Imperial Oil Review

December-January, 1949-'50

Steel for Canada's New Pipe Line

See 'Artery For Oil' Page 2
As the world enters upon a new decade and the beginning of a new half-century, the prophets are at work. Whatever they may have to say about other countries, almost unanimously they predict a bright and expanding future for Canada.

There is good reason to believe the Canada of tomorrow will have an increased population to develop and use the great natural resources of this still-young land; our agricultural and industrial capacity will continue to grow; there will be further mechanization of our farms and factories; our transportation and communication systems will become more rapid and more complete; there will be new comforts in the homes of our citizens.

This progress would seem to be inevitable. It might be retarded by unforeseen events but at the worst Canada's growth would be no more than briefly postponed.

Equally inevitable is the fact that these developments should take form will mean an increased consumption of petroleum. Canada's oil industry will meet the problems of supplying an ever-growing demand for improved products, of providing the services required by the public, and of finding and developing assured reserves of petroleum.

It follows that the dramatic growth of Alberta's oil fields in the past three years is of great importance to Canada. Western Canada has become one of the most active oil exploration and development areas in the world. Large reserves have been established which will supply the demands of the prairie provinces for many years to come and which have taken Canada almost one-third along the way to self-sufficiency in oil.

The benefits of the Alberta discoveries will be extended to wider areas of Canada by the construction of the country's first great pipe line for oil as described in the following pages. The line will supply Ontario refineries and overcome part of the distance problems that have handicapped further growth of the western fields.

The pipe line is a major construction project, involving the investment of large amounts of capital and the organization of brainpower, labor and materials on a large scale. The line is being built and will be operated by the newly-formed Interprovincial Pipe Line Co. Although Interprovincial was sponsored by Imperial Oil Ltd., Imperial's primary concern was in getting oil to market, not in getting into the pipe line business. Accordingly Imperial has not retained a majority interest in the new company.

The line will represent a substantial addition to Canada's transportation facilities and it may be followed by similar projects of importance. Recently Dr. O. B. Hopkins, Interprovincial's president, said: "Canada is witnessing only the beginning of a new era in oil development and in the transportation problems which accompany it. Other pipe lines will probably have to be built to provide markets for the ever-increasing flow of Alberta's wells."

The new pipe line is one activity of the oil industry that will help to assure brighter things for Canada's future. Its effects will be beneficial for Canadians everywhere.

ON THE FRONT COVER:

Our front cover shows the rolling of the first steel plate for Canada's new pipe line at the Steel Company of Canada's rolling mill at Hamilton, Ontario. Stelco will supply 57,000 tons of special steel plate. The assignment, which was started early in June, 1949, will not be completed until this spring. It is the largest plate order Stelco has ever received and represents seven to eight per cent of the company's steel-making capacity over the 10-month period.

Miles of pipe stretching across vast deserts help to link Middle East crude to the markets of the world. Here is a section of the famous Trans-Arabian pipeline which will reach from Persian Gulf to Mediterranean
Artery for Oil

Serving the Nation: Construction of the great new pipe line will enable Alberta crude to reach wider areas of Canada

From some points of view, a pipe line is simply an engineering problem. It's made up of steel and trusses and pumps and terminals. Looked at superficially, a pipe line is just glorified plumbing.

But a pipe line has two ends, and there are people at each end. And that simple, obvious fact immediately makes a pipe line a problem in economics. No longer a dead piece of machinery, it becomes a vehicle through which one group (the oil producers) serves another group (the oil consumers). In the process petroleum moves one way and money moves the other way, and that's economics. And it follows that the line must satisfy the people at each end, the producers and the consumers, if it is to be sound in its economics.

Let's look first at the start of the pipe line, the oil producer's side of the picture.

To keep in business, the oil producer has to be able to do two things—he has to be able to find oil and he has to be able to sell it at a satisfactory price.

If he finds a small amount of oil, he can probably sell it in nearby markets without too much difficulty. This was the story in Alberta before 1947. Production from Turner Valley and other fields was readily absorbed within the three western provinces, often within Alberta alone.

Since the Leduc discovery, that picture has changed and the position of the oil producer in Alberta is one more typical of the producing end of the oil industry. Instead of finding a little oil that can be sold near at hand, the Alberta producers have found a lot of oil that must find markets at some distance.

Right here the producer comes up against one of the basic facts of economics—oil has to pay its own way to market. When the producer looks at crude oil prices in some distant market he must always remember that he doesn't get that price for crude until it's delivered. It's up to him to pay the cost of getting it there.

To take a specific example, the price of an average crude delivered in the Sarnia area is about $3.50. For crude of the same quality a producer in Alberta—or anywhere else—could get only $3.50 and from this he would have to subtract the cost of carrying the crude to Sarnia.

If the Alberta producer sent his oil to Sarnia by rail all the way it would cost something like $3.00 a barrel to get it there. He would receive about 10c a barrel for his oil and there would be no incentive to continue production or to search for new fields.

Obviously, if the producer is to go on seeking and producing petroleum, he must find some cheaper way of getting his oil to market. A market that's $3 away is out of the question. But a market that's, say, $1 away may be quite attractive, may even lead him to intensify his efforts in the field.

By pipe line and lake tanker, markets in eastern Canada might be somewhere around $1 a barrel distant from the Alberta producer. (All these figures are rough estimates since no one can talk accurate dollars and cents until all the costs are known.)

This illustration shows pretty clearly how an oil producer regards a pipe line. To him it spells the difference between a large and a small market, and that in turn tells him whether it will be worthwhile to put more time, effort and money into the search for oil.

But suppose you gave the producer a choice between two pipe lines? Suppose one of them followed a roundabout or hilly route at high cost, and the other followed a straight flat route at low cost, but that both of them ended up at the same destination. Here again the answer is obvious. The producer will choose the low-cost route, because that will give him
Rugged country like this would create many difficult engineering problems if the line had to be built from Manitoba to the Canadian hilly and rural areas. The southern route is comparatively flat, 812 miles shorter, and saves $10 millions in construction costs.

The crude will spread more widely if transport costs are kept low, is of tremendous importance to the consumer. For, except at the fringe or "high water mark", everybody within reach of the new crude gets some benefit from lower crude prices. Obviously, the farther that fringe can be pushed back, the more people will benefit from the lower crude prices that push it back.

So here you have two groups of people, the producers at one end and the consumers at the other, both of whom want to see the pipe line as straight and efficient as it can possibly be. The producers want to see it laid efficiently so that they can get the best possible return. The consumers want to see it laid efficiently so that the greatest possible number of consumers will get the price benefits that result.

This explains why the pipe line will run in a straight line as possible, down across the prairies and over the international boundary to Superior, Wisconsin. At this point, the westward tip of Lake Superior, it will be pumped into lake tankers which can carry the oil to any desired destinations on the Great Lakes. To add to the existing fleet of Canadian tanker ships orders have been placed for the construction of two new tankers which will be the largest ever built in this country.

The pipe line will not mean an end to and across the prairies in an effort to lay oil down at the door of existing refineries. This is because such tankers put into the line add to costs and so reduce the net-back to the producers and restrict the number of consumers that the line can serve.

The same reasons explain why the line is going down to a United States port instead of remaining in Canada to come out at one of the Canadian ports on Lake Superior. An all-Canadian route would add 121 miles of rough country to the line, a distance that would add some 12 per cent. to its cost. It would also increase the cost of operating the line by approximately 20 per cent.—a rather serious obstacle to the movement of oil through the line.

But besides the producers and the consumers, there's another important group who are interested in seeing the line built and operated as economically and efficiently as possible. These are the people who are connected with the operating and financing of the line itself.

This is the group which has to take the risks and make the decisions. On them is the responsibility to see that the line is built in such a way that it will carry its full quota of petroleum. They have to keep the line operating at the highest possible level, which means that they must arrange things that producers will put plenty of oil in at one end and, in turn...
sumers take it all out at the other. Anything which would reduce the throughput would be bad business for the pipe line operators.

Of course, this sort of responsibility rests on any- one who is in the transportation business, whether it's a railroad, a steamship line, a bus service or what have you. But with pipe lines, there's an important difference. A pipe line carries only one kind of freight. It's true that some lines carry products like gasoline, and some have switched to natural gas instead of crude oil, but by and large a line that's built to carry crude is kept in that service.

In this way, a pipe line is a good deal different from a railroad, which can carry anything. It's even different from an ocean-going tanker, which is pretty well confined to petroleum and its products but can carry them anywhere there's deep water. A pipe line hasn't any of this freedom; it's nailed fast to one product and one route.

As a result, anyone planning to build and operate a pipe line has to keep his attention glued to the needs of the producers at one end and the consumers at the other. If the line he builds fails to satisfy both groups, the pipe line operator knows that it won't be successful. And if that should happen, there's nothing much he can do about it.

So far we've discussed these groups, the producers at one end of the pipe, the consumers at the other and those who operate the line. There's a fourth group—those who live in communities along the route of the pipe line.

Some of the people in these communities seem to believe that there is a considerable advantage in having the pipe line come direct to their cities, instead of passing by on its direct trip to the lake.

As it is, refineries in the off-line cities will be served by rail or smaller pipe line and it is true that the cost of delivering crude oil in this way may be somewhat higher than it would have been if such a centre had been on the direct and economical route.

EDMONTON - GREAT LAKES PIPE LINE

ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
TORONTO
SARNIA
CALGARY
REDWATER
LEDLER
EDMONTON
WINNIPEG
REGINA
CROMER
CREMORA
GREINA
CLEARBROOK
SUPEEIO

STORAGE CAPACITY WILL EXCEED 1 MILLION BARRELS

TOTAL LENGTH 1,150 MILES—ESTIMATED COST, $90,000,000.

450 MILES – 20" PIPE
INITIAL CAPACITY
95,000 BARRELS/D.
TO BE COMPLETED IN 1950

340 MILES – 16" PIPE
INITIAL CAPACITY
70,000 BARRELS/D.

360 MILES – 18" PIPE
INITIAL CAPACITY
70,000 BARRELS/D.
TO BE COMPLETED BY SPRING OF 1951

But to deduce from this that off-line centres would be better off if the pipe line were to be diverted in their direction would be pushing the argument too far. For each diversion would add considerably to the cost of reaching the main goal—the lakes—and in so doing would cut down the return to the producer and cut down the volume carried. This, in turn, would make it more costly to reach those off-line centres which would appear at first glance to benefit if the pipe line had been diverted through them. And if the added cost were charged against the centre requesting the diversion, as would be quite proper because it would be the only one to benefit, the resulting cost would in general be greater than if a spur line were built from the main straight line.

The alternative to charging the extra cost to the community would be to deplore the producer’s price further. But putting a squeeze on the oil line would be a very short-sighted policy, since it would certainly reduce his profits and therefore his funds available for wildcoting his way outwards to new fields. The hopes of the west are not pinned solely to Leduc, Redwater and the other known fields, but to the undiscovered pools that may lie beneath the plains of Saskatchewan, Manitoba and the Northwest as well.

So, much though the pipe line builders would like to see their project pass through all the major refining centres of the west, they know that they have to hang out a “no detour” sign and obey it rigidly.

For while a pipe line is only a ribbon of hollow steel, it is alive in the economic sense. Like the tendrils of an obscure plant, it must push its straight and speedy way toward the sunlight. If it doesn't, its roots will suffer.
Why the Pipe Line?

As a result of the wide interest in the plans for the pipe line, many questions are being asked about the broad aspects of the project. The following are some of the more frequent questions with brief answers supplied by the pipe line officials:

Why is the pipe line being built?
Answer: This subject is treated at length in the accompanying article. In brief: Oil production in Alberta has risen to the point where it has exceeded the requirements of the present market in the prairies and is pressing for further outlets. If the oil is to serve wider areas, the great transportation obstructions to be overcome. Construction of the line will provide the most economical form of transportation for oil from Western Canada, permitting it to enter Ontario markets.

Why not a Trans-Canada oil pipeline?
Answer: In entering areas east of Winnipeg, the present fringes of the market, Alberta crude must displace U.S. and South American crude that is now being used in Ontario. Canadian crude has no special quality that makes it more suitable for use in Canada than many other crudes and it must, therefore, meet the price at which imported oil can be purchased. This price is determined by world competition plus the costs of transportation. By keeping transportation costs to a minimum the crude line will enable western oil to compete with foreign crude in Ontario markets.

Why wasn’t an all-Canadian route chosen for the pipe line?
Answer: Because the shortest and least expensive line that can be built to the Great Lakes is to the general advantage of the oil producing provinces and of Canada as a whole. To build the line to Fort William or Fort Arthur instead of running it from the Minnesotan border to Superior, Wis., would have involved greatly increased construction costs, much higher operating and maintenance charges, and considerably more time.

Why would it cost more to go to the Fort William-Fort Arthur area than to Superior, Wis.?
Answer: In the first place, because the line would have to extend 210 miles longer. This means that 125 more miles of pipe and an additional pumping station would have to be installed.

The next mile of line would be part of a section of almost 300 miles, from the Minnesota-Ontario boundary to the lakeside cities, that would be the most difficult and most expensive construction project of the entire line. The rest of the Canadian section of the line will pass through the prairies where construction will be comparatively unincapacitated, but from shortly east of Winnipeg, the Canadian area is wild country, largely lake and rock, rivers and other obstructions. These conditions would greatly add to construction costs and the engineering problems involved would seriously delay the completion of the line. By going to Superior the line will avoid these costs and problems because the land continues to be comparatively flat along that route.

What additional cities did the line were built to the Canadian lakehead cities?
Answer: The additional costs by the all-Canadian route have been estimated at $10 million at least. Operating charges for the line would entail an added $460,000 a year. Retirement of the investment in the initial construction would bring the total additional cost of construction of an all-Canadian line to nearly $1 million each year.

Would not an all-Canadian pipe line develop new traffic in the area crossed and to make the extra cost worthwhile?
Answer: No, the longer and less efficient route would not bring offsetting benefits. A pipe line, unlike a highway or a railway, has almost no effect upon the area through which it passes except under special circumstances to be an adequate sewer anders and industries along its route and help the growth of new communities. But a pipe line is built to carry a single raw material, oil, to a market where it can be used, and it carries its freight in one direction only. It effects the area through which it passes only if refineries can be located in the pipeline and refineries are built only where they can serve markets more advantageously than existing sources of supply.

Will oil supplies for the Canadian lakehead cities be less plentiful because the line is going to Superior?
Answer: No. Adequate supplies of finished products will continue to come from refineries at Superior, Wis., and elsewhere just as they do now. Moreover, the cost of crude laid down at Fort William probably would be lower if it were piped directly to Superior, but it would come through a pipe line direct from the Alberta fields. Crude will be available if the market at the Canadian lakehead is to warrant a refining centre there. In the foreseeable future the market that could be served economically from Fort William would be too small to permit a major refinery operation such as at Superior, which has very large tributary markets. Moreover, Superior can reach the Twin Cities area by water transportation which, for any given distance, is cheaper than all ways by oil pipeline. A major refining operation at Canadian lakehead would entail higher prices for gasoline and other products.

Will Canadian lakehead materials be used in the construction of the pipe line?
Answer: Yes, wherever possible. Substantial contracts have already been placed with Canadian firms and in some instances these have led to plant expansion to handle the orders. Because of the special requirements of pipe line construction, some of the specialized equipment and skills cannot be obtained in Canada and these will have to be imported.

How will the choice of a terminal in the U.S. affect delivery of oil to Ontario?
Answer: It will permit the lowest cost, most direct delivery of crude to Ontario refineries. Crude for Ontario would be transported to terminals along the line and then be transported by tankers to the refineries at Sarnia and Toronto. Imperial's present Canadian flag fleet will be utilized to the maximum and in addition two new tankers, the largest ever to be built in Canada, are to be constructed for this service.

Is it possible that the line may be used to export Alberta oil to the U.S.?
Answer: This is a possibility which will depend on future developments: whether the U.S. wants Canadian oil. Canada's export policy, growth of refineries, expansion of the pipe line's carrying capacity, changes in crude prices and other economic factors. The requirements of the prairie provinces are being met first and the pipe line is being built to help supply Ontario. At the planned initial rates of operation, pipe line facilities will be adequate to supply the market in all for the crude delivered at Superior.

Why would the export of oil benefit Canada?
Answer: Because Canada would no longer have to pay with Canadian oil instead of U.S. dollars for the imports of oil that will continue to be necessary in some areas of the country. Cooperation of the pipe line will solve only a part of the delivery problems that exist because of the great distances in Canada. Even if enough Canadian refineries were supplied to the whole country it may always be more practical for some provinces to import oil from the U.S. and the U.S. than to bring it all the way from Alberta. Imports will probably continue to be substantial.

If some Alberta oil were exported would this reduce the crude supplies available for Canada?
Answer: No. On the contrary, it would make Canada's supplies more secure because it would ease the strain on our scarce U.S. funds. Also, because of transport costs, prices for crude are higher in the land areas of North America than they are along the Atlantic seaboard. By bringing some Alberta crude to the inland U.S. market, Canada would obtain money which would buy large quantities of oil for the eastern provinces where imports are necessary. By exporting at some points and importing at others Canadians not only save heavy transport costs within the country but make supplies of oil more assured for the parts which must continue to import oil.

Why is the pipe line important for the province of Alberta?
Answer: The line must be built quickly and efficiently to stimulate Alberta oil developments. Exploitation for new fields will continue only if there is reasonable assurance that there will be markets for additional production.

Choice of the shortest and least expensive route for the line also is important to Alberta. The longer all-Canadian route would result in substantial increases in the cost per barrel for transporting the crude. This would mean considerable reduction in the prices paid to the producers and therefore affect the value of all the oil reserves in Alberta. It would reduce not only the producers' income but also the revenue of the province and the benefits the people derive from sales of crown lands and from royalties.

Why will the pipe line have an affect upon Canada's dollar shortage?
Answer: Until the recent discovery in Alberta, Canada had to import approximately 90 per cent. of its oil. Last year these imports cost the Dominion $300 million in U.S. currency, an amount almost equal to our shortage of American dollars. Because of the rapid development of the Alberta fields, this year Canada is saving 500 million or more (U.S.), which will not have to be spent on imported oil. The faster the pipe line is built the more Canada will save in this way. When the line is completed it will permit a further saving of $40 million (U.S.) a year.

What were the decisive factors affecting the choice of the route to Superior?
Answer: (a) The saving of at least $10 million in initial construction costs. (b) Savings of approximately $8 million in operating costs. (c) The elimination of many difficult engineering problems. (d) The benefits of better revenues for the province of Alberta. (e) The saving of millions of U.S. dollars which can be realized at least a year earlier because of the time saved in building the shorter line. (f) The increased encouragement to find more oil in Canada. (g) The financial interest is best served by obtaining the maximum value for the national product. In the face of competition the only way to do this is to minimize the cost of buying it down in the competitive area.
The Line Takes Shape

The giant undertaking to pipe Alberta oil to the lakehead is by far the largest project of this nature ever undertaken in Canada. The Alberta-Saskatchewan-Manitoba section will permit a more efficient distribution of oil in the prairie provinces. The extension to Superior will provide a pulsing artery linked with the Great Lakes tanker transportation system to carry Alberta oil to the refineries in Ontario.

Before that goal is reached there will have to be 1,150 miles of pipe laid. There will have to be pumps to move the oil. A communications system must be set up all along the route, and right-of-way will have to be obtained. The project will cost about $90 million.

Oil is expected to flow through the first leg of the line—the 466-mile link between Edmonton and Regina—by the Fall of 1950, and the Regina-Superior line by the Spring of 1951. (See map, page 6).

A total of 175,000 tons of steel pipe will be required for the entire line. Canadian mills will make the 16-inch diameter pipe needed but since they cannot handle 18 or 20-inch pipe these sizes will have to be bought in the United States. All the 18-inch pipe is intended to be laid in that country.

The pipe line route has been surveyed from the air, and the ground survey is nearing completion.

At present initial construction work is in progress at the pumping station sites at Edmonton and near Ermineskin, Saskatchewan. The Edmonton-Regina line will begin operation with two stations, and the section from Regina to lakehead will have four—at Regina, Croomer, Gretna and Clearbrook, Minn.

Initial capacity of the Edmonton-Regina line will be 45,000 barrels a day, and east of Regina it will be 70,000. Refineries at Rosetown, Regina, Brandon, and Winnipeg may receive about 35,000 barrels a day and the balance will go on to Superior. This drop-off will increase as existing refineries increase capacity or new refineries are built.

The capacity of the line can also be increased by addition of new pumping equipment. It is estimated that over 120,000 barrels a day could be handled at Edmonton when conditions warrant an input of that quantity.

Since Superior is closed to navigation for about five months in the year, storage capacity of at least one and a half million barrels will be built there to permit the steady accumulation of oil during the closed season. A loading dock for lake tankers is being put into condition at Superior.

Construction of two new tankers—the largest ever built in Canada—is part of this program of bringing Alberta oil eastward. The new ships will each have a capacity of 115,000 barrels and a speed of 10 knots, which means that each can carry more than 5,000,000 barrels of oil a year. Canadian Shipbuilding and Engineering Ltd. will build the new tankers at Collingwood and Port Arthur at a total cost of about $7.8 million.

The tankers will each be 620 feet in length, 68 feet beam, 35 feet in depth and with a draft of 24 feet.

Here pipe is being laid in a trench that ran uphill near Balston, Wyoming. Canada's new line will meet similar problems.
Deadweight tonnage will be 15,800 and engines will develop 4,500 horsepower. The ships will be ready for service when navigation opens in 1961.

At Superior the tankers will load Alberta crude at an estimated average rate of 57,000 barrels a day. This does not mean that the pipe line will deliver 57,000 barrels every day in the year, for navigation is closed for about five months out of twelve. In winter, therefore, the pipe line will carry about 10,000 barrels a day into the tankage at Superior, and will operate at near capacity for the rest of the year.

Most of the oil will go to Imperial's big Sarnia plant, but refineries at Petrolia and Toronto are also expected to receive Alberta crude.

Not until next Spring will the big job of pipe laying commence. Actual construction is expected to employ between 1,000 and 1,500 men for about 150 days. Work may be in progress in as many as 10 different sections at the same time, and contractors' equipment at each point will probably be valued at more than $500,000. With an average employment of 1,250 men, the project will require 187,500 man-days.

Pipes—almost impossible to obtain a few years ago—have recently been in better supply and Imperial's purchasing department has placed orders for all that will be required. The cost of the pipe is estimated at $21 millions at the mill, and $22 millions after delivery at the site.

Besides pipe, the line will need a communications system and consideration is being given to the installation of a frequency modulation radio. A survey has been made so that equipment may be designed to cover adequately the distance between pumping stations. The survey is necessary because, as radio listeners know, "FM" has a range limited by the horizon which can be seen from the broadcast tower. Hence, hills have the effect of cutting this range. Since the pumping stations are so far apart, repeater stations will be needed between them. A teletype system is also being considered.

When the line is in operation, an air patrol will fly over it at regular intervals, keeping a sharp lookout for any leaks which may develop. Leaks are rare and becoming more so, but the patrol is a precaution against any small leak developing into a large one. Some pipe lines are still patrolled on foot, but for the great length of the Edmonton-Lake Superior line some other system was needed. The air patrol will involve construction of landing strips at some of the pumping stations which are not near existing airports.

The estimated cost of constructing the line is $85 millions, and an additional $5 millions will be available for contingencies and working capital, making a total of $90 millions.

The Interprovincial Pipe Line Co. has raised this large amount of capital by issuing $72 millions of 3½ per cent. 20-year bonds, $17 millions of 21-year 4 per cent. convertible sinking fund debentures and 20,014 of its four million authorized shares of $50 par value capital stock.

The bonds were offered privately to insurance companies and other institutional investors in Canada and the U.S. Of the total, $37 millions are payable in Canadian and $35 millions in U.S. currency.

Interprovincial offered $7,500,000 of the con-
Prelude To Construction

Assembling the men, money and materials
for the pipe line involved years of planning and the
organization of a new Canadian company.

When the pipe line planners announced their decision to link Edmonton with Lake Superior, hundreds of Canadians were already at work on pipe line jobs. White-hot steel was becoming high-strength plate at Hamilton. A pipe rolling mill, to make this plate into pipe, was nearing completion at Welland. Cold, hard steel was being fashioned into pumps, engines and speed increasers at Three Rivers and Lachine. And on the prairie, sun-tanned men drove stakes to mark the route which they had surveyed for the Edmonton-Regina line.

Last spring Canadian firms already had $9 million worth of orders in hand. This amount was for steel plate, for making it into pipe, and for pumps, engines and speed increasers. By fall additional orders had been placed: for glass pipe wrap, an inert material which would wrap the pipe, a $260,000 order went to the Fiberglas plant at Oshawa; the By-Product Coke Co. of Canada Ltd. at Port Arthur received a $650,000 order for a plasticized coal tar which would be used to coat the pipe. Both these large orders involved plant expansion. Glass pipe wrap had never been made before in Canada.

In October it was announced that one tanker—the largest ever to be built in a Canadian shipyard—was to be constructed to carry oil to eastern Canada from Superior. A short time later a second tanker was added to this program. The two will cost about $7.8 million.

These and other orders promised a total of well over $18 million for Canadian industry, with more to come when other items or services are needed. They promised work for Canadians for months to come.

Canadians are at work because planning started long after Imperial Leduc No. 1 well discovered oil in February, 1947—the beginning of a series of major discoveries which have made the pipe line more and more necessary.

Looking ahead, the planners foresaw the day when Leduc, with other Alberta fields then still to be discovered, would be producing more oil than the prairies could use. Where could this oil be sold? What would it cost to take oil to those places? How soon could a pipe line be built?

There were several possible answers to the first question: oil could be sold over the Rockies, in foreign markets or in eastern Canada. The second question required intensive study by pipe line experts. Lights burned late as men studied the problem, calculating the cost of pipe, of pumps, of communications, of right-of-way.

The cost, they figured, would be about $100 millions if the line were laid to saalboard in British Columbia. It would cost about $10 millions less to reach the Great Lakes. The "first step" Edmonton-Regina line would cost $35 to $40 millions.

With these figures, the planners did some calculations of their own. The Rockies are a formidable barrier to pipe laying and British Columbia provides only a limited market for crude oil. Expansion into export markets would be necessary in competition with California, South American and possibly Middle East crudes.

To the east lay the flat prairies, easy country for a pipe line to traverse. More important, if the line went east it would take the crude into the heart of the continent where its value would be highest and where the largest market exists. There is practically no oil production in this area and the value of crude is high because of the cost of bringing it from Texas and other producing fields.

The eastern area also offers greater flexibility because refineries already exist there and they can use a large volume of crude supplied by the pipe line. This is very different from the west coast.
Then Bert Rubery talked with The Steel Co. of Canada. Could they supply the special steel needed for the pipe line and could the British steel be supplied to their usual customers? Yes, that could be done. But it would inconvenience the other customers. The customers agreed, however, and the oil industry is indebted to them, for by their agreement they helped to make the pipe line possible.

This development in the building of a pipe line was something new in Canadian industry. Stelco began production on the largest plate order it had ever received, and for the largest size ever rolled in quantity for pipe. Pape-Horsey Tubes would make the plate into pipe. The company hastened the construction of a new and modern pipe mill at Welland.

While Bert Rubery was hunting steel, Jim Armstrong, Imperial’s pipe line advisor, was at work with other pipe line planners. The Company’s counsel were busy with the legal problems involved, and financial experts were at work on the huge task of raising money.

There was much to be done. What size would the pipe have to be? How about pumps? Right-of-way? A new company must be organized to build and operate the line. What form should it take? How should money be raised?

From the start another factor complicated the situation for the planners.

They knew that the Edmonton-Regina line was only a first step in moving Alberta’s oil into new markets at low cost. They also knew that to provide for an adequate outlet for the oil, the line would have to be much farther west. So, while they worked on the problems involved in completing “the first step” of 450 miles, they also were looking at those of extending the line another 700 miles to the Great Lakes.

H. H. Hewetson, chairman of the board, announced in Regina last May that Imperial was studying extension of the line to the lakes and foresaw the day when Alberta crude would be run in Sarnia refinery.

The possibility of a 1,150-mile tub of steel spanning half the nation caught the interest of many a Canadian. The question cropped up frequently: “Why is this line needed?” The answer involved some explanation. After the Ledar oil field was discovered, other oil fields followed in rapid succession. Woodbend, Redwater, Golden Spike—all were major discoveries and some other successful wildcats may lead to important fields.

With the steadily mounting total of drilling rigs and cost at work on development wells, Alberta was soon producing enough oil for her own needs; then enough to take care of Saskatchewon; then enough for all the prairies.

At this point the industry began a voluntary program of pro-ratting the wells—cutting their production so that they would not produce oil for which there was no market. Each development well which came in, therefore, restricted the output of every other well. Yet development wells still must be drilled, for they are required by leasing and offset obligations.

This situation is not unusual. Nearly every new oil-producing area of any importance has experienced restricted production at some point of its development. The reason is that the task of providing low cost transportation to new markets and getting a...
position in that market cannot be done in a few weeks.

The market that Alberta's oil can reach by tank car has been saturated. Despite co-operation of the railways, there is a limit to the distance oil in quantity can be moved economically by rail. The limit falls far short of the lakeshore.

That is why it is important to press ahead with all possible speed to build the Edmonton-Superior line.

From the beginning it was evident that a separate company should be formed to embrace the specialized job of transporting oil from Alberta. The Dominion government was drafting legislation governing pipe line operations across provincial boundaries. Application was made for incorporation of a company under this act to be known as the Interprovincial Pipe Line Co. It came into being, by special act of parliament, last April 30. The new company has an authorized capital of $200 million. Its president is Dr. O. B. Hopkins, a vice-president and director of Imperial.

Construction of such a long line in such a short time means intense concentration of effort and to aid in the task Loren F. Kahle, born in Toronto, has temporarily joined the Interprovincial Pipe Line Co.

Mr. Kahle is president of the Interstate Oil Pipe Line Co. of, one of the largest in the United States. This company operates some 3,000 miles of trunk lines and 1,000 miles of gathering lines.

He will be in charge of construction and will assist in molding plans for the operation of Interprovincial's new line. While on 18 months leave of absence from Interstate, he has been elected executive vice-president and a director of Interprovincial.

T. S. Johnson, formerly assistant to the vice-president of Imperial (Supply and Transportation), has also been added to Interprovincial's staff as vice-president and director.

Under this direction, Interprovincial is moving ahead rapidly. Next spring mechanized equipment will move in for the pipe-laying job. Several mechanized ditch diggers, each of which can trench a mile or so a day, will begin their work. Trucks will haul the pipe to the ditch, where welders will make it continuous. Once joined, it will be primed, coated with an enamel and wrapped with protective material.

"Side-bloom cutters"—tractors with howitzer booms on their sides—will lift and hold the pipe during welding, coating, wrapping and laying. The wrapped line will be buried under 3½ feet of earth and the trench filled in by bulldozer.

A half mile of pipe will be laid this winter before the main line is begun. This is a special task, for it will cross the South Saskatchewan river near Outlook, Saskatchewan. The pipe is especially heavy—half-inch, compared with ¾-inch for most of the line. The plan now is to dig a trench in the river bottom, working through the ice. Then the welded pipe will be laid and anchored in place.

Another problem which the pipe line planners face is corrasion. Heavily corrosive soils may affect the pipe despite the most careful coating and wrapping. In those areas magnesium anodes are buried near the pipe and they, and not the steel, are attacked. The anodes are replaced as they become eaten away.

Still another problem will be obtaining right-of-way for the line. "Easement" must be obtained from the owners of the land, and this may involve locating owners who are scattered over the face of the globe. Easement means that the pipe line company receives the right of entry to the land to lay the line and to repair it when necessary. Damages to property are settled by negotiation between the company and the owner.

And so across half the breadth of the continent the work of the planners is beginning to bear fruit.

In the meantime, while hot steel slabs slide down to the rollers at Hamilton and surveyors mark a precise route across three provinces, the men who search for new oil fields are still seeking new and greater reserves. That is because a big pipe line linking producing areas with new fields has a great thirst. It would be as absurd to build a Queen Elizabeth to carry a few passengers as to build a pipe line without putting it to maximum use now and in the years to come for the benefit of all Canadians.

FACTS ABOUT THE PIPE LINE

**Oil in the Line**

Mere to fill the pipe line will take 1,858,000 barrels or 94,520,000 gallons of oil.

This is enough oil to supply all of Canada for six days.

If the oil were gasoline, it would be enough to drive an average passenger car 1,558,000,000 miles—66,500 times around the world.

**Steel in the Line**

The line will require 175,600 tons of high-test steel in 1,156 miles of pipe.

This would be enough for 1,000 miles of main line railway track.

Or this steel tonnage would make 2½ times the size of the Queen Elizabeth—the world’s largest.

Or it would make 118,000 average-sized motor cars.

**Oil Speed in the Line**

It will take about 28 days for a barrel to move from Edmonton to Superior.

**Trenching for the Line**

The pipe line trench, five feet deep, two feet wide and 1,150 miles long, will mean excavating 2,250,000 cubic yards. That would make a pile of earth 100 feet square and more than a mile high.

Near the Arctic Circle are these pipe lines that move crude oil from nearby Fort Norman wells to a battery of storage tanks.

This side-honus "oil" and mechanical noises applies a prime cost of 936669.0000000003.64 at the time close the pipe before it is wrapped up. Such machinery are compact and their small operation eliminates interference with farmling.

IMPERIAL OIL REVIEW
Pipe Lines Serve The World

The great oil transportation systems have helped to make petroleum a universal servant

While such significant pipe line developments as the Edmonton-to-the-Great Lakes project are new and in the news, the idea of using pipe to transport fluids is thousands of years old. The first pipe line probably was a hollow log, bringing water downhill from a spring. The Chinese were using bamboo stalks as water pipes about 5,000 B.C.

The first oil pipe line, also made of wood, was anything but a success. In 1861, Herman James started to lay a four-inch line of bored logs to carry oil from a Pennsylvania field to Oil City, six miles away and downhill all the way.

The oil teamsters, however, had other ideas. They earned $30 a day or more for carting the oil, and decided that no new-fangled pipe line would put them out of work. So while the line was laid during the day, the hard-driving, hard-drinking teamsters ("crude skinners", they were called) came each night to burn or break the pipe as fast as it was laid.

A second attempt, made by J. L. Hutchings in the following year, met a similar fate when the teamsters destroyed the line—made of two-inch cast iron pipe—and a rotary pump. This line, however, actually delivered a trickle of oil on its first trial, but the lead-sealed joints leaked badly. There was no second trial before the line was wrecked.

But the principle of moving oil by pipe line was right. A line could bring oil to market at low cost and hence spread the benefits of oil products to more and more people. In the end the pipe line justified itself and today there are in the world vast networks of pipe lines. Some carry oil, some natural gas and some refined products.

The most extensive pipe line network is in the United States. In total length these lines are more than 400,000 miles long—nearly twice the U.S. railway mileage of about 227,000. Crude oil and product lines alone run for 185,000 miles. The volume carried by U.S. oil pipe lines is equally impressive—it reached 2½ billion barrels in 1947.

While the United States has such an impressive pipe line mileage, Canada still has less than 200

Near Caracas in eastern Venezuela this web of pipes moves South American oil to the sea from 1947 dock where tankers wait to take it on for transportation to North American ports.
miles of oil pipe lines within her borders. In the east, a 236-mile line connects Portland, Maine, where tankers deliver their cargoes of crude oil, with Montreal refineries. This line cuts off the long sea trip around our Maritime coast and up the St. Lawrence. Another line connected with the U.S. network, runs from Cuyahoga, Ohio, to Sarnia. Both these lines have most of their mileage within the U.S. In the west, a 31-mile line connects Turner Valley field with Calgary. Leduc oil is delivered to Edmonton refinery through 25 miles of pipe line.

On land the pipe line is supreme as a low-cost oil mover, but it must give way to the modern tanker as the cheapest form of oil transport. Rail delivery is much more costly than pipe line transport. A tank car holds only about 200 barrels of oil. Loading the car, hooking it up to a train, running it to the destination and unloading all take time and cost money. Then the car usually must return empty, a further loss of time and money.

The pipe line, on the other hand, keeps oil flowing day and night, Sundays and holidays, with no such interruptions as the tank car must meet in shunting, loading and unloading. No storms delay the pipe line, for it moves oil underground, below the snowplow clearing a road or rail line.

Besides pipe, pumps and a communications system, a pipe line must have tanks to hold oil before it enters and after it leaves the line. From these tanks oil can be fed into the line at the rate required to keep it full. The tanks at its destination hold the oil until a refinery is ready to use it, or a tanker can load it.

As described in the preceding sections of this story, building a major pipe line is a mechanized job. In a short time nothing above ground except the widely-spaced pumping stations mark the course of the underground river of oil as it flows along quietly and smoothly. It flows at about the speed of a man walking, but as the pumps keep working hour after hour, the line can move a tremendous quantity.

The line needs a communications system so that men at the pumping stations and at the terminals can talk back and forth. Not all crude oils are alike and if different batches are consigned to different destinations, the station operators must know when a certain batch will be coming through so that it can be directed to the proper consignee.

There is very little mixing between two different batches in a crude oil pipe line, or even between two refined products in a product line. However, refined products cannot be run through a crude oil line without contaminating them.

In an emergency, stove oils, for instance, have been run through the Montreal Portland pipe line to relieve a short supply situation in the Montreal area, but the products had to be rerun in a refinery before they could be used.

The contamination is caused mainly by deposits left by the crude, which form on the inside of the
Go-devils, pipe, pumps, tole-type, aircraft and, mainly, brain-power, will combine in an integrated transportation system to bring Alberta oil flowing eastward to the Great Lakes. It will flow slowly, but it will flow steadily, bringing western Canadian oil to Ontario refineries. The pipeline will be a major step forward for Canada's oil industry.

In 1606 Champlain founded the Order of Good Cheer in the Habitation at Port Royal. The buildings were reconstructed in 1939. Here is the entrance gateway, with an oak standard bearing the name of France (left) and New France.

The Order Of Good Cheer

An organization that was part of the proud history of early Canada remains the symbol of Nova Scotia's hospitality.

The quill hovered over the paper. The hand holding it came to rest. Recollection brought a smile of remembrance to the writer's face as he recalled times past. With an effort, he returned to his task.

"We passed this winter very pleasantly," he wrote. "and made good cheer by means of the Order of the Good Time, which I established, and which everybody found good for his health and more efficient than all the kinds of medicine, for which we had little use. This order consisted of a chain, which we placed with certain little ceremonies on the neck of one of our number, giving him charge of the hunting for the day. The next day it was passed on to another, and so on in order. Everybody exerted himself to the utmost to see who could do the best and provide the best game. We found this system by no means bad, nor did the Indians who were with us."
large numbers to meet the first Europeans they had ever seen.

"When winter came," historian Lescarbot recounts, "the savages of the country assembled from far and near to barter what they had with the French; some bringing beaver and other skins . . . and also moose skins, of which excellent buff jackets may be made; others bringing fresh meat, of which they made many a banquet."

Besides trading, the settlers found time for hunting and fishing for the virgin woods abounded with game and the lakes and streams were an angler's delight. From France they had brought as rations salt meat, peas, beans, rice, prunes, dried cod, wine, oil and butter. To these provisions they added, from field and stream, ducks, geese, porridge, plover and other birds; moose, caribou, beaver, otter, bear, rabbit and raccoon; sturgeon, trout, cod, herring, sardines, mussels, crabs and lobsters.

"Of all their meats," Lescarbot continues, "none is so tender as moose-meat (whereof were also made excellent pasties) and none so delicate as beaver's tail." The lawyer-historian could not resist a comparison: "Whatever our gourmands at home may think, we found as good cheer at Port Royal as they at their Rues aux Ours in Paris and that, too, at a cheaper rate."

The winter of 1606-7 was the happiest Champlain was to know in Canada. The bitter times on the St. Croix were behind him and the lean and hungry months at Quebec - years when some minor dish served at an Order of Good Cheer banquet would have been a feast in itself - were still to come.

What happy days those were at Port Royal! The parade of members of the Order, with their steaming dishes . . . the flash of white teeth in dark beards as a jest went swiftly around the table . . . the music and singing . . . the curious Indians watching the feast, clutching at scraps of foods they had never before tasted.

Lescarbot, too, a leading spirit in the Order, recalled that winter with pleasure: "Never at breakfast did we lack some savoury mess of fish and flesh, and still less at our midday or evening meals; for that was our chief banquet, at which the ruler of the feast or chief butler, whom the savages call Atocatic, having had everything prepared by the cook, marched in, napkin on shoulder, wand of office in hand, and around his neck the collar of the Order, which was worth more than four crows; after him all the members of the Order, carrying each a dish. The same was repeated at dessert, though not always with so much pomp. And at night, before giving thanks to God, he handed over to his successor in the charge the collar of the order, with a cup of wine, and they drank to each other."

Gay times they were indeed, for the daily wine allowance for each man was a pint and a half.

It was a promising beginning for Canada's first settlement - a promise which was not easily fulfilled because of troubles that came later. Yet many of the nation's "first" had Port Royal as their locale. The settlement was the launching of one of the first vessels built in the country. The first Canadian mill was built on a nearby creek. The settlement had Canada's first road. Indian chief Membrino and his family were the first Canadian converts to Christianity. But at Port Royal, too, the first blood was shed
in the long and bitter struggle between England and France in North America.

The story of Port Royal goes back to 1605, when Henri IV of France granted a patent to the Sieur de Monts who planned to found a settlement under the patronage of Rosen and La Rochelle merchants. The winter was spent in gathering a party of 120 prospective colonists and in obtaining supplies. The expedition set sail in two vessels in April. A month later they made a landfall at what is now La Have, on Nova Scotia’s south shore.

With De Monts was Samuel de Champlain, Chief Geographer to Henri IV, and already renowned as an explorer. Champlain took the leading part as exploration began and today’s maps still bear some names which he first noted on his charts.

The explorers sailed through the narrow opening, now called Digby Gap, where the sea severs the North Mountain. Beyond lay Annapolis Basin. Chaussee was charmed with its beauty and here he noted the name Port Royal was first used. DeMonts, however, continued the exploration until he had circled the Bay of Fundy. At the entrance of the St. Croix River he found an island and here he decided to establish the colony.

The choice was disastrous, for during the winter scurvy claimed as victims about half of the settlers. DeMonts sailed southward in search of a better location, but turned back after meeting hostile Indians. When Pontgrave arrived with another shipload of colonists, it was decided to return to Port Royal. The establishment of the colony there in 1605 has long been recited by schoolboys as the date of the first permanent settlement of Europeans in Canada.

Good timber there was in plenty, and soon the artisans’ axes were ringing busily as they squared logs. Chips and shavings fell in yellow streams as boards clothed the wooden skeleton of the Habitation. Soon smoke rose from the tall stone chimneys and the smell of cooked food came from the kitchen.

The Habitation, located and planned by Champlain, rose square beside the Annapolis River, opposite what is now Goat Island, and overlooking Annapolis Basin. There the reconstructed Habitation stands today.

On the south side, a cannon platform on one corner and a palisade on the other form the Habitation’s defences. A single doorway, also on the south, gives entrance to the courtyard, around which the buildings are grouped. Beside the gate is the reproduction of the house where the Sieur de Boulay, Captain of the Gate, lived. Next door is the blacksmith shop, where in Champlain’s day the smiths wrought hardware for the Habitation’s doors and windows, and repaired the muskets.

The kitchen and bake-shop adjoin the smithy, and connect with the community room, which occupies the southwest corner of the Habitation. This reproduces the room where the festivities of the Order of the Good Time took place around the long table. Carved into the mantel above a huge fireplace is the fleur-de-lis and the date of the original building—1605.

The artisans’ quarters occupy the west side of the Habitation and here perhaps—historians aren’t quite sure—there was once a chapel and priests’ lodgings. The gentlemen’s dwellings are ranged along the north side of the courtyard. In houses like these lived such men as Marc Lancaut, Master Jacques, the Miner; Surgeon Stephen; Apothecary Hebert and Skippermaster Champlain.

The governor’s dwelling, on the northeast corner, is of more imposing design—it has quarters upstairs.

During the winter of 1606-7 Champlain and Pontgrave lived in the governor’s dwelling for Governor DeMonts had returned to France.

The eastern side of the courtyard has the storehouse, trading room (where pelts still give a flavor of bygone days) and the guard room. In the centre of the yard is the well.

When reconstruction of the Habitation was undertaken, the old well was located, along with the cellar of the storehouse, in an archaeological survey. The well itself is historic, for it was the first dug by Euro-pen in North America north of the Gulf of Mexico.

Dr. J. Clarence Webster, chairman of the Historic Sites and Monuments Board of Canada, has said that the reconstructed Habitation is perhaps the most impressive memorial in North America because Port Royal antedates both Jamestown and Quebec. Only the Spanish town at St. Augustine, Florida, had an earlier founding date.

Port Royal was not a successful settlement—it was a failure. Yet this tiny group of buildings, set precariously on the edge of a continent-wide wilderness, was the beginning of Canada and of the continent’s first social club—The Order of Good Cheer—an historic reminder that while most of Canada’s winters brought cold, hunger, scurvy and death to her first settlers, one at least was a happy time. The warmth and comfort of that time is passed down the years through the message left by Champlain’s quill: “We passed this winter very pleasantly . . .”

Before the Habitation was reconstructed, excavation revealed the site of the original well in the courtyard. It was rebuilt with oak-shingled roof and handmade windshield and bucket. Intensive research into early 17th century construction was done before the Habitation’s rebuilding, so that the methods of the original builders were followed as closely as possible...
When driller Charlie Visser was setting up housekeeping in granaries because there was no other place to live as he searched for oil across the western plains, Mrs. Visser often suggested he "quit this racket". Like all good drillers who are "going to quit next week but never do", Charlie kept right on searching, despite the often rigorous circumstances.

It is about 30 years since Charlie and Mrs. Visser called a granary their home. They live "like other people" now in an attractive home in Calgary. But that mysterious drive which took Charlie into out-of-the-way places two decades ago remains with him and he still is a wildcatter at heart, still searching for oil.

But he operates in a new capacity now. He is Imperial Oil's drilling superintendent for the producing department's western division. Affectionately known across western Canada as "The Big Dutchman", he is one of the pioneers in the prairie oil game.

He probably is the perfect example of what sometimes is called the oilman mentality. He has been looking for the elusive stuff for almost three decades. He's seen so many dry holes he can't count them now. Yet the recent successful developments in Leduc and Redwater, in which he played a part, have not dimmed his enthusiasm for still more searching. His own explanation is simple enough. "Wildcating is charged interesting work and always will be", he says.

His favorite nickname, The Big Dutchman, and his interest in oil wells both were acquired logically. He was born in Rotterdam, coming to Okotoks, in southern Alberta, in 1913. His father was one of the first drill rig builders in the west.

Young Charlie was about 14 years old when he first worked with his dad on rig construction. Cable tool rigs of that day were built entirely of lumber, even to the big hale wheels used on the drive. He wielded saw and hammer on those rigs while he was backing in name schooling at the same time in Okotoks.

His carpentry was such that he was hired for some of the timber work on the Strathmore-Huston irrigation system. In 1930 he did name work on southern Alberta cable tools when the oil business "got him".

The first rotary drill rig in Alberta was operated by a gas company at Barnswell, east of Lethbridge. Charlie was there. He was employed as "dummy" and his job involved dressing the fish-tail bits, which were in use then. Those had to be tempered and shaped for the job.

Charlie took his first job with Imperial in 1924, as derrickman at Dead Horse Coulee, on the Alberta-U.S. border. Several years of work in the south followed until drilling fell off in Turner Valley in 1937. For the next two years, until 1934, he worked for independent drilling contractors and he regards that period as one of interesting economic experimentation for him.

When not in the field, Charlie Visser (left) directs operations by radio. With him is T.V. Moremen, division production manager.
and head for the nearest well, particularly if it is having trouble.

Many who worked with Charlie years ago remember him best when drilling troubles were encountered. One veteran recalls his favorite advice at such times: "Do something—even if it is wrong! But DON'T do nothing!" It's been heard many times over the years.

As drilling chief, he is bitterly interested in the development at Leduc, Redwater and other recent oil strikes. But he still prefers wildcatting for its uncertainty, its frequent unexpected tests of human ingenuity and its general air of excitement. "There's always something to test a man on a wildcat that you don't get drilling in proven ground," he says.

Charlie is particularly proud of the men he directs for their attitude toward "drilling for information." When one of his crews drills a hole, dry or productive, just about all possible formation data is obtained every time. "It's nice to get oil but we know that doesn't happen every time and our fellows get more information than anyone else on every hole drilled," he says admiringly.

Charlie has a grown family of two sons and two daughters. They are all of twins. The twin boys are now 20 and the twin girls are 18. He would like to spend more time with his family than he does.

But that "old man mentality" is a hard thing to curb after a lifetime of oil seeking and Charlie figures it is too late to start now.

**Excelsior Comes In**

In the closing months of 1949, Imperial Excelsior No. 1 was added to the list of oil discoveries in Alberta. Situated just 15 miles north of Edmonton, the latter located near the D-2 more—at roughly 3,800 feet—on November 2. On November 8, after penetrating approximately 40 feet of the zone, the drillers encountered some water. Drilling was continued and the D-3 formation was reached. However, this was found to contain only water and the well was plugged back as a D-3-2 producer. The oil from Excelsior is a sulphur-bearing crude of 35 degrees A.P.I. gravity.

Drilling has been completed at Imperial Simmons No. 1, and at Imperial Normandville No. 1, discoveries that were announced in the preceding issue of the Review.

Imperial Simmons No. 1, located three and one half miles southeast of the Redwater field, discovered an oil-producing formation 190 feet thick. Simmons has excited considerable interest because in addition to finding a possible extension of the Redwater field, the depth of the producing zone exceeds the maximum in the D-2 area (189 feet) at Redwater.

Imperial Normandville No. 1, located in the Peace River district, found a producing zone 26 feet thick. The success at Normandville, which was drilled to a depth of 7,421 feet, was especially encouraging in that it followed three drill tests in the Peace River district. Imperial Claimson No. 1 was abandoned at a depth of 11,710 feet; Imperial Wensley No. 1 was abandoned at a depth of 11,553 feet, and Imperial Spirit River No. 1 at a depth of 9,647 feet.

At the year's end, proven reserves of oil in Alberta totalled more than one billion barrels, and a good start had been made on finding a second billion. Potential production at year end was in the neighborhood of 125,000 barrels a day. However, because Alberta oil cannot at present move economically out of the prairies, actual production is being restricted voluntarily by the operators to the amount that prairie refining capacity can absorb—between 85,000 and 90,000 barrels a day.

Western Canada is now the continent's second most active area in terms of geographical exploration for oil. One hundred and ten seismographs, gravity meters, and magnetometer parties are now working over the 100 million acres in the prairies which is under lease and exploration reservation. Imperial has 10 seismograph parties engaged in the search for more oil in Alberta.

At least one hundred million acres are now under some form of exploration permit or lease from northern British Columbia, through Alberta and Saskatchewan into southwestern Manitoba. Geologically most of it is in the great Canwood, or Macalester, and Alberta troughs, lying between the Rocky Mountains on the west and the Peace-Cambrian gneissic Canadamian shield on the east and north.

In western Ontario a new well in the Beaverfield field came in with an indicated flow of a steady 75 barrels a day, which is considered good for that area.

**W. E. Kleinstein 1886-1949**

W. E. Kleinstein, manager of Imperial Oil's traffic department for the past 10 years, died on August 12, 1949 at the Toronto General Hospital, after a brief illness. Mr. Kleinstein was born and educated in Hamilton, Ont. He became a member of the Company's traffic department at Montreal in 1912. He was transferred to Toronto as head of the rate section in 1919 when the executive offices of the Company were moved to that city. In 1929 he was appointed manager of the traffic department. He was a member of a number of organizations, including the American Society of Traffic and Transportation Inc., the American Petroleum Institute and the Canadian Industrial Traffic League.

**DECEMBER/January 1949-50**

**Imperial Normanville No. 1, located on the farm of Arthur Briggs where wife and family of 650 acres are shown. It is the first oil well discovered in the Peace River district.**
As they make their rounds, Imperial’s Pacific coasters skirt evergreen forests in the lee of towering snow-topped mountains

Pacific Coaster

Imperial’s marketing tankers provide constant service for the scattered communities of the majestic B.C. coastline.

The sailor always respects the sea’s power to destroy his ship. This respect is heightened in British Columbia waters because the coastline, while one of the most beautiful in the world, includes straits, fiords and inlets which create some of the trickiest navigation problems to be found anywhere.

Along this coast Imperial’s tankers ply, serving settlements, lumber camps, fish canneries and mining operations. The ships are known as “floating tank wagons,” serving areas where no roads exist.

The tankers sail through cloveny white fogs which roll in silently from the Pacific; they meet seas whipped to a boiling fury by the wind; they must avoid not only reefs and shoals, but whirlpools, and currents strong enough to “shove an island.”

These and other hazards mean that a skipper who has sailed the seven seas for decades still may not be qualified for the British Columbia coastal trade.

At the same time, it is a coastline made magnificent by the long fiords, often skirted by evergreen forests and towered by snow-topped mountain giants; by myriad islands, all sizes and shapes; and by open seas and sheltered, scenic waterways.

Need for Imperial’s maritime service arises from the fact that the greater percentage of British Columbia deliveries from the Ioco refinery, just outside Vancouver, must be made by ship.

While a goodly portion of those shipboard deliveries are to meet the requirements of cities and heavy industry, a sizable percentage also is distributed at distant points along the British Columbia coast by Imperial marketing ships. Oil products are a necessity of existence for the scores of coast settlements and towns.

Without gasoline, diesel and bunker fuel, stove oil, kerosene and other petroleum products, British Columbia’s great fishing and logging industries would be paralyzed. Shipping on the coast would be virtually at a standstill because the coal-burning ship has all but disappeared from B.C. waters.

With well over 100 points of call, 21 of which are sub-stations that must be kept filled, Imperial tankers in a year travel the equivalent of about six times around the world’s middle.

While B.C. has a “frontage” of about 600 miles on the Pacific Ocean as the crow flies, its deeply indented coastline, including inlets, bays and islands, actually is some 7,000 miles long.

The story of Imperial’s west coast oil ships begins with the big deep sea tankers that carry much of the crude oil brought to Ioco refinery from California. At Ioco the crude is processed into the many products and “floating tank wagon” delivery begins.

From Ioco, the 2,040-ton MV “Imperial Vancouver,” with Capt. P. R. (Padd) Totten and approximately 20 crew members, transports the finished products all along the B.C. coast, keeping the 21 sub-stations filled.

The 450-ton MV “Imperial Nanaimo,” skippered by Capt. Johnny Marron and carrying 13 other crew members, plies the “heavier” route on merchandising trips. Carrying 92,000 gallons of gasoline, diesel and stove oil in her tanks, and 250 barrels of aviation gasoline, kerosene, naphtha and lubricating oil on her decks, she travels the lonely northern coast of B.C. and the equally sparsely settled west coast of Vancouver Island and the Queen Charlotte.

MV “Imperial Namu,” a 131-tonner that carries 21,000 gallons in her tanks (30,000 gallons, if servicing a sheltered harbor area) and 40 barrels on her decks, usually works out of Prince Rupert. Capt. G. D. (Doug) Marshall is Namu’s skipper, and she carries six other men.

“Imperial Oil No. 10” is a large transportation barge drawn by a tug. Carrying the same volume as “Imperial Nanaimo,” the “No. 10,” during summer, services the Gulf Islands in southern B.C. waters. During winter, when uncertain weather makes towing of a large barge outside harbor areas difficult, “Imperial Namu” takes over the “No. 10” Gulf Islands route. The “10” at that season may be seen around Vancouver Harbor, largely in that city’s industrial False Creek.

Another transportation barge, “Imperial Oil No. 11,” supplies bunker fuel to ships, and delivers other heavy fuel to tankage, in Vancouver Harbor and the neighboring areas.

The upcoast housewife with an oil stove; the fisherman out after the salmon or herring schools; the logging-camp operator in a lonely coastal settlement; the lumberjack cook with an oil range and perhaps oil lamps; the little general store at the head of a fiord; the upcoast sirdrel—all are served by those busy marketing tankers.

Orders usually are mailed or radio telephoned to Imperial’s Vancouver office, or given to the tanker skipper to be brought in on his next trip. Imperial’s tankers carry as many as 250 drums on their open decks.

Scores of coastal settlements and towns depend on marketing ships for delivery of petroleum products for industrial and home consumption. Here the Imperial Nanaimo fires up at dock.

Drums of petroleum products are unloaded from the deck of a “floating tank wagon” on to the dock by means of a boom hose. Some tankers carry as many as 250 drums on their open decks.
The cargo is discharged at docks, floats or stiltlogs—long floating docks made of two strings of logs. A typical discharge point is Sandspit, Queen Charlotte Islands, where thousands of gallons of aviation gasoline are unloaded for the airport, and a logging company takes gasoline for its trucks, diesel fuel for its donkey engines, stove oil for the cookhouse and lubricating oil for its machinery.

In places where an Imperial tanker—or any other ship for that matter—simply cannot get in to a mooring, the fisherman or small-scale "hand" logger comes alongside the oil ship in his boat. He buys what he wants from the tanker, which dumps the barrel or barrels into the sea so the purchaser can take them in tow astern of his craft.

The shortest round trip an Imperial tanker makes is about 50 miles, up Howe Sound, near Vancouver, which requires only one day. The longest trip is about 1,000 miles, to the Queen Charlotte Islands, which takes two or three weeks.

Co-ordinator of this west coast tanker fleet's activities is Marine Cargo Dispatcher Roger Phillips.

Petroleum supplies for B.C. coastal points are taken on board the tankers at the loco refinery, just outside of Vancouver.

Biggest of the relay stations for the marketing ships, the one at Prince Rupert, holds 800,000 gallons of diesel, 600,000 gallons of gasoline and 350,000 gallons of stove oil. The ships using these stations normally reload three times.

The modern seeing-eye of radar has done much to help Imperial's ships ply their way safely on B.C.'s coast during foggy or misty weather. "Imperial Vancouver" and "Imperial Nanaimo" both have radar, and "Imperial Nanaimo" is expected to get it, also.

Proceeding upstream from Vancouver Harbor, along B.C.'s "Inside Passage," an Imperial tanker heads through Gulf of Georgia, then towards Seymour Narrows. Here, where the current runs sometimes at 14 or 15 knots, lies treacherous Ripple Rock, which has been called the coast's No. 1 navigation hazard.

Further up the coast, along Seymour Inlet and tributary inlets, lie 15 logging camps. To serve them, the Imperial tanker must go up Schooner Passage, get to Isola Inlet, and in so doing passes an island with an intriguing name: "Trembling Island".

"The current runs so fast there—up to 20 knots, it is said—that the water actually makes the small island shake, hence the name," explains Mr. Phillips.

Going past Kyuquot into Walter's Cove, on west coast Vancouver Island, the entrance is so narrow a scow can almost jump from his tanker's deck to the nearby rocky shore. And there are other similarly "difficult" spots.

With all due respects to British Columbia's famous California-like climate, ice is not a thing unseen in the province's coastal waters.

During last winter, an unusually bad one for B.C., "Imperial Nanaimo" became sheathed in ice while travelling the province's northern coast. The town of Stewart, near the Alaska boundary, was temporarily cut off from ship service, because of thick ice in its harbor.

"Imperial Nanaimo" smashed her way through the ice to Stewart—the first ship to do so.

During last winter, too, "Imperial Vancouver" was at Sandspit Harbor in the Queen Charlotte Islands, when a gale of hurricane force struck.

Mr. Phillips, who was aboard the ship at the time, recalls that "you had to shout right in the ear of a fellow standing next to you, to make him hear. The
further to sea, so did Imperial’s west coast business develop.

Imperial’s tanker crews are “regular fellows.” The veteran sailors among them, like old salts everywhere, never grow too accustomed to the landlubber’s way of life and manner of speaking.

One west coast Imperial skipper, for instance, went on his vacation, and on his return told about it. He related how he had “chartered” a home, though he had never been “aboard” one before, and “stored” it up “aboard” of another homesteader.

The men work hard because hard work is service. The crews of Imperial tankers work a regulation eight-hour day and on the tankers keep going Sundays and holidays, the men pile up these days as credits to be spent on substantial vacations every three or four months.

As well as taking their ships safely through dangerous waters to deliver their cargoes on time, the men who man the Imperial coastal tankers must be a combination of diplomat, businessman, man, and trouble shooter. Their success in the coastal trade can be judged by the fact that once the little “Imperial Navuana” could supply all the oil products needed, now a small fleet of coastal tankers and oil barges is hard pressed to fill their customers’ demands.

Orders and information affecting the movements of tankers at sea are transmitted daily by radio dispatches Roger Phillips, who holds store-to-shore conference over this radio telephone.

Personalities in the News

Clifford R. Moore Retires

Clifford R. Moore, superintendent at Regina refinery since 1940, recently retired after 33 years’ service with Imperial. He joined the Company as timekeeper on the construction staff building the Regina refinery. The plant was completed in September, 1916, and Mr. Moore fired the first crude still. He was successively employed as firman, helper, stillman and distiller foreman at all of Regina. In 1925 he was appointed assistant superintendent becoming acting superintendent in 1936 and superintendent four years later. Mr. Moore is a brother of Clarence M. Moore, former general superintendent of Calgary refinery.

W. O. Longworthy Succeeds C. R. Moore

Ward O. Longworthy succeeds Mr. Moore as superintendent of Regina refinery. A native of Regina, Mr. Longworthy served overseas in World War I. After the war he enrolled in mechanical engineering at the University of Toronto, graduating in 1921. He joined the staff of Regina refinery in 1927 and was made assistant engineer two years later. In 1933 he became process foreman and four years later transferred to the mechanical department as superintendent. He was with this department until 1947 when he was appointed assistant superintendent of the refinery.

W. J. Beynon, New Assistant Superintendent at Regina

William J. Beynon has been appointed assistant superintendent at Regina refinery. He joined Imperial in 1932 soon after graduation from the University of Toronto in chemical engineering. After nine years in laboratory work at Sarnia refinery at Tropical Oil refinery, Barralee, Columbia, he went to Toronto office on the committee of standards. In 1943 he moved to Calgary for production control and process work. He returned to Toronto in 1947 as assistant to the operations manager, manufacturing department.

H. R. Knowles Completes 40 Years’ Service

Hartley R. Knowles, Imperial’s assistant general sales manager, recently received a 40-year button. He joined the Company as a salesman in Saskatchewan in 1909. In 1915 he moved to Toronto for special service station work and in 1921 he was transferred to Winnipeg as city agent. Later he was made assistant manager of southern Saskatchewan division and in 1925 became the first sales manager of eastern Ontario division. After working in New York on special duties in 1927, he became general supervisor of service stations. In 1938 he was named operations manager for Canada and Newfoundland and in 1943 became co-ordinator of operations and assistant to the vice-president on marketing. Two years later he was made regional sales manager for western Canada. He received his present appointment in 1947.

George Sinclair Receives 40-Year Service Button

George Sinclair, who is in charge of the truck weigh scales in the process department at Sarnia refinery, recently received his 40-year service button. He was born in Sarnia and joined Imperial in the★ creepy shop. Later he worked in the car repair shop and in the storehouse. In 1916 he was transferred to the process department where he was employed as a firman on the old pressure stills. Since 1930 he has worked in the process department.

William H. Ward With Company 40 Years

William H. Ward, a Clan 1 mechanic in the boiler-makers department, recently completed 40 years’ service with the Company. He was born in Sarnia, Ont. and joined Imperial as a water-boiler man and immediately after World War 1 when the Company began expanding operations, Mr. Ward worked in several parts of the country on various building projects, including the construction of Montreal and Imperial refineries.
Plowing Champions To Go Abroad

Two Canadian champion plowmen, accompanied by a coach manager, will tour the British Isles early in 1950 to compete in overseas plowing matches and to observe British agricultural methods as guests of Imperial Oil. The plowmen are Ronald K. Marquis of Sunderland, Ont., and James M. Eccles of Brampton, Ont., winners in the Esso Champions home and tractor classes at the 1949 International Plowing Match held at Brantford. The coach-manager is Alex McKinney, Jr., also of Brampton, a director of the Ontario Plowmen’s Association.

The two champion plowmen won their trip in competitions that created a record for the number of entries. Runners-up in the tractor and horse plowing classes respectively were Douglas Campbell, Cainsville, Ont., and Norman Jarvis, Markham, Ont. Each received silver medals and $150 in cash. There were 13 other prize winners in each class who received sums ranging from $10 to $25.

The top men, in addition to winning the all-expenses-paid overseas trip, were awarded gold medals. This was the first time that Imperial Oil sponsored both classes; in the past the Company has sponsored the tractor class.

The members of the overseas team have much in common for all are descendants of Canadian pioneers and work farms that have been in their families for three or four generations. All raise purebred cattle and look forward to visiting some of the famous herds in the United Kingdom in addition to attending Old Country plowing matches.

Ronald Marquis, 38, winner in the horse class is the youngest member of the team. He lives with his father, Lloyd Marquis, on a 150-acre farm that was settled by his great-grandfather. The farm is devoted to mixed farming and raising Aberdeen Angus cattle. Ronald, like his opposite number in the tractor class, Jim Eccles, has been a contestant at plowing matches since he was 11 years of age. He has won many trophies at International matches.

Jim Eccles, 30, works a 425-acre dairy and mixed farm in Peel County, about four miles west of Brampton. Since 1946 he has been an annual prize winner in the class he headed at Brantford. Jim’s great-grandfather came over from the British Isles in a sailboat that took seven weeks to make the trip. The great-grandfather lived for a time at Port Whitby, before moving and settling on the present Eccles farm.

Alex McKinney Jr., the 45-year-old coach-manager, represents the fourth generation of the McKinney family to occupy his farm which is located near Brampton near the Eccl’s farm. It is appropriately named Pioneer Lodge. Alex specializes in raising purebred Holsteins and growing registered seed grain. Mr. McKinney is a member of the Chinguacousy township council and of a number of agricultural and livestock associations.

This device is a scraper that cleans the opening in the pipe line. Inserted in the pipe line, it removes the oil and dirt. The blades and slot remove debris.
Canada's new pipe line will go under the South Saskatchewan River. This engineer is at work with a drilling tool used in tests to find a firm base in the river bed.