THE President and Directors of the Imperial Oil, Limited wish to extend their sincere greeting and best wishes for a Merry Yuletide and a most prosperous New Year.

A BIG COUNTRY

IN THE past ten years two hundred and fifty thousand wells have been drilled on the North American continent at an average cost of $24,000 per well on the Prairies and $475,000 in the Mountains and Foothill country. Four out of every ten wells drilled in producing territory get no oil and only one of every twenty-eight "wildcat" or exploratory well gets oil.

If Turner Valley can be regarded as having been "wildcat" at the time Imperial undertook development in that field, Imperial has found two producers as a result of the explorations. Imperial Oil has completed, or is drilling, altogether forty-five "wildcat" wells to date in the Canadian West, at the usual high cost of pioneering operations. Besides these the Company has assisted several companies to complete test wells.

In the forty wells, Imperial has found oil in the Fort Norman Discovery well and Royalite No. 4, the wells are two thousand miles apart. The Fort Norman well, although a bona fide discovery, is too remote from any market to be of commercial value and is therefore not an asset.

So Imperial's discovery percentage is just about two-thirds as good as the average of the continent and the cost per well has been just about twice the average, while the realization is one out of two.

The moral, if any, is that Canada is a big country in which to hunt for oil.

OIL STOCKS

As an aftermath of the oil stock boom in Texas, United States investigators divulged the tragic fact that less than one per cent. of the money thrown by the public into promotion oil schemes actually brought a return in the form of stabilized dividend—paying securities. The 99 per cent. was a complete washout.

Of five hundred or more Canadian Companies launched at the time of the Calgary oil stock boom in 1914 there are probably less than a dozen still in existence with properties or equity of genuine value and only two have so far secured for their subscribers any dividends worthy of the name.

In face of the circumstance that stocks of the larger petroleum corporations frequently capitalize at higher prices than government bonds, the starting mortality of promotion schemes strikes the uninstructed as a mysterious anomaly and the widespread belief that the big companies have some invisible advantage over the little fellows is natural and understandable.

As a matter of fact they have: but it is not by any means the kind of advantage that exists in popular fancy. On the contrary, the advantage of the big companies lies in possession of the first and prime requisite to success in oil knowledge of the game.

Amateurs in the oil game are prone to believe that oil is where you find it and that in the search one man can see about as far into the ground as another. The uninitiated promoter is likely to find his geologist lacking in the punch and alertness which is a concomitant of success in a competitive world and may blindly pass the scientific opinion by in favor of some other location which has advantages not in any way related to the sub-surface possibilities of oil.

The geologist says nothing. As a matter of fact there is no medium through which he could give expression to his thoughts even did he feel impelled to do so. The education, training and experience which has qualified him to read the middle of the rocks has left him tongue-tied when it comes to placing his hypothesis and deductions before the so-called practical business man. His is a different language. They would not understand. So he passes along and in the natural course of events finds himself in the service of some one of the big companies where executives, with a background of worldwide experience, have come to know his language and appreciate his capacities.

Meanwhile the public's money has gone into drilling a hole on the location which the geologist rejected. Compared with that money the proverbial cellulose oat had a good chance.

MORE POWER, LESS GAS

ORDINARY gasoline explodes, or rather burns, in an automobile cylinder in what may be described as a series of steps, that is, the flame traverses the mixture of gasoline and air, which is under compression, in a series of flashes. In the ordinary motor car as built in America, the compression of the mixture at the firing point is about 70 lbs. to the square inch. If the compression could be raised to say 100 or 105 lbs., a great increase in efficiency would result, because a smaller charge of gasoline would deliver a greater "punch" and so more mileage to the gallon. However, the ordinary gasoline mixture if raised in compression much above 70 lbs. will "knock" violently, because the series of flashes is so greatly accentuated by the higher compression that they become plainly audible, and are not only annoying but damaging to the engine. When tetraethyl lead in small proportion is added, however, the minute particles of lead become instantly incandescent when the spark reaches the mixture in the cylinder, carrying the
Oil Springs, obtained a depth of 165 feet with a spring pole rig, where he opened up a producer for which he refused a cash offer of $25,000 in gold. He lived to see it dwindle to a mongrel pumper and finally, Shaw died in poverty.

But maybe Drake and Shaw had the best of it at that. They probably would both have reached declining years without amusing wealth had they not made the oil of the earth, for, with the average, they had about 95 chances in a hundred of being broke at 65. And they had their crowded hour.

The wildcat who spent his last two dollars for taxicab to the poor house epitomized the philosophy. An essential existence had made life worth living. Why be a piker at the finish?

It is the bad actors who make all of the trouble. For infractions of traffic laws, or if you meet with an accident which the judge says was no accident at all, but the consequence of your own carelessness, the white card is taken away and a blue card substituted. The blue one permits the driver to continue driving over the road. It is a mark against him and he must bear it for a long time— if there is a next— he must produce the operator of the car must be so lenient to blue card man.

If the evidence is against him, besides the fine, the blue card is taken away and a red card issued. The red card disqualifies the operator. The latter is to keep out of accidents and the police court. Because next time his names will appear in the police papers and he will drive no more for a stated period; sometimes the interdiction is forever.

That looks like a good system.

Frank A. Goodwin, registrar of motor vehicles in the cultural state of the comprehensive epitomized in the lan-
guage of the Bostonian a paragraph of motor philosophy which is really worth while. He says:

"The vast majority of our motorists are careful, law-abiding citizens. They have a sense of their responsibilities as well as of their rights on the road.

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The last official figures of oil production in Canada, recently released by the Mining and Metallurgical branch at Ottawa, are for 1925. The figures show that the production for the year 1925 has been 332,001 barrels, of which 153,491 barrels are attributed to Alberta, and 148,514 barrels to Ontario. The remainder, 3,576 barrels comes from the Stoney Creek field in New Brunswick.

While the Stoney Creek field in New Brunswick has been but a small producer and the area throughout which oil discoveries are geologically possible in that province is small, New Brunswick appears unlikely to become a prime factor in Canadian oil production.

Ontario’s production comes exclusively from Western Ontario, the old Petrolia and adjacent fields — which territory has been worked for petroleum for more than a half century. Production has been dropping steadily year by year and oil men count the field about worked out. Unless new horizons are discovered at greater depth, or the field is extended by the discovery of new shallow pools beyond what has heretofore been assumed to be its boundaries, it seems that the chance of establishing Ontario as a heavy producer is not good.

Exploration drilling has been carried on persistently during the recent years and, while results have been mostly negative, the Ontario oil men still retain the faith that somewhere in or adjacent to the old field there is a reward awaiting some lucky driller of the future.

A safer promise of increased production in Ontario lies in possibility of mining for their residues the horizons which have already been depleted of their free oil by the well-pumps of previous operators.

Statistics for 1925 are of course, not yet available and may not be for some little time as the statistical department of the Dominion Government are reportedly deliberate. But the field figures for 1926, up to November 13th, show Royalite as having produced this year, to date, 174,510 barrels of oil, or about one-fifth of the output of the strata is still left in reasonable pipes to a sump at the foot of the shaft.

by Calgary and Vulcan, Alberta, people, attained the remarkable depth of 3,004 feet, where production was tapped and the well shows every promise of becoming a steady producer. The other completion, the Illinois-Alberta, finished a heart-breaking seven-year experience with a well that promised to adequately reward a tenacity and perseverance seldom equalled in the annals of petroleum. Among other wells approaching completion are the Royalite No. 6, the Dilworth Nos. 1 and 3, the McLeod No. 2, Home No. 1, McDougall-Siegur No. 1, Sesnea and Stockman, to mention only a few.

The gravity and general characteristics of the products of the Vulcan and Illinois-Alberta are much similar and it is safe to assume that the same well will apply to the other wells, when completed. The capacities of the two new wells have not yet been accurately gauged as this is written and the probable capacities of the near-completed wells cannot even be guessed at. But the expectation of circumstances is there, nevertheless, to make Canada an exporter of crude oil, and may, perhaps, by extending to northern Alberta, or possibly to California where, with their heavy industry to work upon, costing-head gas is in much demand.

The surprising feature is that, considering the freight that the Turner Valley naphtha may have to stand to reach its market, the situation may come about where a barrel 100 per cent of something more volatile than gasoline is needless to say as desirable as a Wyoming or Ontario.
grade of crude would have been in the same wells.

Which brings us to the consideration of the fact that Royaltie No. 4, and the other two Turner Valley wells now on production represent the total profit-making achievement resultant from an effort upon the part of Imperial Oil and many others during the last fifteen years which has cost many millions of dollars—maybe ten million; maybe more—and which has broadcasted activities over an area two thousand miles from North to South by almost a thousand miles from East to West.

In this great campaign in search of oil, Imperial Oil, Limited, has, naturally, been the leading performer with an expenditure of well over five million dollars; but Imperial has been by no means alone. In fact, it might be said that the Albertan who has not at some stage been inoculated by the oil microbe—usually to his cost—would be difficult to discover. Almost every city, town and hamlet has its group of oil enthusiasts who, with their pet project, are hopeful of tapping the treasure and it must be said that many of them have turned up indications which justify those who can afford it in a continuation of their efforts.

As, for instance, the Wainwright field where, for many months past, these wells have been showing a certain amount of oil sufficient to buoy the hopes of those interested, but which has never yet returned profits in the form of dividends to any of the subscribers of capital. Or the Redstone field, which has shown oil enough to constitute a promise; or the Bow Island field from which billions of feet of gas have been taken and where the Imperial, with deeper drilling, has recently turned up an indication which virtually commands further search and expenditure; or the Jumbo-Pawnee field where there is a structure that meets the geologists ideal with, as far as oil, or the Rice Creek field where 3,400 feet of drilling on a very attractive structure has so far brought nothing but disappointment.

Maybe the best criterion by which to judge the reverse, or debt, side of the picture is a contemplation of the drilling record, with results of Imperial Oil, since the commencement of the Company’s campaign in 1917. Here it is, in cold print:

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Wells Drilled by Imperial Oil, Limited

<table>
<thead>
<tr>
<th>Well</th>
<th>Province</th>
<th>Production Dry Gas</th>
<th>Production Wet Gas</th>
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**ABANDONED**

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<tr>
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<tr>
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<tr>
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<tr>
<td>Rainbow No. 6</td>
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<td>750</td>
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<td>Rainbow No. 8</td>
<td>Alberta</td>
<td>1,000</td>
<td>500</td>
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**PRODUCING OIL**

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**DRILLING**

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**IN THIS RECORD Imperial Oil has not been less fortunate than others.**

The number of abortive attempts by exploration Companies of all kinds, as contrasted with the successes, would probably show that the composite balance sheet of all the enterprises, aside from Imperial Oil, leaves the major effort to have been unremunerative to date.

Nevertheless, the faith persists that there is oil in Alberta—or maybe Saskatchewan. With such a grand spread of Cretaceous formations it would seem unlikely that all the petroleum therein is a "freak" product in a limited section of Turner Valley.

The search will go on until some day some one finds the key that will unlock the treasure vault and open up a flow of new wealth which will forever enriche the Canada from foreign reliance in the matter of oil supply and will rectify one item of the National trade balance which requires rectification in the general interests of public prosperity.

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A PULL FOR THE SINCLAIR CUP

On November 9th and 11th the third annual Times of War Contest for the honor of holding the "Sinclair" Cup was held at Halifax Refinery. On the first day the pull was between the Mechanical Department and Yard Labor, and the second pull was between the Process Department and Yard Labor; the winner of these pulls were the Mechanical Department and the Process Department. These two teams pulled for the championship, and the cup was won by the Process Department. In addition to the honor of winning the cup for their department, each of the contestants were also presented with a ham given by the Works Social and Athletic Association, known as the Imperial Amateur Athletic Association.
THE GREATEST SOCIAL FACTOR

Historic Antagonism of City and Country
Allayed by the Genius of Internal Combustion

WITH the one exception of the art of printing, it may well be doubted if any single industry has brought about so many and sweeping changes to the world as had the modern production and use of petroleum. None, perhaps, has wrought its revolution in manners, customs, modes of life, relations of the individual to the social establishment, in so short a period of time as has the industry of petroleum, along with those others that are collateral to and dependent on it. Earlier among the general uses of petroleum was its service as an illuminant. Do we not quite realize that the most blessed privilege which modern progress has given to man is the ability to make light where there was darkness? The world never knew an adequate illuminant available to all the people till it found it in kerosene. That was in itself a revolution. It was not so spectacular as the later development of the internal combustion engine, which made the motor car possible, but it was probably quite as important in its influence for extension of knowledge, widening of horizons, and opportunity for reading, study and education, as an addition to the privileges and pleasures of life.

The whole mode of life in cities was changed when it became possible effectively to light their streets at night. The ancient and medieval cities were veritable hot-beds of crime, breeding places of revolution, headquarters of armed factions bent on robbery, murder and all violence so long as things were left in the darkness of night. When the sense or gasoline lamps or the city with gas lights, or the metropolis bathed in the electric radiance of the Great White Way— all depend at last on petroleum, which is essential to the manufacture of gas and to the operation of the vast array of domestic and industrial plants that produce electric current.

But of all the services toward a more stabilized social relationship that petroleum has rendered there is none greater than in having made the internal combustion engine possible. Through this single agency life in the country and city alike has been revolutionized, quick and inexpensive transportation has been afforded to the people everywhere, distance has been well-nigh eliminated as a factor in social and business relations. Our generation understands this part of petroleum's service far better than does any other phase of petroleum usefulness; the change has been brought about within our easy recollection. We have seen the revolution in its making and in its accomplishment. We can remember, for it is only as yesterday, how limitations of transport made country life an experience of isolation and loneliness; when the privileges of church and school, of community gathering, of intimate acquaintance, were denied to the great rural community. We know how great the change is, for we have seen it wrought within our day.

We have seen a continent converted into a neighborhood by the multiplication of petroleum-driven vehicles and the construction of modern roads. We have countless farmers enlisted in the service of the farmers to plow their land and cultivate their crops, thresh their grain, and haul their produce to market. We have seen individual lighting and water pumping plants replaced by ever increasing numbers on the farm, driven by the motor, and the motor, to lessen the drudgery of the housewife and to multiply the comforts and enjoyments of existence for the entire family. We have seen the rural school system broadened and bettered, the extension of the rural free delivery, the daily marketing of perishable products, the establishment of the movie in the country towns. In a word, the automobile, made possible by the utilization of petroleum, has within the last century carried to the country nearly every advantage that had formerly been monopolized by the city.

And on the other side, the city has derived its special and peculiar advantages in this age of petroleum. While the people of the open country have been relieved of the deadly and devastating isolation which was their affliction, the people of the cities have been released from the condition that was no less disastrous in its effects on the public health, the public morals, and the social well-being. The city has gone to the country; every year its multitudes more and more seek the fresh air, the sunlight and comforts of the suburbs, while the wealthy minority is fast deserting the city as a place of residence, in favor of the beauties and delights of country estates. The farmer has ceased to be a "rubber" and the city dweller is no longer a prisoner of his limited and unnatural environment. The drawing together of urban and rural population into a new relationship, a more intimate acquaintance, a better understanding and a more sympathetic attitude toward one another, has implications that are as broad and as significant as the most complex social and economic problems of our times. For in all the older societies there seems to have been drawn inevitably a sharp line of demarcation between the populace of the cities and those of the open country. Today the lines of thought were as unlike as if they had lived in different ages and different continents.

Their physical separation, due to the simple element of distance, became the basis of a persistent spiritual separation, an evergrowing tendency to mis-understanding, which inevitably blossomed into distrust and bore fruit in frank hostility. In this conflict interest and aspiration and understanding between country and city, the tendency, with few exceptions in all social history, has been toward the concentration of wealth, of economic power and political authority in the city. The city, indeed, lived off the country; the country was ruled by the city. Culture, education, intelligence, wealth and leisure concentrated themselves in the centres of population. The rural citizenry steadily and inexorably descended toward the level of powerlessness. As we study the record of history, the more we will be impressed that in all its generations and under all its social forms there has been this almost universal tendency. It is a fundamental of human nature that two groups, as mutually interdependent as are the urban and rural populations, cannot possibly succeed in balancing each other if only they get truly to know each other, to understand each other's problems and point of view, to appreciate how greatly they depend upon each other. And this is exactly what these two groups have been doing since the age of petroleum, motor cars and good roads, opened the way for them to meet naturally and informally in communal social relationships. Perhaps this is the most important of all the petroleum and the motor car have accomplished; for it concerns the fundamentals of society, the integrity of the political and economic structure.

No other factor has contributed such a safeguard against the danger of a developing tendency to antagonism of city and country as the easy transportation, the breaking down of the barriers of isolation, the facilitation of intercourse, and mutual understand- ing that have come with the Age of Petroleum. The city has been going to the country, the country has been coming to see and know the city, as never before. Time and again effort has been directed to draw the urban and rural elements of the community into antagon- ism and to carry that antagonism into politics. We need not look far for evidence of a present day effort to accomplish this very thing.

Good roads were the common interest from coast to coast.
TRANSPORTATION OF PETROLEUM BY RAILROAD

In the early days of the petroleum industry, transportation of petroleum was in a primitive and more or less chaotic state. Shipments of crude oil from the wells were first made in lots of five to six wooden barrels on wagons and hauled over poor roads to railheads, hence to the refineries at some adjacent town or village. The finished products, which at that time consisted principally of kerosene, were shipped from the refinery in barrels on small river boats or on railroad cars.

Later pipe lines were slowly developed to get the crude oil from the wells to the refineries, and as the business grew the wooden barrel was found to be too costly and wholly inadequate. Large wooden upright tanks fastened to the floor of flat cars, two or three to a car, were devised. That was the beginning of rail transportation of oil in bulk, and was the beginning or origin of the present tank car, which consists of an upright tank but of a very much larger and improved horizontal form.

In 1865 the first tank, mounted on a railroad flat car, made its appearance. The prototype of this type of tank was called the "Rotary Oil Car." A number of the first tanks on cars were constructed of iron and the majority were built of heavy pine planks, a material more readily obtainable and lower in cost. To shape these tanks were practically the same as the small iron-hooped wooden tanks in use at the wells, being round and of smaller diameter at the top than the bottom and holding from 80 to 100 barrels each. On each flat car two of these tanks were mounted—one at each end over the trucks, making the capacity of the car between 80 and 100 barrels.

The first of these "Rotary Oil Cars" arrived at Titusville, Pa., in 1866, where it received a cargo of oil at the Miller farm, the terminus of the first successful pipe line from Pithole. Miller farm was located four miles below Titusville on the banks of Oil Creek, Pennsylvania.

This car was the property of the Eagle Transportation Company of Philadelphia, Pa., who owned the patent rights and who proposed to build and operate a tank line on all railroads for the transportation of crude and refined oil.

With customary progressiveness we find the builders and users of tank cars soon making improvements in design and construction of the original cars. Dilligam and Cole, a firm of machinists and shopmen located at Titusville, Pa., in 1866 received a contract for fitting 60 tanks on cars for the Oil Creek railroads—now a part of the Pennsylvania Railroad System—with a rather ingenious gate valve or cock that could not be opened without having a wrench that was especially made for the purpose. These tanks were constructed of iron and mounted on a flat iron tank and over the trucks, similarly to those of the Eagle Transportation Company. The capacity of these cars was about 90 barrels (5790 gallons).

This new method of shipping was indeed a step in the right direction, for it eliminated a very considerable loss of oil resulting from leakage in transit, reduced the liability of serious conflagrations and did away with the necessity of a return of thousands of barrels to the producer, besides eliminating storage charges.

Until 1870 this type of car, in which the iron-hooped wooden tank was employed, was used extensively in transporting crude oil to market. In the late sixties, however, the foremen of the present type of tank car was introduced—a design of a car in which a horizontal cylindrical tank replaced the two small wooden ones.

The first of these cars was shipped to the Oil Creek region in 1868 and side tracked at the Royal farm for loading. A radical change was made in the design of these new tanks in that they were fitted with a valve which allowed the oil to expand without injury to the tank. These cars had a capacity of 80 to 90 barrels. Later this was increased to 100 barrels, which became the standard for that period.

The advantages of this new type of cars were quickly recognized by both oil and railroad men; in fact, its adoption was so general that by the end of 1873 the majority of the old type of cars had disappeared.

About May first, 1872, the Old Creek and the Lake Shore Railroad companies issued orders that after that date none of the old type of tank cars would be accepted for transportation over their roads. With few exceptions this ruling was generally adopted by other railroads although even as late as 1876 they were still accepted by the Allegheny Valley Railroad, extending from Oil City to Pittsburgh. By 1880 the last of the early wooden tank cars had disappeared from service.
SIGNPOSTS OF THE OCEAN

By J. Brown

WHEN a ship leaves port the first concern is to make sure that the compasses are reliable. Master how skillfully the compasses may have been adjusted, the magnetic needle is subject to deflections and deviations due to the magnetism of the earth and the local magnetism contained in the structure of the ship itself which cannot be detected without the most careful test. The aim of the navigator is to bring the needle safely under the influence of the earth’s magnetism. This is termed the directive force of the needle when it points magnetic North. Having obtained this desirable result, the mariner may steer a course by the compass and feel confident that his compass won’t lead him astray. Nevertheless, ceaseless watch is kept on the behaviour of the compass, and deviations discovered are recorded in the compass journal and are allowed for accordingly. Another all-important factor for the safety of life at sea is the wonderful expression called “Time.” To the astronomer we are indebted for the involved and intricate calculations which give us the measurement of time. The earth revolves on its axis, and, in consort with the other seven planets, Mercury, Venus, Mars, Saturn, Jupiter, Uranus, and Neptune, travels round the Sun. Owing to the fact that the axis of the earth is inclined to the plane of her orbit about twenty-three and one half degrees, the time taken for her to revolve on her axis is unequal length each day. In order to have a uniform and convenient measure of time astronomers assume a mean sun to move in the Equator equal in motion to the average of the real sun in the course of a year. All clocks and chronometers are adjusted to mean solar time, and the length of a mean solar day is exactly twenty-four hours. The rotation of the earth on her axis causes all the heavenly bodies to rise and set. Everyone is familiar with the rising and setting of the sun, which phenomena applies to the stars also. The time which elapses when a star is on the Meridian of an observer until its return again is about four minutes less than the mean solar day. This period of time is termed a sidereal day, and is of great importance for the purposes of navigation and astronomy. Every ship carries two or more chronometers regulated to Greenwich Mean Time. A careful record is kept of the daily rates, losses, or gaining, by means of wireless time-signals and daily comparison, so that no matter where a ship may be, Greenwich Mean Time is always at hand. The necessity for this is that all the elements in the Nautical Almanac relative to the position and movements of the heavenly bodies are tabulated to Greenwich Mean Time. Without his chronometer the navigator would be at a loss to define his position in space, unless he set himself the task of working out a “Lunum,” an abstract and laborious problem resorted to for finding the correct Greenwich time when no other means are available.

The Meridian of Greenwich is the one chosen from which all other points East and West in the globe are measured, and the Equator, the great circle that lies midway between the Poles, is the starting point for measuring distance North or South. Geographers have divided the globe into a series of great circles passing through the Poles and a series of smaller circles on the plane of the earth’s Equator. The great circles are termed Meridians, and the smaller circles Parallels of Latitude. Intersection of these circles establishes definite positions on the map.

What geographers have done for the earth, astronomers have done for the firmament. The path which the earth and the other wanderers of the solar system trace across the sky in their journey through space is called the “Great Belt of the Zodiac.” This belt is marked by numerous star clusters called constellations. These clusters have all been named and were by the ancients to represent the months and seasons. The constellations have proper Latinised names, but are better remembered by the old rhyme:

“The Ram, the Bull, the heavenly Twins,
And next the Crab the Lion shines,
The Virgin and the Dove of Love,
The Scorpion, Archer and Ho-Goat,
The Man that holds the water-jug,
The Fish with glittering tails.”

Astronomers have charted the Zodiac with great circles and small circles analogous to the meridians and parallels of latitude of the Earth. However, with this distinction, the great circles are called “Hour Circles” and the small circles “Parallels of Declination.” Again, the Equator in the plane of the celestial sphere is called the Equinoctial, and from this plane the declination of all the heavenly bodies north or south, as the case may be, are determined. The point where the earth and in her orbit causes the sun to pass from one constellation to another is chosen as the hour circle from which to measure the corresponding hour circle of any celestial body. This point is called the “First point of Aries,” and while longitude on the Earth is measured east or west of Greenwich, the right ascension of a body in the stellar regions is measured eastward from the first point of Aries. Hour circles are measured from 0 hours to twenty-four hours.

A noteworthy comment here, would be to mention that while the inhabitants of the Solar system, the planets, satellites, and comets are dependent on the sun for their source of light and many of the qualities of life; the stars on the other hand shine with a light inherent in their own structure. Throughout the ages they have maintained in the same relative position with regard to each other.

The Nautical Almanac contains the Right Ascension and declinations of the Sun, the Moon, the Planets Venus, Mars, Saturn and Jupiter and the brightest stars. All the navigational stars have proper names. A little study of the heavens on a starry night will enable anyone with the help of a Star Atlas to pick them out by name from the various constellations, and then one gets to know them personally, and for those who pass their lives in the silent places and the great waters of the oceans, they are constant companions and ever-faithful friends. Having definitely fixed the position in space of the sun, moon, planets and the stars, it but remains for the navigator with his compass, chronometer and sextant to take the altitudes of the objects he chooses to observe above the horizon, and by the application of the formula for the solution of spherical triangles, he can obtain his position and plot his position on the chart with a skill and degree of precision, dependent on how well the observations have been taken.

At every instant of time some celestial body is indicating a true point on the horizon of, when reaching the meridian, recording the latitude: and thus we give to these the designation of “Signposts of the Ocean.”

Mr. ELMER J. FAUCETT, drove his Imperial 80 Chrysler in the recent 290 kilometre Pucallpa-Caycara Motor Race which was run on Sunday, November 14th outside of Lima, Peru, to an established record for the track and finished first in all classes, leading by ten minutes, the second car being a Fast. It is interesting to note that this car was fabricated with International Petroleum Company Rapidol Extra Heavy Motor Oil.

STOCK QUOTATIONS

CHANGES AT HALIFAX REFINERY

HALIFAX Refinery has seen in the past few years an excellent change. The installation of bubble towers on the crude oil skim- ming stills and rerun stills has improved the technique of the refinery. The installation has been in operation for almost a year and has been so successful in ameliorating the overhead boiling points of the light products that it was found unnecessary to operate the steam stills. This elimination of the steam stills has resulted in a great reduction in the use of steam and finally in a big reduction in the consumption of fuel.

Another improvement at the refinery is the addition of a gas absorption plant which has been in operation for 13 months. With the addition of the plant the refinery is able to abstract the gasoline from gas which heretofore was consumed as fuel under the boilers and stills. The absorption plant makes a substantial yield in gasoline, also a saving in dollars and cents to the company.

An improvement has been made in the use of meters for sweetening gasoline. These are made up in a series of cells sufficient to give the necessary time of contact and mixture to accomplish the thorough sweetening of the product put through and recovery of the chemicals for re-use. An added feature of this is that very little labor is required to operate these units.

There is also in operation a very successful unit for the restoring of sulpheric acid, having a capacity of twenty-five tons per day. This unit has proven very satisfactory and a great improvement, at a much lower cost, upon the previous method known as the "Dish Plant." The storage tank field of the Halifax Refinery comprises 23 tanks, having a capacity of 1,600,000 barrels. The greater number of these tanks are used for storing the various grades of crude oils received at the refinery. Several of the tanks are used for storing gasoline and refined water white oils.

The construction work at the Halifax Refinery in the last few years has wrought a wonderful change and has continued practically without interruption since the plant was first located at Halifax.

It is interesting to watch from time to time the changes wrought in the petroleum industry by virtue of its economic need.

ADVERTISING DID IT

A butcher in a certain town had read a good deal about "Milk from Contented Cows," and wanting to keep up with the times, he placed this sign in his window: "Sausages from pigs that are happy."

Auto Tourist: I clearly had the right of way when this man ran into me, and yet you say I was to blame.

Local Cop: You certainly are.

Auto Tourist: Why?

Local Cop: Because his father is Mayor, his brother is chief of Police, and I go with his sister.

25 ton Capacity Acid Plant

The Gas Absorption Plant

THE ORIGIN OF THINGS

By G. E. Burrows, Chief Engineer for International Petroleum Company, Ltd. in Chile.

"WEIGHTS & MEASURES"

THOSE whose business it is to measure and calculate out oil quantities it is interesting to hunt up the origin of the weights, measures, etc., which are now standardised. Legal standard measures were established in England in the reign of Edgar (958) but in 1101, Henry I. decreed that the yard should be the length of his own arm—kings were kings in those days. He also had a standard made which was deposited in Winchester, together with the standard Kings of Edgar. Another standard, with a rather more vague basis, was made in the reign of Edward II (1307), when it was ordained that three barleycorns, round and dry, make an inch, twelve inches a foot and three feet a yard.

Other standards were made in Elizabeth's time but this yard which holds the title "good today is the result of investigations by a Select Committee of the House of Commons appointed in 1758, which in 1760 approved a standard yard which was declared to be the Imperial Standard Yard and the unit of measures of extension, two brass rods being made and deposited with the Clerk of the House.

This was confirmed by Act of Parliament in 1824 which declared that the Standard of Length be the straight line or distance between the centres of the two points in the gold studs in the straight brass rod now in the custody of the Clerk of the House of Commons, wherein the words and figures "Standard of 1824" are engraved, the brass being at the temperature of 62° F., to be denominated the "Imperial Standard Yard."

Unfortunately this standard disappeared and was supposed to have been destroyed by the fire which consumed both Houses of Parliament in 1834 but many years later it was discovered in the Journal Office where it had been deposited and left unnoticed. In the meantime a Commission was appointed by the Treasury to consider the steps for the restoration of the lost Parliamentary Standards and in the report, made in 1841, it was recommended that no alteration be made in the definition of the standard yard of 1760. Ten years later a similar metal rod was made, 38 inches long, on which were fine lines, marked on two small gold rings defined the length of the standard measure; no scales being used in the preparation of the new standard, except those which had been actually compared with the lost standard itself.

Replicas of the new standard were deposited in several Government departments, one of them being imured in one of the walls of the House of Commons.

In 1707, in the reign of Queen Anne, the standard Wine gill was established as 231 cubic inches—the present American measured gallon— but as in 1760 the standard had not come into being, it is not clear whether these inches represented the length of three barleycorns or the thirty-sixth part of the length of the arm of King Henry I.

The Committee of 1778 recommended a standard of capacity containing a certain number of cubic inches; another Committee, in 1814, recommended that the unit of capacity should be a vessel containing a certain weight of distilled water, and in 1841 the Act of Parliament which confirmed the standard yard of 1760, established the standard gill as ten pounds avoirdupois weight distilled water weighed in air at the temperature of 62° F., the thermometer being at 30 inches, and the report of the Commissioners fixed the number of cubic inches in a gallon as 277.27384379.

The term avoirdupois was first mentioned in a Charter of Edward I. in 1305, and in 1332 a statute of Henry VIII. reads: "Beef, Pork, Mutton and Veal shall be sold by weight called "Avoirdupois," and put the unit of price to be paid for these commodities at a halfpenny and three farthings a pound—probably the price for a pound.

A thermometer was invented by Galileo before 1597 but Fahrenheit's thermometer dates from about 1726.

Thomasina's history of Chemistry states that: The first person that brought thermometers into a state capable of practical use was with each other for Isaac Newton in a paper published in the Philosophical Transactions for 1701. Fahrenheit of Amsterdnam was the first person that put Newton's method in practice, by fixing two points on his scale, the freezing-water point and the boiling-water point, and laying off the interval between them into 180° F. The following is an extract from a curious old book written by Peter Shaw who is described as "Pyfician at Scarborough," entitled: Chemical Lectures, Publickly Read at London, In the Years 1753 and 1752. And since at Scarborough, in 1753: For the Improvement of Arts, Trades, and Navigation, etc.

"The Construction, Nature, and Use of the common Thermometer—"1. The common Thermometers are Globules filled with pure Spirit of Wine, and graduated, as to the several degrees, by the rising or falling of the Liqueur, the Degrees of heat whereof it is express'd.

2. Spirit of Wine is chief for this purpose because it is the most refractary Fluid with Heat hitherto known, next to the Atmosphere itself. Desereth Thudid might be employed, but the Desereth would then be left; and Water is unfit for this purpose, as freezing with Cold.

3. They Thermometers are the exactest Instruments hitherto known for measuring (Degree of Heat), being filled either with Alcohol, Brandy, Oil, or Quicksilver, according to the several purposes for which they are designed.

According to Hoylins's Dictionary of Chemistry, the mention of the hygrometer occurs in the sixteenth century, but it is not improbable that Archimedes was the inventor of it, though no proofs of this are to be found.

To quote Peter Shaw again (but using the modern a)
The more conspicuous Methods of examining Water. By means of the Instrument called the Hydrostatical Balance, we took the specific Gravity of the Water proposed, and directly judged of its Purity by its Lightness.

This experiment is a good sub-stitute for several other ways of examining the purity and goodness of Waters; both common and mineral.

For it appears by numerous Instances, that light Water is always the best, most wholesome, and healthful.

"But as the present Method requires the use of a curious Instrument; and a considerable degree of accuracy and attention, other more expeditious, tho' not more exact Trials have been invented; particularly the use of Water-potometers, which are Instruments of far less accuracy; and in which the bell, so as to float, higher or lower, in Water, according as the specific Gravity thereof is more or less. And these Instruments being graduated or divided by Lines on the Stand, they readily show to the Eye, the difference between the specific Gravities of any two Waters proposed; the not with the utmost exactness."

With regard to the expansion of liquids the same author writes:—"We filled the spherical Glass of a bellied Glass, having a long and slender Neck, at three different times, with (1) Mercury, (2) Water, and (3) Spirit of Wine, to the same height; then plunging the Glass successively, into Water kept in the same Degree of Heat, in all the three Trials, as appeared by a Thermometer employed d.) we found each Fluid swelled very remarkably, or rose up to a considerable Height in the Neck of the Glass, above what it had before been placed in the hot Water."

"This experiment seems likewise to hold of all Fluids universally: so that for the present we must allow the Motion of Expansion, or Respiration in Bodies, insensible from Heat, or Fire in general."

Although not bearing directly on the oil business, the origin of the present British railway gauge is interesting.

The first attempt at a railway consisted in laying plank in the cut runnels to facilitate transit in the conveyance of wool and other goods; but the bars had a tendency to bend up at the end, in 1767 short sections of cast iron rails were used. It would seem that the track of the original car was 9 feet outside the wheels—was taken as a standard for the gauge of rails which was measured outside also, and as the width of the single rail at the top was 15 1/2 inches, there remained an inside measure of 7 1/2 inches, the existing standard gauge.

**Crooked Holes**

One of the curious facts about drilling the very deep oil wells that are now being bored in many parts of the country is that the drill, very commonly does not drive straight into the earth, but curves slightly. The deflections are so great that a chart of some wells would look more like a crookedness than a straight line. These deflections are caused by variations in the resistance of different strata and by the fact that the drill frequently encounters sharply tilted rock formations, and tends to slide off them instead of going straight through.

Dr. Alexander Anderson, of Ft. Worth, California, invented a quack remedial apparatus for surveying wells and determining these drfits. A survey of the deepest well in the world, Ondia No. 96, California, developed that at the depth of 6,000 feet it was 917 feet out of plumb. This is not an unusual deviation. It is quite possible for a well bored in the middle of a good sized tract of land, and to wind up at the bottom underneath a considerable slant. There are several cases in which the drill wandered so far out of its direct course that it ran into another well, which was either badly injured or completely ruined as a producer. One of the exasperating details is that two wells quite close together will not follow parallel courses, but may vary widely. Such changes of course add to the materially heavy risk which attends boring for oil.

**THE MODERN CHARIOT**

Deep Drilling Rents Into Specks, Npe Straight Line

Certificate of courtesy when he gets his operator's license. It's no use learning the rules of the road if you don't know the rules of the road. That same signable hole is one machine that should be run with horse sense as well as horse power. It's one vehicle you have to run with your heart and head as well as your hand. Besides that, you have to be sure the other fellow is doing the same thing. I've been driving a long time and I've never been in an accident. I'm not knocking wood either, because I always watch the other follow. That's the only secret I have. If the other man is practicing "Safety in Driving" and you're reac-tional "Courtney in Driving" you're sure and certain that driving will be a great deal easier and more exciting than it is today.

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**JOINT COUNCILS, 1926**

- **DELEGATES**
  - **Montreal Refinery**
    - **Selected**: C. M. Moodin
    - **Chairman**: D. M. Allan
  - **Sarnia Refinery**
    - **Selected**: C. E. Stone
    - **Chairman**: D. M. Allen, Jr.

- **Regina Refinery**
  - **Selected**: C. R. Moore
  - **Chairman**: J. C. McMillan

- **Calgary Refinery**
  - **Selected**: R. B. Robertson
  - **Chairman**: J. D. Haldane

- **Edmonton Refinery**
  - **Selected**: W. E. White
  - **Chairman**: C. R. McMillan

- **Vancouver Refinery**
  - **Selected**: S. S. Nixon
  - **Chairman**: A. J. Smith

- **Quesbec**
  - **Selected**: A. J. S. Oster

**MANUFACTURING DEPARTMENT**

- **DELEGATES**
  - **Electrical**
    - **Selected**: L. J. McCann
    - **Chairman**: H. H. Flinn
  - **Sarnia**
    - **Selected**: A. J. Smith
    - **Chairman**: T. Montgomery
  - **Regina**
    - **Selected**: H. H. Flinn
    - **Chairman**: T. Montgomery
  - **Calgary**
    - **Selected**: W. E. White
    - **Chairman**: C. R. McMillan
  - **Edmonton**
    - **Selected**: W. E. White
    - **Chairman**: C. R. McMillan
  - **Vancouver**
    - **Selected**: S. S. Nixon
    - **Chairman**: A. J. Smith
  - **Quesbec**
    - **Selected**: A. J. S. Oster
Just you try to have a Merry Christmas. That's our best cold weather suggestion.