New Ground for the Census Taker

Canada’s next census will be taken in 1941 and in the vast mineralized areas of the North there will be many new communities for the enumerators to visit—places where when the last census was taken there was no sign of human activity or habitation. Above is Goldfields, Saskatchewan, on Lake Athabaska with its essential equipment—hotels, airways office and Imperial Oil tanks, warehouse and derrick. It was the discovery of pitchblende on Great Bear Lake about ten years ago that stimulated prospecting throughout the Mackenzie River basin and this in turn led to present developments in the Yellowknife district on Great Slave Lake and the Goldfields area on Lake Athabaska. In all this development petroleum played its indispensable part, keeping the airplane aloft, pushing boats over the waterways, turning the wheels of mining machinery and lighting and heating the lonely homes of the pioneers.

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EDITORIAL OFFICE—96 CHURCH ST., TORONTO
MODERN REFINERY INSTALLED AT Norman Wells

New Unit Will Meet Increasing Demand for High Octane Fuels, Motor Gasolines, Diesel Oils, and Heavy Fuel Oils.

With the development of mining operations in those far-off regions lying close to the Arctic Circle in the North-west Territories the demand for petroleum fuels has been steadily increasing. A dependable supply of high grade aviation fuel and diesel engine fuels is essential to both mining and air transportation. To meet these requirements the Northwest Company has built a modern topping unit for the production of these products from crude oil produced locally.

The site of the producing wells and refinery unit is known as Norman Wells and is located 51 miles below Fort Norman on the east side of the Mackenzie River. Norman Wells is 1100 miles north of Edmonton by air and 1600 miles by rail and water. In 1919 drilling equipment was transported by water to the site of Discovery Well No. 1. This well was completed and was producing from a depth of 990 feet by 1921. A small steam still was installed that year to produce motor gasoline by topping a light fraction from the crude. This product was used locally for aeroplane fuels but was not available on the open market. A second well was drilled to a depth of 1602 feet. This was completed in 1925. Refinery operations ceased then and no further use was made of this lease until 1932. During the interval petroleum products were supplied from Waterways.

From 1932 to the present the requirements of diesel fuels rapidly increased until the original steam still was unable to meet the demand. High octane aviation gasoline meanwhile was being supplied in 45 gallon steel drums from Waterways. To meet this market demand for aviation gasoline and diesel fuels, a modern topping and stabilizing plant was constructed in 1939. The new unit has a daily capacity of 840 barrels of Norman Wells crude. The topping plant consists of a modern tube still and fractionating tower producing a light gasoline fraction overhead, a light diesel fuel as a sidestream and a reduced crude bottoms meeting specifications of heavy diesel fuel. The overhead gasoline fraction is then charged to a stabilizer for vapor pressure correction. The finished gasoline, with the addition of Tetracetyl lead and a certain amount of blending agent, meets Canadian Government specifications for 87 O.N. aviation gasoline. Aviation fuel of 80 O.N. can be produced by the unit with only the addition of lead.

The most interesting feature of the unit was the method of construction necessary in order to obtain transportation facilities to such a remote location. The first limitation was the weight and size of any piece of equipment. The maximum weight and size movable by the water carriers was 10 tons with overall crated dimensions of 10 feet by 35 feet. As the facilities for field work at the site are at a minimum, the equipment was shop fabricated to the maximum size of each piece and bolted connections employed for field erection. The tube still was constructed in two halves with tubes rolled in place and then assembled in the field. The insulation and brickwork was placed in the field. Due to the high freight cost to the refinery site, a minimum of cement and brickwork was used. The fractionating tower, four feet in diameter by 35 feet high was shipped complete with

Erecting 1,500 barrel storage tanks on the river bank.
bubble trays, caps, and necks installed ready for operation. The stabilizing column, 10½ inches diameter by 41 feet 8 inches, exceeded the maximum of 36 feet and was shipped in two halves for assembling in the field. The supporting structure for condensers, coolers, etc., was constructed of wood timbers, locally cut. All piping 1½ inches diameter and larger was shop fabricated thus eliminating the necessity of transporting pipe threading and cutting machines. Welding was used to a certain extent but was also kept to a minimum due to the high cost of oxygen and gas at the site.

Due to the brief operating season, production and storage of crude during the winter months is required in order to accumulate enough crude for yearly requirements. The daily refinery charge during the operating period is more than twice the rate of flow of crude from the wells. The tanks used at Norman Wells are all of bolted type construction. They are easy to erect in the field as they do not require rivetting. They have been found to be very satisfactory as tanks put in service more than twelve years are still giving good service.

As Norman Wells is situated only 125 miles south of the Arctic Circle, the time available for refinery operations and construction is short. The first supply boat in the spring arrives at Norman Wells about June 25th, and the last boat during the first week in September. Thus, any heavy material not transportable by air must be shipped within this period. Air transport affords twelve return trips from Edmonton to Athabasca spread over an eight-month period. Air traffic is interrupted for two months each spring and fall because water for landing is frozen at one end of the trip and open at the other, and consequently neither skis nor pontoons can be used. The refinery operates about three months each year, usually from June 10th to September 10th, making sufficient products during this time to meet the requirements for the full year.

Glacial frost has penetrated the ground to a depth of 50 feet. In order to grade and prepare foundation sites for equipment, an ingenius method is used to prevent heaving. During the short summer season the ground thaws only to a depth of 12 inches to 18 inches normally. In grading, this upper layer is scraped off and then operation ceases until six or eight inches more of the ground has thawed out. In preparing a foundation, top soil is borrowed and the required area is raised above the general surface grade. A drainage pit is then dug around the area and filled with river boulders. Surface water is thus prevented from entering the foundation area. As the virgin ground below the fill will never thaw, no heaving is possible.

The Mackenzie river has a normal rise and fall of approximately six feet during the season. The ice action at the shore line is effective 40 feet above the normal waterline, thus requiring all docks, pipe lines, water pumps, etc., to be mounted above the ice action line. Docks and pumphouses are built on skids and moved up to a safe location each fall. As a source of water for condensing and cooling in the refinery, the river is excellent as the maximum temperature reached is 52°F. There is considerable silt in the water, however, and this is a possible cause of plugging of exchanger tubes.

The operating crew of the producing wells and refining unit consists of approximately 60 per cent of men who are brought in from the south and the balance are available locally. Only 30 days elapsed between the time the equipment for the refinery arrived at Norman Wells and the time the new refinery was put on a test run.
The following account of a visit by Government officials to the locale of Canada’s Oil Industry in its early days is abstracted from the Toronto "Globe" and the Toronto "Mail & Empire" of Dec. 7, 1896.

The Imperial refinery at Petrolia, about 1895

Petrolia, Dec. 7. (Special to the Globe)—The Ministerial Tariff Commissioners had an object lesson today, which, it is safe to say, had more effect in impressing them with the importance of a great natural industry than reams of assertions and volumes of statistics could have done. What might be beyond mental comprehension if presented in words and figures was splendidly demonstrated by personal observation. Moderately stated facts and figures indicative of the development and present dimensions of the oil industry of Lambton and Essex might sound extravagant in the ears of one who had never seen the forest of derricks at Petrolia or the black smoke of industry rising from the refining works, but anyone familiar with the conditions as they exist today cannot but acknowledge the value to the country of its oil resources and of the medium through which they are converted to the use of mankind. The coming of the ministers, Hon. W. S. Fielding and Hon. William Patterson, was awaited with interest by the people of the town, who turned out in crowds to welcome them. Everyone who is interested in the welfare of Petrolia is interested in oil, for it is the basis of the industrial and commercial life of the town.

The ministers were met at the station by Mayor Edward and a number of prominent citizens who extended to them a cordial greeting. As the train from London entered the town the steam whistles at the refining and pumping plants shrieked out an ear-splitting welcome that at once impressed the ministers with the industrial importance of the place. Messrs. Fielding and Paterson, with those who accompanied them, were driven to the Hotel Iroquois, a new house, thoroughly in keeping with the progressive spirit of Petrolia, where they were entertained at Luncheon.

Afterwards they were taken for a drive through the oil fields that they might have an opportunity of personally acquainting themselves with the extent, character and needs of the industry. In the party which accompanied them were Mayor Edward, Messrs. John Fraser, M.P., East Lambton; J. F. Lister, M.P., West Lambton; W. S. Culver, M.P., West Middlesex; William McGregor, M.P., North Essex; T. S. Hobbs, M.P.P., Charles S. Hyman, ex-M.P., M. Mauret, F. A. Fitzgerald, President of the Imperial Oil Co., London, Charles McKenzie, H. Gorman, editor of the Sarnia Observer; John Duncan, Sarnia; Charles Jenkins, E. Archer, James Peet, J. J. Bell, M. A., James Kerr, J. L. Englehart, Vice-president of the Imperial Oil Co., John Kerr, Ewen McQuihen, J. E. Perkins, John Walker, Harrison Corey, E. A. Shawnessy, Isaac Greenisen, J. H. Fairbank, ex-Mayor B. S. VanTuyl, Wm. Pratt, J. A. Jackson, Dr. Fairbank, Dr. Cotter, Dr. Calder, Petrolia, and Frank Ward, Wyoming.

The party, as it was driven through the town on the way to the wells and refineries, observed with pleasure the neat and up-to-date character of the business buildings on the Main Street and the many beautiful private houses on the residential streets.

The oil region, of which Petrolia is the pivot, point, covers an area of eighteen miles in length by two and a half in width, and has about 8,000 wells in active operation, producing about 800,000 barrels of crude oil per annum, the wells averaging a hundred barrels a year each. While this is approximately the average, some of the wells fall

Right—An agitator on fire, probably about 1895. Below—Gathering oil. The oil was stored in underground pits.
far short of it, while others produce in sufficient quantities to make up the shortage. The “pushers” of twenty-five years ago, some of which were known to run a thousand barrels a day, are still talked about by the pioneers of the industry, but the younger generation have no personal knowledge of them. The well that yields a barrel a day now is considered good pay. Many of them do not produce half the quantity and yet return profit, though a moderate one, on the money invested in boring the hole. Each one when fully equipped costs about $600, the drilling alone being $150 to $175. The boring rod is iron, three and one-half inches in diameter, 38 feet long, with a steel bit at the point. The whole weighs 800 pounds, and a few days suffices to penetrate the bosom of mother earth to the needed depth. The first boring is through clay 85 feet, rock 45 feet, top soapstone 166 feet, middle lime 17 feet, lower soap 28 feet, lower lime 220 feet, oil rock 5 feet and the work is done when two and one-half feet below the oil rock.

There are 600 owners of oil wells, grading all the way from the large corporate interest down to the thrifty workman, who has invested his small savings in a “hole in the ground” in his back yard. A common sight in Petrolia is a huge derrick standing in front of or a little in the rear of a small cottage. It is the ambition of every man mass here to own an oil well, and more than one if possible. The mechanic gets four or five hundred dollars together and proceeds to sink a well. It is a pure speculation for him, for when the hole is bored to the necessary depth he may “strike oil” or not, just as fortune smiles or frowns upon his venture. If he is successful he secures power from one of the pumping stations at from 10 to 15 cents a day, starts the pump going, and soon he is in receipt of a little income in addition to what he earns at his daily work. The oil is pumped into small tanks near the wells, and from there it is removed to the tanks of the refineries, which issue negotiable warehouse receipts upon it. In the work of extracting the crude oil from the earth 626 men are employed, while in the refining and allied industries many times this number are given work at wages which average $1.25 a day, and frequently exceed that amount.

When the ministers had been given a fair idea of the extent of the country covered by derricks and had seen the walking-beans and triangles doing their work, they were driven to the extensive pumping plant of Mr. J. L. Englehart, who, with Mr. Fitzgerald, explained the system by which the oil is brought to the surface, collected, separated from the water that comes up with it, and conveyed to the refineries. The ministers were given an opportunity of witnessing the operation of “shooting” a well. A torpedo loaded with glycerine was lowered into a well near the pumping house. When all was ready a fuse, called the “devil squib,” was ignited and dropped in. Every man waited breathlessly for the result. It seemed an age. Then there was the muffled sound of an explosion, followed by a geyser of rock, water, dirt and oil, which shot into the air above the derrick. This was voted a great success by the onlookers.

There are five large refineries in active operation, the greatest of which is that of the Imperial Oil Company. The others are controlled by the National Oil Company, of which Mr. John McDonald is president; the Queen City Oil Company, the Consumers’ Oil Refining Company, and the Petrolia Crude Oil & Tank Company. Besides these there is the refinery of Mr. J. R. Mischmick at London.

Probably the most interesting portion of the day was that spent under the guidance of Messrs. Fitzgerald and Englehart in seeing the works of the Imperial Oil Company. The Ministers were shown the process of manufacturing illuminating and lubricating oils, paraffine vaseline and all the other by-products too numerous to mention. Not the least interesting or wonderful thing was the sight of an expert painting oil barrels in the company’s workshops and equally as fine a job sent out every month to administer a coat of blue paint to an oak barrel. The cooperage, blacksmith, boilermaking and tin shops were all visited, and the visitors saw much to interest and impress them.

London, Ont., Dec. 7 (Special to the Mail & Empire) — In Petrolia people are at a loss to account for the prejudice which seems to exist against Canadian oil in the large consuming centres of this country. They say that while there may have been a time when the Canadian article was inferior to the American oil, improvements in methods of refining have brought about a great change, and that the local product is now quite up to, even if it is not superior to, the American standard. The statement is heard that it is a common practice for the retail dealer to sell good Canadian oil to his customers as American oil without taking steps to combat the existing prejudice. If, as is positively asserted in the oil region, Canadian oil is equally as good as its American competitor, and there does not appear to be any sufficient reason why it should not be, it is a pity that energetic steps are not taken to demonstrate the fact to the Canadian public, and so induce a larger consumption of the native product.
MINING OIL with Electric Power

In the Heart of the Jungle in Colombia is the Most Completely Electrified Oil Field in the World.

ELECTRICITY is a weapon of both sides where man and nature contend for the crude oil that lies beneath the broken terrain of the South American republic of Colombia.

Far in the interior, in the upper valley of theickle, muddy Magdalena River, the Tropical Oil Company operates powerful electric generators. A network of nearly 200 miles of power lines spreads throughout the field to serve all production and refining requirements, machine shops, and the domestic needs of the people. Pumping wells, gathering stations, well servicing—practically all plant and field operations, other than drilling, are powered by electricity. This is the most completely electrified oil field in the world.

Nature strikes at these efforts of man with vicious jabs of lightning, amidst such roars of thunder as are heard in few other parts of the world. Her flashes of mighty power surge along the company’s lines, charging them with heavy overloads of burning, fusing, destroying force. But man parries every thrust, and takes his prize. The whole experience has taught a lot of lessons on how to get the most out of electric power under somewhat difficult conditions.

The generators in the field are now capable of turning out power sufficient to supply the requirements of a Canadian industrial community of approximately 25,000 people. The original plant, at El Centro, first consisted of four 1000-kilowatt turbine-driven generators. One of these was later replaced by a 5000-kilowatt, condensing turbogenerator, making the capacity of that plant a total of 6000 kw. In addition, there is a 2000-kw unit at the refinery at Barrancas-Bermeja (about 20 miles away) which is frequently connected in parallel to give a total available power of 9,000 kilowatts.

Steam is the source of power for all these generators. At El Centro, there are seven 500-horsepower boilers fired by gas recovered from the field. Because of the addition of superheaters and the enlarging of the furnaces by means of Dutch ovens, these boilers are now capable of operation at 175% rating. Only 60% of their power, however, is needed for electric generation. About 40% is used for other purposes, chief of which is the main natural-gasoline plant, situated close to the power plant. The policy of centralizing such operations, wherever conditions permit, helps, of course, to cut operating costs.

Generated at 2,500 volts, the primary current is distributed at that pressure within a radius of about two miles. For greater distances it is stepped up to 15,000 volts. There are now four of these 15,000-volt circuits, each designed for a capacity of 1000 kva. (kilovoltempera). All four comprise about 50 miles of line.

Some 70 transformer stations throughout the field reduce the high voltages to the 440 volt secondary currents used in service. Each transformer station serves an area of approximately a third of a square mile, and has a capacity ranging from 50 to 225 kva, depending on the number of wells and oil gathering stations located in the particular area.

Keeping this system alive with continuous current is probably the chief problem of the electrical department. For ten years, constant record has been kept of power interruptions and total output. Such records not only provide a comparison between output and service rendered, thus checking on the efficiency of field equipment, but they help to reduce or eliminate interruptions in service.

Electric storms caused practically one half of the 230 individual power interruptions during 1938. That figure of 230 interruptions sounds big, but most of them were of short duration or applied only to small, isolated sections of the system. Those interruptions not caused by flashover or breakdown due to electric storms, were due to construction, alteration, or maintenance work. Probably a more accurate picture of the efficiency is gained from the fact that last load, due to power outages in 1938, was only one tenth of one per cent of the power generated.

Although there is no evidence of a direct stroke of lightning ever having occurred on the electrical systems, nevertheless it does induce in the lines overvoltages which are difficult to control and which jeopardize line insulators, feeder terminals, and even lightning arresters. In fact, the complete solution has not been found although various protective measures are being tried.

Of all the power generated, about 45% is used for pumping wells. There are more than 650 pumping wells in the field at this time. So this particular application of electric power is the most important and interesting. The average well depth is 2600 feet, ranging individually from 400 to 4000 feet. Extremely broken terrain and heavy undergrowth limit central pumping. Therefore, with the exception of two central pumping towers, wells are equipped with individual pumping units.

Capacities of the various pumping units must be adapted to a wide range of well depth and load.
conditions. Only by discovering and installing the most efficient power unit for each well can heavy loss of power be avoided. It is in this work that the greatest advance has been made in power conservation.

When the first well-pumping motors were obtained, some ten or twelve years ago, the available type of pumping equipment was the "standard front," an adaptation of the cable-tool drilling rig. As this equipment was used for both pumping and servicing, dual-rated motors of 15-35 horsepower were installed. This type of motor is, of course, now known to be a highly inefficient type from the standpoint of power consumption. When manufacturers produced more compact and efficient pumping equipment, and portable hoists came into use, it was possible to do away with the dual-rated motors and substitute general purpose motors. Manufacturers were asked to furnish motors with their pumping units, with the result that the motors supplied were of a size that could handle the rated capacity of the unit. In most cases, however, they proved to be much larger than actual operations required.

At this stage a power survey was made of all pumping installations in the field, and resulted in important discoveries about power problems. It was found that the pumping installations at this time were overpowered to the extent that the average load factor was less than 50 per cent. Obviously, it was time to select driving motors of a type and size for the requirements of each well. From that time, the company bought its motors separately from the pumping equipment; and instead of getting motors rated to handle the maximum capacity of the unit, selected motors to meet the requirements shown by actual load tests.

Keeping the right size of motor at a well is a continuing problem. Production decline, water encroachment, gas-oil ratio control, and various other causes change the load conditions on individual wells almost constantly. A few years ago this problem was given to a special division of the engineering department. Load tests of the several hundred pumping wells were put on a definite schedule, and now constitute an important operating routine. The work of the production and electrical departments is very closely co-ordinated at all times.

So effective have been the efforts for more economical motor application that other studies are now being made of other phases of pumping-well efficiencies. While these studies are closely related to the general one of power consumption, they are quite distinct from that of motor application. They deal chiefly with lifting efficiencies of equipment under varying conditions, and the factors under which they determine the amount of power required per barrel of oil lifted.

FORGETTING THE CARES OF WEIGHTY RESPONSIBILITIES

- One of the most largely attended and enjoyed affairs of the past winter in Toronto was a reception given on February 8th by Colonel R. S. McLaughlin, President of General Motors of Canada, Limited, in honour of Alfred P. Sloan, Jr., Chairman of the Board, General Motors Corporation, and William S. Knudsen, President of General Motors Corporation. Hundreds of representatives of business, commercial, industrial, professional and public life, gathered at the Royal York to meet the principals of General Motors.

In the above photograph G. Harrison Smith, President of Imperial Oil Limited (right), is shaking hands with Mr. Sloan and between them stands Colonel McLaughlin. To the left is Mr. Knudsen, another old friend of Mr. Smith.
A section of "The Valley". In the foreground is the pipe line pumping station. The cluster of houses, upper left, is Little New York.

THE VALLEY
PIPE LINE COMPANY

The newest member of the Imperial Oil corporate family is The Valley Pipe Line Co., Ltd., which has taken over the pipe line system which gathers oil in Turner Valley and transports it to Calgary.

The Company has some 76 miles of gathering line, and approximately 92 miles of trunk line. Starting at an elevation of 3,550 feet in the Valley, the trunk lines cross a range of hills at an elevation of 4,230 feet, and discharge into the terminal tankage at Calgary at an elevation of 3,350 feet. The central tank farm in Turner Valley has a capacity of 100,000 barrels and the oil is moved under pressure of 1,000 lbs.

Prior to 1925 all petroleum production in Turner Valley was transported by team and tank truck, either to point of consumption or a distance of 17 miles to the railroad at Okotoks. The first 4-inch line to Calgary was constructed in 1925, and the second 4-inch line was laid in 1937. The 6-inch line was constructed in the spring of 1938.

The Board of Directors of The Valley Pipe Line Company Ltd., comprises—F. B. Rimel, Chairman; S. G. Coulter, President; J. H. McLeod, Vice-President; and Alexander Barlow and T. E. Burns. C. E. Young is Secretary-Treasurer. The head office of the Company is at 604 Second St. West, Calgary, Alta.

S. G. COULTER
President of the Valley Pipe Line Co., Ltd.

The oil is forced through the trunk lines by this battery of pumps. In winter the oil is heated to avoid congealing.

TESTS and experiments have always been a fundamental policy of Imperial Oil Limited—especially when their object has been to improve methods, reduce waste, or provide against possible failure. So when the production manager of Imperial Oil Hockey Broadcasts asked permission for an advance rehearsal of the first overseas broadcast of the hockey, authority was given him without argument. And that turned out to be very fortunate.

By arrangement with the British Broadcasting Corporation and the Canadian Broadcasting Corporation, plans had been made to put Imperial Oil Hockey Broadcasts on the air in Great Britain for the entertainment of Canadian troops in training there. The undertaking was to start with the game of February 24th; and the broadcast in Great Britain would occur on the evening of the following day, February 25th.

Under this plan, records of the broadcast would be made on Saturday night—actual overseas phonograph records of Foster Hewitt's vivid word-picture of the play. These recordings would later be transmitted by wireless beam to London, England, during daylight hours when beam transmission is at its best. The B.B.C. in turn would cut its own set of records from the beam, and would hold these until evening, when they would be put on the air over the B.B.C. network.

That is a rough skeleton of the plan. But it was complicated by one major difficulty. The average Imperial Oil Hockey Broadcast occupies an hour and a half to an hour and three-quarters. Of this, approximately one hour to an hour and a quarter of elapsed time represents actual play. The maximum time which could be provided by the British Broadcasting Corporation was only half an hour.

So the Imperial Oil Hockey Broadcast production manager asked permission to produce a complete trial broadcast in advance—one that would never be put on the air—for the purpose of determining how that problem could be solved.

On Saturday night, Feb. 17th, the "test run" was made. Starting on the very second of 9 o'clock, E.S.T., a sapphire cutting needle was dropped on the spinning virgin surface of the first of six 16-inch blank transcription disks—each capable of containing 17 minutes of "named broadcast." From disk to disk, the Canadian Broadcasting Corporation transcription crew continued cutting, until the "sign-off" ended the show at 10.52 p.m.

An hour later, a dozen or more radio engineers, announcers, production men and other technicians of the hockey broadcast crew were at work in C.B.C. studios, trying to select from the records of the game the most interesting sessions of boodle. The total duration of all such periods combined must not exceed 20 minutes. The other 4 minutes would be required for an introduction, an ending or "sign-off" and the necessary explanatory "links" between the scattered intervals of play selected.
Seven production men and announcers were given sheets of paper ruled vertically at quarter-inch intervals. Each vertical line was assumed to represent a minute of elapsed time. The broadcast was then played back to this audience, while a technician called off the minutes from a broadcast timing clock. Each member of the critical audience was asked to trace a graph, minute by minute, representing his own opinion of the ebb and flow of listener interest provoked by the play.

Then the graphs were lined up, line for line, and compared.

That was the plan.

But one member of the audience listened mainly for crowd noise. He traced his graph on a basis of the ebb and flow of crowd noise volume as he could hear it. When the graphs were finally compared, this “crowd noise” graph turned out to be practically a “mean,” or average, of all the others.

The significance of this lay in the fact that if a technically-accurate graph of crowd noise volume could be obtained, it would provide an accurate, minute-by-minute index of the ebb and flow of “listener-interest” value in the broadcast. This apparently was verified when it was noticed that crowd noise in advance of a score by the opposing team was just as high as it was in advance of a score by the home team. The cheer following a score by the home team was greater, but the advance excitement in both cases was approximately equal.

Consequently, it seemed reasonable that if the detailed “log” were kept of the play (rushing, shots on goal, scores, etc.), and if this were augmented by an accurate “graph” of the ebb and flow in the volume of crowd noise, a technically accurate comparison could then be made between exciting moments of play in one period and similar moments in another period. This, it was felt, would be most important in helping to decide which intervals of play must be included, and which intervals might safely be omitted from the overseas broadcast. A tentative selection could thus be made on paper, and the “jury” in consequence would not have to spend quite as many hours listening to repeated playings of the records.

The records in question are called “soft cuts.” For phonograph purposes, electrophones are made from them, and records are then stamped from the electrophones, using a hard composition. But the original record has to be a soft composition, in order that the cutting needle can do its work efficiently. If such records are played over two or three times, they naturally lose quality and clarity; and if they are subsequently used for broadcasting, the result is muddy and the words are hard to hear.

Under the original plan, they would have had to be played once through for the “jury.” Parts of them would have had to be played a second time for comparison in case of disagreement concerning parts to be selected. Beginnings and endings of the parts finally selected would then be played a third time for “easing” purposes—i.e., to identify the exact points at which to “fade in” or “fade out.”

And finally, the parts selected would have to be played through a fourth time when they were being dubbed onto the condensed half-hour recording which would later be transmitted by wireless beam to England.

Half of this wear and tear could be eliminated with the aid of an accurate graph of crowd excitement, augmented by a minute-by-minute “log,” or written record, of identifying incidents in the play.

So for the first actual broadcast to England a new system was devised. Three men were put to work with sheets ruled in 10-second intervals of elapsed time, from 9 o’clock to the end of the broadcast. On these sheets, one man keeps a running log of play. Seated in the gondola, he can both hear the broadcast and see the play. Beside him, a second man keeps record of “game time” or “playing time” on similarly ruled sheets of elapsed time. Back in the control room the third man uses an audiometer and plots a graph of the actual volume of crowd excitement.

Those three sets of sheets, when stripped together, provide an actual visual picture of the play, measured out in quarter-minutes.

Continued on page 40

Broadcasting a Hockey Game to the “Boys” Overseas

1. From the announce’s gondola in the “Gardens” at Toronto, the Imperial Oil broadcast poises by line to Station CBL, where it is fed to the national network of the Canadian Broadcasting Corporation and simultaneously to the C.B.C. Recording Studios.

2. In the Recording Studios, records are cut of the entire broadcast while the game is in progress. But since the Overseas broadcast is limited to half an hour, only the most interesting part of these can be used.

3. As they listen to the original recordings, a hand-written “log” of the play and a visual “graph” of crowd noise, prepared while play was in progress, assist the “jury” in selecting the parts of the game to be re-broadcast.

4. The parts selected for the Overseas broadcast are then pieced together on a new set of three records, while Foster Hewitt “cuts in” with brief summaries of less interesting portions of the play which were eliminated by the jury.

5. The condensed game are then played for transmission overseas. Micrometer gauges make it possible for the operator to switch from record to record without a break.

6. The weak electrical impulses from the record playing machine (5) are amplified in the C.B.C. control room, and then sent out over telephone lines to the short-wave beam transmitting station at Lawsonsville.

7. At the Lawsonsville end of the line, the broadcast is given terrific amplification before starting on its jump across the ocean.

8. The beam system antenna transmits the broadcast over the ocean in a straight line, like the beam from a searchlight, so that it is received at the other end with the least possible fading or distortion.

9. The electrical impulses are picked up and amplified in England and another set of records is cut at Broadcasting House, in London. The transmission overseas usually takes place during daylight when beam conditions are at their best.

10. Later that evening the records are re-broadcast by the B.B.C. as Canadian troops gather before the radio sets to enjoy 30 minutes of Canada’s national winter sport.
HENRY H. HEWETSON
Appointed a Vice-President

HENRY H. HEWETSON, who on March 11th was appointed to the office of Vice-President of Imperial Oil Limited, and who directs all of the Company's marketing activities throughout Canada and Newfoundland, is an impressive combination of physical and mental energy and alertness. Tall, broad-shouldered, deep-chested and strong-limbed, his build is that of an athlete and indeed he has substantial achievements in athletics to his credit. Some years ago he was one of the ranking tennis players on the continent and devotees of the game still talk of the day in the early twenties when without the advantage of adequate practice he turned up at a championship tournament in Toronto and in one afternoon defeated three of Canada's topmost players. He still wields a very effective racquet but has travelled about too much and applied himself to business too assiduously to continue his participation in tournament play.

Mr. Hewetson served in the Royal Air Force during the first World War and when the Armistice was signed he was engaged in instructing novices in the ways of handling a plane. In 1919 he was demobilized and he lost no time in looking about for a business career. He chose the oil industry as his field of effort and was taken on to pursue a student course with Imperial Oil Limited. The course was of an intensely practical nature and the new student began his work at Sarnia Refinery where one of his first duties was that of stoking a still. His prowess in shovelling coal, which was the fuel used at that time in this particular still, was apparently as notable as his skill on the tennis courts — probably to the surprise of some observers who thought the life of a flying instructor to be a pretty cashy occupation that would tend to establish a preference for white-collar work.

In a short time Mr. Hewetson was transferred to the Research Laboratory where he quickly mastered the art of washing and polishing retorts and other instruments and so won an opportunity to delve deeply into the mysteries of petroleum. His aptitude and his keenly analytical mind soon showed him to be one with unusual qualifications for the science of chemistry. His predilection in this direction some years later won him a membership in the American Institute of Chemical Engineers.

He subsequently continued to add to his knowledge by work and study in operations and research branches of the petroleum industry in the United States, and in 1924 he was sent to Colombia and Peru to direct work in connection with the construction of refineries for the International Petroleum Company. After completing this work in South America he returned to the north and acquired an extensive and detailed knowledge of petroleum marketing.

From time to time he has served in England and other European countries and for the past two years he has been closely associated with the direct marketing activities of Imperial Oil.

THE LATE JOHN MCNEIL

Not alone to his associates in Imperial Oil but to a wide circle of friends throughout Canada and the United States, news of the passing of John McNeil, a Vice-President of Imperial Oil, at Vancouver on March 3rd, came as a grievous shock.
Mr. McNeil had been in poor health for several years past but apart from occasional absences from his office, carried on with the same industry and efficiency for which he had always been noted and in the course of time those with whom he was in contact came to forget that his health was precarious, just as he pretended to forget it, and his death, therefore, seemed startlingly sudden.
A quiet, efficient and purposeful worker, Mr. McNeil was noted, as one of his associates said, for mental and physical stability. He was noted too for an almost invincible geniality and for good nature and kindliness. To all who worked with him he was the same John McNeil as Vice-President as he was when he first joined the Company's ranks.
Few men had a longer or broader experience in the oil industry than the late John McNeil. He was never engaged in any other business. Born in Muskoka some 57 years ago he was educated in Toronto and when he finished his course in Parkdale Collegiate he secured employment with the Grant-Hamilton Oil Company in Toronto in 1899. Four years later Canadian Oil Companies absorbed the Grant-Hamilton Company and in 1904 Mr. McNeil was appointed Manager at Halifax for Canadian Oil Companies. A year later he became Assistant Manager in the West with offices at Winnipeg and in 1906 he entered the employ of Imperial Oil as Assistant to the Western Manager. In 1912 he was made Manager at Winnipeg and in 1914 was transferred to Sarnia to take charge of gasoline and kerosene sales throughout Canada. Later that year when the Company's marketing organization was transferred to Toronto he moved to that city.
In 1928 Mr. McNeil was appointed Assistant General Sales Manager for Eastern Canada and in 1931 he was elected to the Board of Directors as head of the Marketing Organization. He became Vice-President in 1934.

The funeral was held at Toronto on March 8th and was very largely attended by hosts of friends and business associates.

To his widow The Review extends sincere sympathy in the loss of her devoted and highly esteemed husband.
NOWHERE in the petroleum industry will you find the duplicate of a little railway that serves the 14,000 people who are engaged in producing and refining oil on the International Petroleum Company’s properties in Peru.

This unique railway centres on the town of Negritos, some six miles south of the seaport of Talara. It spreads its steel fingers to 14 separate oil fields. An arm extends northward through a half-mile tunnel, under a series of hills that run from the plateau to the sea, to reach Talara. The line goes south as far as Portachuelo pump station on the north bank of the Chira River, 15 miles from Negritos, which is the source of fresh water supply for the communities.

To the 14,000 Peruvians in the Negritos district, the railway is the artery of life. It brings them their food, assures them their livelihood, and once every week it gives them a free and merry excursion to the market place at Negritos. An average of 3,500 people and 76 produce cars slide over its rails from the terminal each month. In addition, regular scheduled trains give free transportation twice a week from the oil fields to Negritos for workmen and their families.

It is not only a railroad, but a highway—perhaps the only combination railway and highway of its kind in the world. On each side of the narrow-gauge tracks, only 30 inches apart, the ties extend out to give support for an asphalt surface. Motor cars can speed along this asphalt runway, straddling the tracks. The country is flat and open with no bars to visibility, and frequent turn-out points along the roadway permit rapid, safe, two-way traffic.

The asphalt for the road surface was dug from the historic oil seeps in the near-by foothills of the Andes, thus effecting a considerable saving in the costs of highway construction.

All this, however, is only secondary to the serious work of transporting all imported equipment and supplies from the sea to the oil fields, and utility in moving and handling tools and materials on the fields themselves.

Sixty miles of this narrow-gauge line radiate north, east and south from Negritos, with spur lines branching to the 1965 wells in 14 fields. At one time there were two railways, each barred from the other by the hills that run right down to the sea. Everything that was moved from Talara to Negritos had to be hauled over these hills by an inclined railway. This meant unloading and re-loading for transhipment. It cost a lot of money to get the tunnel through the hills but it proved a sound investment. Now, trains from Negritos can go right through to the docks at Talara.
Variety means economy in the locomotive power of this railway. Fourteen Forbord tractors were adopted in the yards in the local shops and are used for hauling light loads. Similar work is done by six English-made Simplex railcar tractors.

One neat power unit, however, is an innovation that seems likely to supplant, in time, its competitors for the light hauling jobs. It is a rail tractor built in the company factory at Nepean and powered by a V-8 engine. It is heavier, faster and more powerful than its rivals, and has the extra advantage of three speeds and reverse.

Two Baldwin gasoline locomotives handle the intermediate loads, and for heavy duty there are seven 16-ton Baldwin steam locomotives on hand. These steam engines are not at the end of the tunnel, and the consequent fire hazard, they are not allowed to pass through. However, they are used on every other section of the system. In addition, three pick-ups and two touring cars are used for line inspection and special service.

Rolling stock consists of 360 cars, of which 120 are of special types such as passenger and tank cars, and oil-well servicing units. Some of the drilling department’s most useful units are permanently mounted on flat cars. Since 1917 a float-mounted rotary rig has been in constant service, and has proved highly satisfactory for shallow drilling and deepening work to 2000 feet. On one car are mounted two-speed drawworks, a 10-inch by 18-inch twin drilling engine, and a 12 by 6 by 16-inch mud pump. In parts of the field, far from the main rotary section, mud is hauled to the rig by rail. This rig can be completely moved from one section to another in 16 hours. The whole outfit was built in the Nepean machine shop from second-hand rotary equipment.

Other special cars in the drilling service include four oil-well cementing units. These are used for ordinary cementing work, and one is equipped for high-pressure squeeze cement jobs.

All the large rotary rigs, of which there are six, operate throughout the field, depending on the road, not only for their mobility, but for all supplies and equipment during drilling time. Drilling wells in active rotary areas are connected by rail to the local field supply house and drill-pipe rack.

In moving such rigs, several flat cars are run onto the well siting at a time. When they are loaded a tractor spots more cars in their place and hauls the loaded ones to the next location. Ten cars usually handle a complete rig.

Altogether, this unique little railroad constitutes the vital nerve system that serves, not only the industrial purpose of its owners, but the life of the whole community.

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Keeping Pace
WITH AIR TRANSPORT

By W. G. CHARLTON,
Advertising Department,
Imperial Oil Limited, Toronto.

AUGUST 15, 1918—At Toronto’s Landside Airport there was unusual activity. Out on the small wood-covered field a Curtiss Biplane was being fueled from a horse-drawn tank wagon. Mechanics around the ‘plane made fast minute checks. To one side a group of officials stood in conference. Fueling completed, the pilot, carrying with him a bulky striped bag, climbed into the cockpit. He scanned the sky, listened to the engine ticking over, and then waved his arm. The ‘plane taxied out, turned into the wind, and raced down the field and into the air.

Four hours later, Lieutenant Longman of the Royal Canadian Flying Corps set the Curtiss Biplane down at Rockcliffe Field in Ottawa. The first official Canadian air-mail test flight had been completed.

March 15, 1940. At Malton Airport just outside Toronto a huge airliner is being fueled from a modern tank truck. From a small hand truck mail bags are stowed into the forward compartment of the big ship. The last passenger buses aboard, the truck moves away and the two motors burst into a deep-throated roar. The air-line taxis down the smooth broad runway and effortlessly wings into space.

Eighty minutes later, as scheduled, the flight is completed as the pilot sets the big ship down on Rockcliffe Field in Ottawa. To-day most of us take for granted the achievements of modern aviation. Trans-continental airmail, the world circled in four days, a regular transatlantic schedule—such things no longer amaze us. But one has only to think back to that first four hour air-mail flight which now takes only eighty minutes to realize the advance aviation has made in the past 21 years.

Aviation has never lost the momentum it gained...
in the First World War. It has gone steadily forward, developing new theories, testing, discarding, always reaching forward to faster, safer and more comfortable air transportation. Years of aeronautical research have developed the sleek, streamlined bodies of the aeroplane of today. Master engineers have designed and built incredibly powerful engines to fit these bodies until, just recently, an aeroplane in a test dive achieved the unbelievable speed of over 575 miles per hour. So fast is this that a bullet fired in the reverse direction from the "plane while it was in the dive would not have gone upward, but would have stood still momentarily and then fallen earthward! Safety developments have not been sacrificed to those of speed in modern aviation. Two radio and the radio directional "beam," ice removers, the gyro compass, the automatic pilot—all were developed to make today's flying as fool-proof as it is humanly possible. New alloys have been compounded to make stronger bodies. Engine designers have made the modern aeroplane engine a marvel of dependable, efficient operation.

Aviation in Canada has not progressed as far or so fast as it has in other countries of greater population. Canada has an area equal to that of the United States and Alaska combined, but the fact that its 11,000,000 inhabitants live principally along the southern edge of this vast territory has made impractical any large-scale development in aviation such as has been experienced in the United States during the past decade. Paradoxically, it is the great northern part of Canada which up to a few years ago was virtually untouched and uninhabited that has made this country one of the world leaders in air-borne freight.

Until the advent of the aeroplane, the Canadian North was very difficult of access. Prospecting was done either on foot or by dog team. For years much of its fabulous mineral wealth lay unexploited because of transportation difficulties. Today the aeroplane, carrying prospectors, flying in machinery and supplies, and in many cases bringing out the refined ore, has truly opened up the North. These "flying boxcars," as the big transport 'planes were nicknamed, in 1928 carried a total of 21,764.587 pounds. Only one country, (Russia) transported more freight than this by aeroplane in 1928.

The first bush flyers were the pioneers of commercial aviation in Canada. Flying across un mapped country, often with inadequate instruments, making their own repairs when they were forced down, living in the unknown on emergency rations for days at a time, those flyers carried on the Canadian war traditions and enhanced the Canadian pilot's reputation for skill that is the envy of airmen everywhere.

Pioneer oil company and through the years the foremost oil company supplying Canadian aviation is Imperial Oil Limited. For more than 21 years Imperial Oil has helped the development of flying in Canada by providing adequate supplies of gasoline wherever they were needed, and today Imperial Oil is the only oil company providing service for aviation in Canada from coast to coast and from the Border to the Arctic. Back in 1928, the little horse-drawn tank wagon which fuelled the first air-mail test flight and the wagon which four days later in Ottawa fuelled the plane that made the first official air-mail flight (Ottawa to Toronto), carried signs which read "Imperial Oil Limited." From that time to the present, Imperial Oil has been so closely associated with the development of aviation in Canada that a history of the one would be incomplete without a history of the other. The following are a few of the highlights in the past twenty years of Canada's aviation history, highlights in which Imperial Oil played its important part as suppliers of aviation products and services.

1919 saw Imperial Oil service at work supplying fuel for the Canadian Air Board flight from Halifax to Quebec. This flight, designed to demonstrate the possibilities of commercial aviation in Canada, was the forerunner of commercial aviation flights in this country.

1920. Taking off from Halifax on the morning of October 7th, Col. Leckie and Major Hobbs of the Royal Canadian Flying Corps piloted their seaplane as far as Windsor, where they alighted on the evening of October 10th. Here the flight was taken over by Air Commander A. K. Tylee, who headed for Medicine Hat in a land machine. On his arrival Capt. A. G. Thompson took charge of the flight, and on October 17th he and Air Commander Tylee landed in Vancouver. Although, owing to poor weather conditions, it took ten days to complete the flight the actual flying time was only 45 hours, which was considered good back in those days. Co-operating with the Air

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1921 Upper left—One of first planes to penetrate Canada's Northland was used by Imperial Oil to carry geologists to the Fort Norman oil field.

1924 Above—Ontario Provincial Air Service established as world's largest forestry protection organization.

1929 Left—Imperial Oil makes new contribution to Canadian aviation. This was for years the best known and most widely travelled plane in Canada.

1930 A year of Trans-Atlantic flights. At top—$100 at St. Hubert Airport, near Montreal. Immediately above—Sir Charles Kingsford-Smith's "Southern Cross" at Marble's Grace, Newfoundland. Both flights refuelled with Imperial Oil products.

1931 Col. Charles A. Lindbergh, landing in Halifax harbour. The Imperial Oil refuelling is in the background.

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tion marketing policy that was to be one of the greatest contributions that the development of aviation in Canada ever received. On instructions from the commercial aircraft companies, Imperial Oil arranged to deliver supplies of gasoline and oils to these companies' caches throughout the north country. The importance of this with regard to the development of northern flying in Canada cannot be over-emphasized. Knowing of these supplies and their locations, the northern airmen were able to fly confidently in the most remote areas with the knowledge that they were never very far away from fuel and lubricants.

1933 Above—One of General Balbo’s Italian Air Armada flights in Canada en route to Chicago. Right—The late Wiley Post lands at Edmonton to refuel for last leg of first solo round-the-world flight.

1934 R.F.A. pilots with famous Hawker “Fury” demonstrated the skill of the British air arm to Canadians public.

1924. The Province of Ontario established the Ontario Provincial Air Service. This, the largest forestry protection organization in the world, has been serviced continuously since its inception by Imperial Oil Limited.

1928 saw Imperial service playing a major part in several memorable events in aviation history. This was the year of the first air-mail flight across Canada. Like the first trans-Canada flight, service along the route was supplied by Imperial Oil. At Greenly Island off the coast of Newfoundland the forced landing of the German plane “Bremen” mobilized Imperial Oil’s Quebec office and the correct grade of fuel was quickly transported to this out-of-the-way place. At Trepassie, Newfoundland, the late Amelia Earhart took off for England in her plane “Friendship.” Gas and oil for this “pleasureable venture,” as Miss Earhart described the trip, were furnished through Imperial Oil’s Newfoundland office at St. John’s.

In the Spring of 1929 Imperial Oil made a new contribution to Canadian aviation when it presented the Aviation League of Canada with a Gypsy Moth, CF-AAA. Within two years “Acker” as the red and white and blue plane was nicknamed had flown over 60,000 miles, including two trans-Canada flights, on Imperial products; and was probably the best known aeroplane in Canada.

1930. While thousands jammed St. Hubert Aerodrome near Montreal the huge British dirigible R-101 settled slowly to the mooring mast which had been constructed in anticipation of its visit. During its stay the huge airship visited Ottawa, Quebec and Western Ontario. Fuel for these flights and for its return trip to England was supplied by Imperial Oil. The year 1930 saw another trans-Atlantic flight. Arriving at Harbour Grace in Newfoundland after fog, unfavorable winds and a temperamental compass had defied its attempt to reach New York from Portmarnock, Ireland, Sir (then Captain) Charles Kingsford-Smith’s “Southern Cross” was refueled by Imperial Oil’s St. John’s office for the remainder of the flight to New York.

In July and August of 1931 the Canadian Flying Club Association in conjunction with the Department of National Defence held the Trans-Canada Air Pageant. Led by Imperial Oil’s Aviation Manager, T. M. “Pat” Reid, in the Imperial “plane CF-IO, the pageant did much to promote the popularity of flying in Canada and demonstrated the feasibility of civilian mass flights across Canada. From coast to coast and back Imperial Oil products were used exclusively by the ‘planes in the pageant.

1932. Amelia Earhart is the first woman to fly the Atlantic Ocean solo.

1933. The late Wiley Post lands at Edmonton to refuel for the last leg of the first solo round-the-world flight. Time for the flight—7 days, 18 hours, 49½ minutes. General Balbo and the Italian Air Armada stop at Cartwright, Labrador, St. John’s, New Brunswick, and Montreal, Quebec, on their way to the Chicago Century of Progress Exposition. Colonel and Mrs. Charles A. Lindbergh, enroute to their North Atlantic Survey flight, land at Imperial Oil’s Imperial Refinery at Dartmouth, N.S.

1934. Five pilots of the Royal Air Force, on visit to Canada with their famous Hawker “Fury” intercepter fighters, demonstrated the skill of Britain’s air arm to the people of Canada.

1935. Dr. Charles Cameron makes 10,000 mile survey flight through North-West Territories.

1936. On an inspection tour of Northern B.C.M.P. outposts, the late Sir James MacBrien, with Flight Lieutenant R. C. Gordon as pilot, completes the longest single air journey (11,000 miles) made to date in Canada.


1938. Trans-Canada Airlines creates pilot training centre at Winnipeg and conducts test flight operations culminating in regular air-mail service between Winnipeg and Vancouver.

1939. Pan American Airways’ “Yankee Clipper” makes first scheduled round trip flight over the North Atlantic via Shediac, N.B. and Botwood, Nfld.

In all these flights Imperial Oil played its part by supplying aviation products and services. It’s a far cry today from the little tank wagon that fueled the first Canadian air mail flight to the modern facilities at Botwood, Newfoundland, that fuel the huge “Yankee Clipper.” Through the years Imperial Oil has marched along with Canadian aviation, extending generous help, anticipating its requirements; always ready to lay down fuel and render service wherever and whenever this rapidly growing industry expressed the need.

“Independence Day” is each year the occasion of a great “flame” at Talara, Peru. Meted for their patriotism, the Peruvians spiritually commemorate the winning of their independence in 1922.
TALARA Salutes a Valiant Friend

Club with a warship's bell which had previously marked the watches on one of His Majesty's ships. The visit of the "Exeter" was described in the Autumn, 1937, issue of the REVIEW which reported that Mr. C. M. Kindersley, Captain of the Talara Club, had thanked Sir Henry for the presentation of the warship's bell.

Though usually considered a "land" game, polo is a favorite sport with British officers and the Royal Navy has its Royal Naval Polo Association. Talara, with its excellent facilities for polo, is consequently a popular port of call for the King's ships in time of peace. On occasion, when visiting ships are unable to field a complete team, teams are chosen from the British officers and members of the Talara Polo Club and many exciting games have taken place.

Below - Crowds at Plymouth welcome home the battle- scarred Exeter. In circle - Commodore Harwood (left) presenting the ship's bell to the Talara Polo Club.

EXECUTIVE AND HEAD OFFICE Changes

JAMES McGrath who at the beginning of the year took over the new and responsible office of Comptroller of Imperial Oil Limited has to his credit a length of service which is not suggested by his comparatively youth. There is probably no one in the Company's employ of Mr. McGrath's age who has been so long in the company's service.

Following a tragic accident years ago in the St. Clair tunnel between Sarnia and Port Huron in which Mr. McGrath's father heroically gave his life in an effort to rescue a fellow railroadman, young James McGrath as the oldest of a widowed mother's three sons became the family's bread-winner although he had not yet entered his 'teens. His first position was that of an office boy but even at that early age he displayed the determination to learn and an ability to assimilate knowledge that advanced him from year to year and made him one of the Company's most capable accountants.

In 1935 signal recognition of his talents was given by his appointment as Assistant Manager of Refineries and he now assumes larger responsibilities in which he will have the support of the entire staff whose respect and friendship he has earned by his ability and personal charm.

- W. J. Whiting, recently appointed Secretary-Treasurer of Imperial Oil Limited, has been associated with the oil industry from the beginning of his business career. He acquired his early experience in Pennsylvania and moved to Canada in 1916 to join the staff of Imperial Oil in the Cost and Yield Department. A few months later when the executive offices of the Company were moved to Toronto Mr. Whiting came to that city where he remained until March, 1919, when he was appointed an assistant in the Financial Statement Department at head office and so returned to Sarnia. In December, 1920, he was made assistant Secretary-Treasurer following the retirement of C. T. Griggs.

- S. B. Scott, recently appointed assistant Secretary-Treasurer of Imperial Oil Limited, joined the Company in 1916, having previously been in charge of the British Government's National War Plants in Canada. Mr. Scott's first task was to survey the Company's marketing and accounting system and in 1922 he became assistant in charge of the Marketing Accounting Office at Sarnia. He was appointed assistant Treasurer in 1935.

SPRING NUMBER, 1940

W. J. WHITLING

S. B. SCOTT
Keeping Quality Up

Automatic Controls in the Sarnia Dewaxing and Grease Plants Maintain Consistent High Quality by Uniformity of Operations.

The increasing use of automatic controls is inherent in mass production industries, such as oil refining. Consistent operation with its resultant uniformity of product quality is necessary because the economies of large throughput may be more than offset by intermittent error. Accordingly, the policy of Imperial Oil Limited has been to use automatic controls to the greatest degree possible, both in new and existing units in its refineries.

Automatic control of process units has been established on the basis of two fundamental concepts of manufacturing: first, that smoothness and stability of operation are essential for high quality and maximum yield of products; secondly, the complexities of modern oil refining equipment entail so many variables that manual control is impracticable because of the many individualities that would be involved. In addition, the complete control of any unit for satisfactory co-ordination must be centralised where visual indications and records of all process factors are available to the chief operator.

Two recent installations in the Sarnia Refinery of Imperial Oil Limited, among the many automatically controlled units of that company, indicate the extent to which this policy is being followed. In the construction of the Grease Plant, the latest type of control equipment has been installed in keeping with the progressive developments in the methods of grease manufacture. Precision control of the quantities of solid components used in producing soaps is secured by weighing the materials on a special type weigh-berry located on the kettles charging floor. All other steps in the operation of the grease-kettles in the Sarnia Plant are controlled from a central panel. From this panel and without leaving the operating floor, the attendant can charge to any kettle any of the various liquid components entering into the manufacture of greases. All materials delivered to the kettles are metered and the quantity of the individual components is automatically regulated by means of a shut-off device on the individual meters, which cuts off the flow when the correct amount has been charged. The temperature of the kettle is indicated and recorded on the panel during the processing cycle permitting temperature adjustments as required for the particular type of grease being produced. Although the manufacture of grease is a batch operation where the number of process variables are relatively few, continuous and accurate control is essential for the maintenance of high quality and maximum plant throughput. These results have been realised in the actual operation of the Sarnia Grease Plant and, in a large measure, are attributed to the automatic control features.

The control installations in the new Ketone Solvent Dewaxing Plant at the Sarnia Refinery are of a much more complex nature. In this Plant there are, in addition to the refrigeration unit required for the chilling operation, four independent, although inter-related, processes. First, the mixing of the waxy oil with the correct solvent volume and the chilling of the mixture to the required temperature for wax separation; Secondly, the filtering of the waxy oil from the chilled solution; the third and fourth interdependent steps are simultaneous recovery of the solvent from the oil and wax phases discharged from the filter. Since all these operations must be co-ordinated and synchronized, the complete control is centralized and is automatic to the greatest degree possible.

One of the most important phases of the process is the filtering of the wax from the solvent oil solution, and it is imperative that the wax crystals be of uniform type and proper size for satisfactory filter operation. This requires that the ratio of solvent to oil be constant at all times and that the chilling during the initial period of the formation of the wax crystals be conducted at a specified and uniform rate. Suitable flow control equipment of the waxy oil and solvent automatically maintains the desired characteristics of the solution, and the chilling is controlled to the desired uniform rate by means of flow controllers on the solution feed and the chilling medium. Precision operation of the two distillation units which recover the solvent from the oil and wax is maintained by means of flow controllers on the charge and furnace feed circuits, and by automatic control of temperature, pressure, and liquid levels at the essential points in the fractionating systems. This control has resulted in smooth performance of the plant at high charge rates with a minimum inventory of solvent.

The necessity for automatic control of manufacturing processes is, in general, recognized by both the Management and Technical personnel in many manufacturing industries. With this impetus, instrument manufacturers have made, and are making, a constant effort to devise and improve control equipment to meet the many applications involved. The illustration accompanying this article indicates the importance that Imperial Oil Limited is placing on modern instrumentation to obtain centralized automatic control of its manufacturing operations.

BETWEEN A view of the centralized, automatic control installations in the Dewaxing Plant at Sarnia Refinery.
Recent Changes in South American Personnel

Closely associated with the mining and petroleum industries of Peru for more than a quarter of a century, Walter S. Reid, executive representative of the International Petroleum Company at Lima since 1923, has moved to Venezuela to assume new duties in that country.

Mr. Reid is a native of Glasgow and first went to Peru in 1913 in the employ of a mining company. In 1915 he returned to Scotland to serve in the British Army and was on active service until 1919 when he returned to Peru. He then joined the staff of the International Petroleum Company and spent some two years in Toronto and in 1923 returned to Lima as general sales manager. In 1928 he succeeded Eduardo Pozano as executive representative. Suitable tribute was paid to Mr. and Mrs. Reid at several functions which were held in Lima prior to their departure for Venezuela.

Mr. Arthur Edgings, for nineteen years in the employ of the Tropical Oil Company and the International Petroleum Company, has been appointed General Manager of the entire operations of the International Petroleum Company in Peru and Ecuador and will henceforth have his office in Lima. Mr. Edgings was first employed by the Tropical Oil Company in 1923 as a geologist and he worked in both the coastal and interior regions of Columbia until November, 1925, when he was transferred to Peru where he continued his professional occupation until January, 1927, when he was made Assistant Resident Manager at Tahuara. In 1951 he was appointed Resident Manager. Mr. Edgings enjoys a wide popularity with all members of the organization.

Arnett Norcott has been appointed Supervisor Manager of the International Petroleum Company in charge of operations both in the oil fields at Negritos and at Tahuara. Mr. Norcott entered the employ of the Tropical Oil Company as Assistant Superintendent of the Gas Department Division in June, 1936. He served for three years in Colombia and was then transferred to Peru as Assistant Field Manager. In 1951 he was appointed Field Manager.

A Quarter Century of Employee Welfare

The welfare programme of Imperial Oil Limited and its subsidiaries in Canada has functioned under the Annuities and Benefits Department for a period of approximately a quarter of a century.

The simple principles on which the plan was founded have proved sound and logical. It provides machinery to care for all its employees as follows: sickness benefits, death benefits, pension, stock and cash saving, vacations with pay and the eight-hour day. The present Employees' Thrift Plan is of a three-fold nature, namely, it provides that the company and the employees become partners whereby if the employee provides 3% of his monthly salary or wage the company provides 3%, or in other words, the company matches the employee's contribution dollar for dollar, and for every additional 1% increase the employee contributes the company will match it with one-half of 1%. The maximum that an employee may contribute to the Plan is 13% of his monthly wage or salary, and the company will match this contribution with 5%. The company's contribution is then allocated to the pension phase of the Plan as a minimum, and the employee's money may be allocated either to the cash saving phase or the stock purchasing phase. If it is desirable the employee may allocate the combined contributions to the pension phase, and the remainder of the combined contributions may go either to cash or stock purchasing.

This Plan has functioned so successfully that the feeling is it has established a criterion which merits the thought of all citizens, as well as Canadian industry in general. In fact, the trend of present-day conditions merits serious consideration of industrial welfare plans of this nature for the simple reason that it is a forward step in social planning enabling a percentage of the earnings to be set aside monthly, thus providing not only for the well being of all employees but for relief to the taxpayer on whose back falls the load providing for the destitute.

During the year 1939, 315 cases of sickness were provided for. Fifty-five employees were placed on pension. Twenty-three amputants and twenty-five employees died during the past year. All of these have been taken care of by sickness benefits and death benefits, which have strengthened and maintained the morale of those saddened by the loss of their breadwinner. The record of industrial accidents has been good; during the past year in the various units throughout the Dominion there were only 114 accidents, all of a minor nature.

May I take this opportunity of expressing to all industrial councils in the Marketing and Manufacturing and Production Departments across Canada the Annuities and Benefits Committee's grateful appreciation for the co-operation that has been rendered during the past season.

J. H. Simpson, Chairman, Annuities and Benefits Committee.

Annuities and Benefits Committee. 1940.

Standing: Left to right—G. L. Thompson, D. E. Ledda, J. R. Lapham, Stewart, Left to right—J. A. New, J. R. Simpson (Chairman), Ronald MacLeod.

Spring Number, 1940.

ALBERTA DIVISION—Left to Right—O. C. Fisk, G. A. Ferguson, S. R. Stearns (Chairman), E. D. LaCoe, M. Ross. Reid.


ONTARIO DIVISION (OTTAWA COUNCIL)—Left to Right—W. E. Dave, A. L. Pearce, E. L. McVitty (Chairman), E. E. Holland, A. W. Blake.


QUÉBEC DIVISION (Québec council)—Left to Right—Joseph Jones, W. Akeson, H. J. Hamilton (Chairman), G. L. Hewes, G. Lessard.


F. E. HOLBROOK

Ends 44 years of Service

AFTER 44 years of service with Imperial Oil Limited and International Petroleum Limited, Francis Edward Holbrook, Secretary-Treasurer of Imperial Oil, joined the ranks of the Company’s annuitants on January 1, 1940.

Like many who have rendered distinguished service to the oil industry, Mr. Holbrook comes from Petrolia, the district in which the Canadian petroleum industry originated, and it was environment that decided his career, for originally he had intended to study medicine. However, in 1896 he secured a temporary position at a Petrolia refinery and the intricacies and mysteries of oil intrigued him so much that the “temporary” employment was extended over a period of nearly half a century, and ended with his occupancy of one of the most important posts in the Company.

Three years after Mr. Holbrook began his career in the oil business, Imperial Oil removed its refining operations to Sarnia. Mr. Holbrook went to that city to serve in various accounting positions which he occupied until December of 1912 when he was transferred to Fort William as chief clerk and assistant agent.

In 1914 International Petroleum Company Limited began its extensive operations in South America and shortly after Mr. Holbrook was sent to Peru as Assistant Chief Clerk. In July of 1917 he was promoted to the position of Chief Clerk. In 1921 he returned to Canada and became Chief Clerk in the International Petroleum offices in Toronto, and in 1927 he succeeded the late J. R. Polkey as Assistant Secretary-Treasurer of International Petroleum. In August of 1928 he succeeded T. C. McClellan as Secretary-Treasurer of Imperial Oil Limited and was moved to the Company’s head office in Sarnia. He has been a Sarnia resident ever since.

Unfailingly affable and even-tempered, Mr. Holbrook during his long services with the Company made hundreds of friends and established a wide reputation for his unfailing devotion to duty. The announcement of his retirement caused regret throughout the Imperial Oil and International Petroleum organizations.

A testimonial banquet, largely attended by employees of Imperial Oil Limited and presided over by T. F. MacNamara, was held shortly after Mr. Holbrook’s retirement and he was presented with a walnut writing desk as an evidence of the esteem of his associates. A brass desk set was presented on behalf of the girls of the office staff and Mrs. Holbrook received a bouquet of orchids.

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D. Stuart Bell, recently retired manager of the Ontario Division, was one of the oldest employees in years of service, having been in the employ of the Company for more than 42 years. Mr. Bell joined Imperial Oil Limited in July, 1897 at St. John, N.B., as office boy. In 1902 he was promoted to the Sales Staff working out of St. John, and in 1914 he was put in charge of lubricating oil sales. The following year he enlisted and went overseas with the 140th New Brunswick Regiment.

He returned in 1919, and in 1921 he was made assistant manager at Ottawa. Then followed four years as manager of Newfoundland Division from which position he was transferred to Toronto as City Sales Manager. At the time of his retirement Mr. Bell was manager of the Ontario Division.

For 27 years the International Ice Patrol has guarded shipping in the North Atlantic against icebergs and has also answered many an emergency call from distressed vessels.

The Patrol was established after the sinking of the Titanic, which cost 1,500 lives and is the greatest disaster in maritime history. The Patrol is performed by the United States Coast Guard and is financed by nations using the North Atlantic shipping lanes.

Though popularly called "Iceberg Hunters", the function of the ships in the Ice Patrol is not to destroy icebergs, an almost impossible task, but rather to report the positions of the icebergs which menace the shipping lanes. Usually the mountains of ice melt rapidly once they enter the warm waters of the Gulf Stream. Sometimes cross-currents tend to prevent the icebergs entering the Stream and the Ice Patrol may tow them into warmer water.

The Patrol does not only seek out "bergs but also makes calculations based upon weather observations and other data whereby, after its long experience, it is able, with almost unanny accuracy, to predict ice conditions in the sea lanes from season to season.

Last year, with trans-Atlantic flying service an actuality, the Ice Patrol inaugurated a meteorological service for the huge flying boats. By means of gas-filled balloons, approximately six feet in diameter, small radio transmitters are carried into the upper atmosphere to transmit continuous radio impulses for several hours. Using an ingenious combination of radio apparatus and meteorological instruments the Ice Patrol records the temperature, the moisture content of the atmosphere, the barometric pressure and other important data.

Life boat practice is an important function of the Ice Patrol and to stimulate interest and efficiency in seamanship as applied to small boats Imperial Oil Limited, Halifax, last year presented a Boat Race Trophy for annual competition among the vessels of the United States Coast Guard assigned to the International Ice Patrol.

In the first competition, the Trophy was won by the crew of the U.S.S. Chelan, who will retain the cup for the coming year.

In a letter of thanks addressed to J. G. Dunlop of Imperial Oil Limited, Rear Admiral R. R. Wasseco, of the United States Coast Guard, expressed the thanks of that service for the Imperial Oil Trophy. "It is with particular pleasure that Headquarters views your action in providing an added incentive among Ice Patrol cutters in small boat seamanship competition." Rear Admiral Wasseco said, "and we appreciate the spirit of goodwill and service interest as evidenced by the presentation of this beautiful trophy."
REFINERY PROMOTIONS

Clarence M. Moore, whose appointment as general superintendent of Calgary Refinery was made effective January 1st last, has been in the oil business since 1902, and entered the employ of Imperial Oil Limited at Sarnia in 1914. In June of 1916 he went to Regina in connection with the construction and operation of the Company’s new refinery there, and in October, 1922, when construction of the Calgary Refinery was begun he went to Calgary to take charge at that point.

Clifford R. Moore, recently appointed superintendent of Regina Refinery, has had a wide experience in the oil and railway businesses. When only 14 years of age he developed eye trouble, as a result of which reading was forbidden and accordingly he went to work in an Indiana oil refinery, where he learned various phases of the business. After six years in this service he entered the railroad business in which he was engaged for the next nine years, seven of which were spent in the capacity of railway agent.

In the early summer of 1918 he came to Canada and secured work as timekeeper on the construction staff building Imperial Oil’s Regina refinery. The plant was completed in September and Mr. Moore fired the first crude still. He was successfully employed as fireman, helper, stillman and shift foreman at Regina. In 1923 he was appointed assistant superintendent and in 1928 became acting superintendent. His appointment as superintendent was made on January 1st of this year.

Allan C. Harrop, appointed superintendent of Calgary Refinery of Imperial Oil, effective January 1st last, is a native of Niagara Falls, Ontario, and a graduate in chemical engineering of the University of Toronto. He entered the Company’s employ at Calgary Refinery in 1925 and the following year was made chief chemist there. In 1927 he was transferred to Tahra, Peru, as chief chemist for the International Petroleum Company, and in 1933 became refinery superintendent at Tahra. In 1936 he was recalled to Canada to take charge of the Regina Refinery.

HOW IMPERIAL OIL HOCKEY BROADCASTS ARE SENT OVERSEAS

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From this visual record, it is possible to select exactly the portions of recording that are required for the condensed half-hour broadcast—and the selection is based on an accurate comparison of interest values, rather than on personal judgment. One by one, the selected portions of the recorded play are “dubbed”, or re-cut, onto the half-hour record. And between them, Foster Hewitt sitting at a microphone in C.B.C. studios, gives a few words’ summary of the intervening play.

By this system, an intelligent selection of high spots is made from the original broadcast for the condensed version; dull spots are easily identified and eliminated, and intelligent bridges of narration are made possible to link each selected interval of play to the next; furthermore, the quality of recording is not ruined by repeated playing before the “dubbed” recording is made.

Although it is only half an hour of hockey that is provided weekly for Canadian troops, that half hour contains the very cream of an Imperial Oil Hockey Broadcast—at least so far as can be assured by careful, methodical effort.

The tripod device is set up on the ice of Steep Rock Lake, near Atikokan some 140 miles west of Port Arthur on the C.N.R. main line. The crew is diamond drilling into the bed of the lake, testing deposits of hematite iron ore which, according to Government geologists are so rich that they constitute one of the world’s largest iron ore supplies. The drilling equipment was hauled from the railway across the lake by diesel tractor and the drill is driven by a gasoline engine.