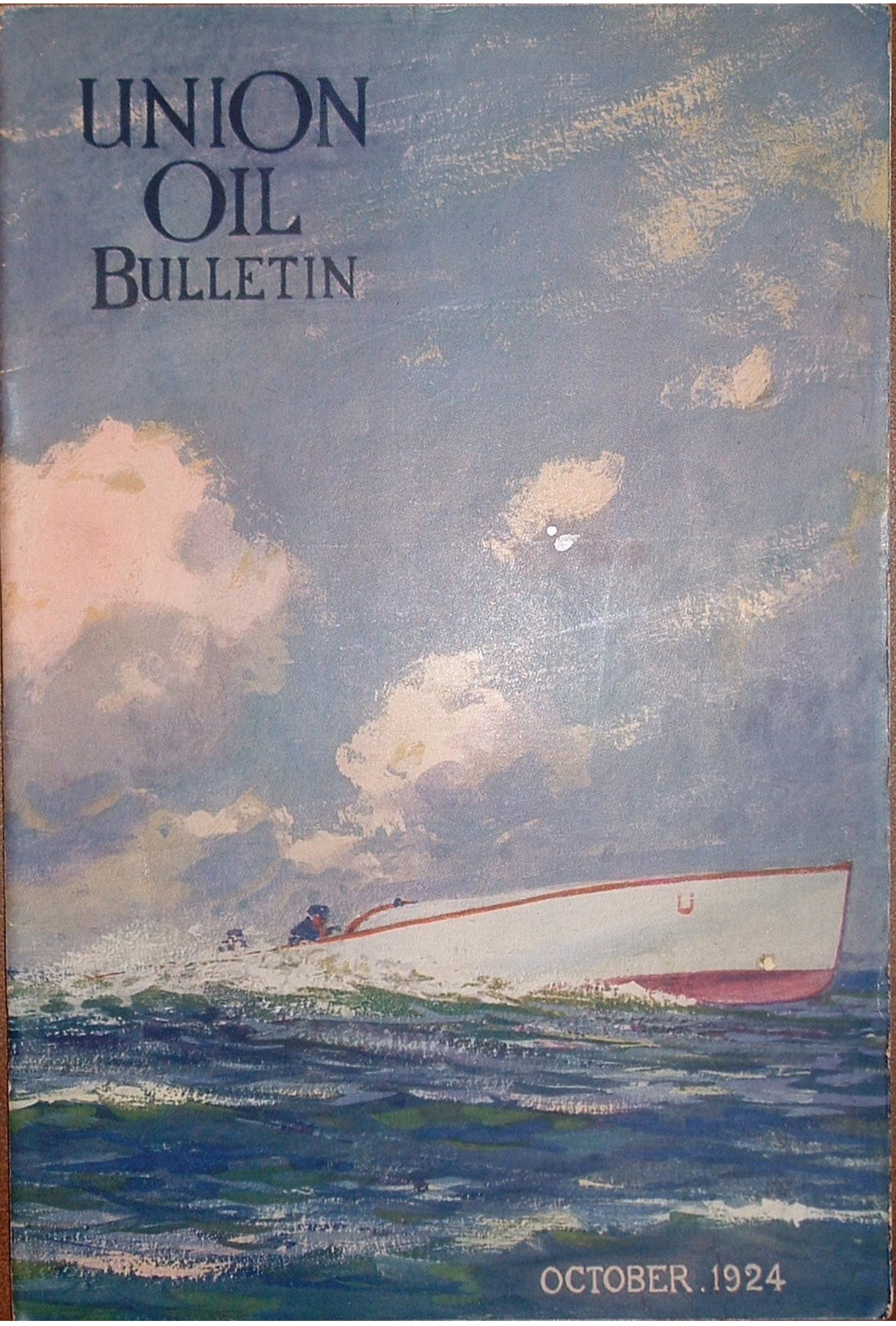
UNION OIL BULLETIN



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Union Gasoline has the quality of non-detonation which means the elimination of "knocking" on hills, and in slow, heavy pulls, quicker acceleration, and a smoother, more vibrationless speed.

Union Gasoline is assurance of all these qualities, so it is worth while to say "Union" when you buy.

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Union Oil Company of California

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Union Oil Company of California

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Keeping Faith With the Motorist

By C. W. RALPH
Director of Sales and Transportation

THE average motorist gives little thought to the matter of producing the crude from which motor fuel is made.

He knows perhaps that not all oil wells drilled are producers; he may know in a general way that it requires considerable capital to develop new territory; but it is doubtful if he fully appreciates the initiative and courage of the oil pioneer, or the demands the petroleum industry has made on new capital in order to keep abreast of the rapidly expanding consumption.

In order to fully appreciate what the industry has accomplished during the past decade in meeting the demands of the motorist, let us glance backward to the opening of the year 1914. At that time the visionary might have dared to predict that great as the industry was then its sales of products would be doubled by the end of 1923. The producer, in turn, would have squelched the dreamer by stating a truism that sales could not exceed the barrels of crude produced and that he could see no possible way of increasing production to such an extent. He would have sought to prove this beyond peradventure by the aid of statistical reports, geological figures, maps and diagrams. The refiner, pipeliner and marine man would have held that the visionary was far too optimistic; the auto expert, who fondly believed that there was an automobile longing in the hearts of enough people to bring about an increase of ten per cent a year in consumption, would have underestimated. In each case the prognostications were far too conservative.

What happened? In 1913 domestic production was over 248,000,000 barrels. In 1923 it amounted to over 732,000,000 barrels. Statisticians report that in 1913 refiners in the United States consumed on an average approximately 573,000 barrels of crude daily, and that in 1923 the daily average was over a million and a half barrels, with a gasoline production for the

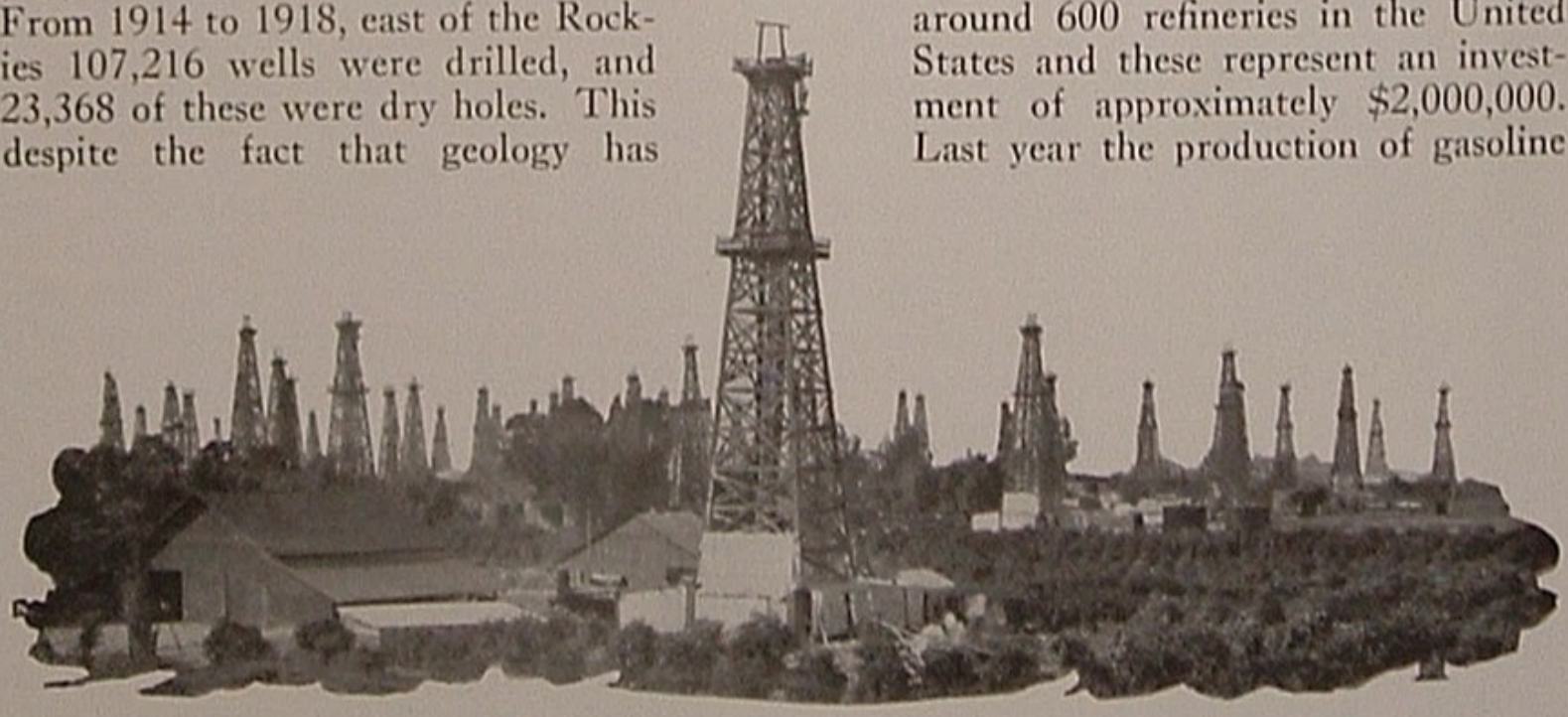
year of 7,500,000,000 gallons. In the period under review the registration of automobiles jumped from a million and a quarter to fifteen millions. These figures are impressive. Let us go further. In the last ten years the total investment in the oil industry has increased from slightly over $1,000,000, to over $8,000,000. But all this wealth of resource and the facilities which it has developed does not guarantee oil, which is the most fugitive and capricious of all minerals. Its illusiveness has made estimates, to say nothing of forecasts, a dangerous occupation.

In considering, then, the task of supplying power and lubrication to fifteen million motorists, a task which has taxed the financial strength and powers of the entire industry, it must be borne in mind that the oil industry had to meet the changing conditions as they arose. In the vital matter of reserves, these had to be built up in times of feast. With coal, iron and copper, the mine owner can block out his holdings so as to meet impending demand and supply. Not so with oil. Feast and famine usually alternate, and the look ahead is necessarily fraught with hazard.

Let us begin with the first problem—the potential crude supply. In seeking this new crude supply, entailing the test of virgin territory, the cost is high. The map of an oil field lies hidden deep below the surface of the earth. Occasionally a well is drilled a mile deep. It now costs from $40,000 to $100,000 to drill a well. From 1914 to 1918, east of the Rockies 107,216 wells were drilled, and 23,368 of these were dry holes. This despite the fact that geology has asserted its influence and that drilling was confined more closely to favorable geologic structures. During the next five years of the decade, with the almost universal utilization of an extensive nation-wide geologic study, and with the accumulated experience of all previous oil-finding efforts, 35,089 dry holes resulted out of a total of 130,205 wells drilled. Last year alone the loss to oil companies through dry holes was over $91,000,000.00. And this figure does not include the money paid for leases or other expenses other than the actual drilling costs of the wells. Nevertheless, the industry met every emergency as it arose. It is safe to say that since the first propelled gasoline car rolled out of the shop not an automobile anywhere in the United States has been laid up because there could not be obtained the necessary fuel.

Finding of the crude, however, is but the initial step in the struggle of the oil companies to meet the needs of the motorists. It may interest the reader to know, for instance, that if all the pipe lines that connect the producing areas with the refineries in the United States were placed on end, they would more than twice circle the earth.

Probably the development of the internal combustion engine and the resultant demand for motor fuels have accounted more than any other factor for the enormous increase in the output of gasoline and lubricating oils. There are today around 600 refineries in the United States and these represent an investment of approximately $2,000,000. Last year the production of gasoline



SECTION OF SANTA FE SPRINGS FIELD

One of the wonder oil fields in the history of the industry. Discovered by the Union Oil Company in 1921. The picture shows the Bell Lease on which the discovery well is located.

UNION OIL COMPANY'S LOS ANGELES REFINERY SEEN FROM THE AIR

In order to meet the demands of the motorists approximately two billion dollars have been invested by the petroleum industry in refineries. Last year American refineries produced 7,500,000,000 gallons of gasoline, in addition to other petroleum products.
The picture shows the location of the company's refinery in relation to the harbor.

was approximately 180 million barrels.

The modern oil refinery is a city of stills, agitators, sweat houses, power plants, machine shops, plant railroads, loading and unloading racks, storage tanks, all underlaid with innumerable pipe lines which bring the crude oil in some instances from the fields as far as 1,500 miles distant. The refinery must also provide crude oil storage. It must manufacture the refined products and then provide additional storage for these products.

Few motorists realize that the fuel that speeds them on their way represents an interesting evolution. They are apt to suppose that all that is necessary is to dump the crude into a big still which is heated up, and the result is the much needed gas.

In the early refineries the process was almost as simple as this, but that was before gasoline became a vital factor in refining. There was then no demand for this by-product, and it was either burned as waste or allowed to run into nearby creeks. But with the coming of the automobile and the resulting demand for gasoline, conditions were changed. The once despised gasoline became the principal product of the refineries and ways and means had to be devised to increase its extraction.

As a result of the readjustment in the use of petroleum by-products it was necessary not only to install better and larger equipment but to enlist the aid of scientific research to increase the efficiency in extraction of gasoline and at the same time to maintain a high standard for the product. In this connection the larger oil companies maintain research departments, where chemists and experts devote their entire labors toward improving the quality of the product by refining processes.

The earlier process and the one now most generally practiced is that of simple distillation. This method in itself, however, was insufficient to secure a gasoline recovery sufficient to satisfy the demand and there was developed the cracking process, which, in its simplest terms, means forcing out of the crude a larger quantity of gasoline through high heat and pressure. Where gasoline is the only objective, it is possible to produce as much as 75 barrels out of every 100 barrels of crude. A later development is the compression or absorption of gasoline vapors out of the gas that escapes from oil wells. This method produces casinghead or natural gasoline.

Gasoline is the monster pocket tickler. It reaches the pockets of fifteen million people, and the saturation point has not been reached. Four hundred and eighty-seven gallons of gasoline are used by each passenger car a year on an average. This means that without including truck requirements which increase the average, that about seven and a quarter billion gallons of gasoline must be placed by the oil industry at the pumps along the highways to supply just one year's motor travel.

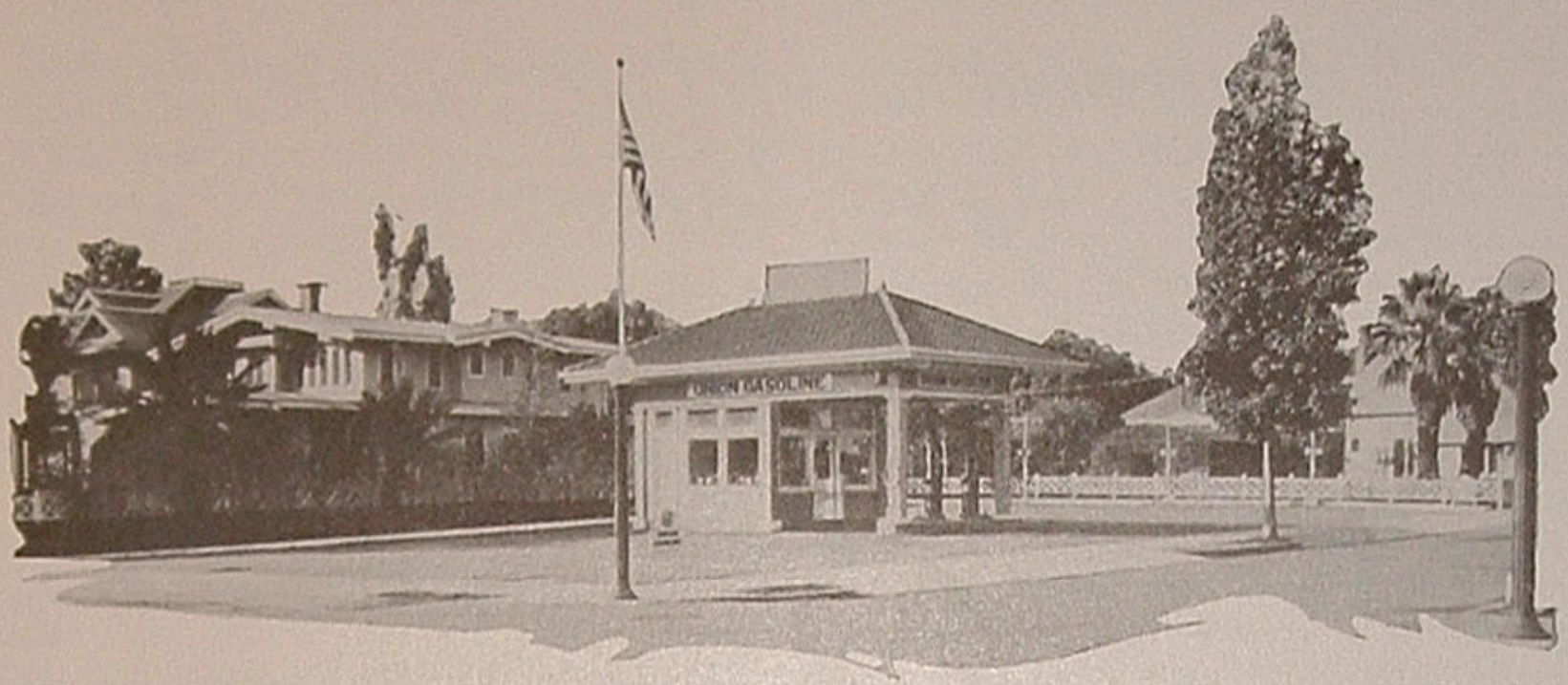
CONSTRUCTING A PIPE-LINE

There are over 60,000 miles of trunk lines in the United States transporting the crude from the fields to the refineries.

The bulk of the refined products is shipped by tank cars and steamers to the various distributing centers. There are about 134,000 tank cars and tankers of approximately 3,731,393 d. w. tonnage engaged in this service. The tankers are, for the most part, the property of the oil companies, as are the majority of the tank cars.

The outstanding development in the marketing field has been the increase in the number of places dispensing gasoline and motor oils. Ten years ago hardware stores and paint shops and garages were looked upon by us as the channels of supply. Motorists had to take thought of an adequate supply of fuel and lubricants before starting out on a trip. Today there are few points in the United States far removed from a modern self-measuring pump ready to serve gasoline, and in most sections there are many attractive filling stations devoted entirely to needs of the motorist.

Millions of dollars have been spent by



WHERE CONTACT WITH THE PUBLIC IS MAINTAINED

A typical company service station, where motorists receive their requirements of gasoline and oil. The gigantic industry as represented by the service station operator is little realized by the average motorist.

the oil industry in making petroleum products the easiest article in the world to buy. The oil companies proceeded on the basis that the primary and fundamental function of every industry is to give service. Earnings are necessary to permit business to continue permanently to give service, for which profit is the legitimate reward. In a fair appraisal of the petroleum industry, these principles are outstanding. Not only has it kept faith with the ever-increasing number of motorists in the matter of supplying the motive power but it has specialized in making marketing service attractive to the motorist. It is but a few years ago when refueling was by the can method, and of still more recent date by the curb pump. These have passed into the discard, and in their place has arisen the modern service station which embraces every convenience for the motorist. In the complacency of present-day conditions, which by virtue of usage have come to be regarded as inherent rights of the motorist, the fact is often lost sight of that these improvements, as represented in the filling station of today, were financed by the oil companies without the cost of gasoline being increased to the consumer. Nor was there any undue altruism in this, if we accept the theory that service cannot always flow in one direction. It was, rather, a sincere effort to meet changing social conditions which have advanced sharply during the past few years.

How many motorists would want to return to the curb-pump method of refueling? Such retrogression would be unthinkable and is never likely to occur, but the question is merely propounded to bring into sharp relief the facilities and conveniences of the present-day filling stations which have been provided by the oil companies. Many of these are more than simply places for the sale of gasoline and oil. They maintain stocks of accessories, grease racks, repair pits and car-washing equipment, while free air and water are an integral part of all filling stations operated by the larger marketing companies. In the Union Oil Company service stations rest rooms are standard equipment.

In performing the remarkable feat of increasing its entire investment from slightly over one billion dollars to over eight billions in the last decade, its annual gasoline production from forty-two million barrels to one hundred and eighty million and in increasing its refining, distributing and transportation facilities many, many fold, the petroleum industry has stood the acid test by meeting every demand made upon it by the motoring public.

Determination of Core Samples in Core Drilling

By ALBERT C. RUBEL
Resident Geologist Long Beach and Dominguez Fields

RECENT application of the core barrel to rotary drilling has led to its general use in all types of development where any doubt exists as to the character and position of the formations to be developed or prospected. Its use is essential to the prospector and it is a valuable and necessary guide to the operator even in the most closely drilled areas.

A perfect core would be an unbroken sample of formation whose total length equaled the amount of formation cut in taking the core, whose diameter was great enough to show the true lithologic character, texture and attitude of the formations penetrated, and whose characteristics were unaltered in any manner while taking the sample. From such a core it would be possible to determine accurately the character and economic importance of the formation cored, whether it be oil bearing or barren, the nature and attitude of the sands and shale bodies making up the formation, valuable fossil evidence, and many other points which would materially assist in the correlation or in the selection of suitable points for water shut-off or production.

Were it mechanically possible to take such cores consistently there would be little to say about the interpretation of the results, but since mechanical perfection has not yet been accomplished, the results of core drilling, while essential to the success of prospecting and development, are far from satisfactory.

Many cores not only fail to represent the formation from which they are taken but are so altered and contaminated by outside influences as to be misleading, creating false impressions from which serious and costly blunders may be made.

Once a core is taken it can not be retaken in the same interval and all evidence of that particular part of the formation must be determined from the sample as recovered.

In the first place it is seldom that the length of core recovered represents more than 75 per cent of the formation cut. Out of 186 runs with a standard make of core barrel operated by experienced core drillers, in a district which may be said to fairly represent the formations in all parts of the Los Angeles Basin, 181 cores were recovered. The average distance drilled by the barrel was 55.2 inches, and the average length of core recovered was 41.8 inches, or seventy-six per cent of the hole made. This figure is probably considerably above average operations as the drillers were in most cases coring continuously and were familiar with the characteristics of the formations and the machinery with which they were working.

If, for example, in a ten-foot run of the core barrel but two feet of shale are recovered, from what part of the ten feet does the shale come and what is the formation in the remaining eight feet? In the course of ordinary prospecting such a question would not be a serious one but in a field where but a relatively thin body of shale, from eight to ten feet, separates the oil sand from the water-bearing sands such a consideration assumes considerable importance.

The condition of the core barrel and the way in which drilling progressed give the best clue to the location of any given sample in the interval from which the core was taken. It has been the observation of the

CORE barrel sampling has been developed to the point where it is of material assistance in determining a suitable formation in which to cement casing to shut off water and to locate oil sands. Some of the problems dealing with core barrel sampling, the proper interpretation and determination of cores are set forth in this paper which Mr. Rubel read before a recent meeting of the American Institute of Mining and Metallurgical Engineers (Southern California Section).

writer, confirmed by the opinion of core drillers and those who are in a position to watch such operations, that if a very hard shell or a hard sand is encountered at any point in the core, so that the cutters are ground down, usually little is to be gained by attempting to recover more core. If, for example, a ten-foot run is made and the first two feet show shale with a hard shell on bottom and the rest is missing, it is likely that the remainder of the interval was a soft shale or a sand which could not exert enough pressure on the shell to force it into the barrel and was consequently washed away and lost. It requires considerable pressure to overcome the friction of the core with the walls of the inner barrel, as evidenced by the difficulty in removing the core from the barrel after it is recovered; and it is reasonable to suppose that a formation must be capable of standing under that pressure in order to force its way into the barrel. For this reason a "broken" formation—one composed of alternate streaks of hard and soft material—is the most difficult to core.

A core of fair length may often be recovered in such a condition, due to the generation of heat either by rotation at the shoe or within the inner barrel, as to completely change its appearance and character. By this means a loosely consolidated sand may be "burned" to a quartzite, a sandy shale may be changed to a hard crystalline mass resembling igneous material, a rich oil sand may be burned to a black carbon-like substance, and a bituminous shale may be burned to a coke. Usually such conditions are so exaggerated as to be readily recognizable, but there are times, particularly in regions where igneous material is known to be present, when the operator may be greatly puzzled.

In coring, as in drilling, there is always a certain amount of whipping or jumping of the drill pipe, particularly with pipe smaller than four-inch, which results in breaking up the core in the inner barrel and churning it around until at times little is left of its original form or texture. A typical example was encountered recently in a well where the formation was alternate streaks of oil sand and brown shale, the sands becoming leaner and thinner with depth. It was desired to determine the vertical limits of production. Three successive cores of an average length of eight feet were taken, showing in each case a very soft, sticky, brown shale resembling well mixed clay, with a few fragments of oil sand and harder shale disseminated throughout the mass. These cores were logged as sticky shale. A careful examination of the cores showed a few small "biscuits" of hard brown shale not greater than one inch in diameter imbedded in a matrix of ground up shale, drilling mud, soft rope and other foreign matter together with a few fragments of oil sand. Nothing could be ascertained of the relative amounts of the sand and shale; and the cores, for the purpose for which they were taken, were worthless. Cores of this nature are quite common and in a number of cases the so-called "rotten shales" which are logged from cores are due to this cause rather than from the original formation.

Drilling mud will also be built up in this manner and, under the pressure which exists in the inner barrel, will become so consolidated as to resemble formation and be logged as "sticky shale," "brown shale" or "gumbo." A typical example of such action is shown diagrammatically in Fig. 1. Here a core twenty-four inches long was logged as sticky shale with streaks of sand. A careful examination showed the shale to consist of compressed drilling mud containing numerous angular fragments of hard brown shale, disseminated throughout. At the bottom was a two-inch streak of oil sand, which represented all of the true formation recovered by the core. Such "building up" is very common, particularly in the upper portion of a core, but it can always be detected upon careful examination.

A second result of this building up action is shown in Fig. 2. This is quite common in the loosely consolidated sands in the Los Angeles Basin and is another result of the jumping and chattering of the core bit in "rough" drilling. The jumping of the barrel causes the sands to break, usually at a right angle to the axis of the core, although the action may occur at all angles, allowing the drilling mud under the high pressure which exists within the barrel to be forced into the fracture, forming relatively thin laminations of mud which are often logged as "thin streaks of sand and

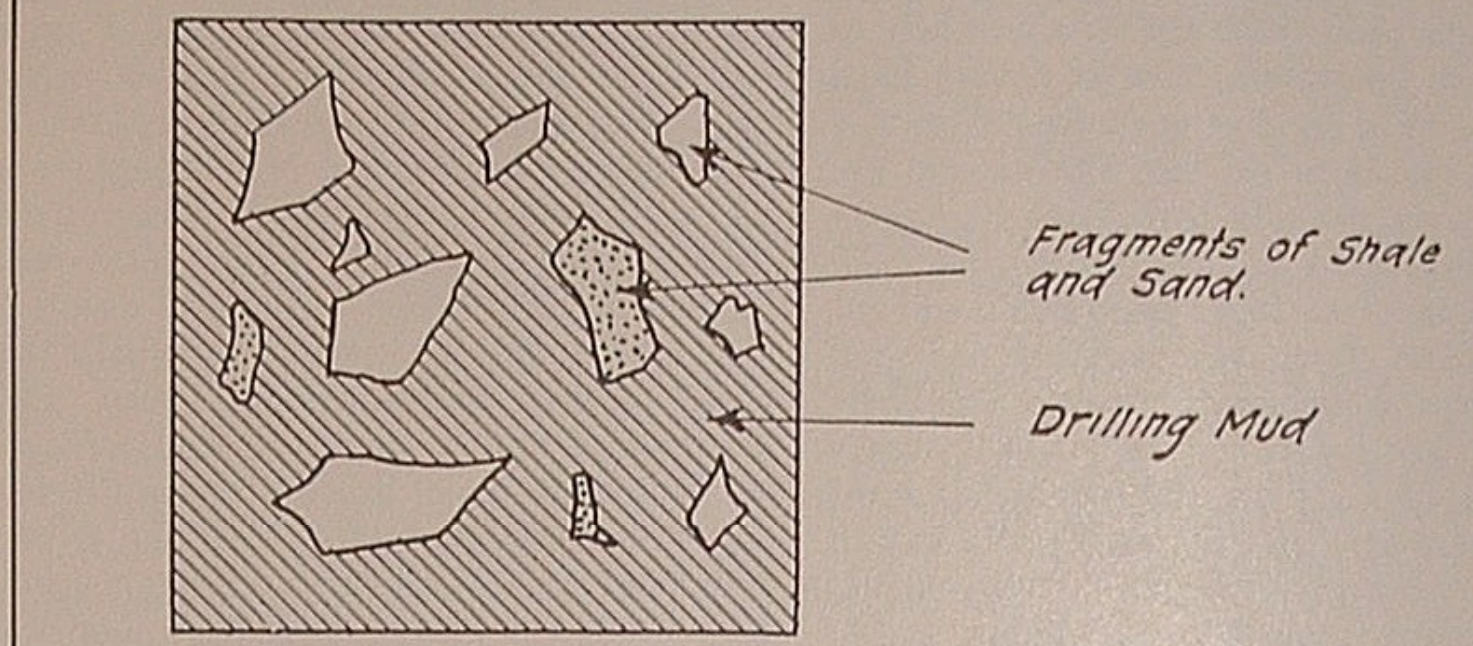


Fig. 1

shale." Sands and shales often occur in such form but the built up variety may be distinguished by the fact that in a longitudinal section of the core such as is represented by Fig. 2 there will be no break in the mud between the coating of the outside of the core and the laminations within the core.

A very serious difficulty, and one which cannot be entirely eliminated from core drilling is the danger of contamination of a barren sand by oil saturated mud. In a hole where oil saturated mud is being circulated, or where oil has been circulated previous to coring, the sample will always be more or less contaminated and one can never be entirely positive as to the source of a "show" in a relatively lean sand. A barren sand or water sand will absorb sufficient oil in a very short time to give it the appearance of a fairly rich oil sand and in some cases it is almost impossible to determine the source of the oil. If an ordinary core two or three inches in diameter, taken with oil saturated mud in the hole, be examined immediately after pulling out, a stain of oil can usually be seen around the contact between the drilling mud and the core, which works concentrically toward the center of the core, the central portion being barren. In a short time, however, the oil will work throughout the entire core and the sand will show a uniform oil content. In sands where the mud builds up in streaks, as noted in Fig. 2, the oil may enter from a greater surface and consequently saturate the sands much quicker.

This impregnation of a water or dry sand with oil from oily mud has been too little recognized by operators and has resulted in useless setting of numerous strings of casing above what was thought to be oil sand. The writer personally knows of at least four wildcat wells in the Los Angeles Basin where the decision as to whether or not to set casing depended upon determining the source of the oil which was present in certain cores. In each one of these wells oil had been circulated prior to coring but, since complete elimination of the circulated oil from the well was almost impossible, it was debatable whether or not the oil contained in the cores was formation oil or that which had been circulated, and with a string of pipe costing from $2,000 to $6,000, in addition to the expense incident to delay and the reduction of hole, the value of correct determinations is evident. Such contamination can usually be detected by examining the core immediately after it is removed from the barrel; and with the larger diameter cores now in general use the difficulty is reduced to a minimum.

The reverse of this condition may occur in a sand which is comparatively rich in oil. If the sand be burned sufficiently to drive off the oil, but not enough to fuse the sand, the result will be a gray, barren or almost barren sand which may be easily mistaken for a water sand, and which may cause the operator to believe that he has passed the productive horizons or has not drilled deep enough for a shut-off. A slight amount of rotation in the inner barrel is sufficient to accomplish this change and it is not un-

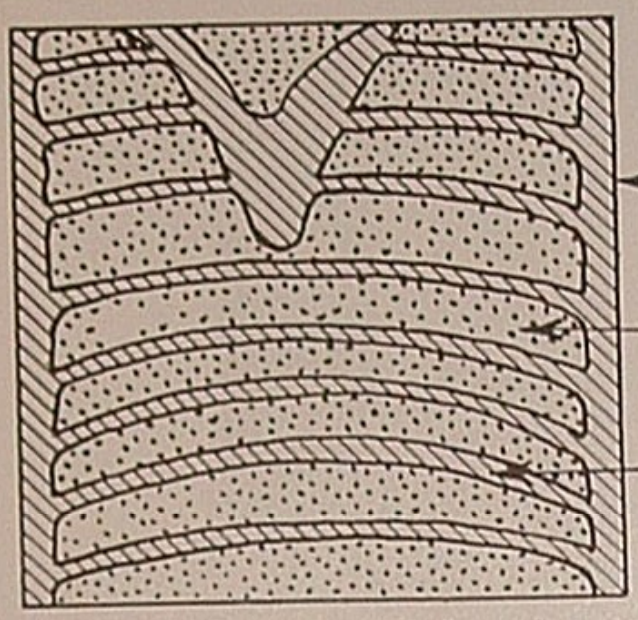


Fig. 2

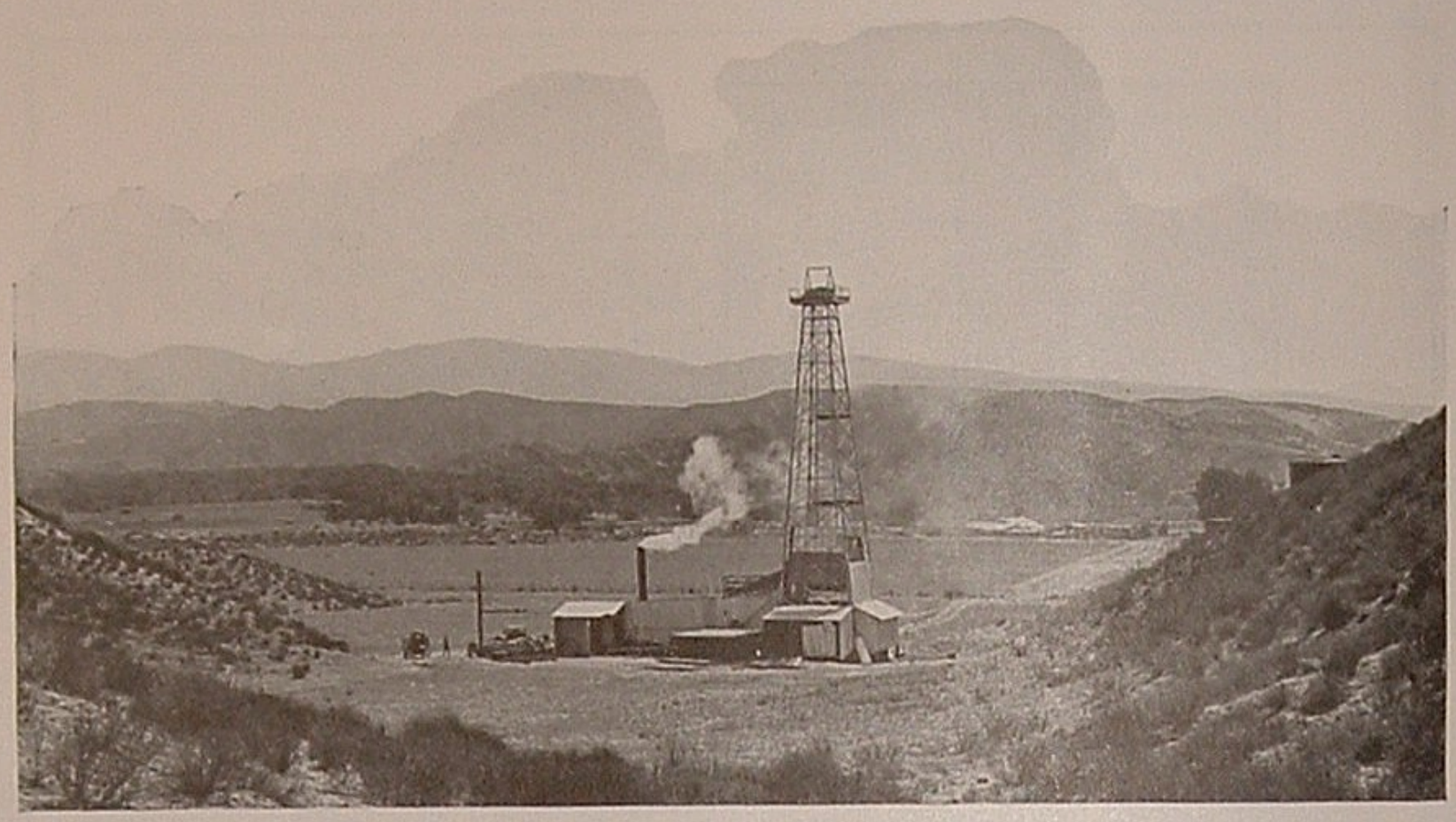
common to find streaks of almost barren gray sands in the center of a core of rich oil sand. The burning will usually occur in the shoe of the barrel and show in the last six to eight inches of the core. This burning of the oil sand can be easily detected in a fresh core, as the burnt sand has a very distinctive, pungent odor. After the core has dried detection is very difficult.

These statements are intended to bring out the more serious features which affect core samples, with some general hints as to the methods of avoiding mistakes. With the knowledge that cores are subject to contamination and alteration it is plain that more than a cursory examination is required to determine definitely just what is represented by the sample as recovered in the core barrel. A core represents an expenditure of from $35 to $50 per foot of sample recovered and should, if possible, yield information commensurate with its cost.

The common practice in examining a core after it has been taken from the core barrel is to remove the outside coating of mud, shave off perhaps a quarter to a half inch of formation for test and classify the core from what appears of the sample thus exposed. This procedure is not sufficient to bring out the more serious alterations and contaminations outlined in the foregoing and sooner or later will lead to costly and unnecessary mistakes. By this means, for instance, a good cut will be shown by a sand which may be entirely barren at the center of the core, a sticky shale may be logged where the formation is entirely oil sand, or, in other words, the operator will not get the true nature of the formation from which the core was taken. The mere breaking up of a core and examining its ends is also misleading as a core will usually break along sand partings and in this manner a section a foot long may be logged as sand whereas in reality it is shale with sand partings along which the core most easily broke. The sand partings may be but a fraction of an inch in thickness yet the section of core thus broken will show at each end and will be called solid sand.

The only way in which a core may be made to yield the maximum amount of information is to split it down the center so that a complete transverse section is exposed and then dig into it until it is determined as far as possible just what real information is represented and how much alteration and contamination have taken place.

There is a tendency among certain operators to regard a core more as a thing of beauty than a possible source of valuable information and there are cases where no one is allowed to mar the appearance of the sample. Such a procedure will result in a minimum amount of information. After a core has been thoroughly examined by a careful observer it retains little of its original form.



THE SAUGUS WILDCAT

Back to the Scenes of Early Activity

By V. L. EHRENCLOU

A CYCLE of extraordinary interest was worked out early this month when the Union Oil Company of California began operations on its Newhall-Saugus No. 1, a wildcat well located about a mile from the junction of the Mint Canyon and Ridge route highways at the town of Saugus.

In making this test which is being closely watched by oil men, the company has returned to the section in which the first struggles of its founder were conducted over forty years ago. And in the attention directed at the well, the oil industry has focused its concern on a locality in which likewise took place the earliest of California oil activities. There is a double retrospect which offers an excellent chance to review the field development of the company as coupled up with the expansion and progress of the industry in California. The two are so admirably linked that one is simply the reflection in a lesser degree of the other.

A few feet off the highway, beyond the Newhall tunnel, stands one battered wooden derrick covering a well that has produced oil in commercial quantities for more than twenty years. Scores of these oil soaked veterans which have been yielding their small daily quota for nearly fifty years can be found within a few miles of the latest Union wildcat.

No section of California is so rich in tradition to those who have watched the oil industry grow from its 12,000 barrel production in 1876 to the record-smashing 264,000,000 barrel yield of 1923, as this quiet hill section of Newhall and Saugus. That many have hopes of a new field being opened up by the present wildcat is especially interesting in view of plans of the Petroleum Pioneers Society to dedicate twenty-nine acres in this locality to the commemoration of California's oil pioneers who struggled with their crude equipment in these same hills half a century ago.

The district also offers the most encouraging commentary which could be written on this state's oil fields. Here is a field discovered in the sixties which is not only still producing oil from hundreds of small wells, but which is actively watched as the possible location of a new pool. Along this

VIEW OF THE COMPANY'S HALE LEASE IN WYOMING

In strong contrast to the company's holdings in California where development is carried on under conditions ideal to the oil workers is this winter scene in the Rocky Mountain region. The wells in the picture are Hale Nos. 1 and 2.

same line it is a matter of record that since the earliest days of the California industry not an oil field of consequence has been opened up and subsequently abandoned. Throughout the San Joaquin Valley, the coast fields of Santa Maria, Summerland and Ventura, and south to Los Angeles and Orange counties can be seen fields still active twenty-five years after their discovery.

It was in Newhall, six miles from the Saugus well, that the first headquarters of the Union Oil Company of California were located, Lyman Stewart opening a small one-room office in the early months of 1883. The first wells drilled by the Hardison and Stewart organization, which, unfortunately, proved dry holes, were sunk here.

Through the four decades that have passed since the Stewart name was first connected with California oil, Union Oil Company has marched in step with the state's industry as a whole. A study of the field development of the company is interesting therefore in more ways than that of showing the progress of the organization itself.

In 1884, one year after Hardison and Stewart began operations at Newhall one well was brought in. Total production for the year was 2,661 barrels. In 1889, the year before the incorporation of the Union Oil Company of California, the companies which formed the latter had twenty-two producing wells. Total production for the year was 64,049 barrels.

In 1890, the year the Hardison & Stewart, Sespe and Torrey Canyon oil companies were merged into the Union Oil Company, production was 84,421 barrels, from twenty-six wells. All were in Ventura County.

In 1892, first production was secured outside of Ventura County, the company following the rest of the industry south to Los Angeles City. One well in Los Angeles produced 15,000 barrels for the year. The year's total swelled to 139,794 barrels, from thirty-three wells.

In 1895, first operations were carried on in the Fullerton, or Olinda field, in Orange County. Due to falling off of Ventura production, total yield for the year was 77,316 barrels, from thirty-nine wells.

In 1900, operations were further extended to the Brea district. Yearly production leaped to 240,146 barrels, from eighty-nine wells.

In 1903, the company got its first well in the San Joaquin Valley. In this year also the company opened in the Santa

The following shows the expansion of the Field Department of the Union Oil Company as to producing wells and total production:

PRODUCTION AND NUMBER OF WELLS

Year	Wells	Year's Production		
1884	1	2,661	Barrels	
1890	26	84,441	"	
1900	89	240,146	"	
1905	154	1,806,719	"	
1910	292	10,300,000	"	(Lake View gusher 5,600,000)
1915	350	4,742,000	"	
1920	524	13,333,937	"	(4,652,000 Bbls. from Mexican wells)
1923	433	18,741,633	"	(165 wells shut in)

Wells and Holdings in California Fields

Field	Date Entered	Present Acreage	Present Number of Producing Wells
Newhall & Ventura	1883	68,400	81
Brea, Olinda & Richfield	1896	7,475	144
Coalinga	1903	1,040	39
Kern River, Midway & McKittrick	1909	15,500	75
Santa Maria	1903	85,600	193
Santa Fe Springs & Montebello	1919	1,325	57
Long Beach & Huntington Beach	1921	210	36
Dominguez & Rosecrans	1923-24	2,700	14
Redondo-Torrance	1923	725	
Miscellaneous Acreage		14,600	

Maria and Lompoc fields on the coast. The expansions brought the total production to 375,570 barrels, from 131 wells.

In 1909, the company first went into the Midway and Sunset fields of the San Joaquin Valley. Total production from 259 wells was 4,540,785 barrels.

In 1919, the Chapman No. 1 gusher came in, opening up the Richfield district in Orange County for the Union Oil Company.

In October of this same year Meyer No. 3, the discovery well of the famous Santa Fe Springs field, came in, although its small production did not attract much attention. Two years later another Union well, Bell No. 1, came in as a 4,500-barrel gusher, flowing the highest gravity oil found up to that time in large quantities in California. This well started the boom which made Santa Fe Springs the most spectacular field in America.

In 1922, wells were brought in at Long Beach, Huntington Beach and Torrance. In 1923, first production was secured in the Dominguez field discovered by the Callen-

THE WILDCAT

Here is a picture of the Callender No. 1 discovery well of the Dominguez field. A picture of the same spot today would reveal over a score of derricks. Fifteen months ago unknown, the field now yields 34,000 barrels daily.

IN THE ORCUTT FIELD

Since the advent of the Los Angeles fields, development in the Orcutt field where the company owns many thousands of acres has been slow. The picture shows the company's Eefson lease.

THE LOS ANGELES CITY FIELD IN 1895

This was entered by the Union Oil Company in 1892. Little thought was evidently given to the spacing of wells in these days as the picture discloses. Most of these derricks have since been dismantled, although the field still yields a small production. Success in these shallow wells in the 90's caused the first oil boom in California.

der No. 1, on the first day of September.

In 1924, production was secured in the Rosecrans district—also a Union discovery.

In 1918, through its subsidiary, Union Oil Company of Mexico, operations were begun in the Mexican oil fields on the east coast of this country. Seven wells were drilled in the Amatlan, Zacamixtle and Chinampa districts. On August 7, 1920, Well No. 6 on Lot No. 114, Chinampa district, was brought in, and on October 31, 1920, No. 9 on the same lot came in. Before going to salt water, near the close of the same year, these two wells produced 4,652,000 barrels of oil. The company is not now operating in Mexico, although it owns in fee 300 acres and has under lease 200 acres.

In 1921, the company purchased in fee 425,800 acres of what is regarded as favorable oil land in Colombia, South America. F. O. Martin, geologist, has been making a detailed study of this property for over a year.

In 1920, Union Oil Company expanded its field program to include Texas and Wyoming. Several small wells have been brought in in Texas, but greater success has come in Wyoming. At Maverick Springs 5,000 barrels daily production is shut in on company property. A new field, Circle Ridge, was opened in Wyoming in 1923. One shallow well is capable of producing 165 barrels daily from a depth of 700 feet on this land.

In 1923, the company brought in near Fort Collins, Colorado, a gas well which produced 82,000,000 cubic feet of gas daily. Subsequent tests showed the well to be capable of producing at least 300 barrels of oil with the gas. This performance started the first great oil boom in the history of Colorado. Since then another giant gas well has been brought in on the Welling-

TRANSPORTATION UNDER DIFFICULTIES

Here is a truck on a Wyoming lease where the company is engaged in oil field development. Union Oil's holdings in Wyoming approximate 18,000 acres, and 5,000 barrels daily production is shut in at Maverick Springs and Circle Ridge.

MITCHELL GASSER IN COLORADO

When old nature throws open the exhaust valve she has something to blow about. She did it with a vengeance in Colorado several months ago when the company's Mitchell well came in as a big gasser. It has long since been capped.

ton dome, where the first was also located and one producing well on the Fort Collins dome, second of the three structures the company originally set out to test.

The latter well, Whitaker No. 1, is shut in, but 750 barrels daily are flowing through the six and eight inch casing. The company is conducting in Colorado its heaviest drilling program ever carried on outside of California. Besides the three completed projects eleven wells are in process of drilling in that state. A contract for the sale of the Whitaker oil to the Midwest was recently signed.

Several months ago the company leased the Bartlett Ranch in New Mexico, comprising 205,000 acres, and including a single structure of 19,000 acres. The company's interest in this land amounts to 125,000 acres. A test well, Vermejo Park No. 1, is drilling at 3130 feet on the land.

The entire holdings of the company total 803,800 acres as follows:

California	194,000	acres
Wyoming	17,900	"
Texas	4,500	"
Colorado	33,500	"
Utah	2,600	"
New Mexico	125,000	"
Mexico	500	"
Colombia, S. A.	425,800	"
	803,800	acres

During the current year a well was drilled in Utah, giving the company drilling operations in six states, viz: California, Wyoming, Texas, Colorado, New Mexico and Utah.

Union Oil Company of California, at present has 630 producing wells, and holdings in almost every California field in addition to those states mentioned.

The field achievements of the company include, in part:

1. Bringing in Lake View gusher, largest American oil well, 1910. Daily production 60,000 barrels. Total yield over 9,000,000 barrels; recovered 6,000,000.

2. Brought in a number of largest wells in state beside Lake View, including:

(a) Hartnell gusher, opening Santa Maria district, 3,000,000 bbls. to date.

(b) Chapman gusher, opening Richfield, 1,500,000 bbls. to date.

(c) Bell gusher, opening Santa Fe Springs, 1,500,000 bbls. to date.

(d) Long Beach Community No. 7, biggest producer in Long Beach field, 1,400,000 bbls. to date.

3. Discovered six distinct new fields in America in past five years. Previously opened up Lompoc field in Santa Maria district and extended fields in San Joaquin Valley.

There is a very small conception on the part of the general public of the force with which oil companies must prosecute the search for new oil fields. Behind the thought of today's wells, today's production, must always be the consideration of tomorrow's wells; of new production to take the place of that which must necessarily decrease. Hence the program of constant exploration and development of new areas, the reaching out into new states—that the supply for future needs may always be maintained.

Memorial to California's Oil Pioneers

PLANS to commemorate the pioneers who made California the greatest oil district in the world have taken definite form in the announcement of the organization of the Pioneers Petroleum Society of California by W. W. Orcutt, Vice-President of the Union Oil Company of California, who has been chosen president of the Board of Directors of the society.

Other officers of the society elected are as follows: K. R. Kingsbury, President of the Standard of California, first vice president; G. M. Swindell, of the Chamber of Mines and Oil, secretary; Edwin Higgins, assistant secretary; General M. H. Sherman, treasurer; W. L. Valentine, historian. A complete list of the Board of Directors is as follows: John Barneson, H. J. Bauer, P. N. Boggs, C. W. Brown, A. C. Diericx, G. Allan Hancock, K. R. Kingsbury, Theodore Martin, W. C. McDuffie, A. C. McLaughlin, Thos. A. O'Donnell, W. W. Orcutt, F. C. Ripley, M. H. Sherman, Paul Shoup, R. E. Small, L. P. St. Clair, G. M. Swindell, W. L. Valentine, F. C. Van Deinse, M. H. Whittier.

Committees appointed by President W. W. Orcutt to further the objects of the organization are as follows:

Membership—G. M. Swindell, Theodore Martin, W. L. Valentine, A. C. McLaughlin, C. W. Brown.

Finance—L. P. St. Clair, chairman; John Barneson, H. J. Bauer, P. N. Boggs, C. W. Brown, A. C. Diericx, G. Allan Hancock, K. R. Kingsbury, Theodore Martin, W. C. McDuffie, A. C. McLaughlin, Thos. A. O'Donnell, W. W. Orcutt, F. C. Ripley, M. H. Sherman, Paul Shoup, R. E. Small, G. M. Swindell, W. L. Valentine, F. C. Van Deinse, M. H. Whittier.

Lands—C. W. Brown, M. H. Whittier, A. C. Diericx, R. E. Small, W. C. McDuffie.

Memorial, Architecture, Etc.—H. J. Bauer, G. Allan Hancock, K. R. Kingsbury, P. N. Boggs, A. C. McLaughlin.

Pioneer "Honor Roll"—A. C. McLaughlin, W. L. Valentine, K. R. Kingsbury, Theodore Martin, C. W. Brown.

History—W. L. Valentine, chairman; John Barneson, H. J. Bauer, P. N. Boggs, C. W. Brown, A. C. Diericx, G. Allan Hancock, K. R. Kingsbury, Theodore Martin, W. C. McDuffie, A. C. McLaughlin, Thos. A. O'Donnell, W. W. Orcutt, F. C. Ripley, M. H. Sherman, Paul Shoup, R. E. Small, L. P. St. Clair, G. M. Swindell, F. C. Van Deinse, M. H. Whittier.

The society, organized as a corporation, has already received its charter from the Department of State and is now qualified to proceed with its undertaking of providing fitting memorials and commemorations to the men who made California oil history. An option on 29 acres of land in the vicinity of Newhall, scene of the earliest oil activities, has been acquired which will probably be exercised upon the approval of the Land Committee.

The ideal has been attained in the selection of the proposed site. In its present state it presents a scene of rugged beauty,

(Continued on Page 17)

TWO VIEWS OF THE PROPOSED SITE

On the left W. W. Orcutt, Vice-President, Union Oil Company and president of the Pioneers Petroleum Society of California is pointing toward the natural amphitheatre. The memorial will be built near the spot where he is standing.

Our Canadian Refinery

By ALLAN H. HAND

WHEN the Union Oil Company entered the Canadian market late in 1921, it found a profitable field for the sale of its refined products. But since its nearest refinery was located in California and it was necessary to ship the products by tanker to the Canadian ports, it was accordingly deemed prudent to establish a refinery in Canada.

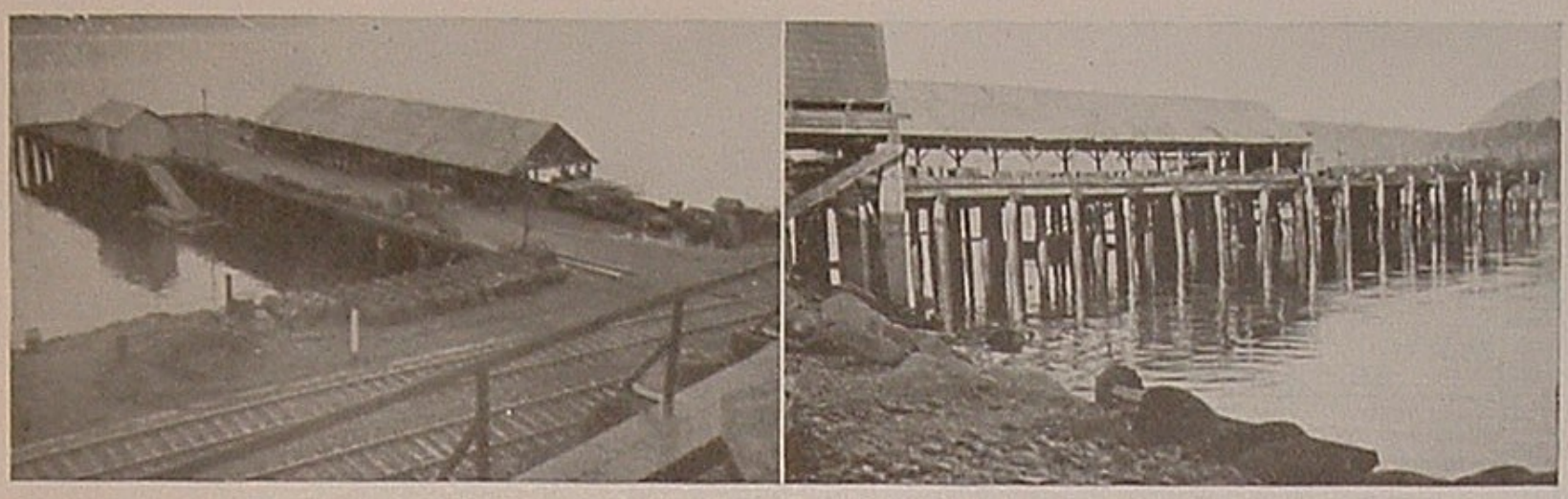
To construct a modern refinery would have consumed many months, and when the opportunity was presented to acquire by purchase a ready-made plant, one that had been in operation for years, a deal was consummated whereby the Union Oil Company of Canada became the owner of British Columbia Refining Company's refinery at Port Moody, some ten miles east of Vancouver.

Much has been written about the modern refineries. They have been truthfully painted in word pictures as cities of stills, agitators, storage tanks and the other necessary units that go to make up the composite picture, with a pronounced atmosphere of industrial activity. By virtue of this conception it would be natural to visualize the company's refinery at Port Moody as coming within this category. But we would be surprised, pleasurably or otherwise, according to the mood, at the setting. True, the stills and other requisites are there, but the first impression of the visitor would probably be the apparently jumbled arrangement of the various units, which remind one of a jig-saw puzzle waiting for some one to straighten it out, and make something of it. Such a conclusion might at first glance be justified, but closer inspection would reveal a close coordination of the various units.

To better understand the reason for this erroneous impression it must be borne in mind that the site of the refinery is on a steep mountain side, wherein all the available space has been utilized, while every inch of ground not actually in use is still heavily wooded. It must be remembered too, that the plant when originally built was laid out for the manufacture of as-

LOOKING WEST ALONG C P. R. TRACKS

The two story building on the right was the old station office of the Canadian Pacific Railroad when the western terminus of its line was at Port Moody. It is now the office of the Port Moody refinery. To the left are oil storage tanks, and beyond these, but not in the picture are the loading racks.



WHERE CALIFORNIA CRUDE IS UNLOADED

The pictures show two views of the company wharf at Port Moody, where company tankers discharge their cargoes. The picture on the left shows the wharf as seen from the refinery, and on the right, as it is seen from shore.

phalt, and was later remodelled for the manufacture of refined and lubricating oils. This naturally mitigated against the best arrangement of the various units, but even against these combined handicaps, the Port Moody refinery is performing a very necessary and important work for the company in Canada.

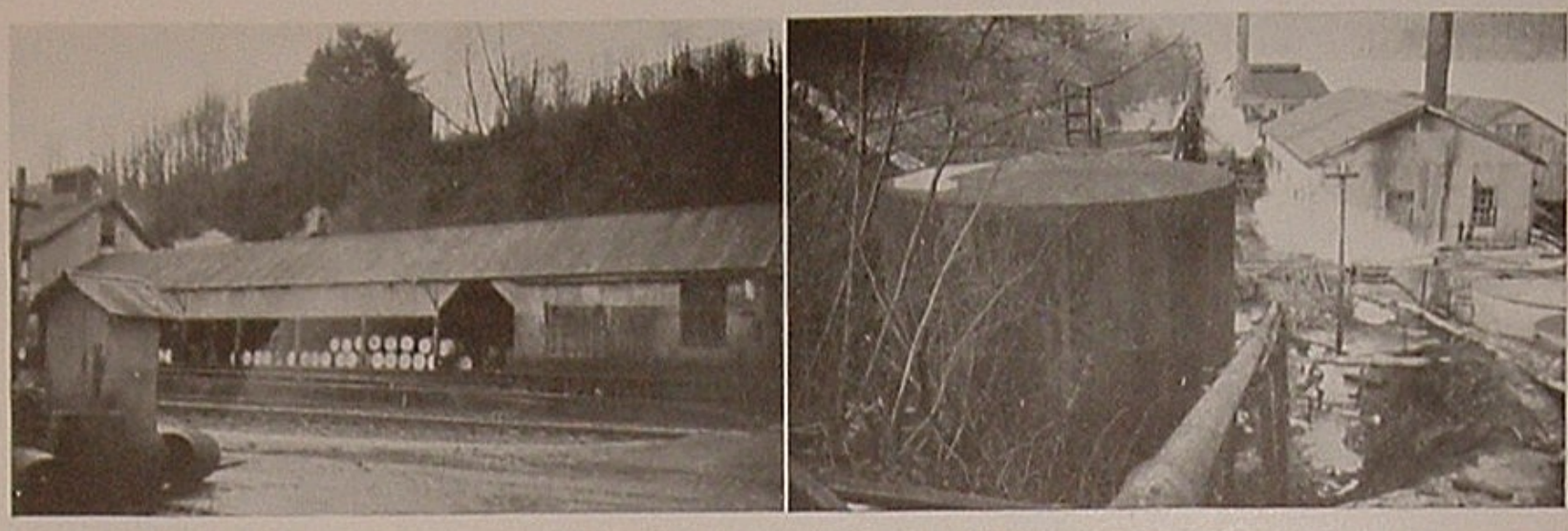
The Port Moody refinery was originally built in 1909 by the British Columbia Refining Company on some eight and one-half acres of land which they had leased the year previous from the Canadian Pacific Railroad. It was the first refinery of its kind in British Columbia and at the time of its construction was generally accepted as being up-to-date in all respects. Fred L. King, who had been in the service of the Union Oil Company for three years, was chosen as the first managing director of the refining company. and all its refining crude was purchased from the Union Oil Company.

A particularly interesting fact about the plant it that it is constructed on the site of the original western terminus of the Canadian Pacific Railroad. The two-story building, now used as a combination office, warehouse, and residence of the chief clerk, was erected about 1884, and was the first western terminal of that company. In spite of the fact that the old station building is constructed entirely of wood and has been moved from the southern to the northern side of the main track to permit more space for the refinery proper, it has withstood the ravages of the elements during those forty years, and from present indications, it will be many years yet before its days of usefulness are over.

Running practically the entire length of the site along the southern side of the railroad are several buildings which house some of the lubricating oil storage tanks, the drum and barrel fillers, together with the can and case plant, lubricating oil compounding kettles, cooper shop, barrel steaming racks, and the drums, barrels and case goods, packed and ready for shipment. A short distance up the hill and to the west is the old agitator shed with equipment for handling acid and other chemicals used in the treatment of certain products. Still further back and to the west are located the stills and condensers with the boiler house adjoining. A building equipped for a machine shop and engine room is next to the boiler house with the forge shop near by.

The main crude storage tank lies to the rear of the plant and well up the hill which enables the oil to gravitate through the plant. A fully equipped laboratory is located across the tracks from the refinery, almost at the water's edge.

Approach to the refinery by water is through the Second Narrows as the northern passage into Burrard Inlet is called. The Inlet is landlocked, the densely wooded steep mountain sides skirting the water's edge for several miles. The water is placid and renders the loading and unloading of tanker shipments a comparatively easy matter. Deep water, sufficient to accommodate the largest tanker, is reached a short distance from shore by wharf, to which the tankers tie up. It is worthy of mention that every barrel of oil refined at the Port Moody refinery since it first started in operation, some sixteen years ago, has been handled by the fleet of the Union Oil Company.



OTHER UNITS OF OUR NORTHERN REFINERY

On the left is compound and barrel platform with the C. P. R. tracks in the foreground. On the right is the boiler house and a six inch still feed line. Beyond the boiler house is the asphalt warehouse and the agitator building.

As previously stated, the plant was originally constructed for the production of asphalt, together with the usual by-products of distillate and lubricating oil stocks, although specialties such as sweeping compounds and liquid soaps were also turned out. When the refinery was taken over by the company in December 1921, a great deal of repairs and alterations were necessary before it could be successfully operated for the production of refined oil. C. G. Brownlee, who was then attached to the company's Los Angeles refinery, was chosen to supervise the work. In seven weeks Mr. Brownlee reported the task completed; on February 5th, 1922, the first shipment of Union Oil products refined in Canada was made. In this short period of time, in the face of heavy storms, with the thermometer ranging from seven to twenty degrees above zero, the plant was completely remodelled, brick work renewed, new lines and storage facilities installed. The improvements and additions which have been made from time to time have greatly increased the capacity of the plant, and has enabled it to keep march with the growing market for Union products in Canada. Today the refinery is supplying the major portion of the company's sales needs in Canada.

To those who cherish the aesthetic in business, the Port Moody refinery represents the ideal. Here is an industrial unit transplanted among the stately trees, centuries old. The hum of industrial activity around the refinery is in strong contrast to the surrounding country, rich in nature's beauty. Even within the confines of the plant proper, as if in silent protest against encroachment, the trees etch their heads in the sky, while wild flowers grow in harmonious color. But the dictates of industry must be heeded, and where beauty and business conflict, man's creation usually wins. Increased demands on the refinery output coincident with sales expansion in Canada will have to be met even at the expense of beauty.

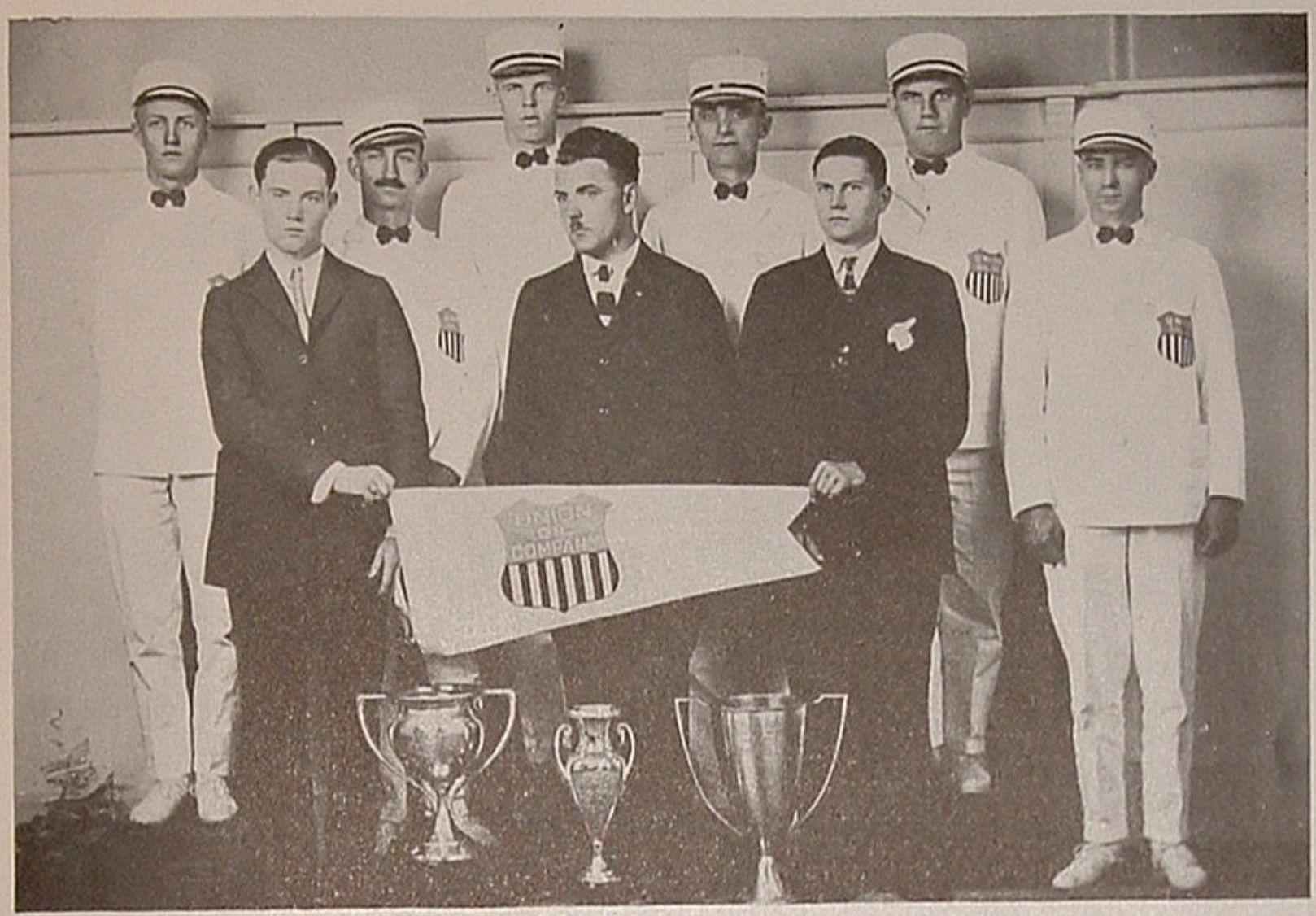
MEMORIAL TO PIONEERS

(Continued from Page 14)

and will lend itself admirably to the art of the landscape gardener.

The highway to Newhall divides the site into two sections. These will be connected, if present plans mature, by an underground bridge. On the one side are 25 acres, where there is space, with little improvement necessary, for the parking of several hundred automobiles. Beyond this, and extending to the top of the ridge, lies thickly wooded country with here and there open spaces that can be readily utilized for picnics and sports. An excellent view of the distant mountains and valley can be had from this section of the site.

Because of the setting, it is proposed to build the memorial on the 4 acres on the other side of the highway. Here, awaiting the handiwork of man, lies an excellent natural amphitheatre, which, when improved, will accommodate thousands of people who will take part in the annual exercises in memory of the California oil pioneers. Winding its way through these 4 acres is a small stream and it is proposed to use this water in the creation of a lake. Drinking water will be derived from two springs on this section of the site.



UNION OIL COMPANY'S PRIZE WINNING TEAM

The team was trained by William Cereghino, safety and fire inspector at the Los Angeles refinery. Left to right, back row, Edgar Harvey, Richard Carpenter, Phillip S. Vanderburg, Alex Matheson, Thomas Nicholls, and Edw. J. Baird, captain. Front, Fane Krebs, William Cereghino, and Samuel Tussey. Krebs and Tussey went with the team to Riverside as alternates.

Company Team Wins Safety Contest

IN competition with twelve of the most expert industrial, municipal and public service first aid teams at the second California Industrial First Aid Contest, the Los Angeles refinery team of Union Oil Company of California captured the special prize for the petroleum industry, a special prize for the best team from south of the Tehatchepi Mountains, and the grand prize for the championship team of the state. The contest was held October 7th, at the Southern California Fair at Riverside, under the direction and supervision of the United States Bureau of Mines, and under the auspices of the Chamber of Commerce of Riverside, the Southern California Society of Safety Engineers, the Society of Safety Engineers of California (San Francisco), Los Angeles Chamber of Commerce, Los Angeles Safety Council and the American Red Cross.

Entered in the contest, in addition to the winning team, were teams from Standard Oil Company (Kern River), Standard Oil Company (Rio Bravo), Shell Oil Company, Associated Oil Company (Reward), Associated Oil Company (Coalinga), Gilmore Oil Company, Fresno Fire Department, Long Beach Life Guards, San Joaquin Light & Power Company, Llewellyn Iron Works, Riverside-Portland Cement Company, Southwestern Portland Cement Company.

As souvenirs of the occasion, the winning team from Los Angeles refinery brought back from Riverside a beautiful Challenge Cup donated by E. D. Bullard, which had been won a year before by the Standard Oil Company team. In addition, they won a silver cup donated by the Los Angeles Chamber of Commerce, a silver challenge cup donated by Drs. French & Early, and a first aid kit donated by the First Aid Equipment Co. Each individual on the team received a silver medal appropriately engraved and donated by the National Safety Council, a bronze medal donated by the American Red Cross, $25.00 in gold, and a souvenir leather bill fold.

Needless to say, the wonderful showing made by the Los Angeles refinery team was the outstanding event of the contest, especially as it was known that this team went into training for the contest only seven weeks before.

The problems worked by the teams in this contest were prepared by Dr. R. R. Sayers, of the United States Bureau of Mines at Washington and were delivered sealed to the captains of the various teams and opened at a given signal. Only a reading of the problems can convey any idea of the variety of injuries for which these first aid teams were trained to care. The problems given at the contest follow:

(Continued on Page 22)

News of the Month

NINE MONTHS' OPERATIONS

Operations of the company for nine months of the year revealed net profits of $9,000,000, an increase over the same period last year of $1,800,000.

Production of crude oil by the company and controlled companies combined was 11,200,000 barrels. The present daily production of the company's wells is approximately 42,000 barrels. One hundred and forty wells are shut-in, however, which are capable of producing 12,000 barrels per day. During the nine months fifty-four were brought in and eight were deepened.

Sales for the nine months approximately $50,-700,000, a decrease in value of $4,400,000 occasioned by smaller shipments of refining crude to the Atlantic seaboard.

Current assets, consisting of cash, United States bonds and treasury certificates, accounts and bills receivable, oil inventories and materials and supplies together with stock subscriptions of $163,320, aggregate $47,000,000, an increase of $4,750,000 over December 1923. Current assets are almost 6 to 1 of current liabilities.

Current liabilities at September 30th approximated $8,000,000. During the nine months the company's mortgage debt in the hands of the public was decreased $4,239,969.

CAST YOUR VOTE

There is grave danger of a deadlock in the choice of a President and a Vice-President in the Presidential election unless every American citizen votes on November 4th.

Failure of any one candidate to secure a majority of the electoral votes will create a situation fraught with serious consequences, a situation which not only will bring confusion in business, but will have a bearing vital to national affairs and conditions sufficient to affect the personal welfare of every citizen.

YOUR VOTE may determine the choice of a President; failure to record it may contribute to a deadlock with its disturbing complications. The issue is clear; the qualified voter who neglects to vote on November 4th will have failed of his duty to his country and to himself.

VOTE—vote intelligently—but by all means VOTE.

DECLARE DIVIDEND

The Board of Directors of the Union Oil Company of California at a meeting held October 6th, declared the regular quarterly dividend of $1.80 per share payable October 28th, to stockholders of record at the close of business October 10th. Stock transfer books will not be closed.

Immediately following the declaration of the Union Oil dividend the Board of Directors of the Union Oil Associates, holding company for the parent organization, declared its regular quarterly dividend of .81 per share, payable October 28th, to stockholders of record October 10th.

GETS ADDED DUTIES

R. E. Haylett has been placed in charge of gas and conservation operations; he will continue to exercise supervision over the activities of the Research and Development Department.

Mr. Haylett has been connected with technical operations of the company for the past nine years.

AUGUST CRUDE PRODUCTION

The total production of crude oil in California for August amounted to 19,112,998 barrels, an average of 616,548 barrels per day. This is a decrease of 5,218 barrels per day under July production.

Stocks increased during the month 1,380,480 barrels. The total stocks at the end of the month were 102,846,705 barrels. The total stock increase for 1924 up to August 31st was 10,921,552 barrels.

One hundred wells were completed during the month with an initial daily production of 33,954 barrels, compared with 137 wells completed during July with an initial production of 55,975 barrels.

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

RENAME LEASE.

The company's property at Athens-On-The-Hill has been renamed the Howard Park Lease. There are five wells drilling on this lease, and one producing well.

AN INTERESTING EXHIBIT

The exhibit of the Union Oil Company at the Northwest Merchants' Exposition held in Seattle last month was an unqualified success, taking the interest of the visitors as the barom-

eter. The exhibit was a replica of a union service station in miniature, but instead of oil coming from the pump coca cola was served. It is estimated that 25,000 people were served with drinks. At times the crowd congregated around the booth was so large that it was necessary for officers to clear the aisles so as to allow passage to the other booths in the immediate vicinity. L. M. Bridgman, District Sales Manager at Seattle, was the man behind the gun, and he put the "show" over with a wallop.

FRESNO OFFICE USES AEROPLANE

A few years ago the idea of using an aeroplane to transport a mechanic to the scene of a stalled auto truck would have been considered as belonging to the realm of dreams. Yet this was successfully accomplished by the Fresno office recently. A company truck had a breakdown in Delano and it was necessary to send a mechanic from Fresno to make the necessary repairs. Mr. Kahler, a relief mechanic, and the owner of a 'plane, volunteered to fly to Delano, and his offer was accepted. The trip, including the repair of the truck, consumed three hours, whereas, approximately, eight hours would have been required had the mechanic used the company car. Another example of the utilization of the aeroplane in emergencies in this day and age of speed.

PUMP STATION FOR DOMINGUEZ

As a result of the mounting production in the Dominguez field the company has installed a pipe line pump station through which oil from both the Dominguez and Rosecrans fields will pass on its way to the Los Angeles refinery six miles distant. The site of the station is on the Callender lease in the Dominguez field.

INSTALL SAFETY DEVICES

Safety devices have been installed on all the Union Oil Company rigs upon leases in the Maricopa, Taft, Fellows and Kern River areas. Work is now in progress on rigs in the Lost Hills, Coalinga and Belridge districts owned by the company.

TENNIS TOURNAMENT UNDER WAY

The sixth annual Union Oil Company tennis tournament got off to an auspicious start on October 11th. Due to the large entry list it is likely that three Saturday afternoons will be required to complete the tournament.

Through the courtesy of the Y. M. C. A. the games were played on the courts of that organization on Whittier Boulevard.

Some slight changes were made in the operation of this year's tournament. It was decided, because of geographical conditions, to limit the competitors to the southern district.

Interest in the tournament was keener than in previous years. The refreshment committee composed of Misses A. P. Mann, E. Goeser, H. Frankland, C. McTighe, Mrs. E. Keeler and Mrs. C. Rickenbacher worked indefatigably to insure the success of the tournament, and their efforts were rewarded with a large gallery.

L. A. PIPE LINE PICNIC

Employees of the Los Angeles pipe line and friends to the number of nearly three hundred held a picnic and sports event at the Orange County park on September 28th. Ideal weather favored the picnickers.

Following a luncheon, a sports program of seven events, five of which were staged on the basis of inter-station competitions, were run off. Probably the greatest interest was aroused by the tug-of-war event which was won by the Stewart team.

The 100-yard dash and the three-legged race were won by Wilmington, and the sack race and human wheelbarrow race were copped by Stewart.

AT THE TOP OF THE HEAP

The picture shows the Union Oil Company baseball team that won the championship of the Commercial league in San Diego, after a gruelling struggle. As evidence of the keen competition in the league in which there were six teams, the company representatives although they lost but one game, found themselves in a three-corner tie at the close of the season. Two play-offs failed to break the tie, but on the third attempt, the Union Oil team won both starts, the first game by the lop-sided

score of 8 to 1 and the "croocial" tilt 3 to 2 in a "hair raising" ten inning game. Truly, the company's baseball team in San Diego is composed of the stuff of which champions are made.

SEPTEMBER U. S. PRODUCTION

Following is the gross estimated production of crude oil in the United States for the month of September:

California	18,382,500
Oklahoma	16,339,330
Texas	11,051,725
Arkansas	3,755,760
Wyoming-Montana	3,581,625
Eastern States	3,225,000
Kansas	2,600,880
Louisiana	1,860,810
Total	60,797,630

OFFICIALS INSPECT COMPANY PROPERTIES

L. P. St. Clair, Vice-President; R. D. Matthews, Comptroller, and Paul M. Gregg, General Counsel, recently returned from a three weeks' inspection tour of the company's lease holdings in Colorado. Among the properties which the officials inspected were the Fort Collins district where the company has two gas wells that are standing capped and one producing well; Douglas Lake, Columbia Heights, and Elk Springs, on each of which structures a test well is being drilled by the company.

NEW PRODUCTION

During the month of September the company's new production was two wells with a combined initial yield of approximately 1,100 barrels daily. Neither well was completed when oil started to flow. Gray No. 1 in the Rosecrans field started flowing 800 barrels per day, but the present production is around 200 barrels daily. There is no liner in this well, and a further falling off in yield will in all likelihood result before the crew goes in to complete the well. Callender No. 4 in the Dominguez field started at 325 barrels daily. Deepening operations are now in progress at this well.

TRANSFERS HIS ACTIVITIES

J. T. Armitage, who has been in the service of the company for the past ten years, and since October 1922, Assistant to Director of Sales and Transportation, severed his connection with the Union Oil Company on September 30th to become sales director for the Pan American Petroleum Company with headquarters in Los Angeles.

Mr. Armitage goes to his new field of endeavor with the best wishes of his former fellow-workers, who presented him with a beautiful clock and a leather traveling set.

BOWLING LEAGUE STARTS PLAY

The company bowling league commenced its schedule for the 1924-25 season on October 14th, and will continue for a period of eighteen consecutive weeks. Ten teams comprise the league and are as follows: comptrollers, (2 teams); engineering (2 teams); gas division; L. A. lubricating; L. A. branch; salesmen (L. A. branch); sales and transportation; traffic.

E. W. Clark, Executive Vice President, has donated a cup which will be presented to the team winning the pennant.

R. W. McCutcheon is chairman of the league, and William Elliott secretary and treasurer.

In order that all teams may have an equal chance, the league will be operated on a team handicap basis according to the records during the past season.

COMPANY TEAM WINS

(Continued from Page 19)

Special Artificial Respiration Problem

Man is found, apparently not breathing, on his back with shoulder and upper part of both arms in contact with a live electric wire. Demonstrate three methods of rescue before treatment. Treat, lift, and carry by one man fireman's lift for 20 feet. Judge or chairman of judges to select any team member for carrying. No burns to treat. Demonstrate artificial respiration 5 minutes.
Reading Time 3 Minutes Working Time 12 Minutes

Problem No. 1

Miner rescued after suffocation with powder smoke, takes occasional gasp; has compound fracture of right leg 6 inches below knee; bones protruding, bleeding in spurts. In state of shock and unconscious. Give artificial respiration 2 minutes.
Reading Time 3 Minutes Working Time 9 Minutes

Problem No. 2

Treat the following injuries: Burn of entire left hand. Fracture of lower jaw and fracture of pelvis in the midline of body in front. Patient conscious, in state of shock.
Reading Time 3 Minutes Working Time 12 Minutes

Problem No. 3

Treat the following injuries: Backward dislocation of right hip; severe injury to left eyeball. Patient in state of shock. Conscious. Place on stretcher and carry 50 feet.
Reading Times 3 Minutes Working Times 10 Minutes

Problem No. 4

Treat the following injuries: Compound fracture of middle of right thigh; bleeding freely bright red blood from wound from a fracture on the front and to the inner side of the thigh. Lacerated wound of forehead, one inch above right eye, blood oozing. Patient conscious, in state of shock.
Reading Time 3 Minutes. Working Time 11 Minutes.

Oral Examination

1. **Bleeding:**
   a. **How would you tell the difference between arterial, venous and capillary bleeding?**
   b. **Give in the order of their importance the measures to be taken in the control of arterial bleeding.**
   c. **State precautions to be followed in the use of a tourniquet.**
2. **Shock:**
   a. **Give the symptoms of shock.**
   b. **Describe the treatment for shock.**
3. **Wounds:**
   a. **Which is more dangerous an open wound or a bruise, both injuries being equally severe? Why?**
   b. **State the preventive measures against infection of wounds taught in first-aid.**
4. **Fractures:**
   a. **Describe the difference between a simple and a compound fracture. Which fracture is more dangerous and why?**
   b. **Give the general symptoms of a fracture.**
   c. **Give treatment of fractures both simple and compound.**
5. **Burns:**
   a. **Describe the treatment for burns giving the precautions to be followed.**

The third State Contest will be held next year at Fresno, and it is expected before that time a number of other teams from various departments of the company's activities will have been trained and the winner and runner-up of a company contest will enter the State contest and defend the challenge cups against all comers.

California Oil Statistics, August, 1924

PRODUCTION

(Figures for production and stocks are in barrels of 42 gallons)

DISTRICT	BARRELS PER MONTH	DAILY AVERAGE August 1924	July 1924	Aug. 1923
Kern River	578,221	18,652	18,504	19,384
McKittrick	176,275	5,686	5,631	5,945
Midway-Sunset	3,254,649	104,989	106,362	74,083
Elk Hills	1,271,661	41,021	38,350	22,135
Lost Hills-Belridge	145,151	4,682	4,174	3,728
Coalinga	767,772	24,767	32,715	14,406
Wheeler Ridge	32,632	1,053	985	420
Watsonville	1,783	58	58	58
Santa Maria	250,122	8,068	7,970	8,603
Summerland	4,511	146	145	146
Ventura-Newhall	387,741	12,508	11,088	10,293
Los Angeles-Salt Lake	76,684	2,474	2,394	3,255
Whittier	69,250	2,234	2,127	1,698
Fullerton	351,021	11,323	11,677	11,610
Coyote	628,511	20,275	19,557	2,190
Santa Fe Springs	1,797,595	57,987	59,562	322,522
Montebello	524,141	16,908	16,778	10,718
Richfield	367,347	11,850	11,561	16,404
Huntington Beach	1,290,901	41,642	43,232	104,582
Long Beach	4,620,041	149,033	154,162	214,818
Torrance	1,741,121	56,165	57,308	5,906
Dominguez	740,414	23,884	16,761	.....
Rosecrans	35,454	1,143	666	.....
TOTAL	19,112,998	616,548	621,766	852,903
July	19,274,755	621,766		
Decrease	161,757	5,218		

FIELD, REFINERY, PIPE LINE & TANK FARM STOCKS OF CRUDE, RESIDUUM & TOPS

	Aug. 31, 1924	July 31, 1924	Aug. Stock Increases	Aug. 31, 1923
Heavy Crude, heavier than 20° A.P.I., including Residuum	50,682,143	49,838,964	843,179	45,592,354
Refinable Crude, 20° A.P.I., and lighter	39,341,459	38,415,864	925,595	29,203,895
Tops	12,823,103	13,211,397	*388,294	10,397,772
TOTAL	102,846,705	101,466,225	1,380,480	85,194,021

*Decrease

	Aug. 31, 1924	July 31, 1924	Aug. 31 1923
Total quantity of above products held at refineries	34,839,783	34,285,698	21,953,777
Total quantity of above products held in fields, pipe lines & tank farms.	68,006,922	67,180,527	63,240,244
Total Stocks, as above	102,846,705	101,466,225	85,194,021

DEVELOPMENT

DISTRICTS	New Rigs Up	Active Drilling	Completed	Daily Initial Output	Active Producing	Abandoned
Kern River	.....	8	1	5	2,174	....
McKittrick	.....	4	.....	.....	273	....
Midway-Sunset	20	62	22	5,658	2,869	6
Elk Hills	1	16	6	1,425	233	2
Lost Hills-Belridge	.....	6	.....	.....	301	3
Coalinga	1	11	.....	.....	1,028	2
Wheeler Ridge	.....	6	1	225	12	....
Watsonville	.....	.....	.....	.....	6	....
Santa Maria	1	9	.....	.....	293	1
Summerland	.....	.....	.....	.....	135	....
Ventura-Newhall	10	42	1	1,070	570	2
Los Angeles-Salt Lake	.....	.....	.....	.....	480	....
Whittier	.....	12	.....	.....	178	1
Fullerton	.....	2	.....	.....	388	....
Coyote	.....	2	.....	.....	230	....
Santa Fe Springs	3	10	2	691	345	....
Montebello	.....	10	.....	.....	152	1
Richfield	.....	10	.....	.....	180	1
Huntington Beach	1	22	6	930	285	2
Long Beach	2	40	11	4,748	489	5
Torrance	22	72	44	10,018	437	1
Dominguez	2	17	5	8,050	20	5
Rosecrans	14	30	1	1,134	2	....
Miscellaneous Drilling	13	97	.....	.....	.....	6
August	90	488	100	33,954	11,080	38
July	119	504	137	55,975	11,305	41
Decrease	29	16	37	22,021	225	3
Average for Year 1923	111	759	82	114,690	8,928	24
" " " 1922	115	605	67	43,700	9,410	17
" " " 1921	90	536	57	15,631	9,425	14
" " " 1920	77	403	49	14,125	9,299	13
" " " 1919	58	340	47	9,572	8,774	18

Refined and Crude

"Flee!" she cried.

"You mean fly, don't you?"

"Never mind what insect I mean. Just run, Pa's coming."

Don't be afraid of big things—a Packard steers easier than a Ford.

Be honest: Did you ever successfully get away with anything? Why not quit trying?

"No, my husband has never spoken a harsh word to me."

"Ah! charming man—so considerate!"

"Oh, no; so cautious."

"Is this a portrait of your fiancee?"

"Yes."

"I suppose she must be very wealthy."

Where's Al these days?

Al who?

Al Cohol.

I don't know. Kerosene him last week; hasn't benzine since—gasoline(d) against a lamp post and took a naphtha.

"Lady," said the tramp, "would you be kind enough to give me the recipe for that cake you handed me this morning?"

"For goodness sake, man," exclaimed the astonished housewife, "what do you want that recipe for?"

"To settle a bet, lady. My partner says you use three cupfuls of cement to one of sugar, and I claim you only use two and a half."

A retail dealer in furniture wrote to a wholesale firm ordering a lot of chairs. The firm wired him back: "Cannot send chairs until you pay for your last consignment." "Unable to wait so long," the dealer telegraphed back, "cancel order."

A man's good breeding is his best security against other people's ill manners.

Patient: "Do you think I'll get well, doctor?"

Doctor: "You have every chance. Nine out of ten cases of this kind die. You're my tenth case; I've had nine others and they all died."

A furrier was selling a coat.

"Yes, madam," he said, "I guarantee this to be genuine skunk fur that will wear for years."

"But suppose I get it wet in the rain," asked his fair customer, "what effect will the water have on it? Won't it spoil?"

"Madam," answered the furrier, and there was a wealth of sincerity in his dulcet tones, "I can only answer: Did you ever hear of a shunk carrying an umbrella?"

Profiting by experience is using the knowledge you have gained through failures. In other words, it's converting failures into successes.

A doctor says that by the aid of selenium we shall be able to see speech in the form of light.

We trust that caddies will then wear smoked glasses.

The Man: "By Jove! Aren't you that jolly girl I kissed on the pier last night?"

The Maid: "About what time?"

Doris: "When Tom proposed to me three years ago I refused him, and he said it would be the death of him."

Maud: "Well, that's not so, for he proposed to me last night, and I accepted him."

Doris: "He must have meant a living death."

"I have liked your 'Aristo' lubricating oil well enough to have used it, and no other, in my Chevrolet car for the last 17,000 miles. The car is in use constantly, and for all sorts of rough ranch duty, often with a trailer, but during this time I have had no trouble which was due to faulty lubrication.

"The Chevrolet being several years old, there is considerable play in the pistons, and consequently some oil works up into the firing chamber, but during the time that I have used 'Aristo' I have never fouled a plug. When the engine was overhauled some time ago, there was but a thin deposit of carbon, which was soft enough to be easily removed."

(Name on Request)

"Carbon" that Blows Out With Exhaust

Keeps Motors Clean *for Thousands of Extra Miles*

THERE is a reason why so many people write us about Aristo motor oil. They note a difference in "carbon" deposits (which eventually result in varying degrees from every motor lubricant).

Motors lubricated with Aristo travel from 10,000 to 20,000 miles without so-called "carbon". Some records of 25,000 to 50,000 miles have been reported by Aristo users.

The reason is, most of the *soft, fluffy* residue that comes from Aristo blows out with the exhaust and thus *removes itself.*

Hard, Flinty, "Sticky" Carbon

Another kind of "Carbon"—hard and flinty—has a tendency to cling and, therefore, accumulates nearly four times as fast as the fluffy kind. Chisels, or special torches, are required to remove it every 3,000 or 4,000 miles, or your motor "knocks" and loses power, due to leaky valves and "sticky" pistons. You know this kind.

This "carbon" also attaches to spark plugs and short-circuits them so the motor misses. It becomes incandescent and pre-ignites the gas, causing "knocking".

There are several real advantages, therefore, in a soft, fluffy residue that so minimizes the time-wasting, troublesome "carbon deposit".

Aristo users are so impressed that they write us frequently. We print their words, from time to time, so that you may learn from others what they know to be the facts about this motor oil.

All first class garages and service stations can supply it.

Union Oil Company
of California

ARISTO Motor Oil

Avoid Motor Oils

containing paraffin or asphalt or any other non-lubricating substance. Aristo Motor Oil is refined by the most advanced processes designed to eliminate everything in the crude which has no lubricating value.

Mac Printing Co., Los Angeles