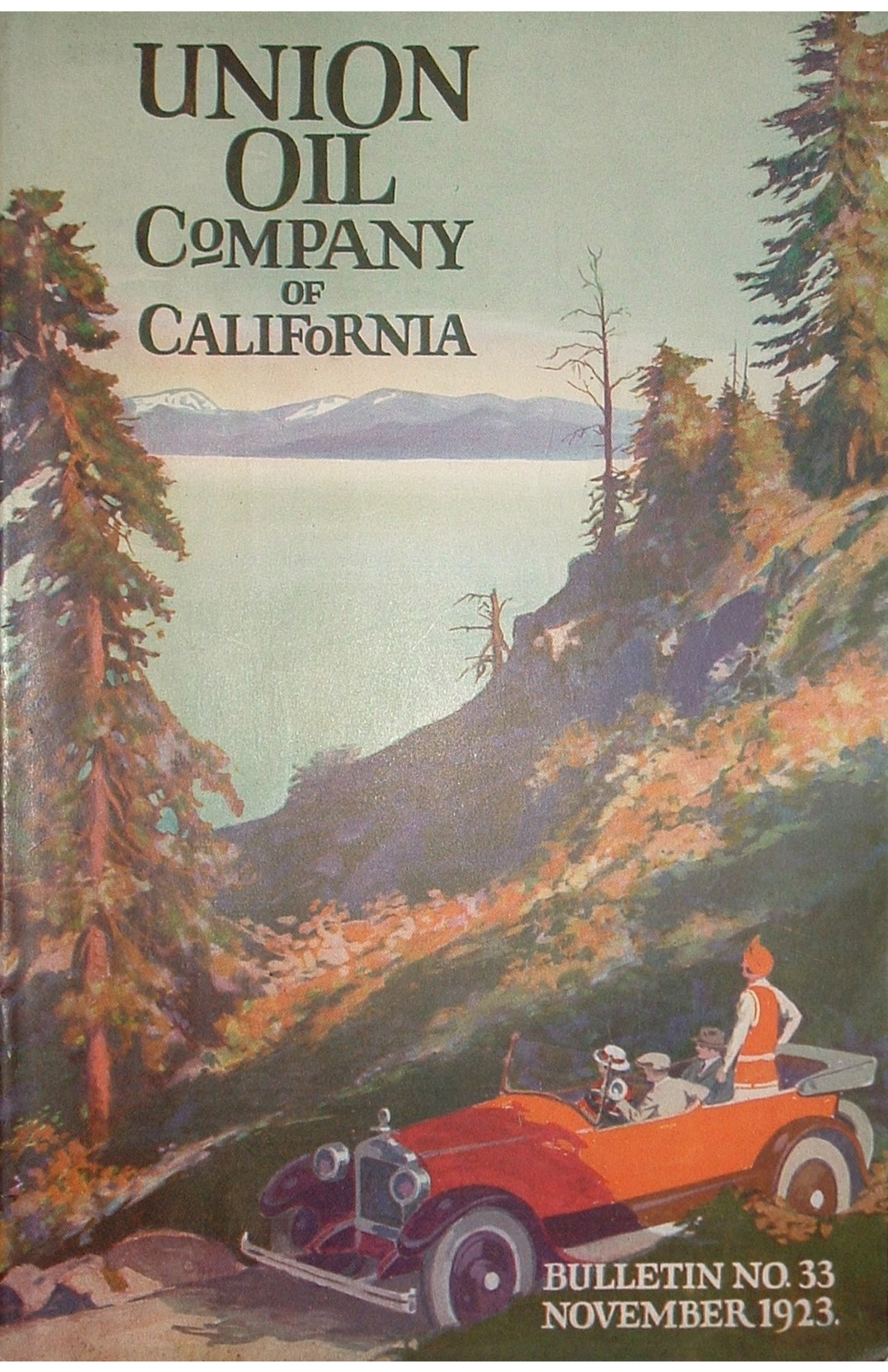


UNION OIL COMPANY OF CALIFORNIA



BULLETIN NO. 33
NOVEMBER 1923.

Non-Detonating Gasoline

Like the Smokeless Powder of the Big Guns

Some gasolines detonate. Union Gasoline does not. And that distinction may largely determine the efficiency of the motor that you drive.

Detonating gasolines explode instantaneously. Crashing against the piston, they depend upon the single impulse for the complete piston stroke.

They limit the compression because of their tendency to explode *prematurely*, resulting in less power and efficiency.

Detonating is a cause of "knocking"—you've noticed it on hills.

Also, those crashing impulses cause vibration, which means wear and tear.

The Powerful Thrust

Union Gasoline is *non-detonating*. Its explosion is prolonged.

It *thrusts* the piston, does not *crash* against it. It causes sustained impulse, exerting power to the full length of the stroke.

Authorities agree that it permits increased compression because compression is limited by the tendency of gasoline to detonate.

New Speed

So with Union *Non-Detonating* Gasoline your car gains new liveliness. You notice a new "lift" on hills, a snappier pickup, more power and less vibration at all speeds—less wear and tear.

And this increased efficiency means more mileage, too.

Union *Non-Detonating* Gasoline is the product of progressive refining methods. Its quality is governed by exhaustive tests. The research of able chemists, equipped with the finest apparatus for studying refining methods, is constantly devoted to its improvement.

So there are many reasons for using this *non-detonating* gasoline in motor cars, trucks and tractors.



Union Oil Company
of California

Union Gasoline

Union Oil Company of California



UNLESS MARKED "COPYRIGHT" ARTICLES
IN THIS MAGAZINE MAY BE USED IN ANY
OTHER PUBLICATION

ADDRESS ALL COMMUNICATIONS TO THE
"BULLETIN" 901 UNION OIL BUILDING
LOS ANGELES, CALIF.

W. L. STEWART - - - - - <i>President</i>	
E. W. CLARK, <i>Executive Vice-President</i>	R. J. KEOWN - - - - - <i>Treasurer</i>
W. W. ORCUTT - - - <i>Vice-President</i>	PAUL M. GREGG - - - - - <i>General Counsel</i>
L. P. ST. CLAIR - - - <i>Vice-President</i>	C. W. BROWN - - - <i>Director, Exploration and Production</i>
R. D. MATTHEWS - - - <i>Comptroller</i>	E. I. DYER - - - - - <i>Technical Director</i>
JOHN McPEAK - - - - - <i>Secretary</i>	C. W. RALPH - - - - - <i>Director, Sales and Transportation</i>

VOLUME 3

NOVEMBER, 1923

BULLETIN No. 33

Nevada, the Sage Brush State

By D. E. ERICSON

Special Agent, Union Oil Company of Nevada

IT is true that more misconceptions exist about Nevada, or the "Silver State," as it is popularly known, than any other



State in the Union. Nevada is the sixth largest State in area and the smallest in population, having an area of 109,821 square miles and a population of 77,407 according to the Federal census, although unofficial agencies place the population at closer to 100,000. The popular impression, particularly in the East, is that Nevada is a desolate waste, but this is not true. It is capable of supporting a population of a million people or more and the reason that it does not do so now is that homeseekers have not been informed of the fact that Nevada has many fertile valleys with soil equally as good as that contained in the adjoining states of Utah, Idaho and California.

Nevada occupies the plateau region between the Rocky Mountains and the Sierra Nevadas, the entire State averaging 4500 feet in elevation. A relief map of the

State looks like a washboard, mountain ranges alternating with valleys running north and south across the State. These mountain ranges are covered with pines and juniper above the snow line and are watersheds for numerous streams which water the valleys below. Cattle and sheep graze upon them in summer. Four large streams furnish plentiful supplies of water to the valleys through which they flow. The Truckee river, which is the only outlet to Lake Tahoe, waters the Truckee meadows, passing through Reno and finally empties into Pyramid lake. The Humboldt is the largest river in the State, and crosses almost two-thirds of the width of the State; with its tributaries it waters Pershing, Humboldt and Elko counties. The Carson and Walker rivers serve Douglas, Ormsby, Storey, Lyon and Churchill counties. Numerous other smaller streams throughout the State run to waste in undeveloped valleys where future storage projects will open up vast areas of fertile land.

There is one Government reclamation project in the State, the Newlands project at Fallon, and another, the Spanish Springs project, north of Reno, in contemplation. The Newlands project covers almost 200,000 acres of land and cost the Government \$6,000,000 to build.

The climate of Nevada is mild, with short, open winters and clear cool summers. The yearly precipitation is less than ten inches for the entire State, the snow staying on the ground only a short time after falling, but the mountains store the precipitation for use during the summer. The southern part of the State has a semi-tropical climate, with no winter at all and with the aid of water from the high mountains, the farmers raise cotton and even oranges successfully.

While Nevada has always been known as a great mining State, and although mining is still a large factor and will be for many years to come, livestock raising is now the leading industry. The livestock industry earned for Nevada stock raisers \$25,000,000 last year while mining brought less than \$22,000,000. The sheep in the State are valued at sixteen and a half million dollars, the cattle at approximately \$25,000,000, horses at \$4,500,000 and cows at over \$3,000,000. A range of 50,000,000 acres is available for this stock, outside of cultivated areas.

Alfalfa is the basic crop of Nevada, because, on account of soil and market conditions, it can be grown with greater profit than any other crop. The ranches are all large, averaging a thousand acres, some as large as 100,000 acres, but the trend is toward cutting up these large holdings and getting in settlers on 40, 80 and 160 acre tracts. Potatoes are the principal export crop and the Nevada potato is acknowledged to be the finest on the market. About 1,500,000 bushels are raised each year. Garden products, as well as fruit and berries are grown readily.

Practically every known mineral is to be found in Nevada. Gold, silver and copper have been steadily produced for over

Courage

*Because I hold it sinful to despond,
And will not let the bitterness of life
Blind me with burning tears, but look beyond
Its tumult and its strife;*

*Because I lift my head above the mist
Where the sun shines and the broad breezes
blow,*

*By every ray and every raindrop kissed
That God's love doth bestow;*

*Think you I find no bitterness at all,
No burden to be borne like Christian's pack?
Think you there are no ready tears to fall,
Because I keep them back?*

*Why should I hug life's ills with cold reserve
To curse myself and all who love me? Nay!
A thousand times more good than I deserve
God gives me every day.*

*And in each one of these rebellious tears
Kept bravely back, He makes a rainbow shine,
Grateful, I take His slightest gift; no fears
Nor any doubts are mine.*

*Dark skies must clear, and when the clouds
are past*

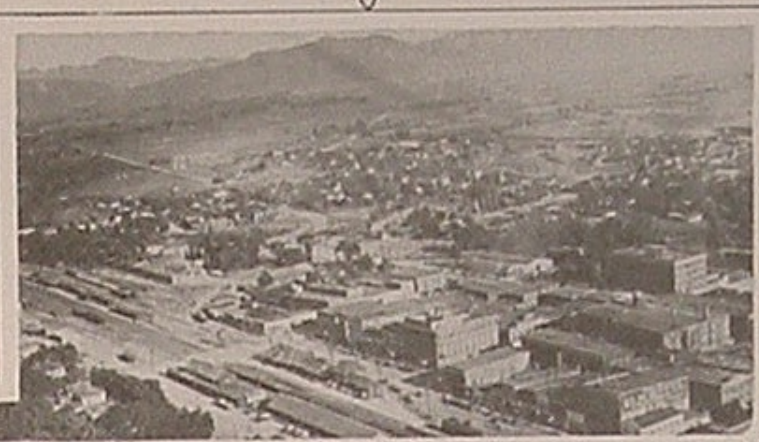
*One golden day redeems a weary year;
Patient, I listen, sure that sweet at last
Will sound His voice of cheer.*

—WRITER UNKNOWN

sixty years. Recently other minerals have come into prominence, such as tungsten, quicksilver, zinc, sulphur, antimony, lead, salt, borax, molybdenum and barite and in the southwestern part of the State platinum has been found. The famous Comstock at Virginia City, discovered in 1859, produced nearly \$100,000,000 in silver and gold, making great fortunes for its owners, some of whom later used the money for the upbuilding of San Francisco. It is a saying, and no doubt a true one, to a great extent, that Virginia City, Nevada, built San Francisco. Tonopah, Goldfield, Rawhide, Austin,

Eureka, Ely and some other of the Nevada mining camps were famous in their day and contributed their quotas of mineral wealth. Of these, only Virginia City, Tonopah and Ely remain as active camps. At Virginia City, many of the old mines have been consolidated and are being operated by one large corporation, the ore being mined and treated at a much lower cost than in the old days. The United Comstock Mines Company is operating one of the largest cyanide mills in the world at American Flat. Tonopah, since its first discovery in 1901 has always been an active silver camp and still is. Just recently another strike of high grade silver ore was announced there. Ely, in the eastern part of the State, is a copper camp, the majority of the mines in that district being owned and operated by the Nevada Consolidated Copper Company, who also have their own reduction works and smelters, also a standard gauge railroad, connecting the Southern Pacific and Western Pacific railroads. The Ely mines and affiliated industries are operating to capacity, employing several thousand men.

Three transcontinental railroads and



RENO, THE PRINCIPAL CITY OF NEVADA

A business section of Reno, showing the Masonic Temple and the post office in the immediate foreground, and to the right an aerial view of the commercial section of the city. The beautiful Truckee river flows through Reno, the picture on the left being snapped from one of the many bridges that cross it.

three transcontinental highways cross the State east and west, but none of these reach the productive areas. As a result, the traveler receives a poor impression of Nevada.

The largest city is Reno, situated 12 miles from the California line, snug up against the Sierra Nevada mountains. It has a population of approximately 18,000, according to unofficial census taken last year and has all the advantages of a big city, with none of the disadvantages. It is the business center of the State, also of the California counties on the east slope of the Sierra Nevada mountains. Carson

City is the capital of the State and is situated 30 miles south of Reno, the two cities being connected by a concrete highway.

Fallon, Lovelock, Winnemucca, Elko, Ely, Sparks, Tonopah, Yerington and Las Vegas are also progressive cities, population of these cities running from 2,000 to 6,000.

The Union Oil Company of Nevada is represented in this territory by seven distributing stations and two service stations. Distributing stations are located at Reno, Minden, Fallon, Tonopah, Lovelock, Winnemucca and Elko. The Reno station was



SUNSET ON LAKE TAHOE

Looking towards the California side of the lake. The picture was taken from the porch of the lodge at Glenbrook, Nevada. Lake Tahoe is one of the most beautiful lakes of the Pacific States and one of Nature's wonder spots.

the first built in the State, being erected in 1914 and operated under the Union Oil Company of California until April 1st, 1918, at which time the Union Oil Company of Nevada opened its office at Reno, the Company having been incorporated in Nevada on August 27th, 1917.

Since that time, six other stations have been added, Minden station having been opened for business in June, 1918, Winnemucca in July, 1921, Elko in September, 1921, Fallon in May, 1922, Tonopah in August, 1921 and Lovelock in August, 1923. The two service stations are located at Reno.

The Union Oil Company supplies a large portion of the petroleum products used in Nevada, its business showing a healthy increase each year. On account of the small population of the State, one would imagine that the demand for gasoline and oils would not be very large, but it is stated that during the year 1922 there was sold within the State of Nevada some six million gallons of gasoline alone. Quite a proportion of this, of course, was sold to tourists.

Mining operations use large quantities of lubricating oils and greases, also stove oil, engine distillate and gasoline for power, where electric power is not available.

Most of the roads in the State are unimproved dirt roads, although in the last few years the State and Government combined have built some good stretches of highway in different sections and the road



TYPICAL NEVADA MINING TOWN

Silver mining is one of the leading sources of Nevada's wealth, and was responsible for the mushroom growth of many towns. The picture is of Tonopah.

situation will continue to improve as new roads are built. Considering the lack of improvement and the small amount of maintenance, Nevada roads are in excellent condition and are generally somewhat better than the average country road of many of the States of larger population.

Nevada is a State of "magnificent distances." In California, in most of the Districts of the Union Oil Company, the distributing stations are situated very close to each other and as a rule to the District Office, but in Nevada the opposite is true; for example, Minden is 50 miles south of Reno, Fallon is 70 miles west, Tonopah 260 miles southeast, Lovelock 104 miles, Winnemucca 175 miles and Elko 320 miles northeast, the three latter being situated on the main line of the Southern Pacific railroad.

Minden serves an agricultural section,



MINDEN COURT HOUSE

Famous for its divorce cases. The plant of the Union Oil Company of Nevada can be seen to the right of the picture.

being the county seat of Douglas county and in the center of the productive Carson valley. Fallon serves the agricultural district of the Newlands project of the U. S. Reclamation Service and is the capital of Churchill county. Several mining districts are also served out of Fallon.

Reno, of course, is the metropolis of the State and serves a large territory, both in Nevada and California. The State University is located here, which institution has extensive mining and agricultural departments. The State Agricultural experiment farm is also situated at Reno.

Roughing it in Nevada is a thing of the past. It is true that you may rough it if you wish, exactly the same as you do in

the Adirondacks. The point is, you do not have to. Nevada is in the transitory stage between wildness and a progressive state and modern development has displaced the state of lethargy which was characteristic of the Nevada of a few years ago. The worst that can be said of Nevada is that she lacks population, but as the dweller within her borders expresses it, "if this is a fault, it is chargeable not to those who are here, but to those who fail to come."

D. E. Ericson, is special agent for the Union Oil Company of Nevada with headquarters in Reno, and is in immediate charge of sales activities in the Nevada territory, but reporting to S. D. Herkner, district sales manager at Sacramento. He has been employed by the Union Oil Company since 1916.—Editor's Note.



HUGE GASSER IN COLORADO

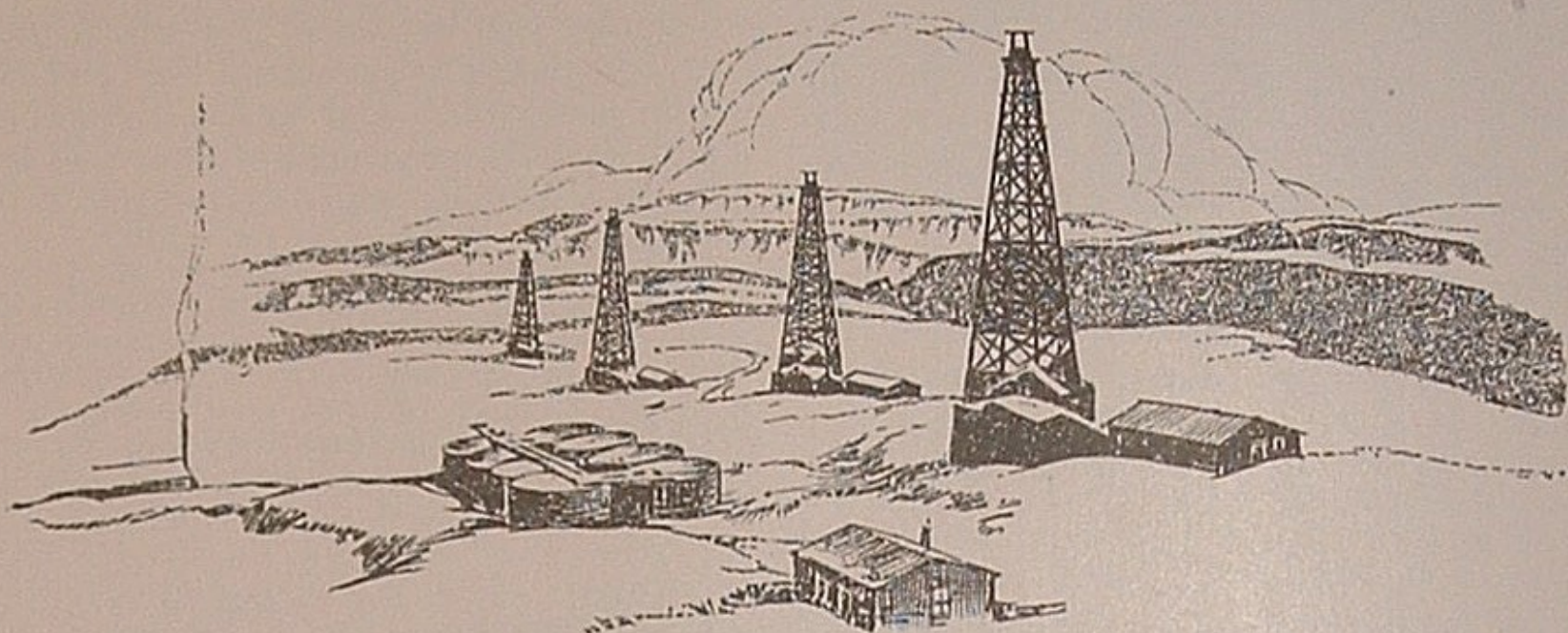
The Union Oil Company of California's test well, Wellington No. 1, located in Larimer County, Colorado, came in on November 12th with a flow estimated to be between 80,000,000 and 100,000,000 cubic feet of gas daily, the biggest gasser ever brought in in Colorado or Wyoming, and giving encouragement that oil may be found at a lower level. The well was completed at 4285 feet, the roar being heard for eight miles and creating much excitement.

From a development standpoint the big gasser is the most important event yet recorded for Colorado in a petroleum way.

The geological and land departments of the Union Oil Company of California last year made complete surveys and secured a total of 65 leases aggregating over 10,000 acres of land, comprising practically the entire structure of the prospective oil field. The district is located some 65 miles north of Denver, 30 miles south of Cheyenne, Wyoming, and in the midst of a thriving farming locality. A gas or oil field, or both, would prove of inestimable value to Colorado as that state has at the present time no real petroleum districts of its own and depends on coal for its fuel.

Maverick Springs Through the Mud

By *RODERICK BURNHAM*
Manager of Lands



IT was in the early Spring of 1921, and we boys who were mixed up with the acquisition of a large number of oil



shale placer mining claims for the Union Oil Company in Garfield County, Colorado, were right in the middle of a heap of trouble. When you stop to realize that it takes eight different people to locate a 160 acre claim, and we were after about 20,000 acres, and you have to have an affidavit from each locator, you can imagine some of the details. We were also working about fifty miners, doing \$500.00 worth of patent work on each claim, which means five holes blasted out of the solid shale and measuring at least 35 cubic yards in volume.

Other outfits were after the different groups of claims also, and through it all were mixed plots and counter-plots and intrigues of all kinds, until the reports that came in to G. H. Q. (General Headquarters as we called the Denver office), sounded more like one of Richard Harding Davis' stories of a revolution in South America than merely buying some land in the United States; but, any way, there

were exciting times for all of us and we were busier than a centipede with the chilblains.

Right in the middle of this came a wire from Charlie Sherman, our Wyoming manager, wanting to know if it wouldn't be possible for me to come at once to Wyoming to examine a structure at Maverick Springs. I wanted to go, all right, but I also thought I ought to stay at G. H. Q. and be on the job if a break occurred. Incidentally, it was right in the Spring, blizzard time in Wyoming, and being a hundred miles from nowhere in the middle of one of those gentle zephyrs at 40 below zero is a long way from the haunting strains of Chiquita as played at the Palais Royal; so I wired Charlie that unless it was impossible to get someone else I would have to beg off on account of press of business, etc., and etc. You know the S.O.S. (same old stuff), and right here is where the wily old fox showed his generalship by wiring Mr. Orcutt, the then manager of the Geological and Land Department, asking that I be sent to Wyoming.

Well, it worked beautifully, and in a few days I got a wire from Mr. Orcutt requesting that "At my earliest convenience, etc., and etc." So I grabbed about seven suits of woolies, an armful of socks, some boots, sweaters, and my sheepskin kimono and caught the night train

for Bonneville, Wyoming, and Bob Hawley went with me.

We picked up Charlie Sherman in Douglas, arrived at Bonneville in the morning, caught a machine to Riverton where we met Mr. W. H. Taylor, who was to show us the property; grabbed a bunch of grub, piled into a "Shesabear" Reo Six with Mr. Wilcox at the wheel, and headed out over the sagebrush for Maverick Springs, fifty miles away. Bless her old heart, "Shesabear" was well named. In fact, she performed nearly as well as my own "Peggy Super Six," and you know that is some admission for me to make. You see, it was just at the tail end of one of the hereinbefore-mentioned 40 below zephyrs, and the thaw had come, and between the snowbanks in the hills and the most beautiful mud-puddles in the valleys, life was just one darn thing after another; but Mr. Wilcox was a skipper after my own heart, for he had plenty of extra tires (two of which we used), and also a beautiful two-handed, honest-to-goodness, mansized shovel and a pick, at which all of us took our turns. Work! Great Guns! Nine hours making that fifty miles.

My maiden modesty alone prevents me from telling you my inner thoughts and possibly some of my expressions about that road. Well, any way, we arrived about 10 P. M., and another Mr. Wilcox, who was in charge of the Sheridan, Wyoming camp, took us in and gave us a true Western welcome, and we



WYOMING SPRINGS FORMATION

An interesting picture of the formation in the vicinity of our Circle Ridge property. The standing on edge characteristic gives one the impression of looking into the earth.

gathered around one of those great big sheet iron stoves with a roaring fire, and

once more life took on its wonderful color.

You might say it was almost perfect, except for — Ah, there it was, that peculiar aroma so dear to the man cub; and it was accompanied by a certain popping, crackling, sizzling sound that only a nice tender beefsteak thrown into a red-hot frying pan can make. So we settled back on our haunches like a bunch of hungry pups,



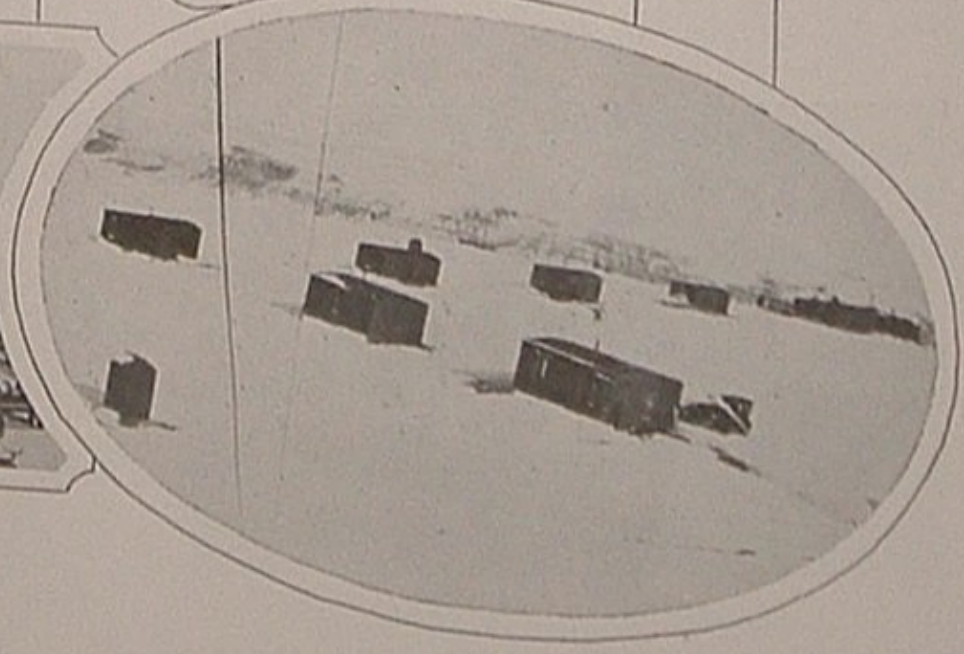
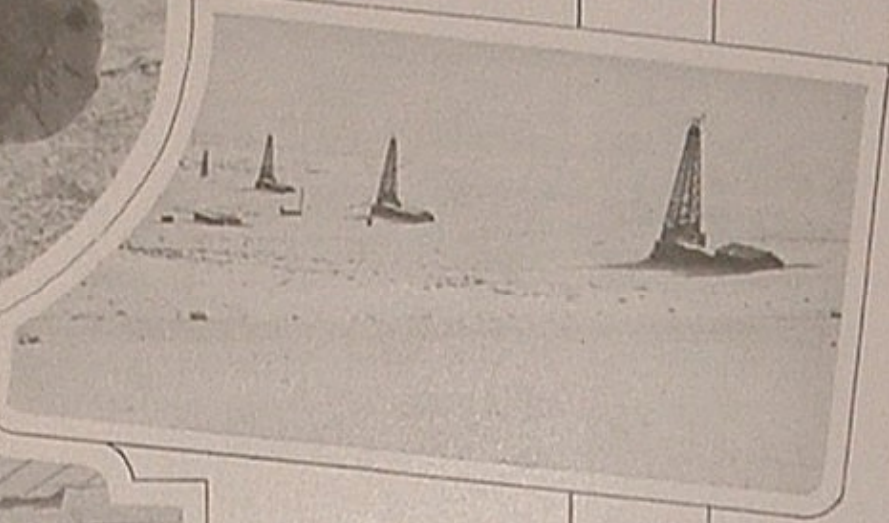
"PEGGY SUPER SIX" HERSELF

Burnham's best friend in his scouting pilgrimages for potential oil territory.

knowing full well what was to come, and believe me it did. Sliced tomatoes which our wise skipper had brought along, old-fashioned fried potatoes cooked to that golden-brown; Mexican beans with chunks of bacon that had been cooked for hours and hours; fried corn and string beans — and the steaks. Oh! man — man, they were beyond description; and coffee, yes, great buckets of it, and big bowls of brown gravy, and those wonderful baking-powder biscuits. Ah — as the Italian says, "It is to see Naples and die." It makes me want to go out and bay at the moon in the sheer delight of being alive, just to think of it.

If Mrs. Wilcox had taken me out on top of Pikes Peak that night and told me it was an oil field, I'd have said, "Sure, you're right, Mrs. Wilcox, we'll spud in in the morning."

Speaking of biscuits, it reminds me of a trip that Mr. Orcutt and a bunch of us had over in the shale fields in Colorado. It was at Uncle Jimmy Franklin's on Roan Creek, and Uncle Jimmy told us a story on his wife. It seems he had to take her to Boston for a very serious and dangerous operation, and as he was leaving the operating room he called the famous surgeon to one side and said, "Now, be awful keerful of her, doc,



ROUND ABOUT CIRCLE RIDGE

This property is located three miles from Maverick Springs, Wyoming and is being developed by the Union Oil Company of California. Reading left to right; Roderick Burnham and Jim Douglas, Wyoming geologist for the Union Oil Company in conference. Like Barney Oldfield, you can tell Burnham by the cigar; wells Nos. 1, 2, 3 and 4 at Maverick Springs; middle left shows the boys engaged in cementing No. 1 at Maverick Springs and right Maverick Springs camp with No. 5 and 6. The derrick in the center is a water well. Lower pictures are close-up views of the camp.

for she's the best biscuit maker in Colorado." And after our first meal at his house we thoroughly agreed with him, and I believe that Mrs. Wilcox holds the same position in Wyoming.

We rolled out of our blankets early the next morning, and took a look at the country, as we hadn't seen much of it the night before, and, say, but it was beautiful! Old Mother Nature must certainly have had some of Mrs. Wilcox's biscuits when she built that particular area, for she was certainly batting a thousand. The mountains and even the hills were standing on their ears as some of them looked like vertical walls of stone, and she had painted them with every color of the rainbow — white, yellow, brown, red, purple, green and grey, all were there, in line after line of color standing out in all the brilliancy of the early morning sun; and, what is more, that sight so dear to the heart of the geologist, in the center of all of these orderly rows she had bent them over in the form of an inverted bowl or dome, as perfect a structure as you could want to see. We didn't say very much, for I think it kinda took us all alike; so we tied on all the accessories of the typical Montgomery Ward "Pebble Pup," till we looked like Xmas trees, and started out to hike.

The camp was down in the bottom of a hole, right in the center of things, and the cliff arched up over us nearly vertical and about 400 feet high. Now, this don't sound like much, but when you start at an elevation of over 6000 feet to begin with, and the climb is straight up, it's not so good, especially as our ribs were well chinked with flapjacks, like moss between the logs of an Alaskan cabin. You can realize what I mean. However, we made it, and the view from the top of the dome was even more beautiful than the one below, for you could see the concentric rings of color formed by the exposure of the various formations dipping away in all directions.

It snowed a bit in the afternoon, but the 40-mile breeze whisked it off the ground as fast as it lit. However, with your eyes full of wind and snow it's not so good, so we headed for camp and gathered around the table and played Union Oil pedro the rest of the day.

The next few days were clear and fine,

and after covering the surrounding country I decided to recommend that the Company take over the 2400 acre lease from the Shoshoni Indian Reservation, which surrounds the Maverick Springs field. The report was turned in, and I headed back for Colorado.

A few months later Peggy and I were disporting ourselves at 120 in the shade among the alkali flats and sand dunes down in the Green River desert country in Southeastern Utah, when I got a wire sent in by messenger that I was to meet Mr. Orcutt and Mr. Frank Hill in Salt Lake City and proceed to Maverick for a final check-up. The time was very short and the only half-way decent road was a long way 'round, and would take too long; so Peggy and I talked it over and she said, "Say, Rod, get some extra gasoline and water, let the air out of all four of my tires, and we'll take the short cut through the sand."

Well, after thinking it over pretty seriously, for it was a bit serious at that, I decided as usual to give in to the ladies, and let her have her own way; so we started within an hour after I received the message. That would put us through the worst of the sand at night, but with two strong headlights (they have no dimmer laws in the desert) and two big spot lights, I figured we could follow the trail left by the sheep wagons.

Everything worked fine. The night was cool and inky black and the lights showed up beautifully. We lost the wheel tracks a couple of times because of drifting sand, but as usual the Lord had both arms around us, and we roared into smooth sailing and hard roads by sunrise.

We had made the 80 miles without a stop. I unjointed myself, piled out and pumped up all four tires by hand, just to show Peggy that I was still young and not a bit tired, broke open a can of red horse and some hard tack and hit the road for Salt Lake. Made it the next day about three hours before Mr. Orcutt and Mr. Hill arrived. Joined them on the train, and we all headed for Maverick Springs.

They checked up the preliminary work O. K., and it was decided that Frank Hill, Charlie Sherman and I should try and go down a certain canyon for a

preliminary survey of the pipe-line road out to the railroad about fifty miles away. So we borrowed Mr. Wilcox and his "Henry's Fault" roadster, which had a poop-deck on the rear, threw in a canteen of water and a couple of soap-boxes which Charlie and I mounted, and away we went.

All went well until we got down into the canyon a ways, and then the road just naturally forgot to exist. They had had some very heavy rains, and most of the bridges were down, but by three of us getting out and pushing and running Henry up on the side of the hills, lifting, blocking up with rocks, and pulling sagebrush, we worked our way down until along late in the afternoon we met our Waterloo.

The creek had cut a bank about 20 feet deep, and the walls of the canyon



BOARDING HOUSE PROFITS

Porkers enjoying their mid-day meal at Maverick Springs. Soon they will furnish the drillers with their mid-day meal.

were so straight up that they leaned backwards, and even Frank Hill looked serious. After awhile he said that it was too bad that it was quite so deep, otherwise he would have got down in the bottom and eased Henry over the bank; but 20 feet was a little bit too much even for him. Say, if you ever need help with a car, just get Frank, for he can lift, push and pull more than any seven men you ever saw.

There was nothing to do but fight our way back up the canyon. So, with Trusty Charlie at the wheel (for he had proven that he was the best "Henry Skinner" in the bunch) we headed out, and eventually, by dint of much work and a couple of blow-outs, found another canyon and got into Shoshoni about 3 in the morning, where the bunch were waiting for us. I went as far as Salt Lake to get Peggy and the rest went on to Los Angeles.

It was along in September when

Charlie finally got the word to shoot, and he sure had to make the fur fly, for he had to ship all his stuff in, build 50 miles (the same 50 miles we had taken nine hours to make) of road, build his camp, and drill to completion (about



THREE OF A KIND

Left to right Jim Douglas, C. H. Sherman, and Roderick Burnham, a trio of the men responsible for the exploitation of the oil territory in Wyoming, by the Union Oil Company of California.

1800 feet) five wells by December 31st. It was some job, but after having made a good many trips with him and watching him skin that Henry, I figured he could do it if anybody could — and he did. He had to anchor his bunkhouses down with steel cables over the roofs so they would stand still in the breezes; and build the boilers, engine and rig all in one building, and do a lot of his drilling at 43 below zero; which are slightly different conditions than those that exist in our Southern California fields; but it was all done and done well in the required time, and we had five



LOOKING NORTH FROM NO. 6

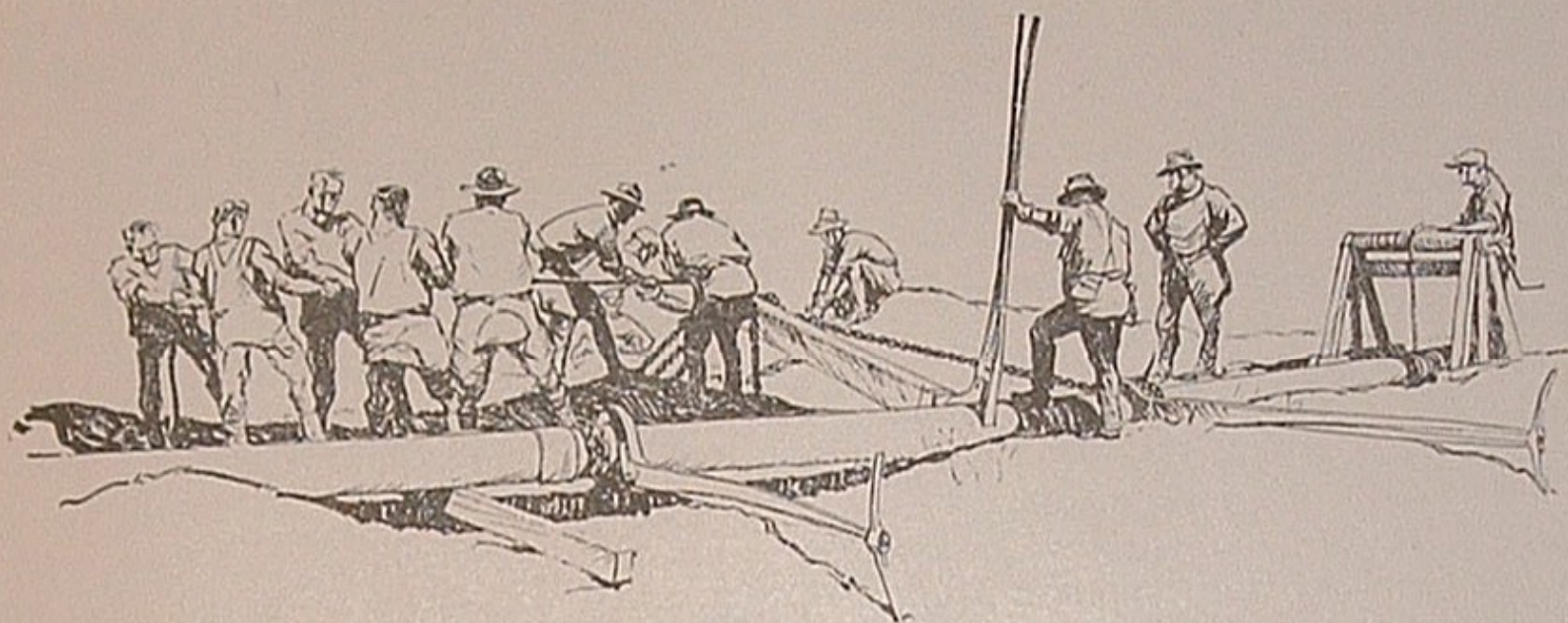
Wells No. 8, 9, and 10, Maverick Springs, four storage tanks and part of the camp buildings under a mantle of snow.

producing wells by December 31st. He has since completed five more wells, and is drilling another now, and the road that took us nine hours to make you can now do in 1:40. Once again man has demonstrated that it can be done.

Los Angeles Pipe Line, 1896 to 1923

By *WILLIAM GROUNDWATER*

Manager of Transportation



THE development of the Los Angeles pipe line system of the Union Oil Company is synonymous with and tributary to the development of the Southern California oil industry. Distribution is second only to production, and the finest product on earth is useless unless it can be delivered to the man who wants it, when he wants it, and where he wants



it. And so we find that the history of the Los Angeles pipe line which was begun when the first unit was constructed in 1896 reflects to a great extent the gigantic strides that have been made by the western oil industry.

It is probable that by the average laymen little thought is given to the distribution of the oil. They are more interested in the actual production of the precious fluid, oblivious to the fact that the handling of the oil after it comes from the ground furnishes more thrills per hour than the actual drilling operations. With the matter of final delivery the public is more or less acquainted, for the Company's trucks and delivery wagons are a familiar sight on the streets of almost any town. Few, however, realize the vast work of transportation involved at the various pump stations whose

slogan is "keep the oil moving" as it is handed on from station to station until it completes its journey from the well to the refinery.

Glimpses into the past are of certain value in that they afford a means of gauging progress that has been made. Twenty-seven years ago when the Union Oil Company of California succeeded in obtaining production in the Olinda field, it was decided to construct a 4 inch line from the field to Los Angeles. The line was capable of handling more than the Union Oil Company's own production and oil purchases were accordingly made from other operators in the field. A small pumping station, known as the Brea Canyon pump station, was installed, which collected the oil from this field, and handed it on to Norwalk where a similar station relayed the oil on to Los Angeles for eventual delivery to city customers by tank wagon. This constitutes the first unit of the Los Angeles pipe line, a system that has grown with the development of the local fields until its receipts for one month have totalled over 5,000,000 barrels.

Development work in the territory contiguous to the Olinda field progressed to such an extent that by the end of the year, the Union Oil Company found it necessary by virtue of increased production to install small pumping plants on the Hall, G. & L. leases and an additional plant in the Brea Canyon known as Station 32. These

last three stations pumped the oil from their respective fields into Brea Canyon station, from which point it was relayed to the Los Angeles storage.

By the end of 1897, the production from the Olinda and Brea Canyon fields exceeded the sales demand in Los Angeles, so that as a further outlet for the oil, it was necessary to construct a 4 inch line to Bixby on the Salt Lake railroad, about seven miles from Norwalk, to allow for car shipments. Increased production and purchased oil necessitated a still further addition to the system, and a 6 inch line was laid from Bixby to the Company's shiploading plant at East San Pedro. On the completion of this unit the loading rack at Bixby was dismantled.

In a little over a year therefore we find that the Company had transportation facilities which permitted of the collection of the production in the Olinda, Brea Canyon and Whittier fields,—the latter had acquired some prominence towards the close of 1897—and distribution to Los Angeles or to tankers at East San Pedro.

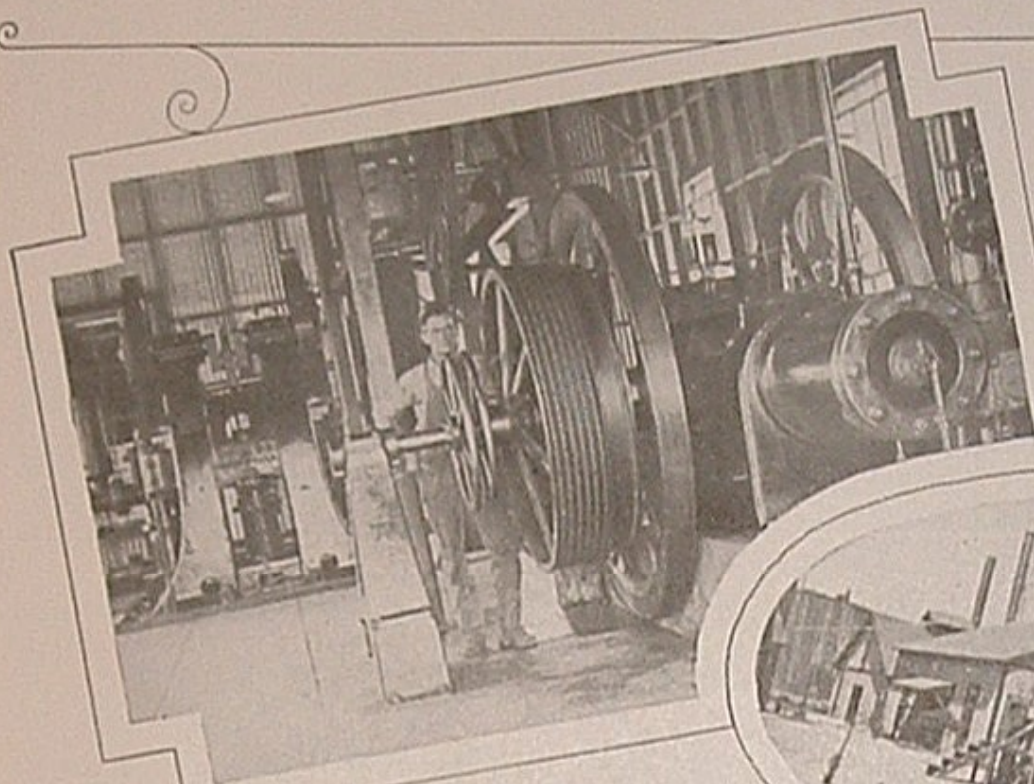
Up to this time little thought had been given to the storage of oil. The law of demand and supply was in unison and there was no need for it. In the next five years however, production so far exceeded the capacity of the pipe line to handle that it was necessary to construct two 37,000 barrel steel tanks at Brea Canyon station. This plant was destroyed by fire but was rebuilt in 1905.

The history of the Los Angeles pipe line during the next few years is a series of additions and improvements. In 1906, in order to afford additional pipe line capacity, it was necessary to take up the 4 inch line between Brea Canyon and Los Angeles and substitute a 6 inch line. Two years later a 6 inch line replaced the 4 inch line between Norwalk and Bixby, thereby making a continuous 6 inch line between Brea Canyon, Norwalk, Los Angeles and East San Pedro. A small pump station was installed near Stewart known as Crawford station, to deliver water for use in drilling operations. In 1908, the Union Oil Company acquired considerable acreage, on which was constructed the Stewart station, one of the principal units of the present system. A 55,000 barrel water tank was built, lines laid to the var-

ious fields, and a Gould Triplex pump was installed to pump the water. With the completion and operation of the Stewart station, the old Crawford station was dismantled. With increased drilling activity and the consequent heavy demand for water, a 10,000 barrel tank was constructed on Sansinena Hills and another of 37,000 barrel capacity on the Stearns lease; the water in these containers was held for emergency in case of shortage of water from the public utility companies which were supplying us. Meanwhile pumps were installed at Stewart, gathering lines were laid to the Brea Canyon, Olinda and other fields in the district, and the oil moved directly to Stewart station. Brea Canyon station was then discontinued.

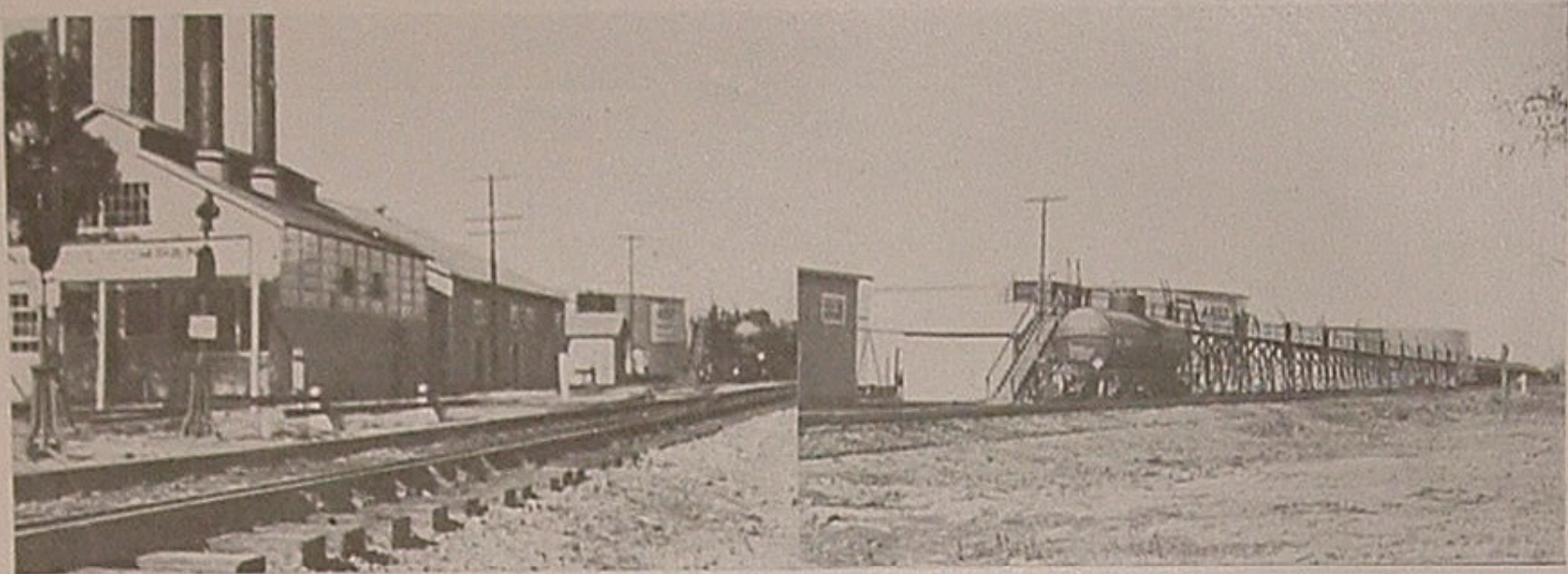
The first two 55,000 barrel tanks were constructed at Stewart in 1908. Two years later, four more were built, and in 1918, ten more tanks were installed, making the total number of 55,000 barrel containers at this point at the present time sixteen. Simultaneously with the completion of the Stewart station, additional equipment was installed at Norwalk, in order to take care of the large volume of oil that was moving through the line.

Due to the abandonment of Station 32 in the Brea Canyon field, a station was built on the Naranjal lease which handled all the production from this district, including the Stearns and Stearns-Columbia production. The Union Oil Company at this time was developing the Graham and Loftus lease and was successful in procuring sufficient production to warrant the installation of a field station, which pumped oil through a 6-inch line to Stewart. In 1915 an additional 4-inch line was laid to connect the Hole lease with Stewart. The previous year, drilling activities of the Company in the Montebello field were rewarded with large production, and a small station was erected to provide for the shipment of oil from this territory by tank cars. A few months later, however, the yield increased to such an extent that it was necessary to augment the pumping capacity at this plant, and a line was laid connecting up with the 6-inch Norwalk-Los Angeles line so that Montebello oil could be moved either to Los Angeles or Norwalk. In 1918, new production was found by the Union Oil Company at Chapman, a line



EARLY VIEWS OF LOS ANGELES PIPE LINE ACTIVITIES

Reading from left, top, Station 32 in 1911; Norwalk station in 1910; pipe line transportation fifteen years ago; Brea Canyon station in 1906 long since dismantled; old pipe line office at Stewart; and the pipe line gauger of fifteen years ago.



AN IMPORTANT UNIT OF THE LOS ANGELES PIPE LINE

This composite picture shows the power house and the loading rack of the Norwalk station. At this point the Union Oil Company has a storage capacity of 420,000 barrels and facilities for the handling of 30 tank cars at its loading rack. Approximately 85,000 barrels of oil are pumped daily.

tying into one of the main gathering lines was laid and a pump station installed.

Production in the southern fields had now reached such a point that the 6-inch line running from Norwalk to East San Pedro was found inadequate, and it was replaced by an 8-inch line which was extended to the newly-constructed Los Angeles refinery. The 6-inch lines between Norwalk and Los Angeles and between Stewart and Norwalk were also replaced by 8-inch lines and a 10-inch line was laid from Norwalk to the Los Angeles refinery.

The Huntington Beach field had been discovered in 1920, but it was not until late the following year that this field began to attract attention. By this time Long Beach had gotten off to a sensational start, and in volume of production had eclipsed Huntington Beach. The effects of this suddenly increased production from these two fields were beginning to be felt. The capacity of the Los Angeles pipe line was already overtaxed when the flood from Santa Fe Springs broke loose, and the task of handling the enormous flow of oil became each day more and more arduous.

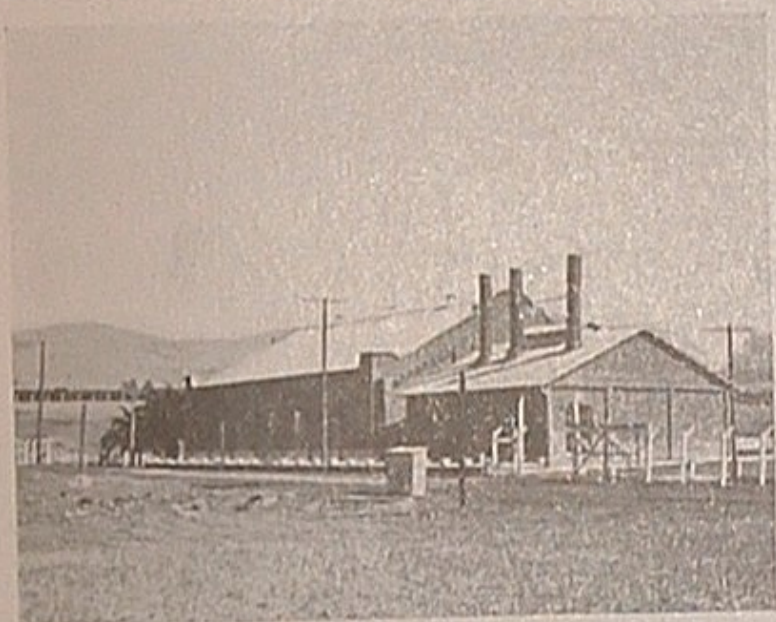


A THING OF BEAUTY IS A JOY FOREVER

So wrote Keating, and the Union Oil Company of California must have had that thought in mind when they constructed the cottages for employees of their Los Angeles pipe line. The snapshot shows a few of the comfy little homes, with wide lawns and shady trees, which the Company has furnished employees at Stewart Station.

It was a struggle in which there was no place for the faint-hearted. At the height of the flood it was not uncommon for oil to be received from the combined fields at a rate of 7000 barrels per hour, and as it is a first essential that an outlet be provided for whatever oil is produced, it was necessary to construct lines which would carry the oil either to the Los Angeles refinery, the ship-loading racks for shipment by tankers, or to the tank farms.

A combination 6-inch and 8-inch line running to the Los Angeles refinery from



STEWART STATION

One of the oldest stations of the Los Angeles pipe line system. The picture shows power and pump houses. This unit pumps 40,000 barrels of oil daily.

the Huntington Beach field handled production from this field, the oil being pumped by a station on the Copeland lease. At the time this work was completed it was not anticipated that the production in this district would ever approximate the flow which later developed, and it was therefore necessary to enlarge the pumping plant with larger pumps, additional boilers and storage tanks, and also to sup-

plement the combination line with an 8-inch loop. Lines of similar capacity were laid to carry the oil from Signal Hill to the Los Angeles refinery and Wilmington ship-loading plant. The 8-inch and 10-inch lines from Norwalk to Los Angeles refinery and Wilmington tank farm handled the production from Santa Fe Springs field.

Some equipment was taken for the additions to the Los Angeles pipe line from the Company's stations between the San Joaquin fields and Port San Luis on the Producers' pipe line, but a large investment was made in new pumps, boilers and other essential materials.

It is a matter of interest to note the enormous growth of the Los Angeles pipe-line system especially within the last few years, as evidenced by the following table:

	Oil Handled Monthly	Stock on Hand	Storage Capacity
1908.....	125,000	290,000	
1910.....	300,000	240,000	
1915.....	280,000	1,120,000	1,400,000
1916.....	280,000		1,400,000
1917.....	280,000		1,400,000
1918.....	280,000		1,370,000
1919.....	280,000		1,360,000
1920.....	485,000	550,000	1,360,000
1921.....	560,000	600,000	1,450,000
1922.....	920,000	675,000	1,350,000
1923 Jan.....	4,300,000	2,125,000	2,250,000
“ Sept.....	4,550,000	7,200,000	7,250,000
“ Oct. 31.....	4,430,000	8,260,000	9,950,000

From its inception in 1896 with the installation of a small line which handled the production from the Olinda field, the Los Angeles pipe line has steadily grown in sympathy with the development of the Southern California fields, until now in point of volume of oil handled, it is one of the major oil-gathering arteries in the country.

CAPTURES HOLD-UPS ON DAY OFF

Devoting his weekly "day off" to a hunt for the two men who held up the Company's Service Station No. 259 at Vancouver, B. C., on the night of November 3rd, Operator W. Jolliffe succeeded in effecting their capture four days after the robbery in a manner which has brought him official commendation. The robbery occurred on Saturday night. Jolliffe searched the pool halls on Monday without success, but refused to be daunted, and continued the hunt on his day off, Wednesday. In the afternoon he spotted them and, after a long chase, the men were captured in a car they had stolen. They were charged with the robbery of Service Stations Nos. 259 and 165, and with the theft of two automobiles, to all

of which they pleaded guilty and were remanded for sentence.

C. W. Ralph, director of Sales and Transportation, expressed his appreciation of the zeal and initiative of Operator Jolliffe in effecting the capture of the hold-ups. Due to Jolliffe's interesting himself to the extent that he did, he put a check to the career of crime of the two men, who perhaps would have committed other robberies. That the persistence and interest in the Company's welfare on the part of a Union Oil employee has been responsible for the capture of bandits menacing an entire community, is gratifying and worthy of unstinted praise.

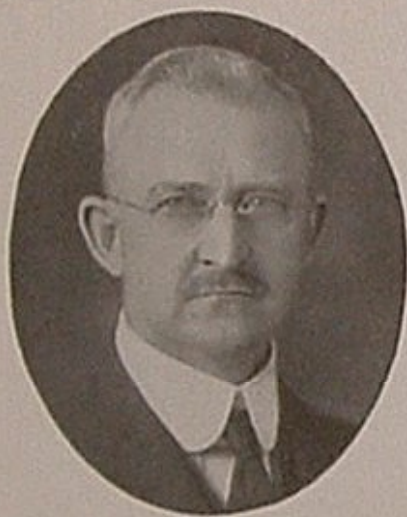
Chile's Copper Industry

By R. B. WALLACE



IT is generally conceded that the largest and richest copper deposits in the world are found in the Republic of Chile, South

America. Adverse economic conditions produced by the aftermath of the war, are disappearing, with the result that the copper industry has very greatly improved. The forecast is for large exportation in the near future.

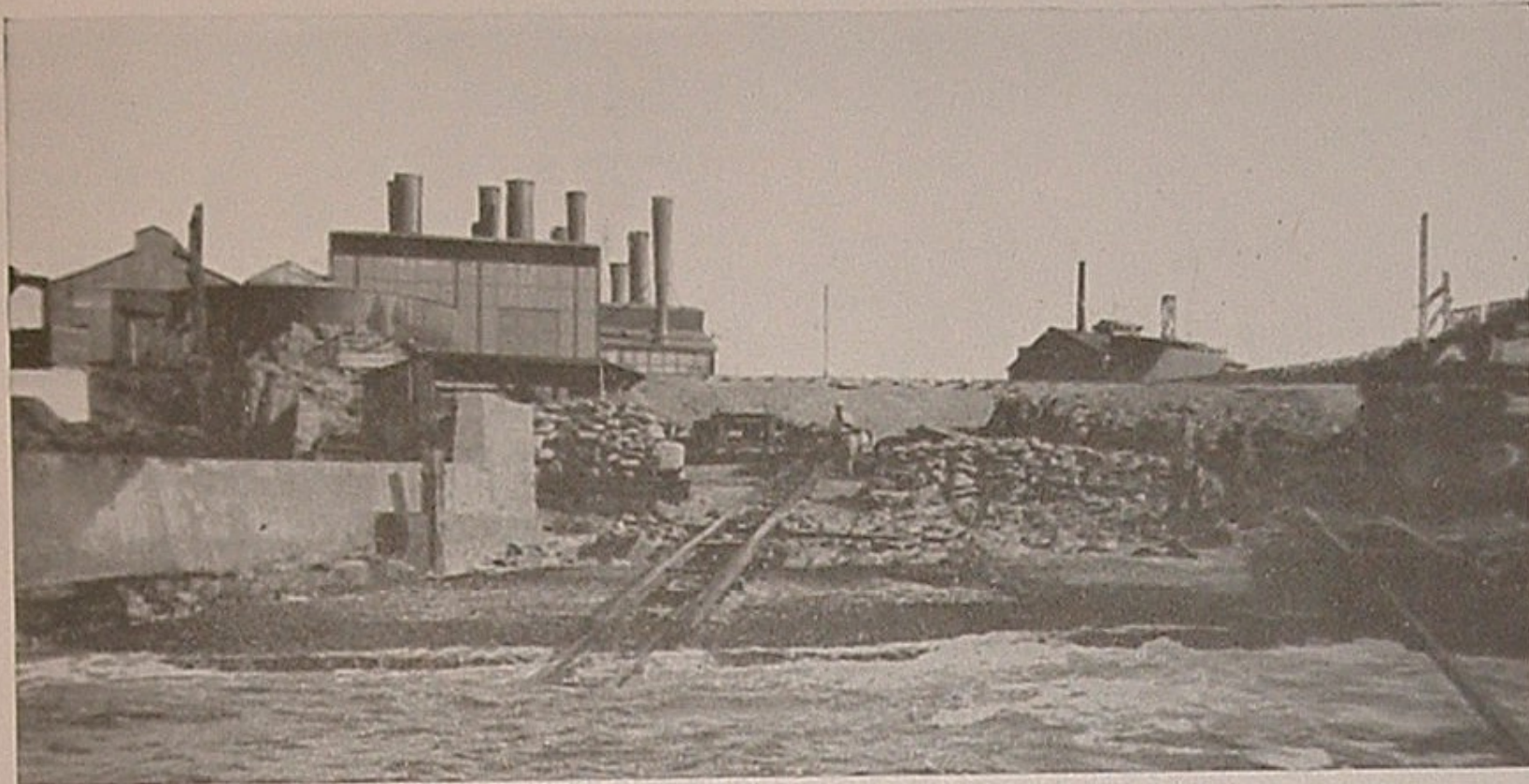


The "big business" game is being successfully played by United States capitalists. Nearly 90% of the present production in Chile is controlled by two well known companies, viz., The Chile Exploration Co. and the Braden Copper Company. Near Raconcagua, a short distance south, and east of Valparaiso, lies the rich "El Teniente" mine of the Braden Copper Co., while in the north, about 90 miles inland from Tocopilla, the Chile Exploration Co. operates the famous "Chuquicamata" mine. In addition to these, is a third producer, the Andes Copper Co., operating quite extensively at their "Potrerillos" mine in the vicinity of Coquimbo. These three companies have their headquarters in the United States, and all their operations are conducted through the Anaconda combine.

The following facts show the commanding position held by the industry. In the three mines mentioned above, there is known to exist over 18,000,000 tons of fine copper. This is 50% of the known copper resources of the whole of the north American continent, and more than 40% of the deposits of the world. While the United States and Japan are in the lead, with Chile a close third in the matter of production, it is nevertheless a safe prediction that within a few years, all countries in the world needing copper will look to Chile for their supply.

Copper experts estimate that the Chuquicamata region alone holds more than 700,000,000 tons of various minerals, of which 2.12% is copper. This percentage represents some 15,000,000 tons of fine ore available. The mine produces 100,000 tons of fine copper annually at approximately \$120.00 per U. S. ton. It is believed that the rate of production can be easily maintained for more than half a century as against 25 to 30 years in the best North American mines.

The main ore body occupies a ridge of the hills and has been proven to a depth well below the base of the ridge. The surface and a few of the veins have been worked in a desultory manner from a period ante-dating the Spanish conquest, originally by the Chuco Indians and the Incas, and later by Spanish, Chilean and other



WHERE UNION OIL TANKERS DISCHARGE AT TOCOPILLA

Showing the slipway for beaching the hose, this procedure being necessary because of the lack of docking facilities. The plant to the left is that of the Chile Exploration Company.

interests, until the property was acquired by the Chile Exploration Company.

The ore is mined with electric shovels operating on benches cut into the hillside. Oil burning locomotives and suitable cars operating on standard gauge tracks, are used in transporting ore and waste from the mine, the former is delivered to the crushing plant in 70 ton ore cars made up in trains of from sixteen to twenty cars.

The electric power is generated by a steam-electric plant located at Tocopilla about 85 miles west. The current is transmitted to the mine over a transmission line at 110,000 volts and transformed in a large sub-station at Chuquicamata.



POWER TRANSMISSION LINES

Power is generated at the Tocopilla plant of the Chile Exploration Company and transmitted over the mountains to the mines.

The El Teniente is the second largest copper mine in the world with some four to five million tons of ore in sight. Produc-

tion at this mine runs about 60,000 tons annually, costing about \$160.00 per U. S. ton. The method of mining the ore is similar to that at Chuquicamata.

While Potrerillos is one of the smaller deposits, nevertheless it likely contains in excess of 1,000,000 tons of fine copper. It could maintain an annual production of 40,000 tons for over 30 years.



UNDER TROPICAL SKIES

A general view of the Chile Exploration Company's staff houses at plant at Tocopilla. Union Oil Company tanks to the left adjoining those of the exploration company.

These mountains of minerals, Chuquicamata, El Teniente, and Potrerillos contain embedded in their granite form, copper and sulphate sufficient to supply all the copper using industries in the world. By electrolysis and other modern processes these mountains are being disintegrated and caused to yield millions of tons of copper of the finest quality.

News of the Month



RETURNS FROM PIPE LINE TOUR

William Groundwater, recently appointed manager of transportation, has made a trip of inspection of the Producers Pipe Line of the Union Oil Company. He was accompanied by E. W. Clark, executive vice president. The Producers Pipe Line system runs from the San Joaquin valley fields to tidewater at San Luis Obispo.

FORTY-EIGHT WELLS DRILLING

The number of wells now being drilled by the Union Oil Company of California in Southern California is forty-eight. Twelve wells are being drilled at Santa Fe Springs, eleven at Huntington Beach, seven at Signal Hill, two at Montebello, and seven in the Torrance and Compton districts.

PIONEER OIL MAN DIES

Milton Stewart, pioneer oil man and elder brother of the late Lyman Stewart, one of the founders of the Union Oil Company of California, died at his home in Pasadena November 20. He was one of the largest stockholders of the Union Oil Company of California.

CUT EVAPORATION LOSSES

Small absorption units installed at tank farms in the Los Angeles basin region are proving an efficient measure because of their being utilized to take off evaporation gases. The Union Oil Company of California is using such a method, pumping the rich vapors which leave the gas traps at the reservoir ventilation to the gasoline absorbers.

PRESENTED WITH DIAMOND RING

On the occasion of his leaving the service of the Union Oil Company of California, Max Dyer, for six years manager of transportation, was presented by his former colleagues with a diamond ring as an expression of their goodwill and fellowship. Mr. Groundwater, his successor, made the presentation.

NEW SERVICE STATIONS

Eleven new service stations were opened by the Union Oil Company of California during the month of October. They are: Soquel Avenue and Ocean, Santa Cruz; First and E, San Diego; 61st and Grove, Oakland; 11th and Willamette, Eugene, Ore. Beretania and Union, Honolulu; Wyandotte and Lower Sacramento Road, Stockton; 3rd and Monterey, Gilroy; 58th and Vermont, Los Angeles; 11th and St. Paul, Tacoma; 11th and L, Sacramento; Electric and Main, Alhambra.

UNION OIL CAFETERIA

A fully equipped modern cafeteria has been opened by the Union Oil Company of California for the benefit of employees of the head office departments. It is located on the seventh floor of the building, and lunches are served to employees at reduced rates.

"WHEN WAGES STOP"

Such is the title of a picture made a few months ago by the major operating oil companies in California for the United States Bureau of Mines. It depicts a story of life in the oil fields and deals with education along safety lines. The Union Oil Company possesses a print of the film, and will be glad to arrange for its exhibition on application.

OCTOBER U. S. PRODUCTION

The gross estimated production of crude oil in the United States for the month of October is 69,073,086 barrels. California tops the list of producing states with a total of 25,931,500 barrels. Texas is second with 14,741,506 barrels and Oklahoma a close third with 12,382,268 barrels.

A. P. I. ANNUAL MEETING

The second annual meeting of the American Petroleum Institute will be held at the Statler Hotel, St. Louis, Mo., during the second week of next month.

TRANSPORTATION APPOINTMENT

William Groundwater has been appointed manager of transportation of the Union Oil Company of California, succeeding Max Dyer resigned. The new transportation chief has been associated with the Union Oil since 1909 at which time he joined the ranks of the Producers pipe line. In 1916, he was made superintendent of that system replacing E. W. Clark, now executive vice president of the Union Oil



Company. Six years later he was appointed assistant manager of transportation with headquarters in Los Angeles. As manager of transportation Mr. Groundwater has responsibility for one of the largest pipe line systems in the country as well as a fleet of 22 oil barges and tankers with a combined carrying capacity of 1,300,000 barrels. The picture shows him standing beside a Company tank car at Norwalk station, while on a trip of inspection of the plant.

CALIFORNIA OIL MAP

The U. S. Geological Survey has issued an oil and gas map of California similar in style to those issued on other states. The map shows the location of refineries and pipe lines and is on such a large scale as to be easily read. It may be obtained from the Survey at Washington, at 50 cents per copy.

PIPE LINE RECEIPTS

Volume of crude oil handled through the Los Angeles pipe line system showed a slight increase in October over the September receipts. The lifting of all restrictions, and the acceptance of all oil offered more than offset the decline in new production, as reflected in the month's receipts.

ERRATA

In last month's issue, page 7, reference was made to the plant of the Mission Transportation Company. This was an error. It should have read Mission Transfer Company.

MOUNT SOLOMON GOLF CLUB DANCE

Members of the Mount Solomon Golf Club, which is composed of employees of the Union Oil Company of California in the Orcutt division, held their first annual dance at Pismo Beach early this month. The dance was largely attended and was adjudged a big success.

SEPTEMBER CRUDE YIELD

The total production of crude oil in California for September amounted to 25,762,487 barrels, an average of 858,750 barrels per day. This is an increase of 5,847 barrels per day over August production.

Stocks increased during the month 2,372,774 barrels. The total stocks at the end of the month were 85,496,609 barrels. The total stock increase for 1923, up to September 30, was 24,311,681 barrels. Indicated consumption for September was 23,389,713 barrels, an average of 779,657 barrels per day. This is an increase of 70,890 barrels per day over August consumption.

Ninety-three wells were completed during the month with an initial daily production of 139,960 barrels, compared with 61 wells completed during August with an initial daily production of 118,433 barrels.

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

EASTERN STOCK INCREASE

Pipe line and tank farm gross domestic oil stocks east of the Rocky Mountains increased 4,379,000 barrels in the month of September according to returns compiled by the American Petroleum Institute from reports made to it by representative companies. The net change shown by the reporting companies accounts for increases and decreases in general crude oil stocks including crude oil in transit.

NON-DETONATING BALL CLUB

Reports come in that the Stockton District of Union Oil Company of California boasts a ball team which is keeping Union Non-Detonating Gasoline before the public by consistently winning from opposing ball clubs in the northern end of the San Joaquin Valley.

One of the recent and most appreciated victories of the team was its 12 to 6 win over the Golden Shell Coyotes, the Stockton team representing the Shell Company.

ABANDON OCEAN BED PIPE LINE

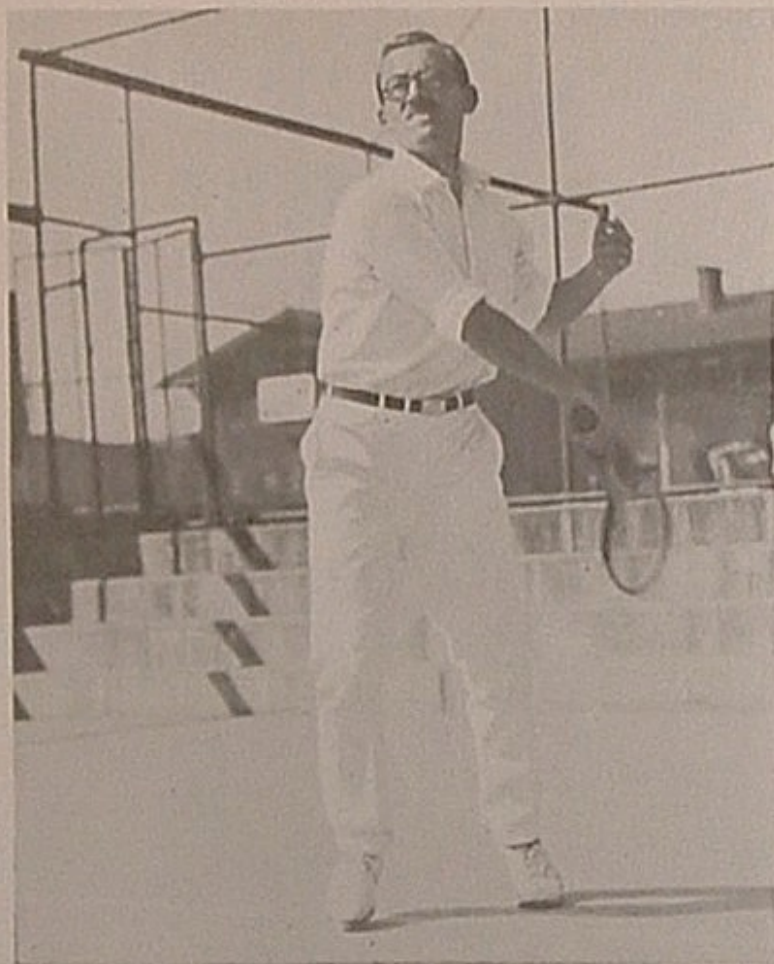
Completion of new pipe lines affording adequate facilities, together with lowered production averages, has obviated any necessity for the Union Oil Company carrying out its proposed plan of loading tankers by means of pipe lines extending from Huntington Beach into the ocean, and when not in use to rest on the bed of the ocean. Some months ago application was made to the War Department for permission to lay such lines, and permission granted. The natural decline in production which has since set in has removed the necessity of carrying out the project.

SPRINGS FIELD FALLING OFF

Intensive drilling and unrestricted development during the flush days of the Santa Fe Springs oil field have left their mark. The new wells that are now being put on production are failing to make 1000 barrels initial yield, although many of these are in territory where derricks are unusually thick, and where large production prevailed in the earlier days. The gas pressure is becoming less, and the water content is showing some increase. In the early part of the month the Springs field lost its first place position to its rival, Long Beach. This was the first time in months that the Beach field outstripped its inland rival.

BRILLIANT PLAY DID IT

Introducing Roland Reinke, new tennis champion of the Union Oil Company of California and holder of the President's Cup for the



ensuing year, who, in the title match, defeated Roy Hornidge. The match was played on the courts of the Los Angeles Tennis Club and was witnessed by a large gallery. The winner lost the first set, but came from behind, and took the next two and the cup by virtue of some brilliant tennis. The picture shows the champion in action.

NEW PRODUCTION FOR OCTOBER

During the month of October the Union Oil Company of California placed on production thirteen new wells with an aggregate daily production of over 8000 barrels. Five of the new producers are located in the Santa Fe Springs field. The older Richfield district added two, while Huntington Beach claimed five. The thirteenth well is credited to the Brea field, being the G. & L. No. 53.

VISITS BIG GASSER

Roderick D. Burnham, manager of lands for the Union Oil Company of California, recently left Los Angeles for Fort Collins, Colorado, to inspect the big gasser brought in by the Union. Burnham made the preliminary investigation, and it was on his report and that of C. R. McCollom, chief geologist, that the Company decided to secure 10,000 acres of land in Colorado and exploit it for oil.

THIS MONTH'S COVER

Lake Tahoe, which J. D. Johnsen, Bulletin artist, has depicted on the front and back covers of this month's issue is a spot of unusual scenic interest. It is claimed jointly by California and Nevada, the dividing line of the two states running through the middle of the lake. In this issue, D. E. Ericson, special agent for the Union Oil Company of Nevada with headquarters at Reno, has written an article on the mining and agricultural possibilities of the sage brush state.

RICHFIELD DEEP SAND PRODUCER

Following a year's work the Union Oil Company's Morse No. 4 came in on October 23rd as a producer of almost 1000 barrels, only to immediately break into a flaming pillar of fire. The fire was caused by heavy pressure breaking a valve, and the resulting rush of rocks against the casing generating a spark. Steps were immediately taken to put out the blaze, which was accomplished after several hours effort by the use of steam. The derrick was demolished, but the well continued to flow, and is now producing approximately 550 barrels, being beamed down. The well is located on the Morse lease in the Richfield district, and producing from a lower zone at 4310 feet. The upper sand in this district is in the neighborhood of 3400 feet.

MORSE CAMP, RICHFIELD DISTRICT

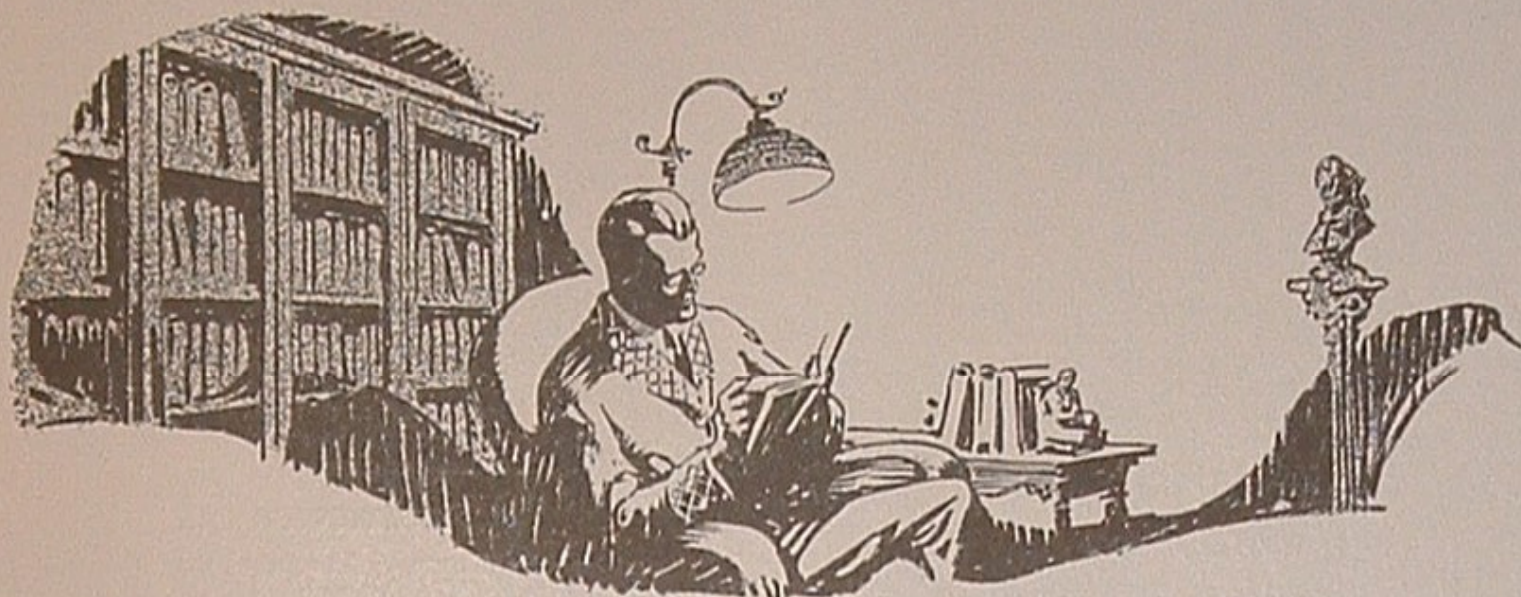
Peace and quiet among industry is reduced to actuality in the Morse Camp of the Union Oil Company of California. The snap-shot was



taken from the derrick of Coyle No. 3 and shows this camp amidst the sheltering trees

Current Petroleum Literature Abstracts

Prepared by *ELIZABETH H. BURROUGHS*
Research and Development Department.



GENERAL

CHU, T. O. Areas in China considered as potential oil bearing territory. *Nat. Petroleum News*, vol. 15, Oct. 24, 1923, pp. 77-78. From an address by a representative of the Chinese Government before the International Petroleum Congress, October, 1923.

RHOADES, R. O. Shell interests are only producers in the Egyptian fields. *Nat. Petroleum News*, vol. 15, Nov. 7, 1923, pp. 61-62, 64. General description of the industry in Egypt.

TEMPLETON, R. R., AND McCOLLOM, C. R. Santa Fe Springs field, California. *Min. and Oil Bull.*, vol. 9, Oct., 1923, pp. 869, 871, 883, 885, 887, 889-891, 893, 895, 935. Paper before the Am. Assoc. of Petroleum Geologists. Gives history of the field and its present status, with description of productive zones, statement of drilling methods used, discussion of water problems, and production and development statistics for the field.

GEOLOGY

GEIS, W. H. The origin of light oils in the Rocky Mountain region. *Bull. Am. Assoc. Petroleum Geol.*, vol. 7, Sept.-Oct., 1923, pp. 488-504; discussion, pp. 504-506. Discussion is chiefly on Wyoming oils from the Cretaceous.

DEVELOPMENT AND PRODUCTION

GEORGE, H. C. Wide variation shown in lifting costs in fields of United States. *Nat. Petroleum News*, vol. 15, Oct. 24, 1923, pp. 67-68, 70-71. A survey made in the course of a study of surface pumping equipment in the representative fields. Figures are for first six months of 1921 and the report is based on operating conditions at 57 groups of properties with a total of 4497 producing wells.

SCHALLER, ALWIN AND BJORNSSON, C. A. Influence of heat upon the recovery of oil by water displacement. Part I. *Nat. Petroleum News*, vol. 15, Nov. 7, 1923, pp. 53-54, 56-57. "In this paper an attempt is made to determine the influence of the use of hot water on the total recovery of crude oil, to find the limits of application and to work out the proportions and arrangements of the apparatus necessary for successful operation." This is merely intended as a starting point for further discussion and possible commercial development.

TURNBULL, GEORGE. Flooding aids recovery of crude oil. *Oil and Gas Jour.*, vol. 22, Oct. 25, 1923, pp. 100-101, 112. Discussion of the profitability of this process of increasing oil recovery and of the advisability of using it in New York State fields.

TRANSPORTATION AND STORAGE

CLARK, E. A. Concrete tunnel conveying oil pipe line. *Engineering World*, vol. 23, Nov., 1923, pp. 273-274. Describes an inverted siphon under the Indiana Harbor canal at East Chicago, Ind., used by the Sinclair Oil Co. to carry pipe lines from Wyoming, Kansas and Oklahoma oil fields to the refineries at Whiting and East Chicago. See also *Petroleum Age*, vol. 12, Oct. 15, 1923, pp. 21, 64-65.

HOLZAPFEL, A. C. Unique anti-fouling record. *Pacific Marine Rev.*, vol. 20, Oct., 1923, pp. 478-479. Tells of the excellent condition of a British training ship afloat for thirteen years without docking or repainting and of the original method of treatment and paints used.

JURS, L. D. World's largest steel tanks for oil storage. *Min. and Oil Bull.*, vol. 9, Oct., 1923, pp. 856-857. Describes tanks being erected at Watson, Calif., by the Associated Oil Co. with a capacity of 178,000 barrels each.

ANONYMOUS. Gasoline tanks protected by artificial shade. *Oil Trade Jour.*, vol. 14, Nov., 1923, p. 76. Brief description, with illustration, of "petticoat" protectors placed on steel gasoline tanks in the Canal Zone for reduction of evaporation due to heat of the sun.

ANONYMOUS. Wiggins floating roof withstands fire tests. *Oil Age*, vol. 20, Nov., 1923, pp. 41-42. Report of tests and description of Wiggins floating roof for tanks, which is said to eliminate evaporation losses and some of the fire hazard.

CHEMISTRY

LANE, E. C. AND LE JEUNE, N. F. Survey of Pacific Coast petroleum products. Part 3. Burning and fuel oils. Bureau of Mines Reports of Investigations, No. 2511, Aug., 1923. 11 pp. Mimeographed. Data on physical and chemical properties of kerosene, Diesel fuel and fuel oil from California crude.

PRUTZMAN, P. W. The chemical properties and general characteristics of California petroleum. Part I. *Petroleum World (Los Angeles)*, vol. 8, Oct., 1923, pp. 32, 65-66, 70, 72, 74. Describes California oils from the standpoint of their value as determined by the quantity and quality of products which they yield, and by the ease and cheapness with which they may be handled in the refinery. Paper before the Am. Assoc. of Petroleum Geologists.

REFINING

CROSS, ROY. Factors entering into the selection of a cracking plant. *Oil and Gas News*, vol. 13, Oct. 15, 1923, pp. 17-18. Gives questionnaire consisting of twelve points to be considered in choosing a cracking process. Facts (chiefly costs) are given in tabular form covering these questions for processes classed either as semi-liquid phase or liquid phase processes.

EGLOFF, GUSTAV. The cracking of California gas oil. *Oil Age*, vol. 20, Oct., 1923, pp. 27, 50, 52-53. Describes the Dubbs process as applied to California heavy oils, with operating data.

EGLOFF, GUSTAV. How the heavy Long Beach residue is being cracked by the Dubbs Process to produce high yields of marketable gasoline and other valuable constituents. Part 1. *Petroleum World (Los Angeles)*, vol. 8, Oct., 1923, pp. 21, 36, 40-41. Description of plant, with operating data.

JOHNSON, C. M. Cracking—or making your oil pay dividends. *Refiner*, vol. 2, Oct., 1923, pp. 5, 7-12, 20, 26, 36. "Complete history of the process of destructive distillation, with all the facts." Includes brief descriptions of the Burton, Dubbs, Greenstreet, Hall, Rittman, McAfee, Cross, Fleming and Jenkins processes.

KILLICK, V. W. Demulsifying California oil by chemical treatment. *Petroleum World*, vol. 8, Oct., 1923, pp. 58, 60, 62. On the Tret-O-Lite process for treatment of crude oil emulsion.

LESLIE, E. H. A refining process we're asleep on—fractionating. *Oil News*, vol. 11, Oct., 1923, pp. 11-12. First of a series of articles which are to outline the basic principles of fractionation, describe apparatus and offer practical suggestions for operation.

MAHONE, F. D. Electrical dehydration of cut oil efficient and inexpensive. *Nat. Petroleum News*, vol. 15, Oct. 31, 1923, pp. 83, 85. Describes apparatus used in electrical treatment of cut oil and gives data on capacity units and cost per barrel of reclaimed oil.

MORRELL, J. C. Handling heavy oil with Dubbs process. *Refiner*, vol. 2, Oct., 1923, pp. 15-16, 18. On the advantages and special adaptability of the Dubbs process in handling low grade crudes and heavy residual oils.

WYANT, L. D. The use of highly volatile natural-gas gasoline as a refrigerant. *Bureau of Mines Reports of Investigations*, No. 2510, Aug., 1923. 10 pp. Mimeographed. Report on experimental runs in which gasoline was used as a refrigerant in refining wax distillate. The installation is described in detail and operating data given, with the conclusion that this method of refrigerating is convenient, useful and economical. See also *Nat. Petroleum News*, vol. 15, Oct. 3, 1923, pp. 99, 101, 105, 107.

UTILIZATION

BELL, H. S. Domestic heating with oil fuel still in development stage. *Nat. Petroleum News*, vol. 15, Nov. 7, 1923, pp. 35-36, 39-40. A discussion of the present status of burners for domestic heating, taking up various types of burners, proper tankage, oil products suitable for fuel, and the problem of the distribution of oil for domestic heating.

DELANEY, C. H. Turbine lubrication. *Pacific Marine*

Rev., vol. 20, Oct., 1923, p. 471. Gives important points to be considered in connection with lubricating oil for large steam turbines, among which are the maintenance of color of the oil, which may be changed by oxidation, freedom from dust contamination, and prevention of aeration of the oil.

FIELDNER, A. C. AND JONES, G. W. Comparative engine tests with crude, acid-refined and silica-gel refined motor benzol. *Bureau of Mines Reports of Investigations*, No. 2517, Aug., 1923. 17 pp. Mimeographed. Describes an investigation undertaken in co-operation with the Division Chemical Co. in order to determine in a qualitative way the possibility of using silica-gel as a refining agent for motor benzol, and especially the possibility of removing sulphur compounds and gum-forming constituents by such treatment. Tests indicated that crude motor benzol could not be used satisfactorily on account of gummy deposits, but that no engine trouble whatever developed when acid-refined or silica-gel refined benzol was used. See also *Chem. and Met. Eng.*, vol. 29, Sept. 17, 1923, p. 543.

WELBORN, C. R. Safeguarding domestic oil burner. *Laboratories Data*, (Underwriters Laboratories), vol. 4, Oct., 1923, pp. 226-231. Tells, from a fire prevention viewpoint, "how to do it and how not to do it," with respect to the construction, installation and maintenance of domestic oil burning equipment.

STATISTICS

BUREAU OF THE CENSUS. Census of manufactures, 1921. Petroleum refining. Washington, 1923. 15 pp. Gives detailed statistics on the operation of establishments refining crude petroleum "by distillation," not including the compounding of refined or partly refined products nor the production of casing head gasoline.

ANONYMOUS. U. S. refineries using cracking processes. *Refiner*, vol. 2, Oct., 1923, p. 13. List gives name of company, location of plant, process and units or capacity.

OIL DISCOVERED WITH MICROSCOPE

The principal oil companies maintain geological, leasing, producing and scouting departments which are made up of trained men, with practical and scientific experience. The most careful records, geological maps, well maps and production data are kept so that the experience of each well may add to the new science of petroleum engineering, decrease the hazards of finding oil and aid conservation.

Rock samples are taken from the well to the geologist's laboratory, are reduced in size until the largest piece has the diameter of about one-fiftieth of an inch, the small pieces carefully washed and the particles thoroughly examined through the microscope. Oftentimes the presence of fossils or certain minerals is discovered only after long and tedious search. When once found and correctly placed in the geological column they become of great value in locating oil producing formations.

"AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE"

This bit of philosophy might seem to apply to health and accidents only, in other words, to "Safety First." As a matter of fact it pertains to all our activities. In our daily work the "ounce of prevention" is the exercise of care in handling details. To see that names are reported correctly, deliveries properly priced, extensions exact, totals verified, and postage accurate, prevents errors on records and saves the many minutes and hours (pound of cure) required to find where the mistakes occurred, to say nothing of the possibility of dissatisfied customers through clerical errors.

We can make ourselves valuable in our jobs if we profit by this adage.

California Oil Statistics, September, 1923

(Figures for Production and Stocks are in barrels of 42 Gals.)

DISTRICT	BARRELS PER MONTH	DAILY AVERAGE		Sept. 1922
		Sept. 1923	Aug. 1923	
Kern River.....	570,078	19,002	19,384	20,229
McKittrick.....	182,096	6,070	5,945	6,333
Midway-Sunset.....	2,239,352	74,645	74,083	77,566
Elk Hills.....	689,624	22,987	22,135	26,402
Lost Hills-Belridge.....	113,774	3,792	3,728	6,537
Coalinga.....	425,950	14,198	14,406	17,258
Wheeler Ridge.....	15,259	509	420	.....
Watsonville.....	1,750	58	58	61
Santa Maria.....	244,835	8,161	8,603	8,434
Summerland.....	4,365	146	146	152
Ventura-Newhall.....	302,709	10,090	10,293	8,368
Los Angeles-Salt Lake.....	92,859	3,095	3,255	3,401
Whittier.....	50,049	1,668	1,698	1,855
Fullerton.....	338,742	11,291	11,610	10,299
Coyote.....	76,729	2,558	2,190	17,397
Santa Fe Springs.....	9,439,874	314,662	322,522	42,639
Montebello.....	314,689	10,490	10,718	18,643
Richfield.....	485,079	16,169	16,404	21,086
Huntington Beach.....	2,688,834	89,628	104,582	32,594
Long Beach.....	7,227,535	240,918	214,818	87,059
Torrance (Redondo).....	222,502	7,417	5,906	524
Compton.....	35,803	1,193	.....	.....
TOTAL.....	25,762,487	858,750	852,903	406,838
August.....	26,440,005	852,903	.....	.....
Decrease.....	677,518	* 5,847	.....	.....

*Increase

Field, Refinery, Pipe Line & Tank Farm Stocks of Crude, Residuum & Tops	Sept. 30, 1923	August 31, 1923	Sept. Stock Increases	Sept. 30, 1922
	Heavy Crude, heavier than 20° A. P. I., including Residuum.....	42,413,027	43,696,865	†1,283,838	39,900,530
Refinable Crude, 20° A. P. I., and lighter.....	31,584,259	29,029,198	2,555,061	*16,358,771
Tops.....	11,499,323	10,397,772	1,101,551	.....
Total.....	85,496,609	83,123,835	2,372,774	56,259,301

†Decrease. *Includes Tops.

	Sept. 30, 1923	Aug. 31, 1923	Sept. 30, 1922
Total quantity of above products held at refineries.....	**26,660,833	21,953,777	9,517,681
Total quantity of above products held in Fields, Pipe Lines & Tank Farms.....	**58,835,776	61,170,058	46,741,620
Total Stocks, as above.....	85,496,609	83,123,835	56,259,301

**About 3,000,000 bbls. previously reported as pipe line stocks are this month, and in the future will be, classified as refinery stocks.

DISTRICT	Development		Completed	Daily Initial Output	Active Producing	Abandoned
	New Rigs Up	Active Drilling				
Kern River.....	.....	1	.....	.....	2,130	.....
McKittrick.....	2	6	.....	.....	283	.....
Midway-Sunset.....	18	42	12	3,137	2,141	7
Elk Hills.....	.....	9	2	1,380	88	.....
Lost Hills-Belridge.....	.....	6	.....	.....	251	.....
Coalinga.....	.....	9	.....	.....	679	1
Wheeler Ridge.....	3	7	1	185	5	.....
Watsonville.....	.....	.....	.....	.....	6	.....
Santa Maria.....	.....	3	.....	.....	327	1
Summerland.....	.....	.....	.....	.....	135	.....
Ventura-Newhall.....	.....	31	2	320	541	2
Los Angeles-Salt Lake.....	.....	.....	.....	.....	634	4
Whittier.....	.....	.....	.....	.....	175	.....
Fullerton.....	.....	5	.....	.....	384	.....
Coyote.....	.....	4	.....	.....	96	.....
Santa Fe Springs.....	17	182	30	76,711	232	7
Montebello.....	.....	8	.....	.....	122	.....
Richfield.....	1	11	1	25	179	.....
Huntington Beach.....	4	91	9	2,289	214	5
Long Beach.....	22	256	31	50,916	266	4
Torrance (Redondo).....	31	61	4	3,747	33	.....
Compton.....	3	10	1	1,250	1	.....
Miscellaneous Drilling.....	3	63	.....	.....	.....	6
September.....	104	805	93	139,960	8,922	37
August.....	75	803	61	118,433	8,882	16
Increase.....	29	2	32	21,527	40	21
Average for Year 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
" " " 1918.....	50	362	50	10,577	8,210	13

Refined *and* Crude



Good luck is the willing handmaid of upright, energetic character and conscientious pursuance of duty.

No matter what the words may be, a song of woe will never make a hit.

Nervous Lady: "Careful, driver, not so fast; this is my first ride in a taxi."

Taxi Driver: "Mine, too."

The fellow with an empty head has a real load to carry on his shoulders.

Happy the man who can endure the highest and lowest fortune. He who has endured such vicissitudes with equanimity has deprived misfortune of its power.

The universe pays the man in his own coin; if you smile, it smiles upon you in return; if you sing, you will be invited into gay company; if you think, you will be entertained by thinkers and if you love the world and earnestly seek for the good that is therein, it will pour into your lap the treasures of the earth.

To win a smile from good fortune, wink at trouble.

The Judge: "Now, are you sure you understand the nature of an oath?"

The Youth (scared stiff): "Sure ain't I yer caddy down at the links?"

Rastus: "Whah yo' gwine?"

Sambo: "Home."

Rastus: "Home! Ah thought you an' yo' missis had a ruckus dis mo'nin'."

Sambo: "Yeah—huh. But Ah done jes' thought o' sumpin' mo' to say."

Mother (proudly): "This is my son, Freddie, Mrs. Higgins. Isn't he a bright little fellow?"

Freddie (accustomed to being shown off in public): "What was the clever thing I said yesterday, Mother?"

Teacher of Hygiene: "Why must we always be careful to keep our homes clean and neat?"

Little Girl: "Because company may walk in at any moment."

"No, my dear, I don't spend to much. It is you who don't earn enough."

"Jack's got a new siren for his car."

"Really. What became of the blonde one?"

Wife: "How many fish was it you caught on Saturday, George?"

Husband: "Six, darling; all beauties."

Wife: "I thought so. The fish market has made a mistake again. They've charged us for eight."

Customer: "I would like to see a pair of shoes that would fit my feet."

Salesman: "So would I."

Difficult Customer: "I can't remember the name of the car I want—I think it starts with a 'T.'"

Exasperated Salesman: "Madam, all our cars start with gasoline."

Lady: "Tobe, I'm sorry to hear your wife got a divorce."

Tobe: "Yessum; she done gone back to Alabama."

Lady: "Who will do my washing now?"

Tobe: "Well, mum, I'se co'tin' again, I co'ts rapid."

Get It Over!

—*That's All*

An author was once asked what one had to do first in order to become a writer.

The answer was "Make black marks on white paper."

A genius was requested to give the recipe for becoming a genius. He replied, "Work".

Ask us how a "Put-it-acrosser" can put it across and our rejoinder is,

“Go To It!”

Nothing ever was put across merely through one half-hearted suggestion.

Say it every week in every way you can think of. Do it over and over again in many different ways and *show enthusiasm!*

Union Gasoline and Aristo Motor Oil are products about which you may be enthusiastic.

They are produced enthusiastically, and their quality is enthusiastically guarded throughout every minute of every working day.

The production department and the research department are everlastingly and enthusiastically keeping at it to maintain quality.

It is up to the sales department to carry on in their own enthusiastic manner.

The real "Put-it-acrosser" is one who simply *puts it across!* He may not know what particular *system* he uses. He just *DOES* it. Like the duck which simply hops in and *swims*.

Neither one of those birds need a special instructor. They're just born with the instinct.

Put It Across Club



J-D
Johnson