

# This Billion-Barrel

the use? The totals would be so great as to be incomprehensible. Enough has been shown to prove the assertion that Oil is Emperor, the giant of industry, and an enormous factor in the making of these United States.

It was only seventy years ago that Col. E. L. Drake drilled the first commercially successful oil well in this country, at Oil Creek, Pennsylvania, going down a few hundred feet, using primitive tools, producing some high-grade oil and pioneering this present gigantic industry. Primitive tools is right: A solid drill that was pounded up and down in the hole from a squat derrick with power furnished by a wheezy steam engine. It will not be long now until oil wells are two miles deep. Wells that are more than a mile deep are too common to excite comment.

There are numerous wells that are producing oil from below the 8000-foot level, and on April ninth of this year the Standard Oil Company of California had a well in the Midway Field, near Taft, California, that was 9629 feet deep, and going strong. Two miles are 10,560 feet.

This well is Mascot No. 1, and was spudded in in January, 1929. No special equipment was provided,

but the drilling started with the routine tools which have been used in all the work. The efficacy of this equipment, used in all California development, is shown by the fact that there has been no lost time on the project, or had not been up to April ninth, because of accident to the equipment, which was the ordinary rotary drill.

## Cementing Pipe a Mile Down

THE rotary drill is simply an enormous auger that bores through the formation as a carpenter's auger bores through wood. It is attached to hollow steel drill pipe, and through this drill pipe and through the bit itself are openings through which a mud mixture flows at all times. This mud is forced out at the bottom of the hole, where the rotary is cutting, and facilitates in that cutting through the formation. It is then forced up on the outside of the drill, carrying with it the rock cuttings made by the drill. The walls of the hole are plastered with mud-and-rock mixture which ordinarily permits the hole to go for a considerable distance before it is necessary to put in casing, or pipes, to preserve the hole.

When the rock is of loose formation or there are cracks and checks in it, the mud mixture enters these, too, and stops them up. Thus, it is necessary to maintain a continuous circulation of the mud mixture to facilitate drilling. There was considerable difficulty in maintaining this circulation during the early part of the drilling of this world's deepest well, and in maintaining that circulation various agents were used, and in large quantities. For example, the drilling mud was at times mixed with such materials as 62,000 pounds of aqua gel, 580 tons of dry mud, 8350 barrels of mixed mud, 650 sacks of cement, 6300 pounds of fissure-sealing compound, 660 sacks of cottonseed hulls, 781 sacks of sawdust and 23 bales of hay. There is utilitarian drama for you: A drilling crew,



An Assembly of Gates and Valves for the Control of Enormous Gas Pressure at the Kettleman Hills Field

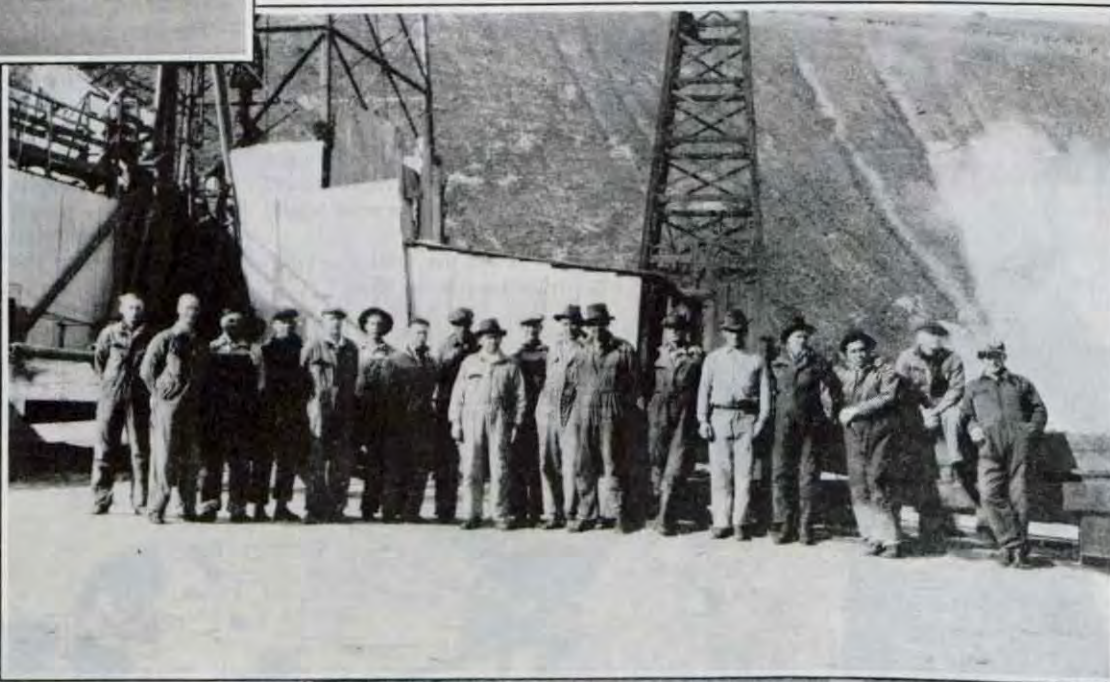
**O**IL is the giant of our national products. It is as futile to try to be conservatively descriptive about oil and set forth the adequate facts, as it is to seek to depict a vast tidal wave or an enormous earthquake in mild and measured terms. Oil demands superlatives.

There is a great drama in oil, and prodigious speculative adventure. There are fabulous riches in it, and gigantic losses. Oil is indispensable to our progress and prosperity. The use of it ramifies in nearly every commercial, manufacturing, distributing, motor, lubricative, heating and transport direction. It warms us and lights us. It runs our tractors and trucks and automobiles, pulls our passenger and freight trains on great railroad systems, propels our ships, whirls countless factory wheels, generates much of our power, fights our wars and flies our airplanes. The by-products of it are used in hundreds of utilitarian ways, and among other things, they make medicine of it.

## A New Industrial Monarch

THESE claims are familiar: Coal is King; Cotton is King; Iron is King. But Oil is Emperor. For example, every person, save a negligible few, who takes a ride in an automobile anywhere in this country takes that ride by grace of a few barrels of oil that came mostly from beneath our own soil. Some comes from Mexico, some comes from Canada, some from Venezuela, and some from other places, but almost all of it is our own product. If you want to be informed concerning the amount of oil we produce in this country, I set you this example in multiplication: The daily average oil output in the United States in 1929 was 3,196,000 barrels. Multiply that by 365, for oil wells, when they work, work every day. Thus we find that our total oil output in 1929 was 1,166,540,000 barrels. Almost one and one-sixth billions. Then, if you are still seeking for big figures, multiply the yearly output by forty-two, which is the number of gallons in a barrel, and there will be a total that will give you a headache.

We might go on, translating this into dollars, adding in the investment costs, and the manufacturing and distribution costs, and the consumption costs, but what would be



The Crew That Drilled the Deepest Oil Well in the World—the Mascot No. 1, at the Midway Field, California



A Portion of the North Dome of Kettleman Hills Pictured From the Air

# Oil Country

By SAMUEL  
G. BLYTHE

working down through a hole a few inches across and a mile and a half deep, stopping up a bothersome hole in the wall of the well by mixing, say, a few bales of hay with some mud.

When an oil-well hole is drilled, the permanent casing must be run in, and that is one of the uses of the derrick. In this Mascot No. 1, the Standard of California ran in 6350 feet of nine-inch casing pipe, which had a total weight of 143 tons and had to be cemented into place more than a mile below the derrick floor. Think that over for a job of skillful work. The lines and derrick were relieved of about 15 per cent of the total weight by the use of a float valve in the end of the nine-inch casing pipe, which enabled the workers to float the pipe on the mud mixture, but the derrick carried 120 tons of dead weight at that, and will carry as much when the drilling pipes are pulled out. Until this setting of the nine-inch casing, the size of the hole was twelve and one-eighth inches, but after 500 sacks of cement had been dropped with exactitude down more than a mile to cement the pipe in, the hole was reduced to seven and seven-eighths inches, and that was the size of it when it had reached 9629 feet—the world's deepest well—on April ninth of this year, with every prospect of getting down to 10,000 feet or more. The production of oil is all drama, while the manufacture and distribution of it is one of the most highly organized and technical businesses in the world.

## The Drama of Oil

GREAT numbers of inventors, engineers, artisans, experimenters, machinists and mechanical geniuses have so elaborated and improved and developed oil-production machinery since the days of Colonel Drake that now there is no more similarity between his methods and theirs than there is between an oxcart and an airplane.

The processes of production have become more and more highly mechanized and efficient, especially during the past fifteen years, and now

the great rotary drills, the towering steel derricks, the intricate appliances for getting from the gas the gasoline that was formerly wasted, the vast and scientifically up-to-the-minute refineries, the improved drill piping, the pipe lines, the pumps, the electrical devices, the core-taking machines make even the machinery of five years ago more or less obsolete.

Even so, they have not obliterated the drama of it. Any person who can stand on the platform of a drilling well and watch a head driller and his crew—with the sure and certain knowledge of their craft, and no more fuss than a gang of carpenters make in nailing sheathing on the frame of a house, working with their gigantic tools a mile and a half or more beneath them, with that enormous auger down there grinding through the rock toward the golden sands—without a thrill is a poor, unimaginative clod.

Down this hole drops a mile, or a mile and a half, or more, of heavy steel pipe—7000 feet of pipe—8000 feet—and at the end of the pipe is the gigantic rotary drill, the big bits of it whirling rapidly and boring, boring down toward either wealth or absolute loss. Who knows? Perhaps the sands are not there. Perhaps there is a geological fault. Perhaps the deadly



The Steel Derrick of the Standard Oil Company of California in Use at the Mascot No. 1 Well



A Blow-Out in a Marland Well at Kettleman Hills, Showing Enormous Power of Gas Which Twisted the Massive Steel Derrick

serpentine obtrudes. Perhaps, as often happens, \$250,000 or more is being thrown to the winds of chance, for there is no finished commercial enterprise, operation or experiment that has less value than a dry hole. It may have cost \$300,000 to make, but if it does not produce oil it isn't worth a nickel. And so many of them are dry—so many.

The rotary drill is a temperamental thing. Not even the most experienced driller knows exactly where his rotary is going when he starts his hole. Of course the assumption is that it is going down in a reasonably straight hole, and the effort is to make it do just that, but there is no telling what devious courses a rotary may pursue, once it gets down a ways. A rotary

has its own ideas about where it prefers to go, and it goes where its errant fancy dictates. It may find a boulder or a formation not to its liking, and go around it, or go slithering off to the right or the left for long distances.

## A Peripatetic Drill

THE drill pipe, being made of sections of pipe jointed together, has sufficient flexibility to indulge the rotary in its desires, and there have been instances where the bottom of a hole was a quarter of a mile away from the top, or more. Sometimes this eccentricity loses a well, for the drill may go away on such a bender that it escapes the sands entirely. We thought we had a fairly straight hole in a well I was interested in, but when we found out about it, we discovered that the bottom of the hole, instead of being beneath the derrick, was several hundred feet away under a water tank, with the well about 4000 feet deep. Recent inventions enable the drillers to survey their holes, and even photograph them, but there is no invention as yet, that I have heard about, that will keep a rotary from wandering around in curves and dips and side shoots if the rotary is inclined that way.

All this is what makes the oil business the most adventurous speculative business in the world, not excluding gold mining—and drilling for oil is mining, at that. This is the fascination, the lure and the drama of it. You may sink a well at a place with every geological and physical sign of oil.

Another Air View of Kettleman Hills, North Dome

(Continued on Page 66)



*A Welcome Gift for the June Bride*

## "Here's The TOASTER That Pops Up The Toast!"

If you're told "this is an automatic toaster" demand to see "the toaster that pops up the toast." For that can only be TOASTMASTER... the World's Most Completely Automatic Toaster

● TODAY you'll find Toastmaster on 500,000 breakfast tables.

Because it makes toast faster—a slice a minute!

Because it makes toast better—each slice perfect!

Every operation is automatic, even to popping up the toast and turning off the current when through. These features bring you *speedy*, complete automatic toasting—and you can't get them in any other toaster made.

### *Toastmaster is Unique*

There is no other toaster that can be "like" Toastmaster—no other can do what it does. Compare it with any other claiming "automatic" features. It will change all previous ideas of what a toaster should do.

All you do is put in a slice of bread, set a lever at the exact shade of toast you want—and forget it. In a few seconds there's

a POP!—and the toast, just as you wanted it, is discharged from the toaster and current turned off.

By toasting both sides at once, all the flavor is sealed in. Toast moist and tender inside, crisp and crunchy outside.

You don't watch the toast—you don't turn it—you can't burn it. Everything is done automatically for you, even to turning off the current.

That's why the speedy Toastmaster is unique among toasters—why, in justice to yourself, you should see one before buying any toaster. More people buy this amazing Toastmaster than all other toasters, at its price or near its price, combined. On sale at all stores in the U. S. and Canada.

**WATERS-GENTER COMPANY**  
219 N. Second St., Minneapolis, Minn.

*A division of the* 239-R

**MCGRAW-EDISON COMPANY**

*Distributed in Canada  
by Canadian General Electric Co., Ltd.*

# TOASTMASTER

AUTOMATIC ELECTRIC TOASTER

... Toasters Now Chromium-Plated... No advance in price!

## THIS BILLION-BARREL OIL COUNTRY

(Continued from Page 9)

And get no oil. A hundred sinister things beneath the surface may squash all the scientific calculations of the location experts. You may go to a place where dozens of drillers have sought unsuccessfully for oil, and be the lucky one to find it. You may drill at a place where all your neighbors are getting oil, and because of some diabolical fault or geological eccentricity down below, get a dry hole.

The drama of it is unceasing and vivid. The gamble of it is the greatest on the globe. The grief is desperate and crushing. The rewards are munificent. The losses are in keeping. Men go out and stick up a derrick in some place where the signs and the seepages and the geological structure seem to combine in beckoning them to fortune. They drill their holes. They hit the productive sands. Or they do not. The labor is prodigious. The cost is great. It is no piker's game, especially since these days of development and discovery of deep sands. If they win they are rich. If they lose they borrow some more money and try again. No person who ever had an experience in seeking or finding oil—its real production, and not mere speculation in stocks—ever is free from the lure of it. It gets into the blood. All over this world, hard-fisted, hard-headed men are seeking oil, in the most remote mountains and farthest corners. They are hard-fisted and hard-headed, but they are sentimental adventurers too—great gamblers in the secrets and the riches of the earth. They are throwing dice with Nature. It is the greatest game there is.

### *Hitting Oil at New Depths*

Let me cite you Santa Fe Springs, California, as an instance of the gamble and the glamour of it. Santa Fe Springs was one of the great flush fields of California that did so much to create the overproduction situation presently to be discussed. It was originally a town site not far from Los Angeles, set apart by the Santa Fe Railroad Company for the benefit of its retired employees. Many of these owned one, two, three or more town lots in the town site, and some were living there. All Southern California, it would seem, is underlaid with oil. In any event, some enterprising person, in 1919, drilled an oil well on this town site and got oil in what were known as the Meyer sands. Naturally, this created excitement, for, hitherto, no oil had been found in that exact locality. So the lease hounds flocked in and the town site was quickly put under oil leases. In 1921 another sand—the Bell sand—was discovered and this set off the entire bunch of firecrackers.

There never has been more intensive drilling for oil than there was at Santa Fe Springs. As the land was held in small parcels, it was grabbed up in small parcels. In passing, it may be said that if one or two of the big companies had controlled that field there would have been a saving of more than \$100,000,000 in exploitation expense, but that isn't part of the story. After the Bell sand came the Fox sand, and Santa Fe Springs was producing about 400,000 barrels of oil a day. That was in 1922. This intensive production sapped the field. It languished and declined.

Then, in 1928, some gambler with the gods of chance deepened a well to 6000 feet after all the oil men, or most of them, said the field was practically dead, and after many had relinquished and abandoned leases. He hit the Buckbee sand, and away went the field again in a mad scramble to deepen to the Buckbee. The field shook off the shroud, got out of the coffin and danced a jig on the lid of it. This adventurer had dramatized the situation. And his fellow adventurers, being good gamblers, said that if there was good oil at 6000 feet,

it might be that there was good oil below that level, and they were right. They found the O'Connell sand at 7000 feet, and the Clarke sand at 8000 feet, and up gushed the oil again. Now the field is petering out again, but who knows what is below? Nobody, but it is a good bet at ten to one that some oil man with the real oil-gambling spirit within him will keep on going down to find out.

Of course, as with all other American industries that have expanded as has the oil business—from the few-barrels-a-day production in Colonel Drake's well at Oil Creek, in 1859, to the more-than-1,000,000,000-barrels production of last year—the oil industry has been organized, capitalized, consolidated and made highly efficient in all the oil-producing centers. There are a dozen or so—maybe twenty—very large oil-producing companies and hosts of smaller ones, but there is no monopoly of it. If a brave oil seeker has the money or can get it, and can get a lease on a chunk of good-seeming oil land, there is nothing to stop him from putting down a well. There is no law or custom against wildcats. And the big oil companies do a lot of wildcatting themselves. The search for oil is continuous in all parts of the world. The amount of capital ready for investment in oil production seems limitless.

Moreover, the improved methods of production, the flexibility of oil-drilling machinery, and the efficiency of it, compared with the old standard drilling, are similar to the mobility of the automobile compared with the horse and buggy. The greatest factor is the ability to get down deeper into the earth. Only so recently as 1912, when K. R. Kingsbury, now president of the Standard Oil Company of California, joined that company, there were a few wells in California down to 3500 feet, and that was considered miraculous. Oil men from all parts of the country came out to California to see how this wonderful feat of penetration to the depths of the earth was accomplished. Now, as I have said, a well 3500 feet deep is rather shallow. Two-mile depth is what they are shooting at, and the deep and deeper sands.

The three greatest oil-producing states are California, Texas and Oklahoma. The development of the automobile engine and the other internal-combustion devices for obtaining power gave the oil production of this country its greatest impetus, and the consequent intensive search for new oil territory discovered many new and highly productive fields. Gasoline became one of the most important products of the country, but the fact was soon apparent that there was a great deal more oil beneath our soil than even the most enthusiastic and optimistic oil prophets, oil seekers, geologists and experts dared to predict.

### *A Wild Scramble for Oil Profits*

They found oil in many places, and in some places they found subterranean lakes of it. There was no restriction or conservation of production. It was a wild scramble to get some of the gravy. Naturally, the big companies, with great capital, acquired large acreage and could control their drilling on a scientific basis in some instances; but even big oil companies are human, and no matter what their ideas were as regards conservation, they could not hold oil land idle when companies next to them were drilling and draining their oil. They were forced to drill offset wells, and oil began to come forth in great quantities.

Hence, it was not long before two conditions arose: The first was that there was a wasteful, expensive and burdensome production, and the second was that there arose a band of economists who proclaimed that

(Continued)

(Continued from Page 66)

our oil resources were rapidly being depleted, that it would be only twenty or thirty years, at this rate of production, before all our oil would be gone. There was much to do over this, direful in the extreme, and much demand for strict conservation.

Overproduction of oil in the Western Hemisphere, and especially in the United States, which came to a dangerous peak in 1929, may be traced back, to a large extent, to the oil discoveries of 1921 and 1922. Some of California's most prolific fields were discovered in these years—notably Santa Fe Springs, Long Beach and Huntington Beach.

Those were the years when California was at the beginning of her big oil spree, and when any person with a lease on a fifty-foot oil lot drilled a well, and some of them tried to drill two. These discoveries resulted in widespread prospecting in all parts of California, particularly south of the established Coalinga field, although many an enthusiastic oil company went broke trying to find oil far to the north of the general producing area.

Up to that time oil men were dubious over the feasibility of the profitable development of large production from such depths as 4500 feet, or thereabouts, but the success of such production at Santa Fe Springs led to deeper drilling, not only in California but in the Mid-Continent field of Texas, Oklahoma and Kansas. This deeper drilling resulted in the discovery of some of this country's largest pools, and it was followed by the perfection of geophysical instruments for the location of oil lands. They went down a long way after oil and got it.

For example, they produced oil in large quantities from a depth of 8525 feet in the Big Lake field in West Texas; from 8300 feet at Long Beach, California; from 8200 feet at Santa Fe Springs, California; from 7900 feet at Ventura Avenue, California, and from depths ranging just beneath these in other fields in California, Texas and Oklahoma.

New discoveries continued in California after the great outgushing of 1923, not only in Southern California but in the San Joaquin Valley. The news of these discoveries brought in large quantities of Eastern oil capital, and also large numbers of Mid-Continent operators, who wanted some pieces of the pie. The result has been, from that time to this, new discoveries and deeper developments, which have brought the potential production of California up to well over 1,000,000 barrels of oil a day, of which a large portion is not to be considered as mere flush production, but well settled, long-time production, not subject to drastic decline if opened to full capacity.

### Black Gold in the Sooner State

Meantime, Oklahoma was not idle. That state put on an oil show in 1922 and 1923, particularly in the central part of the state, that was a whale also. They found the deep Wilcox horizon, and with that came the famous and exuberant Seminole area. Then, still drilling deeply and prospecting widely, they found the Oklahoma City pool, which, at present, if allowed to flow at full capacity, would itself produce more than 1,000,000 barrels of oil a day. Furthermore, this Oklahoma City pool is the first Oklahoma field of large proportions where the oil comes from the siliceous-lime formation, and there is plenty of siliceous-lime formation beneath the topside land of the state. This great Oklahoma City pool forecasts other discoveries in similar formation. There is a lot of oil in Oklahoma.

That year of 1923 certainly put oil on the map, for Texas came marching to the front with the discovery of the Big Lake pool in the West Texas Permian basin. This was quite a pool and excited the Texas oil men to such a degree that they began putting down wildcat wells all over the place, and one of those wildcat wells landed right in the middle of what is now known as the Yates pool, in Pecos County. Oil men say

that the Yates-pool field is the largest potential oil-producing field in the United States, and probably in the world. There were other discoveries, and the geophysical instruments have indicated more fields in East Central and coastal Texas, as well as coastal Louisiana, many of which have been substantiated by drilling test wells. There is a lot of oil in Texas also.

It must not be forgotten that, in addition to these three great producers—California, Texas and Oklahoma—there is oil in Kansas, Wyoming, some in Montana, in Canada, and much in Mexico, to say nothing of prospects in various other parts of the continent, and besides, the Eastern production in Pennsylvania, Ohio, West Virginia, and so on, which has its explicit oil uses. In the meantime, Venezuela took a hand in the game. There had been much prospecting in the Maracaibo basin, and, adjoining the eastern shores of Lake Maracaibo, one of the world's most important oil fields was located. They got some good wells there in 1924 and 1925, but the discoveries in and the development of the Lagunillas field, in 1927, put Venezuela on the oil map. There was a production of more than 400,000 barrels daily in Venezuela, as of July, 1929, and as much more production was shut in.

### Vast Oil Reserves

Thus, so far as it has gone, with undoubtedly more to follow, the Western Hemisphere is pretty well off for oil.

However, speaking in terms of the industry, the United States has not yet recovered from the effects of the great overproduction that began in 1923. California has had large quantities of oil shut in in the ground each year since 1922, and at the present time the curtailment—the difference between what is produced and what could be produced—is 450,000 barrels a day, although the demand for California oils is greater now than ever.

The correct shut in in Oklahoma is estimated at 1,158,000 barrels a day, and in Texas, where the gigantic Yates pool—almost a subterranean ocean of oil—has increased potential production so greatly, the difference between the actual production and the possible production if the wells were run wide open is nearly 5,000,000 barrels a day. There has never been a time in our oil history when the proved oil reserves, both in wells actually shut in, or pinched down to much smaller production than they are capable of, combined with undrilled, but proved, oil land were as great as they are today, and improvements in producing and prospecting and refining machinery and appliances are constantly being made, with the consequent future certainty that this increased flexibility and adaptability of the production machinery will find more and more oil as the oil is needed.

The total daily supply of oil, in 1929, speaking in terms of the United States, was 3,196,000 barrels, and the total daily demand 3,006,000 barrels. In addition to this, we imported a daily average of 298,000 barrels, and the Venezuelan daily average production was 375,000 barrels. The total stock of oil held in storage on April 15, 1930, in the United States, was 689,000,000 barrels.

These stocks represent a capital investment of \$1,000,000,000, for oil is a cash commodity and storage is very expensive, requiring vast tanks, either above or below ground. Furthermore, as the production far exceeded the requirements of the country and that production was increasing rather than decreasing, the situation might easily become chaotic. This was realized several years ago, but the ordinary commercial safeguards in such a situation were not available. The oil operator is an independent person. If he can get a lease on a good piece of oil land, he can drill a well, or several wells, or a hundred, if he has land enough. The rewards of the past have been so great that every oil driller, whether a company or an individual, saw no reason why he should suffer by restricting drilling

## IN ATLANTA MEN WEAR BOSTONIANS SHOES FOR MEN



ATLANTA—metropolis of the South. A city of gracious hospitality—of well-dressed men and women. How splendidly Bostonians fit into this atmosphere of prosperity and refinement! For these shoes, too, are distinguished for their good taste—their correct style. A typical example—the “Summerdress.” Try on a pair of these zestful outdoor shoes today and learn how much style and foot-cradling comfort Bostonians give you. Modestly priced at \$7 to \$10.



Bostonians are sold in  
Atlanta by Eiseman's,  
56-58 Peachtree Street.

COMMONWEALTH SHOE & LEATHER COMPANY  
WHITMAN, MASSACHUSETTS

# Pipes tell the truth about tobacco

CORNCOB and briar, dudeen and hookah, pipes are pipes wherever you find them. They have personality — unobtrusive, easy-going, comfortable pipe-personality that wears well with men. And they have character, they're trustworthy, *they tell the truth about tobacco* by giving tobacco plenty of room to burn as it should. As the tobacco is, so is its smoke from pipes.

Pack some Edgeworth in your favorite pipe: watch this fine old tobacco wake up when you touch the light to it; see it swell and stretch, using all the room in the bowl; best of all, relish the flavor and the fragrance of its rich, *cool* smoke—for these are Edgeworth's inner secrets. Where else

than in your pipe could you find so revealing and pleasing a tobacco truth, even about Edgeworth?

If you are new to pipes and have no favorite to fill, buy a good pipe—corncob or briar or what not. Get one that has no varnish in the bowl, for even though a varnished bowl soon gets right you want the unvarnished truth about Edgeworth. And as for the Edgeworth, we'll send you some to try, whether your pipe is new or old—a generous free packet of this slow-burning burley blend, for nothing more than the coupon. Tempting fate, is it? But Edgeworth *always* invites the truth that pipes tell. This truth has made Edgeworth!

## EDGEWORTH SMOKING TOBACCO

Tune in on WRVA, the Edgeworth Radio Station.

Corncob Pipe Club every Wednesday, 8:30 P. M. Eastern Standard Time.

Edgeworth is a combination of *good* tobaccos—selected carefully and blended especially for pipe-smoking. Its quality and flavor *never* change. Buy Edgeworth anywhere in two forms—"Ready Rubbed" and "Plug Slice." All sizes—15¢ pocket package to pound humidor tin—Larus & Bro. Co., Richmond, Va.



LARUS & BRO. CO., 100 S. 22d St., Richmond, Va.

I'll try your Edgeworth. And I'll try it in a *good* pipe.

My name \_\_\_\_\_

My street address \_\_\_\_\_

And the town and state \_\_\_\_\_

Now let the Edgeworth come!

E-31

or shutting in his wells, when others did neither. There was a lot of dog-eat-dog about it, and intense rivalry and competition for territory.

Various attempts at conservation and reduction of waste and expense were made, but they were not effective. Oil men refused to be bound by any covenants or agreements. They were all on their own, and devil take the hindmost. They felt that, no matter how much too much oil was produced, their particular oil would bring in the money, and money was what they were after. Then, along toward the end of 1928, came the crisis.

As far as oil was concerned, 1929 threatened to be the worst year in oil history. Enormous stocks were held in storage and new fields were adding to the visible supply. If the potential production in Western Texas had been fully developed, it would have been good-by to the oil business, for the Yates pool alone, with all its wells opened wide, would have produced 5,000,000 barrels of oil a day—almost twice the entire production of the country, and more oil than can be used now or is required for every national oil need.

### Damming the Oil Flow

The American Petroleum Institute met in Chicago in December, 1928, and considered the situation. The country was zoned as to its oil production and oil possibilities, and committees appointed to consider the requirements of each zone. The decision of these committees, backed by the Institute, was that the crude-oil production of 1928 should be considered as the peak requirement for 1929 and the following years until the industry was stabilized.

The first result was in Oklahoma, where, with large areas shut in or pinched down, the production was exceeding the refinery demand by 75,000 barrels a day. The operators appointed an umpire to control the situation, and production was prorated and curtailed sufficiently to eliminate the surplus. This was an astonishing and almost unbelievable event in the oil industry. The operators in Oklahoma actually curtailed production of their own free will and accord. Nobody had thought that such a thing was possible in that cutthroat business, but here was Oklahoma showing the way for the return to oil sanity, and the example was a powerful one.

But Oklahoma had her troubles. The great Oklahoma City pool was discovered, and here was a disturbing, almost calamitous, factor. Here was an oil threat that might easily upset the entire plan. The Oklahoma operators met it squarely and efficiently. They shut down absolutely all producing and drilling wells for thirty days, all operators agreeing and standing by. Here, again, was something new in oil, and something no oil man in the world would have believed possible even so recently as 1927. After that drastic move, the production of the field was set at from 50 to 60 per cent of its potential output. On January 1, 1930, the field, with a potential production of 400,000 barrels, was producing about 90,000 barrels, and Oklahoma seemed stabilized, for flush production in the Seminole area was controlled also.

The Texas operators followed Oklahoma's lead, or, rather, went along with them. They restricted production and restricted drilling, especially in the troublesome Gray County area, and presently Texas was doing her part in the conservation program.

This left California—the remaining member of the great oil-producing triumvirate—to get into the game, and California was an unruly member, but eventually sat in. After various cooperative plans had failed, because certain producers refused to be bound by any agreement and continued actively in the development of oil-producing lands, with a consequent excess and rapidly mounting production in a state that was already producing almost 900,000 barrels of oil a day, and could assimilate not much more than 600,000 barrels, the California Legislature passed, in May, 1929, a law

declaring that "the unreasonable waste of gas" is unlawful. When the law was passed it was estimated that the wastage of gas in California was 400,000,000 cubic feet a day and, subsequently, this wastage increased to the enormous total of more than double that amount—that vast quantity of gasoline and heat and power-producing gas blown off into the air and lost forever every twenty-four hours! There was waste more prodigal than the world had ever known before. In terms of fuel oil, this wastage was equivalent to 132,000 barrels a day.

The gas-conservation law said nothing about oil and its production, but gas is the power that sends the oil to the surface, and if gas production is restricted, oil production will be restricted also. Indirectly, the law reduces oil production, which was the object of it.

The state began legal operations, under this law, to help bring California back to a normal and profitable oil-producing level. Suit was brought to enjoin the unreasonable waste of gas at Santa Fe Springs and in other fields of California. A small insurgent group of oil producers fought this action, resisted the application of the law, and halted the injunction proceedings. The California Supreme Court held that operators wasting gas unreasonably were guilty of nuisance under the law, and ordered the trial to proceed. The trial court held that the law is constitutional, and issued an injunction limiting the production of gas and, consequently, of oil from the Santa Fe Springs field. Eventually, the law will be tested in the highest courts, and if it is upheld, the way is open for restriction based on something more substantial than mere agreement, for other states can pass similar laws if so inclined.

Meantime, California was not doing so well as had been expected along curtailment lines. The gas law had been held up. Voluntary agreements for curtailment had lapsed after certain times. The average daily production of oil was 180,000 barrels a day more than in 1928, when there was a lot too much oil, and at this juncture the Standard Oil Company of California, which controls the field prices of oil in that state, stepped in and brought the oil hogs to their senses. On October 21, 1929, the Standard of California made a drastic cut in the prices offered for the production in the flush and disturbing fields—Long Beach, Santa Fe Springs, Seal Beach and Ventura Avenue. These cuts ranged from forty cents to \$1.05 a barrel, and they brought the flush-oil boys up standing. Conditions did not justify price quotations, the Standard said, which would encourage continued and disastrous overproduction.

### Establishing an Economic Level

That action did the trick. Even the greediest of the flush-production operators saw that there was no sense in producing two barrels of oil for the former price of one, and seeking to get three barrels by new production. It hit them right in the pocket-book—their most vulnerable spot. Meetings of producers were held, committees appointed, and there were agreements to curtail overproduction. In three weeks California's oil output fell 205,000 barrels daily. Then the Standard of California restored the former prices, for that reduction in oil produced practically restored the equilibrium, not only in California but in the rest of the United States as well. The mark of production set as this is written, in April, is 609,000 barrels a day, and it is expected that this level will be maintained for a considerable time.

This curtailment agreement covered all the oil fields in California, practically, save the great Kettleman Hills field, where there was an entirely different situation as to ownership. The Standard Oil Company of California owns alternate sections of land in fee—some 30,000 acres—covering the whole Kettleman area, while the Government owns practically all the remainder. That Standard ownership is another of those

(Continued on Page 72)



(Continued from Page 70)

incredible oil happenings that make the oil game the most alluring and the most adventurous there is.

When the Southern Pacific Railroad was built across that country, years ago, the Government granted to the railroad company, as a bonus, or subsidy, for its development of transportation in that section, every alternate section of land, running back a certain distance from the tracks, which was the usual Government custom in those days. A section of land is 640 acres. This land ultimately came into the possession of the Pacific Oil Company, which was the oil subsidiary of the Southern Pacific Railroad, and eventually the Pacific Oil Company was consolidated with the Standard Oil Company of California.

### Monuments of Disappointment

The Kettleman Hills country is an area of wild, rough hills, forbidding, raw, unlovely. It forms a part of the western margin of the San Joaquin Valley, in California. Between these hills and that division of the Coast Range Mountains known as the Tremblor Range is a narrow valley called Kettleman Plains. Its northern limit is about ten miles southeast of the oil town of Coalinga, and eight miles south of these hills is the Lost Hills field, which has been producing oil for the past nineteen years. It was just land—and poor land, at that—with no agricultural possibilities, and was worth, in its raw state, a dollar and a quarter an acre, say, or less. However, other similar land in the San Joaquin Valley had oil under it, producing vast amounts of money for the discoverers and exploiters of it, and prospectors had tried out Kettleman Hills.

Wildcatters had been in the Kettleman Hills for years. The records show that nine wells had been drilled to various depths and abandoned before November, 1900, and until the great Milham discovery well was brought in, on October 6, 1928, after enormous difficulties, which included the redrilling of the hole from 5800 feet to 7108 feet, thirty-eight wells were drilled, all dry or impossible of completion because of water and other implacable foes of the oil drillers. The Milham people kept going despite their troubles. It took them from March 2, 1927, to October 6, 1928, to get their well, but when they did get it, they had one of the greatest oil wells in the world. After this well was fully developed it produced, and has produced since, a daily average of 3200 barrels of oil and a daily average of 71,800,000 cubic feet of wet gas—which is gas from which gasoline can be extracted.

That was not all. A well producing 3200 barrels of oil a day is not such a whale of a well as wells go, but this well produced 3200 barrels of oil that was, and is, practically good gasoline. This oil has a gravity of 60 per cent. It is a clear white oil that you can put in an automobile tank and use as is, if you want to make the experiment, and not the ordinary oil of commerce, that must be put through the usual and complicated refinery processes before it can be used for motor power. Hitherto, any oil of more than 30 per cent gravity was considered first-class oil.

Thirty-eight bands of hopeful oil men spent millions in those hills before oil was found. Dry and abandoned holes puncture that forlorn territory on all three of the great domes. Sagging derricks, each showing the adventurous spirit of some oil man, give desolate testimony of the fruitless explorations of the years gone by. And then came an even more adventurous and determined body of men, who drilled deeper; and now Kettleman Hills is one of the world's greatest potential oil fields, unique, save for a little similar production at Calgary, Canada, and in a few other places, and of a potential value so vast that the figures seem fantastic.

The hills are divided into three domes, known as the northern, the central and the southern. The northern dome is about

thirteen miles long, and the central dome about six miles. The length of the southern dome has not yet been determined, but many geologists think it may be as long as the northern dome, or longer, and include Lost Hills at its southern end. The width of the three domes is about five miles.

The Standard Oil Company of California owns practically half of this territory in fee, with no leases, or bonuses, or royalties to pay. Almost any figure you like is conservative enough as an estimate of its money value. And the Standard Oil Company of California carries its 30,000 acres on its books—of which 6000 acres are already and absolutely proved—at seven dollars an acre. What do you think of that as an example of the money there is in oil when things come right? No wonder the oil man never quits. Fortune may be beneath the uneven floor of any barranco or in any hill.

Kettleman Hills fired the imagination of every oil man in the country, and within nine months after the discovery well came in, thirty-five wells had been started in the field. The number was smaller than usual in such circumstances because of the restricted holdings of the field. The Standard of California and the Government owned most of it. Ordinarily, with diversified holdings and leases to be fought for and royalties to be boosted and plots to be secured, 200 wells would have been spudded in in the same time. However, here was a new situation, and as the field undoubtedly was of the greatest potential oil-producing value—greater than can be calculated—and about half of it was owned by the Government, the Government stepped in and began to conserve.

Leases or prospecting permits had been granted for practically all the Government land, for oil prospectors never give up hope, but the Government took immediate steps to shut in the oil in this great field until it is needed. Even if no more than the thirty-five wells that were started had been allowed to go to completion, those wells, with their attendant enormous flow of gas, with their production calculated on the production of the wells already in, and the accompanying gasoline to be secured from the gas by casing-head methods, would have supplied approximately all the gasoline needed by the Pacific Coast, leaving all the other 700,000 or 800,000 barrel production of California superfluous.

### Developing a By-Product

Standard Oil of California, owning half of this Golconda, met the Secretary of the Interior halfway on the problem. Whatever the Secretary of the Interior, representing the Government, arranged was all right with the Standard of California, and it was decided and affirmed that the north dome, until now the only producing area of Kettleman Hills, would be limited to four wells; three of which are offset wells to the discovery well, which, because of its enormous flow of gas and other mechanical difficulties, cannot be shut in. This agreement runs to July 1, 1931, unless there is a demand for Kettleman crude oil in the meantime, which is not expected, and, in any event, there will be no overproduction in Kettleman Hills, but an orderly development of this wonderful field.

Another phase of this field and of other California fields is the conservation and utilization of the gas. Natural gas has been utilized for years in all parts of the country for industrial, commercial and domestic purposes. Within the past few years processes have been developed whereby the gasoline content of the wet gas has been extracted at the wells by means of certain distillation handling. This product is called casing-head gasoline and is used for mixture with and reinforcement of the gasoline obtained from the crude oil in the refineries. It adds greatly to the values of oil production.

As an example of the value of this product, the comparative gas conditions as to San Francisco and Los Angeles may be cited. Last year, Los Angeles, being in

Southern California and in closer proximity to gas supply than San Francisco, used 35,000,000,000 cubic feet of gas for industrial purposes, and 32,000,000,000 cubic feet for domestic and commercial purposes. During the same time San Francisco used but 35,000,000 cubic feet of gas for industrial purposes, but did use 19,000,000,000 cubic feet of manufactured gas for commercial and domestic purposes. Manufactured gas has approximately one-half of the heat of natural gas. Thus, the comparative use of natural gas in heat units in the San Francisco area was between 9,000,000,000 and 10,000,000,000 cubic feet.

There is no doubt that the great industrial and residential expansion of Los Angeles in the past ten years has largely been due to the accessibility and use of natural gas. Now, with these vast potential supplies of natural gas within piping distance of San Francisco and the thickly populated and highly industrial Bay region around San Francisco, pipe lines are being laid, and presently this region will be supplied with gas for miles around. This means not only greater profits for the operating companies but also great industrial expansion and economy in the San Francisco region, with their attendant benefits.

### Sanity in the Oil Industry

It is estimated that a daily average crude-petroleum production in the United States of 2,797,000 barrels, augmented by imports of crude oil and crude-oil products and by the domestic production of natural gasoline, should keep a supply-and-demand balance for all products except fuel oil, the stocks of which would increase approximately by 133,300 barrels daily throughout the year. It would be impossible, under any curtailment program, to keep fuel-oil stocks unchanged, because the residuum fuel oil resulting from straight-running the crude through the refineries exceeds the estimated fuel-oil demand to be satisfied. The daily average crude-oil production in the United States for the week ending March 22, 1930, was 2,535,900 barrels, and the potential production, with all fields at their full potential production, was roughly estimated at 10,000,000 barrels daily. There is a lot of oil in this country.

In making these estimates, it was assumed that both imports and exports of crude oil and its products would continue about as at present during the remainder of the year 1930. It was also assumed that about 100,000 barrels of crude oil would be produced daily which would never reach the refineries, but would be burned directly as fuel or transferred to stocks of heavy crude and fuel oil.

Therefore, if this national policy of curtailment of wasteful and unneeded oil production hangs together in the three great oil-producing states of California, Oklahoma and Texas, we are entering on a period of sanity, greater efficiency and greater emoluments in the oil industry. That is a large if. Save for the California gas law, there is no legal restriction on unlimited oil production by those who have oil to produce. The agreements now operating are agreements among the producers and manufacturers themselves.

However, as they are based on a sane realization of the business idiocy of producing more than can be sold and the cutting of costs by the stoppage of waste, it may be that the conservation policy now working so efficiently will hold until a national formula is devised that will do the trick. Though the situation is more hopeful now than ever in the past, it may blow up at any time. Still, the benefits have been clearly demonstrated. Oil can be conserved. Oil should be conserved, not because there isn't plenty of oil but because it is sheer business lunacy not to recognize the imperative economic law of supply and demand.

There is hope. Conservation will continue unless the oil producers are the biggest and greediest business jackasses the world has ever known.

## Powder

### Cleans Teeth as Nothing Else Can

**For Cleaner, Whiter Teeth—do as your dentist does, when he cleans your teeth—use POWDER**

There is nothing known that will clean and polish teeth so quickly and leave them so gleaming white—as POWDER. Science has found nothing to take its place.

That is why your dentist, when cleaning your teeth, as you know, always uses powder.

As powder is the essential cleansing part of any dentifrice; a dentifrice that is... ALL POWDER... just naturally cleans best.

Dr. Lyon's Tooth Powder IS ALL POWDER—100% cleansing properties. This is more than twice the cleansing properties of tooth pastes.

### Dull Teeth Become White

For over SIXTY YEARS, dentists everywhere have prescribed Dr. Lyon's Tooth Powder, because—teeth... simply cannot remain dull and film coated when it is used.

It cleans off all stains and tartar, and polishes the teeth in a harmless and practical way that leaves them sparkling—many shades whiter.

It is free from all grit or pumice and cannot possibly scratch, or injure, the softest enamel, as years of constant use have shown.

Dr. Lyon's is the only dentifrice old enough to prove that it can preserve teeth for life.

### Neutralize Acids

In addition to cleansing, it is probably the greatest neutralizer known for ACID MOUTH, being many times more effective than other anti-acids.

Dr. Lyon's Tooth Powder keeps your teeth REALLY CLEAN and clean teeth mean—firm, healthy gums, maximum freedom from pyorrhea and the least possible tooth decay.

Brush your teeth with Dr. Lyon's regularly—consult your dentist periodically—and you will be doing ALL that you can possibly do, to protect your teeth.

Dr. Lyon's Tooth Powder is not only doubly efficient, but it costs... only half as much... to use. Even a small package lasts twice as long as a tube of tooth paste.



In use over 60 years