HELPING ALONG THE WAR

From coast to coast and in all branches and departments, employees of Imperial Oil Limited have rallied to the support of the War Savings Plan and are pledging their savings to help provide the funds needed for vigorous prosecution of the War for Freedom. At Sarnia refinery, a giant progress board indicates the score for the various groups of employees and stimulates a lively patriotic competition among the workers.

The Company has made it easy for employees to subscribe by co-ordinating the War Savings Plan with the Employees' Thrift Plan.
THE SEARCH FOR OIL IN CANADA

IN CANADA oil is found in commercial quantities in the Provinces of New Brunswick, Ontario and Alberta and in the Northwest Territories. During 1939 total production reached an all time peak amounting to 7,407,563 barrels. Canada now ranks 15th among the oil producing nations of the world and second among the producers in the British Empire. Although the total amounts to only about half of one per cent of all the oil produced in the world, it is almost double the quantity of the crude oil produced by Germany.

Production, however, still falls far short of consumption which in recent years has approached 2,000,000 barrels annually. Recoverable oil remaining in the known fields probably does not greatly exceed 100,000,000 barrels. It is therefore apparent that were it possible to produce Canadian fields at a rate sufficient to meet consumption and deliver economically to the points of consumption, these fields would be exhausted in less than three years. It is, of course, impossible to produce Canadian fields at such a rate and this indication merely creates a convenient yardstick to measure the relationship between reserves and consumption and to compare this relationship in Canada with that prevailing in countries where oil is produced in sufficient quantity to equal the demand. The United States, for example, with an annual production of approximately 1,200,000,000 barrels, has reserves of 200,000,000,000 barrels or about 15 years' supply at the current producing rate. The State of Texas has a reserve of 25 times the amount of its present annual output and even there it is considered advisable to encourage exploratory activity. Canada, therefore, with reserves amounting to less than 3 times the annual consumption, should lend every encouragement to exploratory effort.

Over 80% of the production of this country comes from the Turner Valley field in the Province of Alberta. Oil was first discovered in this field in 1914 and created one of the wildest booms in oil history. Early production was small and with the outbreak of the war the boom collapsed and Turner

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Valley faded from the public mind. Ten years after Royalite No. 4 well was drilled to a deeper zone known as the Madison limestone, Calgary drillers had worked up a new structure. The Valley was soon established as a large "wet gas" or "naptiha" field. Over ten years again elapsed before the real crude oil was discovered on June 30, 1930, in the Turner Valley Royalties No. 1 well. Since then that oil over 100 productive crude oil wells have been completed.

In addition to the Turner Valley field some oil is produced in Alberta in the Red Coow, Wainwright and other miscellaneous districts in the Province.

Because of the production already found there, there is reason for hoping for more promising fields than in any other province and in recent years this province has been the scene of and still continues to enjoy the greater amount of exploratory activity undertaken throughout the Dominion. Last year in the Foothills Area, drilling was active on fourteen wells and the total footage drilled amounted to over 40,000 feet. The Steenvilis Area was the scene of the greatest activity and several wells in that region obtained good flows of gas. In the Leduc County Area three wells obtained some crude oil. Geological and geophysical surveys are being continued in several regions in the province and a number of test wells are being drilled.

In importance to Alberta in volume of oil produced comes Ontario with production in 1939 amounting to 393,978 barrels. Oil was discovered in this province in 1856—near the town of Hornby—on January 30, 1869—and it is estimated that over 333,000,000 barrels of oil has been produced since that time. Production reached its peak in 1900 when over 900,000 barrels were produced, but since that time new discoveries have failed to offset the decline in the older fields.

In 1929 production reached its peak in 1900 when over 900,000 barrels were produced, but since that time new discoveries have failed to offset the decline in the older fields.

In the province of Nova Scotia oil production was started in 1886 by the Maggie Village Field. Since that time no further prospective wells have been found, and continued exploratory efforts in this province may yet result in the discovery of additional oil wells. Oil is also produced in commercial quantities in the Northwest Territories from wells near Fort Norman on the Mackenzie River and this field supplies the mining operations in the Great Bear, Great Slave and Yellowknife Areas. There is a large oil field in the Mackenzie Valley near Fort Norman, and several deep test wells have been completed, but without success. There is still, however, considerable to learn regarding conditions in this area.

In Nova Scotia a number of attempts have been made to secure production in the Lake Aulac region on Cape Breton Island where indications of petroleum exist on both north and west sides of the lake. The structures which were tested were not favourable for the preservation of such oil as may have existed and the results were disappointing. Complicated geological conditions in this region make further attempts a hazardous undertaking. A number of productive wells have been drilled in Pictou County with the objective of determining if the productive formation in New Brunswick extends into this region, proved its absence. A test of a favourable structure in Cumberland County with a similar objective was carried to a depth of 4,134 feet without encountering the New Brunswick productive problems in Nova Scotia are on the whole complicated and much remains to be done before a thorough understanding of conditions in this respect will be had.

Some years ago a number of deep wells were drilled on Primrose Island near Charlottetown reaching a depth of over 6,000 feet. The objective here again was to reach the horizons which are productive in New Brunswick and the failure to get through the overlying rocks at this depth has discouraged further attempts.

Over the past quarter of a century, Imperial Oil Limited and its subsidiaries have carried on a systematic and progressive exploratory campaign in the search for oil in Canada. Geological surveys and investigations have been undertaken in every province and district in Canada except Prince Edward Island and the Yukon. These studies and investigations have been followed up by the testing of areas in the Northwest Territories, Alberta, Saskatchewan, Ontario, Quebec and Nova Scotia. In all over 500 wildcat wells averaging over 5,000 feet in depth have been drilled. The total cost of approximately $5,000,000. Geological studies and investigations in Canada have cost the company over $800,000. These efforts are being continued and the outlook for the war has been intensified. During the current year about three times the average of the past annual expenditures on exploratory surveys will be spent on work of this nature.

Although fully half of Canada is occupied by a great block of ancient crystalline rocks, so greatly complicated by folding and faulting that the subsurface rocks are still largely unexplored, there is reason to believe that oil may be found in them, possibilities of future production exist not only in the present producing regions but in parts of most of the unproductive provinces and in the Northwest Territories. The continued efforts of the Federal and Provincial Mining Disclosure Boards to collect and analyze the mass of information obtainable from drilling wells, their detailed mapping throughout the Dominion and their annual reports to solve the geological problems in areas on which the basis of our present knowledge do not seem attractive in the search for oil of inestimable value and assistance to the oil man and geologist.

The search for oil in Canada is being continued by individuals, governments and large and small companies; new facts are sought and new methods employed in an effort to increase the production of this Dominion.
Map of Ecuador showing area set aside for exploration. Below—Market day in a typical town in Ecuador.

The oil exploration parties now at work in Ecuador make extensive use of the Gravity Meter to assist in determining the structure of underground formations. The photographs show, left, how the Gravity Meter is transported from one location to the next, and right, the operator taking a reading from the instrument.

With International Petroleum in Ecuador

Exploration of a Large Area of Ecuador is Being Undertaken by International Petroleum Company Limited as Part of a Long-Term Development Program.

If you will turn to the Annual Report of the International Petroleum Company Limited for the year 1939, you will find about half way down on the page addressed 'To the Shareholders', the following: 'In Ecuador, the Government of that Republic during 1939 granted to your Company the exclusive right to explore a tract of about 10,000,000 acres with the option of selecting therefrom and holding an area of 1,000,000 for exclusive exploration. Geological and geophysical parties are now engaged in exploration work on this concession.'

Thus is introduced another chapter in the Company's expansion in the Southern Hemisphere—first Peru, then Colombia, next Venezuela and now Ecuador—all part of a long-term program for preserving and enlarging the Company's oil reserves in South America.

As the result of negotiations between the Government of Ecuador and the International Petroleum Company Limited, the Company acquired in June of 1939 a concession for exploration and, should exploration warrant, development of a large tract.

Under the terms of the agreement with the Government of Ecuador, the Company has four years in which to study a concession of 4,000,000 hectares, or approximately 10,000,000 acres. The concession is located in the coastal province of Ecuador in the department of Guayas, between the foothills of the Andes and the Pacific Ocean. Out of this area the Company is to have the right to select 400,000 hectares for subsequent development should the preliminary investigation justify setting up operations in that country.

For some time now geological parties have been at work and it is hoped to complete the surveying of the entire 4,000,000 hectares well in advance of the end of the four year period provided in the agreement. Core drilling is about to be started and the Company has recently purchased a heavy drilling outfit which will be put to work shortly on the drilling of test wells of considerable depth.

A large part of the area has never before been mapped, and the mapping of the main topographic and drainage features is an undertaking of no small magnitude. The work is made extremely difficult because of a general lack of roads, to-
gather with a wet season which extends over approximately five months, during which all survey work must be confined to the navigable sections of the rivers. Some reconnaissance mapping may later be carried out by airplane, the observers and geologists in the plane sketching in by hand the significant topographic and geological features observed.

Present survey activities consist of a group of some ten engineers, six geological parties and four geophysical parties, the latter comprising three gravimeter and one magnetometer crews. Light trucks are used for transporting materials over the roads during dry weather, while launches and outboard motors are used on the rivers. Over narrow trails burros are used for pack purposes. The mapping and survey parties are away from five to six months at a time, returning at the end of the dry season to headquarters where they spend the rainy months working up maps, completing reports, etc., preparing for their return to the field the following year.

While in the field the parties keep in constant touch with each other and with headquarters by means of short wave radio. Every morning at 7 o'clock, at noon and then again in the evening communication is held between the field and Guayaquil. By means of the radio, supplies are ordered, transportation is arranged, progress in the field is reported and personal messages are exchanged with the outside world.

In the summer of 1937 an exploration concession of 500,000 acres of nonmineral lands was secured on the west coast, but this area proved unpromising, and the present much larger concession was acquired about a year ago.

Executive offices of the company are in Quito, although the headquarters is in Guayaquil, located at the mouth of the Guayas River. Quito is the capital of Ecuador and is located well inland in the Valley of Quito, which is encircled by the towering Andes. No less than 20 volcanoes can be counted from the city which is situated some ten miles south of the Ecuador, 9,550 feet above sea level.

Outstanding among the many towering peaks of Ecuador is Pichinchu, the "bulling mountain," whose eruptive activities have rendered it an object of dread since time immemorial. Cotopaxi, whose beautiful cone rises more than 19,000 feet above sea level, is the most destructive and has periodically devastated the countryside. Highest peak in Chimborazo, 20,776 feet high.

The Ecuadorians are a hospitable people and the Government has been most co-operative in assisting the Company in its search for oil in their country. The only oil fields so far discovered in Ecuador are on the Santa Elena Peninsula, the semi-desert area west of Guayaquil. These fields are largely controlled by English companies but the output is small. In the early twenties, Internation Petroleum Company, Limited, drilled several wells on or near the Santa Elena Peninsula and also drilled two wells near the area of the concession acquired in 1937, but did not succeed in developing any production.

Although Ecuador is a well-watered land with no fewer than ninety rivers, most of its waterways are so short and swift that they are of little commercial value. Running through the middle of the country is the Guayas River, the only stream in Ecuador of importance to flow into the Pacific Ocean. It is navigable less than 200 miles inland. It has such a low gradient that tidal effects are felt from 50 to 75 miles inland and practically all navigation in both directions moves with the tide. Rivers draining eastward through the montana, as the forested region of the upper Amazon foothills belt is termed, are navigable by small steamer and canoe and flow into the Amazon, providing communication with the Atlantic sea coast.

Ecuador derives its name from its position at the equator, and although among the smaller South American countries it is, by reason of its natural features, one of the most interesting on the continent. The country is rich in vegetation and produces cotton, corn, sugar, rice and tobacco. Among the more common economic plants are the ivory-nut palm, which furnishes vegetable ivory for the manufacture of buttons, the coca tree, from which the coca bean is gathered, the fiber plant used for making Panama hats, the balsa tree or corkwood, furnishing the lightest timber in the world, and the chinchona tree which yields quinine.

The area of the country is variously approximated at between 116,000 and 178,000 square miles. The population is estimated at between 1,150,000 and 2,000,000, composed of Ecuadorians, whose native language is Spanish, and a number of Indian tribes, speaking various languages of their own.

In the Andean foothills, avalanches frequently occur during the rainy season, blocking the few roads that there are, and since there are no other ways around, travelers must wait while tons of dirt and debris are cleared away. In recent years, many miles of new roads have been constructed in Ecuador and old roads are being conditioned for motor traffic. Deep gorges make road-building difficult in the mountain region, while months of rain in the lowlands frequently wash away by flood the work of the previous season. The Quito-Guayaquil Railway, 200 miles in length, is a monument to railroad building genius, the tracks above Huirque climbing upward in a daring zigzag cut out of the mountain side. Guayaquil, the lowest point of the railway, is a modern city about forty miles up the Guayas River from the coast and is Ecuador's chief port.

In addition to the hardship of working in a virtually unexplored area, plus five to six months of rainy weather and few roads, the exploration parties must contend with a whole host of insect pests, and must be continually on guard against tropical diseases. To the uninitiated this would present a serious problem, but as a result of the Company's experiences in Colombia and Peru, the situation is well in hand.

If this venture in Ecuador is successful it will greatly add to the economic independence of the Republic by reason of the revenue which would accrue to the Government in the form of royalty on the oil, and the employment provided both skilled and unskilled Ecuadorian workmen and the education and living facilities provided their families. As a result of progress now being made, it is expected shortly to start heavy drilling in the most promising areas.

A small railroad connects the Santa Elena Peninsula with Guayaquil, main port on the Ecuadorian coast. The photo shows a second-class train taking on water near the town of Zopazot.
SEARCHING FOR OIL

The Chemist Comes to the Aid of the Driller by Analysing Samples of Soil for Clues to Buried Deposits of Oil.

In the early days men went about the country looking for oil—for places where oil seeped up through the ground or spread out on the water in the form of oily film—for common sense told them that where there were signs of oil it was reasonable to suppose there might be oil nearby and so early oil wells usually were drilled where surface indications looked the most promising.

But it was not long before accessible likely-looking places of this kind had been drilled, and so with no further visible signs of oil to act as a guide, oil men for awhile were at a loss to know where to turn next. It was at this point that science came to the rescue, and it is the intervening three-quarters of a century the locating of oil by scientific means has been brought to a high degree of perfection. And while finding oil still is and probably always will be hazardous, much of the guesswork of drilling has been eliminated by the advanced technique of geology and geophysics. The result has been the elimination of much hazardous drilling and a saving in the number of dry holes drilled, especially in those areas previously untouched by any prior drilling.

Lest aid to the driller in his search for hidden oil is soil analysis. In this radical departure from previously employed exploration, the earth's crust is "sniffed"—scientifically, of course—for traces of gas from oil-bearing sands underground. Little holes are dug at regular intervals throughout the area where oil is suspected, and chemists in the laboratory go to work analyzing the soil for evidence of oil vapors usually associated with the presence of oil. When used on areas where geologists believe oil may be found, geochemistry, as the new science is termed, quickly determines the presence or absence of gas which is believed to have coworked its way earthward from oil deposits deep beneath the surface.

For years chemists have known that high concentrations of hydrocarbons and minerals occur over the top and edges of oil and gas fields as a result of leakage from the fields, and while geochemistry to date has been used largely as a means of qualifying geological and geophysical findings, expansions of geochemistry look for the day when new oil and gas deposits may be discovered by the soil analysis method alone.

The theory of this new science is quite simple: slowly, very slowly, the high pressure gas from a buried oil pool migrates upwards through rock pores and rock fractures to the surface where it is whiffed away by the wind, leaving behind in the earth's crust all of its wax and mineral make-

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Photograph by Robert Yonali Richia, Courtesy Geophysical Service Inc.

IMPERIAL OIL REVIEW

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PAVED WAYS FOR THE TOURISTS...

Good roads, built with the aid of the millions paid in taxes by Canadian motorists, have been an important factor in Canada's economic growth.

FULLY aware that "good roads bring business—bad roads drive it away", tourist-conscious provinces have made vast extensions and improvements to our highway systems in recent years. Under the relentless force of giant diesel tractors and huge road-building machines, new roads have been pushed further afield to bring new prosperity to areas they serve and make more accessible Canada's great national parks and other outstanding scenic attractions.

Provincial governments have long been conscious of the need for better roads and have, as a result, speeded up their efforts to improve our highway systems. Provincial governments have realized also that in this day of motorized travel, Canada must have good roads if it is to take its place in world business. New roads open up vast areas for industrial and mining expansion and result in new prosperity for hundreds of communities previously cut-off from the rest of Dominion.

Built with the aid of the millions paid in gasoline taxes by Canadian motorists, these same roads have been a major factor in the remarkable development of Canada's tourist trade in recent years, for without roads this influx of tourists and tourist money would never have reached its present gigantic proportions. As many as 16,500,000 United States citizens are said to have crossed the border by automobile in a single year, spending while here an estimated $200,000,000. Adverse propaganda in the U.S. has kept some American tourists at home this summer, but with the Federal and provincial governments and private business engaged in an extensive drive to stimulate travel by Americans in Canada, the flow of American cars into this country is being resumed. As the effects of propaganda are broken by concerted Canadian publicity the tourist trade should return to the pre-war level.

The series of photographs on the following two pages graphically describe some of the work that has been done by the road builder in Canada.
ROADS OF TODAY FOR THE TRAFFIC OF TOMORROW...

The modern highway engineer, aided by powerful machines and new road-building techniques, pushes safe, smooth new highways to completion swiftly and economically. Typical of highway construction in many parts of Canada are these photographs showing work on the new Montreal-Mont Laurier highway.

1. Guided by surveyors' stakes, crews of workers with axe and saw cut a clearing where the new road is to go. Next will come the dynamite crew to blast stubborn rocks, deep-rooted stumps.

2. Known as "bull-dozers," giant diesel ploughs push their own way through lawless banks of earth as they go about the job of grading and levelling the roadbed.

3. Powerful tractors pulling automatic unloading carts which carry 12 cubic yards of material at a time, bring in fill for the low spots—occasionally sink into the soft mud, have to be dug out.

4. Cleared of trees and rocks, and graded, this quagmire of mud is ready to be turned into a smooth highway by latest road-building methods. The soil will be paved with asphalt.

5. A mighty power shovels sate away mountains of gravel which trucks haul to the asphalt mixing plant, there to be combined with the asphalt and other materials.

6. Towering above the countryside, the road-building equipment represents a big investment in machinery. At right is the mixing apparatus which blends materials for the road base. Left is the asphalt mixing plant where crushed rock, gravel and asphalt for the surface are combined.

7. Conveyor belts carry the material from one operation to the other. This is the asphalt mixing plant conveyor.

8. Blended in the mixing plant, the base materials are spread out ready for compounding into a dense roadbed.

9. Powerful as a locomotive, this grader levels base materials dumped on the roadway by the trucks. Next come watering wagons and steam-rollers.

10. Watered and rolled, the finished base provides a strong foundation for the asphalt surface.

11. A close-up of the asphalt plant shows Imperial Oil tank cars which carry the asphalt to the plant where it is mixed with crushed rock.

12. With this modern asphalt paver a mile of asphalt can be laid each day at enormous savings of the taxpayers' money. Thus the new highway moves steadily forward, ready for traffic as soon as it is finished.
Taming THE JUNGLE

An Industrial Centre in the Interior of Colombia Built on Oil.

Petroleum Company Ltd., whose notable success in Peru logically attracted their attention.

Large scale development work was undertaken on the De Marais concession about 1926. The company had first to face a number of physical difficulties that might have seemed insurmountable a few years earlier. The only avenue of transportation reaching Barranquibemoya was the Magdalena, but the shifting course of the river, the numerous sand bars and snags and the swift current made it difficult to carry the heavy drilling equipment to the field. It was necessary to construct specially designed low boats and barges as well as a railroad from Barranquibemoya to El Centro.

The greatest precautions were necessary to avoid malaria, the fever that defeated the first efforts to construct the Panama Canal. Moreover, there was no centre of population close by and labor had to be recruited from up and down the valley for many miles, suitable housing had to be arranged and supplies secured to feed at least 5,000 workmen and 500 staff members at the peak of construction.

Medical and sanitary work, housing, supplies, road and railroad building, the design and building of a river fleet of course incidental to the main work of drilling up the field, laying gathering lines, constructing tanks, machine shops and a power station. Well over $50,000,000 were invested before a single barrel of oil reached seaboard.

Finally there emerged in the jungle after much patient effort and heavy expenditure a community complete with schools, hospitals, clubs, comfortable residences for married and single staff, modernized quarters and messes for workmen, a golf course and recreation grounds for all. The camp was served by a modern water treating and sedimentation plant, ice and refrigerator plant and a large commissary supplying the wants of workmen and employees virtually at cost. Due to the distance from manufacturing centres very complete machine and blacksmith’s shops were necessary. Over 500 kilometers of roads had to be built. Each well required a specially built road involving excavation and grading which is usually completed several months in advance of moving-in with drilling equipment.

Over these roads travel the 500 tracks and automobiles of the Tropical Oil Company’s fleet. These vehicles operate only on the concession for while there is now a road to Barranquibemoya, the usual method of travel from El Centro to the river port is over the 500 kilometers of narrow gauge railroad built for the company.

In its present stage of development the field consists of two anticlinal structures comprising an aggregate of approximately 13,000 producing acres.

The early wells were drilled with cable tools and this system of drilling was used with more or less indifferent success during the first few years of development. The rock formations, which consist mostly of conglomerated sands and shales, do not favor the cable tool method. About 1925 rotary rigs were introduced in the field and rapidly proved their superiority over cable tools. For the past twelve years rotary rigs have been used exclusively.

To date approximately 1,100 wells have been drilled.

With the exception of two central pumping powers the wells are equipped with individual pumping units. The extremely broken terrain and the heavy undergrowth are not conducive to central power pumping. Due to the wide range in well depth and load conditions, pumping equipment of various capacities is operated in the field. A distinctive feature is the extensive application of electric.

Continued on Page 36
ROCKY MOUNTAIN HIGHWAY

New Banff-Jasper Scenic Route Links Famous National Parks.

A NEW wonderland of stately mountains, huge ice fields, giant timber, and turbulent rivers, has recently been opened up for the motorist between Banff and Jasper National Parks in the Canadian Rockies. These scenic playgrounds, long separated by mountains impenetrable except by saddle-horse and pack train, are now linked by an all-weather highway of 186 miles. Previous motor route between the two parks involved a 611-mile round-about drive.

The Banff-Jasper road begins at the town of Banff, headquarters of Canada’s oldest national park, at an elevation of 4,800 feet and makes a gentle ascent up the beautiful Bow Valley to world-famous Lake Louise. There motorists may swing almost due north to enter on the Banff-Jasper Highway proper, or turn to the left and enter the new Big Bend Highway connecting Lake Louise and Mount Rundle and the Kootenay Park—last link in the Western portion of the Trans-Canada Highway providing a shorter and quicker route between the prairies and the British Columbia coast.

From Lake Louise, the Banff-Jasper road continues up Bow Valley, past inspiring Wapetik and Hector Lake to Bow Lake, source of the Bow River where snow-capped peaks rear up on three sides with Bow Glacier flowing down on the western end. From Bow Lake the new mountain highway sweeps through a broad alpine meadow to the summit of Bow Pass, then descends into the Mistaya River valley by easy grades. It passes glistening Mistaya and Wapetik Lakes, and then comes in view of Mount Chephren, a giant pyramid of rock 10,715 feet high.

Proceeding north the motorist goes on to the Valley of the North Saskatchewan River where waters cross the prairies to eventually mingle with the salt water of Hudson Bay. Ascending the North Saskatchewan is a climb known for years at the “Big Hill,” an abrupt rise of 1,000 feet. Previously a pack trail overcame this by a series of sharp zigzags up the mountain side, but modern engineers have accomplished it by a traverse around the shoulder of Mount Athabasca and a number of long, flat switchbacks to the higher level.

Continuing, the motorist passes Mount Wilson, climbs to the top of Sunwapta Pass, the Atlantic-Wrccer watershed, drops into the Sunwapta Valley and then follows a pleasant, winding course to Jasper, headquarters of the largest national park in North America.

For views of the new Banff-Jasper Highway, see the following two pages.
186 miles of breath-taking beauty awaits the motorist on the recently completed mountain highway connecting Banff and Jasper National Parks in the heart of the Canadian Rockies.

1—Along the highway from Jasper to the Columbia Icefield. 2—Driving north near Crowfoot Glacier. 3—Mt. Temple, a few miles north of Lake Louise. 4—Mt. Silverhorn and beautiful Waterfowl Lake. 5—Bow Peak and Crowfoot Glacier looking south from Bow Pass. 6—Mt. Athabasca. 7—Columbia Icefield section of Jasper National Park. 8—Another view of Mt. Athabasca, from the highway above Sunwapta Canyon. 9—Mt. Thompson from summit of Bow Pass. 10—Kanimna Peaks. 11—Driving south toward Mt. Chephren.
"This Fascinating Oil Business"

U S U A L L Y books on oil and the oil industry suffer either from being too technical for the layman or from being inadequate from the point of view of those in the oil business. But a book has now been published that achieves the happy combination of being readable and understandable to those who know very little about the oil industry and at the same time useful and instructive to those who are already members of the oil fraternity. "This Fascinating Oil Business," by Max W. Ball, tells in simple, non-technical language the story of oil from its beginning as sedimentary deposits beneath the sea to the time of its delivery as refined products for many uses; and of the oil industry in its all its operations from geological surveys to the marketing of the finished product.

Its author is an authority on the subject. For more than 30 years Mr. Ball has been associated with the oil industry in technical and executive capacities and as a consultant. He was with the U.S. Geological Survey for 10 years, latterly as Chairman of The Oil Board. At present Mr. Ball is living in Edmonton, dividing his time between the Alberta capital and Denver, Colo., where he received his early training in mining and geology.

To cover the story of oil and the oil industry in all its phases, Mr. Ball acts as guide as he takes the reader on a tour of the oil industry. The reader is introduced to the different oil men—the geologist, the lease man, the driller—and so on until all the oil men have been met and their different functions explained. The reader goes on a geological survey, and the different survey methods are explained to him. He watches the driller at work as he sinks his tools thousands of feet into the earth. He visits refineries and follows the processes that refine crude oil into finished products. He takes a quick trip around the world as Mr. Ball tells briefly the story of the different oil producing countries. When the tour is over, the reader has a clear picture of the oil industry in all its operations.

Of special interest to motorists, as the largest consumers of petroleum products, is the chapter "Disposing of the Products." Here is discussed the marketing of petroleum products, the last step in the operations of the oil industry. What strikes one most in reading this chapter is the description of the fierce competition which exists in the oil business. The author shows how this competition affects every angle of the petroleum industry, and how every operation is directed to bringing the consumer the highest quality products at the lowest possible prices. In this competitive struggle, no refiner can afford to overlook the slightest technical advance that is discovered, for this advance will be used by some other refiner to present the consumer with a higher quality product, or to offer his present high quality products at a slightly lower price.

This competition extends to the very source of petroleum products, the oil fields. Each field must sell its production at a price that will just allow for quality and cost of reaching the market will maintain it in a competitive position with other fields; fields in one country cannot combine to exact a high price because oil from other countries would then flow in to capture the market.

On the other hand, no refiner can post a purchasing price at a field lower than its true market value, for some rival refiner will offer a slightly higher price to obtain the field's output.

Mr. Ball answers in this chapter the question "Why the Price of Gasoline?" He shows how to begin with the government taxes fix an important part of the price. Transportation charges next fix a substantial amount. These charges, as Mr. Ball says, are fixed charges over which the refiner has no control. Subtract them from what you pay per gallon, and you will have what is left for the refiner, the marketer and the retailer. After the marketer and retailer have taken their share what is left goes to the consumer. Out of this he has to pay for his crudes, pay his operating costs and interest on his investment, pay his corporation taxes, and make a profit if he can... !

"This Fascinating Oil Business" is recommended to anyone, within or without the industry, of a readable, thoroughly entertaining all-over story of oil.

Published by McCallum & Stewart, Ltd., Toronto.

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ALBERTA ROYAL COMMISSION REPORTS ON THE OIL INDUSTRY

Advises Against Government Control—Commends Efficiency and Enterprise Resulting from Free Play of Competitive Forces—Profits are Fair and Reasonable and No Need is Seen for Regulation—Duplication of Outlets Does Not Penalize the Consumer.

After an investigation that was conducted over a period of 14 months, during which every phase of the petroleum industry was thoroughly explored and some 15,000 pages of evidence and 750 exhibits received, the Royal Commission appointed by the Government of the Province of Alberta on October 12, 1928, submitted to the Lieutenant-Governor of that Province on April 17 last a lengthy report in which its findings are stated in detail.

The report was made public on June 14. It is signed by the Hon. Mr. Justice A. A. McGillivray, Chairman, Major R. L. Liptaat, Commissioner.

No need for government interference

The findings of the Commission are definite and are summed up in the following paragraph:

"We repeat for the sake of clarity and emphasis, that which we have before said that no case has been made out for Government intervention in Alberta in any branch of the petroleum industry, including marketing, as to which we are specifically directed to report. We could not fail to find on Dr. Frey's and Dr. Brown's evidence alone that there is very real competition in this Province; that prices are not out of line with prices in other places in which competition is keen; that the cost performance is reasonable and that the profits are not excessive. In such circumstances there is not the slightest occasion for the Government to exercise government control for the protection of the public. On the contrary it would seem that the public in Alberta is adequately protected by the play of conflicting forces prompted by desire for gain." Outlining the thoroughness with which the investigation of the oil industry was conducted, the Commissioners say:

All mystery removed

"All mystery surrounding every branch of the industry has been removed; all suspicions as to unfair or unethical practices have been exploded; the basic principles upon which the whole industry operates have been made known in general and in Alberta in particular have been examined into; and so the record of the proceedings before this Commission cannot but be of interest to the industry, the public and any department of Government which has to do with this industry."

"We think we should make particular mention of the assistance rendered to us by the oil companies carrying on business in Alberta. We would not have been wholly surprised if..."
their attitude had been that the inevitable re-
sult of the sitings of a Government-appointed
Commission cannot be mandatory for further
taxation or lower prices, and that this was a
type of inquiry from which they might well
stand aside and was not as if they were
forced to participate. On the contrary these
companies showed a desire to make full
and complete disclosure of which evidence
would indicate was all of their activities; they
also showed a willingness to collaborate, by the
attitudes of their lawyers before us, by
throwing open their books for examination,
and by providing at great cost to themselves
every conceivable kind of statement which the
accountant to the Commission required. So
that there may be no misapprehension as to
our being deceived, we may add that in our view
there is no oil company in Canada which can
boast of a more capable petroleum accountant
than has been of the benefit of having as account-
ant to this Commission. It is fitting to add
that without the hearty co-operation of the
major companies in the industry, we could not
possibly, without years of inquiry and the as-
sistance of other Provinces and probably the
Courts of other Provinces, have obtained the
data which is now before us, and which we
repeat is in our opinion an inestimable value to
this Province, regardless of the value of any
report produced thereon.

- EVIDENCE WAS INDEPENDENT

We also like to make particular mention
of the assistance rendered us by the Coun-
sel to the Commission. We at first questioned in
our own minds the wisdom of a member of the
Attorney-General's Department in the Pro-
vince, acting as Counsel to the Commission be-
cause we felt there was a possibility that he
might be automatically influenced in leading
evidence to incline towards witnesses whose
evidence would be in consonance with any views
which the Government might have as to what
should be done about the petroleum industry.
It is pleasing to be able to say, at the end of
our inquiry, that Counsel to the Commission
carried himself not only with very great ability
but also with conspicuous fairness. He explored
every branch of this industry through the
medium of witnesses who were best able to
speak upon the subjects upon which they were
asked to speak. He has been concerned to pro-
duce witnesses with knowledge; he has not been
centered to predetermine the effect of their
evidence but to throw it into the witness
box; he has gone into the United States of
America and procured men entirely independent
of the industry, who yet could speak with a

- PRODUCTION COST CANNOT BE DETER-
MINED

Production is then dealt with and the Commission
accepts the views of expert witnesses that it is
impossible to form any opinion as to the cost of
production of crude oil in the Turner Valley
and that from the standpoint of the refiner who must
buy and sell in competitive markets disregard of
production costs and understandable. The Commis-
sioners express the belief that Imperial Oil Limited
and other local refiners are showing a ludable
disposal of the market that the Turner Valley crude oil
in preference to foreign crude oil but say it is clear
that this desir can be manifested only so long as the
refiners can sell Turner Valley crude oil to their
refineries at the price at which they can place
foreign crude at the same points.

The part played by the rule of capture as applied
to the recovery of oil is dealt with at some length
for this is the standard of its effect in promoting
over-production and the view is expressed that the only
one complete answer to the rule of capture is unit
operation of oil fields.

In the section dealing with field price, statistics
relating to world production of crude oil are re-
viewed as also much of the evidence which was
given by such experts as Dr. John W. Prey,
Associate Director of the Petroleum Conservation
Division, Department of the Interior, United States
Government, and Dr. G. Granger Brown, Consulting
Engineer and Professor of Chemical Engineering at
the University of Michigan, who has specialized
in matters relating to the petroleum industry.

- TURNER VALLEY PRICE IS IN DYNAMIC
EQUILIBRIUM

In short, the Commission finds that the price of
Turner Valley crude is neither in the same
competition and that at the prevailing prices and under
prevailing conditions, is in dynamic equilibrium with
prices elsewhere. It does recommend that the field
price should be increased by 8¢ to give the Turner
Valley producers the benefit of the reduction of 8¢
in pipe line rate and housing charges at Calgary
which was effected some time ago when the Commis-
sion brought in an interim report on the pipe line
rate. It is felt that the Commission’s recom-
mandation in this connection is in line with the
evidence given by Dr. Brown and the opinion
expressed in the industry by R. V. A. Jesser, Vice-President
of Imperial Oil, when he testified.

Lengthy consideration is given to the subject of
wider markets and transportation costs and in these
considerations the Commissioner’s views may be sum-
marized as follows: that it is economically unsound for
the Turner Valley producer to cut his price for
the purpose of sending products refined from Turner
Valley crude at Regina east beyond the Portage
La Prairie “economic fringe”; that while
they would market some more oil, the producers
would receive less money if they were to cut the price
sufficiently to permit of moving Turner
Valley products into the Winnipeg market; that a case
has been made out showing that the anti-dumping laws
of Canada as they affect products imported from
Montana are not properly enforced and that
strict enforcement of such laws might have some
effect in moving products made from Turner Valley

S U M M E R N O U N B E R 4 .1940

- "...The development of the tech-
nique, and the bringing into being of
devices for discovery of oil, and the
advancement in methods of trans-
portation and in the processing and
marketing of crude oil have been extra-
ordinary, and are largely attributable
to the efforts of those large corpora-
tions whose right to exist has been so
crrently called into question by the
small unit within and members of the
public without the industry."
PRICE IS FAIR AND REASONABLE

Dealing with the refining of crude oil the oil commission reviews in a general way the basic principles of refinery operation and then deals specifically with the question whether the refiner's price for gasoline in the Province of Alberta is fair and reasonable. In arriving at a conclusion it takes the performance of Imperial Oil Limited for reasons which is the largest refiner in the Province and that its operations are the only ones which present a complete and adequate picture under review. It finds on the basis of the expert evidence submitted and the conclusion of its own accountant that the price of any one product of petroleum cannot be definitely ascertained any more than the precise cost of various cuts of crude can be determined by the packer. Accordingly it concludes that the way in which to ascertain whether prices are fair and reasonable is to examine the profit performance of the industry. It accepts the Imperial operation in this connection because it is the lowest-cost operation and therefore must be fair from the standpoint of the refiner and distributor and the ultimate consumer.

After careful analysis of the figures and various adjustments and a review of the capital employed in the refineries in the Province the commission concludes that the refinery price of gasoline in Alberta is not out of line and that the rate of return upon invested capital is adequate to provide for the earnings for any reduction in tank car price at the present time. It also reports that the differentials between the prices of the various grades of motor fuels are fair and reasonable.

MARKETING SYSTEM IS EFFICIENT

The following two paragraphs introduce a lengthy section devoted to the marketing of gasoline.

"As in the case of crude production, so in the case of gasoline distribution, the system had its main development during a period of rapidly expanding markets under exceptionally high prices. These influences ultimately led to an overproduction of crude which in turn led to an overexpansion of the marketing system to make the surplus available to the consumer. This surplus was created and sold by way of retail outlets for this overproduction and overstocking. There was an intense competition to get deliveries to the consumers and so the oil companies either did not have the capital, or did not wish to employ it to build service stations and increasingly relied on the retail outlets for the sale and distribution and service stations and retail outlets because it is on this ground more than any other that the industry has been criticized for alleged extravagances which it has been contended, result in excessive costs to the consumer.

SERVICE IS ADEQUATE

With regard to "undue expansion" the commission has this to say: "It may be that if Imperial Oil Limited had not extended its marketing operations and facilities to supply all areas its investment might be less, its operating cost less, and its immediate profit greater, but it is to be borne in mind that the oil has pointed out there has been a pronounced tendency to extend the territorial operation of companies more and more broadly. This is largely due to the desire of the marketers to maintain its gasoline position against competitors. It may also be due to competition in the future of the country and to a laudable ambition to give a present service for all petroleum products in all parts of the country. It will take care of the peak demand in sparsely settled as well as in populous areas. Every marketer must take into account the size of the area in which the marketing is taking place, the transportation facilities, the railway situation, the distance factors, the state of highway development, the density of the population, the relationship of city to country population, the climate, the nature of the land and diversity of agriculture, and then form a judgment as to what his marketing operations will be. It would be unfair to compare an operation such as that of Imperial Oil Limited with the operations of companies which cater only to selected areas; each marketer has formed a judgment as to method, type and extent of distribution and, unless there be a demonstrable lack of prudence in the investment made by Imperial Oil Limited is the large operation which it has undertaken in furtherance of its judgment, it seems to us that it cannot be said that the investment is not a prudent one. As before stated the motivating force behind the operation may be to be the first in the field and to maintain gallonage position against all competitors; it may be that is is more concerned with public service; in any event we cannot say that their judgment as to expansion is faulty and so that their operating expense in pursuance of it is unreasonable; nor can we point to their investment in premises or facilities for wide distribution, and say that it is improper for the purpose. Fortunately the findings made by the commission with regard to undue expansion of marketing facilities and allowed to continue marketing facilities and retaining outlets because it is on this ground more than any other that the industry has been criticized for alleged extravagances, which have been contended, result in excessive costs to the consumer.

IMPERIAL OIL SYSTEM IS EFFICIENT

Dealing with duplication of service stations, the commission concludes that the principal cost of operating bulk service stations is the commissions which are paid on sales made by the agents at these stations. Analysis of this cost was made by Imperial Oil Limited and tested by its own accountant the commission finds that with regard to bulk station expenses and the revenue made by Imperial Oil Limited that in the overall picture its marketing costs are increased as the gallonage is reduced. "In the result," says the report, "we think that there is no sound basis upon which we rested the elimination of existing service stations by government intervention and that this should not be attempted. Concluding its views on the operation of service station absorption the commission says:

GOVERNMENT SHOULD NOT ATTEMPT TO REDUCE NUMBER OF SERVICE STATIONS

"To come back to the effect of service station absorption we are of the opinion that the
"...In the result, we are of the opinion that service station absorption should be considered a part of an efficient operation and that the company whose rate of return is under consideration, cannot be said to have an unreasonable rate of return because of any service station absorption costs."

Under consideration cannot be charged because of:

- **JObBER COMPETITION IS REAL**
  Dealing with distribution of petroleum products by jobbers and marketers, the Commission reports that in its opinion the competition of Alberta jobbers and truckers is real and any attempt to eliminate them from the marketing systems now in use would have the effect of increasing the number of refiners needlessly, and moreover, would interfere with the competition of a class whose members are keen competitors, because they are small enough to accommodate themselves to ever-changing conditions more readily than the large organizations can.

- **So-called 100% contracts whereby dealers engage to sell exclusively the products of one petroleum marketer are not found to be an abuse.**
  Reviewing retail marketing, the Commission expresses the opinion that the spread between the wholesale price and retail price of gasoline charged by the dealers at the larger points in the Province and at many of the smaller points is reasonable but suggests that in some cases excessive retail margins are being charged. In this connection it is recommended that the dealer be required to post for the benefit of the purchaser the price which he pays to the wholesaler for the gasoline so that the purchaser will know what margin the retail dealer is exacting.

- **The subject of standardization of petroleum products is discussed and after reviewing considerable evidence the Commission expresses the opinion that it is desirable to set up standards as a protection for the public but recommends that any standards set up should be minimum standards so that they will not impede competition.**
  A section of the report deals with taxation and in this connection the Commission reports that “one of the means by which a levy in the price of gasoline may be brought about in the Province of the Dominion is by reduction in the gasoline tax.” However the Commission does not recommend such a procedure but it does recommend that gasoline taxes should be earmarked for road construction.

- **TAX EVASION IS A SERIOUS MATTER**
  Tax evasion is also dealt with and is considered "a serious matter". It is remarked that the Province is affected by loss in revenue and consequently those who pay their taxes are suffering consideration to bear the burden of taxation which unscrupulous people manage to evade. Because of the fact that gasoline taxes are regarded to such an extent as general revenue and not earmarked for road construction, the Commission expresses opinion that there can be no logical reason why the price should be favored any more than any other user of gasoline through rebate of taxes on products which

The industry has done well in the matter of making pricing cuts that would be equivalent to what is stated as is instated by the fact that since February of 1936 standard gasoline prices were reduced 7 cents whereas the net cost of raw materials declined only 3.7 cents per gallon.

Reverting particularly to suggestions that had been made for the appointment of a government board with mandatory powers over the industry the Commission says: "...It would be quite wrong for us to first find, as we do, that the oil industry has come through a searching inquiry without having been found guilty of improper practices or of having made undefined profits or of having demanded prices which are either exorbitant or out of line with prices elsewhere and then to recommend that this industry be placed under the domination of some government agency."
that large corporations or for that matter small corporations or individuals have a free rein to do to the public precisely what they may see fit in the matter of prices in those cases in which competition fails to assure a proper price. On the contrary it is our firm opinion that there always should be a proper relationship between the cost and profit performance and the price. It seems to us that the day for the gouging of enormous fortunes through the manipulation of exorbitant prices out of a helpless public is gone and that the day has come when it must be recognized that the Government as the representative of the public is concerned with protecting the public interest and so is concerned to see to it where competition does not do the work of keeping prices within reasonable bounds, that there is government control in order that the public do not suffer in consequence. This may well happen when the assumed competition in non-existent or nominal or cohesive.

"If we are right in this view it would seem to follow logically that the Government should be equally concerned to see to it, again in the public interest, that prices do not become so low as to discourage the inflow of capital into the industry, or so low as to eliminate most competitors and bring about a state of monopoly."

"... the Government should be equally concerned to see to it, again in the public interest, that prices do not become so low as to discourage the inflow of capital into the industry, or so low as to eliminate most competitors and bring about a state of monopoly."

"Our opinion about this whole question of Government in business or interfering with business may be shortly stated. In our view a Government should not be in business in competition with its own citizens. In our view a Government that eliminates competition by creating a Government monopoly with respect to any commodity will in all probability carry on that business with a greater capital investment and at a greater operating cost and so at a greater ultimate cost to the consumer than private industry would do, for the simple reason that those who carry it on have not the spur of self-interest to reduce cost in order that they may extend profit to themselves.

"With regard to Government control as distinguished from Government ownership, we live under a competitive capitalist system and until that system be changed for a better system if there be a better system it would seem only reasonable that competition should be allowed free play so long as competition is so carried on that the public does not suffer at the hands of the competitors. In other words we think that Government intervention should take place when it appears to be a necessary step for the protection of the public against the evils of oppression by an industry."

TWO men had complete charge of oil distribution in a sales territory from the Great Lakes to the Pacific Ocean in the infancy of Imperial Oil's western operations. One of these men lives in Edmonton today and marvels at the development of the single industry in a single lifetime.

He is S. B. Blackhall, veteran of oil marketing in the hectic oak barrel days, who in 1903 became first western office manager for Imperial Oil. Retired since 1918, Mr. Blackhall at 85 is the Company's oldest annuitant, and still retains vivid memories of his oil-days debut and a keen interest in "the trade" as it functions today.

His story starts in January, 1897, in London, England, the date and place of his birth. In an old diary still in his possession his arrival in London, Ontario, in 1879 is recorded. Three years later his career in oil was under way.

At 16 years of age, Mr. Blackhall went to work keeping a simple set of single-entry books for Sharpe Brothers, oil dealers in London, Ontario. For the next nine years he was in daily contact with the east's pioneer oil firms, particularly six small ones who merged their interests to form the London Oil Refining Company.

That firm in 1880 became the Imperial Oil Company Limited. While not then an employee, Mr. Blackhall saw the company's beginning and was not long in joining the vigorous young enterprise.

Directed by men of foresight and daring, the new firm sought wider fields for oil distribution. There was but one answer—go west! Settlers were pouring into this undeveloped fertile land. The wild dream of an ocean-linking railway spanning the Prairies and piercing the Rockies was becoming a reality as the thin bands of steel crept westward.

With this move westward went a new demand for oil. With the demand went the supply and directing this supply was Imperial Oil's first western manager, H. E. Sharpe of London, Ontario, and his office assistant, Mr. Blackhall. Mr. Sharpe opened the territory with an office in Winnipeg in 1881 and Mr. Blackhall joined him in 1883.

For five years this pair comprised the entire office staff, handling the company's affairs throughout the west. Storage facilities as they are known today did not exist. There were no market indices on which to base estimates for required stock. Limited rail transportation was overcome by use of oxartes.

A single upstairs room housed the first office. Two desks, other sundry furniture and a stove completed the layout. With Mr. Sharpe as personal contact man popularizing the new firm and its product, Mr. Blackhall handled the other chores of cashier, stock clerk, credit manager and office boy. It was five years before an office boy was added to bring the staff to three.

"We faced new problems daily but just met them as they came," Mr. Blackhall recalls in Edmonton recently. "One of our first was storage. There were no such things as tanks as they are today."

Before Imperial Oil's Winnipeg debut in 1881, E. D. Moore, pioneer Winnipeg oil man, had tried storage of oil in pits dug in the ground. Those pits
sunk several feet deep were lined with carefully moulded clay. Oil was poured into these but experience soon taught that the wastage was terrific. "The wide open spaces were our storage warehouses for the big oak barrels," recalls Mr. Blackhall. "There was no limit to our storage after we settled how it should be handled. Rebuildings were laid on the ground and long rows of barrels were piled on them. Another layer of boards and a covering of hay provided fixed storage."

"The new railway going through gave us our biggest customer. But there was a big demand for oil for lessoning purposes and as new lamps were developed this increased our sales."

"We had a real problem trying to calculate in advance our oil requirements for a year's business. In so young a country this was almost impossible. However, we did get the help of railway officials, big distributing warehouses and others in estimating what oil they would need for a given period. These estimates were checked with actual consumption in the past and we arrived at a figure for our next year's stock. We rarely missed the mark by much despite the handicap."

Contrasting with present marketing experience, Mr. Blackhall recalls that in those first years gasoline was a glut on the market. No one wanted it or knew what to use it for if it was made available. "It brought no price and was useless for several years," he confessed.

Carloads of oak barrels filled with oil were shipped out of Winnipeg. From the end of steel excars the big tube to Hudson's Bay posts throughout the prairie freighters and others handled these consignments.

Empty barrels returned to Winnipeg brought $1.25 each in the first few years. "These were steamed out and relaid in Winnipeg. Before oil was poured into them for westward shipments, a second regaining job was completed.

"Finally we had so many barrels in circulation the payment for empties was gradually reduced until it disappeared altogether," Mr. Blackhall remembers. "By that time we had used up so much oak that eastern firms were supplying us with elm barrels."

He proudly recalls the performance of these old barrels in a shipment to Swift Current which involved 250 miles by excars. The purchaser had been sent two cars of oil in barrels when only one had been required. But, despite storage of the oil over to the second year, loss by leakage was only about two barrels.

LABORATORY--more convenient handling of containers in the excars, a crate containing two square tins was devised by the company. These wooden frames, in which two gallon tins were packed in sawdust, were widely used in long-distance shipments to western posts for many years. Despite the many hardships, this two-man western division completed total sales of $22,186 in the first full year of operation. In less than 10 years, sales had reached a figure approximating the quarter-million mark.

"All this business was carried on through personal contact with buyers and by hand-written correspondence." The latter was a slow process in many instances. But it was a wonderful feeling that was developed between the company and oil buyers in those days when all transactions were done personally. When the first competitors came into the picture some years later they had a terrific fight their getting a foothold since our own trade was built on a personal acquaintance with our many customers."

All the problems were not so far removed from the tiny office. Winnipeg boasted no miles of pavement in those days and mud was a real difficulty. "In winter, the office was a cold, damp place in the office and they were an important item of equipment," Mr. Blackhall smirks in recalling. "While there were only two of us in the office, we had a few warehousemen and we had frequent calls that our wagon was stuck. Three full oil barrels in a wagon went a long way to make a hole in that mud. Mr. Sharp often went out to find the wagon hub-deep. It was for such occasions we kept the boots handy."

Office routine, too, was not on the highly mechanized basis of today. Mr. Blackhall's early records were entirely in longhand. Pricing, invoicing and other office recording was a tedious job. Coupled with these difficulties was the problem of high freight rates. Of gross revenue during the first few years, freight absorbed about one-third. "But we enjoyed all the work and excitement of seeing a new business grow in a new country," Mr. Blackhall recalls with pride.

"We got an office boy after five years and within 10 years we had an office staff of 10. Growth was rapid thereafter."

"There were times when we east-coasters got an unexpected thrill out of the new western job. One such time was when a warehouseman shouted from one of the barrel storage racks. We ran to see the cause of the excitement and found three bears snooping around the barrels. And that was right in Winnipeg."

Mr. Blackhall still is active. His white hair is thinning and his gait is slower, but his mind is keen and his interest in the company undimmed. He is proud of the part he played in the development of a great Canadian industry. As one of the oldest members of the industry, Mr. Blackhall and his wife enjoy the fruits of a well-earned retirement made possible by the company's pension plan.

SEARCHING FOR OIL WITH TEST TUBES (Continued from page 21)

up. While more or less new to this continent, soil analysis has been practiced for a number of years by the Russians as a means of locating oil and gas. They do not, however, analyze the soil but the gas from the soil. Holes from six to ten feet deep are drilled in the earth, which are sealed with a metal cap. By means of a vacuum pump gas is extracted from the soil at the bottom of the hole which is then analyzed to determine the presence or absence of oil or gas in the underlying earth.

The American method is to analyze the soil. From a vast cross-section of shallow holes small samples of soil are taken, sealed in air tight containers and forwarded to the laboratory. The depth of the gas from the surface varies from a few inches under the surface to depths of 10 feet. Usually, however, samples taken some feet below the surface are favorable because it is believed that shallow samples might be subject to the effects of erosion, contamination, etc. A small boring tool, similar to a pest hole auger with a long handled, is usually used and the soil is immediately placed in individually numbered, air-tight containers for transportation to the laboratory. For the average survey, four to five samples are taken per square mile so that over a large area the samples indicate a regular pattern. At the laboratory, spread out in individual trays, the samples go to large ovens for drying to remove all trace of moisture. They are then pulverized and weighed out into uniform portions, ready for the analysis. Following the analysis, the discovered hydrocarbon and mineralization values are charted on maps at their respective collection stations. With these maps as a basis, and with knowledge derived from previous surveys, the experts are proved or disproved by drilling, the geologist will be able to determine in advance the probable possibility of undrilled wells.

The most familiar pattern obtained on the maps as a result of charting from soil analysis testings, appears in the shape of a halo. The halo map is especially interesting since it has been found that the hydrocarbon values are very low over the producing area of the field and very high around the edges. This has been interpreted as being caused by the oil "clogging" the formation immediately above it to form an impermeable cap. This cap retards the escape of gases over the subsurface of the structure and causes a high concentration of gases looking toward the edges of the cap.

Most oils in their natural state are under great pressures, ranging from a few hundred pounds to 5,000 or 6,000 pounds per square inch. At the same time, the oil has a high temperature, often reaching 200°F. or more. The result is a natural dissipation of the oil into hydrocarbon vapors which, because of their buoyancy, are forced upwards through the earth to the surface. Although such formations as compact limestone and shale are usually imperious to oil, they offer easy passage to oil vapours and therefore there is nothing to hinder the upward movement of the vapours. At the surface the vapours are concentrated in the soil by evaporation and by condensation.

Admittedly still in the experimental stages, oil surveys mark an important step in the direction of locating petroleum deposits by scientific means.

CROSS-SECTION OF A TYPICAL OIL FIELD AS VISUALIZED BY THE GEOCHEMIST

MAGNETIC DISSOLUTION OF ORES IN WATER HYDROCARBON DISSOLUTION IN WATER DISSOLUTION IN ALKALI DISSOLUTION IN ACID ENSOLOGY
TAMING THE JUNGLE

Continued from Page 17

AID FROM THE SOUTH

WASHINGTON to contribute to their country's war effort, the women of Talaera and Negritos connected with the International Petroleum Company Limited, have formed a local Red Cross Chapter under the parent Peruvian body in Lima.

A month after the outbreak of war a group of ladies in the oilfields took the initiative by calling a meeting of all those interested. At this meeting a committee was elected and the secretary wrote promptly to the British Minister in Lima asking for instructions for volunteer workers. Communication was thus established with the "Cruz Roja Aliada del Peru", an organisation which had already been formed in the capital by ladies of the foreign colonies and Peruvian sympathisers, and from them a list of articles required by the Red Cross and instructions for making them were received. The local Society was also authorized to use the designation "Cruz Roja Aliada Franco-Britanica del Peru, Talaera-Negritos Branch".

Soon after its inception, the ladies' committee organized a bazaar, which was held at the Talaera Club on December 9th, last. Every article for sale was made and donated by the local people. The rush to buy was most gratifying and in less than two hours the booths were stripped bare. On March 2nd another bazaar was held at the Negritos Club.

Of all funds assembled by these and other means, seventy-five percent is refunded through Lima to Red Cross Headquarters for their disposition, and such remittances have now reached the imposing total of four thousand nine hundred dollars; nearly $2000 at current exchange rates. The remaining twenty-five percent is retained by the local committee for the purchase of materials for sewing.

In Ecuador, where International Petroleum Company Limited has recently undertaken an extensive search for oil in a desert area, the dry season extends over a period of about six months and the problem of obtaining water is difficult. This picture shows how water is hauled from wells on the Santa Elena Peninsula to neighboring towns. The animals are burros, a type of small donkey, commonly used as beasts of burden.