

The **TEXACO STAR**



DECEMBER 1930

★



ERWIN GALLERWAY

SANTA CLAUS VISITS THOUSANDS
OF FAMILIES ON CHRISTMAS EVE,
AND CHILDREN HURRY DOWNSTAIRS
TO EMPTY BULGING STOCKINGS

The TEXACO STAR

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DECEMBER, 1930

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Brief and to the Point

★ The cost of traffic congestion within an area of fifty miles around New York City is one million dollars a day, according to officials of the Regional Plan of New York and Environs. Two-thirds of the members of the Pittsburgh, Pennsylvania, Motor Club have reduced their downtown buying because of traffic congestion. And the Harrisburg, Pennsylvania, *News* said editorially that parking in trade areas blocks the merchant's doorway.

★ Footprints on the sands of time are not made sitting down.

★ A new pyramidal type of airplane filling station has been erected at Heston Airport, London. Three planes can be fueled from it at the same time.



★ Upsetting another popular belief, an aviator recently dropped more than two miles before opening his parachute and found that he did not lose consciousness, but only became dizzy because of constant spinning when he fell.

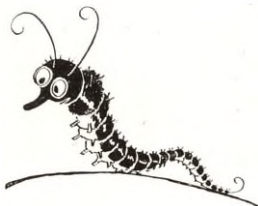
★ The American Air Transport Association reports that passenger-carrying airplanes are daily flying 91,361 miles in the United States, and are serving 226 communities on 263 regular schedules. A year ago the daily total was 61,025 miles, and only 151 communities were listed.

★ Based on the assumption that the total retail trade per year in the United States amounts to about forty billion dollars, a recent survey by the Department of Commerce showed that the total value of returns and allowances is nearly three billion dollars.

★ The American Petroleum Institute estimates that there are more than 350,000 automobile service stations in the United States.

★ California collected \$8,755,119.42 from her gasoline taxes for the first quarter of 1930. The annual total is estimated at more than \$40,000,000, nearly half of the total of all public utilities taxes collected by the State Board of Equalization.

★ Data compiled by the American Medical Association shows the total number of hospital beds in the United States to have been 907,133 in 1929. There are now about three hundred convalescent homes in the United States.



★ Bacilli are coming more and more to take the place of manpower and costly machinery. At a recent meeting of the American Chemical Society, a newly-discovered bacillus was described that does the work of an intricate machine in extracting oil from coconuts. The machine used to crush the shell of the nut; now the bacillus is introduced, and it turns first the sugar and then the protein into liquids on the surface of which the oil floats.

★ It is easy to pick out the careful driver; all the dents are in his rear fenders.

★ Gasoline taxes in Virginia profited that state \$679,081 more for the first eight months of 1930 than for the corresponding period in 1929.

★ A census of manufacturing shows that in 1929 there were 5.2 per cent more workers and 5.9 per cent more establishments than in 1927.

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The Geographical Center of Our Country at Fort Riley, Kansas

The Hub of the United States

TEXACO Asphalt Pavement Has Stood Here for Thirteen Years Without Repair

PROBABLY not one out of ten schoolboys could tell the location of the geographical center of the United States, yet it is marked by a monument which was at one time so attractive to souvenir hunters that it was being demolished chip by chip and had to be protected. About 3000 motor vehicles pass the geographical center of the United States daily, riding on a pavement of TEXACO Asphalt.

The monument does not necessarily stand in honor of the geographical center, but rather it is a memorial to Brevet Major E. A. Ogden, Assistant Quartermaster, U. S. Army, who died August 3, 1855, and who, according to an inscription on the monument, opened a quarry where stone was mined to build the first permanent buildings in Fort Riley, Kansas. The small obelisk is within the limits of Fort Riley, within a few feet of Usway No. 40 South, which has been paved with TEXACO Asphalt since

1917. The inscription on the stone reads as follows:

On the site marked by this monument Major Ogden, in 1855, opened a quarry from which was obtained stone used in the construction of the first permanent buildings erected at Fort Riley, Kansas.

The original Ogden Monument was erected in 1855, but as time passed it became so mutilated by souvenir hunters that it was moved inside the fort. Another similar monument was dedicated on the same site and fenced about for protection. It is this monument which records the geographical center of the United States.

The TEXACO pavement at that point on Usway No. 40 South is of the Asphaltic Concrete type and is supported by an old macadam foundation. In the thirteen years that the pavement has stood, it has never needed repairs at any time.



*Monument on
Quarry Site,
Fort Riley*

What's the Matter With the Petroleum Industry?

*Address Delivered at a Meeting of the American Petroleum Institute
in Chicago on November 12, 1930*

By C. B. AMES

Vice President of The Texas Company

OVER a period of years, the demand for petroleum and its products will exceed the supply. At the present time, the supply exceeds the demand. The problem of the industry is to flatten out the curve so that supply and demand may be continually kept in a reasonable state of balance. With the exception of a few flush pools the producers of the United States are today giving away their crude oil, that is to say, the price they are receiving does not more than pay the cost of production, if costs are figured on a proper accounting basis. The product itself, therefore, while exhaustible and irreplaceable, is yielding the producer no return, and in some cases a minus return.

This is a problem which has for a long time been receiving the attention not only of the industry itself but of the Federal Government and the authorities of the oil producing states. An effort to analyze the situation and an examination of the remedies which have been proposed may not be without value, and, for the purpose of the analysis, the situation may be considered in the light of the producing, refining and marketing phases of the industry.

PRODUCTION

During the past few years remarkable progress has been made in the production of crude oil. Great skill and intelligence have combined with large expenditures of capital in discovering oil at greater depths and in devising machinery and methods for recovering it, so that today much of the production which is burdening the industry is coming from horizons more than a mile below the surface of the ground, which only a few years ago were thought to be beyond the reach of the drill.

The open flow tests which are being taken from time to time as the basis for proration show a very large volume, but these tests are for an insufficient time to establish the actual potential. It is conservatively estimated, however, that the actual potential is at least double the demand.

This excess of supply over demand is the cause of all the trouble in the industry today.

REFINING

Much progress has likewise been made in refining efficiency. As gasoline is the most valuable product of refining, much of the industry's ability has been devoted to improving recoveries, so that now the industry as a whole is converting into gasoline ap-

proximately 40 per cent of the crude, whereas fifteen years ago the gasoline recovery was only twenty per cent.

Even so, the refining industry as a whole is inefficient as the recovery of gasoline by the general use of the methods now known can be increased to fully sixty per cent, thus reducing by a very great amount the necessary requirements of crude.

Today the industry, in order to produce the requirements of gasoline, is producing an enormous quantity of fuel oil which has so flooded the market as to bring an entirely inadequate price and to displace coal in many instances where coal could profitably be used. This has not only been an onerous burden on the petroleum industry but it has likewise been one of the causes for the depressed condition of the coal industry, which in turn, has deprived the railroads of a large volume of freight.

This unfortunate condition of the refining industry is directly caused by the overproduction of crude.

MARKETING

Of all the branches of the petroleum industry, marketing is in the worst condition, and in it there has been the least progress. The Code of Marketing Practices has been helpful, but there has been such an enormous oversupply of products that the marketing end of the business has almost broken down. The sales departments of the various oil marketing companies and the independent wholesalers and retailers of gasoline seem to be engaged in a mad struggle for volume without regard either to value of the product or profit in its distribution. It is not unusual for the oil companies to produce crude, transport it to their refineries, refine it, and sell the gasoline for less than some of the dealers receive for distributing it through their stations. In some cases we have even seen marketers offer a discount to customers who will buy on credit instead of paying cash, and it is not unusual for great ingenuity to be displayed in devising methods of complying with the letter of the Code, while violating its spirit.

This chaotic condition in the marketing business is the direct result of the overproduction of crude.

Let us now turn to an examination of some of the remedies which are being applied and which have been proposed.

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PRORATION

This is the most effective remedy which has been applied and the results which have been achieved have been excellent and afford hope for the future. These results have been achieved by the coöperation of State and Federal agencies with the industry; in some cases by the application of law, and, in others, merely by coöperation.

In Oklahoma an effort has been made by law not only to prevent physical waste but economic waste. In that State, economic waste as such is prohibited by law, and waste incident to the production of crude oil in excess of the market demand is declared unlawful. The Corporation Commission is given broad power to prevent waste by ascertaining the market outlet for the State as a whole, for the various producing areas of the State, and apportioning the market outlet between these areas and between the several producers of any given area. This statute has recently been subjected to attack in both the State and Federal Courts of Oklahoma and has been upheld by both. These decisions are most helpful and greatly strengthen the proration movement in that State. There the Corporation Commission, upon the application of the oil producers, has ascertained the market outlet for the State to be approximately 550,000 barrels, and has apportioned this outlet to the various producing areas.

In Texas the law prohibits physical waste but specifically excludes economic waste from consideration of the Railroad Commission. It contains provisions relative to preventing discrimination and requiring purchasers to purchase ratably. The Railroad Commission is given broad powers of enforcement and under the Act, upon application of the producers, has found that the market outlet for Texas is approximately 750,000 barrels per day, and has ascertained the market outlet for each producing area of the State in order to prevent discrimination between areas and between producers in any area. This order of the Commission is now under attack in the Courts but no decision has as yet been announced.

Last year California passed an Act prohibiting the unreasonable waste of gas and setting up machinery for administering the law. This Act has not yet been applied as litigation has held it in abeyance. The ground of attack is that while the State has the power to prohibit entirely the waste of gas, the effort to prohibit the unreasonable waste of gas prescribes no definite standard, and therefore, the law is void for uncertainty. Whether the attack succeeds remains to be seen. While the California statute has not yet been enforced, the producers of that State have restricted their output to approximately 600,000 barrels per day.

The New Mexico statute permits agreements, but does not otherwise prevent production. Under this statute, the Hobbs pool is under proration.

As a result of the activities in these and other States, the actual production is now less than 2,400,000 barrels and is approximately in balance with

demand. However, we started into the year with 632,000,000 barrels of crude and refined in storage and that is approximately the figure today. This enormous quantity of storage oil and the uncertainty about proration are the immediate causes of the demoralized market for crude. The proration orders and agreements are all for short periods of time. It is probable they will be renewed but not certain, and therefore, the overhanging potential threatens the stability of the situation and jeopardizes the price structure, notwithstanding the great good that has been accomplished.

UNITIZATION

An oil pool is a unit and obviously ought to be operated as such. Diligent efforts are being made to bring about unit operation and substantial progress is being made. This movement has, and is entitled to have, the support of the industry. It is so obviously sound that there is practically no division of opinion as to its desirability. The only differences of opinion are as to its practicability. Surface ownership does not coincide with the boundaries of the oil deposit and therefore there are numerous surface owners entitled to penetrate the oil sands. Each one desires to recover as much of the oil as possible and it cannot be known in advance how much is under the surface of each owner. Some surface owners need the oil in their business while others do not. Different leases have different drilling obligations. The royalty owners are an important part of the picture. This diversification of interest is an obstacle in the way of unit operation. Under the law a surface owner has the right to drill on his own land. This is a right of which he cannot be absolutely deprived. He cannot be forced into a unit operation, and therefore, unitization must rest upon consent and not compulsion. As the diversity of interest sometimes prevents consent, progress in unitization can only be made gradually and by persuasion.

It cannot be regarded, therefore, as an effective remedy for existing evils, but only as an alleviation of them.

THE TARIFF

A strong effort has been and is being made to procure a tariff on crude oil and its products. This subject is now being considered by the Tariff Commission, which will make a report to Congress in the near future. Whether a tariff will remedy the situation or improve it remains to be seen. We can only hope that if Congress imposes a tariff on imports that the result will be beneficial. The fact, however, is that during 1929 we exported 162,257,000 barrels of crude and refined products, while we imported only 103,709,000 barrels. Our exports, therefore, were approximately 54,000,000 barrels in excess of our imports or an average of approximately 150,000 barrels per day. The record for 1930 is about in the same proportion. If the effect of the tariff is to exclude foreign oil, it forces that oil thus excluded into foreign markets and might

have the effect of excluding American oil pro tanto from those markets. If the effect of a tariff on wheat, as to which we have an exportable surplus, is a criterion by which to judge the effect of a tariff on oil, it will not be helpful, because while there is a tariff of 42 cents a bushel on wheat, the prices for wheat in Minneapolis and Winnipeg are approximately the same.

WASTE OF GAS

It is estimated that two billion cubic feet of gas are being daily blown into the air, of which California is wasting approximately 600 million cubic feet, Oklahoma 400 million, the Texas panhandle over 500 million, and West Texas and New Mexico about 250 million. Last year the total consumption of natural gas is estimated at 1913 billion cubic feet, of which 360 billion cubic feet were used by 5,116,000 domestic consumers, the rest being used for field purposes, carbon black, fuel, and like purposes. The total consumption, therefore, for domestic purposes, was less than one billion feet per day, while the total consumption for all purposes was something over five billion feet per day. We are, therefore, blowing into the air twice as much gas as is being used for domestic purposes and approximately 40 per cent of the total consumption, and nearly all of this waste is occurring in three States.

Under the established law of the land, each State has the power to stop this waste, and it is well to inquire what the effect would be if the States should exercise this power.

In the first place, it would stop this terrible waste of an exhaustible and irreplaceable natural resource. The average price per thousand cubic feet paid by domestic consumers in 1929 was 62 cents and in the course of time, there will be a market for every foot of the gas that is now being wasted.

In the next place, it would reduce the oil production. It is estimated that this gas which is being wasted is bringing to the surface more than 400,000 barrels of oil per day. In addition, the gas which is being wasted is producing enormous quantities of natural gasoline which is not needed at this time, and which is a contributing cause to the demoralization of the industry. A reduction of 400,000 barrels of crude per day, and a reduction of the natural gasoline output derived from the wasted gas would have an immediate effect upon the crude situation of incalculable value to the industry.

This diminution of the crude supply would result in better refinery practices in order to increase the percentage of gasoline recovered and reduce the fuel oil output. The effect of this would be to avoid flooding the market with fuel oil, thereby improving the price received and benefiting both the coal industry and the railroads.

It would likewise reduce the enormous stocks above ground and thus bring the industry into a better statistical position.

After a while, as the demand for crude increases, the gas which would otherwise be wasted would be

returned to the oil sands for further use in the production of crude, thus increasing the ultimate yield by a figure which is estimated by some competent observers as twenty per cent of the total.

The tendency, also, would be to discourage wildcatting, as there would be no incentive to discover new flush areas before there was a market for both the gas and oil.

It would greatly benefit the oil producing States by conserving their natural resources and encouraging industry and promoting a fair price for their products, to say nothing of the direct benefit to the State governments, by increasing their revenue which, to a large extent, is based on a percentage production tax by which these States participate in the better prices for crude.

Finally, it would be a genuine conservation movement, and go far towards preventing immediate overproduction and insuring maximum ultimate recovery. Such legislation, of course, should be accompanied by ratable taking requirements, which would insure to all producers a proportionate share of the outlet for both gas and oil, and supplement, without superseding, existing statutes and the efforts now being made by the industry to correct existing evils.

For many years the Governments of the oil producing States have been vitally interested in this problem and conservation legislation extends over a period of forty years. During the past six years the Federal Oil Conservation Board has given a national impetus to the movement and has done much towards correlating the activities of the various States and of the industry itself. Much of the fine spirit of coöperation now found amongst the oil producers is the direct result of the activities of the Federal Oil Conservation Board, but we must always bear in mind that the primary object of these public agencies is the conservation of our natural resources. They rightly believe that a genuine policy of conservation is important to the Nation; they recognize that the present waste hastens the approach of the day when our oil and gas deposits will be exhausted. It cannot be too often repeated that the oil and gas resources of the Nation are irreplaceable; that when they are once exhausted they are permanently exhausted, and that the Nation and the States, as well as the industry, should do everything within their power to conserve them, not merely in order that those of us now engaged in the business may make a profit but that future generations may not be deprived of their use.

Over the plains area of the Southwest the Indians and the buffalo formerly found a home. The Indians would kill the buffalo as they needed them for food and clothing. Gradually the white man pushed the Indian to one side and for the sake of immediate profit, slaughtered the buffalo merely for their hides. After it was too late and the buffalo were gone, this waste was severely condemned. Over these same areas today, natural gas is being wasted and not even the hide is being saved. Shall we repeat the history of the buffalo or shall we act in time to prevent it?

The Story Teller

A Tale of Christmas

By WILFRED B. TALMAN

THE old man came out of the dim shadows in the rear of the deserted bookshop. In his hand was a shabby wreath that he had hung on the door just before Christmas for the past two years. He pulled a stepladder up in front of the door, blew some of the accumulated dust from the wreath as he twirled it slowly, and mounted the ladder painfully, a step at a time.

"Christmas again!" he mused. "Seems as though last Christmas was only a couple of weeks ago. Well, it's just the same all the year 'round for me, and when a man gets old the weeks and months don't mean any thing."

He carefully straightened the wreath, which seemed determined to hang askew. Then he reflected that every time the door was opened its equilibrium would be disturbed. With a gesture of resignation to the perversity of the wreath, and perhaps to the perversity of all things in the world, he shuffled down the stepladder with the same painful movements he had used in mounting it.

Out in the street people were hurrying past, intent on making the rounds of a certain number of stores on their Christmas shopping lists before the closing hour. They bent their heads into a wind that carried the portent of snow. Down in the corner of the newspapers that a sweater-clad boy in front of his shop was trying to sell was a notice, printed in black type—"Only 10 Shopping Days to Christmas".

Henry McKay leaned against a shelf which dis-



"Christmas again!" he mused

played the latest books, adorned with flashy covers for the holiday season, and watched those who passed by. He knew only too well that they would not stop to look at his books. Years ago, when there were not so many lending libraries, and when the department stores did not cut prices to a bare margin of profit, many of them used to buy books. But it was different now. One could even get the books of the month by mail, without venturing out into the cold or wasting time while old Henry McKay shuffled around his shop looking for a desired volume.

McKay's landlord was threatening to raise

the rent of the bookshop, and McKay had been having a hard time scraping together the few dollars required up to now. Instead of a good living and ten per cent from his business, he was making a poor living and one per cent. All over the city there were bread lines this winter. His bank balance, accumulated dollar by dollar, had melted away during a recent illness. He owed several persons small sums of money. A cheerless Christmas loomed ahead.

Before McKay's hair had become gray and his hands shaky, he had wanted to become an author. He knew that he had an inner talent for it. As a story teller he was superb. During the few years he had been at school the younger children would flock around him and insist, "Tell us a story, Mr. McKay?"

But when he tried to write, he learned that pub-

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lishers and editors were difficult to approach, especially when they discovered that the material the young man McKay was bringing them was not what they wanted. McKay himself knew that the things he put on paper were not the same things that he would tell to a child sitting on his knee. His education was insufficient as a vehicle for the written expression of stories about knights and fairies and pioneers and pirates.

Standing by the door of his shop, looking out at the Christmas throng, McKay was startled out of his dream of the past. Someone was about to enter. The man turned down the collar of his overcoat. It was Russell Minton, publisher.

Some of McKay's hopes of authorship had once centered about Russell Minton. The publisher had come to the bookshop a number of years before in search of a rare first edition. McKay had it, safely stowed away in the back of his shop. Minton came several times after that, once with one of his children. McKay had told the little girl a story while the publisher browsed among the books. As the child listened with rapt attention, McKay saw out of the corner of his eye that Minton had stopped thumbing pages and was listening. McKay went home that night and painstakingly wrote what he thought was a good story for children. He put it in the mail the next morning, addressed personally to Mr. Minton. It came back with a brief, polite rejection slip. Many more stories came back. McKay, discouraged, stopped writing.

"Good evening, Mr. Minton," said McKay. "I have some good first editions that will make excellent Christmas presents."

"I have no doubt of that," said the publisher, "but frankly, I'm not giving first editions this year. I didn't come in to buy anything. Instead, I came to invite you out to my country place for a few days before Christmas."

"But I can't leave the shop," protested McKay. "I'd lose all my Christmas business."

"Unless I'm mis-

taken," rejoined Minton, "your Christmas business will be small. It might pay you to take a rest. There's something I'd like to talk over with you. I'll be expecting you the day after tomorrow."

When Minton had left, McKay sat down wearily. In order to make a good appearance at Minton's home he would need a new suit, new shoes, and several dollars for a railroad ticket. Wrapped safely in brown paper and hidden in the back of his shop was a set of the "Commentaries of Curtius Gallus", one of his prized possessions. McKay had hoped to keep this rare work for himself. Only a few days before, a neighboring bookseller had inquired for the set. McKay knew that the bookseller would give about half its value.

Minton had said he had something to talk over with him. McKay took the bull by the horns. Perhaps here was his chance. He took the heavy parcel lovingly from beneath his dingy desk, shut up his shop, and shuffled down the street.

The living room of the publisher's home, with its deep rugs and heavy window drapes, was warm and quiet in the evening. A fire blazed cheerfully beyond the hearth. McKay leaned back in the soft chair and closed his eyes. He wondered how many stories he would have to sell to Minton to buy luxuries such as this—for he was again determined to sell his talent to Minton in some way. That afternoon, shortly after he had arrived, McKay had inquired of the publisher what it was he wanted to talk over.

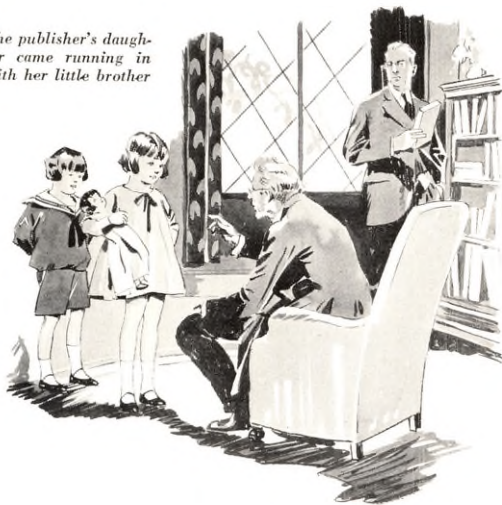
"Well, I'd rather not say just now," said Minton.

"Perhaps in a day or two. I have a number of things on my mind right now."

McKay wondered, also, how he could get enough money to buy another set of the "Commentaries", as well as enough to pay his advance in rent.

Shrill laughter came from the other side of the door leading from the living room to the rest of the house. It burst open and the pub-

The publisher's daughter came running in with her little brother



lisher's daughter, now about eight years old, came running in with her little brother.

"Tell us a story, Mr. McKay?" she asked, pulling a cushioned footstool up before the fire. "Tell us a story like you told me once before?"

McKay smiled. "Why, I'm no good at telling stories," he said modestly.

"Oh, yes you are, Daddy says you can tell stories fine."

The little boy stood silently with his hands behind his back and coyly refused an invitation to sit on the old man's lap.

"Once upon a time—" began McKay, after the fashion that all story tellers begin, and began a story of fairies and giants and witches and goblins that made the eyes of the little fellow almost pop out of his head.

"Telling stories to the kids again, eh?" asked Minton, coming over to McKay. "By George, but you're a master at that. I only wish you wrote them as well as you tell them!"

The next night, and the night following, the children came into the living room as McKay sat before the fire. An older daughter of the publisher was sometimes in the room when the inevitable tale began, but when McKay started to speak she always rose quietly and left.

During the day, McKay lounged about the house, not quite content, though a vacation was an unusual thing with him. For one thing, he wished that he could have a volume of the "Commentaries of Curtius Gallus." The publisher's library was a well-stocked one, but it was possible that he never had had any interest in the contents of the "Commentaries." McKay spent most of his time reading his host's books, but he seemed to feel most keenly the loss of his own rare volumes.

Sometimes the children took walks with him through the fields. The old man made Mother Nature seem to them so much like a real person that they almost expected to meet her coming around a clump of bushes in her wind-blown cloak.

The night before Christmas the weather was even colder that it had been for the past week. The fire

"You're certainly not going to pay me for telling stories to your children!"



was welcomed by McKay that night, and he had begun to look forward to the evening visits of the children. He sat dreaming again after the children had gone. Perhaps he dozed, for suddenly he noticed that Minton was standing beside his chair.

"Merry Christmas, McKay," said the publisher, extending a slip of paper. "Your stories have been excellent." The old man took the paper and held it toward the light.

"One thousand dollars!" he exclaimed. "You're certainly not going to pay me for telling stories to your children!"

The old man's face clouded. "I can't accept it. I haven't been reduced to charity yet."

"Charity, man? Who said anything about charity? That check is for advance royalties on your book." And the publisher thrust something forward.

McKay's hand trembled as he took from Minton's hand a series of unbound pages covered with printed matter and rough drawings. He felt the publisher's hand on his shoulder.

"McKay, we needed some new children's tales, and I knew you could do them. My oldest daughter has been just outside the door every night when you have told your stories to the children. She has taken down every word in shorthand. Yesterday I had them set up in type to see how they'd look, and an artist sketched in a few of the illustrations. Just dictate a few more stories in your evenings and you'll be another Hans Christian Andersen."

The old man turned to him. He could say nothing. Words seemed choking him, but he could not express his thanks. The publisher understood, and with a final pat on McKay's shoulder, left the room.

McKay crossed to a window and pulled aside the drapes. A few flakes of snow were falling, seeking the company of others that had covered the ground lightly a few days before. And then the old man spoke the first childish words that he had uttered to himself in a long time.

"Santa Claus," he said, "if there are some poor children you want to give some stories to next Christmas, I know a rich author who's going to write them."



Part of the West Texas Pipe Line After Laying of Pipe and Backfilling

A Railway Without Rails or Passengers

Oil Pipe Lines Transport a Great Freight Tonnage Efficiently

By R. B. McLAUGHLIN

Secretary and Assistant Treasurer, The Texas Pipe Line Company

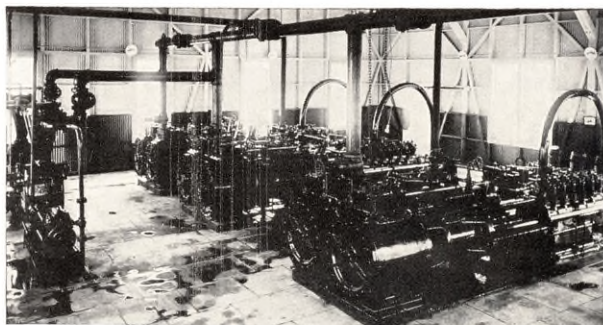
SINCE the drilling of the Drake well in Pennsylvania in 1859, improved and unique transportation methods have played a most important part in making petroleum and its products available to the whole world. There has been built in the United States a great pipe line transportation system. It has sometimes been called an underground railway, although it is easily one of the most efficient of all devices of speedy movement of a great freight tonnage. It is probably the least known of all transportation organizations in the world.

In many respects a pipe line system is similar to a railway system with the trunk line feeders, terminals, storage yards, switch systems, stations, dispatchers and telegraph and telephone system. Another similarity to railroads is that interstate pipe lines operated as a common carrier are subject to the provisions of the Interstate Commerce Commission by virtue of the so-called Hepburn amendment of 1906. In various states intrastate trunk lines are common carriers, subject to the jurisdiction of the State Commissions. The pipe line system is divided

into two divisions: first, the gathering line system which transports the oil from wells of producers to points of delivery within the gathering district or to a point of connection to a trunk line for transportation beyond the gathering district, and second, the trunk line system for transporting the oil which has been gathered from the wells of producers, or has been received from connecting lines, refineries or vessels.

In February, 1917, by enactment of the Texas Legislature (Chapter 30, General Laws of Texas, 1917), oil pipe line companies were declared to be common carriers and were placed under the jurisdiction of the Railroad Commission of that State. However, in 1906, pipe line companies doing an interstate business, by an act of Congress, were declared to be common carriers and placed under the jurisdiction of the Interstate Commerce Commission. Under and by virtue of the provision of Chapter 31 of the General Laws of Texas, 1917, companies owning or operating oil pipe lines were required to incorporate separately such pipe lines, and in case of ownership of oil pipe lines beyond

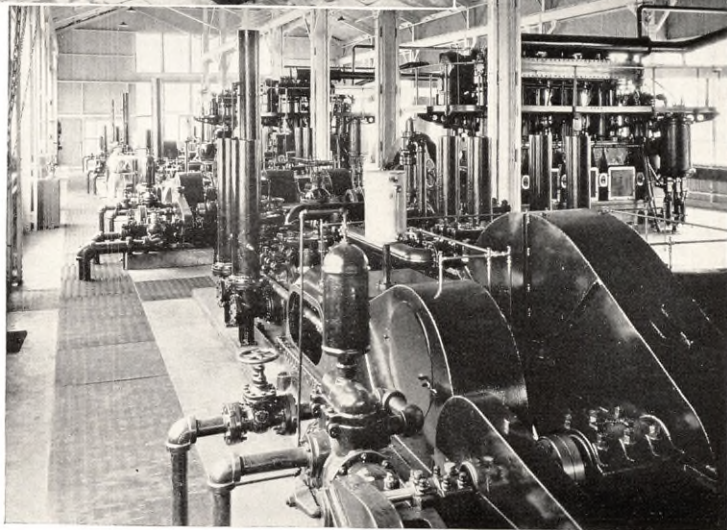
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*Steam Operated
Pump Station at
Sour Lake, 1905;
Up-to-Date Then*

★

*(Right) Modern
Pumping Station
Employing Die-
sel Oil Engines*



Spindletop District equipped with one 35-horsepower boiler and one ten-by-six-by-three Snow pump. A six-inch line was constructed from this station to Garrison, a distance of approximately three miles, where steel tankage had been erected to receive the oil. It was from this station and

the borders of Texas, additional pipe line corporations could be organized outside of the State and such oil pipe lines could be sold and conveyed to them. In every case the organizing corporation could own all of the capital stock of the organized pipe line corporations.

The Texas Company complied with the mandatory provisions and organized The Texas Pipe Line Company, a Texas corporation, on June 26, 1917, and The Texas Pipe Line Company of Oklahoma, an Oklahoma corporation, on June 27, 1917, and conveyed to the two Pipe Line Companies all of its pipe line assets in the States of Texas, Louisiana and Oklahoma. Prior to the organization of the two pipe line companies, the pipe line system was operated as a Department and Plant facility of The Texas Company.

The first pipe line facility was installed in the spring of 1902 and consisted of a local station in

through this section of line that the first barrel of The Texas Company's oil was transported. In August, 1902, a six-inch line from Garrison to Port Arthur, a distance of thirteen and seven-tenths miles, was placed in operation and the oil was pumped from the Spindletop station to Port Arthur and loaded direct on boats. This was prior to erection of any facilities at the Port Arthur Works, and this method of handling remained in effect until after the erection of No. 1 Pump House at Port Arthur.

In 1903, a six-inch line was constructed from Garrison to Sour Lake, a distance of 22 miles, to receive the oil from the Sour Lake Pool.

In 1905, due to development of the Humble Field, the Port Arthur-Sour Lake line was extended to Humble, a distance of 52 miles. Due to development in southern Louisiana, in 1906 a six-inch line was constructed from Evangeline Field to Lake Charles, a distance of 40 miles.

The TEXACO STAR

In 1907, the pipe line system was extended into Oklahoma, by the construction of 473 miles of eight-inch line from Humble, Texas, to Tulsa, Oklahoma.

In 1910, the system was extended into northern Louisiana by the construction of 192 miles of eight-inch line from



*Large Crews
Were Required
to Connect Pipe
Lines 20 Years
Ago*



*(Left) Laying a
Section of Pipe
Line Today With
Special Tractors*

Port Arthur, Texas, to Shreveport, Louisiana. In 1912, due to development in North Texas, a six- and eight-inch line was constructed from West Dallas to Electra, a distance of 160 miles. In 1913, an eight-inch line was constructed from Dallas to Ranger, a distance of 113 miles, due to development of production in the north central Texas area.

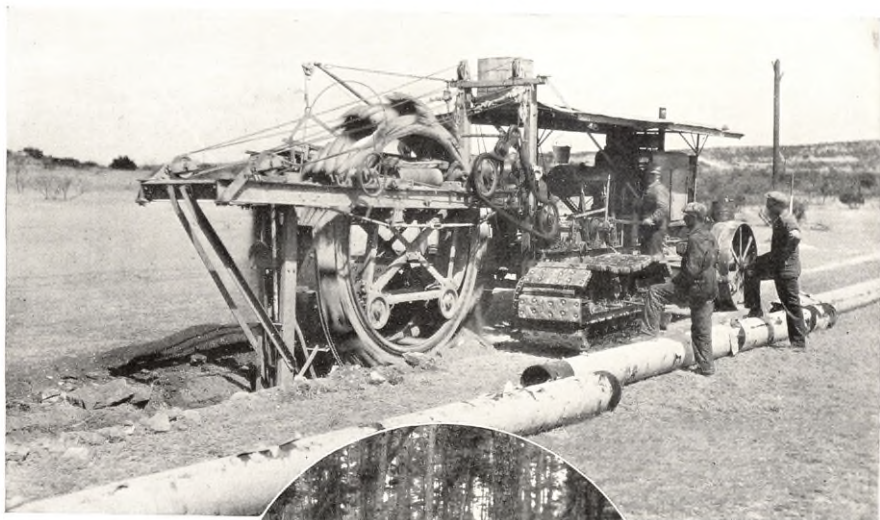
In 1923, developments in Arkansas justified the construction of 91 miles of ten-inch line from Louann, Arkansas, to Shreveport, Louisiana.

In 1923, the West Dallas-Electra Line was extended from Electra to the Panhandle area, consisting of 153 miles of eight-inch line, and as a result of this extension it was necessary to construct an eight-inch line from Olney to South Bend, a distance of thirty miles, and an eight-inch line from Corsicana to San Augustine, a distance of 146 miles. In the latter part of 1923 construction began on the extension of 547 miles of ten- and twelve-inch

line from Houston to West Texas with a branch line extending from San Marcos to San Antonio. Our West Texas line was later extended into Lea County, New Mexico. The extension of our facilities into West Texas was completed and placed into service in July, 1929, providing a daily maximum capacity of 55,000 barrels.

In 1930 a six-inch branch line was constructed from Rosanky (a junction on our West Texas line) into the Darst Creek Pool.

During the period from 1902 to 1929, inclusive, the main trunk line system, in certain sections, was paralleled or looped with branch lines extended to the various oil pools, together with the necessary gathering line system, until today we have a network of 6,161 miles of various sizes of trunk, loop, branch and gathering lines extending into the various sections of five states, and are handling 135,000 barrels of thirty-five different kinds of oil daily.



Ditching by Machine, As It Is Done at Present

(Left) Negro Ditchers on a Pipe Line 21 Years Ago

In 1923 The Texas-Empire Pipe Line Company was organized, which is operated under the management of The Texas Corporation, which owns one-half interest in said Company. In 1929 this Company constructed a twelve-inch line from Cushing, Oklahoma, to East Chicago, Indiana, a distance of 678 miles, with an eight-inch branch line from Heyworth to Lawrenceville, Illinois, a distance of 130 miles, and a six-inch line from Wilmington to Lockport Works, a distance of 21 miles, the main twelve-inch line having a daily maximum capacity of 50,000 barrels. In 1930 additional pumping stations were erected, which increased the daily maximum capacity to 72,000 barrels.

In the early days, the construction of lines depended solely upon manual labor, and approximately two hundred men were required to construct an eighth-inch line, as compared with our present day method of constructing electric welded lines, with the use of ditching machines and tractors, equipped with boom, winches and backfillers, requiring 40 men.

Prior to 1923, line pipe was lapwelded with low



carbon content, as compared with the electric welded pipe of high carbon content. Our Gray County-Port Arthur eight-inch line and the Cushing-East Chicago twelve-inch line were of a high carbon steel. The twelve-inch

pipe used on The Texas-Empire Cushing-East Chicago line has a tensile strength of 64,000 pounds per square inch, as against 48,000 pounds per square inch to be obtained in the low carbon lapwelded pipe heretofore used. The difference in strength of the steel permits operation of the system at 750 pounds working pressure, as against 600 pounds pressure of the lapwelded pipe with the same factor of safety. The high tensile steel also makes it possible to reduce the pipe wall thickness and the weight per foot per pound approximately nine pounds. As pipe is purchased on a tonnage basis, this has the effect of reducing the investment cost, and by being able to operate at a higher working pressure increases the daily capacity on a twelve-inch line approximately ten thousand barrels per day.

Our Gray County-Port Arthur eight-inch line was the first all electric welded line to be constructed

The TEXACO STAR

by this company, and it is the first time this type of welding has been used in the construction of oil lines and the first time used in constructing a main line of any distance. The pipe coating applied on pipe for this line as well as other main lines subsequently constructed, was spiral wrapped at the pipe mill, using special machines designed for this class of work.

The pumping stations, in the early days, consisted of thirty to forty horsepower field boilers and small steam driven pumps, which were later replaced by 175 horsepower water tube boilers with steam driven and straight line and fly wheel pumps. These have subsequently been replaced by more modern Diesel and motor driven equipment of greater horsepower, which consists of two hundred and four hundred horsepower Diesel engines connected to Duplex and Triplex Pumps and three hundred horsepower motors connected to centrifugal pumps.

The pumping equipment installed in the electric stations constructed on The Texas-Empire Pipe Line Company's system consists of eight-inch, four-stage centrifugal pumps operated at 1,800 revolutions per minute with a maximum daily capacity of 91,000 barrels at 375 pounds pressure. When operated in a series of two, these will handle the same quantity at 750 pounds pressure. When operated on this basis, 1,600 horsepower can be developed on 300 horsepower synchronous motors. Where movements are less than 63,000 barrels per day, the system can be operated with one motor unit, and part of the load will be placed on the Diesel stations by intake pressure.

Sand Springs Station, which is located ten miles from Tulsa, is operated from the Oil Dispatcher's office located in Tulsa by remote supervision control. A switchboard located in the dispatcher's office indicates by means of red, green and white lights every important operating condition at the station. By observing this board the Dispatcher can

at all times determine the pressure at which the pumps are operating, whether all mechanical features such as the bearing temperatures and gaskets are in normal condition, interruption of power or emergency arising due to line break, fire or overheated motor, and can shut down the station by switch in his office. This method of control has been used extensively in electric sub-stations and power plants and involves no untried features from an electric point of view. The Sand Springs Station represents the first application of the remote supervision control to pipe line pumping stations.

The system of The Texas Pipe Line Company and The Texas Pipe Line Company of Oklahoma consists of 63 main line stations and 73 secondary stations, or a total of 136 pumping stations, while the system of The Texas-Empire Pipe Line Company consists of 19 main line stations, or a total of 155 stations and 7,053 miles of pipe line.

In the published statistics showing the financial and operating data of 34 carriers by pipe line for the year 1929, The Texas Pipe Line Company and The Texas Pipe Line Company of Oklahoma, consolidated, ranked fourth in the miles of line operated; sixth in the amount invested in plant facilities; ninth in the quantity of oil transported, same being 4.91 percent of the total oil transported by pipe line carriers during the year 1929.

The improvement that has been effected since the first barrel of oil went through The Texas Company's first pipe line is incalculable. Just as every other branch of the industry has added improved methods and labor-saving devices, so the pipe lines through which our oil passes have been kept abreast of the times with regard to efficiency and safety. At the beginning, persons constructing pipe lines had to "feel their way", using the trial-and-error method, but in later years, standards were adopted, natural obstacles overcome, and pipe line transportation has been brought to its present perfection.

Bellhole Welder on the Texas-Empire Pipe Line



The Contribution of the Petroleum Interests to the Growth of Port Houston

By J. S. CULLINAN

Mr. Cullinan was one of the organizers and the president of The Texas Company from the time of its organization in 1902 until November, 1913. The following is an address before the Port Houston celebration dinner October 28.

THE origin of petroleum has never been determined; it is usually found associated with salt water and natural gas; hence, the theory of condensation from hydrocarbon gasses given off by the high temperatures of the interior of the earth, deposited in sand or other porous formation, sealed by overlying non-porous formation.

Petroleum was discovered on Oil Creek, a tributary of the Allegheny River, in the State of Pennsylvania, at a point something over 150 miles north of Pittsburgh, near the present city of Titusville where for many years the Seneca Indians gathered, bottled and distributed the oil dipped from a seepage and used and sold it for medicinal purposes. Col. E. L. Drake conceived the idea of drilling a well to the source of this seepage. This was done and at a depth of 68 or 69 feet the sand was developed from which for many years oil was produced. This well was completed in August, 1859.

I moved with my parents from another point in Pennsylvania to Oil Creek in the winter of 1863-69. The petroleum production of the United States at that time was at the rate of 4,000,000 barrels per annum. The product was handled from the wells in wooden barrels, by teams, to Oil Creek where it was moved in wooden barges to Pittsburgh and other points on the Allegheny River. Later a railroad was built to the field, after which it moved in wooden tanks set on flat cars until the iron or steel car was developed. The product was at that time refined at Pittsburgh and other points on the Allegheny River and was used principally for light, replacing whale oil, the candle, and the tallow dip—the principal sources of artificial light at that time.

While there had been some minor production and development near Nacogdoches in the early sixties, some of which reached the markets, the quantity was limited and the business never reached commercial proportions, and the oil industry of your state originated in Corsicana. I came to Texas (a damned

Yankee) in October 1897. Petroleum production of the United States had then increased to 60,000,000 barrels per annum. Our interests constructed the first pipe line and installed the first refinery in Texas.

The first use of oil for fuel on American railroads (now consuming upward of 70,000,000 barrels a year) dates from Corsicana. In like manner, oiling of streets and roads began there and from there extended to all parts of the U. S. A. An interesting commentary is that scientists then warned our prospective investors that the formations in Texas were not such as would produce petroleum in quantity, yet 123 of 254 counties of Texas are now producing either oil or gas, or both, and the production of Texas for 1929 was 298,441,000 barrels, or an average of 313,000 barrels per day, or approximately five times the entire production of the United States in 1897.

The opening of Lucas Gusher in Spindletop on January 10, 1901, developed an entirely new and unlooked for situation, which resulted in greatly stimulating the use of fuel oil in the United States. Marine requirements up to that time, practically nothing, have increased to a consumption of upward of 90,000,000 barrels per year; industrial requirements to around 30,000,000 barrels per year; public utilities and commercial and domestic heating each absorbing about the same amount, something over 30,000,000 barrels per year.

In 1902, associated with Governor Hogg and other Texans, The Texas Company was organized. Like our Corsicana undertaking, which developed into the Magnolia Petroleum Company, the initial capital of The Texas Company was less than one hundred thousand dollars; the net assets of the two now exceed one thousand million dollars.

Of the 15 major oil companies maintaining general offices in Houston, offices that furnish employ-

The TEXACO STAR

ment to thousands of your citizens, The Texas Company was the first to establish here in 1905. The Texas Company further extended the first pipe line from the Oklahoma fields to the Gulf Coast and was first in introducing fuel oil for naval use.

The seven major refineries on the Houston Ship Channel represent a capital outlay of \$200,000,000, a crude capacity of upward of 200,000 barrels per day and employ several thousand people; the Galena-Signal Oil Company and our interests established the first plant now owned by The Texas Company.

The unusual prosperity the United States has enjoyed for a number of years may be attributed chiefly to the enormous quantity of our natural resources, such as petroleum and natural gas, that have been consumed. It is estimated that during the past 50 years more of the world's natural resources have been destroyed or distributed than in the previous 1900 years, possibly for all previous time.

It is further well to remember that petroleum, being liquid like water, has no marketable value at its source and depends for such on sound policy leadership that in barter and trade will secure for this product something commensurate with its intrinsic value.

To illustrate: The hotel where I register in New York delivers a quart of Poland Water to my room, charging me twenty times the price at which gasoline is selling for at the filling stations on the nearby streets, yet Poland Water is produced from a spring that may be expected to continue in perpetuity, involves practically no cost except the bottle transportation charges from Maine to New York, and trucking to the hotel; while the bulk of our petroleum is now produced from such depths that the initial cost for completing a well is ten times as much as it was when the first pipe line was extended from the Gulf to Oklahoma in 1906. The oil is pumped and re-pumped through several hundred miles of pipe lines representing millions of dollars of invested capital, processed through refineries costing tens of millions of dollars, moved in tank ships thousands of miles to highly expensive terminals along the East Coast, again shipped in tank cars to central points in the city or interior; from there trucked to filling stations and sold at one-twentieth of the price of Poland Water.

Again, while we may be justly proud of the petroleum development along the Ship Channel, we must not overlook the fact that in the past few years foreign-owned refining capacity, using Vene-

zuela crude, has been constructed in the Dutch Islands of Curaçao and Aruba. That is more than 50 per cent greater than what we have on the Ship Channel, yet while located in a foreign country and owned by foreign interests, the product therefrom reaches the eastern markets of the United States on transportation equality with what we manufacture on the Gulf Coast, subject to no tariff or other embargoes, while practically everything that the oil industry uses in the way of equipment, material and supplies is burdened with a heavy tariff, adding to the problems with which the industry is confronted in seeking not only world, but its own natural eastern market.

As applied to the future development of the Houston Ship Channel, we must not overlook the active and aggressive competition of other Texas ports both east and west of the Ship Channel, all outlets for the same hinterland, competition that will be accentuated by the completion of the Intra-coastal Canal.

Our national economic trouble seems to be under-consumption rather than over-production; with less than 7 per cent of the population of the world, with the world's greatest financial and natural resources, with abundant crops and manufacturing capacity, as one side of the picture, and 90 per cent or more of the world's population sorely in need of the things we are able to furnish in exchange for things that they should be in a position to give us in exchange, as the other side, there is something radically wrong in our laws, our economics, or our people, in failing to meet this situation as it should be met.

Foreign trade is a two-way traffic and unless we have become a nation of morons we should be prepared to tear down all barriers that prevent its orderly movement.

As to leadership, it is inconceivable that statesmen of the type of George Washington, Thomas Jefferson, Andrew Jackson, Abraham Lincoln, Grover Cleveland, Theodore Roosevelt, or Sam Houston, or business men like Rockefeller, Morgan, Rogers, Hill, or Gates would not have found a way to meet such a chaotic situation as now confronts production, industry, distribution, and employment in the United States, including the petroleum industry.

Finally, with all our admitted shortcomings and mistakes, we may continue to accept the advice given years ago by one of our leading financiers, namely, "NEVER SELL AMERICA SHORT".

TEXACO ON ROAD

The Vehicles the
Fathers Rode in
By, and the T
Tanks on Wh
Ride tod



Trucks Like the One
Above May be Seen
Transporting TEXACO
Over Many a Road



This New Type of Aluminum Painted Ce (a



A Tank Truck of the Early Days



The Tank Car A
Old Style Le
Black Painted
Now Used for O
Gasoline and K

ROAD AND RAIL

*iclesthat TEXACO
 oden Days Gone
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 With Their Sons
 ide today*



*The Truck Above Was
 Placed in Service in
 Minneapolis District
 a Short Time Ago*



ed C (above) Carries Gasoline and Kerosene



*C Above Has
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 an Kerosene*



Before the Heyday of the Automobile

The TEXACO STAR

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Captain Hawks

The record-breaking flights of Captain Frank M. Hawks to Havana, Cuba, and return, prove two things. In the first place, they show that properly built airplanes, efficiently piloted, can cut down considerably the time now required for personal communication with points outside of the United States. Furthermore, such a flight, even at high speed, can be made in perfect safety in such a plane as the *Texaco No. 13* with which Captain Hawks has made so many records recently. Secondly, the flight proved that even on a flight taking a little longer time than the average working day, a good motor properly fueled and lubricated is in no way strained or overheated.

Captain Hawks proved, not long ago, that personal communication was better than wire transmission when he brought photographs from Philadelphia to New York in twenty minutes—less time than the pictures could have been transmitted by wire. The possibilities for rapid transmission of papers of state to the capitals of nearby countries are obvious. Captain Hawks, always practical, points the way to more rapid commercial transportation of mail and parcels.

Flying the *Texaco No. 13*, Captain Hawks broke the then existing fourteen-hour record flight to Havana, 1,400 miles from New York, by covering the distance in nine hours, 21 minutes, on November 6. He averaged 182 miles an hour, battling a thirty-five-mile-an-hour head wind. On the return trip, made November 9, Captain Hawks was officially timed at eight hours, 44 minutes. He brought letters and newspapers with him, upholding a slogan coined after his flight from Philadelphia—"Don't telegraph—send it by Hawks."

Proration

The result of one of the latest moves in the attempt to establish and maintain proration makes it appear that the conservation movement is firmly rooted in Oklahoma. Rulings in two cases that came before the Federal Court and the Supreme Court in Oklahoma were in favor of proration. The Federal Court ruling

was the first made by that court dealing with the constitutionality of a statute and of an order of the Corporation Commission since the enactment of Oklahoma's conservation law in 1915.

Getting unanimity of action on conservation has been one of the most difficult feats attempted by the oil industry since the movement to keep production and market demand side by side was begun. A lone producer who refuses to be allied with the plan can force others out in self-defense.

The two cases that were brought before the courts endeavored to show that the Oklahoma conservation statute was unconstitutional in that it took property without due process of law; that even if the law were valid, the Commission's order went beyond the authority of the statute; that the order was discriminatory and was the result of a plot by certain major companies, and that enforcement of the order was damaging the plaintiff's wells.

The court rulings were broad but firm, and embraced even more points than actually were argued.

A Tribute

The cover of the November *Nation's Business* depicted a scene of the early days of the oil industry, and in paying a tribute to petroleum the magazine said, describing the cover:

"The world knew petroleum—a black, ugly substance that oozed from the ground or up through the beds of creeks, to be sopped up in blankets and bottled as medicine or smeared on the bearings of cumbersome machinery.

"But a few men had a broader vision. They believed they could bore deeply into the ground and bring up oil in quantities. The world scoffed.

"But the pioneers persevered. They matched their ingenuity against new problems. Water drowned out their simple boring tools. They sank a pipe into the hole, to hold back the flood. Every day they sank their bits a little deeper.

"Then they were rewarded. Petroleum flowed up through their pipe. They had oil in quantities and after them came a horde of inventors, chemists, physicists, building great new industries on the foundation of their discovery.

"These pioneer oil men gave the world a new source of mobile power, the means to lubricate the high-speed machinery of hurrying production. They provided work for millions of men in oil fields, in motor factories, on miles of good road. They added to human pleasure, human productiveness and human wealth."



The Eskimo, the aborigines of the tropics and jungle, the Chinese coolie and the desert tribesmen of Arabia have all been aided in their social development by TEXACO products, but a new use for TEXACO tinware is shown in the above photograph, sent in by G. E. Strickland, Assistant General Manager for The Texas Company (South America) Limited, stationed at Rio de Janeiro. A representative of the Company, spending a week-end on a ranch in Sao Paulo, found a young pine tree whose tender young shoots were protected against too heavy elemental onslaughts by TEXACO metal made from a can that had contained TEXACO lubricants.

The oil industry appears to be kind to the press and the pioneer newspaper man. According to the annual report of the School of Journalism of Columbia University, 25 newspapers came into existence in 1928 and 1929, most of these in growing oil towns in Texas and Oklahoma. THE TEXACO STAR welcomes these contemporaries in the field and hopes at some time to chronicle the history of the press with relation to the oil industry.

Speaking of frontier towns, some of the mining villages of the old West received names as picturesque as any in the world. Some of these were Shinsbone Peak, Seven-by-Nine Valley, Chucklehead Diggings, Centipede Hollow, Petticoat Slide and Gospel Gulch. All of these picturesquely named towns are not in the West. An article will appear soon in THE TEXACO STAR telling of Bivalve, New Jersey, where the chief industry is oyster fishing.

Captain Frank M. Hawks

Tells How the Autogiro

Gave Him a New Thrill in

The Ups and Downs of Flying

IT WAS my good fortune the other day to be invited down to the factory of the Pitcairn Autogiro Company, and the invitation was extended to include the flying of the autogiro.

For the benefit of the reader who is unacquainted, perhaps, with this development, briefly let me say it is unique, and offers tremendous possibilities for real contribution to the advancement of aviation. The autogiro in its present state has sufficient perfected detail that it is absolutely safe for the average aviator to fly. It offers the smoothest, safest landing of any aircraft I have ever flown.

Flight is promoted by two combinations: a conventional low wing, plus a rotor which has the appearance of a windmill revolving on a vertical axis above the center of gravity. The rotor, or wing section vanes, which revolve, formulate enormous lifting power. This permits of a very rapid take-off, speedy climb and remarkably slow descent.

To go into the engineering details involved in the design of the autogiro would require page after page of lengthy discussion and would then be "Greek" to the layman. I might say that it probably would be "Greek" even to many persons connected

with aviation. The theory of the plane is absolutely revolutionary, and I am somewhat enthusiastic about its development because of this fact. In aviation, we need more individuality in design, and the autogiro certainly is a marked example of this.

Some have asked me what were my sensations in flying this machine. In turning the flights over in my mind, my first sensation was, of course, the odd feeling of that rotor whirling above my head. I cannot say that it was an uncomfortable feeling; but true enough, it was a weird and strange sensation.

While warming up the machine's motor preparatory to take-off, it is necessary to engage the clutch to start the whirling of the rotor. This is a very simple process, done by merely pulling a lever on the dash; first, slowly, so as to start the revolutions of the big windmill gradually so as to effect no unnecessary strain upon the clutch and gears; then, as it gains momentum, the clutch handle is pulled clear out and locked, thus placing the rotor in full gear mesh. The balance of the operation is merely the warming of the motor.

Before taking off, it is necessary that the rotor

•
*Captain Hawks
Making a Perfect
Vertical Landing in
an Autogiro*
•



The TEXACO STAR



James Ray, Vice President of the Pitcairn Autogiro Company, with Captain Hawks

be turning in excess of one hundred revolutions per minute. By applying the brakes on the running wheels, you keep the machine from rolling while the motor, which is in the front of the plane, of course, is turned up to 1400 revolutions. With this number of revolutions of the propeller, the rotor will then pick up its full one hundred revolutions per minute, and the autogiro is ready to be taken off the ground.

The next operation is very simple, merely the simultaneous release of the clutch, disengaging the drive shaft from the regular airplane motor to the rotor, and the releasing of the foot brakes from the wheels, while applying full power to the motor in front of the machine for the take-off. The take-off in itself is effected exactly like that of an airplane.

Now, I have explained that this rotor has been started by means of a drive shaft and clutch arrangements, and is turning over at the rate of one hundred revolutions per minute on the take-off.

flight. It keeps a sustained speed, variable only to a very slight degree in accordance with the airplane's maneuvering.

One may dive and climb at will, make vertical turns, and the like. As I have said before, the autogiro flies exactly like any ordinary airplane. The real sensation that I experienced was in landing. Cutting off the motor one thousand feet directly over the field, I pulled the stick back and proceeded to fly, on my first landing, about 30 miles per hour coming in to land. The descent was at about an angle of 45 degrees, and on touching the ground I did not roll more than ten feet, without any application of the wheel brakes whatsoever. I took off again and again and landed to become accustomed to this new, strange craft. It intrigued and thrilled me.

Jim Ray, Vice President and Chief Test Pilot for the Pitcairn Autogiro Company, came over and we discussed the machine before my last flight. I

The Pitcairn Autogiro and the Texaco No. 13 on Pitcairn Field



The TEXACO STAR



The *Texaco No. 13*
Leads Two Auto-
giros Over New Jer-
sey

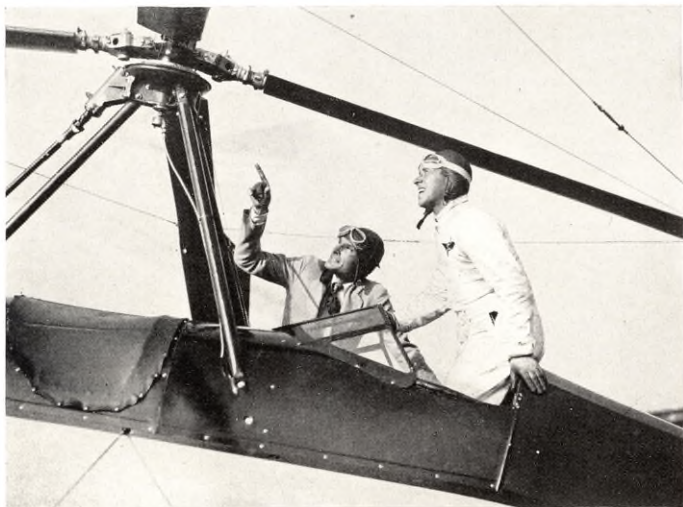
now had enough experience to endeavor a more vertical descent, and he told me to come up, shut off the motor, pull the stick back and let her land ("settle down" would be better) at zero miles per hour. This I did. There is no question that it is quite a sensation for a pilot who has been flying a fast airplane that lands between 60 and 70 miles an hour and that must be manoeuvred carefully into a field with an accurate judgment of approach, to then step into a machine and fly right over the center of the field, shut off his motor and drop straight down on the circle that marks the center of an airport.

The first few times it was difficult for me to do this, as I wanted to approach from a distance back, and, of course, in trying to do this, each time I would just drop down and find myself about to land in somebody's tennis court or front yard.

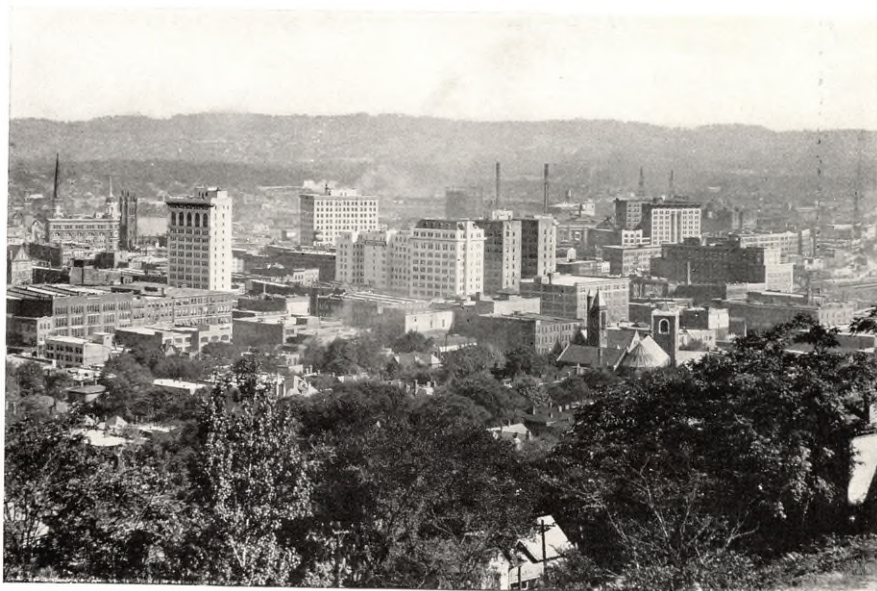
I want to fly autogiros more. I would like to have enough experience on them to be more conversant with every detail. The technical side of their construction and their theory is most interesting and offers a great possibility to aviation advancement. Something that will descend vertically and rise almost vertically has long been desired. If a straight away, high speed can also

be embodied in such an airplane, together with load carrying capacity, we certainly have an era of great advancement before us. I believe the autogiro has made marvelous progress, and the closing chapter of my experimentation was certainly proof of this.

We flew in formation, I with the *Texaco No. 13*, and two pilots each with an autogiro, from Pitcairn Field to Trenton, New Jersey. It is true, I had to throttle my motor in the *Texaco No. 13* down to 1200 revolutions per minute and was cruising at about 90 miles per hour instead of pushing the plane to her full cruising speed of 210 miles per hour. But at the same time I was impressed with the fact that the autogiros were also throttled down, though, of course, not nearly as much as I was. I would imagine that they were turning something like 1900 to 2000 revolutions per minute. This proved to me that they did move along at a fair rate of speed in their flights across country, as well as having the ability to land in a restricted area.



Captain Hawks Learns
from Captain Ray What
Makes the Wheels Go
'Round



The City of Chattanooga as Seen From Cameron Hill

A Beauty Spot of the Southland

Chattanooga Beckons to Tourist, Business Man and Agriculturist

THE RESIDENTS of Chattanooga in the Volunteer State, Tennessee, claim for it vast potentialities in the realm of industry and manufacture, supreme opportunities for the agriculturist and unsurpassed beauty of scenery and wealth of historic interest from the point of view of the tourist. To them it is known as "the Dynamo City of the South."

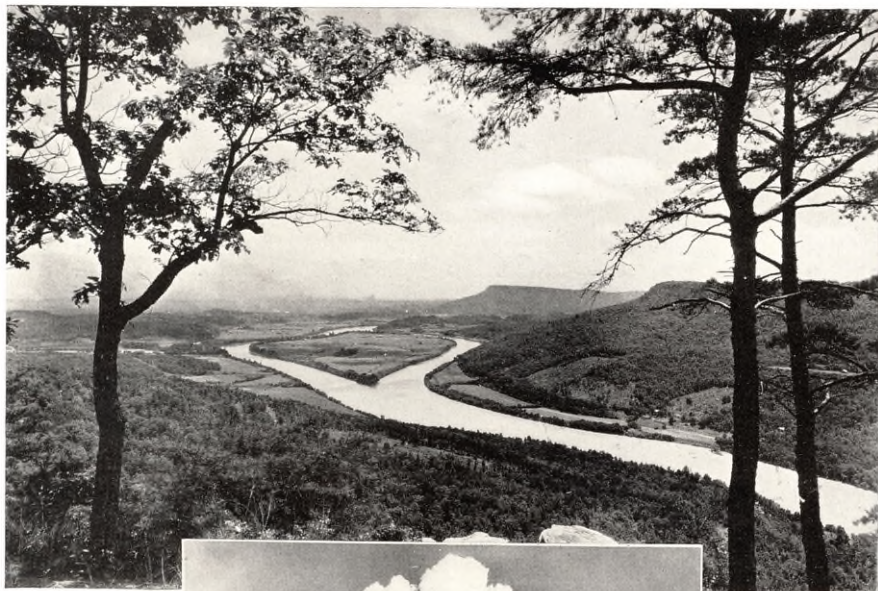
Chattanooga lies in a fertile valley in which the Tennessee River loops around the scenic Moccasin Bend. Above the city tower Lookout Mountain, Signal Mountain, Missionary Ridge and Raccoon Mountain, all of them sites of military operations and heavy battles in the Civil War.

In the extreme southeastern corner of Tennessee, near the borders of Alabama and Georgia, Chattanooga's geographical position is highly strategic with relation to the entire South. Thousands are drawn to the city each year by its vast commercial and industrial activities. There are 391 manufacturing plants making about 1500 articles from lip sticks to steel bridges, many of these articles having a sale throughout the world.

From Chattanooga, sawmills are shipped to Africa; boilers and sugar-making machinery throughout the world; oil-well drilling equipment to Siberia; fire hydrants, valves, bath tubs and enamel ware to all points on the globe; dyeing machines to South America; knitting machines to Mexico, and scores of other forms of implements and equipment everywhere.

Over 36,000 persons work in Chattanooga's manufacturing plants, where products valued annually at approximately \$165,000,000 are made. Articles exported in a year are valued at about seven million dollars. The capital invested in Chattanooga industries is nearly \$150,000,000. In the building of the Chattanooga Manufacturers' Association there is a permanent industrial exhibit, one of the first of its kind in the United States, which has attracted delegates from all parts of the country. The foreign trades department of this organization is extending its work to many new overseas markets and into many remote ports on the American continent.

Natural resources are plentiful in the Chattanooga region; fuels are low in price; hydro-electric



*Chattanooga From
Signal Mountain*

power is reasonable; labor is plentiful and good; transportation is adequate; the climate is agreeable throughout the year.

Along agricultural lines the Chattanooga district, taking in territory within a radius of 75 miles around Chattanooga and including parts of northern Georgia and northern Alabama, is pleasantly situated. Dairying is increasing; hog, sheep and poultry raising thrives; gardening and hay and grain raising



*(Left) Lookout
Mountain Incline*

are made profitable because of the rich soil, and fruit and berry farming, with cotton raising and the growing of tobacco, sweet and Irish potatoes and peanuts, is on the increase.

The city of Chattanooga is accustomed to entertaining a constant flow of visitors, and is an experienced and enthusiastic hostess. Visitors will find every provision for their comfort, convenience and entertainment. There are excellent hotels, retail shops and amusement



Point Lookout on Lookout Mountain Towers Over Chattanooga

places. On both Lookout and Signal Mountains are resort hotels. Efficient street car service reaches most of the points of interest, and sight-seeing buses operate on frequent schedules. Automobiles for rent at a moderate cost give the visitor every opportunity to visit out-of-town points.

The climate of Chattanooga permits golf to be enjoyed the year 'round on four eighteen-hole courses. Swimming, tennis, horseback riding, mountain climbing, hiking, hunting and fishing and other sports offer diversion. In every way Chattanooga anticipates the visitor's wishes and convenience. The Chamber of Commerce and other civic organizations can be counted on by the visitor for information and aid.

The battlefields of the Civil War near Chattanooga offer one of the strongest attractions to persons with historical interests. After the evacuation of Chattanooga by the Confederate soldiers, some of the most desperate and decisive battles of the war were fought on these mountain sides overlooking the city. These fields of conflict are today marked with monuments erected by many of the states whose sons took part in the fights. Hundreds of markers

and tablets indicate the position of the different regiments of the Blue and Gray armies.

A few miles southeast of the city, at Chickamauga, was fought one of the most desperately contested battles of the war between the North and South. The grounds and the monuments on the field are well cared for, and provide both inspiration and instruction for the visitor. Chickamauga Park is owned by the Federal Government and has many miles of beautiful drives. Orchard Knob, the headquarters of General Grant during the war, and Fort Oglethorpe, a regimental cavalry post, are among the spots worth visiting, and others are the Soldiers and Sailors Memorial Auditorium in the city, built at a cost of over a million dollars and one of three of the finest structures of its kind in the country; Market Street Bridge over the Tennessee, the longest bascule lift bridge in the world; "The General," an old-time wood-burning locomotive which figured in the "Andrews' Raid," one of the daring episodes in the war, and Hale's Bar Lock and Dam, one of the largest electric power developments now operating in the South. Its lock is three hundred feet long and sixty feet high, and the dam nearly half a mile

The TEXACO STAR

in length, a triumph of engineering construction.

A number of leisurely hours on Lookout Mountain are necessary to complete a visit to Chattanooga. Rising from the very edge of the Tennessee River, Lookout Mountain commands an entrancing view of the noted Moccasin Bend, the Chattanooga Valley on the east, Lookout Valley on the west and the city of Chattanooga, surrounded by ridges and mountains as far as the eye can see. The peaks of seven states are visible in the distance on a clear day. Lookout Mountain possesses unusual historic interest as the scene of the "Battle Above the Clouds."

A concrete highway, brilliantly lighted at night, leads to the four principal objectives at the summit: Fairyland, an unusual residential estate; the Lookout Mountain Hotel, the Lookout Mountain Cave and Point Park.

There are three cave trips commonly shown to the public. Labyrinthine passages on the lower level appeal to one's sense of gracefulness and proportion, and the higher levels show scenes that are weird and awe-inspiring.

On the higher level there are stalactite and stalagmite formations, weird passages, yawning caverns, an underground river, delicate draperies of onyx rock draped over large rock columns extending from floor to ceiling. Some chambers have high, arched and vaulted ceilings, as in a cathedral, where a whisper is echoed in deep musical tones. Other chambers, no less beautiful, have more of the intimacy of a chapel. There are miles of pas-

sages, electrically lighted, and with a system of trails familiar to ten guides who show the stranger from one amusing scene of nature to another.

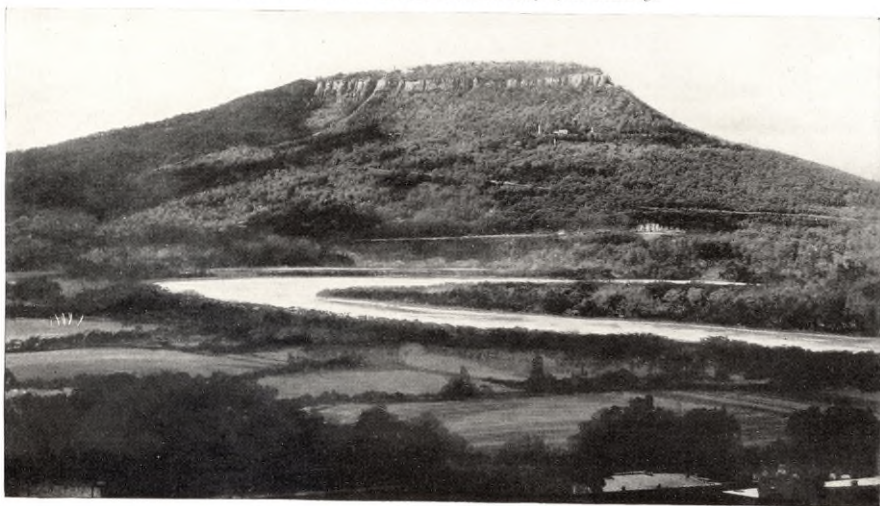
Dates as far back as 1830 are cut on the walls as testimonials to the early explorers who first sought out the mysteries of the caves. A hundred years ago the entrance to them was gained through a natural opening, since blocked by railroad construction. Before Chattanooga had been founded, the caves were a rendezvous of the Cherokee Indians who roamed the hills and valleys of Tennessee. Later, during Civil War days, they were a refuge for soldiers.

Cavern Castle, a structure built of mountain stone, towers eighty feet over Lookout Mountain Cave, and has within eight thousand square feet of floor space, including the roof garden, the main and mezzanine floors. It is the entrance to the various levels of the cave, and from the castle an elevator descends to the cavern through hundreds of feet of solid stone.

Chattanooga offers also educational advantages. The University of Chattanooga is there, as well as a number of preparatory schools and a modern system of public schools. As a title for the metropolis, "the Dynamo City" justifies its name in fact as well as in fancy.

Driving conditions around Chattanooga are unusually severe because of mountainous roads, and TEXACO motor products demonstrate their marked superiority to such a degree that many outstanding dealers operate a TEXACO (Continued on last page)

Lookout Mountain as Seen From the City of Chattanooga





A Typical Landscape in the Pecos County Oil Field Country

Amusement in the "Great Unfenced"

Oil Workers Find Much to Entertain Them, Even in Desolate Regions

By GRACE GADDIS

THE TWILIGHT winds that blow across the hills of the Western oil country carry Rudy Vallée's crooning insincerities and Jimmy Rogers' blues, likewise the absurdities of Amos 'n' Andy. And from the vague, blue distance of some lonely lease may drift the haunting, wistful echoes of Alma Gluck's sweet singing, or Madam Schumann-Heink's big golden voice. For the songs of this desolate land of sudden, sharp silences and sentinel derricks are many and varied.

They come from the phonographs and the radio sets that arrive with almost every camping and housekeeping outfit that comes to these lonely outposts of the petroleum industry. The phonograph music is nearly always accompanied by an agonized wheezing and scratching, for the ever-blowing sand sifts into the machines and crawls between the records lying in stacks upon dusty shelves and tables, creating havoc.

But nevertheless, the music is always there—symbolic of mankind walled in by loneliness, reaching out after a little of sweetness and forgetfulness. In the twilight and evening hours when the long day of work is over and the last meal of the day is finished, the phonograph is cranked up, or the radio

dials are twirled to the proper resting place and the evening's entertainment is on. Often a radio set is put up at a well which is being drilled and the crew on the long, lonely night shift work to programs from weirdly far away places of the earth.

Evenings are necessarily short on the leases where twelve hours of labor, seven days a week, are required to keep the golden-brown fluid pouring down to the Gulf. It is usually too far to the nearest town to permit of spending an evening at a movie, so music, nearly always of the "canned" variety, and books and magazines make up the chief sources of amusement for the lease dwellers of the Western oil fields—music and reading and conversation. For people gathered together from so many different parts of the world, as oil workers are, cannot fail to be interesting and stimulating to each other. There are more bona-fide soldiers of fortune with more startling experiences to their credit in the oil fields than were ever found in a carload of books of adventure.

A tall, blond Britisher offered plenty of cause for speculation to a camp near Iraan several months ago. He was pathetic in his stubborn efforts to get

The TEXACO STAR

a bath and dress each night before dinner, a difficult feat in a land where water is hauled in barrels and boarding house meals wait on no man's fastidiousness. There were those who, having read Bret Harte, said that the Englishman was a "remittance" man in a convenient exile. But no one ever knew, for he drifted finally into the oblivion that so often swallows up the followers of this spectacular industry.

A Russian Jew came to a camp near Crossett bearing an ancient suitcase and a battered violin. At night the wail of the violin awoke the silence of the sleeping hills and swept sadly up to the moon and stars, while men who wanted to sleep swore earnestly and the men who were given to moods grew restless and unhappy. The man was a better violinist than a roustabout, for the hardboiled lease superintendent fired him within a few days.

A pale, thin boy, an undergraduate from a Northern university, gauged tanks for an oil company in Pecos County by day and read the political history of Europe by night.

The majority of pieces of literature that reach the oil fields, however, are what is popularly known as "light". Twelve hours of dressing tools or laying pipe or generally "roughnecking" leave little inclination for heavy ploughing through printed matter deeper than a detective yarn or a love story. Most popular of the men's magazines are those devoted to the zippy, he-man, out-of-doors yarns.

Occasionally, in the newer fields where every one is "flush" and keenly conscious that a boom is on, first-class orchestras may be found in the recreation halls. And even back into the more isolated

communities a piano with a tin dish-pan tone frequently finds its way to a little school-house or a flimsily built shack where there will be a dance twice a week. The piano may be drummed upon by a straying member of an orchestra out of luck, or by a citizen from down Matamoros way who has found that pounding a piano in a border cabaret grows monotonous and who has brought his wits and his nimble fingers to the "Great Unfenced" to see what he can see.

On Saturday nights the streets of every little town in the oil fields are filled to overflowing. Cars of every known make and of every year's vintage back to 1915 crawl up and down the narrow, twisting thoroughfares until midnight, notwithstanding the fact that work must go on next day, Sunday, as usual.

The little picture shows are filled, the domino parlors and recreation halls take care of capacity crowds, the eating places do a land-office business on Saturday night.

And then, late at night, the same cars of the vintage of past years will crawl back to the lease houses; roustabouts will drift sleepily back to their camps, and silence will come over the town—silence amid lights that blink off, one by one.

Sunday is quiet. The people have gone back to the shacks and the tents among the derricks and the well machinery miles away. New phonograph records, new radio tubes and other repairs, new packs of cards and boxes of dominoes and detective stories go out with the boxes of groceries on Saturday night, for humanity must be amused, no matter where destiny has placed it.

A Lease House in the Trans-Pecos—a Modern Frontier Home



Stormy Winds and Calm Seas

The Romance of Seafaring Did Not Die with Whaling and Clipper Ships

IT is one thing to pilot a vessel across the Atlantic in calm weather and quite another to steer her safely through rough seas. This much is elementary in the life of a sailor. The traders of Salem and the whalers of New Bedford discovered on their first voyages that the Atlantic is a tricky ocean. Its pranks are sometimes funny and sometimes tragic. Endowed with what often seems to be a sense of humor, it has only ships and sailors with which to play.

You folks who lie snug in your landlubber's bunks during the cold winter nights, listening to the wind race through the trees and flatten bushes to the ground, can thank your lucky stars you've a roof over your heads. It's a comfort to realize that houses were built for protection. Yet the sailor cannot always be so confident of the protective value of the deck above his bunk. Sometimes the tricks that the ocean plays may take it from him in less time than it takes to light a pipe.

One swallow doesn't make a summer, but one wave can be a storm. That doesn't seem logical, but it's just one of the tricks of the Atlantic. Captain Robert E. Lee of the TEXACO Tanker S. S. *Franklin* tells of seeing the British tanker *Laristan* in the harbor of Rouen, France, after a voyage in which the *Laristan* was frightfully damaged by a single wave.

The *Franklin* had finished a rather rough voyage from Port Arthur, Texas, with a cargo of lubricating oil. The *Laristan* had been only a few days ahead of her, and had run into a hurricane in the Bay of Biscay. One large wave struck her, tore away the captain's quarters and badly damaged the entire midship house. The captain was rescued from his cabin by members of the crew and was sent to a hospital at Marseilles along with five of the crew who were injured less seriously. The single wave also put the midship steering gear out of order, forcing the *Laristan* to make port using the aft gear.

The sailor on an oil tanker has not been left out entirely from romance and narratives of the picturesque, but the sailors of Salem and Marblehead and New Bedford, who manned ships when sailing was sailing and not steaming or motoring, seem to have captured the lion's share of the glory. Captain Lee's tale points out that though the able seaman of today does not have to climb aloft when the halyards are coated with ice and furl a topsail

with sleet cutting his cheeks to the raw, he has the same old tricky ocean to contend with.

The winds are just as cold and stormy as they were a century ago and the waves are just as high. Nearly as much skill to make a steel vessel breast the waves and to handle a wheel is required as in the time when wooden ships used canvas motive power. Some ship masters say that the modern ship requires more skill, but less men in comparison with the vessel's size.

The cargo of the whaling ship that came back to her Yankee port with her waterline out of sight was smaller than the amount of petroleum products the modern tanker can carry. The *South Africa*, one of the newest of The Texas Company's fleet, could no doubt accommodate all the sperm oil used in New England lamps in a decade and all the whalebone used in the corsets of Yankee spinsters during the same period, and have room enough left over to stow away the teakwoods and spices of a clipper ship or two.

The *South Africa* bore 4,300,000 gallons of TEXACO gasoline into the harbor of Durban, South Africa, recently, on her maiden voyage from Port Arthur over an Atlantic that thought it best not to play any pranks with a tanker so young. About half of her load was to be dropped off at Durban. Other nearby ports that receive shipments of gasoline from The Texas Company are Capetown and Port Elizabeth, and from these points the product is distributed as far as the Belgian Congo, Portuguese East Africa and Rhodesia.

A party of visitors, made up of business men of Durban and representatives of foreign countries stationed there, inspected the new vessel and the plant of The Texas Company of South Africa, Limited, at Island View. They were entertained at tea aboard the ship and drank a toast to Captain Kjell Gran, Captain of the *South Africa*. G. S. Mayo, Managing Director of The Texas Company of South Africa, Limited, explained that the vessel merited her name partly because the paneling of the captain's and officers' quarters was of satinwood obtained from South Africa.

The men on the oil tankers refuse to yield the palm to the ships of the past when it comes to seamanship, comfort and safety. What is more, they say, the food is better. The romantic days of sailing are not yet over, and all things considered, a seaman's life is quite a happy one.



Texaco Service Station in Santo Domingo City

Globe Trotting With TEXACO

XVI—SANTO DOMINGO

By J. A. LOPEZ

Manager, Santo Domingo District, The Texas Company (Caribbean), Limited

LA HISPANIOLA was the name given by Christopher Columbus to the island that he discovered in the year 1492 and that is now composed of the Dominican Republic and the Republic of Haiti. Columbus's expressed will was that he be buried in Santo Domingo, and although there are various opinions, it is generally believed that his remains are kept in a lead casket in the Cathedral in Santo Domingo City. There are indeed very few foreigners that come to Santo Domingo City, either to reside or on a short visit that do not request the privilege of visiting the Tomb of the Great Navigator. It has been decided that a lighthouse be erected in Santo Domingo City in his memory. Construction of the lighthouse will commence not later than 1935 and it is estimated that the cost will be in the neighborhood of three million dollars. Funds required for the purpose will be donated by the Government of the United States, Latin American and European nations and by public subscription.

La Hispaniola, Porto Rico, Cuba and Jamaica form the Greater Antilles. On the north, the shores of the Dominican Republic are caressed by the waves of the Atlantic Ocean; on the south, the Caribbean Sea is its boundary line; on the east,

Mona Passage separates it from the Island of Porto Rico; and on the west, its neighbor is the Republic of Haiti.

The island has a territory of 72,527 square kilometers, of which extension a little over two-thirds is occupied by the Dominican Republic with a population of about one million inhabitants. The Republic consists of the Provinces of Santo Domingo, Azua, Barahona, San Pedro de Macoris, Seybo, La Vega, Espaillat, Santiago, Puerto Plata, Monte Christi, Samana and Duarte. Each province has a Governor who is under the immediate direction of the President of the Republic. The official language is Spanish and over 90 per cent of the population are Catholics.

Santo Domingo City is the oldest city in the New World and is the capital of the Republic. It was founded in the year 1496 by Don Bartolomé Colon, a brother of the Discoverer. It was previously located on the left bank of the Ozama River but in the year 1502 was moved to the right bank by Comendador Ovando. The Ozama River flows into the Caribbean Sea and Santo Domingo City is located on its delta. It is the headquarters of the President of the Republic and the administrative seat of the

The TEXACO STAR



Santo Domingo City Texaco Warehouse and Bulk Station

able and efficient government of Santo Domingo.

There are two short distance railroads in operation. However, Santo Domingo City is connected with the other important towns by a good system of modern highways. Carretera (highway) Duarte, 292 kilometers, commences in Santo Domingo City on the south and ends in Monte Christi on the north, passing through the towns of Los Alcarrizos, Villa Altigracia, Sonador, Bonao, La Vega Moca, Santiago, Navarette, Villalobos and Monte Christi. Carretera Mella connects Santo Domingo City with the sugar cane districts of San Pedro de Macoris, Hato Mayor, Higüey, Seybo and La Romana, with a total length of 175 kilometers. Carretera Sanchez, 260 kilometers long, leads out of Santo Domingo City toward the west to the Haitian border, going through the towns of San Cristobal, Santo Cruz de Yaguata, Paya, Bani, Azua, San Juan de la Maguana, Las Matas de Farfan and Comendador. Carretera Castillo starts at San Francisco de Macoris, in the cocoa district, and joins Carretera Duarte at kilometer 110 from Santo Domingo City. Carretera Luperon, sixty kilometers long, between Puerto Plata on the Atlantic Ocean and Santiago, the most important interior town located in the tobacco district. Carretera Boca

Chica with a length of 27 kilometers links Santo Domingo City to the beach of Boca Chica on the Caribbean Sea, the most lovely bathing resort in the West Indies. Sunrise and sunset and the rising of a full moon at Boca Chica are sights that are worth seeing.

TEXACO products are marketed in the Dominican Republic by The Texas Company (Caribbean) Limited. Gasoline in bulk is received in Santo Domingo City from the Guayanilla Plant of The Texas Company (Porto Rico) Incorporated, by a small tanker which is used exclusively in this service. From this bulk plant, gasoline is shipped in schooners and trucks to interior points and other ports where they are handled through warehouses for further distribution. In Santo Domingo City proper, gasoline is delivered to dealers and Company-operated stations by tank truck. Cased goods and lubricants in containers are shipped direct from

Texaco Symbols Spell Service in Santo Domingo



The Texas Company's Port Arthur Refinery, Port Arthur, Texas, to all of the warehouses located at the ports. TEXACO products are redistributed to the smaller interior towns and villages on trucks, carts drawn by mules and oxen and on the backs of horses, mules and donkeys.

The Red Star with the Green T

The TEXACO STAR

enjoys an excellent reputation in the Dominican Republic and plays a very active part in the growth and development of the country. Transportation is chiefly effected by automobile, truck and motorcycle and TEXACO products are extensively used. Plowing the fields of the large sugar plantations is done by modern methods and TEXACO Power Kerosene and

there is an abundance of opportunities for developing new enterprises. The people are hospitable, the climate is semi-tropical and health conditions are good. The country has a good future prospect and will undoubtedly attract foreign capital in view of the fact that it offers very attractive possibilities for investment. It would not be strange if within



Tank Truck at Santo Domingo Bulk Station

lubricants are widely used. Registration of motor vehicles shows that 3122 touring cars, 1032 trucks, 64 buses and 65 motorcycles are in service.

There are indications of petroleum in the Azua district and during the past twenty years or more several wells have been sunk but nothing of importance has been accomplished. At the present time a company connected with the Dutch petroleum interests is making preparations to drill two wells but it is doubtful if oil will ever be found in commercial quantities.

The country is lovely. It has splendid soil and



(Left) Tomb of Columbus in Santo Domingo

the next fifteen or twenty years Santo Domingo should become the most important country in the West Indies. Sugar cane is the principal crop and then

follows cocoa, coffee, tobacco, corn, plantains, bananas and all other tropical fruits. Rice is grown in small quantities but the Department of Agriculture is now endeavoring to induce farmers to produce a large enough crop to supply the domestic demand amounting to millions of pounds per annum. There is an abundance of mahogany, lignum vitae (called in Spanish guayacan) and many other kinds of precious timber. A very *(Continued on last page)*

OUR WHO'S WHO



RALPH B. McLAUGHLIN, who contributes an article on the pipe line subsidiaries of The Texas Company to this issue of THE TEXACO STAR, was born in Fredonia, Pennsylvania, and

received his education in Beaver Falls, Glassport and Philadelphia, in the same state. In 1906 he came to The Texas Company to be Clerk at Sour Lake, Texas. When a construction office was established in Dallas the same year he was transferred there as Clerk, and remained in Dallas until the completion of the eight-inch pipe line from Tulsa, Oklahoma, to Humble. He was transferred to the General Office in Houston in 1908, and when the Pipe Line Department was organized in 1911 was appointed Cashier and General Bookkeeper and later Auditor of Disbursements. His election as Assistant Secretary of The Texas Pipe Line Company came in 1917, and seven years later he was elected Secretary and Assistant Treasurer. Five years ago he was elected Assistant Secretary of The Texas Pipe Line Company of Oklahoma.

BEAUTY SPOT

(Continued from page 25)

station specializing in TEXACO Certified Service.

In the same manner, TEXACO industrial lubricants are used in a large portion of the industrial plants of the city, and records show that each year more plants in Chattanooga turn to TEXACO to solve their problems in the elimination of friction. There is a TEXACO lubricant for every problem, and those who have found their way out of lubricating difficulties by the use of TEXACO are lavish in their praise.

TEXACO Ethyl gasoline has also been highly appreciated in the hilly Chattanooga region, and represents about 40 per cent of TEXACO gasoline sales volume.

GASOLINE TAX

North Dakota, which was among the first of the states to adopt a gasoline tax, recently voted down a plan to raise its tax from three to four cents a gallon. The proposal lost in every district in the primaries. The state levied a one cent tax from 1919 to 1926.

OIL RECOVERY

Oil exists in its undisturbed reservoir rocks under a pressure which generally corresponds rather closely with that of a column of water of a height equal to the depth of the reservoir below the surface. This pressure is undoubtedly hydrostatic. In some instances the pressure may be more or less than hydrostatic, but these instances are believed to be special conditions.

The relations of oil, gas and water in various reservoirs differ widely and have the greatest influence on the manner in which the oil is produced when the reservoirs are tapped. In some reservoirs there is little gas and the oil is backed up by water in hydrostatic connection with it, so that as the oil is produced at the wells the water follows up in its place. Such wells yield their oil by steady flow, which may continue at a fairly uniform rate for a considerable time, or even until most of the oil has been produced. The water acts as a natural water drive, and is thought, in many cases, to cause a high percentage of extraction of the oil.

In some reservoirs the oil pool is not backed by water in hydrostatic connection with it, so that only the expansive force of the gas associated with or dissolved in the oil is available to force it out to the well. The recovery of oil by natural means from such a reservoir depends mainly upon the action of the expanding gas in driving oil to the well.

ROMAN ROADS

The Romans, recognized as the greatest road builders of history, were the benefactors of civilization through their gift of the use of asphalt in highway construction. The expansion of Rome's great road system ended with the disintegration of the Empire, but standards of highway construction were established and have lived through the ages.

Modification of what the Romans learned have been chiefly in detail. Modern roads are built on the same plan of levelling and grading marked routes, providing for drainage, removing the subsoil to a depth of a few feet, filling this trench with broken stone, applying pressure to consolidate the mass, and then surfacing with stone set in a binder of asphalt.

The large granite blocks the Romans used for surfacing gave way to the more easily obtained smaller stone used by later road builders. Use of small stone originally was a measure of economy and convenience, but since has been found to have been the correct step technically, providing the pliability required for wheeled traffic.

Granite and wooden blocks later came into use for surfacing, the wooden blocks being largely responsible for the introduction of oil and other bituminous products in road work with the idea of providing a dustless and waterproof surface.

Breakdown of the feudal system and establishment of central government, especially in France, gave the modern macadam road its real beginning. This idea of a waterproof, drained road surface spread to England, where turnpikes were developed, and has reached its modern materialization in the thousands of miles of macadam, oiled and asphalt roads throughout the United States.

A COMMON CAUSE

Approximately sixty different nationalities were represented recently at the sixth International Road Congress in Washington, D. C.

The convention room in the Chamber of Commerce Building was divided into four sections; one each for those speaking French, Spanish, German, and English. In order that every speech might be understood by all those present an interpreter translated the addresses for the respective sections, an ear-phon being connected to every seat in the hall.

STUDYING EVAPORATION

From refinery to filling station gasoline undergoes constant handling, and because of the necessity of conserving the product during the months of lower consumption against the big demand of the summer months is frequently held in storage for considerable periods. Gasoline, being a volatile product, is subject to evaporation, and various methods have been devised for handling and storing it in steel tanks to reduce this loss to a minimum. As part of a general study of evaporation losses, the Petroleum Experiment Station, maintained by the United States Bureau of Mines and the State of Oklahoma at Bartlesville, Oklahoma, has started a series of observations on bulk storage tanks. These tanks will be under study for about three months, during the hottest part of the year, when evaporation is greatest.

GLOBE TROTTING

(Continued from page 31)

large percentage of what is produced is exported to the United States, and with few exceptions imports into the Dominican Republic come from the United States.



CHRISTMAS LIGHTS SHINE
FROM A TEXACO SERVICE
STATION IN VANCOUVER,
WASHINGTON



1 Remove the ice-cube separators from of the freezing pans of your refrigerator.



2 Place a bottle of the new crack-proof Texaco Motor Oil, not entirely full, in the pan.



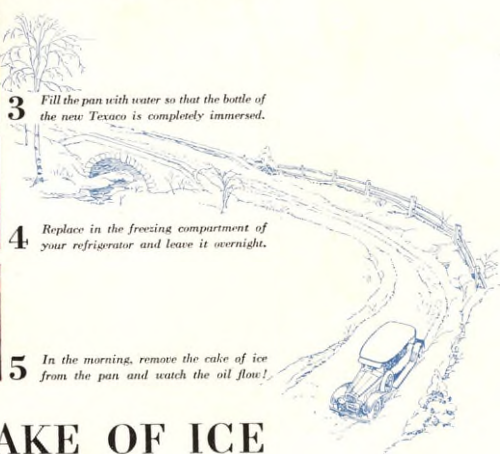
3 Fill the pan with water so that the bottle of the new Texaco is completely immersed.



4 Replace in the freezing compartment of your refrigerator and leave it overnight.



5 In the morning, remove the cake of ice from the pan and watch the oil flow!



FROZEN IN A CAKE OF ICE

TEXACO FLOWS FREELY

HERE'S a convincing "cold pour" test that anyone can make overnight in the freezing compartment of a refrigerator! Frozen in a solid cake of ice, the new crack-proof Texaco Motor Oil still flows freely.

Watch the bubble rise as you turn the cake of ice from end to end. Many oils are dangerously sluggish in the cold—many harden thick as grease. Such oils bring needless winter wear to every moving engine part.

The new Texaco flows instantly. It lubricates even when water freezes! It is as free from objectionable carbon-forming impurities as from the cold-congealing substances that imperil an engine on frosty nights and mornings.

Drain out the old oil. Fill with the correct winter grade of the new crack-proof Texaco today.

THE TEXAS COMPANY



THE NEW **TEXACO** MOTOR OIL

© 1930, The Texas Company "CRACK-PROOF" . . . LONGER-LASTING