made by certain oil corporations and others offering to exploit and develop the Papuan oil-fields, but, after consideration, the Cabinet decided to adhere to the policy of governmental development.

(i) BY THE ANGLO-PERSIAN OIL CO. LTD. AS AGENTS.

During the war the dependence of Australia on foreign sources for its supplies of oil was repeatedly emphasized, and the Naval Board, having regard to the danger of such supplies being cut off at any time, pressed for the expedition of the development of the Papuan oil-fields, and suggested that the co-operation of the British Admiralty be solicited. The Commonwealth Government recognized that, in view of the immense area involved and the natural and other difficulties to be faced, the consequent expenditure would necessarily be heavy if the work of prospecting and development were to be thoroughly and systematically proceeded with; and, as it had definitely decided to retain control of the likely oil-bearing areas, it determined to invite the co-operation of the British Government.

The then Prime Minister—the Right Honorable W. M. Hughes—when in London in 1918 opened the negotiations, and the Imperial Government agreed to contribute up to a limit of £50,000 on condition that the Commonwealth Government contributed an equal amount. Although the Imperial Government has never undertaken oil-field development on its own behalf, it holds a controlling interest in the Anglo-Persian Oil Co. Ltd., which had, at various times, acted as agent for the Government. It was therefore decided that the company should act as agents for the two co-operating Governments, and an agreement was entered into for that purpose. The steps leading up to this agreement and the terms of the agreement itself were presented to Parliament on 12th May, 1920—Parliamentary Paper No. 27 of 1920.

Briefly, the terms of this agreement, dated 7th July, 1919, were that the company, as agent, should—

- (i) send out a fully-equipped geological expedition to explore the Territory of Papua for petroleum;
- (ii) select suitable areas for the purpose of test drilling;
- (iii) superintend the boring operations, and generally bring the work to the development stage;
- (iv) subject to the approval of the Governments, plan and install pipe lines, storage tanks, reservoirs, &c., for the storing and transportation of petroleum.

It also provided—

- (a) that all contracts made by the agents in pursuance of the agreement were to be made by the agents on their own account, whose discretion in regard thereto was to be absolute in every respect;
- (b) that all appointments to the staff, and all dismissals therefrom, should be in the sole control of the agents, who were also to fix the remuneration of the staff;
- (c) that the Governments would defray the whole expenditure under the agreement, which was not to exceed £100,000 unless specially approved in writing.

This agreement was of short duration, for by the end of 1921 the amount of £100,000 provided for had been expended. The British Government then withdrew, as it did not propose to make further money available, whereupon the Commonwealth Government acquired the former's share in the assets for the sum of £25,000.

The control of operations was handed over to the company at the beginning of 1920. A party of experienced oil geologists, headed by the company's chief geologist, Mr. Lister James, arrived in Papua in March, 1920, followed in May by Mr. Andrew Gillespie, who was sent by the company to take over the management of the work in Papua, with instructions to see that a thorough geological examination was made of the likely oil-producing areas and to initiate boring operations. The party first proceeded to Upoia on the Vaillala River, where drilling operations had already been conducted by the Commonwealth Government. Attention was given to the local geology, and a study made of the work of previous geologists and the interpretation thereof. In the opinion of the members of the Anglo-Persian Oil Company's staff, the wells sunk had been located in ground too highly faulted to justify any hope of a commercial yield of oil. A subsequent detailed geological survey of the area confirmed this conclusion, and the company recommended that drilling operations at Upoia be not continued.

Owing to the severely faulted anticlinal structure at the area, known as Hohoro, near the mouth of the Vaillala River where a bore site had already been fixed, the company considered that this also was unsuitable for the location of a test well.

As no recommendations could be made to test by the drill the areas where operations had been conducted, an extensive geological examination of the Gulf Coast region extending from Yule Island to the Vaillala River was decided upon. After a great amount of geological work,

recommendations were made concerning a number of sites, the most promising of which was an area known as Popo, situated near the Kapuri River, about 7 miles from the coast in a direct line, but about 20 miles by the river. It consists of an almost isolated range of hills about 5 miles in length. In the opinion of the company's experts the anticline is an almost ideal structure for storing large quantities of petroleum. The gas blows and traces of oil in the area indicate that petroliferous conditions exist in the lowest group of beds, and it is known that farther to the north-west in the Vaillala region beds which may be roughly correlated with this group contain oil, though owing to the unfavorable structural conditions the oil is not present in paying quantities.

On completion of the surveys leading to the selection of Popo as an initial location to be drilled, geological examination was extended to the area between the Purari and Kikori Rivers, in order to determine whether good structure and indications of oil existed in this westerly extension of the petroliferous series of the Vaillala region. In extent this area measures approximately 1,200 square miles, and the survey occupied the geological staff six months. Good anticlinal structure was found on the Era River. No indications of oil or gas were found. No recommendation to test this area by the drill was made, as it was considered by the Company's geologists very probable that the petroliferous group existed at too great a depth.

The Company has also pointed out that certain areas in Papua still remain unsurveyed, viz., the Turama, Bamu and Fly Rivers in the west, and the Cape Vogel district in the east, and has recommended them as worthy of geological examination.

The actual site for the drilling operations at Popo was given to the boring staff in April, 1921. It is situated on the top of a ridge about 400 feet above the surrounding country.

Before actual drilling operations could, however, be commenced much preliminary work was necessary. In Papua conditions demand that technical operations shall be self-contained; expert drillers and machinery have to be imported, workshop facilities and accommodation and stores provided, and generally the arrangements have to be such as will admit of the operations being conducted independently of outside resources. At Popo clearings had to be made, roads constructed, houses erected, and a water supply provided. Concurrently with this preparatory work a drilling rig 90 feet high was erected, and the machinery was installed as it arrived.

Drilling operations commenced on No. 1 bore on 23rd March, 1922, and were carried on continuously day and night until the following October, when a depth of 1,781 feet was reached. Here the bore entered a stratum of very soft flowing mudstone with greatly increased gas pressure which forced the mudstones up into the bore about 300 feet. Many attempts were made to take the bore through the mudstone, but without success, as it was found that below 1,781 feet the casing pipe became bent to such an extent that further progress was impossible with the arrangements at hand. As conditions were found to be abnormal other methods were adopted, including the use of certain hydraulic circulating attachments, and a specially heavy string of 10-inch casing, but again without success. Work was suspended for six months until new 10-inch casing arrived. This was sunk to 1,723 feet by 30th June, 1923. By the end of the following month the 10-inch casing was down to 1,800 feet, and the 8-inch casing reached 1,825 feet. As the drilling superintendent was of opinion that the only means of proceeding further with the bore would be by the rotary method of drilling, work on this hole was discontinued.

As the prospects at Popo were considered very encouraging, and it was felt that, in any case, operations there should not be confined to a single test, it was decided to sink another bore. At the same time it was recognized that material alterations would have to be made in the system of drilling to meet the conditions encountered. A site for the second bore was selected in December, 1922, and boring was commenced twelve months later with an American cable system of drilling. A depth of 894 feet was reached in February, 1924, when work was suspended pending the arrival of new plant.

Meanwhile, in view of the information gained during drilling operations at Popo, it had become apparent to the company that the existing drilling plant would have to be converted to the Fauck system—inverted water flush. It is claimed that this system possesses all the advantages of the percussive and of the rotary systems, but none of their disadvantages. It has been used with great success by the Anglo-Persian Oil Company in Central Europe under conditions very similar to those existing at Popo, and has drilled wells under such conditions to a depth of over 5,000 feet. To operate this plant the company sent out a special staff of drillers headed by a drilling manager, who is an engineer and geologist of high academic distinction and wide practical experience.

When the new plant arrived it was found that the casing in No. 2 bore was so bent as to prevent further drilling. The casing was thereupon withdrawn, and the hole, not being vertical, was plugged. A new bore—No. 3—was started 20 feet away, with the Fauck system. A commencement was made on this bore on 25th November, 1924, strict precautions being taken to ensure the verticality of the hole and to give the new drilling system a thorough test.

When the Accounts Committee visited Popo in May, 1925, the bore was down 1,348 feet, and by the beginning of July a depth of 2,191 feet had been reached. At the depth of 2,375 feet heavy cavings took place and the boring tools were buried. Efforts, which it is anticipated will prove successful, are now being made to pass the obstruction and permit the bore to be carried to the desired depth.

According to the geological reports the petroliferous zone should extend from between 2,000 to 3,500 feet below the surface, and it is considered that the bore should at least be carried right through this zone.

The company regards this bore as the final test of the Popo area on which it will base its recommendation to the Government whether that territory should be abandoned. Its geologists consider that the prospects of striking oil in considerable quantity are very favorable at Popo, and that the area should on no account be abandoned until thoroughly tested. A find of oil in quantity at Popo would, they consider, warrant the drilling of other promising areas in the same neighbourhood, and the ultimate result from such operations may be expected to be of considerable importance. Whatever the result may be, expert opinion points out that failure to strike oil in one particular bore cannot be accepted as conclusive proof of the non-existence of oil in that area. In other countries bores have been abortive, yet other holes in close proximity have produced a flow of oil. Nevertheless the chances against striking oil in subsequent bores after the first has been a failure are multiplied tenfold.

Although there is no formal agreement between the Commonwealth Government and the Anglo-Persian Oil Company for the carrying on of the work, the general terms of the original agreement have been generally adhered to, subject to various arrangements contained in correspondence. The question of having a definite agreement has been under consideration from time to time, and in the Auditor-General's Report for the year ended 30th June, 1923, comment is made of the fact that no such agreement exists. In July, 1923, Cabinet approved of a temporary arrangement being entered into whereunder the boring operations in progress were to be continued on the Government's behalf subject to the following conditions:—

- (a) that the cost of operations (including wages of drilling party, cost of commissariat, service of native police, transport, and other incidental expenses) should not exceed, on the average, £2,000 per month; and
- (b) that this arrangement should be terminable on one month's notice in writing by either party (i.e., the Commonwealth Government or the company).

This arrangement still exists.

The present work in Papua is being carried on under the direction of Mr. W. G. Langford, who is the Manager in Papua for the Anglo-Persian Oil Co. Ltd., and Mr. P. Mazalan, the Drilling Manager—an expert in the Fauch method of boring. After graduating at the Melbourne University and obtaining the degrees of Master of Science and Master of Mining Engineering, Mr. Langford proceeded direct to Papua in 1916 to serve as a cadet under Dr. Wade. He carried out geological surveys and filled various positions on the oil exploratory staff, eventually becoming chief assistant to Dr. Wade. On the return of the latter to the south Mr. Langford was left in charge for the Commonwealth. When the company took control Dr. Wade returned to England, his appointment as Director of Oil-fields terminating on 31st December, 1920; but for the following twelve months he was paid a retaining fee to tender such advice as may have been required in London.

To provide for governmental representation on the field Mr. Langford was, from 1st July, 1920, appointed official representative of the Commonwealth Government, the detailed instructions as to his duties in this position being prefaced by the following paragraph:—

"It is the Minister's desire that you should return to Papua at the first available opportunity, where you will act as representative of the Commonwealth Government on the oil-fields. In this capacity you are to keep in touch with the representative of the Anglo-Persian Oil Company, to watch the progress of all work conducted by the company as Agent for the Commonwealth Government and for the Imperial Government, to give the company's representatives the benefit of your knowledge of native affairs, general conditions, and past work done on the oil fields, and to render assistance in any possible manner as occasion arises. In doing this you will avoid anything that may possibly lead to friction and will act with due tact and courtesy, aiming always at being as helpful as possible to the company's servants and avoiding an attitude of criticism.

It is clearly understood that you have no authority over any of the company's staff or servants, nor any authority to give any orders in connexion with the development of the field."

Briefly set out, the duties comprised the compilation and despatch of a monthly report of all work done; the preparation of plans, bore sections and diagrams for the special information of the Government, keeping in touch with all boring operations, and being present at tests of all important work, the examination of all reported oil occurrences which might come under notice; the collection of all moneys due to the Commonwealth and the adjustment of outstanding accounts; and the carrying out of such geological, palaeontological and physiographical work occurring in proximity to the station, provided it did not interfere with the main business covered by the instructions.

In May, 1921, the manager, Mr. Gillespie, was instructed to proceed to the Commonwealth Oil Refineries Ltd., but he retained general control of the Papuan operations from Melbourne. Mr. George, who had arrived in April, 1921, took over the work on the field from Mr. Gillespie, but resigned in the following September. Mr. Langford was thereupon appointed by the company, with the concurrence of the Minister, as manager of its operations in Papua. In his dual capacity Mr. Langford forwards reports each month, or more frequently when necessary, both to the company and to the Home and Territories Department, which has charge of oil exploration work, and furnishes such information as either party may at any time desire. A copy of all account-books and vouchers is supplied to the Department, and all expenditure is subject to audit by the Commonwealth Auditor-General.

In explanation of Mr. Langford's dual appointment it was indicated that the original agreement between the British and Commonwealth Governments and the company rested on the basis of confidence as expressly declared in the preamble to the agreement:

"Whereas likewise the Governments have full confidence in the ability of the agents to conduct such investigations and operations as may be necessary. Now therefore it is hereby agreed as follows:—"

Furthermore, it was contended that the work to be performed by a Commonwealth representative on the field did not warrant the heavy expenditure which would be essential to secure the services of an independent expert with the requisite qualifications to supervise operations. Mr. Langford himself stated in evidence that he did not find his position embarrassing; he had never received any conflicting instructions, and he was at liberty to supply any information desired by either party. He considered that as the objects of the Commonwealth and the company were identical, namely, to find oil, the interests of both were being continuously looked after by him. The actual work of attending to departmental correspondence and preparing his official report did not occupy him two days each month.

The staff at Popo consists of seventeen, viz., manager, drilling manager, three drillers, four assistant drillers, mechanic, accountant and storekeeper, wireless operator, native labour superintendent, captain and engineer of the motor scow *Vailala*, nurse, and cook, and in addition about 255 natives are employed.

The works accessory to the actual drilling operations comprise: Eight houses for staff quarters, furnished with essentials only, a hospital, an office and a store; eight houses for natives and a native hospital. Water is pumped from the Kapuri River through a 2 inch pipe line 3 miles long to tanks on the hill, whence it is gravitated to the houses for bathing and laundry use and to the bore for drilling purposes. Rain water is caught in tanks at all the houses for drinking purposes. Transport with Port Moresby, distant 20 miles by river and 100 miles by sea is maintained by the motor scow *Vailala*, which was built for the Commonwealth Government in 1915, and was specially designed for crossing the shallow bars which exist at the mouths of all rivers running into the Gulf of Papua. A smaller launch, the *Kapuri* is kept for use on the river and in emergencies. At the river landing a 5-ton swinging derrick crane has been provided for unloading. Materials are moved to the field 3 miles away by road; in the dry season when most of the heavy transport is done—a 3-ton motor lorry is utilized, but in the wet season the goods are carried by natives. At the field the road from the landing passes under a 5-ton travelling crane which can place loads direct from the motor lorry on to an inclined tramway of 3-foot gauge about 800 feet long and rising 300 feet, which conveys them to the crest of the ridge near No. 1 bore. A road about 400 yards long connects with No. 3 bore. This road is on the flank of a steep hill, and on account of its grade materials have to be hauled or carried along it by natives. An up-to-date machine shop has been established at the foot of the tramway, and is equipped with machines, acetylene welding outfit, &c., sufficient to carry out practically all the repair work on the field. Sheds have been erected at convenient places for the storage of machinery and tools, and three large sheds at the landing contain the machinery and casing brought from the *Vailala* field. The supply of firewood for the boilers has always been an acute problem. The nearest supplies are now almost a mile from the bore, and all requirements are cut and carried in by native up tracks too steep for motor transport. Telephones are installed at all principal points on the field and at the river landing, and a one kv. radio set is in communication at least twice daily with the Port Moresby station of the Amalgamated Wireless Company.

The expenditure which has been brought to account since the Anglo-Persian Oil Co. Ltd. took control of the operations has been:—

	£-
1920-21	15,000
1921-22	115,655
1922-23	29,913
1923-24	27,489
1924-25	14,199
	<u>202,256</u>

To this must be added £25,000, representing the net amount contributed by the British Government, i.e., its original £50,000, less the amount paid by the Commonwealth for its assets—making a total of £227,256 to the 30th June, 1925.

This amount includes £4,285 expenditure incurred in a geological survey of the Aitape and Madang districts of the Mandated Territory—ex-German New Guinea. This work was undertaken by the Anglo-Persian Oil Company's geologists between March and September, 1921, concurrently with the work in Papua. From the examinations made, the company reported that the oil prospects in the coastal areas were unfavorable; but that further inland geological conditions were more favorable although no definite indications of the presence of oil had been discovered. The company recommended that the Middle Sepik Basin should be geologically examined as the results of the geological work carried out tended to confirm the belief that favorable structure and strata may reasonably be expected in that area. Prior to 7th January, 1924, the right of searching for mineral oil in the Mandated Territory of New Guinea was reserved to the Crown; but by the *Mining Ordinance (No. 2) 1923*, which came into operation on that date, all companies incorporated or registered in the Territory, two-thirds of whose shares are held by British subjects, are now eligible to engage in prospecting for oil. Under this Ordinance 25 licences, covering areas totalling 23,760 square miles, are at present in existence, but no practical results have yet been reported.

In consequence of certain allegations and insinuations which have been made from time to time in the Commonwealth Parliament and before the Public Accounts Committee concerning the search for oil in Papua and the work of the Anglo-Persian Oil Co. Ltd. in particular, the Committee endeavoured to obtain reliable first-hand information which would confirm or otherwise the rumours which were so rife. Certain witnesses heard in Melbourne and Sydney merely repeated the rumours, and, although they professed to believe them, could give no definite information as to their source.

To give interested persons in Papua an opportunity to place before the Committee any information which might be available on the subject of oil exploration work, the Committee, prior to leaving Australia for the Territory, communicated with his Excellency the Lieutenant-Governor of Papua, who caused a public notice to be inserted in the *Government Gazette* and in three consecutive weekly editions of *The Papuan Courier*—the only paper published in the Territory—announcing the Committee's visit and inviting the attendance of any one who had information to tender. Of the witnesses who appeared before the Committee in Papua none, however, attended in response to these notifications.

Representatives of the company were emphatic that every possible step had been and was being taken to thoroughly test the oil bearing areas of Papua and to obtain oil in commercial quantities.

(III) BY PRIVATE COMPANIES.

In July, 1923, the Commonwealth Government decided to permit private individuals or companies to prospect for oil in Papua, except within an area of approximately 1,160 square miles, including the Popo district, which was reserved for the operations of the Commonwealth Government. To control private prospecting the Papuan Government passed the Mineral Oil and Coal Ordinance, which came into operation on 1st January, 1924. The Ordinance provides that any company incorporated under the law of the Territory or of the United Kingdom, or any other part of the King's Dominions, which desires to prospect for mineral oil may apply to the Lieutenant-Governor for a licence in respect of an area of land not exceeding 1,600 square miles. Each licence is granted for a period of five years, and confers on the licensee the exclusive right to search for mineral oil in the land specified therein, including the sinking of shafts and bores and the erection of machinery. In the event of payable mineral oil being discovered by a licensee on the land included in a licence, the licence confers on the holder a preferential right to a lease

in respect to an area of 160 acres, and also a reward lease of a further 640 acres, to be selected from the area covered by the licence. The holder of a licence is required to commence his search for oil within 90 days after the grant of a licence, or such further time as is allowed by the Lieutenant-Governor, and must employ at least four white men continuously for at least six months in each year in actual prospecting or searching for oil. Any discovery of oil, or of indications of the presence of oil, must be immediately reported to the Lieutenant-Governor, who may direct the future working of the land covered by the licence. The Lieutenant-Governor may also grant mineral oil leases, not exceeding 21 years as to term. The maximum area of a lease is 160 acres, except that reward leases may cover an area up to 640 acres. The Governor-General of Australia has the right of pre-emption of all oil or products thereof produced by a lessee from any land held under a mineral oil lease. The price to be paid for the oil or product, if not agreed upon by the parties, is to be fixed by arbitration. Every lease contains a covenant by the lessee to pay a royalty of 25 per cent. per annum on the gross value of all crude oil obtained from the land, except that in the case of the leases issued to the first licensee to discover oil, the royalty will be £2 10s. per cent. per annum on the gross value of crude oil obtained during the first five years of the lease. Other covenants provide for the refining in the Territory or Australia (by the Commonwealth Oil Refineries Limited, if directed by the Lieutenant-Governor) of all crude oil produced, and for restrictions on shipment of crude oil outside the Territory.

Under this Ordinance fourteen licences, covering areas totalling 12,652 square miles, are in existence. Prospecting work and geological investigation are proceeding on some of these areas; one concern, whose concession includes the lands along the Vailala River formerly operated by the Commonwealth, has been fully manned since May, 1924, buildings have been erected, a road made, and plant installed; whilst two others have recently imported boring machinery. Up to the present, however, no results have been reported.

OIL EXPLORATION WORK IN AUSTRALIA.

By notification in the *Commonwealth Gazette*, dated 2nd January, 1920, the Commonwealth Government offered a reward of £10,000 for the discovery within Australia of petroleum oil on condition that oil to the extent of 50,000 gallons was obtained with the bore flowing freely, and producing oil in commercial quantities. In the following September the amount of the reward was raised to £50,000. In an endeavour to earn this reward several parties have conducted boring operations in various parts of Australia, and have furnished the necessary monthly reports to the Department, but up to the present there has been no satisfactory result.

In addition, the Government of New South Wales has offered a reward of £10,000 for the discovery and production of 100,000 gallons of natural mineral oil within that State. The Government is also prepared to help prospectors with the advice of its technical officers, and to subsidize operations carried out at an approved site.

The Government of South Australia also offers a bonus of £5,000 to the person or company which first obtains from a bore or well situated in the State of South Australia 100,000 gallons of crude petroleum, containing not less than 90 per cent. of products obtainable by distillation.

To ascertain what steps had been and are being taken to discover likely oil-bearing areas in Australia, the Committee heard evidence from many expert witnesses, including the Adviser to the Commonwealth Government (Dr. Wade, petroleum technologist), various State Government geologists, and professors of geology. There were also submitted to the Committee numerous reports of the State Mines Departments, bulletins of the Geological Surveys, and other official publications containing details of the work already carried out in Australia in the search for oil and the results which have been achieved. Briefly summarized, it may be stated that, although small traces of oil and quantities of inflammable gas have been found in various localities throughout Australia, no definite indications of the presence of oil in payable quantities have been discovered. Evidence showed that much of the boring in Australia had been conducted without proper preliminary geological examination, and that many supposed oil discoveries reported from time to time had been found upon impartial investigation to have been based upon evidence which had been misinterpreted. It was stressed that only the bore can ultimately determine whether oil exists below the surface in any particular locality, but inasmuch as boring is an expensive process, it is essential that investigation of supposed oil bearing regions should first of all be entrusted to an experienced and qualified geologist who, after mapping the area in detail, should fix the sites for trial boring.

In order to obtain independent and expert opinion concerning the prospects of finding petroleum in commercial quantities within Australia, the Commonwealth Government, in March, 1923, arranged for Dr. Wade to revisit Australia to make detailed geological examinations of various areas. Dr. Wade arrived in Melbourne in March, 1924, and has since been engaged on this work. The first areas visited by him comprised the Northern Territory and the Kimberley

District of Western Australia. His report, published as Parliamentary Paper No. 142 of 1923-24, indicates that there is, in his opinion, no possibility of commercial quantities of oil being discovered in the areas examined by him, except perhaps in certain districts along the Fitzroy River, where he considers the sinking of test wells should be undertaken.

It might here be mentioned that the Mineral Oil Ordinance of the Northern Territory contains provisions similar to those in force in Papua (see page 12 *ante*). Under this Ordinance many prospecting licences have been issued in the Northern Territory, but owing to forfeitures due to non-payment of rent, only five licences, covering a total of 4,900 square miles, now exist. On only one area, viz., Elcho Island, is prospecting work being conducted.

Dr. Wade's next report (presented to Parliament on 13th August, 1925), dealt with Queensland, which State, from geological examination and results previously achieved by boring, was regarded as the most promising region for oil discovery. The areas visited by Dr. Wade comprised :-

1. Beaudesert and Boonal.
2. Laguna Beach, near Tewantin.
3. Wolston, between Brisbane and Ipswich.
4. Ruthven, in the neighbourhood of Longreach.
5. The country north of the railway line between Miles and Roma, around Juandah, Orallo, and Injune.

In each of these areas drilling for oil had already been undertaken. In Dr. Wade's opinion the conditions existing in the three first-mentioned areas were not in favour of oil being present in commercial quantities. Concerning that section of Queensland north of the railway line between Miles and Roma, and including the area between Longreach and Isisford, in which the Ruthven bore is situated, after summing up the evidence in favour of and against the existence of payable quantities of oil, Dr. Wade concluded that there was hope of oil being present at moderate depths where structural features were favorable, and that the evidence was sufficient to encourage further prospecting work. He suggested that an attempt should be made to geologically map this area in as great detail as possible, special attention being given to localities where any indication of suitable structural conditions appeared; and he added that even if natural gas only be obtained, provided that it occurred in such quantities as had been proved in one of the bores at Roma, the exploitation of such gas should prove profitable, and would be likely to lead to the development of secondary industries in this part of Queensland.

Dr. Wade pointed out that the work necessary before the search for oil in Queensland could be put on a proper basis, could not be undertaken by small companies with limited means; it would require to be undertaken either by the Government or by a large corporation having ample reserves specially ear-marked for prospecting and developmental work.

According to the evidence heard by the Committee, and official publications of the Geological Survey of New South Wales, the prospects of obtaining commercial supplies of flow oil in that State are by no means bright. In the report of his investigations in New South Wales (presented to Parliament on 19th August, 1925) Dr. Wade states that a certain amount of prospecting, together with some boring, has been done in the State, but no positive evidence of the existence of oil in commercial quantities has yet been brought to light. As a result of his examinations, however, he considered that there was hope of supplies of natural gas being obtained in certain areas, and recommended that tests be conducted.

In Victoria, areas in the south-east (Lake Bunga) and the south-west (Glenelg River) have recently come under notice as likely oil-bearing districts, but the State Geological authorities do not regard them as very hopeful.

Much exploratory boring has been done in South Australia, and claims that oil had been discovered, or was on the point of being discovered, have been made on many occasions by the interested parties, but nothing tangible has resulted, nor have these claims been substantiated in such cases as have been examined or by samples submitted to the State Mines Department from time to time for analysis.

Although much attention has been given during recent years to the possibility of the occurrence of mineral oil in Western Australia, with the exception of the areas in the Kimberley district already referred to, there appears to be little, if any, hope of success. Boring by private companies is in progress in the Kimberley district, and though there may be a reasonable chance of finding mineral oil, a definite result cannot be expected for some time.

Prior to his recent departure from Australia, Dr. Wade investigated the oil possibilities of the Lake McDonnell area in South Australia and areas in the south-western portion of Western Australia, and at Cheyne Beach, near Albany, but his reports are not yet available.

In Tasmania no indications favorable to the presence of commercial quantities of flow oil have been discovered.

FEDERAL GEOLOGICAL SURVEY.

The need for early action for Australia to obtain reliable information concerning its mineral oil resources so impressed the Committee that, on 5th January, 1925, a communication in the following terms was addressed to the Prime Minister :-

"Although the Report of the Joint Committee of Public Accounts in connexion with its present investigation of the expenditure on Oil Exploration, Development, Refining, &c., in the Commonwealth and Papua, cannot be made available until Parliament is in session, there are certain features which have been brought out in the evidence already heard by the Committee which, in its opinion, demand urgent attention by the Commonwealth Government. These features relate particularly to the possibility of Australia being made more self contained in the matter of oil supplies which are essential for her defence and for the maintenance of her industries. I have therefore been directed by my Committee to address this communication to you at this stage of the Committee's proceedings in the hope that early action might be taken to give effect to its recommendations.

With regard to mineral oil, the evidence which has, up to the present, been heard from reliable and expert witnesses emphasizes the urgent necessity for a well-ordered scheme for the more scientific prospecting for mineral oil, the Committee therefore recommends that the Commonwealth Government should immediately summon a conference comprising the State Geologists, Professors of Geology of the various universities, representatives of the Commonwealth Institute of Science and Industry, &c. to formulate a scheme to provide for—

- (a) the carrying out of a geological survey of Australia with a view to locating probable supplies of mineral oil;
- (b) the most scientific and systematic method of prospecting for mineral oil in areas where such geological survey has shown favorable indications to exist;
- (c) the best method of providing financial assistance towards the discovery and development of mineral oil-fields—whether by means of a reward, the granting of a bounty, or by the payment of a subsidy; and
- (d) the proper co-ordination of effort between the Commonwealth and the States."

Under date 6th March, 1925, the Committee received the following reply from the Prime Minister:—

"The Cabinet has been giving careful consideration to your letter of 5th January, dealing with your Committee's investigations into the expenditure on oil exploration, development, refining, &c., in the Commonwealth and Papua, and certain factors which in the Committee's opinion demand urgent attention by the Commonwealth Government.

I desire to inform you that the suggestion that the Government should immediately convene a conference to formulate a scheme for systematic survey, prospecting, &c. has been specially considered in conjunction with a report recently made by Dr. Wade, and the Cabinet has decided to forthwith summon such a conference, comprising Government Geologists and their Chief Assistant Geologists for the following purposes—

- (1) To review the present position of the geological survey of the several States of the Commonwealth.
- (2) To arrange for the proper co-ordination of the State Geological Surveys.
- (3) To standardize the methods of geological survey.
- (4) To adopt a common scheme for the scales, colouring, and mode of presenting the information on geological maps.
- (5) To facilitate in every way the interchange of the geological knowledge of the Commonwealth and elsewhere.
- (6) To consider the possibility of a scheme of systematic study of important problems.
- (7) To minimize the disadvantages of the merely artificial boundaries between the areas of geological survey.
- (8) To consider any other matters deemed to be of importance in developing a comprehensive geological knowledge of Australia.
- (9) To consider the question of holding periodical conferences.

The Government desires to thank the Committee for its suggestions and to express its appreciation of the interest which it is taking in this most important question, and shares its views as to the necessity of Australia being, if possible, self-supporting in the matter of oil supplies."

This conference met at the Institute of Science and Industry, Melbourne, from 2nd to 4th June, 1925, and was attended by representatives of the Commonwealth, each State, and the Australasian Institute of Mining and Metallurgy, the following being present:—

Chairman.—Sir George Knibbs, K.B., C.M.G., &c. (Director, Institute of Science and Industry).

Commonwealth—

Professor Sir T. W. Edgeworth David, K.B.E., C.M.G., B.A., D.Sc., F.R.S.
 Dr. Arthur Wade, D.Sc., A.R.C.Sc., &c.
 Dr. H. Herman, D.Sc., B.C.E., M.M.E. } Australasian Institute of Mining and
 Mr. Colin Fraser, M.Sc. } Metallurgy.
 Mr. A. S. Kenyon.

New South Wales—

Mr. E. C. Andrews, B.A., Government Geologist.
 Mr. W. S. Dun, Palaeontologist.

Victoria—

Mr. W. Baragwanath, Director, Geological Survey.
 Mr. D. J. Mahony, M.Sc., Geological Survey.
 Professor E. W. Skeats, D.Sc., A.R.C.Sc., University.

Queensland—

Mr. B. Dunstan, Chief Government Geologist.
 Mr. L. C. Ball, B.E., Deputy Chief Government Geologist.
 Professor H. C. Richards, D.Sc., University.

South Australia—

Mr. I. Keith Ward, B.A., B.E., Government Geologist.
 Mr. R. Jack, B.E., Deputy Government Geologist.
 Professor Sir Douglas Mawson, K.B., D.Sc., B.E., University.

Western Australia—

Mr. A. Gibb Maitland, Government Geologist.

Tasmania—

Mr. A. McIntosh Reid, Government Geologist.
 Mr. P. B. Nye, M.Sc., B.M.E., Government Geologist.

Secretary.—Mr. G. A. Cook, M.Sc., B.M.E. (Institute of Science and Industry).

The report of this conference outlined the efforts which had been made since 1910 to have a Federal Geological Survey established, and concluded with a definite proposal for the initiation of a Federal organization.

The resolutions passed by the conference, which are of particular interest in connexion with the present inquiry, affirmed—

- (a) The desirability of holding an annual conference of Commonwealth and State geologists, the heads of University Geological Departments, and other representative geologists to consider and discuss urgent problems of common interest, and to co-ordinate their work, &c.
- (b) The necessity for uniform action by the Commonwealth and States in controlling the development of minerals by the introduction of legislation insisting on the publication in every prospectus, whether for public or for private circulation, of a report by a qualified mining engineer or geologist not financially interested in the venture, and that such mining engineer and geologists should be registered.
- (c) That, with regard to oil—
 - (i) the most effective method by which the Commonwealth could assist in the discovery and production of mineral oil in the areas administered by the Commonwealth (Papua, the Northern Territory, and the Mandated Territories) is by carrying out systematic and detailed geological surveys in these areas.

(ii) similar detailed surveys should be made in the States, and the Commonwealth Government should assist in this work if desired by the States, and the State Geological Surveys should be asked to indicate the areas which seem, in the existing state of knowledge, to require such detailed examination.

(iii) the offer of a reward of £50,000 for the discovery of oil in commercial quantities is not such as to achieve the purpose it has in view, and the money would be better spent in assisting in the detailed systematic surveys mentioned in the previous resolutions.

(d) The desirability of establishing a Federal Geological Survey to deal with the geological history and structure of the Territories under the administration of the Commonwealth, and, with the concurrence of the States concerned, of Australia, and also to deal with the mineral and underground water resources of the Territories under the administration of the Commonwealth Government.

The scheme suggested by the conference for the initiation of a Federal Geological Survey provided for a Field Staff of six parties and the following branches:—Palaeontology, Petrology, Chemical, Lithographic and Draughting, Museum, which, together with the necessary Administrative Staff, Clerical Assistance, Travelling Expenses, Printing, &c., would, it is estimated, with the organization fully staffed, cost £43,100 per annum.

COMMITTEE'S OBSERVATIONS AND RECOMMENDATIONS.

The demand for petroleum products for commercial and defence requirements is continually increasing, and the problem of locating supplies within the Commonwealth or its Territories becomes more insistent.

The occurrence of petroleum is governed by laws under which it is formed and concentrated beneath the earth's surface, where the requisite geological structure exists for its retention. During recent years the science of oil geology has made great strides; nevertheless no one can foretell with certainty that oil will be discovered in a particular place; still less can it be said what quantities will be found. Only the bore can ultimately determine the question.

The consensus of geological opinion concerning the prospects of flow oil being discovered in commercial quantities in Australia is, unfortunately, not very favorable. Much detailed geological survey work, however, yet remains to be done, and until this is completed it cannot be definitely laid down that the Commonwealth possesses no oil-bearing areas. Nevertheless, based upon present knowledge, there are two regions in which indications are more or less encouraging, viz., the Roma district in Queensland, and the Kimberley district in Western Australia, wherein further detailed geological mapping should be undertaken and trial boring conducted where favorable structures are located. There is also hope that supplies of natural gas may be found in certain areas in New South Wales.

Owing to the non-success which has attended oil-boring ventures, capital to enable the work to be continued is difficult to obtain. The offering of rewards by the Government for discovery is not, in the opinion of the Committee, the best means by which to achieve the desired object. The location of payable oil will in itself be sufficient reward to the fortunate discoverers. Better results will, it is considered, be gained by devoting the money to the assistance of systematic geological surveying and exploratory boring in likely oil-bearing areas.

Generally speaking, however, the prospects of oil being discovered in commercial quantities in Papua are hopeful. Oil and gas seepages are numerous, and several bores have yielded small quantities of oil. But the difficulties of prospecting in a tropical country, and of boring in soft muddy strata subject to intense gas pressures, have caused the experimental stages of development to be long and costly, and up to the present no commercial supplies have been tapped.

The early work along the Vailala River was carried on without adequate superintendence; there was lack of co-ordination between the drilling parties, and apparently profitless expenditure owing to insufficient scientific knowledge. With the appointment, in 1915, of Dr. Wade as Commonwealth Director of Oil-fields, the position improved, but there does not appear to have been any proper appreciation by those responsible at the Seat of Government of the importance of the work, and little interest was taken by them in the Papuan oil exploration work, due perhaps to war matters occupying attention.

For the nine years during which the Commonwealth itself controlled the work in Papua, the expenditure totalled £131,034. Much detailed geological and geographical knowledge was acquired, and a small quantity of oil—approximately 2,000 gallons—from a number of shallow bores was obtained.

With the advent of the Anglo-Persian Oil Company Limited in 1920 as agents for the Imperial and Commonwealth Governments, more extensive detailed geological survey work was undertaken, but up to the present the actual production of oil has been nil. At Popo, where operations are now being conducted, three bores have been sunk. Numbers 1 and 2 reached depths of 1,825 feet and 894 feet respectively, when they had to be abandoned before any results were achieved. Number 3 bore now being worked is regarded by the company as the final test before recommending either the continuation or the abandonment of the work in this area. The bore has reached 2,375 feet, but it is considered that boring should not cease until the hole reaches a stratum below which there is no possibility of the occurrence of oil. According to the geological examinations of this locality, the petroliferous zone should extend from 2,000 feet to 3,500 feet below the surface.

The present work is being conducted for the Government by the company under an arrangement terminable by one month's notice on either side, and when the bore reaches the depth indicated there will arise the question of future operations. Should oil be struck, tanks, pipe-lines, and other provision for storage and for the transport of the crude oil to the refinery must be undertaken, and as such work demands extensive technical experience, the Committee is of opinion that the provision of these services for and on behalf of the Commonwealth Government should be in the hands of a company, such as the Anglo-Persian Oil Company, which already has the trained personnel available. The refining of oil which may be produced in Papua has been anticipated in the *Oil Agreement Act 1913*, which provides that the Commonwealth shall supply to the refinery company, i.e., the Commonwealth Oil Refineries Limited, indigenous oil for refining, up to 200,000 tons per annum, as it becomes available to the Commonwealth—indigenous oil meaning crude mineral oil obtained in the Commonwealth or in any Territory or under the authority of the Commonwealth or in any place over which the Commonwealth has a mandate.

Should, unfortunately, oil not be struck in the present bore, the question will have to be decided whether the search for oil in Papua shall be continued. Three hundred and sixty thousand pounds have been spent by the Commonwealth Government during the past fourteen years, and, beyond certain detailed and extensive geological surveys, there has been little practical result. Compared, however, with the amounts expended on oil exploration work in other countries, this sum cannot be regarded as excessive. On many fields in various parts of the world over half a million pounds have been spent before production took place, whilst in the Argentine £1,000,000 were spent before oil was discovered, and most of the £8,000,000 spent some years ago in an endeavour to develop an oil-field in Russia was completely lost, as the field proved to be of no commercial value.

Expert geological opinion concerning oil prospects in Papua is so favorable that further prospecting is justifiable and necessary, and the Committee recommends that such work be continued. Should success be achieved, the Commonwealth would then possess a virgin oil-field free from the influence of any of the big oil groups. The work of searching for oil, however, demands not only considerable financial resources, but also keen and experienced technical and geological knowledge. For these reasons it is considered that such work can be more properly undertaken by a private company on behalf of the Commonwealth than as a purely governmental function, and in the Anglo-Persian Oil Company Limited, with a wealth of such knowledge at its disposal, is a company which to a major degree is an Imperial concern.

Although at first glance the dual appointment of Mr. W. G. Langford as Commonwealth representative on the field and local manager for the Anglo-Persian Oil Company appears illogical, it must be remembered that the company occupies the position of the agent of the Commonwealth entrusted to carry out certain work. This officer had had many years' experience on the field, with a good record, and possessed the necessary qualifications, there appears to the Committee, therefore, to be no justification for incurring the expense of having another representative on the field, who, if he were to be in a position to satisfactorily supervise the work, would have to possess at least equal qualifications. The actual work he performed for the Commonwealth did not, according to Mr. Langford himself, occupy him two days each month.

The Committee is of opinion that upon the withdrawal of the Imperial Government from the agreement, dated 7th July, 1919, between the British Government, the Commonwealth Government, and the Anglo-Persian Oil Co. Ltd., the Commonwealth Government should have entered into a properly drawn-up agreement with the Company, instead of permitting the work to proceed merely by arrangement.

In conclusion, the Committee is of opinion that, as a result of its close investigation of the work of the Anglo-Persian Oil Company Limited and its officers in Papua, and a visit to the scene of operations at Popo, there is no justification for the insinuations oft repeated that the company

is not doing its best on behalf of the Commonwealth Government to find oil in the Territory. The services of the company's experts have been placed at the disposal of the Commonwealth Government for the performance of this work, and only actual expenditure incurred by the company in connexion with operations in Papua is allowed it.

The Committee is unanimously of opinion that early steps should be taken to create a Federal Geological Survey, designed to co-operate with and correlate the geological work of the States. At present geological nomenclature differs in some cases, and formations traced to the boundaries of States have been found to be named and coloured differently in the adjoining States. Moreover, in the Territories within its own jurisdiction, viz., the Northern Territory, the Federal Capital Territory, Papua, and the Mandated Territories, the Commonwealth has large areas where useful and valuable geological work can well be carried out and the nucleus of a field staff created without fear of overlapping State activities.

In recommending the Government to convene a conference of geologists to discuss this important subject, the Committee had not in mind the creation at the outset of such an elaborate organization as that outlined by the Interstate Conference of Geologists held in Melbourne last June. The Committee is of opinion that for a considerably lower annual cost there can be created an efficient Federal Geological Survey which can achieve the desired objects.

J. G. BAYLEY,

Chairman.



Office of the Joint Committee of Public Accounts,
Federal Parliament House, Melbourne,
12th August, 1925.

RECOMMENDATIONS OF MINORITY.

We are of opinion that, in the event of oil in payable quantities being discovered, it should be the duty of the Commonwealth Government to at once undertake the storage, transport, refining and marketing of the product.

Expert geological opinion concerning oil prospects in Papua is so favorable that further prospecting is necessary, and we agree that such work should be continued. Should success be achieved the Commonwealth would then possess a virgin oil-field, and, in order to be absolutely free from the influence of oil combines the Commonwealth Government should, under expert advice and assistance, vigorously prosecute the development of oil-bearing areas.

The present position of dual control, wherein one officer now represents both parties to the arrangement, is unsatisfactory. As it was deemed necessary to have independent supervision during the existence of the agreement between the British and Commonwealth Governments and the Anglo-Persian Oil Company Limited, we consider it essential that such independent supervision should be continued under the existing arrangement between the Commonwealth Government and the Anglo-Persian Oil Company Limited.

We are of opinion that no evidence has been adduced to confirm the contention that the Anglo-Persian Oil Company Limited is not making every effort on behalf of the Commonwealth Government to find oil in the Territory of Papua.

In connexion with the conference held to discuss the question of a Federal Geological Survey, we consider that the recommendations of the Conference should be adopted and put into operation.

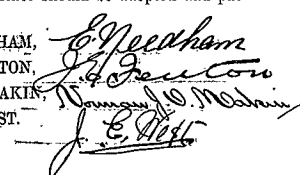
E. NEEDHAM,

J. E. FENTON,

N. J. O. MAKIN,

J. E. WEST.

Melbourne, 14th August, 1925.



ADDENDUM.

Since this Report of the Public Accounts Committee was written, the Commonwealth Government has announced its intention to withdraw the offer of a reward of £50,000 for the discovery of petroleum within Australia, referred to on page 13 herein, and to grant assistance by means of a subsidy in prospecting for oil and in carrying out detailed geological survey work in likely oil-bearing areas. This course has been recommended by the Committee—vide page 17.

To carry out its intention the Commonwealth Government has authorized the expenditure of a sum of £50,000, to be utilized as follows:—

In the States of New South Wales and Western Australia—to subsidize boring either by the State Governments or by private companies on a basis of £1 by the Commonwealth for each £1 expended by the State or company in actual expenditure on boring, provided that the bores are put down in certain specified areas recommended by Dr. Wade, or at such sites approved by a representative of the Commonwealth—the total expenditure to which the Commonwealth Government is to be committed in respect of each State not to exceed £22,500.

In the State of Queensland—the Commonwealth Government is prepared to join with the State Government on a basis of £1 contributed by the Commonwealth Government for each £1 contributed by the State, up to a total expenditure by the Commonwealth of £5,000, to enable a thorough detailed geological survey to be made of the areas recommended by Dr. Wade.

J. G. BAYLEY,

Chairman.

Melbourne, 14th August, 1925.

