



THE

Imperial Oil

REVIEW

SUMMER

1940



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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.

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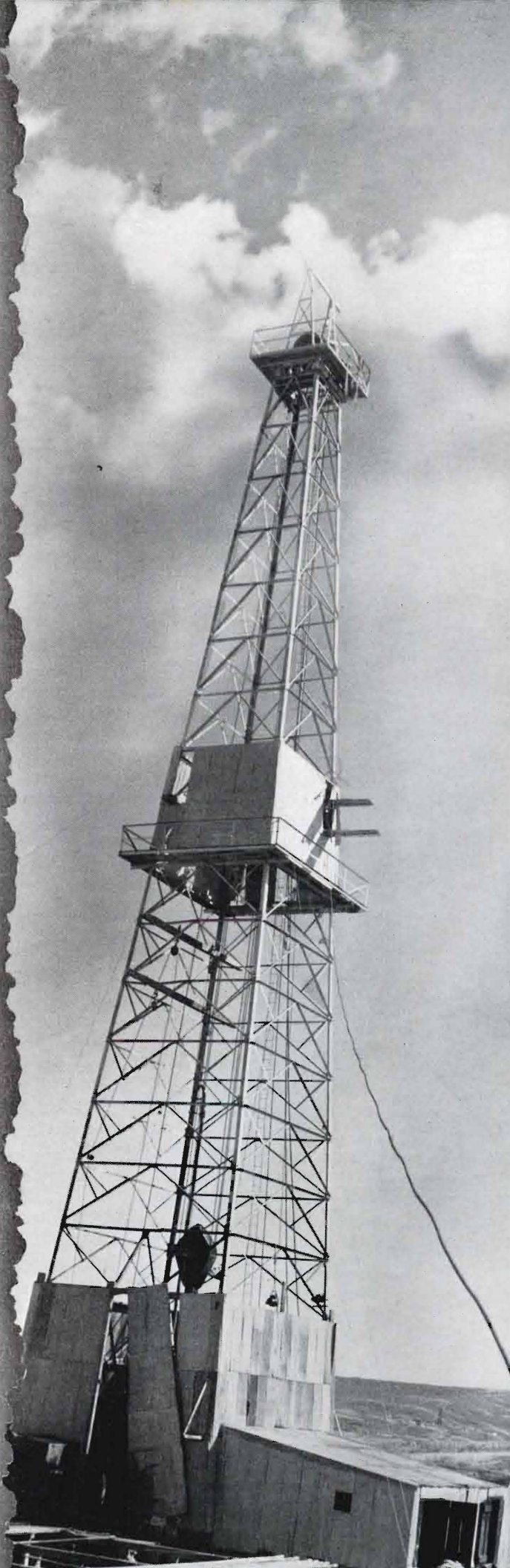
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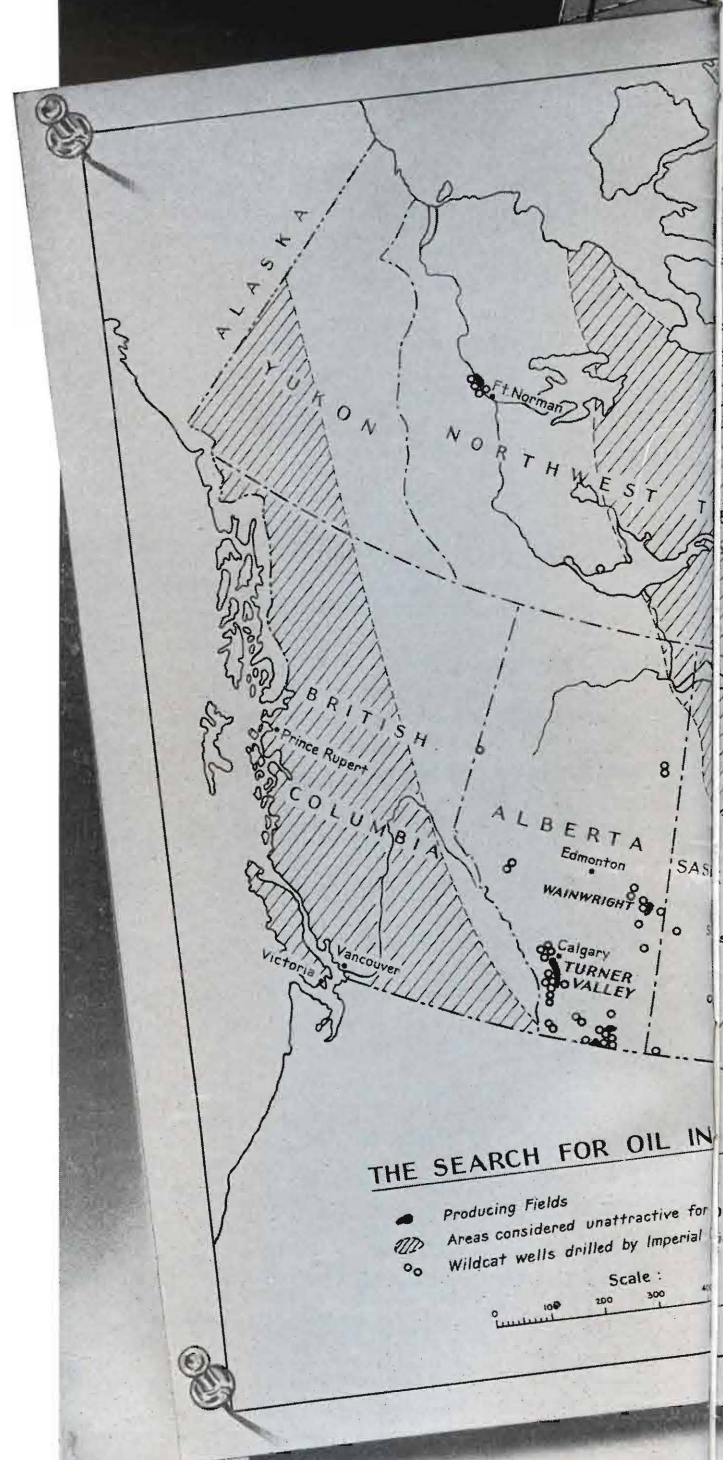
THE SEARCH FOR OIL IN CANADA

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 7,837,503 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 approximated 42,000,000 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 1,250,000,000 barrels, has reserves of 20,000,000,000 barrels or about 15 years' supply at the current producing rate. The State of Texas has a reserve of 23 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 90% 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

Continued on Page 4





THE SEARCH FOR OIL IN CANADA

Continued from Page 2

Valley faded from the public mind. Ten years later when Royalite No. 4 well was drilled to a deeper zone known as the Madison limestone, Calgary staged a second boom and Turner Valley was soon established as a large "wet gas" or "naphtha" field. Over ten years again elapsed before the real crude oil was discovered on June 16, 1936, in the Turner Valley Royalties No. 1 well. Since that time 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 Coulee, Wainwright and other miscellaneous districts in the Province.

Because of the production already found there, the prospects in Alberta appear far more promising 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. In the Plains Area, twenty-four wells were active during 1939 and hole made amounted to approximately 49,000 feet. The Steeveville Area was the scene of the greatest activity and several wells in that region obtained good flows of gas. In the Lloydminster 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.

Next in importance to Alberta in volume of oil produced comes Ontario with production in 1939 amounting to 205,978 barrels. Oil was discovered in this Province at a very early date — around the 1860's — and it is estimated that over \$33,000,000 worth 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 wells. In 1939 production showed a 20% gain over 1938 but this was due largely to the work-over of old shallow fields and to some new drilling in the Glencoe and Watford fields. In the Watford field which was discovered in 1938, there are now a total of almost 100 wells. Recent discoveries in Ontario have been small but at shallow depths.

A number of deep tests have been drilled in Ontario to the Trenton limestone, the formation which for many years yielded prolific production in Ohio. The results of these tests have been discouraging but the possibility that many if not all of these wells were not located on geologically favour-

able structures must be admitted and the prospects of securing production from the Trenton Limestone in Ontario cannot as yet be condemned. Some geological and geophysical work was undertaken in the province in 1939 in an effort to select areas that may be worthy of a test well. In spite of the thousands of wells which have been drilled in the southwestern part of the province its possibilities have not yet been exhausted. Due to the drift covering most of the bedrock, and to the fact that a relatively large proportion of the area has already been tested it is becoming increasingly difficult to select areas where drilling is warranted. Outside of the southwestern portion the only part of the province which may be of interest to oil prospectors borders the southwest coast of Hudson and James Bays. Here, apart from the economic difficulties of marketing any production which may be found, the sedimentary rocks are believed to be comparatively thin and this area therefore is not relatively so attractive a prospecting ground as other areas in Canada.

A small amount of oil has been produced for several years in the Stoney Creek field about 10 miles south of Moncton in the Province of New Brunswick. About twenty years ago several wildcat wells were drilled in the extensive area of sedimentary rocks to the east and north of Moncton. Geological conditions suggest that the producing formations in the Stoney Creek field may underlie a part or all of the area to the north and east of Moncton. The wildcat wells drilled in that area, however, were not carried to a sufficient depth to prove or disprove anything in this regard. There are other areas in the province where seepages and indications of the possible presence of oil bearing rocks are found, and continued exploratory efforts in this province may yet result in the discovery of additional producing fields.

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 area in the Mackenzie Valley where further prospecting may be carried out, but one needs to remember that in an area such as this, development is a matter of very heavy capital expenditure and the transport difficulty would also make itself felt in connection with the getting of the oil out of the area.

In the other provinces in Canada no oil is at present being obtained which could be classed as commercial production. Recent developments in Saskatchewan have resulted in the finding of some oil in the Lloydminster Area which may prove to be commercially successful. Considerable exploratory work including drilling, geological and geophysical examination and shallow structural test well work was undertaken in this province during 1939 and is being continued during the current year. Geological conditions similar to those in the Plains Area of Alberta extend into Saskatchewan and successions of alternating beds of sandstones, conglomerates, dolomites, limestones and shales in part rich in organic matter are believed to underlie large areas in the province. If structural features suitable for the accumulation of large quantities of petroleum can be found they should be worth testing.

A number of wells have been drilled in the past in the other western provinces, Manitoba and British Columbia, but so far nothing of importance has developed as a result of this drilling. Geological conditions in certain parts of these provinces however are not unfavourable and some indications to encourage further investigations have been found. A test is being made on the Commotion Creek Structure 85 miles west of Hudson Hope in the Peace River District. Drilling is now under way and this well should be completed during the current year.

In the presently unproductive provinces of Eastern Canada deep tests have been drilled in Quebec, Nova Scotia and Prince Edward Island.

In the province of Quebec the Gaspé-Anticosti and St. Lawrence Lowland regions present geological conditions which are not entirely unfavourable for the presence of oil in commercial quantities. In the former area over 50 wells were drilled between 1860 and 1900 which yielded some oil and recently renewed attempts are underway to more conclusively test its possibilities. Considerable drilling has been done in the St. Lawrence lowland and several deep 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 Ainslie region on Cape Breton Island where indications of petroleum exist on the 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 makes further attempts a hazardous undertaking. A well drilled at a structurally favourable location in Pictou County with the object of determining if the productive formation in New Brunswick ex-

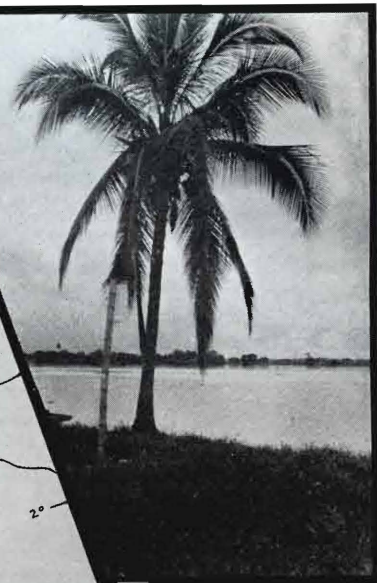
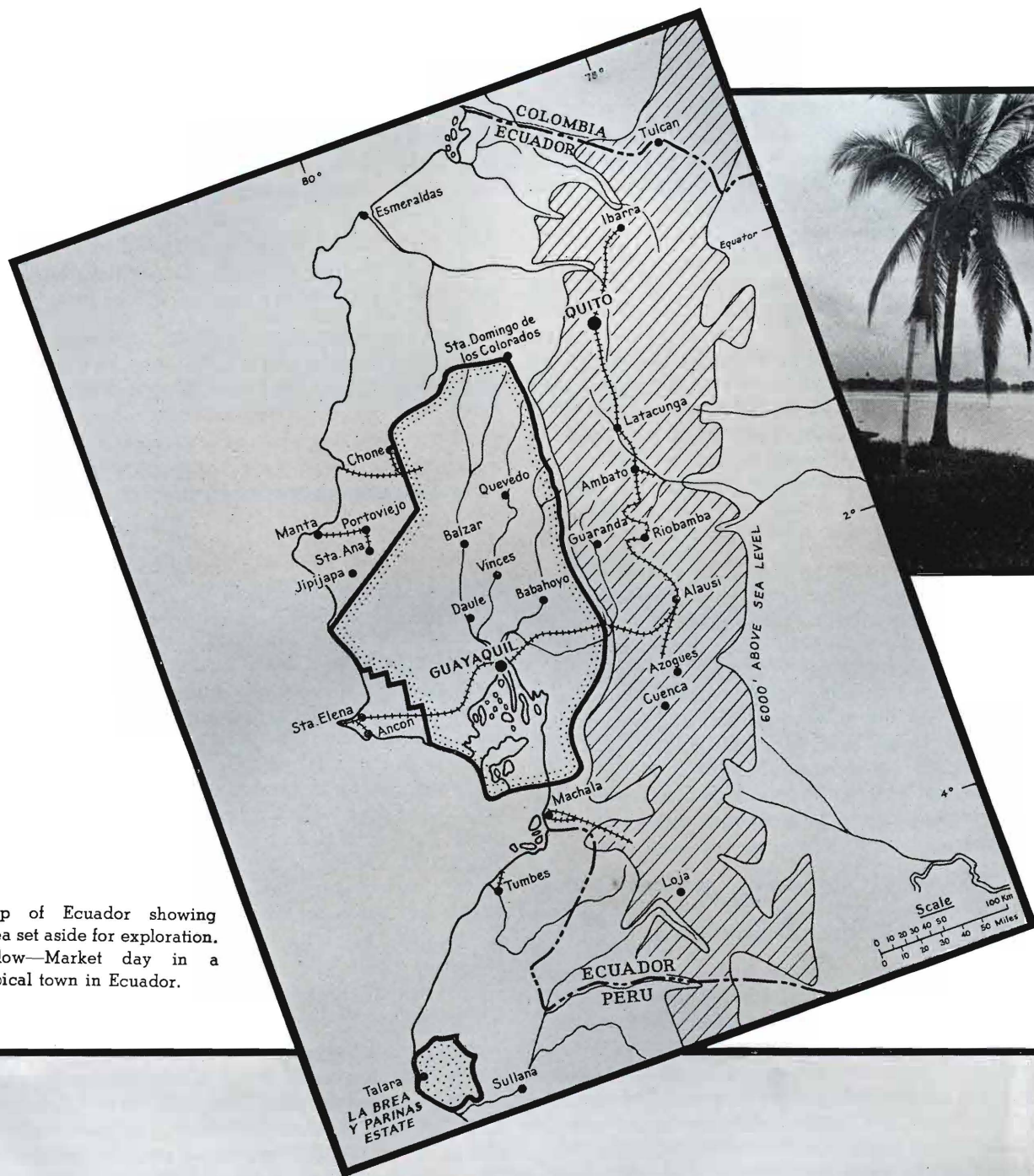
tended into this region, proved its absence. A test of a favourable structure in Cumberland County with a similar objective was carried to a depth of 4,134 feet without encountering the New Brunswick productive horizon. Geological problems in Nova Scotia are on the whole complicated and much remains 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 Prince Edward Island, one on Governors 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 by them 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 50 wildcat wells averaging over 3,000 feet in depth have been drilled at a 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 since the outbreak of the war have 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.

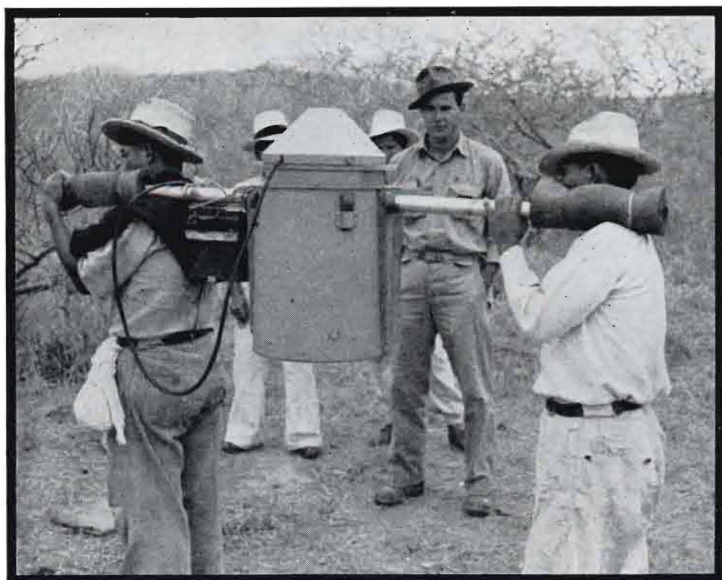
Although fully half of Canada is occupied by a great block of ancient crystalline rocks, so greatly disturbed, altered and eroded that oil is not likely to be found in them, possibilities of future production exist not only in the present producing regions but in parts of most of the unproductive provinces and in the Northwest Territories. The continued efforts of the Federal and Provincial Mining Bureaus to collect and analyze the mass of information obtainable from drilling wells, their detailed mapping throughout the Dominion and their attempts to solve the many intricate geological problems in areas which on the basis of our present knowledge do not seem attractive in the search for oil is 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 being constantly sought and new methods employed in an effort to increase the production of this Dominion.

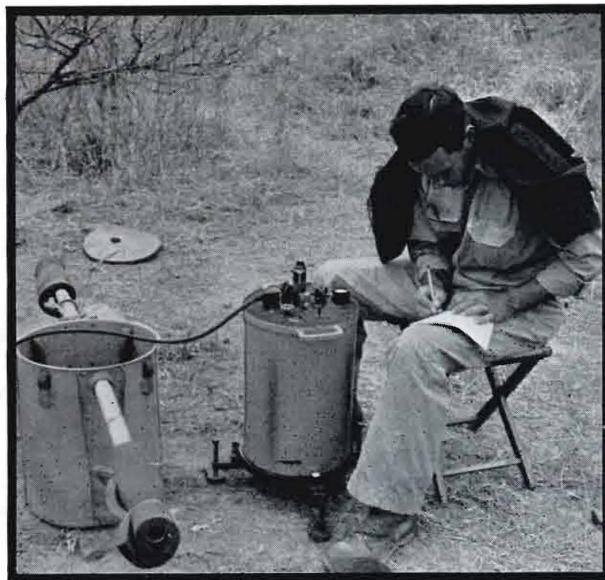


Map of Ecuador showing area set aside for exploration. Below—Market day in a typical town in Ecuador.





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. These 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-

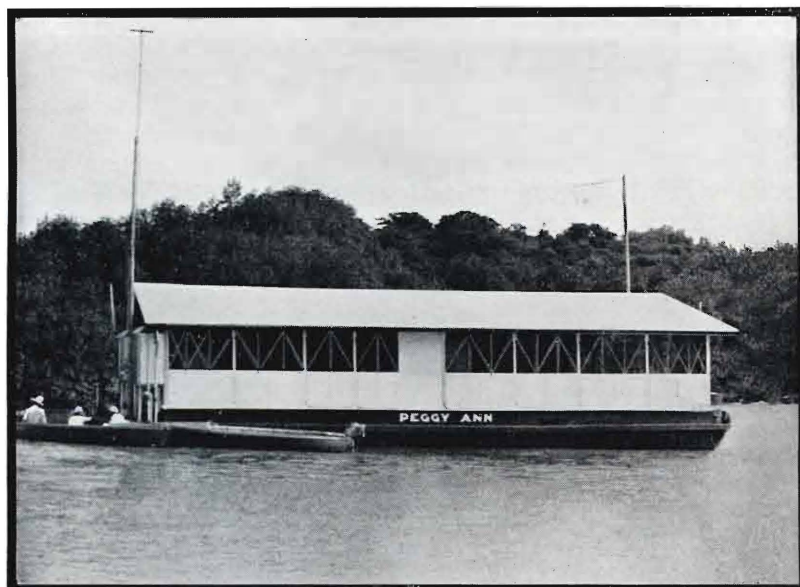
gether with a wet season which extends over approximately five months, during which all survey work must be confined to the navigable sections of the rivers. Some reconnaissance mapping may later be carried out by airplane, the observers and geologists in the plane sketching in by hand the significant 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 gravity meter 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 study 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 national lands was secured on the west coast, but this area proved unpromising, and the present much larger concession was acquired about a year ago.



Exploration parties working along the streams live in this house boat which provides accommodation for a crew of ten.

Executive offices of the Company are in Quito, although the seat of operations 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, 9,350 feet above sea level.

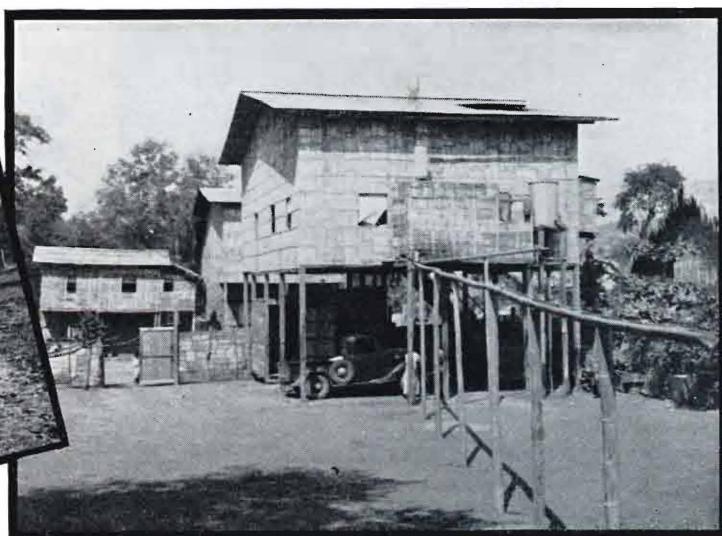
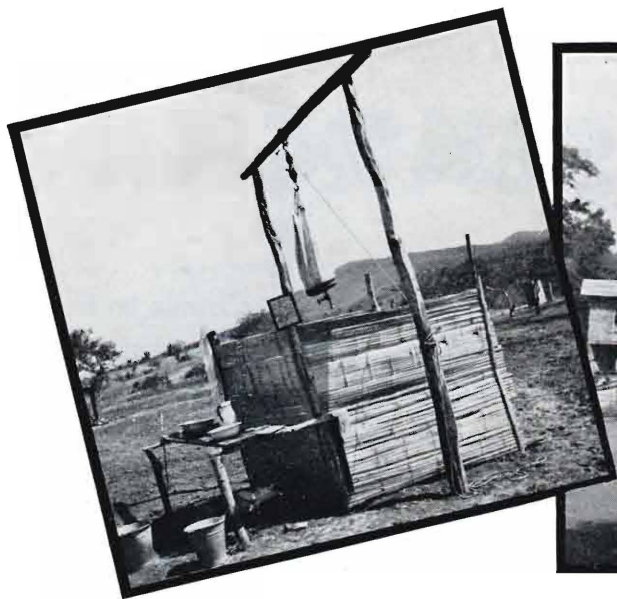
Outstanding among the many towering peaks of Ecuador is Pichincha, the "boiling mountain," whose eruptive activities have rendered it an object of dread since time immemorial. Cotopaxi, whose beautiful cone rises more than 19,000 feet above sea level, is the most destructive and has periodically devastated the countryside. Highest peak is Chimborazo, 20,576 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, International 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 commercial 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 concession 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 effect is felt from 50 to 75 miles inland and practically all navigation in both directions moves with the tide. Rivers draining eastward through the montaña, 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 athwart the equator, and although among the smaller South American Republics 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, cocoa, sugar, rice and tobacco. Among the more common economic



Left—All the comforts of home—A field showerbath. Right—Field Camp headquarters at Jipijapa, in Manabi province. The house is made of split bamboo.

plants are the ivory-nut palm, which furnishes vegetable ivory for the manufacture of buttons, the cocoa tree, from which the cocoa bean is gathered, the fibre plant used for making Panama hats, the balsa tree or corkwood, furnishing the lightest timber in the world, and the cinchona tree which yields quinine.

The area of the country is variously approximated at between 116,000 and 176,000 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.

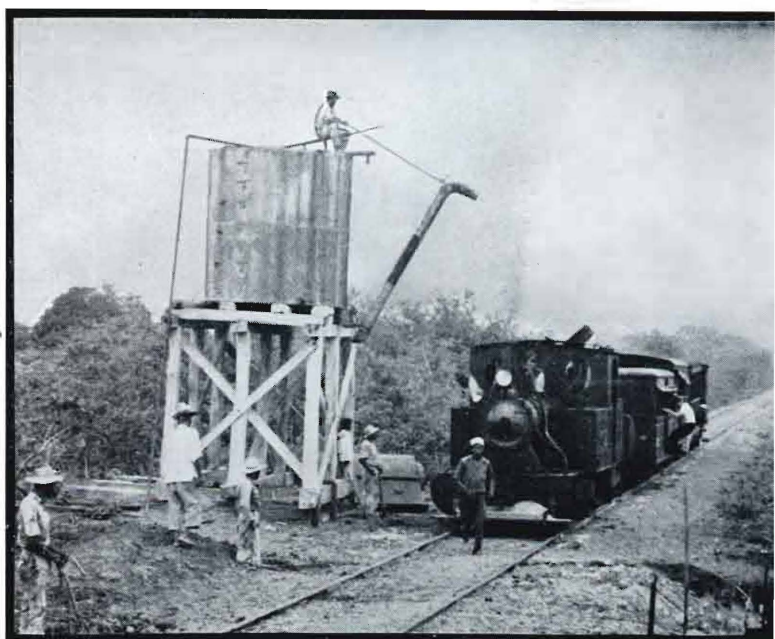
In the Andean foothills, avalanches frequently occur during the rainy season, blocking the few roads that there are, and since there are no other ways around, travellers must wait while tons of dirt and debris are cleared away. In recent years, many miles of new roads have been constructed in Ecuador 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, 290 miles in length, is a monument to railroad building genius, the tracks above Huigra 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 Zapotal.



SEARCHING

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



DRILL HERE, HERE AND HERE—

says the geochemist. From a vast criss-cross of shallow holes, samples of soil are taken for analysis (upper left). Fresh from the field, the samples go to large ovens (above) for drying, then to the laboratory where chemists (left) probe the carefully indexed samples for tell-tale traces of oil. With the last of perhaps hundreds of samples analysed and recorded, the map-maker (opposite page) plots his map showing where prospects seem most favorable.

*Photos by Robert Yarnall Richie,
Courtesy Geophysical Service Inc.*

FOR OIL

with Test Tubes

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.

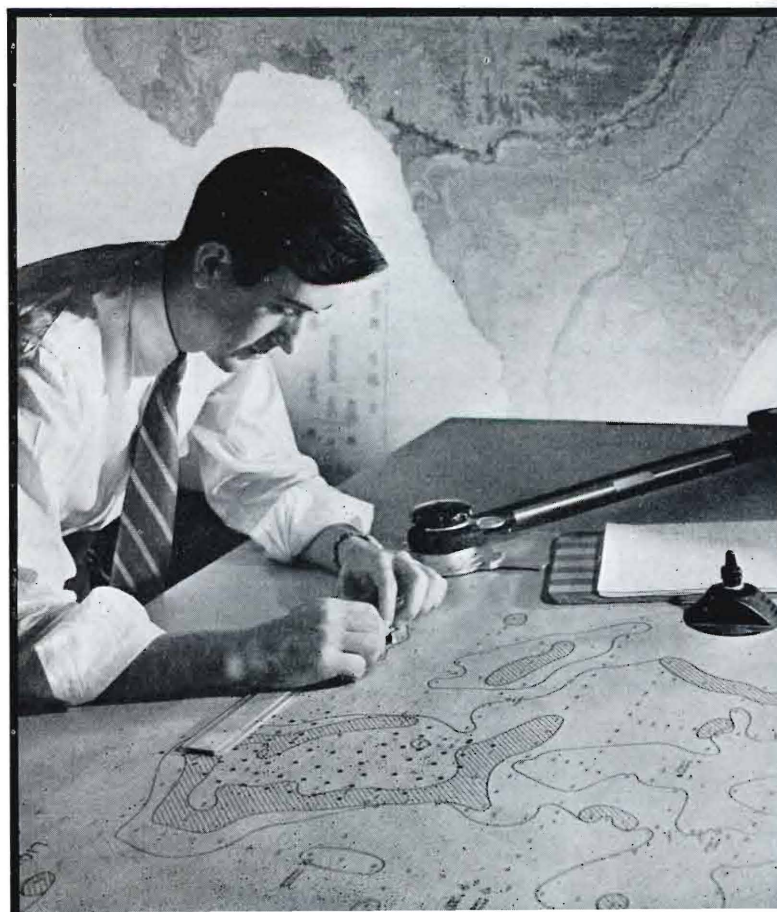
But it was not long before accessible likely-looking places of this kind had been drilled, and so with no further visible signs of oil to act as a guide, oil men for awhile were at a loss to know where to turn next. It was at this point that science came to the rescue, and in the intervening three-quarters 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 haphazard drilling and a lessening in the number of dry holes drilled, especially in those areas previously untouched by any prior drilling.

Latest 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 an area where oil is suspected, and chemists in the laboratory go to work analyzing the soil for evidence of oil vapours 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 worked its way earthward from oil deposits deep beneath the surface.

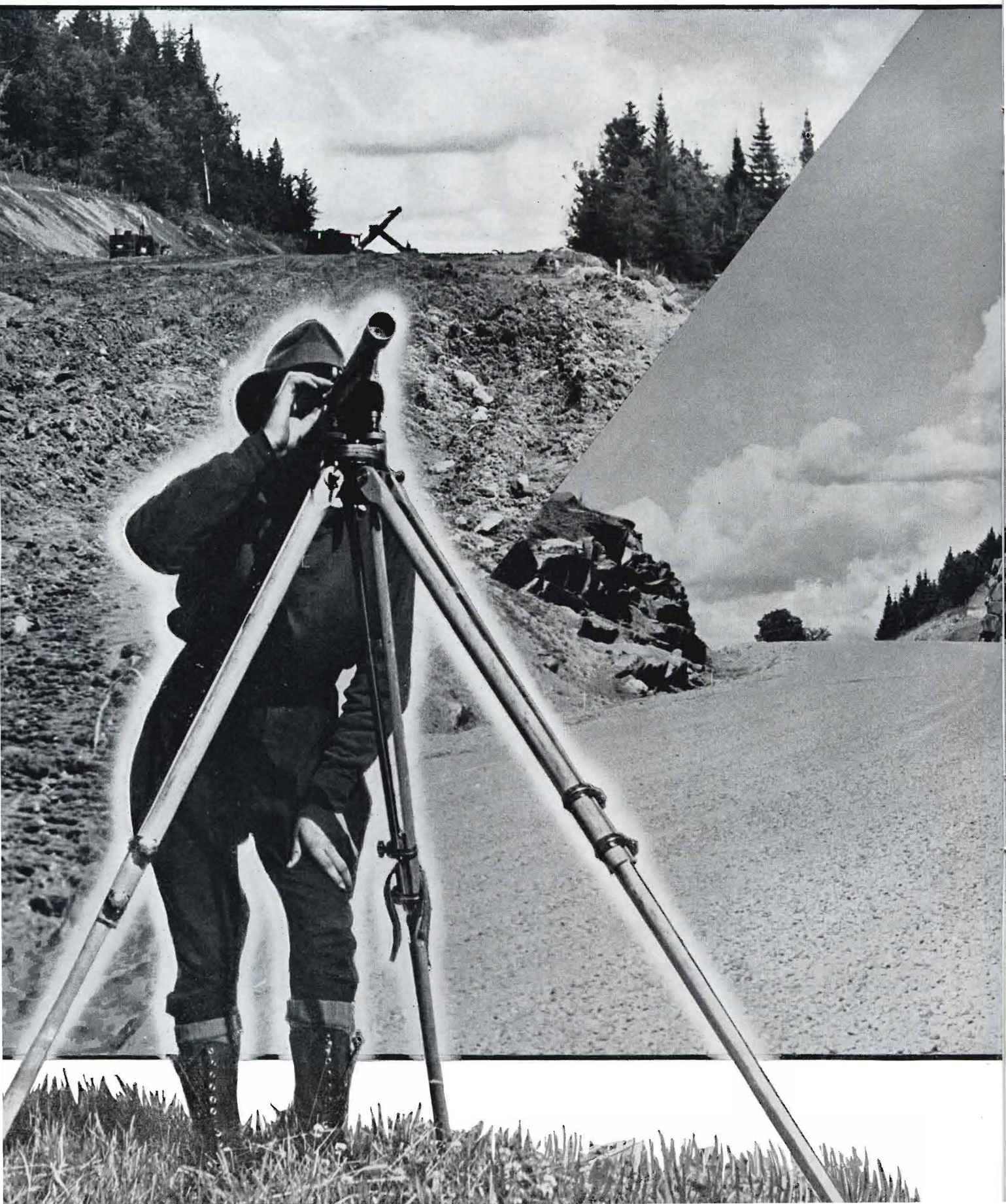
For years chemists have known that high concentrations of hydrocarbons and minerals occur over the top and edges of oil and gas fields as a result of leakage from the fields, and while geochemistry to date has been used largely as a means of qualifying geological and geophysical findings, exponents of 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 nearly all of its wax and mineral make-

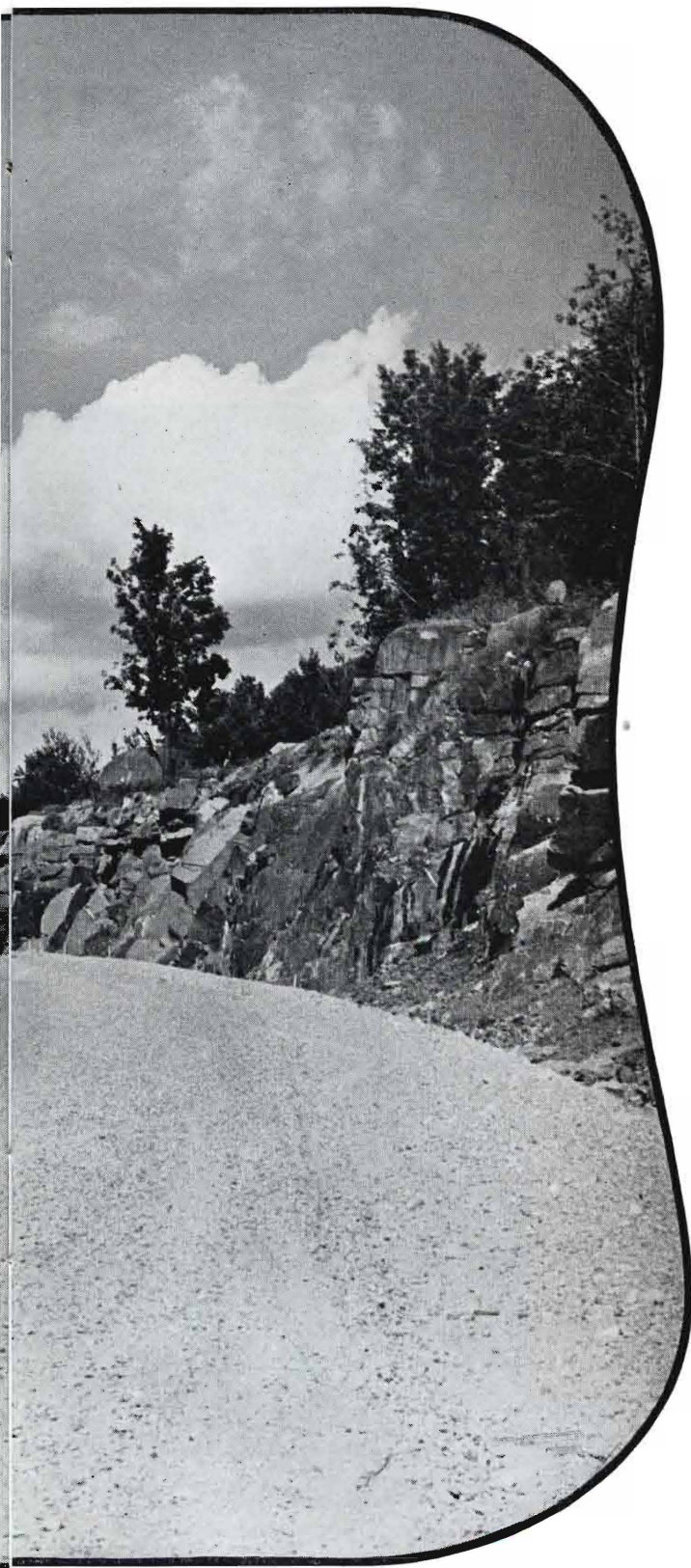
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PAVED WAYS FOR THE



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 \$260,000,000. 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.

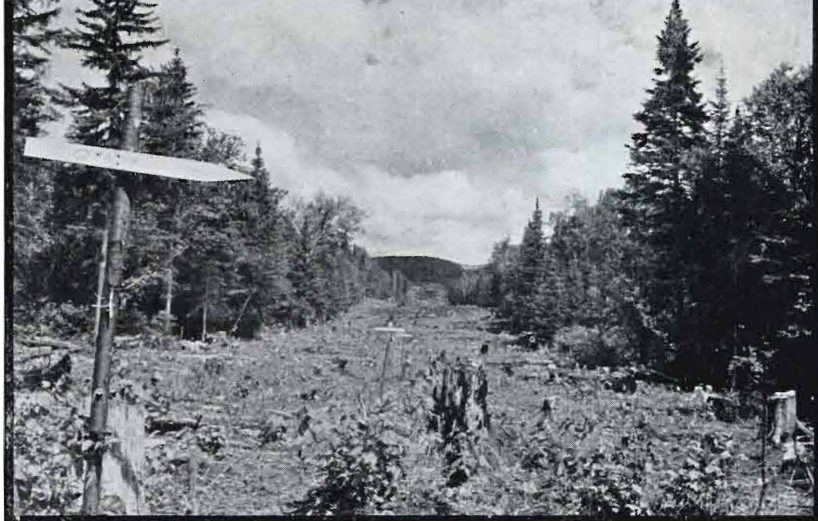
The series of photographs on the following two pages graphically describe some of the work that has been done by the road builder in Canada.

Building a modern highway is a gigantic task. Left—
A section of new road cleared of rock and trees. Right—
The new highway ready for its final asphalt surface.

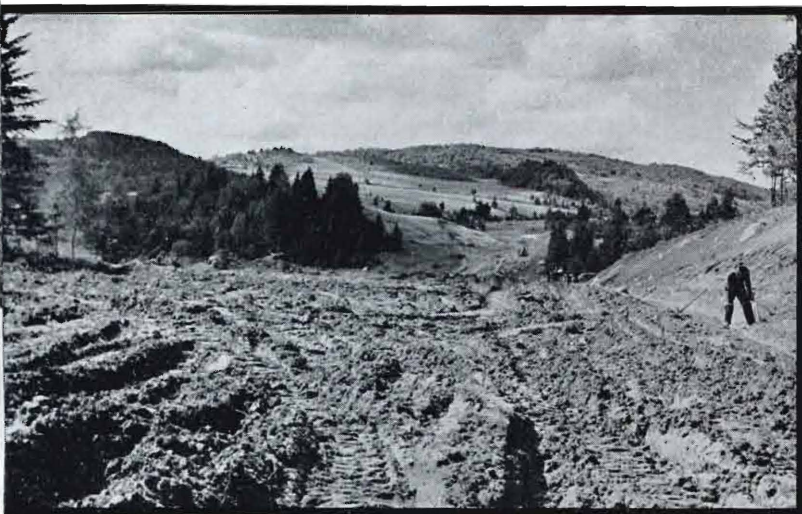
ROADS OF TODAY FOR THE TRAFFIC OF TOMORROW...

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.

—Photos courtesy Canadian Industries Limited



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.



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 road will be paved with asphalt.



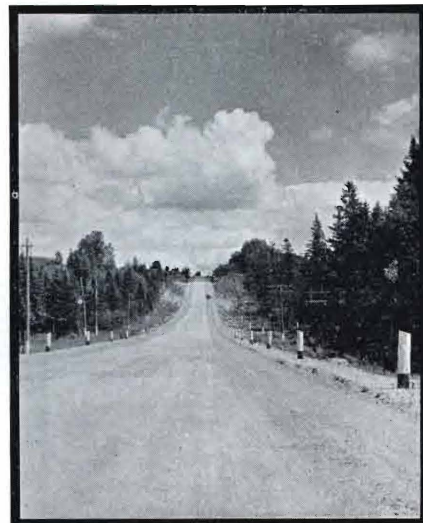
5 A mighty power shovel eats away mountains of gravel which trucks haul to the huge mixing plant, there to be combined with the asphalt and other materials.



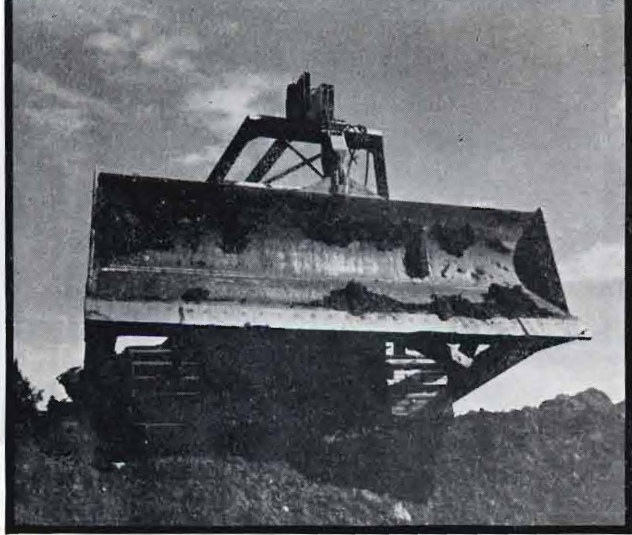
8 Blended in the mixing plant, the base materials are spread out ready for compounding into a dense roadbed.



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.



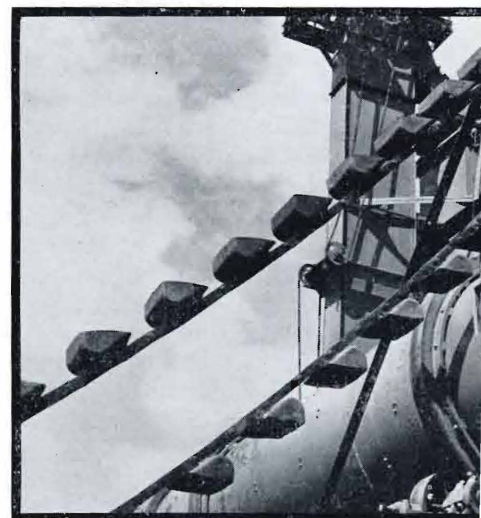
2 Known as "bull-dozers", giant diesel ploughs push their way through heavy banks of earth as they go about the job of grading and levelling the roadbed.



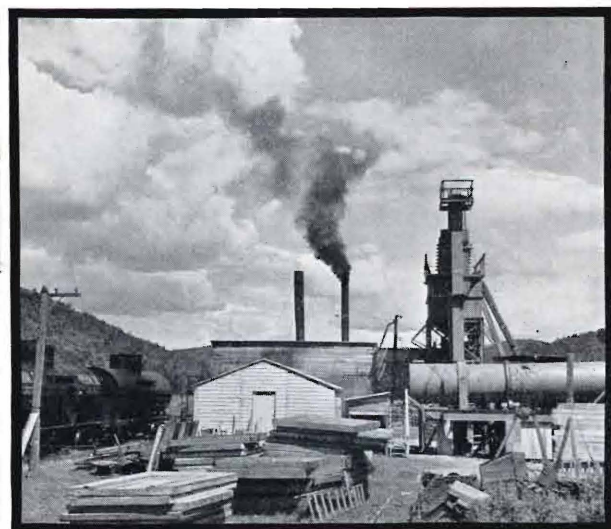
3 Powerful tractors pulling automatic unloading carts which carry 12 cubic yards of material at a time, bring in fill for the low spots—occasionally sink into the soft mud, have to be dug out.



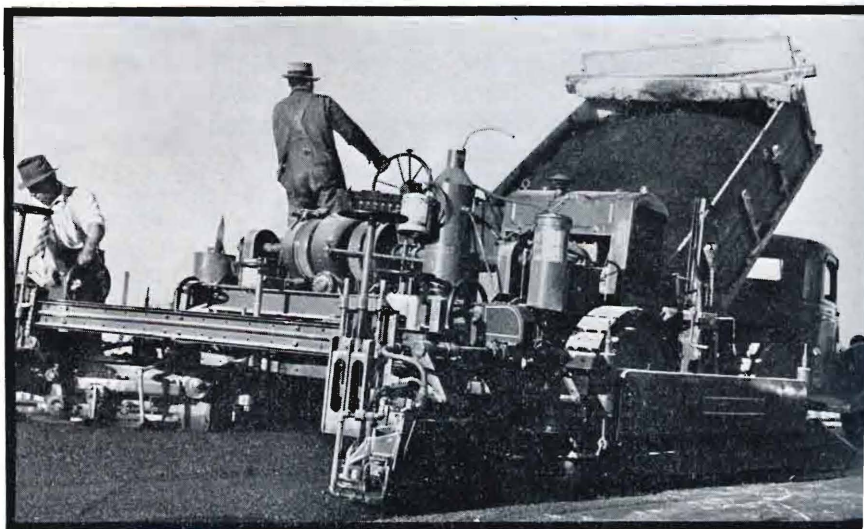
6 Towering above the countryside, the road-building equipment represents a big investment in machinery. At right is the mixing apparatus which blends materials for the road base. Left is the asphalt mixing plant where crushed rock, gravel and asphalt for the surface are combined.



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



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.

SOME 400 years ago a small but indomitable band of conquistadores rested near the banks of the Magdalena in what is now the Republic of Colombia. The scene must have been one of suspended animation for the company, clad in heavy armour, carrying cumbersome weapons, had completed 360 miles of their incredible journey through the sweating jungle. They had poled their canoes and hacked their way through all but impenetrable forests half pushing, half dragging unwieldy European horses. Bodies of their comrades were strewn down the valley behind them. Weary but erect guards maintained constant watch over the remaining horses, objects of extraordinary care since Quesada, commander of the expedition, had decreed that the four men assigned to each horse must pay with their lives for the loss of the animal entrusted to their care.

Somewhere in the camp natural curiosity must have triumphed over weariness for soldiers brought to Don Quesada a peculiar substance they had found not far from the camp. It was a black viscous fluid and might have been recognized by Marco Polo or the Crusaders of an earlier age. To the commander it meant little; he was in quest of fabulous stores of gold. Moreover he had just received news of much greater moment; twins had been born to the Royal House of Spain. In honor of this event, the encampment was named Infantas.

Oil had been discovered at the great Infantas field, but the Spanish soldiers pushed on in quest of a better-understood wealth and the rich deposits remained undisturbed for another four centuries.

In 1905 the two great Colombian concessions were under consideration by the government in Bogota. General Barco was a familiar figure in the government buildings where he was busy clearing up details in regard to his concession in the Catatumbo. De Mares, a French engineer, equally familiar in the capital, had just received a concession to an extensive area in the Magdalena Valley near the town of Barrancabermeja including the site of Quesada's camp.

There followed discouraging years for the concessionaire when many times his dreams of a rich oilfield on his concession must have appeared to be growing ever more remote. His persistence was rewarded in 1916, however, when a prominent group of oil men organized the Tropical Oil Company, surveyed the concession and located and drilled three producing wells, proving the existence of an important reserve of petroleum. The tremendous difficulty of penetrating the jungle and drilling these wells indicated the necessity for the enlistment of an organization of wide experience and very substantial resources to develop commercial production. The Tropical Oil Co. sought the aid of International

Taming THE JUNGLE

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

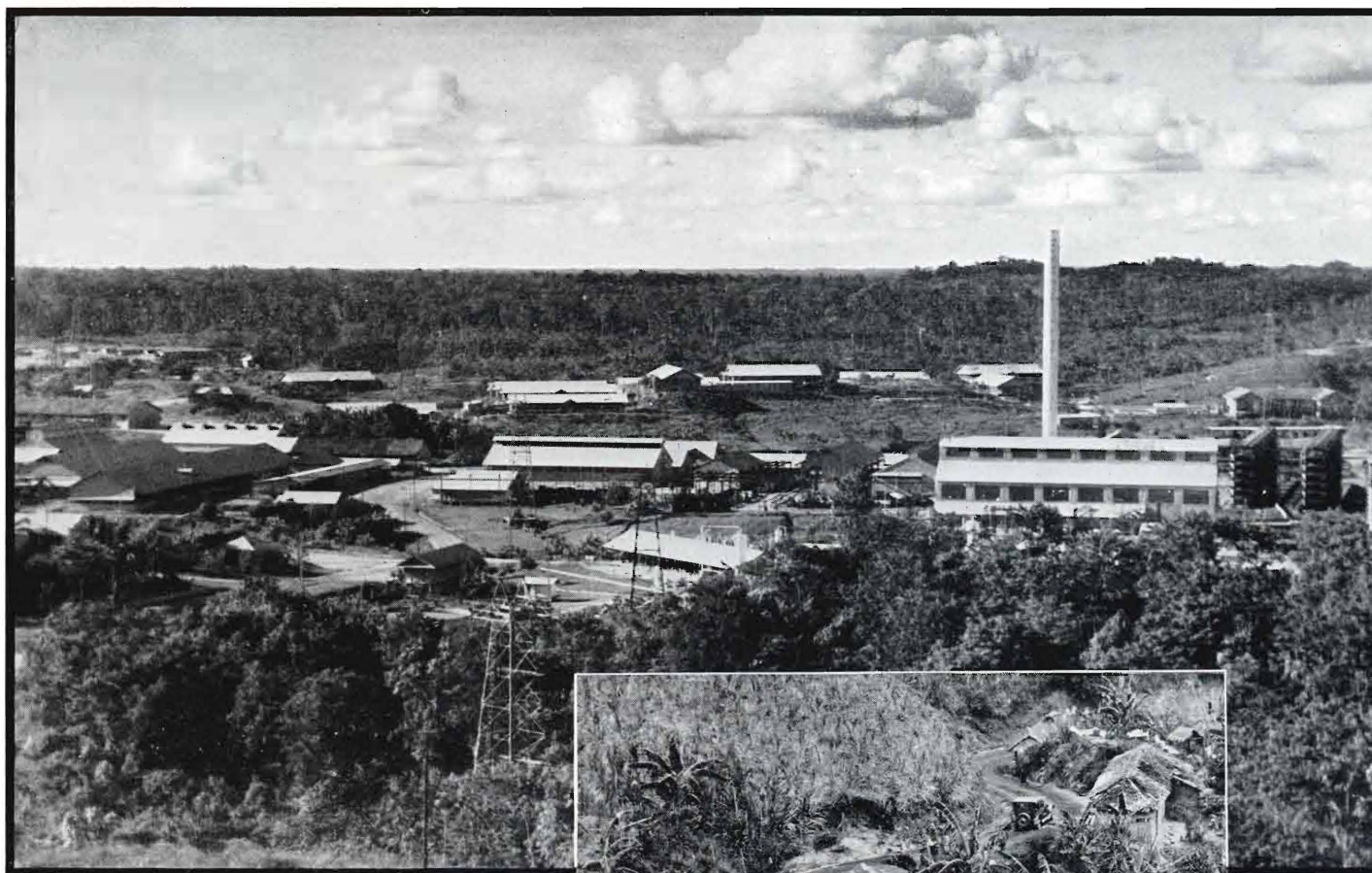
Petroleum Company Ltd., whose notable success in Peru logically attracted their attention.

Large scale development work was undertaken on the De Mares concession about 1920. 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 Barrancabermeja 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 tow boats and barges as well as a railroad from Barrancabermeja 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 were of course incidental to the main work of drilling up the field, laying gathering lines, constructing tankage, 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 sedimenta-



Above—A view of the El Centro Camp, with the powerhouse on the right. Note the transmission lines which carry electric power to the oil fields. Right—A section of the road which cuts through the jungle.



tion 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 requires 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 300 trucks and automobiles of the Tropical Oil Company's fleet. These vehicles operate only on the concession for while there is now a road to Barrancabermeja, the usual method of travel from El Centro to the river port is over the 30 kilometers of narrow gauge railroad built by the company.

In its present stage of development the field consists of two anticlinal structures comprising an aggregate of approximately 12,000 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 unconsolidated 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 rotaries 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 elec-

Continued on Page 36

JASPER NATIONAL PARK

Largest National Park in North America. Area 4200 Sq. miles. Vast region of majestic peaks, ice fields, broad valleys and beautiful lakes. Popular Alpine playground. Includes Jasper Lodge, famous resort. Park est'd. 1907.

CANADA'S MO
Showing
Canadian Rock

PREPARED BY
from data sup

COLUMBIA ICEFIELD

Largest body of ice south of the Arctic Circle. Approximately 150 Sq. miles.

BANFF-JASPER HIGHWAY

(Also known as Columbia Icefield Highway) New 186 mile motor-road connecting Canada's largest and oldest National Parks. Under construction since 1910. Opened 1940.

BIG BEND HIGHWAY

Last Western Link in Trans-Canada Highway (opened 1940) providing newer and shorter route from prairies to the British Columbia Coast.

YOHO NAT. PARK

Famed Yoho Valley, Kicking Horse Valley, Emerald and O'Hara Lakes. Area 507 Sq. miles. Est'd. 1886.

GLACIER NATIONAL PARK

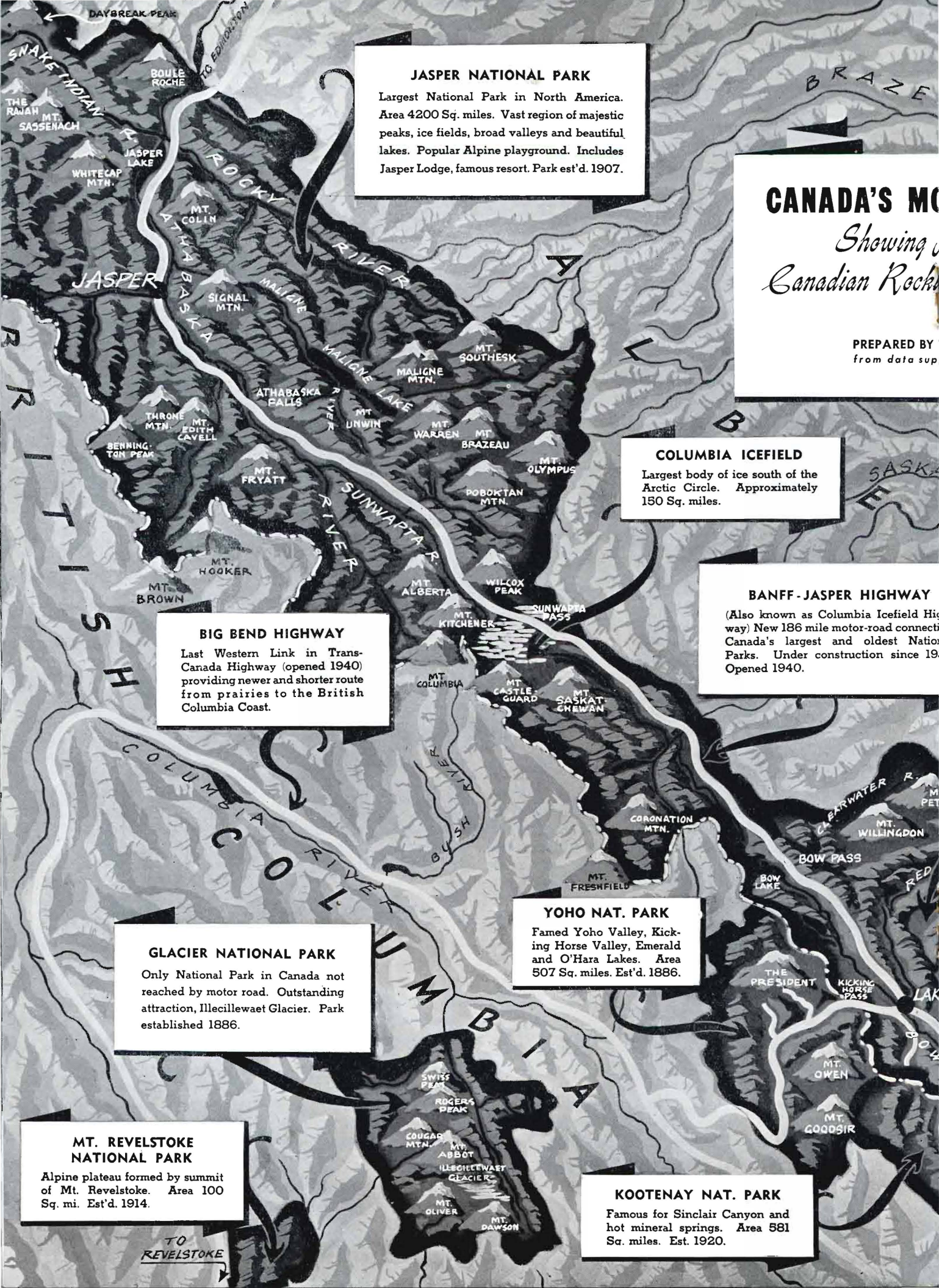
Only National Park in Canada not reached by motor road. Outstanding attraction, Illecillewaet Glacier. Park established 1886.

MT. REVELSTOKE NATIONAL PARK

Alpine plateau formed by summit of Mt. Revelstoke. Area 100 Sq. mi. Est'd. 1914.

KOOTENAY NAT. PARK

Famous for Sinclair Canyon and hot mineral springs. Area 581 Sq. miles. Est. 1920.



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 511-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 4,500 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 Revelstoke National 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 Waputik 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 Waterfowl 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 whose 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 zig-zags up the mountain side, but modern engineers have accomplished it by a traverse around the shoulder of Mount Athabaska 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-Arctic 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.

MOUNTAIN PLAYGROUNDS

*National Parks of the
West accessible by Motor Road*



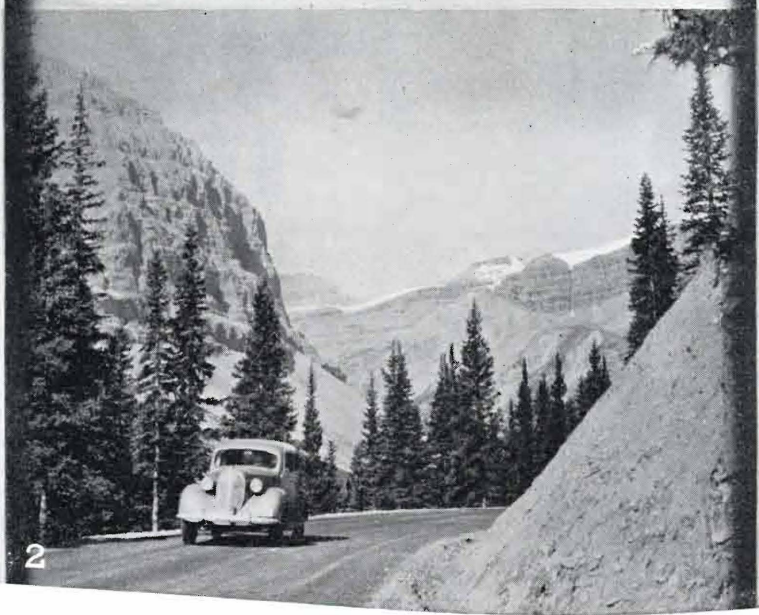
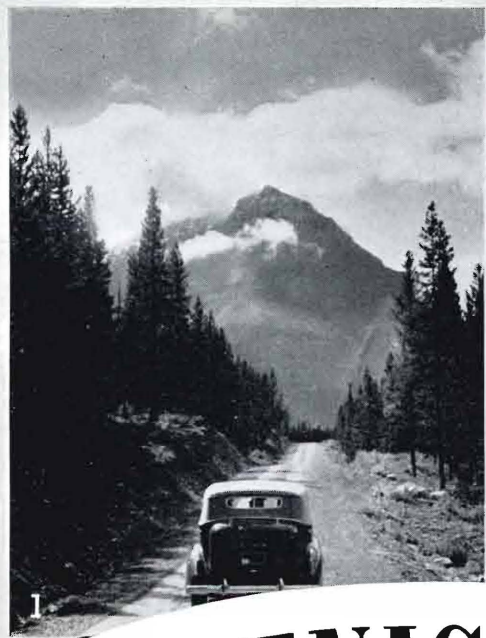
THE IMPERIAL OIL TOURING SERVICE
Sponsored by the National Parks Bureau

BANFF NATIONAL PARK

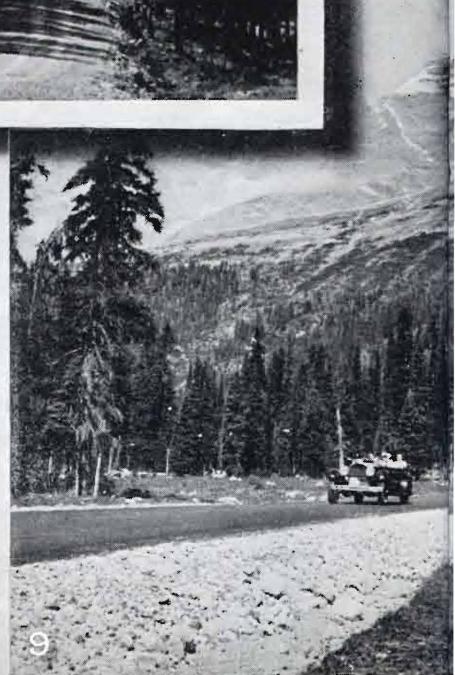
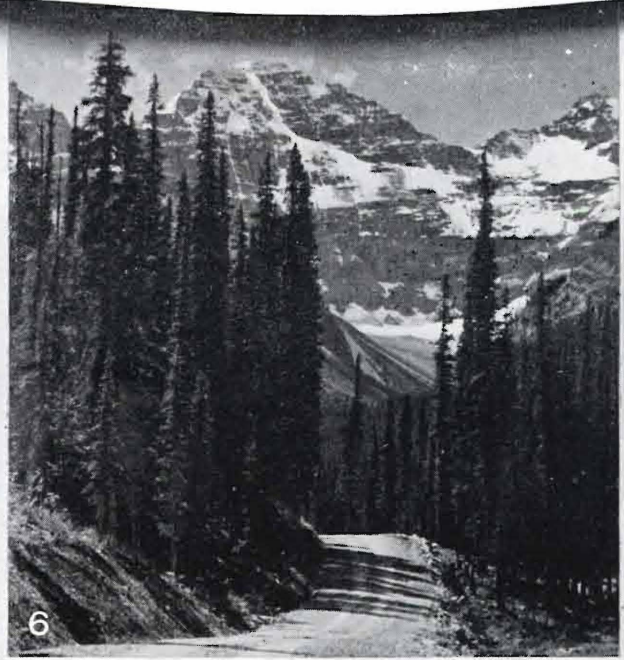
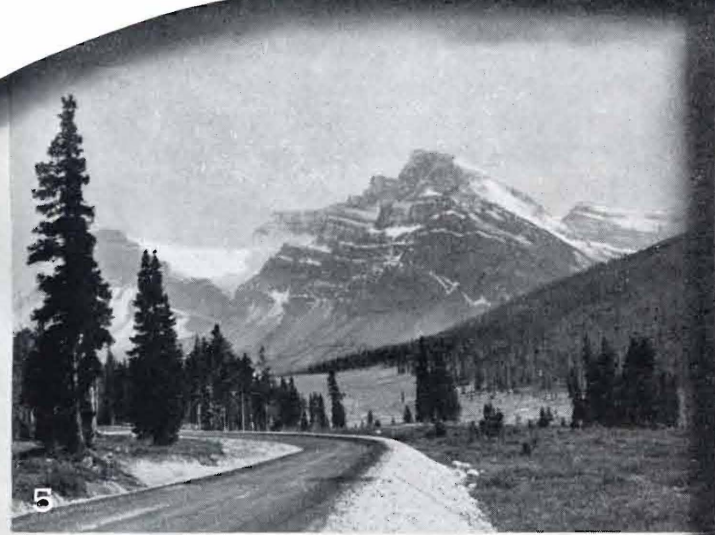
Oldest of Canada's National Parks. Established 1885. World famous mountain playground and winter sports centre. Contains famous resorts, Banff and Lake Louise. Area 2585 Sq. miles.

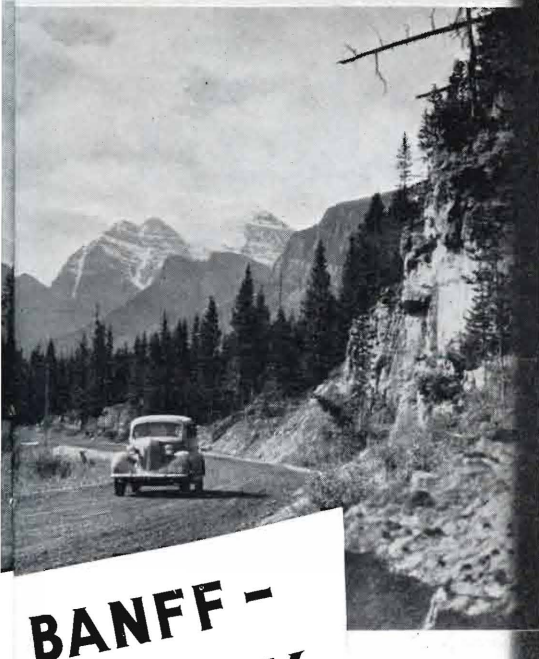
BANFF-WINDERMERE HIGHWAY

To Cranbrook, Waterton Lakes
National Park and U.S. points.

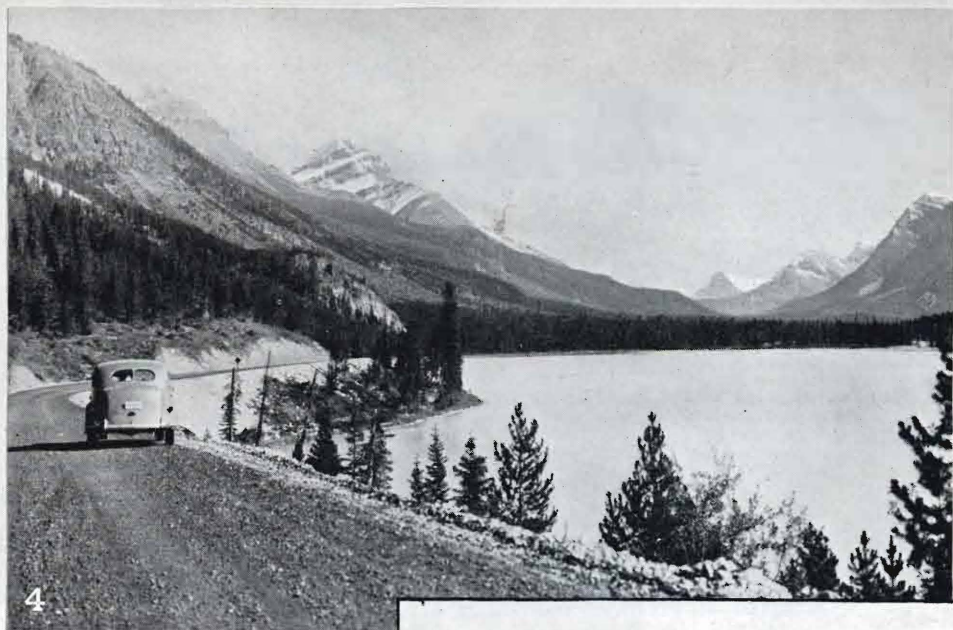


SCENIC SPLENDOUR OF THE JASPER





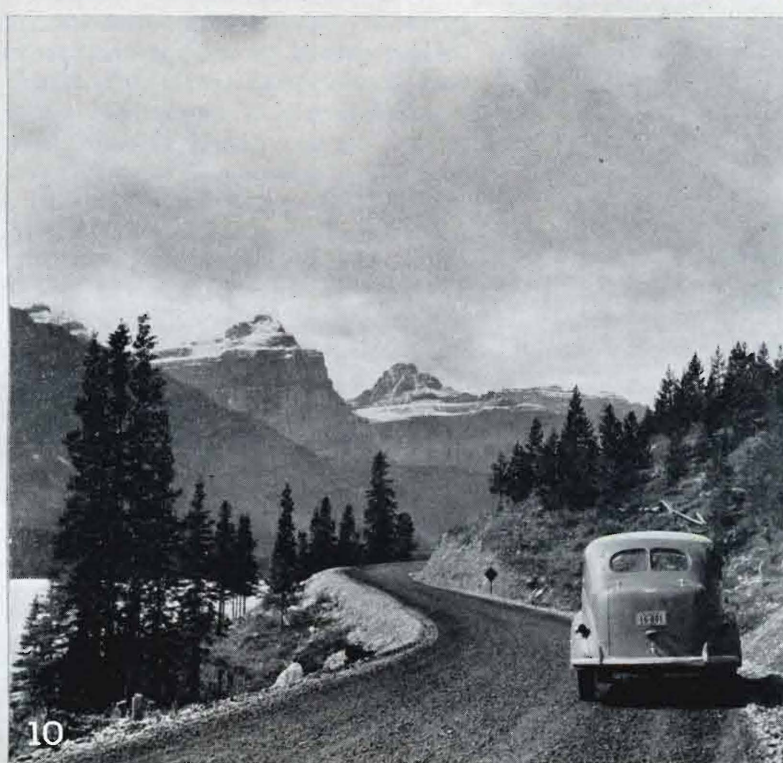
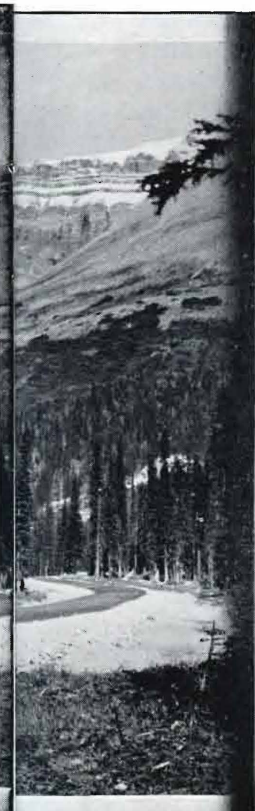
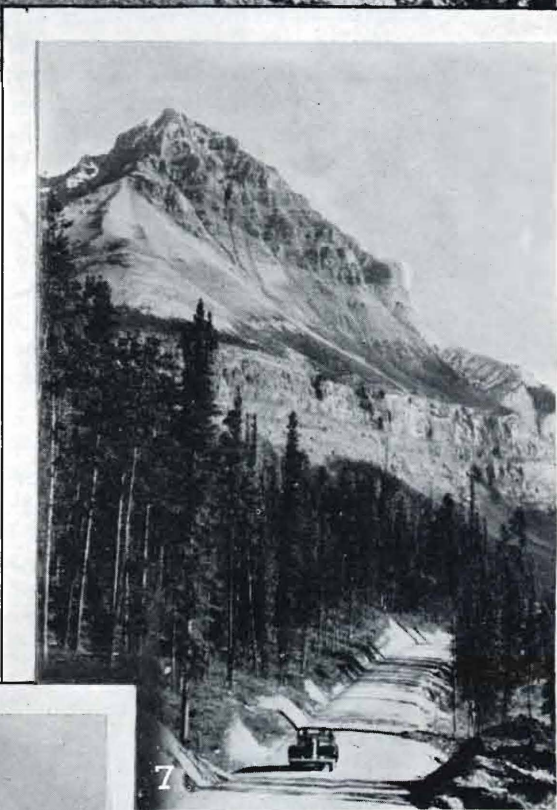
BANFF - HIGHWAY



186 miles of breath-taking beauty await 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. Athabaska. 7—Columbia Icefield section of Jasper National Park. 8—Another view of Mt. Athabaska, from the highway above Sunwapta Canyon. 9—Mt. Thompson from summit of Bow Pass. 10—Kaufman Peaks. 11—Driving south toward Mt. Chephren.

Pages 20 and 21



"This Fascinating Oil Business"

USUALLY 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 seas to the time of its delivery as refined products for many uses; and of the oil industry in all its operations from geological surveys to the marketing of the finished product.

Its author is an authority on the subject. For 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 out on a geological survey, and the different survey methods are explained to him. He watches the driller at work as he sinks his tools down 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 dedicated 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 with due allowance 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 and 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 "Who Fixes 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 spread what is left goes to the refiner. Out of this he has to pay for his crude, 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, as a readable, thoroughly entertaining over-all story of oil.

THIS FASCINATING OIL BUSINESS, by Max W. Ball (\$3.75).
Published by McClelland & Stewart, Ltd., Toronto.

THE DRILLER



The lordly driller begins to smile
When his tools get down past
the second mile,
And asserts, in words that
would shock the ladies,
That he'll drill you a round-
trip well to Hades.

—from "This Fascinating Oil Business"

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 Regimentation—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, 1938, 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, and Major L. R. Lipsett, 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 contending forces prompted by desire for gain."

Hereunder follow further excerpts from the report which comprises 528 pages.

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 suggestions as to unfair or unethical practices have been explored; the basic principles upon which the whole industry operates throughout the world 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

" . . . 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 contending forces prompted by desire for gain."

their attitude had been that the inevitable result of the sittings of a Government-appointed Commission would be recommendations for higher taxation or lower prices, and that this was a type of inquiry from which they might well stand aloof except insofar as they were forced to participate. On the contrary these companies showed a desire to make full and complete disclosure of that which the evidence would indicate was all of their activities; they also showed a willingness to collaborate, by the attendance of their principal officers 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 we had the benefit of having as accountant 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 assistance 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 of inestimable value to this Province, regardless of the value of any report predicated thereon.

• EVIDENCE WAS INDEPENDENT

"We would also like to make particular mention of the assistance rendered us by the Counsel to the Commission. We at first questioned in our own minds the wisdom of a member of the Attorney General's Department in the Province, acting as Counsel to the Commission because we felt there was a possibility that he might be subconsciously 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 conclusion of this inquiry, that Counsel to this 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 produce witnesses with knowledge; he has not been concerned to predetermine the effect of their evidence before putting them 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

voice of authority concerning the industry, men whose reputations as petroleum experts are international and whose integrity cannot be called into question. We recognize that all of this could not have been done by him without the expenditure of money and so it could not have been done without the concurrence of the Government of the day in this effort to bring about a fair and untrammelled inquiry without regard to what the results of that inquiry would be. We may add that, long though this inquiry has been, it could easily have been as long again were it not for the extraordinary capacity for work which has been displayed by both Counsel and accountant to this Commission."

The universal and competitive character of the petroleum industry is then referred to.

• A WORLD-WIDE, COMPETITIVE INDUSTRY

"It may not be as well understood, or as well remembered, that the Petroleum Industry is a competitive industry; that it is world wide in its ramifications and that the Petroleum Industry in Alberta, in any of its branches, including production, refining and marketing, cannot be viewed except as part of a world picture."

"The rapid growth of the industry has been but a successful attempt to keep pace with ever-increasing demand for petroleum products. Rapidly expanding markets and keen competition have given rise to the objective of mass production at low cost. This objective has affected the corporate structure of the industry with a tendency toward large companies in integrated form. It is only right to say that, in our view, there could have been no support for the present day range of activities of the industry, and of the other industries dependent upon it, without the dynamic technology which has been developed in every branch of the oil business through the unstinted expenditure of money by companies who were in a financial position to make large expenditures in support of scientific endeavour. The development of the technique, and the bringing into being of devices for discovery of oil, and the advancement in methods of transportation and in the processing and marketing of crude oil have been extraordinary, and are largely attributable to the efforts of those large corporations whose right to exist has been so frequently called into question by the small unit within and members of the public without the industry."

The first of the several chapter headings of the report is "Exploration" and in this section the general principles relating to seeking for oil are reviewed at some length.

• PRODUCTION COST CANNOT BE DETERMINED

Production is then dealt with and the Commission accepts the views of expert witnesses that it is impossible to form an 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 is understandable. The Commissioners express the belief that Imperial Oil Limited and other local refiners are showing a laudable desire to make use of Turner Valley crude oil in preference to foreign crude oil but say it is clear that this desire can be manifested only so long as the refiners can get Turner Valley crude oil to their refinery doors 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 from the standpoint 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 reviewed as is also much of the evidence which was given by such experts as Dr. John W. Frey, 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 oil is set by world-wide 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 8c to give the Turner Valley producers the benefit of the reduction of 8c in pipe line rate and loading charges at Calgary which was effected some time ago when the Commission brought in an interim report on the pipe line phase of the industry. The Commission's recommendation in this connection is in line with the evidence given by Dr. Brown and the opinion expressed by R. V. LeSueur, Vice-President of Imperial Oil, when he testified.

Lengthy consideration is given to the subject of wider markets and transportation costs and in these connections the Commission's views may be summarized as follows: that it is economically unsound for the Turner Valley producer to cut his price for

"... The development of the technique, and the bringing into being of devices for discovery of oil, and the advancement in methods of transportation and in the processing and marketing of crude oil have been extraordinary, and are largely attributable to the efforts of those large corporations whose right to exist has been so frequently called into question by the small unit within and members of the public without the industry."

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 crude in a southerly direction other than at a loss; that stabilization of conditions in the Illinois oil fields may have some effect in moving products from Turner Valley crude further east; that construction of a pipe line to Regina would not enlarge the market for Turner Valley crude but rather improve the producers' revenues; that no useful purpose is to be served in considering what price Turner Valley producers could sensibly take for the benefit of competing in the Ontario market because there is no likelihood of a pipe line to the Great Lakes being built until greater oil reserves are in sight.

The Commission reports that in its view and under existing conditions and without further oil discovery, the only real hope of a material extension of market for Turner Valley crude lies in reduced transportation rates for gasoline moving east from Saskatchewan and Brandon refinery points to the City of Winnipeg.

• PRICE IS FAIR AND REASONABLE

Dealing with the refining of crude oil the 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 that it is the largest refiner in the Province and that its operations are the only ones which present a complete picture for the period 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 meat 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 fairest from the standpoint of the purchasing distributors and the ultimate consumer.

After careful analysis of the figures and various adjustments and a review of the capital employed in the operation, 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 not so high as to indicate the need 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 which deals with 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 over-refining of crude, and as the oil companies either did not have the capital, or did not wish to employ it to build service stations rapidly enough to provide relief by way of retail outlets for this over-production and over-refining there was an intense competition to get dealer outlets, some of which were in competition with the company-owned stations. But even with the dealer outlets, there was not enough outlet expansion to take care of the refined products, and so we have the introduction of the jobber who disposed of the refiner's surplus in direct competition with the dealers and the company-owned service stations. It thus appears that the evils of over-production have

carried through into refining and from refining into marketing, with the result that we have an over-developed marketing system which, though efficient and convenient, constitutes a high cost mechanism.

"Turning from the general to the particular, we may say that there is no doubt the Alberta distributing system is said to be uneconomic and this adverse criticism is associated with proposals for immediate action to effect economies by statutory regulation and change. We shall have occasion to return to a discussion of this subject; for the moment we are content to say that those who are alarmed at what would seem to be uneconomic marketing practices would probably be the first to deplore a lack of service and lack of convenience and to decry the freezing of competition by rigidity of control."

• MARKETING PROFITS NOT UNREASONABLE

After many pages reviewing marketing operations in Alberta and analyzing in detail figures submitted in respect of marketing costs, etc., the Commission states: "We have not the slightest hesitancy in saying, with due regard to all the evidence before us, that on the basis of it this rate of return (7.56% on invested capital) is not an unreasonable one."

Both from the point of view of the public and the industry, great interest attaches to the findings made by the Commission with regard to alleged undue expansion of marketing facilities and alleged duplication of bulk distributing stations and retailing 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 sparsely settled areas its investment might be less, its operating cost less, and its immediate profit greater, but it is to be borne in mind that as Dr. Frey has pointed out 'there has been a pronounced tendency to extend the territorial operation of companies more and more broadly'. This may be partly due to demand and partly due to the desire of the marketer to maintain his gallonage position against competitors. It may also be due to confidence 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 served; a service that 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 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 operation 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 in 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 Imperial expansion may be to be the first in the field and to maintain gallonage position against all competitors; it may be that it is also 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 imprudent. We think it fortunate that the judgment of marketers in this Province is in consonance with the giving of adequate service to our all important farming districts, even though they be remote from large centres of population."

• IMPERIAL OIL SYSTEM IS EFFICIENT

Dealing with duplication of bulk stations, the Commission finds that the principal cost of operating bulk stations is the commissions which are paid on sales made by the agents at these stations. Analyzing figures submitted by Imperial Oil Limited and tested by its own accountant the Commission finds that with regard to bulk station expense over and above commissions, these average only .46c per gallon on all products handled. Accordingly it says: "Assuming that the elimination of duplication would reduce the per gallon cost of operating these bulk stations, apart from commissions, the total cost being only .46c per gallon, it is obvious that only a very slight saving could be anticipated and as against this, there is the danger of supplies being inadequate to meet demand in the rush seasons when the farming activity is greatest." It finds further that the efficiency of the Imperial Oil type of distribution system depends upon there being a large number of bulk stations as these permit of meeting all calls for all products at all times and, at the same time, decrease the cost of

transportation to an extent that the elimination of any considerable number of them would appear to be an uneconomic proceeding. "We think it cannot be said that Imperial Oil Limited operates more bulk stations than it needs for its particular system of distribution. We also think that this system of distribution is an efficient one."

• DUPLICATION OF SERVICE STATIONS DOES NOT PENALIZE THE CONSUMER

Duplication of retail service stations is then dealt with and the practice of the marketing companies of owning a number of service stations which are usually leased to individual operators who sell to the public on their own account is reviewed. It is pointed out that the rentals obtained from these operators are considerably lower than the taxes, depreciation and other expenses necessary to maintain the properties. This excess of expense over rental revenue, sometimes called "service station absorption", is part of the wholesaler's marketing expense and the Commission says that if duplication in service stations is affecting the tank wagon (wholesale) price of gasoline it is doing so through the effect of this expense account on the returns of the wholesalers.

However the Commission then analyzes Imperial Oil's expenses in this connection and finds that these expenses amount to about 5.2% of the total marketing expenses. In relation to total prices charged to dealers and farmers for all products, these expenses amount to less than 1% of the total price. Consequently the Commission says that it appears that the service station expense which the wholesale marketer bears is negligible when examined in the light of the total marketing expense, and that the prices charged by the wholesale marketers for petroleum products cannot be said to be materially affected by such costs. It adds however, that if duplication of retail service stations does add to the cost, no matter how little, it should be eliminated if possible but it inclines to the belief that the difficulties attaching to the elimination of the surplus are well-nigh insurmountable and that if any marketer has the volume of his business reduced by the elimination of service stations it automatically follows that in the overall picture his 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 may be rested the elimination of existing service stations by government intervention and that this should not be attempted."

Concluding its views on the question 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.”

prices charged by the wholesale marketers are not materially affected by such costs. We think that this service station absorption is a kind of undercover competition but none the less legitimate competition. Competition, whether under cover or above board, must be met, and so service station absorption is one of the factors that has a tendency, sooner or later, to lower the tank wagon price. We believe that an attempt to reduce service stations through government intervention is not desirable, first, because it is not a practicable thing to do and second, because if done arbitrarily it tends towards favoritism and monopoly, neither of which commends itself to us.

“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.”

No abuse is found in the prevailing practice of so-called “free deliveries” to farmers and the Commission cannot see that the rate of return on invested capital could in any wise be affected by this practice.

With regard to the practice of the major oil companies of loaning containers to farmers, the report has this to say:

“We are of the opinion that the use of drums for delivery to farmers by marketing companies is, under existing conditions, neither a wasteful nor an inefficient proceeding and that the investment in drums is a legitimate one and so, in our judgment, the rate of return on invested capital by the company whose rate of return is

under consideration cannot on this account be criticized.”

• **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 that any attempt to eliminate them from the marketing systems now in use would have the effect of increasing the number of refineries 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 should 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 reduction in the price of gasoline may be brought about in the Provinces 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 sooner or later called upon 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 farmer should be favored any more than any other user of gasoline through rebate of taxes on products which

he purchases for agricultural use; however it is also of the opinion that in view of the difficulties under which the farmer operates today one may be illogical in this respect for the sake of the indirect benefits which accrue to all taxpayers from anything which tends to make the business of farming a prosperous one. Accordingly the rebate of 6 cents out of each 7 cents per gallon tax paid on agricultural gasoline should continue but tax evasion should be stopped forthwith by whatever means are available, no matter how drastic.

Various methods of providing exemption from road taxes on agricultural gasoline are reviewed. The coupon system now in effect is one that facilitates tax evasion and it is recommended that instead the farmer should be required to pay the tax and make application for a refund which would be payable on proof by statutory declaration.

The Commissioners dealt at length with the subjects of conservation and proration and make various recommendations in respect of these. In effect they recommend enlarged duties for a conservation and proration board but are opposed to unlimited power for such a board and declare that there should be a "clear cut understandable declaration of policy" by the Legislature.

• SHOULD CONSOLIDATE LEGISLATION

It is recommended that the 24 Statutes in the Province of Alberta which affect the petroleum industry in some or all of its branches should be "brought under one roof" and made a separate part of a new Conservation Act.

In view of the increasing trend towards government intervention in business as expressed by price fixing legislation the observations of the Royal Commission in this connection are of particular interest. The Commission expresses no opinion as to what has been done in other jurisdictions and does not profess to have knowledge in this connection, adding "we certainly have no information as to what, if any, lasting benefits have come from government action in these provinces".

• ONE-CENT PRICE REDUCTION WOULD PUT REFINER IN A LOSING POSITION

The report then goes on to point out that if the refinery prices of all gasolines, tractor distillates and kerosene had been reduced during 1938 by only 1 cent per gallon, the refining operations of Imperial Oil Limited would have been carried on at a loss. It is also pointed out that if wholesale prices had been reduced by 1 cent with refinery prices remaining unchanged Imperial Oil would have had "the unreasonable return of only 2.8% on its marketing investment". This, it is said, should deter the Province from entering upon a plan of price reduction by legislative decree, particularly as the

industry has done well in the matter of making price cuts without mandatory direction to do so as is instanced by the fact that since February of 1936 standard gasoline prices were reduced 7 cents whereas the cost of raw materials declined only 3.7 cents per gallon.

Referring 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 undue 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.

"It may well be that this conclusion will not be well received as there are many people who are given to adverse criticism and loose talk about the petroleum industry largely because in its membership there are to be found large corporations. It does not occur to such people that a corporation may be so large that quite aside from moral considerations it may not be the part of wisdom for it to be either extortionate or dishonest. It also does not occur to such people that generally speaking the large corporation has the large volume of business and so the low cost performance which permits of it most readily and effectively lowering prices to the general public. We do not suggest

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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 medium 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 is non-existent or nominal or collusive.

"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.

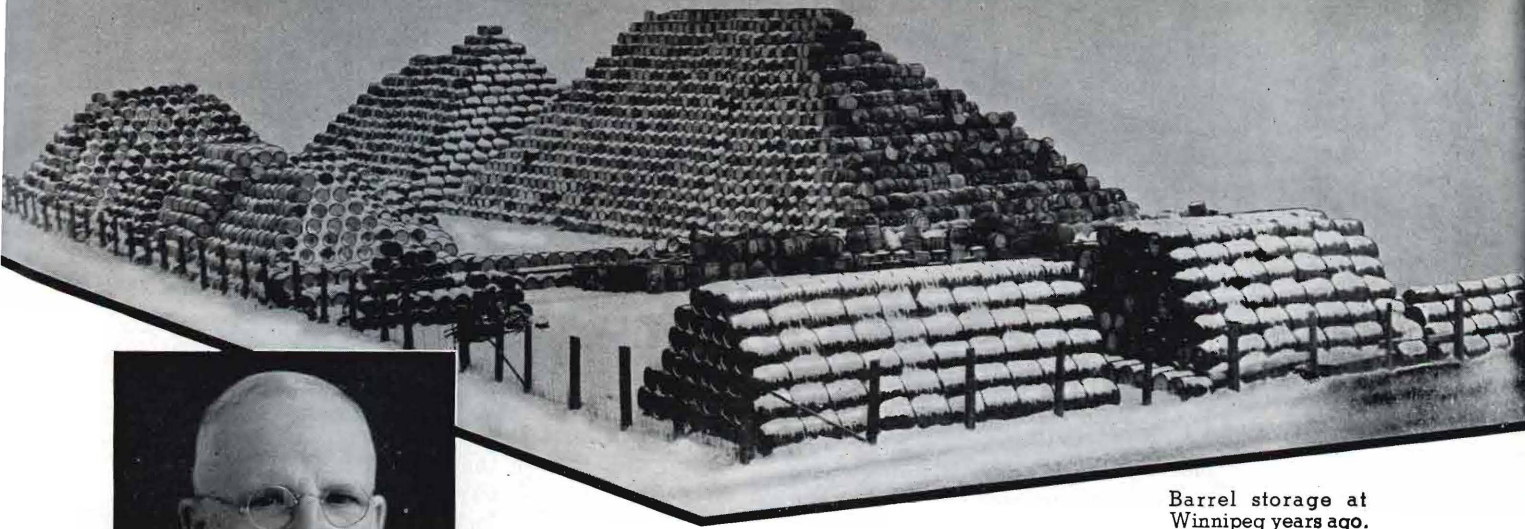
"Our opinion about this whole question of Government in business or interfering with business may be shortly stated. In our view a Government should not be in business in competition with its own citizens. In our view a Government that eliminates competition by creating a Government monopoly with respect 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 capitalistic 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 only take place when it appears to be a necessary step for the protection of the public against the evils of oppression by an industry".

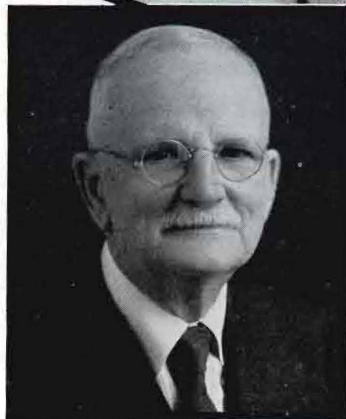
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Barrel storage at
Winnipeg years ago.



A Western Oil Pioneer

S. B. Blackhall, Imperial Oil's oldest annuitant, recalls the Company's earliest Western operations.

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 those 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 1883 became first western office manager for Imperial Oil. Retired since 1918, Mr. Blackhall at 83 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, 1857, in London, England, the date and place of his birth. In an old diary still in his possession his arrival in London, Ontario, in 1870 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 pour-

ing 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 oxcarts.

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 recalled 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. These 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. Scantlings were laid on the ground and long rows of barrels were piled on these. Another layer of boards and a final covering of hay provided fine storage.

"The new railway going through gave us our biggest customer. But there was a big demand for oil for illumination 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 says.

Carloads of oak barrels filled with oil were sped out of Winnipeg. From the end of steel ox carts relayed the big tubs to Hudson's Bay posts throughout the prairies. Private 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 reglued in Winnipeg. Before oil was poured into them for westward shipments, a second regluing 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 oxcart. 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.

Later, for more convenient handling of containers in the ox carts, a crate containing two square tins was devised by the company. These wooden frames, in which two five-gallon tins were packed

in sawdust, were widely used in long-distance shipments to western posts for many years.

Despite the many handicaps, 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 approaching the quarter-million mark.

"All this business was carried on through personal contact with buyers and by hand-written correspondence," says Mr. Blackhall. "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 trying to get 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.

"We kept a pair of long rubber boots handy in the office and they were an important item of equipment," Mr. Blackhall smiles 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 were all a team of horses could handle in that mud. Mr. Sharpe 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 even were times when we easterners got an unexpected thrill out of the new western job. One such time was when a warehouseman shouted from one of the barrel storage piles. 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 Imperial Oil family, 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 11

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, analyse 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 analysed to determine the presence or absence of oil or gas in the underlying earth.

The American method is to analyse the soil. From a vast criss-cross of shallow holes small samples of soil are taken, sealed in air tight containers and forwarded to the laboratory. The depth at which the samples are taken varies from a few inches under the surface to depths of 10 feet. Usually, however, samples taken some feet below the surface are favored because it is believed that shallow samples might be subject to the effects of erosion, contamination, etc. A small boring tool, similar to a post hole auger with a long handle, 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 traces of moisture. They are then pulverized and weighed out into uniform portions, ready for the analysis.

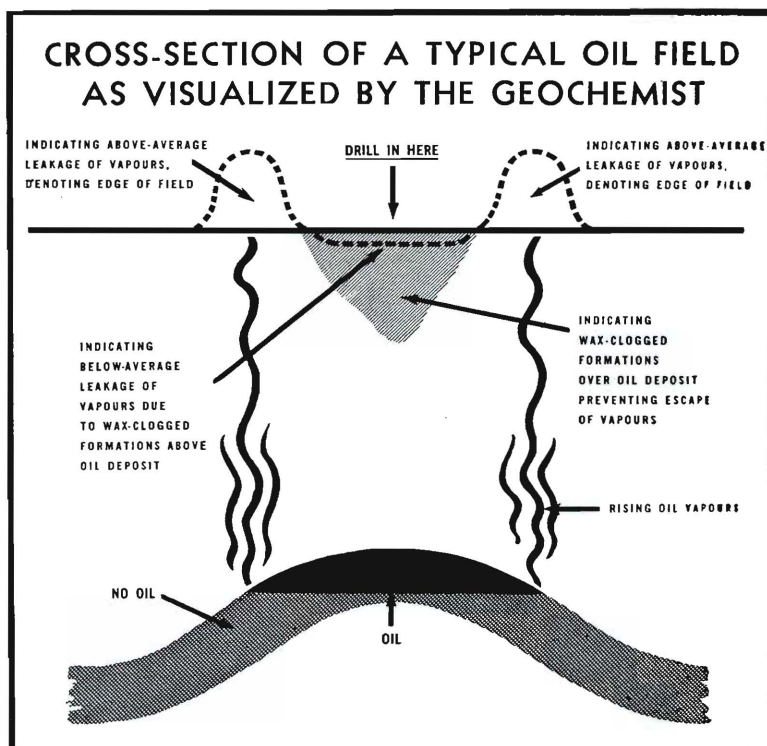
Following the analysis, the discovered hydrocarbon and mineralization values are charted on maps at their respective collection stations. With these maps as a basis, and with knowledge derived from previous surveys which were proved or disproved by drilling, the geologists will be able to determine in advance the producing possibilities 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 impervious cap. This cap retards the escape of gases over the main portion of the structure and causes a high concentration of gases leaking about 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 distillation of the oil into hydrocarbon vapors which, because of their buoyancy, tend to rise upwards through the earth to the surface. Although such formations as compact limestone and shale are usually impervious 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 absorption and by oxidation.

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



VOLUNTEERED *for* SERVICE

• MANUFACTURING DEPARTMENT

SARNIA REFINERY—Clarke, Chas. C., A/Cpl. 11th Field Batt., R.C.A.; Corbett, Jas. F., Gunner, 26th Field Batt., R.C.A.; Doherty, Thos. B., 2nd Lieut., 1st District Depot, R.C.E.; Elliott, Maynard, R.C.A.P.S., R.C.A.F.; Hayes, Alex., MacKenzie, 2nd Lieut., Essex Scottish Regiment, 1st District Depot; Hunter, Colin Co., Lieut., 11th Field Co., R.C.E.; Johns, Russell P., Sapper, 1st Field Park Co., R.C.E.; Kindersley, C.M., 2nd Lieut., 11th Field Co., R.C.E.; Richardson, R. S., Q.M.S., 11th Field Co., R.C.E.; Richardson, Thos., Lieut., 26th Field Batt., R.C.A.; Sabourin, Chas. A., Lieut., 26th Field Batt., R.C.A.; Scott, Ken. E., Sgt., 26th Field Batt., R.C.A.; Scott, Robt., Cpt., 1st Field Park Co., R.C.E.; Spence, Wm., Era 4th Class, R.C.N.V.R.; Stuart, Howard E., Lieut., 1st Field Park Co., R.C.E.; Williams, John T., 2nd Lieut., 11th Field Co., R.C.E.; Wood, Malcolm, Field Survey, R.C.E.; Wright, John D., 2nd Lieut., 11th Field Co., R.C.E.; Wynne, Jos. E., Sgt., 11th Field Co., R.C.E.

MONTREAL REFINERY—Alcide, Sylvestre, Private, 18th Field Ambulance, R.C.A.S.C.; Anderson, Thos., Gunner, No. 1 Survey, Regt., R.C.A.; Barrett, Malcolm, J., Sapper, 2nd Pioneer Batt., R.C.E.; Cyr, Frank (Firmen), Private, 4th Co., Veterans Home Guard; Darker, Alf. Wm., Private, 1st Army Field Workshop, R.C.O.C.; Gorman, Gerald, Sapper, R.C.E.; Gwillam, Robt., Gunner, 7th Field Batt., R.C.A.; Hawksworth, R.A., Signaller, R.C.A., 7th Medium Battery; Hollister, Harlow E., Private, 2nd Div., Petrol D. Section, R.C.A.S.C.; Langevin, Leo, Private, Reg. De Maisonneuve; Lecuyer, Leo, Private, R.C.A.; Leitch, John E., Flight Lieut., R.C.A.F., Quebec; McLachlan, Walter Aird, Sapper, 4th Field Co., R.C.E.; Moore, Chas. Cartmall, Sapper, 4th Field Co., R.C.E.; Nash, Harry, Private, No. 1 Field Workshop; Nash, Norman S., Private, 1st Batt., Black Watch; Plummer, Frank, A/Skipper, R.C.N.V.R.; Scott, John, Private, R.C.A.S.C.; Seale, Bruce R., Private, No. 1 Field Workshop; Simard, Dr. Rene, 2nd A.C., Flying Instructor's School, R.C.A.F.; Southern, Ernest, R.C.A.S.C., 2nd Div.; Wakefield, K. M., AC 2nd Class No. 8 (BR) Squad; Whitworth, H. H., Artificer, R.C.N.V.R.; Williams, Serrell, Motor Boat AC 2, R.C.A.F., Manning Pool, Toronto.

HALIFAX REFINERY—Carew, S. O'N., Captain, P.L. Fusiliers; Creighton, G. E., Squad. Leader, HQ. Eastern Air Command; D'Arcy, Robt. E., Corp., 2nd Fortress E&M R.C.E.; Hunt, D. W., Corp., P. L. Fusiliers, MG.; King, Robt. D., Major, G.S.O. 3; Manuel, Chas. Ed., Sapper, 6th District Depot; McKenna, John L., Corp., 2nd Fortress R.C.D.; Miles, Chas. W. E., Flight Lieut., R.C.A.F.; O'Leary, John E., B.S.M. 9th Heavy Batt. H.R.C.A.; Ross, John, Sapper, 6th District Dept.; Van Buskirk, J. H., 2nd Lieut., P.L. Fusiliers; Wise, Chas. G., Lieut., 2nd Fortress E&M R.C.E.

REGINA REFINERY—Banks, Sydney H., Private, 1st Corps, R.C.A.S.C.; Berthiaume, Louis Joseph, Private, 12th District Depot, Regina; Berthiaume, Ovide E., Private, 12th District Depot, Regina; Borton, Lionel S., Private, 12th District Depot, Regina; Brown, Grant Leroy, Private, 12th District Depot, Regina; Cardwell, E. L., Private, 10th Field Ambulance R.C.A.M.C.; Clemenshaw, C. J., Private, 1st Corps, R.C.A.S.C.; Detlor, H. R., Private, 10th Field Ambulance

R.C.A.M.C.; Drogness, Oscar E., AC/2 R.C.A.F.; Erlandsen, Geo. G., Private, 12th District Depot, C.A.S.F.; Frost, Lambert, Private, 12th District Depot, Regina; Gort, John E., Sgt., 21st Anti-Tank Batt.; Gouk, Archibald, Sgt., 14th Field Co., R.C.E.; Griffin, Wm. H., Private, 1st Corps, R.C.A.S.C.; Hanson, Herbert, AC/2, R.C.A.F.; Hollinger, B. B., Air Craftsman, No. 2, R.C.A.F.; Horne, Lionel J., Private, No. 1 Ordnance Field Park, R.C.O.C.; Howland, Robert Leslie, Private, Regina Rifle Regt.; James, Reginald, E. C., Private; Love, W. O., Private, 10th Field Ambulance R.C.A.M.C.; Nesbitt, Robt., Engine-man, R.C.N.V.R.; Nicholson, Ernest, Private, 12th District Depot; O'Brien, Thos., Private, 1st Corps, R.C.A.S.C.; Ritchie, G. A., ABS., R.C.N.V.R.; Ross, Robt. R., Stoker, R.C.N.V.R.; Stranaghan, Sam., Private, 10th Field Ambulance, R.C.A.M.C.; Wilson, Jas. T., Flight Lieut., R.C.A.F.

CALGARY REFINERY—Bell, Geo. H., Gunner, 23rd Anti-Tank Batt., R.C.A.; Blair, Jas., Lieut., 13th Field Co., R.C.E.; Harris, W. H., Sapper, 13th Field Co., R.C.E.; Hodges, Geo. B., A.C. No. 2, R.C.A.F.; Larson, Carl, Sapper, 1st Can. Pioneer Batt., R.C.E.; McNair, Ernest, M., Air Craftsman, No. 1 Squad, R.C.A.F.; Murray, W. A., Flight Lieut., No. 112 (AC) Squadron; Watson, Alex., Private, Calgary Highlanders.

• GENERAL MARKETING DEPARTMENT ...

ONTARIO DIVISION—Burns, Leslie W., Lieut., 1st Corps Petrol Park, R.C.A.S.C.; Eady, Archie D., Gunner, R.C.A. Depot; Evans, M. M., Major, Ontario Regiment (Tank); Gowan, C. E., Corporal, Essex Scottish; Henderson, D. E., Corporal, Essex Scottish; Kindersley, Robert, E. G., 2nd Lieut., 2nd Can. Pioneer Batt., R.C.E.; Lewis, Albert J., AC/2 Central Flying School; Moore, W. G., Private, No. 2 Det., R.C.O.C.; Radford, Wm. S., Gunner, 4th Anti-Tank Batt., R.C.A.; Sharp, Chas. M., Gunner, No. 1 District Depot; Shaw, Vincent, Victor, Private, No. 2 Can. Infantry Training Centre; Vickers, J. W., Driver, 1st Corps Petrol Park, R.C.A.S.C.; Wakefield, L. W., Major, Essex Scottish; Watt, A. G., Private, Cameron Highlanders; Wolfe, John F., 2nd Lieut., R.C.A.

QUEBEC DIVISION—Barracough, F. B., Sergeant, 27th Batt., 1st Anti-Tank Regiment; Broadhurst, J. T., Sergeant, 1st Batt., Black Watch; Clark, S. C., A/C 2, No. 1 Manning Depot; Cockburn, Alex., Q.M.S., 2nd Batt., Black Watch; Landreville, Robt., A.C. No. 2, Headquarters Squad., R.C.A.F.; Ritchie, Wm. S., Gunner, 1st Med. Brigade, R.C.A.; Rosevear, Harold G., Private, Royal Montreal Regiment; St. Pierre, J. W., Flt. Lieut., 2nd (AC) Squad., R.C.A.F.; Scully, Geo. W., Pilot Officer, R.C.A.F.

MARITIME DIVISION—Arsenault, J. C., 2nd Lieut., 2nd Fortress E. & M. Co., R.C.E.; Coakley, A. D., Corporal, Halifax Rifles; Currie, R. M., 2nd Lieut., Halifax Rifles; Merchant, R. T. P., 2nd Lieut., 51st Batt., R.C.A.; Minshall, N. H., Lieut., Princess Louise Fusiliers; Neilson, A. G., R.S.M., R.C.A.S.C.; Pippy, G. A., Lieut., 10th Searchlight Batt., R.C.A.; Wambolt, Jos. V., Sapper, No. 6 District Depot.

MANITOBA DIVISION—Ayden, A. J., Lieut., Winnipeg Light Infantry; Bates, John Harvey, Private, Lake Superior Reg't., C.A.S.F.; Duncan, John H., A.C. No. 11, Squad No. 1, R.C.A.F.; Greenlay, Wm. E., Captain, R.C.A. Training Centre.

SASKATCHEWAN DIVISION—Campbell, W. F., Lieut., R.C.N.V.R.; Hargreaves, Edward Eric, Sapper, R.C.E.; Hems-worth, J. A., No. 1, Ordnance Field Park, R.C.O.C.; Hulme, Thos., Gunner, 21st Field Batt., R.C.A.; Sparks, W. A., Gunner, 113th Field Batt., R.C.A.

ALBERTA DIVISION—Brown, Frank E., Flying Officer, R.C.A.F.; Dickson, R. G., Sapper, 9th Army Troop Co., R.C.E.; Harding, Harold V., Sapper, 9th Army Troop Co., R.C.E.; Hoadley, Geo. R., AC 2, R.C.A.F.; Keats, Lyle, Sapper, 13th Field Co., R.C.E.; Langford, E. P., Sapper, 9th Army Troop Co., R.C.E.; McNabb, Allan, Driver, 61st Field Batt., R.C.A.; Roberts, H. B., Gunner, 61st Batt., R.C.A.; Tyrrell, Lawrence, Sapper, 9th Army Troop Co., R.C.E.

BRITISH COLUMBIA DIVISION—Abernethy, Emerson, Lieut., R.C.N.V.R.; Bird, John Chas., 3rd Divisional Petrol Co., R.C.A.S.C.; Britton, T. M., Private, No. 11 Det., R.C.A.S.C.; Bruce, Walter, AC2,; Crosfield, E. W., Bombardier, 31st Heavy Batt., R.C.A.; Lea, R. T., Captain, 6th Div., R.C.A.S.C.; Logan, P.L., Private,; Rix, A. G., Captain, 102nd Heavy Batt., R.C.A.

NEWFOUNDLAND—Harris, Robt. F., Gunner, Royal Artillery, Nfld. Reg't.

I.O.L. SHIPPING CO.—Brown, C. W. G., Lieut., R.C.N.V.R.; Duncan, Reg. W., A/C 2, R.C.A.F.; Hickey, Lester A., Skipper, R.C.N.V.R.; Hurst, Allen, E.R.A. 1/c R.C.N.V.R.; Kent, D. A., Pay Lieut., Com. R.C.N.V.R.; Lyness, Gilbert, Gunner, 51st Heavy Batt., R.C.A.; Millen, H. J., Staff Sgt., No. 6 Detachment, R.C.O.C.; Pulsifer, Palmer E., Stoker, R.C.N.V.R.; Smith, John H., A.B.S., R.C.N.V.R.

TECHNICAL SERVICE & RESEARCH—Backman, Harold, Sergeant, 11th Field Co., R.C.E.; McIntyre, Gordon, Major, Richards, Chas. V., Sergeant, 11th Field Co., R.C.E.

56 CHURCH STREET—Beecroft, Geo. (Purchasing & Printing), Major, 2nd Army Field Workshop; Bray, John F. (Secretary's), Signaller, No. 32 Co., 2nd Div., Signals; Brown, Harry (Maintenance), Private, No. 2 District Depot; Burns, Thos. (Maintenance), Private, 1st Brigade Co., R.C.A.S.C.; Hamilton, John W. (Legal), Lieut. R.C.N.V.R.; Madden, G. E. (General Sales), Lieut. R.C.A.; Murray, J. E. (Purchasing & Printing), C.S.M., 2nd Field Park Co., R.C.E.; Sanderson, Jas. H. (General Sales), Captain, 2nd Division Signals; Walsh, Chas. (Maintenance), Private, No. 2 District Depot; Wrenshall, C. M. (General Sales), Captain, 11th Field Co., R.C.E.

F. J. WOLFE RETIRES

ANNOUNCEMENT was made recently of the retirement of Frederick J. Wolfe, Chairman of the Anglo-American Oil Company, Limited, London, England, on account of ill-health. The announcement was of particular interest to members of the Imperial Oil family because of Mr. Wolfe's association with Imperial Oil for many years. Although it is more than nine years since he resigned his position as Vice-President of Imperial Oil Limited to become chief executive of the Anglo-American Oil Company it seems but a short time since he was in his office at 56 Church Street, Toronto, directing the marketing activities of the Company.

Mr. Wolfe was born in Brantford, Ontario, and for 38 years has been actively engaged in the oil business. He began his career by answering a help-wanted advertisement of the Queen City Oil Company at Toronto in 1902. This company was one of the first units of the Canadian oil industry and acted as a marketer for Imperial Oil before the two concerns amalgamated. Mr. Wolfe's first duties were those of a statistical clerk. His ability led him through positions of increasing responsibility to the post of Vice-President in charge of Marketing and in 1931 he was invited to head the Anglo-American organization which operates throughout the British Isles. In this position he made many friends and at a dinner held in his honor on April 12th last in London regret was voiced at his decision to retire.



Frederick J. Wolfe

During his three decades of service with Imperial Oil Mr. Wolfe earned the regard of his associates throughout the organization for his friendly human qualities as well as for his business ability and on the occasion of his retirement he takes with him the sincere good wishes of the entire Imperial Oil family.

TAMING THE JUNGLE

Continued from Page 17

tric power for practically all plant and field operations outside of drilling.

Production from the field is run to the refinery where it is processed and products distributed throughout the Republic. No refined products except fuel oil are exported. By far the greater part of the crude production goes to the Andian National pipeline which transports it to Mamonal on the Caribbean for shipment by tanker to world markets.

The refinery, located at Barrancabermeja, 18 miles from El Centro, is a complete installation consisting of a crude still battery, a two stage distillation unit, a phenol plant and an asphalt plant as well as plants for making lubricating oils and greases, drums and tins, together with loading facilities and tankage. Practically the entire petroleum requirements of Colombia are furnished by the Troco refinery.

Bogota, the capital, represents the largest domestic market and to reach its 8,400 ft. elevation, petroleum products must be shipped up the Magdalena River to La Dorada, there by rail to Bogota. Medellin and Cali represent other important centres reached by combinations of river, rail and road transport. A road has recently been completed between Barrancabermeja and Bogota, but the river

still remains the principal avenue for distribution of refined petroleum products.

As early as 1922 a fleet of four stern wheel steamers with eight barges was placed in service. There are now nine steamers and 40 barges. As the river current reaches a velocity of seven miles per hour in places, considerable power is required to navigate the many tricky bends. During 1939, 2,519,649 bbl. of bulk products were moved on the river at the rate of approximately 15,000 bbl. per trip. The development by Tropical Oil of the system of pushing barges ahead of the steamers instead of towing them which is customary in other parts of the world, is the only thing that makes it possible to move such quantities of cargo with the present efficient fleet. The company maintain their own dry docks and designed and developed all their own fleet with the exception of the four original steamers. The crews are entirely Colombian.

The foresight and persistence of those connected with the development of the De Mares concession has been rewarded by building this single concession to a point where Colombia is the world's ninth largest oil producer.

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AID FROM THE SOUTH

WISHING to contribute to their country's war effort, the women of Talara 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 organization which had already been formed in the capital by ladies of the foreign colonies and Peruvian sympathizers, 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 designa-

tion "Cruz Roja Aliada Franco-Britanica del Peru, Talara-Negritos Branch".

Soon after its inception, the ladies' committee organized a bazaar, which was held at the Talara 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 remitted through Lima to Red Cross Headquarters for their disposition, and such remittances have now reached the imposing total of four thousand nine-hundred soles; nearly \$900 at current exchange rates. The remaining twenty-five percent is retained by the local committees 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.

**ROLL
OUT
THE
BARREL!**

