ONE OF OUR MAJOR MOVES FOR 1926

April 10th will see the inauguration of one of our major moves for 1926 in the offering of a new Imperial process motor oil—Marvelube. We have confidence that the new product, on merit alone, will create an immense demand for itself with the Canadian motorist.

Four years ago the scientists of the Imperial Oil Research Department had, upon the merest hint of a new principle in oil refining and, recognizing in it possibilities of the creation of a new motor oil to meet a world wide want, pursued the suggestion until by countless experiments and tests, they have brought this product to a state of perfection which is, we believe, the closest to the ultimate so far attained in motor oils. The name of Marvelube has been adopted to signify its marvelous lubricating qualities.

Marvelube is not an improvement nor an adaptation of any previously commercialized product but something entirely new. The new oil is made from selected grade of Peruvian Crude, the world’s finest lubricant base and the original low carbon content of the crude is reduced to the merest trace by the Marvelube vacuum process of refining. It also sets a new standard in all the other qualities by which motor oils are judged. Marvelube not only has less carbon and greater stability but contains less sulphur and shows great resistance to emulsification than any of the other grades under inspection.

To satisfy the research department as to the excellencies of Marvelube a large number of actual tests were carried out in 1925 and the results have amply corroborated all expectations of superiority. Marvelube will readily prove the motorist’s friend. The old worries of preignition, “knocking,” “draggly - clutches” action and unnecessary transmission noise will have been reduced to the minimum.

Mention is made of Marvelube in the Review only on account of its unique interest to readers concerned in the oil business. As spectators in-the-know, it will be as interesting to members of the Imperial Oil family to watch the progress of Marvelube toward public favor as it must be for a playwright to watch from the wings the development of his drama toward the inevitably accepted climax; and acceptance will undoubtedly be as unanimous. Marvelube will sweep the board.
THE NEW BUILDING

BY J. B. K. FISKEN

In commencing to describe the new addition to the building of the Imperial Oil Limited, one is immediately struck not so much with the size as the importance and beauty of the site for such a building.

On one of the main corners in Toronto and having a fine aspect to King Street, and looking over the church-yard of St. James Cathedral, this lot is roughly fifty-four feet by eighty feet, to the south of the existing building and on the ground formerly occupied by the building of the Toronto Railway Company.

The new structure will contain eight storys with basement and sub-basement and the columns in the new structure are being designed for additional storys which may be added in the future.

The present building on Church and Court Streets has four bays on Church St. and six on Court Street. The new facade will have nine bays on Church Street and three on King Street.

The faceting material will be of Indiana Limestone on the street elevations.

The lower storys will have large semi-circular windows as in the present part, lighting the first and second floors, and the second floor is designed in such a manner that it may be removed should a more lofty room be desired. These large windows make a fine motif for the lower floors and with the wide pilasters and deep reveals, the ornamental stone caps and cornice make a very handsome facade.

The main feature on King Street east will be a large stone and bronze entrance in the centre of this front. The central arch will have rusticated stone reveal and soldier and will contain a wide moulded limestone architrave with ornamental cornice over the entrance. Doors and frames will be cast of bronze with heavily ornamented stop mould, cornice and shield having modelled and turned bronze balusters before the fanlight. The shield will be supported by ornaments and scroll work, the whole resting on the bronze cornice.

Entering this door and passing through the marble vestibule, we reach a corridor leading to the present hallway and having the elevators and stairs on the west side. This hallway, the floors and walls of which are of polished marble like the present hall, has bronze and plate glass doors on either side leading to large offices on this floor.

We pass up three wide marble steps to the level of the present elevator hall and find a marble stair with bronze newel and hand-rail leading to the floors above.

From this point we reach the basement and sub-basement, the former being completely taken up by large storage vaults with electric fans for ventilation and a room for the superintendent. The latter is at present undesignated.

The second to the seventh floors will be used for the expansion of the various companies and departments and are laid out for their convenience, having mahogany trim with slate base and limewash floor as in the existing building.

The floors are equipped with all the modern requirements as intercommunicating telephones, teletypewriters, call bells, ice-water and ample lighting equipment.

The eighth floor will have a marble corridor as in the present one, having marble floor and dado running through the new building. This floor will have additional executive offices with an assembly room for conferences.

The general construction will be the same as in the present building with steel columns and framing with terra cotta tile arches and concrete fill. The windows will be of metal throughout and the roof of Imperial Asphalt with copper flashing. Above the fifth floor in the west will there be windows and good light may be expected on these floors.

It is intended to use the present elevator equipment and in transferring them to the new location, will arrange to have two elevators running at all times. The heating and ventilating will be connected to the present system and no new boilers or pumps will be required.

The general contractors for the new portion are the Jackson-Lewis Co., Ltd., Federal Building who are the contractors for the new government block the Queen's Park and have built many large buildings here and in other parts of the province.

DELIVERING THE GAS TO CALGARY

WHEN, on the 30th of November last, the Royalite Oil Company commenced delivery of natural gas through the 10-inch pipe line to the service mains of the Canadian Western Natural Gas, Light, Heat and Power Company, there was brought to completion one of the most important projects in the history of petroleum development in Western Canada.

The gas comes from the Royalite No. 4 well, frequently spoken of by Calgarians as the "Wonder Well" and its delivery to Calgary marks the first opportunity that Royalite Oil Company has enjoyed to cash in on the twenty million cubic feet of gas that every day for more than a year has been wasted at the Turner valley field.

The story of Royalite No. 4 has already been told in these columns how it came in with a volume and pressure that wrecked and finally set fire to the derrick, how for weeks it defied the best efforts of the most competent men in the business to harness it, and how, after it had been harnessed, a large volume of gas had to be wasted for the double reason that on account of the tremendous rock pressure the well could not be completely closed in while at the same time the gas was not fit for consumption without first being treated to remove the sulphur content.

The problem that presented itself to the Royalite, therefore, involved the construction of a scrubbing plant adequate to provide transportation for the gas from the field to the city.

The sulphur content of Royalite No. 4 gas is 700 grains to the 100 cubic feet. The requisite maximum capacity of the scrubbing plant required was 20,000,000 feet and the length of the pipe line 30 miles.

As an annex to the main program there was also the necessity for a four-inch pipe line of the same length to deliver the crude naphtha product of the No. 1
well to the refinery in Calgary. This was the program on which the construction department commenced about May 1st of last year.

ASSIMPL PLANT

Incidental to the construction items, there were, of course, several features to be adjusted by the diplomatic corps; an arrangement with the company for the financing of the pipe line; arrangement for right of way for the line, adjustment of rates, and many others with most of which Royalite was interested only in a secondary way and which have no place in a story of construction.

After expensive research and investigation the Koppers Company process of liquid purification using soda ash as a precipitant, was decided upon and the plant ordered from C. Brown & Company of Alhambra, California, on July 1st, 1925.

At about the same time 400 tons of 10-inch line pipe, constituting 30 miles, for the gas line to Calgary and 30 tons of 4-inch pipe, the same length, for the gasoline pipe, was ordered for immediate delivery.

Anticipating the arrival of the material, W. L. Morgan, absorption expert, arrived to take the situation in hand as commanding officer. Mr. Morgan has travelled into many countries in pursuit of his specialized calling, which is the installation of plants for the extraction of natural gasoline from wet gas and although there are few men in the world who know more about this specialty than Mr. Morgan, the Calgary episode was his first experience with the business of absorbing sulphur from gas.

Associated with Mr. Morgan throughout the work was S. G. Colussi already a familiar figure to Review readers who have followed the progress of events at Turner Valley, and Sam’s well-known capacity in the realms of chemistry found plenty of scope.

In principle, the Koppers process of purification although patented, is simplicity itself. The gas carrying its natural content of sulphur is introduced at the bottom of a cylindrical tower about six feet across and about eighty feet high. At the top of the cylinder a liquid carrying soda ash is introduced. The gas rises to the top of the tower by pressure and specific gravity and the liquid falls as rain, going down a well. Soda ash has an affinity for sulphur. Passing through the gas, the soda ash grabs the sulphur out of the gas. At the top of the tower a purified gas emerges to enter the pipe line for Calgary. At the bottom the now sulphur laden liquid falls into a tank below the floor, from which receptacle it passes into the re-absorbers to be relieved of its sulphur. Taking the sulphur out of the liquid is as simple a process as putting it in. Air passed through the liquid releases the sulphur and allows it to escape into the atmosphere. The action is a purely mechanical one; not chemical.

In the accompanying photograph the construction scene conveys the idea. The smaller cylinders, to the right, are for the extraction of the sulphur from the gas; the larger tank-like affairs are for the release of the sulphur. No smoke comes out of the stack; only sulphur, and it is made high to get the vapor well off the surface before releasing them. The buildings below house the gas controls and the pumps which handle the absorption liquid and the air.

Going in, Royalite No. 4 gas carries 700 grains sulphur to the 100 cubic feet; coming out, it has been purified to the point where it carries only 10 grains, an almost negligible quantity. The capacity of the plant is very close to 200,000,000 feet per 24 hours, although an exceptionally mild winter in Alberta this year cut the demand so that the maximum required seldom passed half that amount.

Construction of the plant was commenced on August 1st and delivery of gas commenced on November 30th.

Construction of the pipe lines in the earlier part of the season was well in advance of the construction of the absorption plant, but delays caused by some difficulties arising between the gas company and the city hall held up work for some little time and an unexpected siege of winter conditions in September and October further hampered operations, but by heroic efforts the contractors completed both lines to the city in time to accommodate the absorption plant and no time was lost.

The performance probably constitutes a record in such line of construction and reflects shining credit on the field forces of Imperial's liveliest western subsidiary, the Royalite Oil Company.

HALIFAX MAKES MERRY

The evening of February 12th was the scene of a gay and rollicking spectacle. The "Haligonians" forgetting dull care and the serious things of life, made merry at their annual office dance held in their new office building, recently completed.

The upstairs portion of the building, which under ordinary circumstances is a very bright and pleasant room, bore little if any resemblance to its every-day appearance, being transformed from "just an office" to a gaily decorated ballroom. The color scheme used was mauve and rose, changing the room to a veritable fairy-land. Much credit goes to Mr. W. L. Weaver who had charge of the decorations.

Music was provided by a "peppy" orchestra and many novelty dances were included in the programme. The staff and guests numbered ninety and the committee in charge are to be congratulated on the affair which was declared a huge success.
THE ROCKIES IN MIDWINTER

BY R. P. TUCKER

To the true lover of the great out-doors the lure of the trail is as potent in the winter as in the summer. Conditions may be different and, of course, naturally more severe, but the changed appearance of the country makes up for this by a new presentation of the beauty of Nature in the wild.

Much has been said of the glory that is Banff in its fleeting weeks of summertime, but as a winter spectacle the beauty of Banff rivals and surpasses that of many places world-famous and extensively advertised. The Sulphur Baths are open all year round; the winding Bow River is frozen over, affording excellent skating between its low banks, fragrant with the breath of pines. The beautiful Waterfalls are a mass of tumbled ice blocks, except for one narrow aperture through which pours a jet of water more powerful than any that man has yet harnessed to hydraulics. In some places the current can be seen through feet of transparent ice, the glittering opalescent green water as flows beneath presenting an eerie suggestion of imprisoned power. The mighty towering moun-
tains stand snow-capped, as guardians of a New World, their sides pinafored to the timber line, long ribbons of snow lodged in the crannies on the rock faces above, giving a beautiful tapestry effect, woven across cathedral walls, six counties wide.

The least-often observed miracle of the trail is the birth of a new mid-winter day as the sun bursts over the horizon, sending a roseate glare to rouse a sleeping world to life.

Leaving Calgary at a quarter to six in the faint starlight of a glorious January morning, well equipped for the astounding possibilities of a day's motoring, the lone policeman gives us a searching once-over as we speed out into the foothills. Cochrane, the first inhabited point reached lies immersed in darkness at the foot of the minor hills. Then on to Ghost Ranch, no companions but shooting stars—the darkest hour before the dawn—and from now on the sky line to the West begins to lighten. To the west there is to be faintly discerned the rugged edge of the mighty ranges, and from under the very wheels ghostly half-luminous forms of white rabbits streak to cover against the powdery snow.

A mile or so beyond the Entrance Gates, from the top of a high curve in the road we behold that masterpiece of Nature, the first breaking of a new day across a primitive landscape. The panorama of valley, stream and mountain unfold gradually; new effects each moment give to familiar views strange aspects of grandeur. The shifting twilight making the mountain masses seem alive and on the march. Rose tipped, the snow-white bosoms of the "Three Sisters" appear to hover as though brushing from side to side on the volupitous contours which imply their name. The mighty pinnacles of Mount Rundle come into view; the mists of night retreat before advancing day; the morning light plays from peak to peak like a gigantic searchlight, leaving the valley yet in darkness, and the air fills with sounds of a new morning.

What has been must have been for those inrepid pioneers who discovered and first traversed these passes through which we latter-day travelers hum our way, so smoothly and so fast and in such wonderful comfort. What an insignificant thing in the permanency of mountains is a man in an automobile?

Atrip to Banff Hill, as its homes are habituated its way through the gently swaying pines rises like a winding path to a snow-carpeted fairyland. Beyond, the road drops down past the animal park and into the Honeymoon Paradise of Banff. How unlike the Banff of the tourist season, with no place to park! Now the shop signs are all gone, the windows in stores and hotels boarded up. The streets, all clear of traffic, seem unbelievably wide. Spray River presents an enchantment, its low banks glistening like silver, all the bushes white with the ring of frozen spray.

The camp ground, so crowded in summer and alive with camp fires and the tinkles of banjos, lies calm and serene with a light mantle of snow and on the golf links glistening white has replaced that wonderful green.

Things so mundane as meals have to be taken; and wonderfully enjoyable they are as the kettle boils and the sandwiches disappear while the picnickers sit in the blazing midwinter sunlight, the vast panorama spread out before them, imprinting indelibly on the pages of memory a never-to-be-forgotten picture of the glories of the Rockies in midwinter.

TORONTO DIVISION HOLDS GAY EVENING

A
trompto dance programme held in Columbus Hall on the evening of February 20th, about 550 Toronto office employees and friends spent a most enjoyable evening.

A crowded floor and a seven piece orchestra contributed to the enjoyment. A Paul Jones ballet in the programme as well as a lucky spot dance but perhaps the most interesting dance of the evening was the "Premier Hunt Dance", which consisted of a number of letters being distributed to the ladies, and the first couple securing the word "Premier" which had to be made up of letters distributed by the ladies during the dance, were recipients of a box of chocolates.

"Marvellink" was served to quench the throats of the many dances, while light refreshments were served midway between the dances.
DAILY ROUTINE OF A WIRELESS OPERATOR ON BOARD AN OIL TANKER

By L. F. MAHNINN

The average life of a Wireless Operator on an oil tanker is common enough, but there are certain times when an otherwise dull routine is made interesting. When the Radio gear is in good working order, and the apparatus is functioning satisfactorily, the "daily dozen" largely consists of listening in during schedule watch hours and exchanging positions and weather reports with other ships. Then there is the nightly report of the ship's position to be sent to the nearest land station, which is possible, for publication in the newspapers. If, however, your ship happens to be out of range of a coast station, which is often the case on the San Pedro-Chile route, it is always possible to pass your position on via relay from other vessels until it reaches the coast station for which it is destined.

The evening Press Bulletin is always eagerly looked for by the crew, and the brief paragraphs received from various naval stations are very welcome on an isolated trade route. The Operator is generally asked for copies of all the Press Bulletins he has accumulated, by the superintendents of the various oil stations down the Chilean Coast, and the news contained in the bulletins is read with avidity and appreciation by the people of a news-hungry part of the world.

Communicating with Chilean and Peruvian coast wireless stations is always interesting, as their lack of knowledge of the English language makes conversation rather complicated. The writer remembers having given some information to the operator of the station at Ilo, Peru, and of having received a very profuse message of thanks saying, "Many thanks my very dear children!" The Peruvian operator evidently thought he was saying the utmost in polite thanks. After a short sojourn in the Southern climes, it is generally possible to pick up enough of the Spanish language to make oneself understood, and one of the Operators on an Imperial Oil vessel who is quite proficient in Spanish has become quite popular with the different Peruvian and Chilean coast station operators. Some of the operators on the oilships have the "Ship Journalism" bag, and publish, beside the daily news bulletin, a weekly or monthly magazine. This helps to while away the hours, and is a pleasant way of filling in spare time. Space time, however, is not so plentiful as most people imagine.

Operators on the oiltankers have the ship's clerical work to do, and assist the Captain in making out necessary Customs, Immigration and other papers. The ships' monthly reports are also typewritten by the operator, to be generally managed to keep busy.

Climbing the masts to make repairs to the antennas is one of the little pleasures not usually considered in the life of a Radio Operator, but it has been the writer's misfortune to be called upon to ascend the "heights" on frequent occasions, and it might be added that looking down at the sea from a height of about 80 feet is quite thrilling, especially when one happens to be hanging on to the mast with one hand, and using a pair of piers with the other. The rolling of the ship, accentuated by the height, helps to make the business of antenna repairing very interesting.

The various repairs to the transmitting apparatus necessary from time to time often prove difficult and have on certain occasions kept the operator busy during the entire night in order to effect repairs by daylight and transmit some important message. As the average tanker is not equipped with emergency apparatus, it is vital that the transmitting apparatus be in good working order. Aiding the navigation of the vessel by obtaining Radio Compass bearings is another duty which adds to the interest of the daily life, and brings forth the value of the Radio to the shipping world.

The SS "G. Harrison Smith" of the International Petroleum Fleet has been equipped with the latest in ship transmitting and receiving gear, and does excellent work over long distances in the vicinity of 4,000 miles. The installation on the big vessel is known as C.W. or Continuous Wave apparatus, and is much more efficient than the old style Spark system, although some fine work has been done by the half kilowatt installations on the other ships in the fleet.

The copying of weather reports particularly in storm regions, is another important duty of the operator, and it is possible to keep track of the West Indies hurricanes by means of the reports broadcast by the U.S. Naval stations during the storm period. We reports when in the vicinity of the Gulf of St. Lawrence are also important, for sale of the vessel's safety.

Another event in the life of the operator is the daily time signal by which the ship's chronometers are checked, and is a good instance of the further value of the modern Wireless set.

On the whole, the operator has a very interesting time of it, and it is noticeable that the wireless men on the oiltankers generally stay with the ships for considerable periods.

MR. E. V. A. KENNEDY

It is with deep regret that we announce the death on March 6th, of Mr. E. V. A. Kennedy, secretary of the Imperial Oil Company, at Rochester, Minnesota, where he had gone for special treatment. Mr. Kennedy was a man greatly beloved by everyone in the organization and the greatest sympathy is felt by the staff of the Company for his sisters who were with him at the time of his death.

The news of his death came as a distinct shock to the members of the organization, as the latest news gave promise of return to his duties.

Mr. Kennedy was born at Evansville, Vanderburg County, Indiana, in 1870 and entered the petroleum industry in January, 1890. For years he was assistant secretary of the Imperial Oil Company, at Toronto as secretary, succeeding Mr. H. A. Archbold.

Mr. Kennedy had over thirty-six years of service in the oil business and is another pioneer who had taken an active part in the development of the oil industry in Canada. He was an intensely likeable man who was at the same time most efficient in his duties. No man was more admirably fitted to fill the important position of secretary and his death will be greatly felt by the company's staff.
IOCO ADVANCES

BY H. IBROCKINGTON

Work was begun at Ioco last June on two Cracking Coil Units, and they will shortly be in operation. Except for small details, they are identical with those recently installed at Sarnia. On one point, however, they are in advance of all other Imperial Oil refineries; that is, in the method of removing coke from the soaking drums.

A word about the soaking drums. They are six feet in diameter and forty feet high, and, having to withstand a working pressure of 350 lbs. per square inch, they are made of steel plate, two inches thick. It is in these drums that the greater part of the "cracking" takes place, and where, therefore, most of the coke is formed. The removal of this coke is the problem.

It has hitherto been the custom to leave a network of steel chain hung in the soaking drum whilst they are in use. When the drum is "off," a cable is passed through the bottom manhole and attached to the chain. A pull from a winch breaks up the coke, and the cleaners do the rest. We, however, are going to drill the coke from the drums.

A few months ago, there arrived from Fort Normand three strong silent men, oil-well drillers, with more than a passing acquaintance with Petrolia. We were informed that they were going to drill a seventy foot hole under each soaking drum. We were inclined to scoff. Our subterranean excursions with pick and shovel had always stopped at the line of hard pan, which in this district is four or five feet below the surface. The evolutionists amongst us had the impression that below that lay the Antipodes.

The fundamentalists were almost sure that it was the entrance to Hades (more especially on wet days). But to these hardy drillers from the north, seventy feet below might be a little unusual in temperature, but as for a hole in the ground! In a very short time a mast towered above the first soaking drum, and a cable was passed through the top and bottom manholes and attached to the drill. The drilling had begun.

A steel casing, twelve and a half inches in diameter, is lowered into this seventy foot hole, and in this casing the kócédriiling shaft is centred. At the end of a run, the bottom manhole cover of the soaking drum is removed, and the shaft is lifted and rotated by an auxiliary engine. The drill on the end of the shaft cleans the drum.

But this is by no means all that has been happening at Ioco during the last six months. The Crude Stills have been brought up to date. Four stills have been remodelled and will be used for the continuous running of Californian crude oil. They have been fitted with return tubes and the latest rectifying equipment. Two stills have been equipped with bubble towers surrounded by partial condensers, and a third with a water knockdown tower. These, together with the automatic device for controlling the vapour temperatures, have been a familiar feature at our other refineries, and so need no further description.

To accommodate an increased throughput of crude oil, there have been built two 120 ft. by 42 ft. storage tanks, and two 40 ft. by 42 ft. charging tanks. In addition to this, the facilities for unloading crude oil will soon be greatly enlarged. A new twelve inch pipe-line has been laid from the dock to the storage tanks, and we are on the point of installing a new pump, which has the combined capacity of the two existing.

No doubt it will be thought that this is enough for Ioco for one year, but we have still to tell of the Gas Absorption Plant.
**PRODUCTION OF PETROLEUM**

**Operation**

With the general nature of the drilling tools known, let us now proceed to the actual work of drilling an oil well. First, a shaft about 8 or 10 feet square is dug down, by hand, to the base of the rock. A wooden "conductor" of somewhat greater inside diameter than that of the well is then placed, like a hollow column, upon the bed-rock foundation so that it rises vertically to the base of the derrick. But if the ground between the surface and the bed-rock is too hard for digging it is penetrated by a strong iron "drive-pipe" fitted at its bottom with a sharp steel shoe, which, driven down, like a pile driver, starts the hole for the drilling tools to finish to a depth of 80 to 300 feet. The string of tools is so long that obviously they cannot be used for drilling until they have a hole to drop into.

**Spudding.**

If the bed-rock bottom of the spade-dug shaft or the hole driven by the drive-pipe is less than about 60 feet from the surface, the drilling operation starts with spudding, in which the string of tools without the jar is raised and dropped by the following method. The string is lowered until it reaches within about 6 feet from the bottom, being held by the brake on the bull wheel. A rope known as a jerk line is loosely tied to the drill line a few feet above the bull wheel, while the other end is attached to the crank pin on the band wheel. When this crank revolves it imparts a side pull or jerk on the drill line, which raises the string and drops it.

Spudding may be continued to a depth of 300 to 1,000 feet, depending upon the formation.

**Drilling** may now begin in earnest. The full string of tools when screwed together is lowered into the hole, as the cable gradually unwinds from the bull wheel. The walking beam, if it has been noticed, was not used in spudding, but it now comes into play by connecting its end with the pitman, which in turn is connected to the crank pin of the band wheel. At the other end of the walking beam is attached the temper screw, which is about 6 feet long and is threaded in order that it can be gradually unwound as the hole deepens. To the side of the temper screw the cable is secured by the rope clamp, allowing at first about 15 to 20 feet of slack between the clamp and the crown pulley, to give free movement to the drill. Just before drilling begins the bit hangs a few feet above the bottom of the spudded hole, and the cable is therefore taut. After the tools are run down in this position by the engine and then allowed to drop back, the weight of the tools, applied to the stretching-steam (or elasticity) of the cable, will send the bit to the bottom of the hole. With this the aggressive work of the bit begins, the string of tools rising and falling with almost uninterrupted regularity, in union with the rocking walking beam from which the string of tools is suspended. With the Standard rig, drilling must not be thought of in the sense of boring; it is made by the constant shattering of the rock due to the powerful blows to which it is subjected. While the tools go up and down, the driller, using a short lever attached to the temper screw, lengthens it, thus gradually lowering the tools.

Steel cable is now almost universally used in drilling; but on account of its lack of elasticity as compared with rope, a 500-foot length of manila rope, known as a "crocker," is sometimes inserted just above the tools to prevent this one disadvantage of the steel cable by giving the proper stretch and "pick-up." The drilling action of the bit takes place when the walking beam has reached its bottom stroke. The action of the tools may be likened in a way to the effect of a pencil which is - attached to a long elastic band. While the band which holds the elastic may move only a fraction of an inch, the pencil will move up and down several inches. While a steel drilling cable is of course not especially elastic, it is true nevertheless that it possesses enough elasticity to raise the tools several times as high as the arc through which the walking beam passes. It is through the means of the temper screw and the judgment of the driller that this adjustment is regulated until the temper screw reaches its lowest limit, when it becomes necessary to readjust it and allow more slack cable to pass from the bull wheel through the rope clamp.

**Bailing** is repeated at necessary intervals. In order to remove the crushed rock and mud which has accumulated at the bottom, a bailer must be lowered into the hole, the tools having been withdrawn. It consists of a cylindrical steel pipe slightly smaller in diameter than the hole. At its bottom is a ball-and-socket valve with a tongue extending downward from the ball. While the bailer is being lowered the ball, by resting on its seat, keeps the valve closed, but when the projecting tongue hits bottom the ball is forced up and the valve is opened to admit the known amount of water in the bailer after which the valve is closed by the weight of the ball within the pipe as the bailer is being lifted out. Bailing is repeated until the cuttings are removed. In deep wells as in spudding and after each bailing, water is poured into the hole to keep the loose particles of material in suspension. The speed of drilling varies with the hardness of the rock encountered. While the hole is still shallow (500 feet or less), the tools make about 42 strokes per minute, but as the drilling goes deeper the rate decreases until at a depth of 2,000 feet there are only 30 strokes per minute. In shale formations the bit may drill 125 to 150 feet in a 12-hour shift; in slate, 75 to 100 feet; and in limestone, perhaps only 2 to 25 feet.

**Dressing the Bit** is done as often as six times to the "lower" (or shift of 12 hours). After the tools are withdrawn from the well the bit is removed with large special wrenches and replaced with a new set. To this end, as shown in figure 2, the new bit, the tool dresser heats the bit just withdrawn to a red heat, the driller assisting in forging the tool back to its proper condition. Shaped tool steel is a very important item, as for every 100 bits, for heavy use, one is a large ram suspended by a cable is swung against the tool. In forging the tool three things must be kept in mind: preserving the proper diameter as determined by a gauge; keeping the water courses (or grooves) open; and getting the proper angle and edge to the bit.

**Changing the Bit** is by no means an easy job; strength and experience are essential. A large bit, being much too heavy for two men to lift, has to be raised with a block and tackle to the suspended stem, to the bottom of which the bit is to be screwed. The work is also too heavy to work to be done by hand, so the huge wrenches that have been placed on the bit and stem respectively are attached to a jack. The jack, running on a semicircular track, moves one of the wrenches, the other one being held stationary. When the tools are screwed together almost to the hill," the driller and tool dresser have to "heave-ho" with all they have in order to budge the jack on the track from just one notch to the next. They insert a rock into the hole to get more leverage, and throwing all their force against it they are finally able to screw the bit to the stem tightly enough that it will not work loose until the bit is out.

In addition to the delays caused by changing bits, there are other interruptions in the drilling. Since 3,000 pounds of steel are constantly being raised and lowered against hard rock at the bottom of a hole deepening to thousands of feet, breaks in tools or cable may occur that hold up the drilling for days or even for months. A common place for a break is in the bit, and this injury may go from bad to worse before it is detected from above. Even after the break is known it is possible the broken part may be so pounded and wedged that it will be most difficult to remove it from the hole. If the break is near the top of the string of tools, the driller will usually notice it at once or ascertain the loss of weight on the cable. Breaks are frequently in the screw joints, the weakest spots, but sometimes the cable itself is broken and this is observed at once.

**Fishing.** When a break in the bit means an interruption in the drilling, the driller must fish out the broken parts by means of the various fishing tools. A "fishing job," as it is called in the field, is a very skilled and exacting piece of horse work. Up to the point where a break in the tools occurred thousands of dollars in time and labor may have been spent, so naturally an attempt is made to finish what has been started rather than give up and begin another well.

To extract a broken cable a two- or three-propped spear with sharp backward-pointing spurs is dropped into the well, where it hooks onto the cable. In fishing for the heavier tools, a special device called a slip socket may be used. It is equipped with hardened tooth on the sliding beam which can grasp the bottom of a cone-shaped cylinder, within which they are fitted. This tool is dropped over the broken part so that the tool goes over the end of the fragment, which is gripped and then held fast by the teeth as they slide downward to the small end of the rising cone-shaped cylinder.
FUEL OIL IN COLOMBIA

FIVE years ago oil was an unknown commodity as far as fuel is concerned. A person travelling on the Magdalena River then would have made a slow trip on the way to Girardot as every five or six hours the steamer would stop opposite a wood-pile on the banks of the river and the passengers would sit sweltering in the heat, watching eight or ten stoves carrying on wood for the next four or five hours’ run. Then, again at sundown the captains of the vessels would usually stop to take on the main load, and this is the hour when mosquitoes and insects are coming out for their evening meal.

The use of wood to-day has been practically abandoned on the Magdalena River and over 35 vessels have been converted to oil burning. There are no more stops at the wood-piles and no more delays while the captain bickers over the price of wood. The vessels run now from 24 to 36 hours without fueling and stopping only for 30 or 40 minutes at the fuel oil stations located at different strategic points on the river.

Five years ago a passenger sitting in a day coach on any of the railways branching out from the Magdalena River would have to keep his window closed in order to avoid having his clothes burnt off by the sparks from the engine.

This change has been due to the perseverence and the influence of the Tropical Oil Company in converting not only locomotive and steamer to the use of oil, but converting public opinion to the use of this clean and efficient fuel. At first the progress was small, and well it can be remembered when the first boat started out from Barranquilla on her up trip with oil. The passengers were dubious. The captains did not like to make the experiment, and it really appeared as though public opinion did not favor the change, as travellers did not seem to realize that an era of comfort and quick travelling was at hand. Four months went by before another vessel was converted and it was really six months later before the third.

Ashes and dust were prevalent, and it was always aggravating after putting on a clean white duck suit, to sit down on a seat covered with cinders and ashes. To-day time has wrought a change. All of the railroads along the Magdalena have been converted to oil. There is no more coal dust or ashes; no more stopping at the wood-pile to take on fuel and no delays in climbing up some of the steeper grades to wait until the steam has been raised on account of poor fuel.

In 1922 there was just one vessel using oil on the Magdalena. By the end of 1923 five vessels had been converted. The end of 1924 could only show a total of twelve or thirteen vessels using oil, but in the year 1925 results were far more gratifying and to-day there are 40 vessels under oil and at least six more to be converted prior to the time this article is printed.

The railroad companies were even sooner than the steamship companies in adopting oil as a fuel, and it was not until the Spring of 1925 that La Dorado Railway converted their first locomotive, but after the attempt they changed back to wood fuel. It was four months later, however, that they decided to make another attempt. They realized then that greater efficiency was to be had, but again prejudice stepped in, and after converting another locomotive, oil was not adopted as a standard fuel for almost a year later. The Cartagena Railway was the second to attempt the change, but through one delay and another, a year passed before it was finally decided to convert all their locomotives. The Puerto Wilches Railway and then the Barranquilla Railway afterwards began to use oil, while the Antioquian Railway was even slower still in changing over to the new method, and it is only in the last three months that they have finally begun a progressive program of adopting oil fuel exclusively on their railway.

This predominant change, though slow at first, is now decidedly sure, and very few countries can, in looking back over such a short period, better the record, as fuel oil has become the standard fuel throughout, not only for transportation but industries as well. The conversion now is almost complete, and it is safe to say that wherever fuel oil or oil products can be delivered and are available for use, they constitute close to 90% of the motive power. Petroleum has undoubtedly been the prime factor in bringing prosperity to Colombia for, with its general use, the wheels of industry are turned more economically and with greater power.

QUEBEC’S ICE SCULPTURE

THE winter-time furnishes us with many and varied snow and ice pageants that man has taken advantage of by making gala displays to advertise the metropolis of old King Winter. An outstanding feature among these is that of ice-sculpture which in old Quebec is quite prominently displayed on its thoroughfares.

Old Quebec prepared for the influx of American visitors this winter by daily adorning the entrances to their stores with animals, motor cars and other designs that are adaptable to modern ice sculpture, which give a very unique appearance to the city. The models are carved out of solid ice, the sight of which, although familiar enough to Quebecers has aroused considerable comment on the part of the strangers visiting the city.

There are many excellent models erected in prominent parts of the city but the miniature design of the Canadian Pacific engine is one of the best.

These attractive models with their quaint life-like images add to the "old world look" of the city that distinguishes Quebec and charms the many tourists.

The task of setting up the bases on which to support a number of animal models is not very easy but wins the hearty approval of Quebec's visitors. The city presents Winter in all its festive array adorned by the hand of man by the aid of ice sculpture.
Stock Quotations

The latest stock quotations before going to press give the following bids as on March 24th:

Imperial Oil (new issue) 33 1/2
International Petroleum 30 3/8

Asphalt

Last year in California there was laid 11,160, 128 square yards of asphaltic pavement of which 6,144,981 square yards were on asphaltic concrete base. The remaining yardage was laid on bases of concrete, macadam, brick, etc.

Mr. Motorist

To place a rim properly on a wheel, see that it is straight all around before tightening the lugs. Do not screw down one lug before proceeding to the next. Go all around the rim, turning down each nut a few revolutions, keeping up the procedure until all the lugs are down snugly. If one lug is tightened while the others are loose, there is danger of bending a rim or having a top-sided tire. A rim unevenly held may squeak or work loose.

High Quality Wheat

Ninety-five per cent of Canada's wheat crop in 1924 has proved to be of merchantable quality according to figures compiled by the Dominion Bureau of Statistics. Of the total estimated crop of last year, 204,607,000 bushels, 225,008,000 bushels came up to the standard as compared with 454,804,000 bushels or 96 per cent of the 1923 crop of 474,199,000 bushels.

Only Once

As the stage coach careened toward the edge of the cliff the timid tourist gazed anxiously down the brawling stream 300 feet below.

"Do people fall over this precipice often?" he asked.

The driver shook his head.

"No, madam," he returned placidly, "never but once."

Gasoline Tax

The Motoring Public have enriched the Treasury of the Province of Ontario with $2,440,384 since last May until the 31st of December, through the operation of the 3-cent tax on gasoline placed in operation by the Government last spring. In other words citizens of the province have dumped $1,392,820,000 gallons of gasoline. Taken at the average rate of 30 cents a gallon for this motive fluid, the Government figures, show that Ontario spent the tremendous sum of $24,005,840 from May to December on gasoline.

Although 100 tons of oxid would supply the medical needs of all countries, the annual world production is nearly 2,000 tons.

Tourist Influx

Last season nearly two million cars bearing United States license plates entered Canada and remained in the country in each case from one day to six months, state officers of the Department of the Interior, Ottawa. This represents a heavy increase over the year previous and it takes no account of such international travellers as entered Canada by boat or train.

Spend $136,000,000

Estimates of expenditures by visitors to automobile parties alone place the total as $136,000,000 divided among the various provinces as follows:

British Columbia $35,000,000
Alberta 20,000,000
Saskatchewan and Manitoba 10,000,000
Ontario 30,000,000
Quebec 30,000,000
Maritime Provinces 10,000,000

$136,000,000

The Ontario Tourist Research Bureau has estimated that the tourist trade for 1926 will be worth $190,000,000 to the province, and the Quebec estimates are almost identical. If all these figures are even approximately correct it is evident that the statement recently made by the President of the Canadian Automobile Association, that Canada's tourist harvest over the next few years will be $569,000,000 annually, is not out of the way.

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JOINT COUNCILS, 1926

Imperial Oil Limited
Elected and Selected Representatives for the Year

MANUFACTURING DEPARTMENT

DELEGATES
Montreal Refinery
Elected: Cecil Miller
Selected: A. McAlpine
Sarnia Refinery
Elected: T. Montgomery
Sellected: Arthur Kirby
Regina Refinery
Elected: Fred. N. Hinz
Selected: Frank Birkett

DELEGATES
Halifax Refinery
Elected: John F. Pell
Selected: C. M. Moore
Calgary Refinery
Elected: Isaac Kantor
Selected: C. M. Moore

DELEGATES
Toronto (Princess St.)
Elected: Robert B. Jones
Sellected: A. S. Brown

MARKETING DIVISIONS

Hamilton
Elected: S. S. Jones
Selected: John Warren
Montreal
Elected: E. E. Tupper
Selected: E. W. Scrofani

Winnipeg
Elected: T. J. Driscoll
Selected: T. J. Driscoll

Vancouver
Elected: D. H. R. Tupper
Selected: D. H. R. Tupper

Edmonton
Elected: John Smolich
Selected: John Smolich

Quebec
Elected: J. A. Arsenault
Selected: J. A. Arsenault

ANNUITIES AND BENEFITS COMMITTEE

P. F. Scudder: C. D. Dew
E. B. Bletchley: W. I. Thomson
E. A. Gove: B. L. Thompson
To-day is yesterday returned;
Returned full-powered to cancel,
expiate, raise, adorn.
And reinstate us on the rock of peace:
Let it not share its predecessor's fate,
Nor like its elder sisters die a fool.

—Young