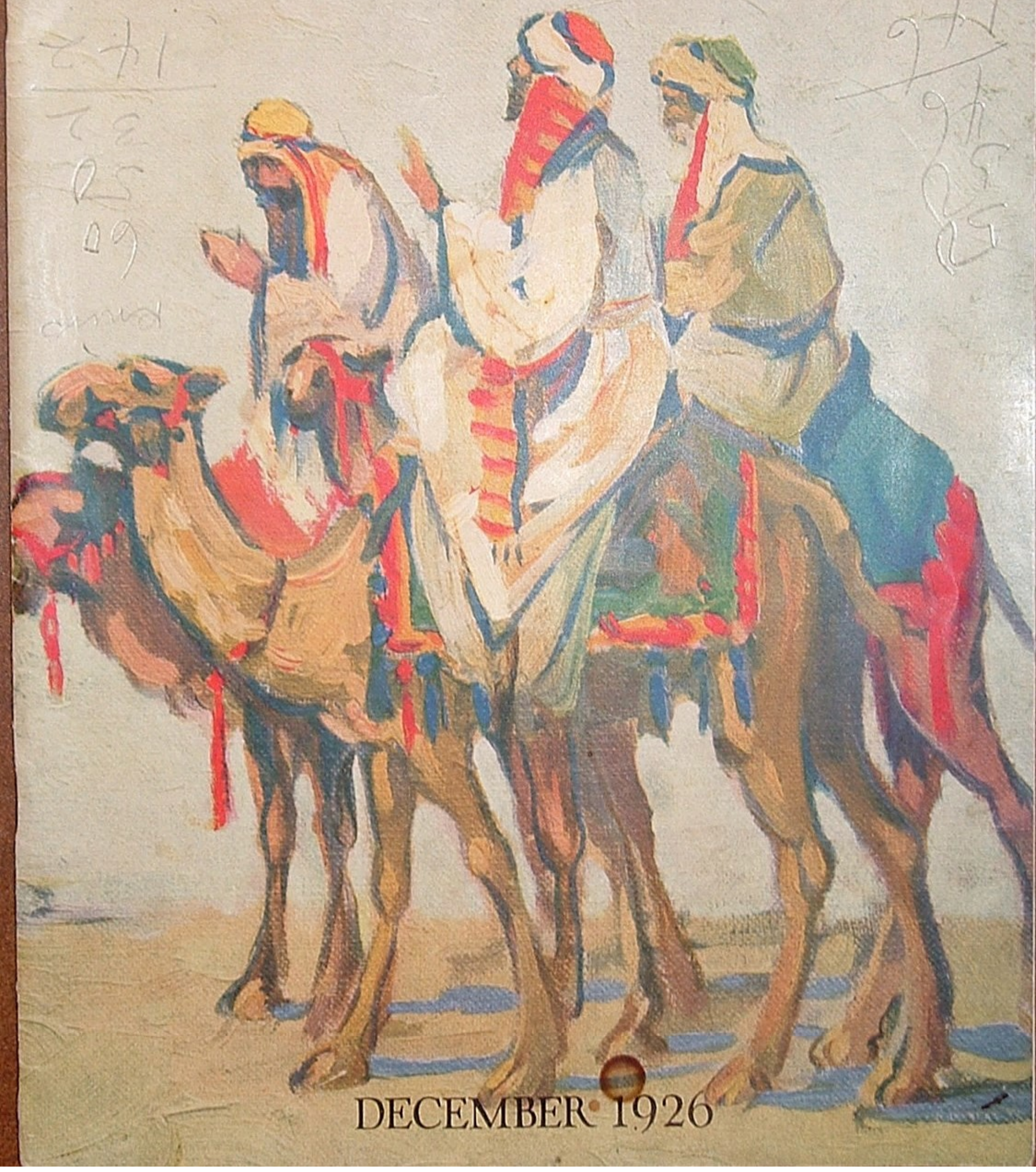
UNION OIL BULLETIN



DECEMBER 1926

TAKE YOUR CAR up that hill today and see where you have to shift gears—or where you ought to have shifted, as that "knock" in the engine will tell you.

Then tomorrow fill your tank with Union Ethyl Gasoline and take the same hill. *You will be amazed at the difference.*

For Union Ethyl Gasoline not only stops all "knocking" but turns the carbon in your cylinders into a source of greater power and smoother running.

In fact, the more carbon you have, the better Union Ethyl works!

On sale at the nearest Union filling station or Independent Dealer.

Stop that "*knock*" with Union *Ethyl*
Gasoline and turn carbon into *power*

UNION OIL BULLETIN

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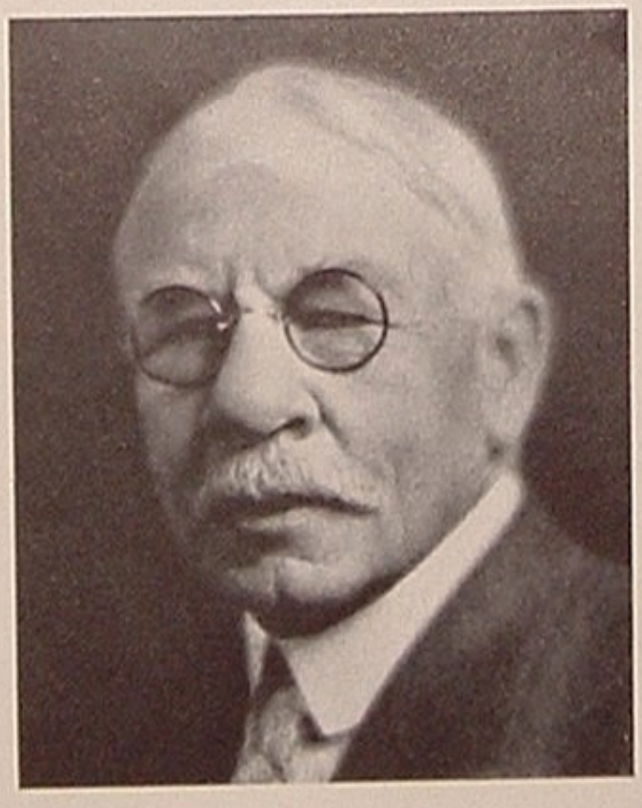
VOLUME VI DECEMBER, 1926 BULLETIN No. 10

Mr. Clark Honored by Petroleum Industry

THE highest honor the petroleum industry has to confer has been bestowed upon E. W. Clark, our Executive Vice-President, who was elected President of the American Petroleum Institute at the seventh annual meeting, held at Tulsa, Oklahoma, December 7th, 8th and 9th.



Mr. Clark's life history has been synonymous with the progress of the West. He has been connected with practically every line of endeavor on the Pacific Coast, although for the past fifteen years his efforts have been devoted almost exclusively to the petroleum field.

This expression of esteem with which Mr. Clark is held by the oil fraternity is a just and fitting tribute to the years of earnest, unselfish effort he has given toward the achievement of those things which were best for the industry as a whole. His devotion to this work has been unfailing since the organization of the National Petroleum War Service Committee out of which, after the close of the war, was evolved the American Petroleum Institute. He has been an unseen guiding hand in the working out of many intricate problems which have confronted the petroleum industry.

Many important matters such as conservation of petroleum resources, standardization of equipment, uniformity of methods and accounting will be before the industry during the coming year, and the Institute is assured of a leader whose sole thought will be dominated by the best interests of the great body which he serves.

Union Ethyl

DO YOU want to get the pleasure that is really in your bus?
Do you want to climb a steeper hill in high?
Do you want to pass the other guy and listen to him cuss?
You do! Well shake hands, buddy. So do I.

Do you want to hear that even purr the kittens imitate?
Do you want to throw away the old low gear?
Do you want your ancient four to shame the very latest eight?
You do! Then brother, kindly listen here.

Do you want to stop that pinging which they call the carbon knock?
Do you want the wheels to turn a hundred more?
Do you want your hack to run as smooth as any mantel clock,
When you press the pedal clear down to the floor?

Then all you have to do if you would bring these things to pass
Is make the nearest Union Oil canteen,
And don't go fooling round with any other kind of gas.
Fill up with UNION ETHYL GASOLINE.

—B.Z.

Harbinger of Happy Miles

The Pacific Coast motorist is now fully aware that "Ethyl is here," having been made available by Union Oil Company. Thousands of western motorists have heeded the urge to "Ride with Ethyl" and are overjoyed with the results, while more thousands are planning to test the remarkable claims made for this new super fuel at the first opportunity. The legitimate query "What IS Ethyl?" is answered in the following article.—Editor's Note.

ETHYL is not a gasoline. It is an anti-knock compound which, when added to gasoline, produces a certain result. Hence it follows that the better the gasoline into which Ethyl is put the better the resulting fuel. Ethyl will not make a super-fuel out of a poor grade of gasoline.

In the manufacture of Ethyl Brand of Anti-Knock Compound we find two ingredients, namely, lead tetra ethyl and an organic fluid known as ethylene di-bromide. The combined mixture is 60 and 40 per cent, in other words, 60 per cent lead tetra ethyl and 40 per cent ethylene di-bromide. The lead tetra ethyl is made by taking ordinary metallic pig lead, and to this add 10 per cent metallic sodium. The two are melted together and then ground into a powder and placed according to careful weights in a pressure still. Then into this still is released a gas known as ethyl chloride gas, which is made from organic chloride gas compounded with ethyl gas, which is made from ethyl alcohol. The resultant chemical reaction forms two compounds, lead tetra ethyl and sodium chloride (ordinary table salt). The two compounds are then steam distilled to get rid of the table salt and impurities. The finished product, lead tetra ethyl, comes out as a water-white oil liquid of a weight of approximately 14 pounds per gallon.

The next question is: "Why the ethylene di-bromide?" At time of combustion in an automobile cylinder the temperature is raised to about 3000 degrees F. and the lead tetra ethyl without the ethylene di-bromide would form lead oxide, or more familiarly known to you as white lead, which has a fusing point of about 800 degrees F. At this temperature the white lead would turn into metallic lead and obviously the motorist would not want metallic lead deposited in his cylinders. However, the ethylene di-bromide mixture keeps the lead oxide from turning into metallic lead and it goes off as vapor.

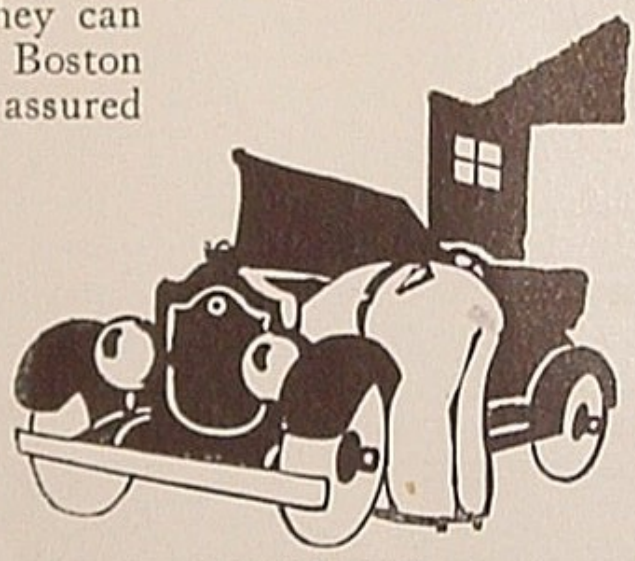
Some idea of the minute amount of ethyl fluid added to our gasoline is had when it is realized that only one part of lead tetra ethyl to 2523 parts of Union Gasoline is used, or, putting it a little differently, a four-ounce bottle of lead tetra ethyl will treat 50 gallons of Union Gasoline with the desired strength. A word about this desired strength. The Union Oil Company sent to the Ethyl Gasoline Corporation Laboratories a sample of regular Union Gasoline which

it has been marketing. Anti-knock tests were then run by the Corporation Laboratories to determine the anti-knock value of Union Gasoline. It was found to be very high and consequently but a small amount of ethyl fluid was necessary to raise the anti-knock value of Union Gasoline to a point considerably greater than the standard value prescribed by the Ethyl Gasoline Corporation. The standard anti-knock value in the Ethyl Gasoline must be equivalent to the anti-knock value of 40 per cent benzol and 60 per cent navy specification gasoline.

It is interesting to know that with the Union beginning the sale of Union Ethyl Gasoline, Ethyl Brand of the Anti-Knock Compound will be sold in every state in the Union and also the Dominion of Canada.

Such a wide sale of Ethyl Gasoline is of tremendous advantage to tourists and motorists because now they can go from San Francisco to Boston or New Orleans and be assured of an absolutely standard grade of Ethyl Gasoline.

So much for the manufacture and mixing of Ethyl. The next question which comes to mind is: "Why is Ethyl needed?"



IS THERE CARBON IN YOUR CAR?

Back in the ages dark of automobiles, in other words, about 1912, when the motor manufacturers began to realize that an automobile could be made a thing of use and not a curiosity or a toy, engineers began to experiment and try to produce a more efficient, smaller, snappier and more economical motor. Obviously, the way toward this was to increase the compression in the motor. When an inflammable vapor like a mixture of gasoline and air is compressed an explosion occurs. The more this mixture is compressed the greater the power of the explosion, and of course the more efficient and the more flexible the motor itself becomes, together with the need of using less fuel.

In the old days of 1912, as mentioned, the automobile manufacturers thought that the time was then ripe to increase the compression of the automobile motor above that which previously had been put out. They did this on an experimental scale, of course, and immediately they found that with the local gasoline which they were using (experiments having taken place at the General Motors Research Laboratory in Ohio) a very severe "knock" or detonation took place. This, by the way, was the first time that this "knock" or detonation had ever been known or heard of in any automobile motor, due to the fact that in those old days the compression of the cars was relatively low (about 2 to 1) and the volatility of the gasoline especially high, running, up to 65° gravity. When this "knock" took place in their experimental motors they first thought it was mechanical trouble and, upon investigation, they found that this was not so and they then realized that there must be some property in the gasoline which caused this "knock."

Accordingly, the engineers sent out for samples of gasoline produced all over the country. They found a very peculiar thing, that is, peculiar to them at that time, that some of the gasolines run through their new experimental motors performed without any "knock," and that others of seemingly the same characteristics, such as distillation range, gravity, etc., "knocked" severely.

This was really the birth of the idea and endeavor to find and eliminate detonation or motor "knock." Mr. C. F. Kettering, who is now Vice-President and in charge of all research work of the General Motors Corporation, then designated Mr. Thomas Midgley, who is the inventor of the Ethyl fluid, to try to find out what this "knock" was, and more important, how it could be eliminated with any or all gasoline which might be offered for sale to the public. In those early days of automobile design they were not nearly as familiar with the details of combustion as they are today, but they had the idea that any black object will absorb heat much more readily than a white or light-colored material, and they felt that this

"knock" was due in some way to a tremendous increase in heat in the motor, and that if they could have a black fuel they might be able to absorb this heat and get rid of the "knock." Accordingly they searched around trying to find a black dye for gasoline. In those days knowledge of chemical experts disclosed no black gasoline soluble dye in existence, so one man in the laboratory suggested that they drop some iodine in some gasoline, which was done and gave some very pretty black gasoline. This gasoline, with the iodine content, was then run on the new higher compression type motors, with which they were experimenting, and presto! the "knock" was eliminated. This looked ridiculously simple. They thought that they had the whole question licked.

Accordingly they asked the Du Pont Company to try to produce for them a black gasoline soluble dye. This was forthcoming in a few months and all of the officials were present to witness the test of the new black gasoline in the new type motors on which they were experimenting. Needless to say, as soon as this gasoline was run the motor "knocked" as merrily as ever. Then they realized that there was some property in the iodine and not the color that eliminated the "knock." It was impossible for them to use iodine due to scarcity and the high price, but inasmuch as iodine is a metal of one of the low grades, they began to experiment with metals. Metals are not soluble in either oil or water, so it was necessary for them to make what is known in chemistry as an organic liquid, all of which organic liquids are soluble in oils. Previously little or nothing was known of the manufacture of metallic (metal) organic liquids, but after many years of hard work in the laboratories, in which over 35,000 different chemical compounds were actually tried on motors, they found that lead could be turned into an organic liquid known as lead tetra ethyl, as described.

However, before leaving this point it might be opportune to explain just what a compression ratio is, as we mentioned that the old cars had a compression ratio of about two to one. When the piston of an automobile motor is down at its bottom position, the volume in the cylinder, that is, the cubic-inch displacement from the top of the piston to the top of the combustion chamber, is arbitrarily designated as one. When the piston comes up on the compression stroke and reaches its maximum height and the charge of air and gasoline is compressed to one-fourth its volume, or four times, the compression ratio is then designated as four to one. If the gas is compressed, for another example, five times, or to one-fifth of its volume, the ratio is then five to one.

From the above we have tried to show that Ethyl Gasoline is the forerunner of one of the most important developments in the automotive industry, in other words, by adding a minute amount of Ethyl fluid, the compression ratio of the automobile of the future can be increased tremendously, and this means a big gain in performance, speed, flexibility and economy far and away beyond any conception of what the motorist knows of today's automobile.

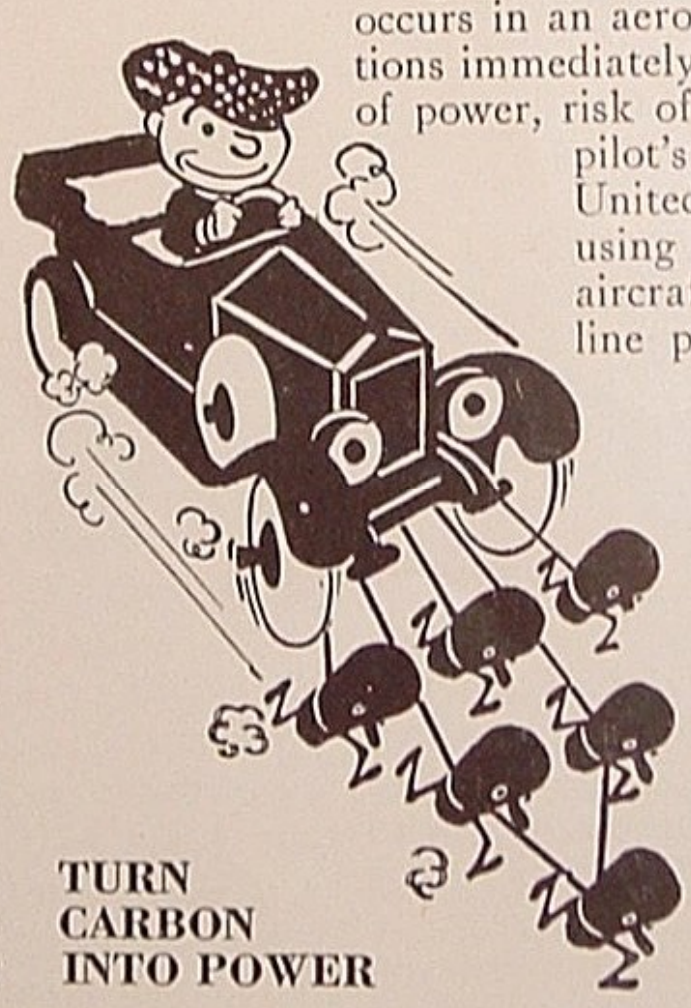
DOES YOUR CAR EAT GAS?

The question next arising is: "Why Ethyl Gasoline for present-day automobiles?" The car of today is designed to give certain maximum power on a certain compression ratio, cars averaging today about 4½ to 1. Just as soon as these cars begin to carbon up a little, the carbon itself being a foreign matter in the cylinder, it raises the compression, or, in other words, makes smaller the combustion chamber of the cylinder. Making a combustion chamber smaller increases the compression ratio and you get "knocking."

Carbon also creates another condition in the motor. Carbon is one of the best insulators on the market today, so when the explosion takes place in a motor with

carbon present in the cylinder, the amount of heat carried off by the cooling system, in other words, the water around the cylinder, is diminished and considerable of this heat, due to the insulating power of carbon, remains in the cylinders, which would have been carried away thru the cooling system. When the next compression stroke occurs, this heat is present and, as heat will expand in gas as additional explosions of the gases take place, additional compression is created in the motor and there occurs what is known as the carbon "knock." You have probably heard the so-called carbon "knock" called pre-ignition. There is no way that pre-ignition can possibly take place in an automobile engine under any condition unless the timing of the spark is entirely wrong.

In spite of the presence of carbon in a motor, Ethyl Brand of Anti-Knock Compound eliminates all "knocking" even though the carbon continues to build up inside of the cylinder. Again, we have seen how the increasing of compression increases power, so by permitting the carbon to build up in the cylinders the power is automatically increased by increasing the compression through making the combustion chamber smaller as the carbon forms.



TURN CARBON INTO POWER

Increased flexibility, in other words, increased pick-up, smoothing out of the motor, or elimination of vibration with additional power due to the complete elimination of the carbon knock, briefly summarizes the advantages of Union Ethyl Gasoline in the present day automobile.

Here is some really interesting news as well as information: Frank Lockhart was first in the World's Automobile Racing Classic at the Indianapolis Speedway on May 31; Harry Hartz was second; Cliff Woodbury third. All three of these racing drivers used Ethyl Gasoline. However, this was nothing new because Ethyl Gasoline has been used in every race for the past three years.

In fact the properties of Ethyl Gasoline were responsible for the ability to use the 91 cubic inch displacement racing motors —the smallest motors ever used.

The aeroplanes of the United States Navy as well as the British Air Ministry have adopted Ethyl Gasoline as a standard fuel. The great dirigible balloons of the United States Army and Navy all operate on Ethyl Gasoline. Safety in flying depends upon the perfect response of an aeroplane or dirigible motor under all conditions. Perfect response depends upon the fuel used. It must be a fuel that gives power when needed, and full power in turn means attaining the maximum revolutions per minute which the motor was designed to deliver. When "knocking" occurs in an aeroplane engine the revolutions immediately drop. This means loss of power, risk of control and risk of the pilot's life. This is why the United States Government is using Ethyl Gasoline for its aircraft, because Ethyl Gasoline positively and effectively eliminates "knocking" and maintains the maximum revolutions.

The motor of an automobile, like the motor of an aeroplane, is designed to deliver a certain number of revolutions per minute to give maximum power and response under all conditions, then as carbon forms, that "knock" occurs and the motor revolutions drop and power is lost. On hills and the pick-up in traffic, Union Ethyl will eliminate the "knock" in the motor of an automobile just as it does in an aeroplane engine. Union Gasoline, combined with ethyl fluid, is science's latest contribution to automotive progress, having passed every conceivable test.

Lifting Oil With Gas

By F. F. Hill, Mgr. Field Operations

The following paper, delivered by Mr. Hill before the recent annual meeting of the American Petroleum Institute, Tulsa, Oklahoma, gives the results of the company's test of the gas lift principle in California fields—Editor's Note.

MUCH has already been said and written about gas lift possibilities in connection with oil production and the theoretical and scientific sides of the subject have been pretty well covered by the different experts, so I will try and deal only with some of the results obtained by our company.

The air lift for producing oil was employed with some degree of success in California over twenty years ago and in April, 1911, our company was able to bring Bell No. 5, in Cat Canyon, Santa Barbara County, California, from a pumper of less than one hundred barrels up to five thousand barrels per day. We could not duplicate this performance nor could our neighbors, although there were many compressors installed and many attempts made in the same field; so this incident was looked on as more or less of an accident.

In 1914, Mr. Phillip Jones of Santa Maria, California, secured a patent on the process of circulating gas into oil wells to bring out oil, extract the gasoline from the gas, then compress the gas again and reintroduce it into the well. Even though considerable thought was given to the development of this system at that time its final usefulness was not recognized until the past few years.

The Union started some gas lift experiments nearly two years ago, and have gradually increased the scope of this work until we now have approximately one hundred wells producing by gas lift.

The use of the air lift in water wells has been a familiar subject to many engineers for a long time and the gas lift in oil wells seems to be a near relative. Although it has been our experience that a general formula for using the gas lift cannot be written at this time, as each well requires individual study, perhaps the one

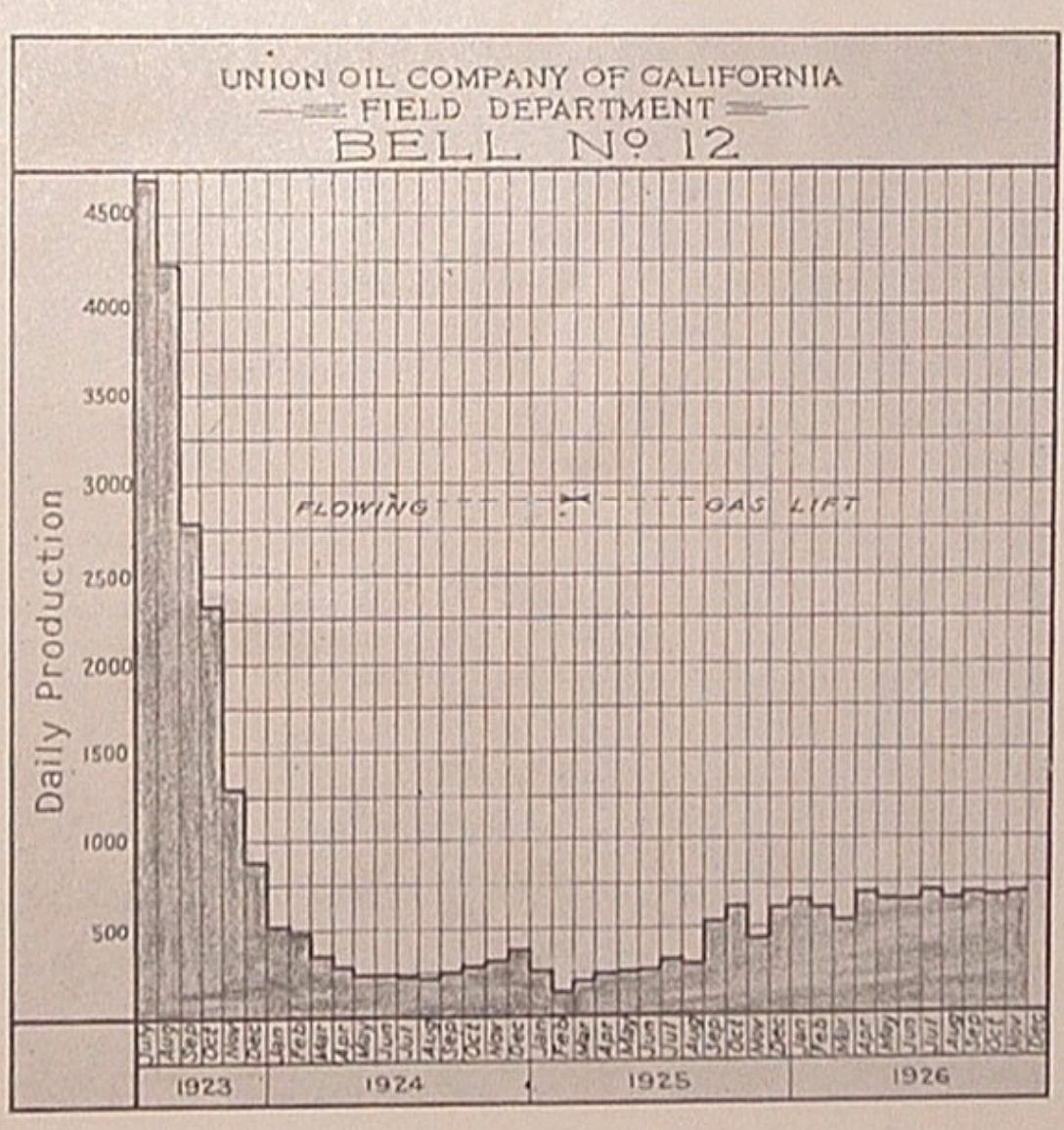


Chart 1—Is production chart of Bell No. 12 and one of the early wells to be put on gas lift by our company. The well was completed July 5, 1923, at a depth of 4730 feet, with an initial production of 4,596 barrels of 34.6 gravity oil, and has produced 915,179 barrels to November 1, 1926. This well was about all in as a natural flowing well, but is still going strong on the gas lift with no evidence of any decline.

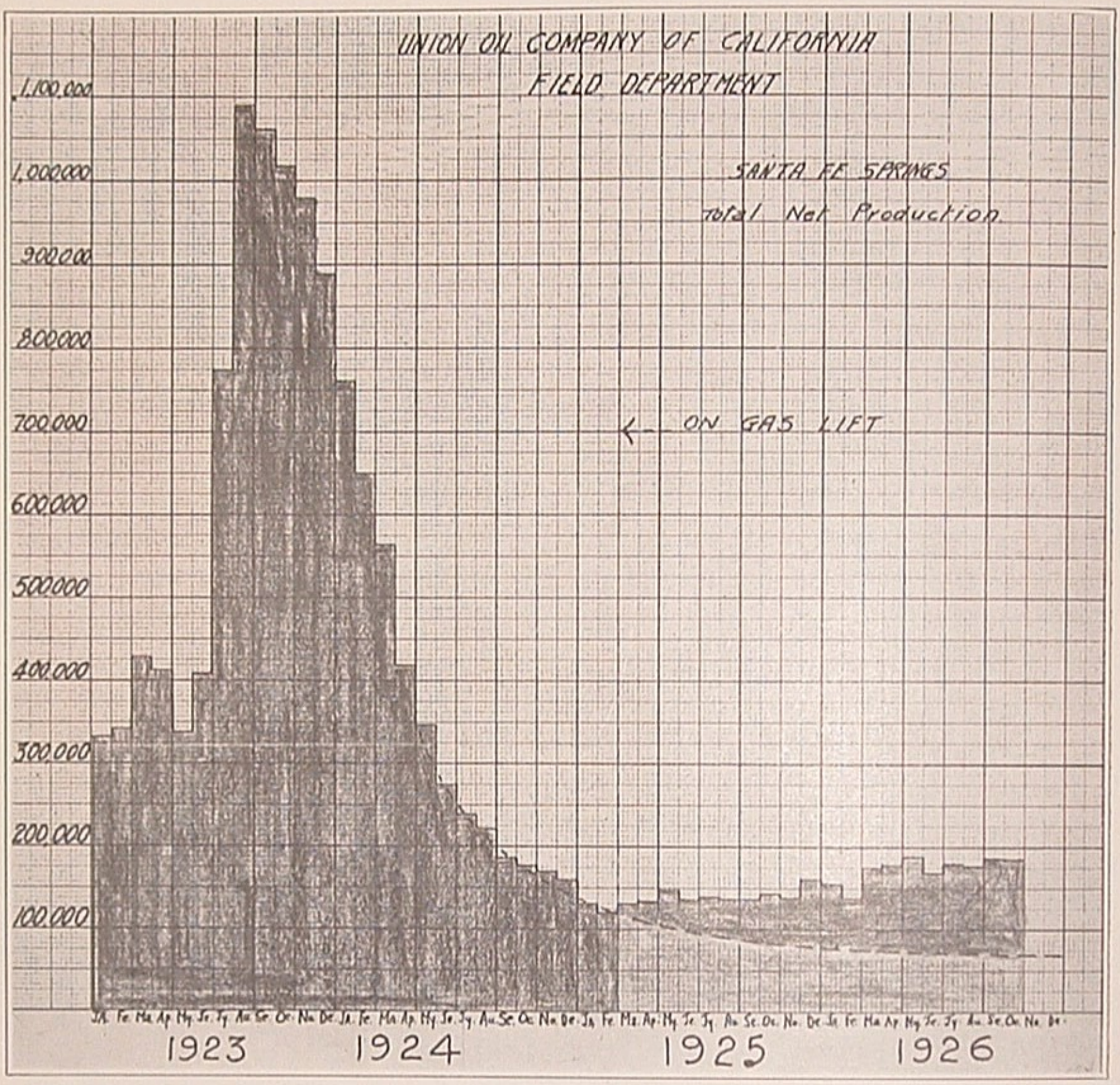


Chart 2—Shows total production of Union Oil Company of California in Santa Fe Springs Field, dotted line indicating the probable or expected production according to usual method of making decline curves under normal conditions. The increase shown is very largely due to use of gas lift, although there are some improvements in pumping methods in this field that have helped a little. There are 18 wells on the gas lift, 18 wells pumping and 2 wells flowing naturally.

controlling factor that will govern in all cases is the fluid level in the well, which in turn reflects the formation pressure, and the results to be obtained will be proportionate to such pressure.

Even though the gas lift is working successfully in many wells and in many fields we should not become stampeded with the idea that it is going to cure all production ills, as it should be remembered that the big increase you hear about in production is taking place on selected wells.

The gas lift is not applicable to all wells; and though some pumping wells won't flow or perform on the gas lift they should not be forgotten, as they are the meal ticket of the industry and the big ones of today may be the pumpers of tomorrow or in the near future.

We are frequently asked:

(a) Is the gas lift successful and will it increase production?

(b) Is it profitable?

(c) Will it increase the ultimate yield?

There are already a sufficient number of production records to prove beyond

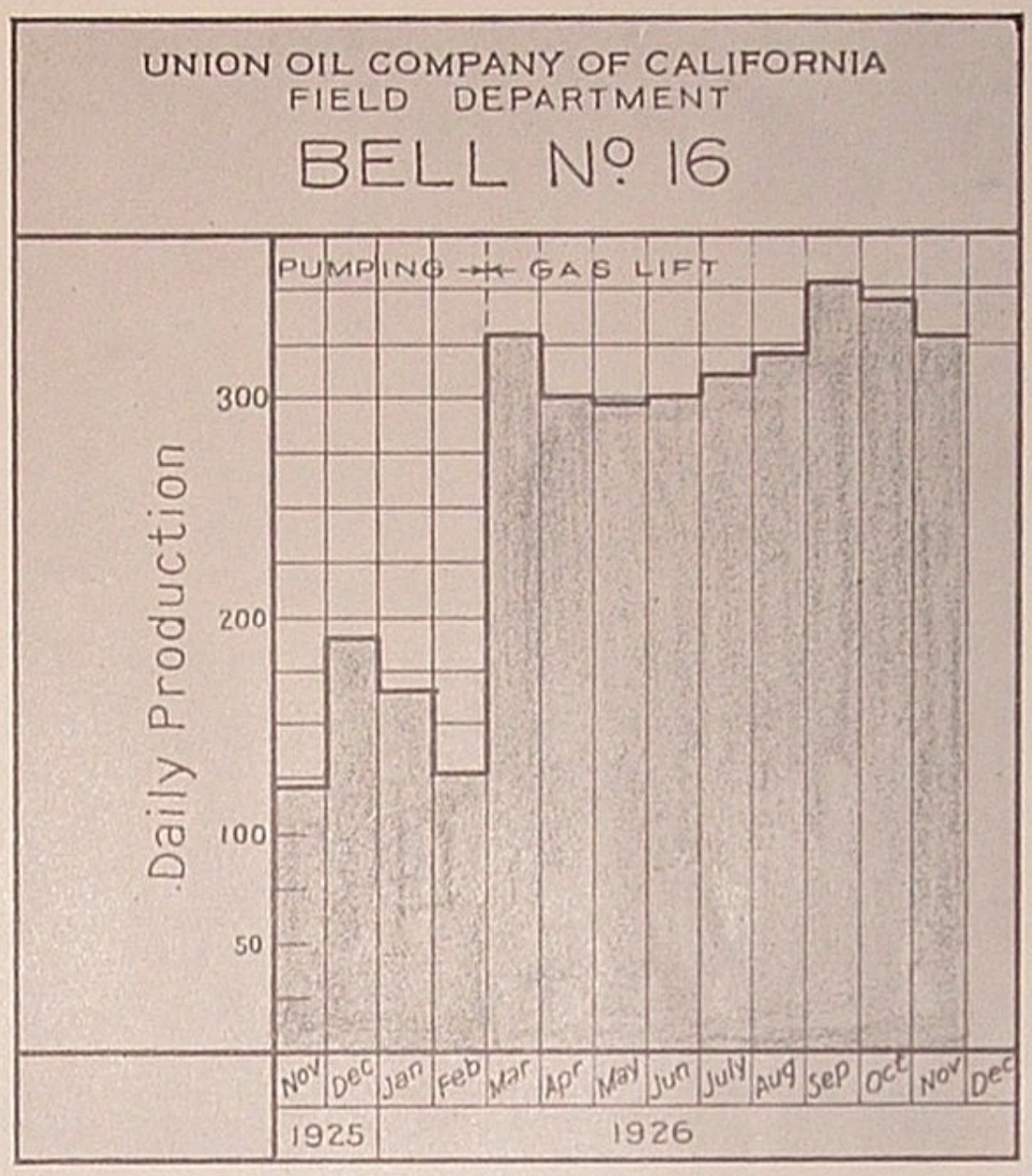


Chart 3—Bell No. 16. This well came in October 15, 1923, at 4628 feet, with an initial production of 3065 barrels, and has produced to date 649,657 barrels of 35.6 gravity oil. Aside from the change from a pumper to a gas lift well there is a short history earlier that the chart does not show here. It had dwindled down to a 75 barrel average pumper. The gas lift was tried in March, 1925, but would not work, and while trying to make the well produce on gas we pumped seven million feet of gas back into the formation and gave up the gas lift test, but when the well was put back pumping its production was doubled. We later put on the gas lift and it again doubled over the last pumping increase. A Fritzie might say, "We did it some good besides helping it, although we didn't understand what we knew about it."

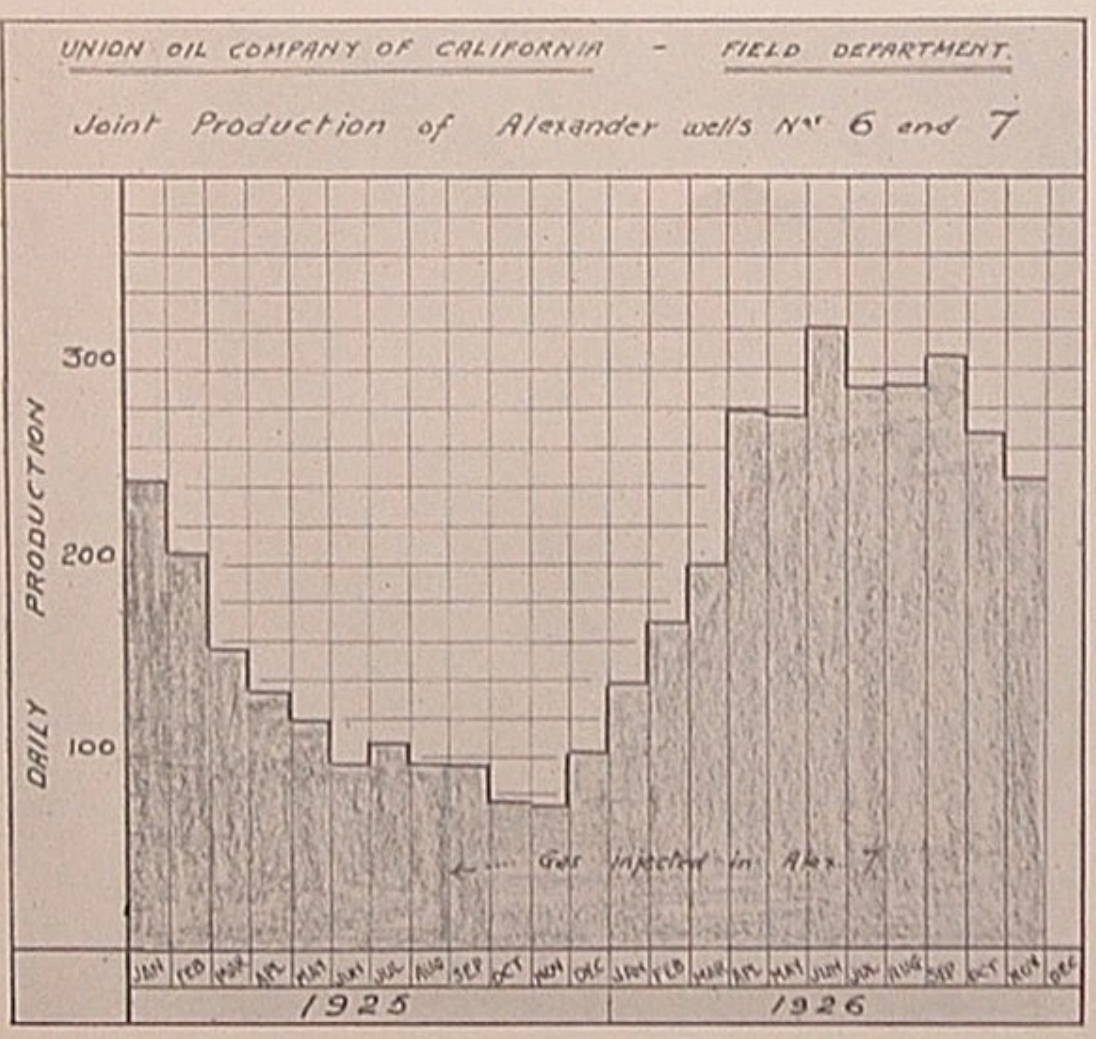


Chart 4—Combined production of Alexander Nos. 6 and 7 after the experiment. A substantial gain in production is shown.

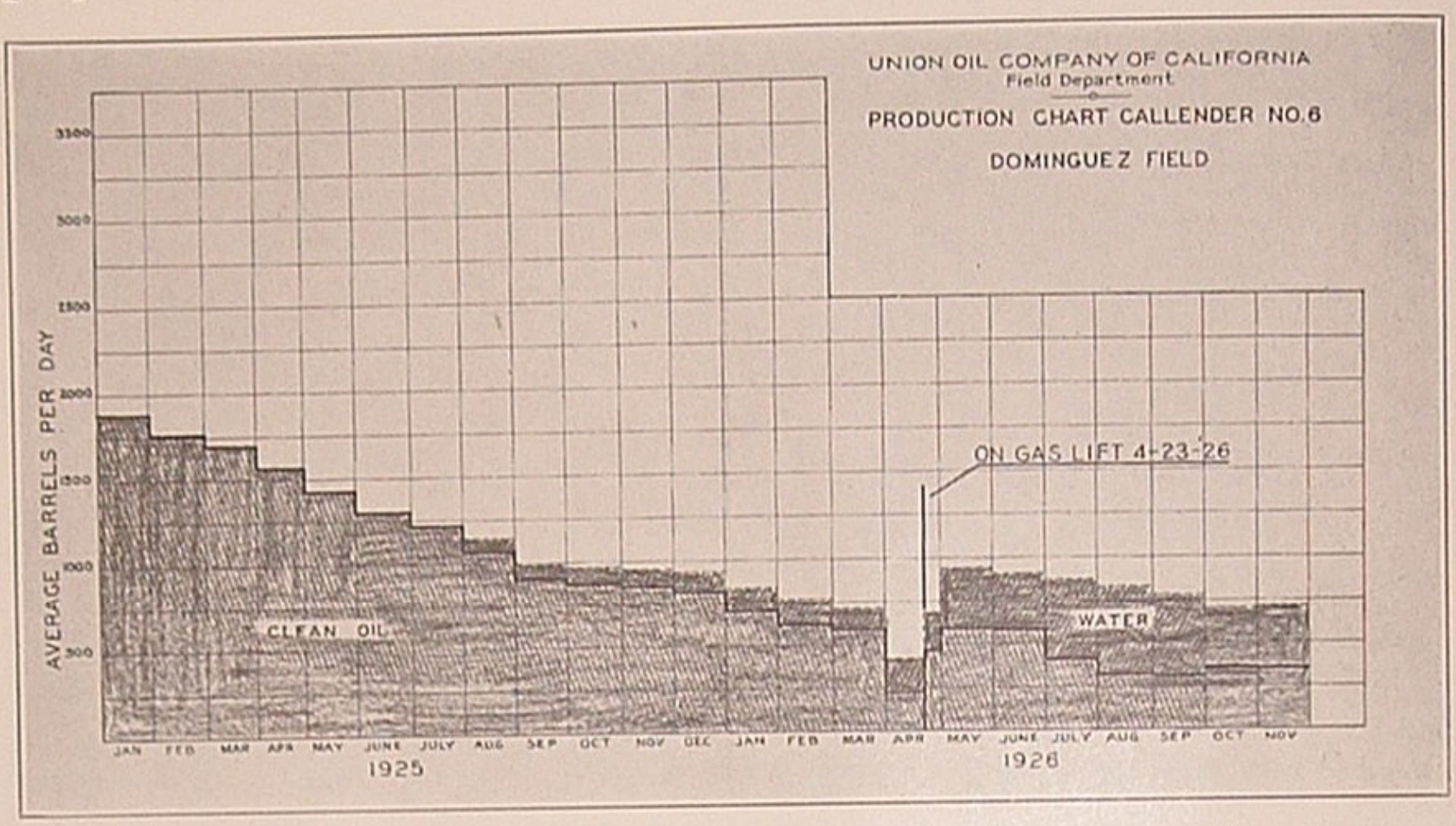


Chart 5—Shows production from Callender Well No. 6, Dominguez Field. This well was completed August 23, 1924, at a depth of 4339 feet with an initial production of 2,631 barrels of 32.5 gravity oil. Total production to November 1, 1926, 907,725 barrels. It will be noted that edge water encroachment started to show in August, 1925, and in April, 1926, the well stopped flowing. During the latter part of the same month the gas lift was installed and the well is still making considerable oil production along with a large amount of water. The water production alone would in all probability be more than could be handled by pumping from this depth, and without the aid of the gas lift the well probably would have been abandoned long ago, or deepened in the hope of getting another producing horizon with a shut-off below the edge water in the upper zone.

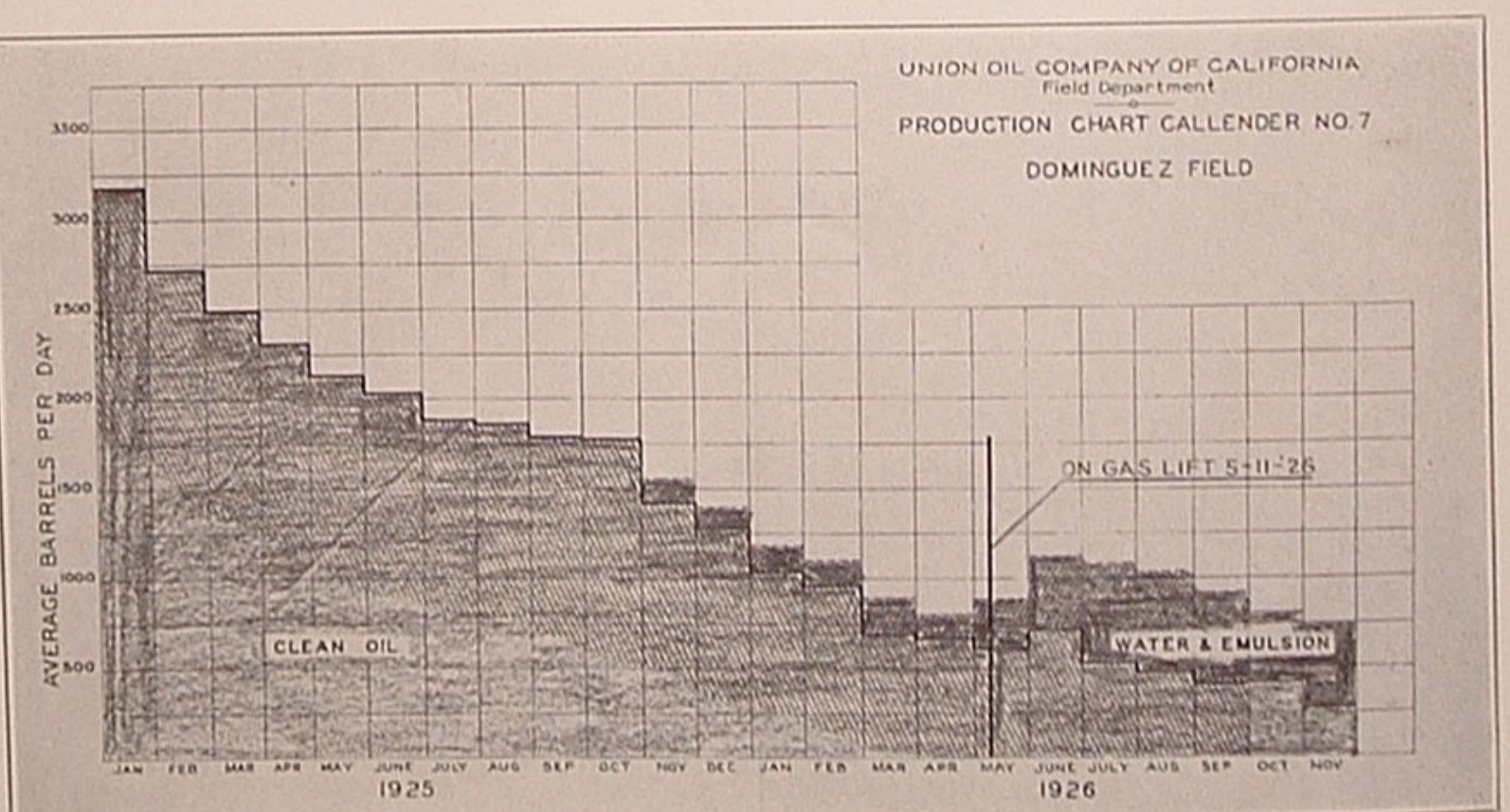


Chart 6—Production chart for Callender Well No. 7, Dominguez Field. The well was completed December 24, 1924, at a depth of 4464 feet, initial production, 3,505 barrels of 31.6 gravity oil. Like its neighbor No. 6 it was a victim of edge water and stopped flowing in April 1925, but was revived by the gas lift and is still making commercial production, which could not be obtained by pumping.

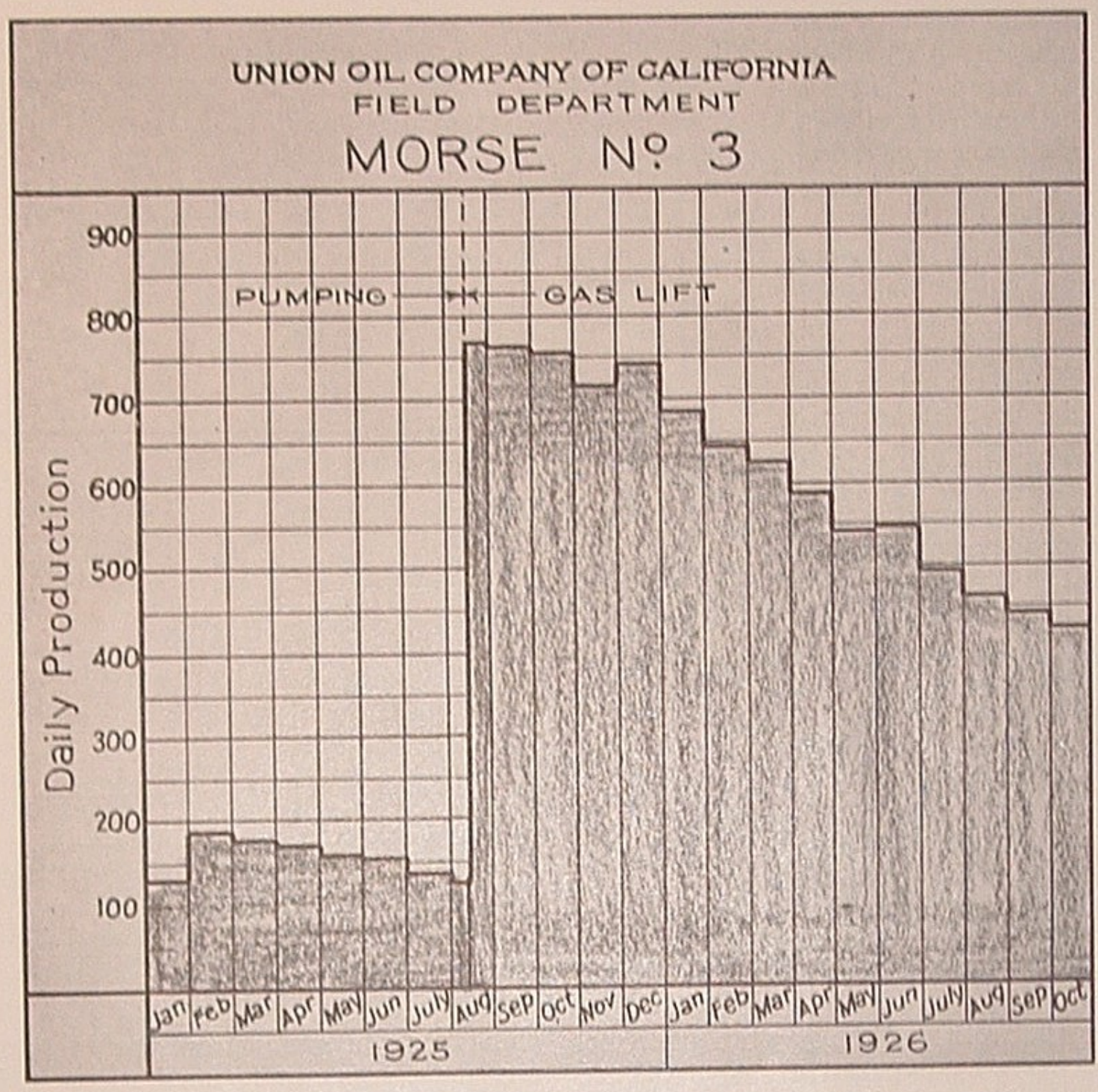


Chart 7—Showing production of Morse No. 3, Richfield, California. This well was completed April 3, 1922 at 4340 feet with an initial production of 4,326 barrels of 25.5 gravity oil. Total production to November 1st, 1926 1,799,963 barrels. This well had produced a lot of oil and one might think it had done its duty and that 150 barrels or so of production by pumping would be about all that could be expected. With the gas lift, however, which was put in in August 1925, the well is still going strong after fifteen and a half months. The decline curve on gas lift shows a faster drop by gas lift than by pumping, but there is already a substantial amount of increased production tucked away to the well's credit and the gas lift.

any question of doubt that the gas lift is a success under favorable conditions. These conditions will usually be found in wells which are still flowing, or have just passed from the status of a flowing well to a pumper, or in wells where there is a reasonable fluid head. It should be easy to rejuvenate such producers; the bigger the well or the higher the fluid level the greater the increase should be.

Profits have to be figured from many angles and are dependent on surrounding conditions, such as the location of wells, competitive operations, size of drainage area, condition of well, well equipment, etc.

A good argument can be presented both for and against increased production. Some will say, "Why try to increase production at this time when there is already an over-abundance of oil and why not keep it in the ground in its natural reservoir, and take it out when needed with possibly higher prices?"

Others will say, "Get the oil out as fast as possible and if it can be extracted faster with gas lift than by pumping, by all means employ this method, as under-

ground material only has a certain life. And where water is cased off, after a certain length of time, you run chances of losing your well once the casing is destroyed."

Further, in handling pumping equipment there are many hazards and frequently a well has to be abandoned or redrilled caused by an accident to the pumping equipment.

Our company has some wells producing with gas lift at a greater depth than five thousand feet where pumping could not successfully be accomplished. In other wells oil and water are being produced in such quantities that the water alone could not be pumped with an ordinary working barrel. As stated previously, however, these are exceptional conditions, but they do prove the utility of the gas lift principle.

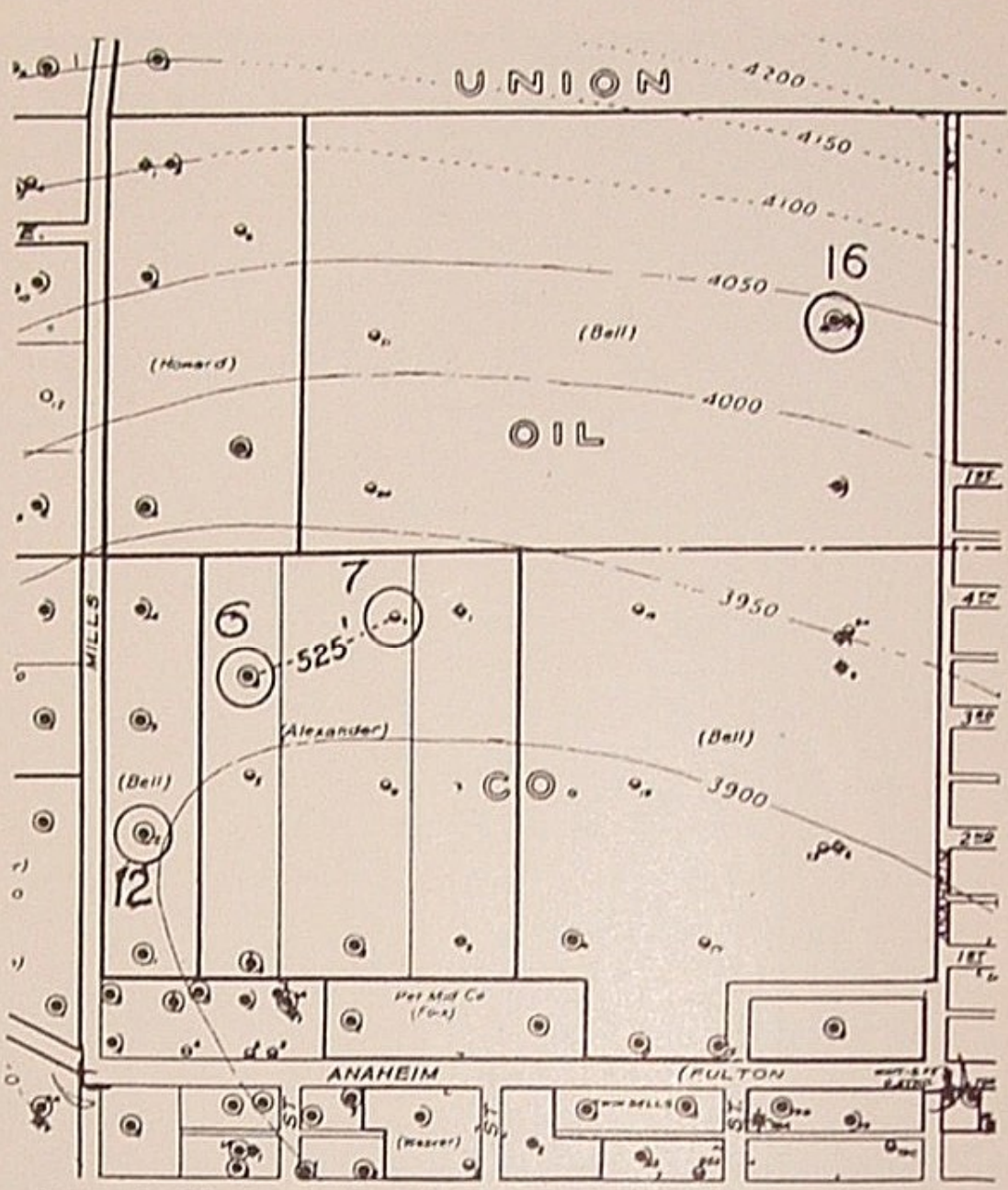


Chart 8—Shows portion of Santa Fe Springs Field, and location of four of the wells discussed here.

If wells are comparatively new and are good candidates for the gas lift and have not been equipped for pumping they should show a substantial saving in the operating cost and the recovery of more oil on the gas lift than by pumping.

If wells, however, have their pumping equipment in group jack plants or individual plants and all the oil that the well is capable of making is being produced by pumping, then serious consideration and careful figuring should be done before throwing out one type of equipment and putting in another, as when once started on the gas lift system the plants are usually out of balance, especially where additional wells are being taken off pumping and put on the gas lift, or where new wells coming in require gas. It resembles a poker game where an ante of three calls five to play. One week you may require more distribution lines, header manifolds, meters, etc., then more high pressure compressors, then additional gathering lines to take care of increased gas production, which calls for more low pressure machines to bring gas in from the wells; then the gas plants are found to be undercapacity, and after the rounds have been made a few times for appropriations it may be likened to the Dago's philosophy of digging the ditch. When he was asked why he was digging a certain ditch, he said, "I digga the ditch to getta the mon to buya the grub to getta the strength to digga the ditch."

As to increasing the ultimate production with the gas lift the system is so new that the answer should be withheld. However, almost everyone who has made a study of the subject I believe agrees that the gas underground is the motive force that brings the oil to the well, and when this force is spent the well is dead; so we may reasonably conclude that where formation gas is conserved by reducing the gas to oil ratio a greater ultimate yield can be expected; and my understanding is that in most cases where the gas lift is in operation there has been a substantial reduction in the gas to oil ratio.

The Diesel Engine

Its Uses and Advantages

By O. Berg, Jr.

SINCE its invention by Dr. Rudolph Diesel of Germany in 1892, the diesel engine has been tested in all types of installations varying from the submarine to the oil electric locomotive and motor truck.

Besides economy of operation the diesel engine has other advantages over the steam engine. Full power is quickly available and the engine can take on full load from idle as soon as the operator can make the different shifts, a matter of two or three minutes. The diesel engine has no standby losses, as with the stopping of the engine no further fuel is consumed. It also possesses the further advantage of being a self-contained prime mover, its only auxiliary being the air compressor. The small requirements of the engine reduces to a minimum the space necessary for fuel storage, which in Marine installations makes possible greater cruising radius on a given quantity of fuel. An interesting example of this is the M. S. Aorangi which many of you visited last year. This vessel which is the largest motorship afloat, is 600 feet long and of 23,000 tons displacement and has a cruising radius of 15,000 miles; bunker space being provided for 21,000 barrels. To obtain the same cruising radius with steam, using oil for fuel, it would be necessary to provide bunker space for 60,000 barrels or with coal fuel, 15,000 tons. It is interesting to know that this ship which is on the Australian run of the Canadian Royal Mail Line of the Union S. S. Company of New Zealand is under contract with the Union Oil Company for all of her diesel requirements.

She will not long be known as the largest motorship afloat however, as two vessels, the "Carnarvon Castle" and the "Asturias" have been launched and are now at the outfitting docks and will eclipse her tonnage and power. Another motorship, the "Saturnia", recently launched will, when completed, be the largest and highest powered motor vessel in the world. She is being built in Italy and is 631 feet in length and is capable of carrying 3000 passengers. Among the many novelties proposed for this vessel is the absence of funnels and accommodations for sea planes. Each of the two Burmeister & Wain double acting Diesels normally develop 9000 shaft h. p. and 10,000 shaft h. p. when supercharging blowers are brought into operation.

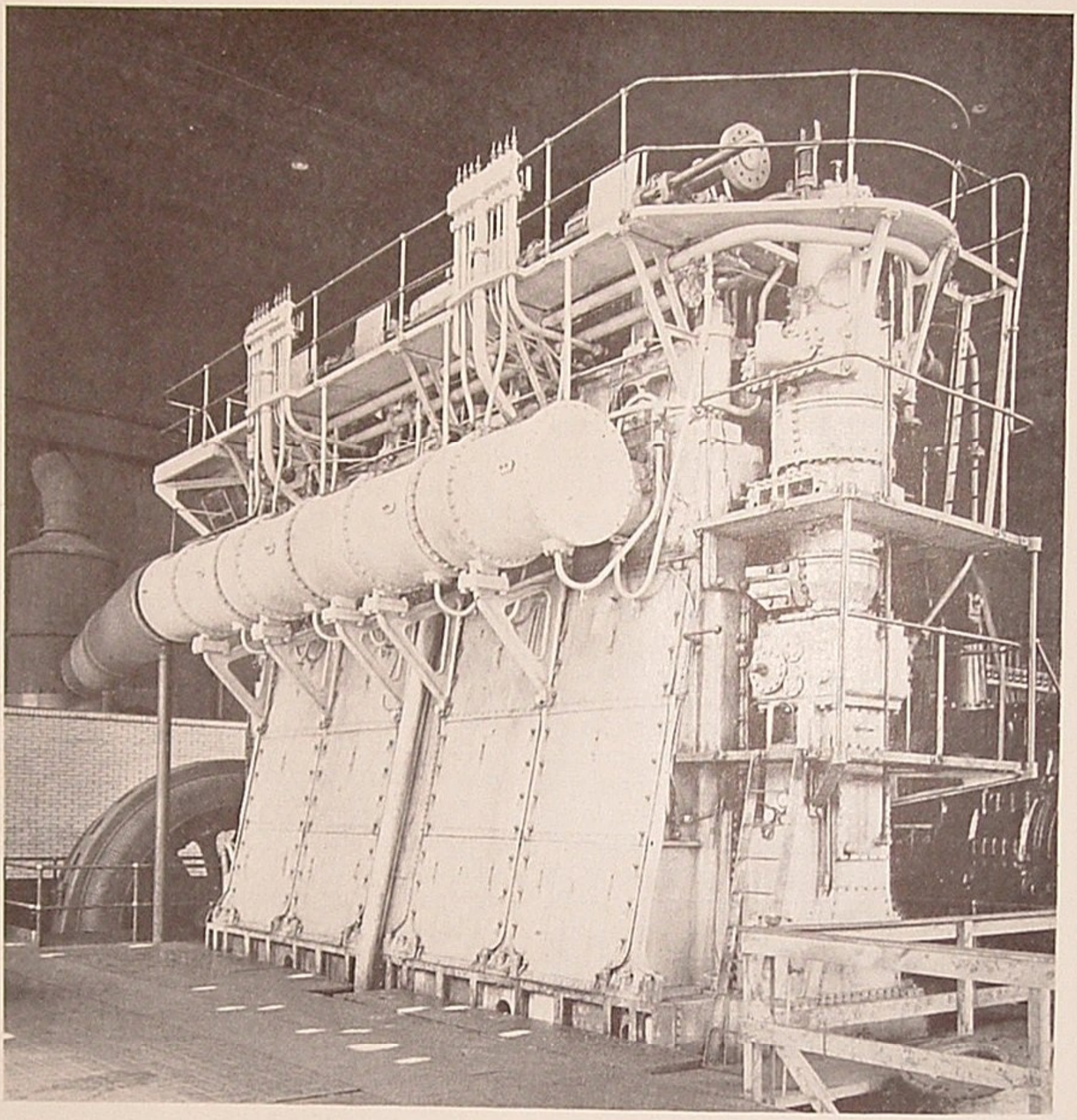
This is surely rapid development for the motorship when it is taken into consideration that all of these vessels are larger than any steamer having San Francisco as a regular port of call with the exception of the occasional around the world liners.

Only recently the M. S. Olinda, which was in the fuel oil service of our company at San Francisco, has been converted to diesel drive. She is now powered with a 250 H. P. Enterprise Diesel Engine which drives her one knot per hour faster than the old 300 H. P. gas engine.

Besides an increase in speed, there is also quite a reduction in operating cost. With gasoline for fuel it cost about $4.00 per hour to run full speed. With her diesel engine she can now attain a speed of one knot faster at a cost of 72c per hour, a saving of $3.28 per hour in fuel.

The adaption of the diesel engine to marine propulsion can be readily seen when these figures are taken into account. In Denmark 94.5% of the tonnage building is diesel and in Sweden 92%. Italy's construction shows 63.5% motorships and Germany rates 77% with Holland 63% and Japan 46%.

According to Lloyd's, the figures for the quarter ending June 30, 1925 as compared



A Late Type of Stationary Diesel Engine.

with the same period for 1924, show an increase of 39% in motorship tonnage and a decrease of 32% in the steamer tonnage under construction. When compared with the tonnage under construction, in June 1923, this year's figures show a decrease of 50% in steamship and an increase of 180% in motorship building.

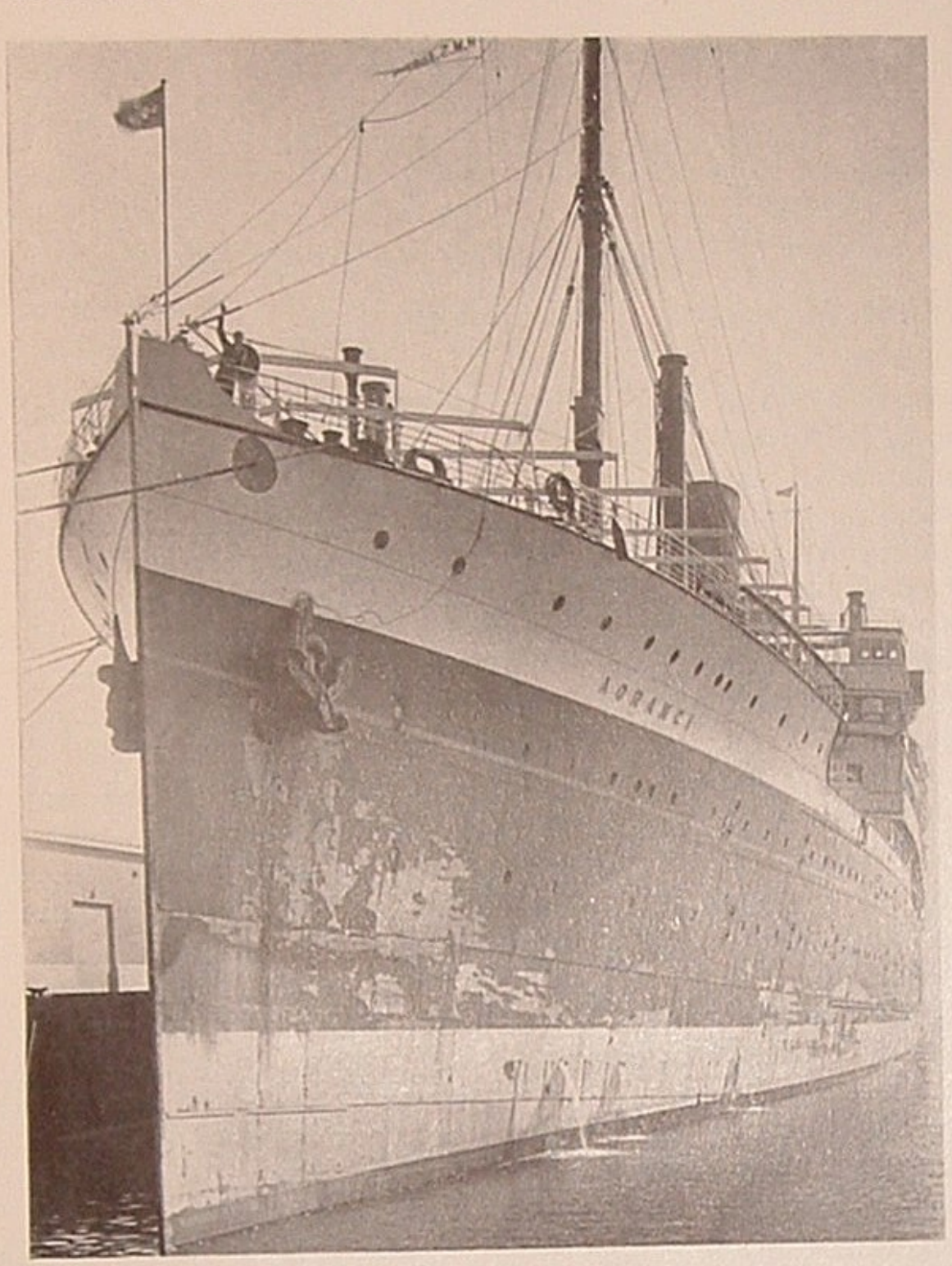
Several reasons are apparent as to why Europe has lead America in the development of the diesel:

First—the general business profits in America having been so large in the last decades, little thought was given to the most economical methods of production and operation. Also competition with the industrial countries of the world was not so keen as in Europe.

Second—coal is much cheaper in the United States than in Europe and consequently is more wastefully used; while the leading idea in Europe is economy in operating cost, the leading idea in the United States is economy in first or installation cost.

Third—the steam engine in America is much cheaper than abroad, but the diesel engine, due to its many working parts, is not and never will be a cheap engine.

Fourth—With the existing surplus of steam tonnage in America which can be purchased at very attractive prices, it is not probable that shipowners will install diesel engines in new tonnage at the present cost.



M. S. Aorangi—The First Large Motor-driven Passenger Boat to be Built.

Fifth—The majority of the Diesel engines, particularly the larger units manufactured in the United States, are under European license, which naturally retards development in this country.

However, arrangements are now being made and contracts have been let for the conversion of 18 U. S. Shipping Board vessels from steam to the diesel engine under an amendment to the Merchant Marine Act providing a fund of twenty-five million dollars for this purpose. In addition, twenty-five million dollars will be set aside annually for a five year period to assist individuals and private shippers interested in the construction of new vessels designed for diesel propulsion.

Despite the fact that this engine originated in Europe, America is credited with the adaption of the diesel engine to electric drive which has brought about the development of the oil electric locomotive, of which four are in operation; and if service performance equals the demonstrations, many steam locomotives will be replaced. The electric drive used in this locomotive protects the engine from the strains and shocks that a steam engine would have to contend with because of direct drive. More traction is also obtained with the oil electric locomotive as it is possible to deliver the exact amount of energy necessary to turn the driving wheels at the prescribed speed. With the oil electric locomotive, water towers as used by steam roads are unnecessary as are the many transmission lines and power plants of the present electric roads.

It is said that the oil electric locomotive can exert the same amount of effort as the steam locomotive at one third the operating cost.

Experiments are now being made in San Francisco with the diesel engine in the heavier type of motor truck. A 1915 Holt "75" tractor engine has been installed in a ten ton Fageol chassis. The magneto and spark plugs were removed and a pump and spray nozzel were installed and this truck with a five ton cargo covered the distance from Los Angeles to San Francisco at an average speed of ten miles per hour and consumed only thirty-seven gallons of stove oil, costing a little more than two dollars. Experiments of this type have been going on in Germany for a number of years and automobiles, motor trucks and even motorcycles have been equipped with the diesel engine. At the present time there are about 4000 motorcycles operating in Germany using a single cylinder diesel engine of about seven to nine h. p., and satisfactory tests have also been made on the diesel engine installed in the lighter-than-air airship.

Natural Petroleum Supply

Geologic Analysis with Special Reference to Practical Conservation

*By C. R. McCollom, Chief Geologist

THE very rapid development of the petroleum industry has called for an equally rapid development of applied engineering to oil production. The general problems of oil finding will no doubt be discussed by other speakers and I will confine my remarks to the applied geologic and engineering principles to the known fields as exemplified by the past year's experience with the gas lift by the company whom I serve.

The State of California has a total area of approximately 101,310,000 acres, of which we have a known producing area of approximately 63,000 acres, and an undeveloped but proved additional 63,000 acres, making a total of 126,000 acres of known oil land. Of the remainder there is still approximately 30,700,000 acres in which oil fields may be found, but of which only a very small percentage may prove to be economically productive.

The figures quoted suggest that there will no doubt be found, at sometime in the future, virgin territory now undiscovered which will increase the potential reserve for that State. In the meantime, if we can be assured that of the known production we can economically procure a larger recovery, we will, no doubt, as an industry preserve these new areas for later exploitation if the amount recovered from known areas can meet the demand.

Sometime in October, 1924, the Los Angeles Chamber of Mines and Oil gave a luncheon at the Alexandria Hotel, at which time there were several five minute talks presented. With a great deal of temerity the writer suggested that with the tremendous amount of money that was being expended by the industry in search of new fields, he thought a reasonable amount of money might be well diverted from this channel towards investigation of better methods of recovery and utilization of the known oil. He is glad to report at this time the results of such an expenditure by his own company in California, the production details of which were presented yesterday afternon at this meeting by Mr. F. F. Hill, Manager of Field Operations for the Union Oil Company of California.

On the basis of the results of producing in excess of 2,200,000 barrels of oil by gas lift for the period June, 1925, to June, 1926, and comparing the actual amount of oil and casinghead gasoline recovered, it is found that the amount of oil mined by this new method has increased 124% over and above that which we estimate would have been recovered from the same wells, based upon normal decline curves, had they been produced by the ordinary flowing and pumping methods. In addition to this it was shown that the gas-oil ratio was reduced 33% and due to the increased amount of oil obtained, the production of casinghead gasoline was increased 183%.

The above quoted figures indicate an actual experience on selected wells in flush and partially depleted territory, and no prediction can be made that the percentages indicate what the gas lift will do when applied elsewhere.

The average gas-oil ratio by old practice was 1843 cubic feet per barrel, and by gas lift 1209 cubic feet per barrel.

Conservation in its true definition has been materially aided by these activities within the industry itself, and the writer has no doubt but that we are seeing only the beginning of such practical methods of conservation. The industry, through its company research staffs and its A. P. I.

*Delivered at the Seventh Annual Meeting of the American Petroleum Institute, Tulsa, Oklahoma, from original data prepared by R. E. Haylett, D. B. Myers, F. W. Lake, A. C. Rubel, R. W. Garman and W. L. Stewart, Jr., of the Union Oil Company of California.

and A. A. P. G. committees, has suggested and will continue to suggest, problems that will be worked up, the results of which will culminate in additional practical conservation movements.

In order to determine whether or not the increased production, both in oil and gasoline, can be in fact credited to increase in ultimate yield, a very detailed study of the entire problem was inaugurated which included the services of the Production, Research and Development, Gas and Geological Divisions. The concerted opinion was that at least 50% of the increased production could be credited as an increase in ultimate yield.

The theory that oil is moved through the producing formation to the well by the expansive force of a dissolved gas, and that in the case of the flowing well that same force is used in lifting the fluid from the lower portion of the well to the surface, is generally accepted by men familiar with oil production. At a comparatively early time in the life of an ordinary well, the amount of gas in the formation declines to a point where it does not exert sufficient force to lift the fluid to the surface, and some mechanical means must therefore be employed. If, in the flowing life of the well, there be an excess amount of gas and this excess gas be retained in the formation, it can later be used for moving and lifting additional oil, with a greater ultimate yield per well. Laboratory tests on a particular oil show that 344 cubic feet of gas can be dissolved in one barrel of oil at 1800 lbs. per square inch. Under ordinary flowing conditions for this particular type oil in its particular field, approximately 2400 cubic feet of gas was produced per barrel of oil at 1500 lbs. rock pressure, which is over six times the amount of gas dissolved in one barrel of oil. Therefore, it follows that for each barrel of oil lifted by this method there were five barrels of oil left in the formation robbed of the activating force of this gas. This resulted in five barrels of "dead" oil remaining in the formation which (theoretically) could not be recovered by ordinary pumping methods. Decreasing the gas-oil ratio increases the ultimate recovery of oil, and, therefore, this ratio becomes an index of the efficiency of recovery. Under the same pressure conditions, the closer the gas-oil ratio approaches the gas solubility factor, the closer the ideal production conditions are obtained for 100% recovery, giving due consideration, however, to the possibility that encroachment of edge water effects a possible natural water drive which might reclaim some of the "dead" oil.

Using the gas-oil ratio data for pumping and gas lift wells during the past year in Southern California, there is afforded a direct comparison showing the estimated percentage recovery by these methods, and also the expected increase of recoverable oil from the original oil in the formation that would not have been recovered by the pumping method. On the basis of this comparison, it is found that 23% of the total oil in the sands was recoverable by the pumping method and 33% by the gas lift method, a net gain of 10% of the total recoverable amount of oil, or an increase of 43% over the original calculated ultimate production of the pumping well. An analysis of these data suggests that by the use of the gas lift we have accomplished two prime purposes, first, a saving in the number of cubic feet of gas per barrel of oil lifted, and, second, a conservation of gas in the sand to help activate the oil remaining in the formation.

In addition to the application of these principles to the area to which we have ordinary flowing and pumping problems, it was found that in at least three cases wells which were ready for abandonment were salvaged because of the fact that the mechanical condition of those wells made it impossible to produce them by pumping methods without the necessity of spending an amount of money which would make it a non-commercial venture. The three cases cited indicate a practical conservation of the amount of oil recovered by the use of gas lift in that it was found possible to introduce small tubing in these wells and flow them by this method with the result that over a four months' period these wells produced 21,000 barrels of oil.

An important question concerning the gas lift process is one having to do with the quality of the oil produced by such

The Patent Policy Plan

IN ORDER to stimulate and assist inventive genius and to provide still another means for unifying and promoting the interests of both company and employees, Union Oil Company of California has adopted a uniform policy respecting patentable inventions. Under the provisions of this new Patent Policy Plan the company will enter into an agreement with the employee to prosecute for patent such useful inventions as he may make, and handle the patents with suitable awards for the mutual advantage of both.

The administration of the Plan will be in the hands of three members of the Executive Committee. These administrators will appoint a working committee of competent experts to prepare and present all data in each case for final consideration and award.

The employee member will assign to the company his entire right in any invention which he has conceived, and at the expense of the company, will assist in every way to accomplish letters of patent. The term invention embraces any device, apparatus, method, process or improvement relating to the business of the company.

A description of each invention must be submitted to the administrators as soon as conceived. The administrators will then solicit the written opinions of departmental heads and other interested parties regarding the value of the invention. Should the administrators decide that the disclosure is useful in the company's business, and is patentable, the company will proceed to file patent applications. In the case of a rejection, the disclosure is returned to the employee with properly executed release from the agreement.

Upon the acceptance of the disclosure and execution of the patent application and assignment, the employee will be paid a primary award of one hundred dollars. If the invention is licensed, additional compensation to the employee will be based on income from licensees, and will be half the net profits so derived. If the patent is sold outright, the employee receives half the net profits resulting from the sale.

No compensation other than the primary award of one hundred dollars will be payable to the employee for the use of the invention by the company unless greatly increased profits are enjoyed as a direct result, in which case the administrators, with the approval of the Board of Directors, may award additional compensation.

Employees are now being asked to sign the agreement with the company respecting this plan. Although this agreement will be a condition of employment in the future, is optional with present employees, but it is hoped that all present employees will recognize the liberal terms of the plan and will join with the administrative and operating officials who are entering into the agreement.

The plan is exceptionally advantageous to the employee, and all are urged to give serious consideration to the benefits that will accrue to them thereunder, and to use his own particular ability in thinking of the company's activities, so as to promote the maximum of efficient scientific achievement.

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methods as compared to the quality of the oil from the same well as produced by the ordinary methods of flowing and pumping. As a result of the data available it has been found that comparative samples taken before and after gas lift shows 9 wells with oil gravity lower and 9 with gravity higher, after the introduction of the gas lift, the average of all showing C.23 A. P. I. higher after the introduction of the gas lift. This indicates that the quality of the oil produced and run from the field tanks under the gas lift method of production is at least as good as it was under the pumping system. Under certain conditions there is undoubtedly an excess stripping of the oil by the gas. One test indicated a reduction of 1.3 gravity A. P. I. in the oil and a reduction of 4% in the 54% gravity gasoline content, which, however, was recovered in the treatment of the gas in the absorption plant.

Sports

BASKETBALL

The "Aristos" are maintaining their fast pace in the Los Angeles Petroleum Athletic Association League having won five out of the six games played, sharing first honors with General Petroleum.

One game remains to be played in the first half of the season's schedule, the winners of which will play the winners of the second half, ending February 17, for the league championship. Needless to say, the Union quintet is determined to be in the final play-off.

BOWLING

On November 30 the Los Angeles district bowlers completed the first half of league competition with the Engineering Bears, Manufacturing and Traffic Department Teams in a three-corned tie for first-place.

Individual averages of bowlers this year are considerably better than other years. The improvement shown is a great pleasure to themselves and their friends.

The company entry in the Major League of the Petroleum Athletic Association is now in sixth place with 17 points won and 15 lost. Off to a disastrous start by losing six of the first eight points played for, they have developed into a well balanced team able to hold their own with any team in the league.

TENNIS

The eighth annual tennis tournament was held at the Los Angeles Tennis Club on the afternoon of November 21, 27 and December 5. The president's cup for men's singles went to R. H. Hornidge for the second time, Mr. Hornidge having won it seven years ago.

A dinner dance was held on the evening of November 27 in the attractive rooms of the Club House, which was attended and enjoyed by many besides the participants in the tournament. W. L. Stewart, Jr. made a short speech and presented the trophy to the winner.

The winner of the ladies' singles for the handsome trophy presented by the Land & Geological Dept. was Miss Consuelo Willard, who with her partner, Desaix B. Meyers, also won the mixed doubles, defeating Miss Conklin and R. H. Hornidge.

The men's doubles was won by Gerald G. Blue and R. H. Hornidge, who defeated Ray Ingram and R. Gillies in the finals.

GOLF

Below is the result of the draw for entrants in the Head Office district for the first Union Oil Company Golf Tournament:

Championship Flight

L. I. Messinger	vs.	A. W. Anderson
J. B. Arthur	"	R. W. Martin
J. G. Mackie	"	C. F. Lienesch
C. R. Erb	"	E. Bouteiller
A. W. Koerber	"	C. S. Morgan
T. J. Collins	"	C. W. Fritz
J. B. Parks	"	D. F. Black
E. S. Fuller	"	H. C. Ferry
E. V. Manico	"	W. L. Stewart
E. G. Ragatz	"	R. L. Poer
C. R. McCollum	"	R. D. Reinke
R. D. Matthews	"	G. G. Blue
W. L. Stewart, Jr.	vs.	R. H. Hornidge
W. L. Standard	"	L. Wolff
R. E. Haylett	"	M. F. Robertson
John McPeak	"	J. T. Howell

First Flight

R. E. Morrison	vs.	J. W. Ash
Earl B. Noble	"	H. H. Hannah
M. G. Hauser	"	F. R. Wallich
H. A. Lapham	"	W. S. Grant
Spencer Britton	"	H. H. Tobey
D. T. Forbes	"	Gordon McKelvie
J. F. Simpson	"	W. J. Kelly
R. L. Bryant	"	C. S. McKeever
F. D. Fisher	"	L. G. Metcalf
H. O. Crawford	"	T. L. Fleming
A. B. Mason	"	R. G. Dickson
W. Comstock	"	A. E. Willman
D. T. Forbes	"	E. W. Crell
W. D. Sellars	"	J. M. Stirrett
A. S. Quackenboss	"	R. O. Jones
M. Ruedy	"	J. C. Clifton

L. I. Messinger won low gross in the qualifying rounds with a score of 237. J. T. Howell was second with 253. One player for each 16 contestants will qualify to play for the President's Cup.

Santa Fe Springs District

Ray C. Ingram, who is captaining this district, advises the following entries:

K. C. M. Anderson	F. L. Jennings
Stanley Clarke	J. D. McClocklin
A. J. Brunner	T. E. Purress
Ronald D. Gibbs	P. J. Schmitz

Stanley Clarke tops this list with a gross score of 257 for the 54 holes, closely followed by Ronald Gibbs, who was nosed out by one stroke.

(Continued on Page 22.)

UNION GOLFERS DEFEAT PAN-AMERICAN

The Los Angeles District golf team met and defeated an aggregation of brassie wielders from the Pan-American Petroleum Company at Palos Verdes, November 14, with a score of 36 to 10. Arrangements for a return match are now under way, acording to G. G. Blue.

At Palos Verdes—Left to right: W. L. Stewart, Jr., G. G. Blue of the Union Oil Company and John C. Black and A. McNabb, of the Pan-American Petroleum Co.

J. M. DOUGLAS APPOINTED VENEZUELAN MANAGER

James M. Douglas, geologist in charge of the Rocky Mountain territory in Colorado and Wyoming, has been appointed Venezuelan manager of the Union National Petroleum Company, and will sail for the South American Republic the first of the year.

Mr. Douglas is an experienced oil operator, having been born in Bradley, Monterey County, California, and worked in the Santa Maria and Midway fields even before entering college. Following the completion of his course in geology at the University of California, he went to Casper, Wyoming, where he pursued geological work until 1917. That year he joined the air service of the American army. After the armistice he followed his profession independently in the Middle Western regions until December 1921, when he became associated with the Union Oil Company.

The Union National Petroleum Company is the operating company formed by Union Oil Company and Pantepec Oil Company of Venezuela to develop approximately 900,000 acres of Pantepec's potential oil properties. The development work will be started early in 1927.

SALES MEETING AT WOODLAND

An enjoyable and instructive meeting was held at Woodland, November 16th, when agents, assistant agents, tank truck salesmen and service station operators from Woodland, Vacaville, Dixon, Arbuckle and Knights Landing gathered to receive a message from S. D. Herkner, Manager Central Division.

An excellent duck dinner was served at the Palace Grill through the generosity of Agent R. J. McCann of Dixon, whose good aim was responsible for the ducks, and his mother, who prepared the birds for the cook.

After dinner the boys listened to talks by Mr. Herkner, L. H. Fish, District Sales Manager, M. B. Webber, Assistant District Sales Manager; and C. H. Mann, District Credit Manager, all of the Sacramento office.

UNION MEN HONORED BY W. A. A.

At the recent election of officers, Francis P. Smith, Asphalt Engineer, was made treasurer of the newly organized Western Asphalt Association.

The association was organized by leading oil companies and large asphalt paving concerns in Southern California for the purpose of promoting the use of asphalt.

In addition to the election of Mr. Smith as treasurer of the new association the directorate includes J. B. Arthur, Manager of Fuel Oil Sales.

NEW PRODUCTION

Eight new wells were brought in by the company during November, with an aggregate initial daily yield of approximately 5,139 barrels.

Stearns No. 67 in Brea Canyon was brought in with 2,000 barrels a day. Montebello contributed 877 barrels a day from La Merced No. 28. The Dominguez field was represented by two wells, Callender No. 3 with 415 barrels and Hellman No. 3 with 310 barrels daily. Boss No. 2 in the Valley came in producing 120 barrels daily. Yockey No. 1, a 1,000-barrel producer, was brought in in Colorado. Coyle No. 6 with 75 barrels, Coyle No. 7 with 56 barrels and Towell No. 2 with 286 barrels, all in the Richfield area, completed the list.

SALESMANSHIP!

Following is the text of a letter received last month by R. J. Kenmuir, District Sales Manager at Vancouver, B. C. This is the sort of thing we like to hear about our service station operators. Gentlemen:

I wish to express appreciation for the service rendered me by two of your men.

When nearing your station S. E. corner Granville and Pacific at 9 o'clock last night, I got a puncture, and pulled my car into a light by one of your air hoses. It was raining heavily. Your men came out and invited me to drive in under shelter. They then found me an extra jack and changed my wheel without my touching it, and at no little trouble to themselves.

This kindness extended to one who was not a customer and with no proffered remuneration has made me feel much indebted to your company.

Very truly yours,
(Sgd.) J. H. HEMSWORTH.
Beaton & Hemsworth Logging Co., Ltd.
Vancouver, B. C.

P. S. I learn that the names of these young men are Tough and Jones.

UNION PRODUCTS FEATURED IN ENDURANCE RUN

Chained to the steering post of a stock Jewett touring car supplied by M. R. Lampman, Spokane representative of the Paige-Jewett Company, E.

Steele, well known endurance driver, recently staged an endurance run that lasted four days and three nights. Union Non-detonating Gasoline and Aristo Motor Oil were used exclusively during the 1500 mile test.

SALESMEN CONVENE AT EUREKA

A dinner and get-to-gether meeting was enjoyed last month at the Eureka Inn, Eureka, by a large number of employees of the Eureka and Fortuna sales territory. The feature of the session was several interesting talks on salesmanship delivered by S. D. Herkner, Manager Central Division, A. R. Atwood, District Sales Manager at San Francisco and W. F. Lewis, Asst. District Sales Manager, San Francisco.

OCTOBER CRUDE PRODUCTION

The total production of crude oil in California for October amounted to 18,966,058 barrels, an average of 611,808 barrels per day. This is an increase of 8,310 barrels per day over September production.

Total stocks of crude and all products in Pacific Coast territory increased during the month 359,618 barrels. The total stocks at the end of the month were 144,986,347 barrels. The total stock decrease for 1926, up to October 31st, was 12,329,962 barrels.

Seventy-three wells were completed during the month with an initial daily production of 50,986 barrels, compared with 58 wells completed during September with an initial production of 26,832 barrels.

Complete details of production and development by fields for August will be found on page 23.

THIS MONTH'S COVER

By the use of vivid color and bold strokes of the brush and knife, Artist T. H. McKay has painted a cover especially for this issue of the Bulletin that conveys the spirit of the Yuletide in an unusual but effective manner. It is this ability to vary the technique without lowering the standard of art that has helped to make Mr. McKay's work so popular among Bulletin readers.

UNION OF CANADA DIRECTOR SUCCUMBS

C. Gardner Johnston, a director of the Union Oil Company of Canada, Ltd., died at his home in Vancouver, B. C., November 22.

Mr. Johnston had been a director of the Canadian company since its inception in 1921, and had been active in its organization. For many years he was engaged in the steamship brokerage business in Vancouver, and was one of that city's most prominent business men.

You've got to hand it to the fellow who snaps his fingers at Tough Luck and grins his way through Adversity - The World loves that kind of a Winner

MISFORTUNE tests the MAKINGS of a WINNER

There are my sentiments! Bill Jones

Participants in the golf tournament between Union Oil Company and Pan-American Petroleum Company at Palos Verdes.

DELEGATES TO A. P. I. CONVENTION

Among those from Los Angeles who attended the American Petroleum Institute meeting at Tulsa, Oklahoma, December 7, 8 and 9, were the following representatives from Union Oil Company:

E. W. Clark, Executive Vice-President
L. P. St Clair, Vice-President
R. E. Haylett, Technical Assistant
Ralph J. Reed, Chief Engineer
F. F. Hill, Manager Field Operations
W. L. Stewart, Jr., Secretary, Manufacturing Committee
A. G. Page, Manager of Refineries
R. W. Garman, Mgr. Natural Gasoline and Gas Operations
J. D. Rearden, Traffic Manager
Geo. H. Forster, Assistant Comptroller
W. A. Raine, Mgr. Research and Development
T. F. Ott, Lubricating Technologist

WINS WITH UNION ETHYL

Winning four first and two seconds—1000 points—in the six heats, Spitfire VI, the little clipper hydroplane owned by J. H. Rand, Jr., won the National Motor Boat Championship held in San Diego Bay December 12, using Union Ethyl Gasoline as fuel.

And the famous $6,000 Elgin Trophy for the fastest time made was won by Spitfire V, also using Union Ethyl. Spitfire V set a new world's record of 47.05 miles per hour—made possible by the Union Ethyl used in its motor.

UNION ETHYL MAKES BIG HIT

While the average motorist was placing his stamp of approval on Union Ethyl Gasoline, the George W. Retzer Jr. Ford Agency of Los Angeles undertook a unique test using Union Ethyl as fuel. This test was a seven-day non-stop run, using a stock Ford car with the hood sealed and the self-starter removed. One hundred and thirty gallons of Union Ethyl were consumed in covering 3,110 miles, with an average of 24 miles to the gallon. This remarkable record demonstrated the economic advantages of the new super-fuel in addition to its other desirable features.

Another test has just been concluded by the Pickwick Stages, the largest company of its kind on the Pacific Coast. This concern operates a fleet of stages from San Diego to the Canadian border. This particular test was made with one of their thirty-three passenger busses on the run from Los Angeles to San Diego and return.

The results of the test showed that not only was less fuel consumed in making the trip, but it required less gear shifting. The steepest grades were negotiated in high and second, where with ordinary gasoline it would have been necessary to have used second and third. There was no knocking on the hills or labored pulling by the engine.

Chas. H. Wren, President of the Pickwick Stages, Inc., classified the test as a most remarkable one, and stated that as a result of it, his company had decided to use Union Ethyl, which he characterized as a gasoline giant.

MUSIC CLUB GIVES INITIAL PERFORMANCE

The Union Oil Company Vocal, Orchestral and Dramatic Club made its debut Monday evening, December 13, at the States Societies Club, Los Angeles, before a large audience of employees and their friends. The program consisted exclusively of Union Oil talent in the Los Angeles district.

With the ever amiable Judge Cooney stationed at the "mike" as master of ceremonies, fourteen numbers were presented, ranging from syncopation to the most soulful of classical arias. Each number drew generous rounds of applause, and all who attended are convinced that when it comes to real entertainment, to quote the Judge "Union Oil is champion."

Gerald G. Blue, sponsor of the Club, and J. F. Simpson, who arranged the program, are deserving of much praise for their efforts in staging such a creditable performance.

We understand this has created a feeling of friendly rivalry in other districts, as we hear rumors that Santa Fe Springs is planning an entertainment to be staged at Whittier probably in January.

SPORTS

(Continued from Page 19.)

Ocean District

Captain C. A. De France announces the following list of entrants in his district:

Jos. L. Fuller	Clarence Quick
E. C. Critchlow	A. J. Buttrell
E. V. Jones	H. E. Aston
John Douglass	C. A. De France

J. M. O'Leary

The results of the qualifying scores gives low gross to E. V. Jones, followed by J. M. O'Leary.

Orange District

Captain H. C. Yarbrough has turned in the following entries from the Orange district:

A. H. Brown	E. Prehoda
Earl Fields	Howard Robinson
John Potts	H. C. Yarbrough

Milton Varner

Sacramento District

The following entries have been received from H. Mann, captain of the Sacramento team. The list is lead by S. D. Herkner with W. G. Matheson in second place.

S. D. Herkner	E. E. McCormick
W. A. Day	C. H. Mann
J. S. Hall	L. E. Mines
W. L. Smiley	L. W. Rackerby
J. R. Phillips	L. H. Fish
N. C. Warner	O. D. House
J. K. Young	S. Myer

W. G. Matheson

We don't know where the President's Cup will make its home for 1927, but on looking over the list of entrants, we notice the names of S. D. Herkner, Sacramento, Stanley Clarke, Santa Fe Springs, Jack Fraser of Vancouver and other experienced players which will make it a tight race for the final honors.

FRASER SHOWS RARE FORM

Jack Fraser, with the Union Oil Company of Canada, Ltd., in Vancouver recently startled the golfing fraternity in the far north by negotiating the sporty Shaughnessy Heights club course in two strokes below par, setting a new amateur record for the course of 70.

Mr. Fraser's feat was all the more remarkable when it is considered that he had been out of the game for the past five months while on a business trip to Alaska.

California Oil Statistics, October, 1926

PRODUCTION

(Figures of production and stocks are in barrels of 43 Gals.)

DISTRICT	BARRELS PER MONTH	DAILY AVERAGE Oct. 1926	Sept. 1926	Oct. 1925
Kern River	384,117	12,391	11,612	12,421
McKittrick	164,723	5,314	5,374	5,614
Midway-Sunset	2,894,150	93,360	94,188	100,239
Elk Hills	1,060,685	34,216	34,710	27,043
Lost Hills-Belridge	150,785	4,864	4,810	4,569
Coalinga	611,354	19,721	19,411	19,546
Wheeler Ridge	33,355	1,076	1,041	1,018
Watsonville	1,783	58	58	58
Santa Maria	155,006	5,000	4,982	6,547
Summerland	4,033	130	129	129
Ventura Avenue	1,564,794	50,474	47,952	26,433
Ventura-Newhall	195,955	6,321	6,062	5,875
Los Angeles-Salt Lake	58,964	1,902	1,904	1,961
Whittier	62,767	2,025	1,975	2,034
Fullerton	683,340	22,043	20,059	13,312
Coyote	502,686	16,216	16,482	18,155
Santa Fe Springs	1,425,403	45,981	47,280	53,479
Montebello	540,278	17,428	17,803	19,225
Richfield	539,704	17,410	18,027	12,735
Huntington Beach	1,681,216	54,233	45,194	44,881
Long Beach	2,963,049	95,582	97,084	104,331
Torrance	823,950	26,579	26,984	32,401
Dominguez	682,413	22,013	22,382	27,665
Rosecrans	443,307	14,300	13,602	25,437
Inglewood	1,278,910	41,255	42,523	80,468
Newport	5,367	173	109	71
Seal Beach	53,964	1,741	1,762	.....
TOTAL	18,966,058	611,808	603,498	645,648
September	18,104,954	603,498		
Increase	861,104	8,310		

STOCKS

	Oct. 31, 1926	Sept. 30, 1926	Oil Stock Increases	Oct. 31, 1925
Heavy Crude, heavier than 20° A.P.I., including all grades of fuel	88,588,410	88,572,233	*16,177	84,455,136
Refinable Crude, 20° A.P.I., and lighter	30,323,321	30,308,093	15,228	43,381,862
Gasoline	10,614,073	10,545,392	68,681	9,935,079
Naphtha Distillates	4,120,222	4,281,018	*160,796	6,478,634
All Other Stocks	11,340,321	10,919,993	420,328	9,918,761
TOTAL ALL STOCKS	144,986,347	144,626,729	359,618	154,169,472

*Decrease.

DEVELOPMENT

DISTRICT	New Rigs Up	Active Drilling	Completed	Daily Initial Output	Active Producing	Abandoned Wells Drillers	Producers
Kern River	4	14	5	1,035	1,330	4	....
McKittrick	1	7	....	.....	307	....	....
Midway-Sunset	12	39	15	1,491	2,988	5	1
Elk Hills	....	....	....	.....	251	....	2
Lost Hills-Belridge	....	1	1	35	317	....	....
Coalinga	2	6	....	.....	963	....	2
Wheeler Ridge	....	1	1	185	27	....	....
Watsonville	....	....	....	.....	6	....	....
Santa Maria	....	4	....	.....	224	1	....
Summerland	....	....	....	.....	135	....	....
Ventura Avenue	1	32	3	7,220	69	1	....
Ventura-Newhall	10	35	4	455	519	2	....
Los Angeles-Salt Lake	....	....	....	.....	376	....	....
Whittier	....	5	....	.....	192	....	....
Fullerton	....	10	3	2,350	439	1	....
Coyote	....	1	....	.....	214	....	1
Santa Fe Springs	3	3	1	180	338	1	....
Montebello	1	6	1	125	184	....	....
Richfield	7	22	1	100	194	1	....
Huntington Beach	50	89	27	31,983	397	3	....
Long Beach	6	24	2	1,426	744	....	10
Torrance	....	3	2	233	657	....	....
Dominguez	2	2	....	.....	75	....	....
Rosecrans	1	3	5	3,849	137	1	1
Inglewood	1	1	2	319	203	....	1
Seal Beach	4	5	....	.....	1	2	....
Newport	....	2	....	.....	9	....	....
Miscellaneous Drilling	3	127	....	.....	.....	4	....
October	108	442	73	50,986	11,296	26	18
September	127	445	58	26,832	11,254	27	11
Increase	19*	3*	15	24,154	42	1*	7
Average for Year 1925	105	417	79	42,247	11,393	28	12
Average for Year 1924	103	510	103	42,412	10,903	28	21
Average for Year 1923	111	759	82	114,690	8,928	24	
Average for Year 1922	115	605	67	43,700	9,410	17	
Average for Year 1921	90	536	57	15,631	9,425	14	

*Decrease

Refined and Crude

"I am a woman of few words," announced the haughty mistress to the new maid. "If I beckon with my finger, that means 'come.'"

"Suits me," replied the girl, cheerfully. "I'm a woman of few words, too. If I shake me head, that means 'I ain't comin.'"

* * *

"Go 'head, Ezry, it's your move."

"Durn it, wot's the rush. I haven't got rested from movin' that other checker yit."

* * *

Lady—Isn't it wonderful how a single policeman can dam the flow of the traffic?

Boy—Yes, grannie; but you should hear the 'bus drivers!

* * *

"Lots of pretty girls in Los Angeles?"

"Yes—but I never see them."

"What's your line?"

"I run a beauty shop."

* * *

Host (grandly): "Yes, there's no doubt that the radio has come to stay. . . . What is it, Hortense?"

Hortense: "It's a collector, sir. He says if you don't pay up the installments, he'll have to take your radio set back."

* * *

Junkman (at back door): Any old junk you want to get rid of, lady?

Lady: Yes, come in; my husband will be here in a minute.

* * *

There's a place in the sun for every man if only he will have faith that it exists and take the trouble to find it. Start looking now.

He (waiting in restaurant for order): "Where is that chicken I ordered an hour ago?"

Waitress: "Well, the cook hasn't killed it yet, but he has gotten in a couple of nasty blows."

* * *

It was a soiree musical. A singer had just finished "My Old Kentucky Home." The hostess, seeing one of her guests weeping in a remote corner, went to him and inquired in a sympathetic voice: Are you a Kentuckian?"

And the answer came quickly: "No, madam, I am a musician."

* * *

"Darling, you are the most beautiful woman in the world."

"Oh, Harold, how quick you are at noticing things!"

* * *

We are all manufacturers—making good, making trouble or making excuses.

* * *

A tourist stopped for a drink at a lonely cabin in the Tennessee mountains. He noticed four holes in the door.

"I don't like to be inquisitive," he remarked, "but what are those holes for?"

"We got four cats," said the mountaineer.

"Why wouldn't one hole be sufficient?"

"Stranger," said the mountaineer, "When I say Scat, I mean SCAT!"

* * *

"August," asked the three hundred pound wrestler, with his opponent's head nestling gently but firmly on his manly bosom, "has any one ever spoken to you about Listerine?"

MORE THAN nineteen
hundred years ago the very stars did halt
in their courses through the heavens, to
acclaim the birth of a new brotherhood
upon the earth ~ And once at least in
each year since do men take pause in
their affairs....as we do now ~ To see
their fellow-creatures shining in their
true but unaccustomed light ~ While
songs ascend and hearts o'erflow with
the Divine and ancient heritage, the
spirit of good will to all men.

Union Oil Company
of California

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