The TEXACO STAR

APRIL 1931

Crude Oil Goes to Its First Market

NOT long after the discovery of petroleum seepages by the white man, traditional Yankee ingenuity found a practical use for the evil-smelling, molasses-colored substance. According to a contemporary writer, a man named Cary, one of the first settlers on Oil Creek, "possessing perhaps a little more enterprise than his neighbors, would collect or purchase a cargo of oil and proceed to Pittsburgh and exchange it for commodities needed in his family. This cargo consisted of two five-gallon kegs, that were slung one on each side of a horse and thus conveyed by land a distance of seventy or eighty miles. Sometimes the market in Pittsburgh became very dull, for a flatboatman would occasionally introduce a barrel or two at once that he had brought down on his raft of lumber or logs. At other times the demand fell off, so that the purchase of a barrel was hazardous."

The Seneca or rock oil as it was called, was used for medicine and was said to be particularly efficacious in the treatment of sick horses; for many years it served no other purpose.

Cary and his horse, therefore, are the legitimate forerunners of today's giant petroleum transportation system by which thousands of barrels of crude oil daily are carried from the producing fields to the refineries.

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THE COVER ON THIS ISSUE OF THE TEXACO STAR IS THE SECOND OF A SERIES OF ORIGINAL PAINTINGS, BASED ON AUTHENTIC DATA, DRAMATIZING OUTSTANDING INCIDENTS IN THE DEVELOPMENT OF THE AMERICAN PETROLEUM INDUSTRY

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The TEXACO STAR

VOLUME XVIII NUMBER 4

APRIL

1931

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IN THIS ISSUE

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Cover by Fred Craft

A PUBLICATION OF
THE TEXAS COMPANY

Printed monthly for distribution to employes and stockholders

ADDRESS: THE TEXACO STAR, THE TEXAS COMPANY
135 EAST 42ND STREET NEW YORK CITY

EDITORIAL BOARD

E. F. JOHNSON, *Director of Company Publications*
PHILIP C. HUMPHREY, *Assistant Director*

BRIEF *and to the* POINT

★ At the beginning of the present year there were 15,000,000 radio receivers in American homes, according to *Radio Retailing*. Retail sales of radio equipment for 1930 amounted to $500,951,000.

★ A machine has been invented to test the fatigue of workers. Part of it consists of a low platform which teeters in two directions. As the worker becomes fatigued he sways from side to side with increasing frequency. This swaying is recorded by meters on the platform.

★ Opinions are made by minorities, but are used by majorities.

★ A new way to fight prairie fires with airplanes has been discovered. In some sections, forest rangers use planes to search for incipient blazes, but recently in California when a blaze threatened to spread over level territory several planes were lined up, their wheel brakes locked, and engines started. The blasts from their propellers beat back the flames, even though there was a strong wind behind the fire.

★ Old-time transportation is again coming into fashion in Bulloch County, Georgia, it is reported. The horse and the mule are being used for travel, and public places have found it necessary to rebuild their hitching racks.

★ An orange a year for one person out of every 15 was the average purchase 23 years ago, when a well-known brand of oranges began to be advertised. Today every member of a vastly larger population in America eats an average of five oranges a year.

★ The chief test of any business organization is its usefulness to society. If it does not serve society it doesn't deserve to live.

★ The aurora borealis, or northern lights, and earth currents that interrupt wire communication are produced by sun spots, according to a belief recently expressed by Milo E. Todd, Professor of Electrical Power Engineering at the University of Minnesota.

★ Aviation courses are now offered in 74 colleges, and 1,000 more students than in 1930 are including them in their curriculum.

EWING GALLOWAY

TALLEST IN THE BRITISH EMPIRE

★ The boiler room of the 34-story Canadian Bank of Commerce Building in Toronto, Ontario, contains sufficient machinery and equipment, all of which is Texaco lubricated, to provide light, heat, water, purified air, telephone and elevator service for a town with more than 3,000 population

Review of Current Conditions

"Public interest demands the right to choose that form of transportation best adapted to social and economic needs, and railroad efforts to strangle motor vehicle competition through legislation designed to increase taxes and impose further restrictions, it seems to be certain, will be fought by numerous industries and their trade organizations," says W. R. Boyd, Jr., executive vice-president of the American Petroleum Institute, as quoted in *The Oil and Gas Journal.*

"In the history of railroad freight rate regulation by the Federal government, begun in 1887, there probably has never been such a complex matter before users of the railroads as that created by the decisions of the Interstate Commerce Commission," according to a staff writer in the *National Petroleum News.* "Obviously the decisions of the commission are based on the false premise that the railroads have a virtual monopoly of transportation. . . . The big question for the railroads to decide was not how much they could take from the shippers of petroleum products, but how much traffic they could hope to retain, not on increased rates, but at present rates."

"Legislative guns are in position in Texas for a first skirmish in the general transportation battle to be waged by the railroads, on the one hand, and truck-train and bus owners, on the other," says the above magazine.

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A staff writer for *National Petroleum News* says "Oil wells now completed in the United States could produce 1,500,000,000 barrels of crude in 1931, Dr. Joseph E. Pogue, consulting engineer, told the American Institute of Mining and Metallurgical Engineers at its annual meeting. Without further drilling possible production would thus exceed demand by 70 percent.

"If all drilling of new wells were to cease, supply of crude oil would not be in balance with estimated demand for 28 months. At a subnormal rate of drilling calculated to bring in wells with a combined initial production of 2,500,000 barrels per year, it would require 50 months before demand would overtake supply, Dr. Pogue reported."

The Oil and Gas Journal prints an announcement that "Thirty-six oil companies have been asked to contribute to a fund of $100,000 to make possible for the year, July 1, 1931, to June 30, 1932, continuance of the American Petroleum Institute's program of fundamental research in petroleum. It is expected that contributions will be sought later from all units of the industry."

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"Constitutionality and reasonableness of crude oil proration practice in Texas were upheld in district court at Austin, February 13, when Judge C. A. Wheeler ruled in favor of the state railroad commission in a suit brought by the Danciger Oil & Refining Company," according to *National Petroleum News.*

The Oil and Gas Journal has this to say about proration: "The petroleum industry might as well make up its mind on two things right now, plan its business accordingly, and disregard all the minor developments, contentions and talk which simply serve to muddy the waters. The policy of curtailing crude oil production and limiting runs to stills by refiners in line with demand must be continued regardless of what opposition develops or what form is taken by efforts to overthrow proration. The second big factor which should be kept constantly in mind is that no definite improvement in the general situation can be experienced at the present level of prices."

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A staff writer for *National Petroleum News* is authority for the statement that "The automotive Diesel engine has come to stay, and its designers, and those responsible for its development in new fields, have solved a large number of the many problems which were faced at the outset. Many more problems, mechanical and otherwise, remain to be solved before this 'new' cycle and the engine which employs it can be as universally applicable to every day uses as is the gasoline motor."

Aerial View of Mount Hope Bridge

Mount Hope Bridge

New Structure Provides Short Cut Between Providence and Newport

IN these days, when so many bridges span rivers and other waterways of the United States, and builders compete to build the longest or highest span, a ferry seems a slow mode of travel. Bridges are superseding ferries at many points in the country in deference to the speed of modern travel. One of the lines of ferry transportation that a bridge recently replaced had been operated continuously for just short of two and one-half centuries.

Bristol Ferry over Mount Hope Bay, a part of Narragansett Bay, Rhode Island, was almost a centenarian link of communication between the island of Rhode Island and the mainland when it carried Washington, General Lafayette and General Rochambeau. Several Presidents of the United States in later years also used the Bristol Ferry, which cut short the traveling distance between Providence and Newport, at one time rival capitals of the State of Rhode Island.

Now the ferry is gone, but in its place is Mount Hope Bridge, seventh largest suspension bridge in the world and the largest structure of its kind in New England. Upon its completion, late in 1929, two bronze plaques attested the fact that a jury of five members, sponsored by the American Institute of Steel Construction, had selected Mount Hope Bridge as the most artistic steel structure built in that year.

The slopes of Narragansett Bay within sight of the bridge were the home of the Indian King Philip, son of the great Massasoit, who planned there the attacks which in 1675 and 1676 struck terror into Rhode Island and Massachusetts towns. When he was slain on these same slopes by one of his own tribe the power of the Indians in southern New England was broken and the colonist no longer had to carry his gun when he went to church or followed the plough.

Not far below the bridge Colonel Barton and his men came ashore one night during the Revolution, after crossing the bay in small boats, and captured General Prescott, British commander, overpowering his guard and pulling the general himself from bed.

Mount Hope Bridge was erected by a corporation formed by State Senator William H. Vanderbilt, with Douglas H. Coleman of New York as president. The Vanderbilt family fortune had been founded upon transportation, and the senator deemed it proper to enter that field himself. He owns and conducts bus lines running between Providence and Newport, and his transportation company is one of the largest users of the bridge. Most of the buses that cross it, 135 feet above the channel of Mount Hope Bay, use Texaco products.

The short cut from Providence, "southern gateway of New England," to Newport, "social capital of the world," starts at Bristol, about 15 miles south of Providence, and goes over to Portsmouth on the island of Rhode Island by way of Mount Hope Bridge. Vehicles pass between towers 285 feet high on foundations that extend (*Continued on last page*)

Annual Report of the President for 1930

The text of the President's Annual Report to the Stockholders is reproduced in this issue for the benefit of those readers of THE TEXACO STAR *who may not have received a copy of the original. Lack of space makes it necessary to omit the tables.*

New York, N. Y., March 14, 1931.

To the Stockholders:

We submit herewith Annual Report of The Texas Corporation and its subsidiary companies for the year ended December 31, 1930. The report is on a consolidated basis. Since it is our practice to carry merchandise inventories at the lower of cost or market, they were valued at market, lower than cost, as of December 31, 1930.

Earnings for the year ended December 31, 1930, after deductions for Federal Income Taxes and all reserves, amounted to $15,073,303.18, or $1.53 per share on the average of 9,850,885 shares outstanding during the year, as compared with $48,318,072.22, or $5.12 per share on the average of 9,433,164 shares outstanding in 1929.

Inasmuch as gasoline is the major petroleum product, its sale accounts for the greater part of the Company's revenue. In 1930 the average service station price of gasoline, based on 50 representative cities in the United States, exclusive of state taxes, was approximately one and three-quarters cents per gallon under the average price in 1929 and five cents under the average for the period 1921-1928, inclusive. In foreign as in domestic markets, prices of petroleum products generally were lower than in the previous year. Considering these facts, it will be readily understood why results were less favorable in 1930.

The balance sheet shows net working capital of $197,693,508.71, including cash, securities and notes receivable of $69,452,091.96, with no bank loans. Total current assets were $229,926,399.51, with current liabilities of $32,232,890.80, bearing the ratio of 7.1 to 1.

The following investment expenditures by divisions of activities were made during 1930:

Producing	$12,632,582.71
Refining	14,258,543.67
Sales—Domestic and Foreign	21,112,897.53
Tank Farms and Tankage	235,834.28
Pipe Lines	1,154,550.01
Other Facilities	1,555,411.09
Total	$50,949,819.29

PRODUCING OPERATIONS

UNITED STATES

Gross crude oil production in 1930 from wells operated by the Company aggregated 42,033,877 barrels, as against 50,410,685 barrels in 1929, a decrease of 8,376,808 barrels, or 16.6%. Our interest in this production, plus our interest in oil produced by others, amounted to 36,603,829 barrels in 1930, a decrease from the previous year of 6,995,295 barrels, or 16.0%. On December 31, 1930, our gross daily crude oil production was 97,278 barrels, and in addition we had more than 153,000 barrels daily shut in, our reasonable potential daily production exceeding 250,000 barrels. At the close of 1929 our gross production was 129,110 barrels, in addition to which we had 43,000 barrels daily shut in, or a total daily potential production of approximately 172,000 barrels.

In the light of discoveries made largely during the year, our known crude oil reserves have been materially augmented, notably in Van Zandt County, Texas, Lea County, New Mexico, and St. Landry Parish, Louisiana.

Proven and undeveloped acreage held on December 31, 1930, amounted to 6,124,560 acres.

Operations under our contract with The Louisiana Land and Exploration Company resulted during the year 1930 in the completion of four producing oil wells. This brings the total completions on these properties to eight oil and two gas wells, and the number of domes or structures proven for oil or gas production to five.

Our production of natural (casinghead) gasoline amounted during the year to 3,042,087 barrels, a decrease of 3.4% from 1929.

Venezuela and Colombia

At the close of 1930, Texas Petroleum Company, a subsidiary, held in Venezuela a total of 140,351 acres of exploration and exploitation concessions. We had at the end of the year, through the California Petroleum Corporation of Venezuela, a one-half interest in 679,568 acres of exploration and exploitation concessions. Total acreage held in Venezuela was reduced during 1930, due to adjustments made in converting certain exploration concessions to an exploitation status, whereby 50% of the exploration concessions were returned to the government as required by law.

In Colombia, Texas Petroleum Company held at the end of the year 810,000 acres in fee and under option.

Pipe Lines

No major pipe line construction was undertaken during the year. A branch line of 39 miles from our main West Texas-Port Arthur line to the Darst Creek Pool in Guadalupe County, Texas, was completed, and has a daily capacity of 20,000 barrels.

The installation of additional stations and equipment on the Texas-Empire pipe line was completed, increasing the daily capacity of this line to 70,000 barrels.

Refining

Crude oil run to stills increased 111,645 barrels, or .2%.

The percentage of gasoline manufactured from crude oil run at all Company refineries averaged 49.0% in 1930, as against 48.3% in the previous year.

Sales

Sales volume of all Texaco products in 1930, both domestic and foreign, is considered satisfactory, in view of the economic situation prevailing throughout the world.

Texaco Ethyl Gasoline was placed on the market in the Spring of 1930 and its acceptance has been very satisfactory, and the same applies to our new Texaco Motor Oil.

Pursuing our program to have Texaco distribution throughout the length of the 23 principal United States transcontinental highways, our products were available on approximately 36,000 miles of the total of 50,192 miles comprising these 23 major routes at the end of 1930.

The activities of the Company in the field of aviation during the year further focused attention on the airplane as a means of rapid transportation, and at the same time demonstrated the outstanding qualities of Texaco Aviation Gasoline and Texaco Airplane Oil. In 1930, flying the monoplane *Texaco No. 13*, Captain Frank M. Hawks, the Company's Aeronautical Advisor, established east and west transcontinental speed records as well as various inter-city records.

Our aviation products are now on sale at 250 of the major airports in the United States, and are increasingly popular among pilots and aviation companies alike. We likewise have wide distribution of Texaco Aerodiesel Fuel for use in the Diesel type airplane engine.

Marine

The Company's marine equipment, owned and chartered, was operated to capacity until the latter part of 1930, when a reduction in our transportation requirements, coupled with unsatisfactory charter rates, made it advantageous to withdraw gradually from service five Company owned vessels ordinarily engaged coastwise. The indications now are that the "laid-up" tonnage will reënter its regular service over the first four months of this year.

The year was free of major marine accidents.

Sulphur Operations

Revenue from sulphur operations in which we are interested compared favorably with that of 1929.

Taxes

Domestic taxes other than Federal Income Tax increased $502,527.72 over 1929 and 1929 exceeded 1928 by $455,594.75. Increase of $7,117,368.84 in state gasoline taxes was an additional burden on the Company and its customers.

Distribution of Stock

There were 74,970 stockholders as of December 31, 1930, representing an increase during the year of 9,072. The tabulation below shows the distribution of stock as of the close of the year:

	Number	Shares	Percentage of Stock
Brokers	540	924,217	9.38%
Men Stockholders	43,325	4,710,891	47.82%
Women Stockholders	27,798	2,178,785	22.12%
Corporations and Banks	1,196	853,696	8.67%
Fiduciaries and Estates	2,111	1,183,562	12.01%
	74,970	9,851,151	100.00%

By order of the Board of Directors,

R. C. HOLMES, President

Balance Sheet

ASSETS

	December 31, 1930	December 31, 1929	Inc. or Dec.
CURRENT ASSETS:			
Cash	$ 27,383,706.59	$ 27,926,201.65	−$ 542,495.06
Marketable Securities	21,906,971.96	49,727,694.59	− 27,820,722.63
Loans Secured by Marketable Securities	14,091,274.57	.....	+ 14,091,274.57
Notes Receivable	6,070,138.84	2,290,517.32	+ 3,779,621.52
Accounts Receivable	30,176,686.53	48,029,800.67	− 17,853,114.14
Inventories:			
Merchandise, Crude and Refined Oils	123,461,068.29	135,850,408.10	− 12,389,339.81
Materials and Supplies	6,279,665.40	7,165,934.28	− 886,268.88
Other Current Assets	556,887.33	714,571.04	− 157,683.71
	$229,926,399.51	$271,705,127.65	−$41,778,728.14
PERMANENT INVESTMENTS:			
Non-Affiliated Companies	$ 3,454,571.25	$ 2,791,405.75	+$ 663,165.50
Affiliated Companies	11,896,619.19	10,648,151.81	+ 1,248,467.38
	$ 15,351,190.44	$ 13,439,557.56	+$ 1,911,632.88
Bond Sinking Fund	$ 1,395,000.00	$ 702,000.00	+$ 693,000.00
FIXED (CAPITAL) ASSETS:			
Properties, Plant and Equipment:			
Lands, Leases, Wells and Equipment	$197,276,491.51	$194,876,391.62	+$ 2,400,099.89
Oil Pipe Lines and Tank Farms	78,771,719.41	78,658,809.98	+ 112,909.43
Refineries and Terminals	138,152,151.63	127,385,977.95	+ 10,766,173.68
Tank Cars and Other Railroad Equipment	9,525,160.72	8,646,717.57	+ 878,443.15
Ships and Marine Equipment	33,673,517.84	33,672,832.96	+ 684.88
Sales Stations, Facilities and Equipment	99,475,122.04	81,280,737.78	+ 18,194,384.26
Miscellaneous	2,696,641.32	2,257,635.96	+ 439,005.36
	$559,570,804.47	$526,779,103.82	+$32,791,700.65
Patents	376,782.59	383,030.25	− 6,247.66
	$559,947,587.06	$527,162,134.07	+$32,785,452.99
Less Reserves for Depreciation, Depletion and Amortization	235,345,944.46	215,342,035.16	+ 20,003,909.30
	$324,601,642.60	$311,820,098.91	+$12,781,543.69
Prepaid and Deferred Charges	$ 10,623,113.35	$ 12,186,300.28	−$ 1,563,186.93
	$581,897,345.90	$609,853,084.40	−$27,955,738.50

LIABILITIES

CURRENT LIABILITIES:			
Accounts Payable	$ 18,421,007.35	$ 21,164,715.73	−$ 2,743,708.38
Accrued Liabilities	6,423,497.32	11,018,530.92	− 4,595,033.60
Dividend Payable January 1st	7,388,386.13	7,387,940.25	+ 445.88
	$ 32,232,890.80	$ 39,571,186.90	−$ 7,338,296.10
FUNDED AND LONG TERM DEBT:			
The Texas Corporation:			
5% Convertible Sinking Fund Gold Debentures, 1944	$100,000,000.00	$100,000,000.00	.....
California Petroleum Corporation:			
5½% Convertible Sinking Fund Gold Debentures, 1938	9,600,000.00	10,200,000.00	− 600,000.00
5% Convertible Sinking Fund Gold Debentures, 1939	6,400,000.00	6,800,000.00	− 400,000.00
The Louisiana Land and Exploration Company:			
Mortgage Bonds (Assumed)	.....	1,135,000.00	− 1,135,000.00
Purchase Obligations	2,929,101.75	5,281,763.13	− 2,352,661.38
	$118,929,101.75	$123,416,763.13	−$ 4,487,661.38
Deferred Credits	$ 968,037.96	$ 1,367,885.33	−$ 399,847.37
Capital and Surplus of Minority Interests	264,186.60	407,138.22	− 142,951.62
Common Capital Stock (Par Value $25.00)	246,278,775.00	246,251,250.00	+ 27,525.00
SURPLUS:			
Capital Surplus Paid-In	$ 48,146,616.80	$ 48,127,885.60	+$ 18,731.20
Earned Surplus (Unappropriated)	135,077,736.99	150,710,975.22	− 15,633,238.23
	$183,224,353.79	$198,838,860.82	−$15,614,507.03
	$581,897,345.90	$609,853,084.40	−$27,955,738.50

Consolidated Income and Surplus Account

	1930	1929	Inc. or Dec.
Gross Operating Earnings	$188,812,427.42	$213,262,170.00	−$24,449,742.58
Operating Charges:			
Operating and General Expenses	118,819,895.38	111,011,368.86	+ 7,808,526.52
*Taxes	7,671,592.37	11,194,797.36	− 3,523,204.99
Intangible Development Costs	8,725,553.97	12,275,388.04	− 3,549,834.07
Depletion and Lease Amortization	7,943,619.32	7,699,202.50	+ 244,416.82
Depreciation, Retirements and Other Amortization	27,259,433.67	24,259,015.37	+ 3,000,418.30
	$170,420,094.71	$166,439,772.13	+$ 3,980,322.58
Net Operating Income	$ 18,392,332.71	$ 46,822,397.87	−$28,430,065.16
Non-Operating Income (Net)	3,265,503.88	4,297,230.91	− 1,031,727.03
Income before Interest Charges	$ 21,657,836.59	$ 51,119,628.78	−$29,461,792.19
Interest Charges:			
Interest on Funded and Long Term Debt	$ 6,428,730.81	$ 2,063,866.42	+$ 4,364,864.39
Other Interest	248,573.68	763,716.54	− 515,142.86
	$ 6,677,304.49	$ 2,827,582.96	+$ 3,849,721.53
Profit for Period	$ 14,980,532.10	$ 48,292,045.82	−$33,311,513.72
Loss Applicable to Minority Interests	92,771.08	26,026.40	+ 66,744.68
Net Profit Accrued to Corporation	$ 15,073,303.18	$ 48,318,072.22	−$33,244,769.04
Earned Surplus at End of Previous Year	150,710,975.22	131,247,825.99	+ 19,463,149.23
Direct Adjustments	† 1,153,330.27	† 360,463.99	− 792,866.28
Total	$164,630,948.13	$179,205,434.22	−$14,574,486.09
Dividends Paid or Declared—Cash	29,553,211.14	28,494,459.00	+ 1,058,752.14
Earned Surplus at End of Year	$135,077,736.99	$150,710,975.22	−$15,633,238.23

†Deductions.
*Amounts shown do not include gasoline taxes, amounting in 1930 to $37,120,013.00, and in 1929, $30,002,644.16.

Secretary Ingalls' Navy Hell-Diver, Used by Rogers and Hawks on the Trip

Will Rogers—Ground and Lofty Impressions

By FRANK M. HAWKS
Aeronautical Advisor, The Texas Company

Passenger

A QUARTER OF A MILLION DOLLARS FOR THE AMERICAN RED CROSS RELIEF FUND FOR DROUGHT SUFFERERS WAS RAISED BY WILL ROGERS, NOTED HUMORIST, IN A RECENT AERIAL TOUR OF 48 CITIES AND TOWNS IN THE STATES OF TEXAS, OKLAHOMA AND ARKANSAS. MR. ROGERS WAS PILOTED BY CAPTAIN FRANK M. HAWKS, WHOSE SERVICES WERE DONATED BY THE TEXAS COMPANY IN ADDITION TO THE GASOLINE AND OIL USED ON THE TRIP. IN THIS ARTICLE, WRITTEN EXPRESSLY FOR READERS OF THE TEXACO STAR, THE COMPANY'S AERONAUTICAL ADVISOR GIVES HIS IMPRESSIONS OF AMERICA'S FAMOUS COWBOY PHILOSOPHER.

Pilot

ARRIVING at my office on January 19, I found a telegram on my desk indicating that Will Rogers was in New York. Previous telephone conversations with Jesse Jones, noted financier of Houston, Texas, had already informed me that I was to have the privilege of flying Mr. Rogers on a proposed tour in the interest of the drought sufferers in the States of Oklahoma, Texas, and Arkansas.

I lost no time in getting in touch with Will Rogers by telephone. I had seen him many times in the movies and on the stage and was wondering what type of individual I was soon going to have the pleasure of meeting face to face. All these thoughts ran through my mind as I waited for an answer.

"Hello, hello," came over the telephone, and I replied, "Mr. Rogers, this is Frank Hawks."

"Oh, yeah," came his reply, "Where are yer? Me an' Bill Hart are havin' breakfast—come on over—I want to see yer."

Twenty minutes later I nervously rang the bell at his room in the Plaza. He answered the door and my nervousness left. A big, brawny hand clasped mine and the grip was backed up by the sturdy frame of Will Rogers, the famous cowboy humorist himself.

"Gee, I'm glad to see yer! Lord, you're only a little runt, aren't yer? I thought y'were a great, big feller!" and we both laughed.

That meeting was the start of a most delightful acquaintance. A long discussion ensued concerning airplanes, and finally Dave Ingalls, Assistant Secretary of the Navy in charge of Aeronautics, made one of the finest offers it has been my good luck to accept—he offered his personal airplane, the Curtis Hell-Diver, equipped with a 600-horsepower Wright Cyclone engine. With that settled, the next move, of course, was to secure some vehicle to take us to Washington, and we called up Casey Jones who kindly loaned us a Cessna in which to make the first leg of our trip.

I realized in this first meeting with Will Rogers that truly I was to travel about with a very famous person, who was not only admired, but loved by everybody. He shakes hands with policemen, doormen, elevator operators, taxi drivers, waiters in restaurants, hat girls—everybody is his friend and he is just the same to everyone. He has a genial way

about him that always brings a smile or a laugh and it is quite apparent that he never would intentionally offend anybody in this world.

On January 21, about noon, we arrived at the flying field at North Beach, New York, to take off for Washington. At the last minute Casey Jones decided to go with us in order to bring back the Cessna which he had loaned us so the three of us hopped in and away we went.

When we arrived in Washington, we spent some time inspecting the Hell-Diver, Secretary Ingalls' plane. I had never flown it before and of course it is always natural for a pilot to ask numerous questions concerning the instruments and controls. I was asking these questions of the chief mechanic when Will said, "Yes, I think yer better find out where the gasoline turn-off is, Frank. Yer better stay out here a while an' practice with this thing."

Turn About—Secretary Ingalls Borrows the Texaco No. 13 for a Trial Flight

Mr. Ingalls had been so kind in lending us his own plane that it seemed only right that I should lend him the *Texaco No. 13*, to which suggestion my employers, The Texas Company, agreed. It was a pleasure that evening to hand him the keys and advise him about the gadgets of that little ship.

The next day we were out at the field bright and early. We had breakfast at the Anacostia Station. Soon the motor was warm and we were ready to go; as usual the camera men, reporters and newsreel men were on the spot. Will remarked that everything the Navy had no use for was put on him. We bundled him up with all the flying clothes available, and strapped a parachute on his back. He remarked, "I don't know why, it's funny—I don't know why, but I feel like Annie Lindbergh."

Up to the last minute Will had insisted that I "oughter practice," and our first "practice" took us from Washington to Little Rock, Arkansas, with stops at Greensboro and Nashville.

We were not actually beginning our show; we were only there a few days in advance to see what conditions were so that Mr. Rogers could talk and write intelligently on the subject for which he was touring that section of the country.

The next day we went to England and Pine Bluff, Arkansas, and thence to Fort Worth, Texas, where we met Amon G. Carter and received the schedule for Texas. I wanted it immediately so I could work out flying time. This enabled me to outline completely our arrivals and departures from every point for the entire week we were there.

Right away Will told me he was going to make an actor out of me. Of course, I was willing to obey. The act went something like this: Will would appear and give about an hour's talk and then he would introduce me. His introduction was most complimentary; he was gracious not only to me but to The Texas Company for lending my services in this good cause. Then I would come out on the stage and give my monologue. I must have been terrible at first because each day he would say to me, "Don't be so technical." In other words, it was a nice, polite way of saying, "You're rotten!" Soon I became wiser and dug up some aviation jokes and by observing Mr. Rogers' manner of handling his audience, I began to learn a little and could extract a few laughs from the audience myself.

After my speech of 15 or 20 minutes, Will would come on again for about half or three-quarters of an hour. This was a two-hour show we played at each point we reached in the daytime. The evening performance was more elaborate. We had the services of the Revelers, that world-renowned quartet; Jimmy Rogers, the cowboy yodler, was along and gave a very commendable act and Chester Byers, who is considered the world's greatest trick roper, gave a beautiful exhibition. Will acted as announcer, contributing the major part of the program himself with his stories and lariat.

I was not able to go with him from Fort Worth down to Austin, San Angelo and Abilene because it was necessary for me to hurry back to New York City for an important engagement to which I had previously been committed. So when Will started south through Texas on January 25, I flew north to New York. One of Will's jokes in introducing me later was to refer to this Fort Worth to New York trip, which had been covered in eight and one-half hours, by saying "an' so he left me to go to New

York; and he was gone the better part of the day."

I caught Will again at Breckinridge, Texas, and from there continued with him throughout the entire tour. The other cities visited in Texas were San Antonio, Dallas, Port Arthur, Beaumont, Houston, Wichita Falls and Waco.

The week in Texas was most successful and something in excess of $30,000 was secured.

Then came a week in Oklahoma. Starting at Oklahoma City we covered Norman, Chickasha, Ardmore, Duncan, Lawton, Durant, Stillwater, Enid, Ponca City, Shawnee, Ada, McAlister, Muskogee, Miami, Bartlesville, Okmulgee, Chelsea, Clairmore and Tulsa. It was a glorious week; Will Rogers homestaked with a fitting climax at Tulsa, bringing in $30,000 for the night's performance and totaling more than $100,000 for the week's activity in his native state.

Before passing into Arkansas, let me deviate a moment from the chronological order of the tour to state that Mrs. Rogers joined us in Oklahoma City. Earl Halliburton very generously loaned his tri-motored Ford with Bob Cantwell flying and this plane carried Mrs. Rogers and any others of the troupe who cared to fly. Incidentally, not many did.

Mrs. Rogers is a wonderful woman with a charming disposition, poise and personality that win one's heart immediately. I am sure that Will himself will agree with me that she has been his guiding star and has brought to pass much of the success of the Rogers family through her counsel and advice.

We passed into Arkansas and started the Arkansas week at Fayetteville. The next down was Rogers, Arkansas, which, by the way, is the home of Mrs. Rogers.

The next morning we encountered the first little town at which it was impossible to land with the Hell-Diver; Russelville, Arkansas. Will drove by car to Russelville for the eight a. m. performance. I flew the Hell-Diver on to Conway, which was to be our next stop later in the morning. At Conway I secured a light airplane and flew back to Russelville in time to do my part of the show as usual and returned Will to Conway for our 10 o'clock performance. In the next three days we visited Hot Springs, Little Rock, Batesville, Paragould, Jonesboro, Forest City, Helena, Stuttgard, England, Pine Bluff and Texarkana, where the tour ended.

The total receipts ran very close to a quarter of a million dollars. It is important to explain here that it was emphatically pointed out by Will from the start that there were to be no deductions from the money raised; everybody's services were free and no expenses of any kind were to be taken from the receipts. Theatres and committees, and whoever worked with us locally, donated their services. Will Rogers gave his services and in addition paid all expenses. More than that, I saw him give freely at almost every town and believe that at the close of the tour he had personally donated to the fund not less than $5,000. Of course my services and the oil and gasoline were donated by The Texas Company.

★

Rogers and Hawks Just Before the Takeoff on the Red Cross Flight

Pocahontas and The Cavalier

Texaco Lubricated Norfolk & Western Trains Follow Old Alleghany Trail

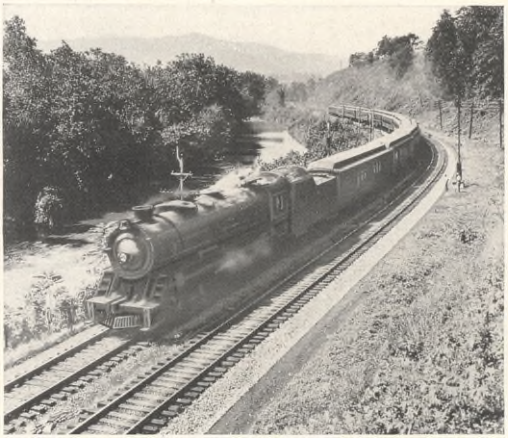
IN the wilderness that became "the cradle of the American nation" there roamed more than three centuries ago an Indian princess and a cavalier from the Old World. The trails over which they wandered were but dim paths worn by the moccasined feet of natives under the powerful chieftain, Powhatan. How the princess, Pocahontas, saved Captain John Smith from the wrath of her father the chieftain is one of the dramatic incidents marking the establishment of the first permanent English settlement on the shores of America.

After the red men and John Smith the cavalier, other white settlers followed these same trails on foot, and later in horse-drawn vehicles. Today these paths are trails of steel that stretch from Norfolk on the Atlantic Ocean through Virginia and West Virginia to Cincinnati and Columbus, Ohio. Over these long-established links of communication between the East and the Middle West, day and night, roll "The Pocahontas" and "The Cavalier," crack passenger trains of the Norfolk and Western Railway.

"The Pocahontas" was chosen several years ago from among suggestions by employes as a name giving personality to a new east-to-west passenger train. When a companion train was put in service the following year, it was called "The Cavalier," in keeping with Virginia traditions.

These trains—two daily each way—make the run of about 670 miles between Norfolk, eastern terminal of the railway, and Columbus and Cincinnati, western terminals, in an average time of about 21 hours. "The Pocahontas" and "The Cavalier," both of which are lubricated by Texaco products, traverse a section of the country rich in tradition, and on the trip to the Atlantic coast pass through the prosperous and fertile section of southeastern Ohio, the coal fields of West Virginia and follow the steel trail over the peaks of the Alleghany Mountains at Bluefield, West Virginia.

From these heights may be seen both a country of natural beauty and a billion-dollar coal field. After entering Virginia through a gateway flanked on one side by towering palisades and on the other by jagged mountains, the Blue Ridge Mountains come into sight. Continuing east, the trail passes the classic buildings of the Elks' National Home at Bedford, which have as a background the delicately tinted twin Peaks of Otter, more than 4,000 feet high.



The Pocahontas and (below) The Cavalier Passing Through West Virginia's Hills

Nearing the end of the trail "The Pocahontas" and "The Cavalier" pass through Appomattox, where the Civil War ended; then Petersburg, bearing the marks of both the Civil War and the Revolution; the great Dismal Swamp, hallowed in the verse of Thomas Moore and Longfellow, and historic eastern Virginia with its shrines and battlefields.

And on the last stretch to the coast, appear the waters of the Atlantic.

The Sackett Home, Built in 1870 on the Foundations of the Old Commissary

The Ghost of Camp Colorado

A Tale of Pioneer Days in Old Texas

By ROBERT E. HOWARD

"The muffled drum's sad roll has beat
The soldiers' last tattoo;
No more on life's parade shall meet
That brave and fallen few."
—THE BIVOUAC OF THE DEAD.

ON the banks of the Jim Ned River in Coleman County, central West Texas, stands a ghost. It is a substantial ghost, built of square cut stone and sturdy timber, but just the same it is a phantom, rising on the ruins of a forgotten past. It is all that is left of the army post known as Camp Colorado in the pioneer days of Texas. This camp, one of a line of posts built in the 1850's to protect the settlers from Indian raids, had a career as brief as it was stirring. When Henry Sackett, whose name is well known in frontier annals, came to Camp Colorado in 1870, he found the post long deserted and the adobe buildings already falling into ruins. From these ruins he built a home and it is to his home and to the community school house on the site of the old post, that the term of Camp Colorado is today applied.

Today the house he built in 1870 is as strong as if erected yesterday, a splendid type of pioneer Texas ranch-house. It stands upon the foundations of the old army commissary and many of its doors and much of its flooring came from the old government buildings, the lumber for which was freighted across the plains three-quarters of a century ago. The doors, strong as iron, show plainly, beneath their paint, the scars of bullets and arrows, mute evidence of the days when the Comanches swept down like a red cloud of war and the waves of slaughter washed about the adobe walls where blue-clad iron men held the frontier.

This post was first begun on the Colorado River in 1856, but was shifted to the Jim Ned River, although it retained the original name. Built in 1857, in the stirring times of westward drift and Indian raid, the old post in its heyday sheltered notable men—Major Van Dorn, Captain Theodore O'Hara, whose poem, "The Bivouac of the Dead" has thrilled the hearts of generations, General James B. Hood, General James P. Major, General Kirby Smith, and the famous General Fitzhugh Lee, nephew of General Robert E. Lee. From Camp Colorado went Major Van Dorn, first commander of the post, to Utah, in the days of the Mormon trouble. And from Camp Colorado went General James P. Major with the force under Van Dorn, and Captain Sol Ross, later Governor of Texas, on the expedition which resulted in the death of Peta Nocona, the last great Comanche war chief, and the capture of his white wife, Cynthia Ann Parker, whose life-long captivity among the Indians forms one of the classics of the Southwest.

When the clouds of Civil War loomed in the East and the boys in blue marched away from the post in 1861, their going did not end Camp Colorado's connection with redskin history. For from the ranch-

house and store built on the site of the post. Henry Sackett rode with Captain Maltby's Frontier Battalion Rangers in 1874, on the path of Big Foot and Jape the Comanche, who were leaving a trail of fire and blood across western Texas. On Dove Creek, in Runnels County, which adjoins Coleman County on the west, the Rangers came up with the marauders and it was Henry Sackett's rifle which, with that of Captain Maltby, put an end forever to the careers of Big Foot and Jape the Comanche, and brought to a swift conclusion the last Indian raid in central West Texas.

Monument Marking Burial Place of One of the First Shorthorn Cows of Central West Texas

Of the original buildings of the post, only one remains—the guard house, a small stone room with a slanting roof now connected with the ranch-house. It was the only post building made of stone; the others, adobe-built, have long since crumbled away and vanished. Of the barracks, the officers' quarters, the blacksmith shop, the bakery and the other adjuncts of an army camp, only tumbled heaps of foundation stones remain, in which can be occasionally traced the plan of the buildings. Some of the old corral still stands, built of heavy stones and strengthened with adobe, but it too is crumbling and falling down.

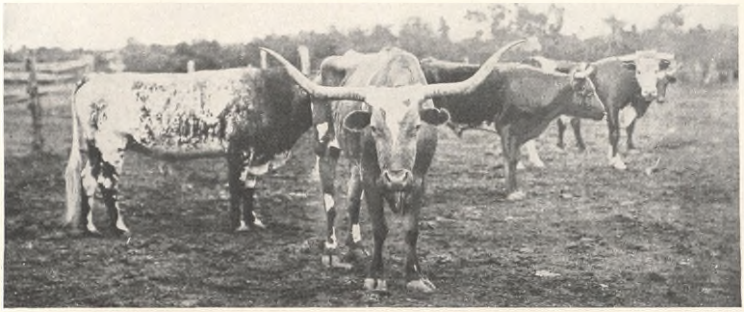
The old guard house, which, with its single window, now walled up, forms a storeroom on the back of the Sackett house, has a vivid history all its own, apart from the military occupancy of the post. After the camp was deserted by the soldiers, it served as a saloon wherein the civilian settlers of the vicinity quenched their thirst, argued political questions and conceivably converted it into a blockhouse in event of Indian menace. One scene of bloodshed at least, it witnessed, for at its crude bar two men quarreled and just outside its door they shot it out, as was the custom of the frontier, and the loser of that desperate game fell dead there.

Today there remains a deep crevice in one of the walls where two military prisoners, confined there when the building was still serving as a dungeon, made a vain attempt to dig their way to liberty through the thick, solid stone of the wall. Who they were, what their crime was, and what implements they used are forgotten; only the scratches they made remain, mute evidence of their desperation and their failure.

In early days there was another saloon at the post, but of that building no trace today remains.

Guard House of Camp Colorado, Built in 1857

Yet it was in use at least up to the time that Coleman County was created, for it was here that the first sheriff of the county, celebrating the gorgeous occasion of his election, emerged from the saloon, fired his six-shooter into the air and yelled: "Coleman County,



BROWN BROS.

"The Longhorn Follows the Buffalo and the Indian Into Oblivion"

by God, and I'm sheriff of every damn' foot of her! I got the world by the tail on a downhill pull! Yippee!"

A word in regard to the builder of the house that now represents Camp Colorado might not be amiss. The Honorable Henry Sackett was born in Orsett, Essexshire, England, in 1851 and came to America while a youth. Building the house, largely with his own labor, in 1870, he lived there until his death a few years ago, acting as postmaster under seven Presidents, and as store-keeper for the settlers. The south side of the stone house, built into a single, great room, was used as post office and general store. Henry Sackett was a pioneer in the truest sense of the word, an upright and universally respected gentleman, a member of the Frontier Battalion of Rangers, and later Representative in the Legislature of Texas, from Brown and Coleman Counties. He married Miss Mary MacNamara, daughter of Captain Michael MacNamara of the United States Army. Mrs. Sackett still lives at Camp Colorado.

The countryside is unusually picturesque—broad, rolling hills, thick with mesquite and scrub oaks, with the river winding its serpentine course through its narrow valley. On the slopes cattle and sheep graze and over all broods a drowsy quiet. But it is easy to resurrect the past in day dreams—to see the adobe walls rise out of dusty oblivion and stand up like ghosts, to hear again the faint and spectral bugle call and see the old corral thronged with lean, wicked-eyed mustangs, the buildings and the drill grounds with blue-clad figures—bronzed, hard-bitten men, with the sun and the wind of the open lands in their eyes—the old Dragoons! Nor is it hard to imagine that yonder chaparral shakes, not to the breeze, but to crawling, stealthy shapes, and that a painted, coppery face glares from the brush, and the sun glints from a tomahawk in a red hand.

But they have long faded into the night—the reckless, roistering cavalry men, the painted Comanches, the settlers in their homespun and buckskins; only the night wind whispers old tales of Camp Colorado.

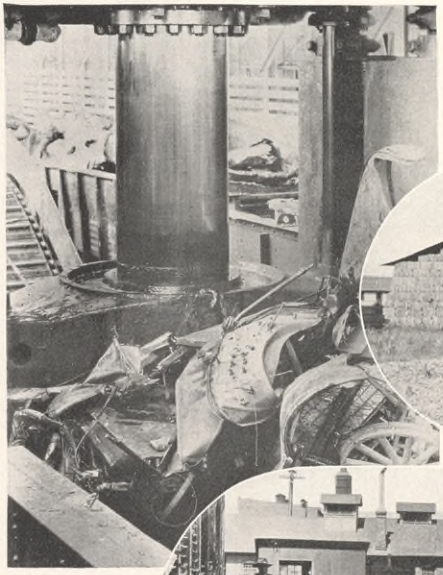
A half mile perhaps from the Sackett house stands another remnant of the past—a sort of mile-stone, definitely marking the close of one age and the opening of another. It stands on a hillside in a corner of the great Dibrell ranch—a marble monument on which is the inscription:

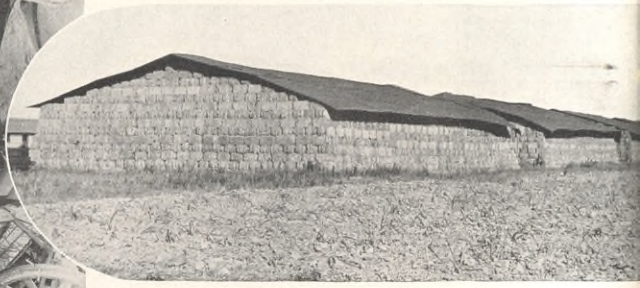
BREEZE 21ST 31984
HEREFORD COW
BORN 1887 DIED 1903
MOTHER OF THE DIBRELL HERD
DIBRELL

This monument marks the resting place of one of the first registered, short-horn cows of central West Texas. When Breeze was born, West Texas swarmed with half-wild longhorns, descendents of those cattle the Spaniards brought from Andalusia; now one might look far before finding one of those picturesque denizens of the old ranges. Fat, white faced, short horned Herefords of Breeze's breed and kind have replaced them, and in the vast pageant of the West, the longhorn follows buffalo and Indian into oblivion.

A Few Relics of the Old Post

WEALTH FI





Sugar Cane Fiber, Known as "Bagasse," is Manufactured into Wallboard

(Above) Ford Salvage Plant Where About 600 Cars and Trucks a Day are Crushed and Melted Up

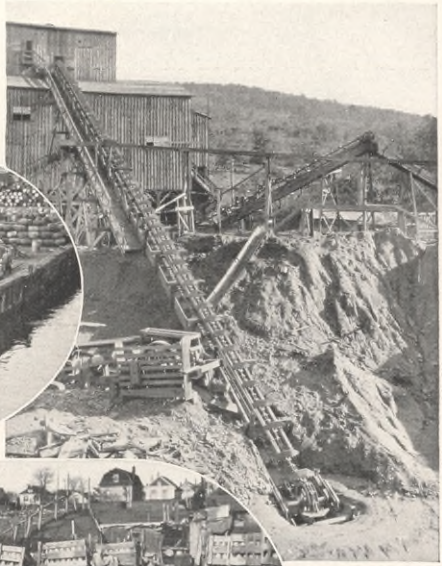
Reclaiming Copper from Mine Water; (Above): It is Deposited Chemically on Old Tin Cans

From Watch Springs to Autos (Left); a Billion Dollars a Year is the Value of Scrap Metal

Millions Are Re Paper from kets

OM WASTE

Thousands of Barrels are Salvaged from Dump Heaps and Put into Use



A "Culm" Bank of Fine Coal and Dirt at a Coal Mine; (Above): the Coal Dust is Recovered

Milk Bottles (Above) from Dump Heaps are Crated and Resold to Dairies

PHOTOS

Annually zed in Collected te Bas- Offices

(Right) Chicken Feed from Crushed Oyster Shells; the Shells are Also Used for Paving

Oil Wells—Straight and Otherwise

Sinking a Vertical Shaft Deep into the Earth is Far from Simple

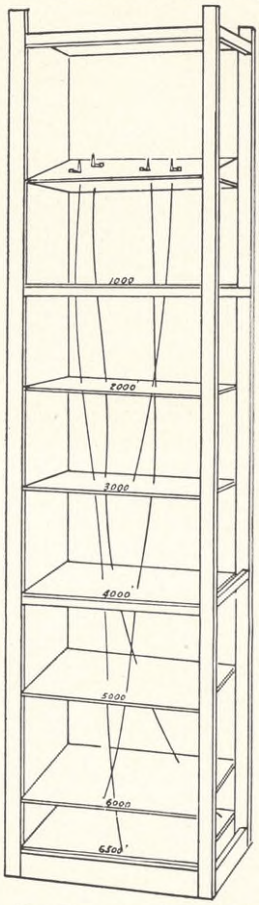
By H. L. STRADER

Petroleum Engineer, South Texas Division

THE problem of drilling a straight hole in an oil well is one which, in the past three or four years, has come to assume a position of paramount importance to those actively engaged in the drilling and producing departments of the industry. Next to the problem of proration it is probably more widely discussed than any other among superintendents, engineers, and men in the field. This is as it should be, because to the superintendent a straight hole may mean the difference between a producing well and a dry hole and to the man in charge of production, the difference between a well which pumps easily and economically and one that is the source of all sorts of production trouble.

Before going any further into the subject it would be well to give some definition of just what is meant by a straight hole. Theoretically speaking, a straight hole is one whose course is at an angle of 90 degrees with a plane drawn tangent to the earth at the point of location on the surface. Practically, in rotary drilling, this is a mechanical impossibility and so there have been specified certain limits beyond which the well cannot drift and still be classified as a straight hole. In some localities this limit has been set at five degrees. However, as we continue to drill deeper wells we have found this limit to be too great; because a five-degree deviation, if continuous from the surface, would cause a horizontal drift of approximately five and one-half feet for every 100 feet drilled in a downward direction. This, in a 5,000 or 6,000-foot well, would amount to a displacement of from 250 to 350 feet, horizontally.

In many fields where the producing zone is narrow a well having this much drift would end up as a dry hole. As a result many of the major companies are specifying, both to their own drillers and to independent drillers operating under contract, that the well shall not deviate more than one and one-half degrees at the maximum.



Three-Dimensional Scale Model Showing Courses of Oil Well Drill Holes and Depth in Feet

The benefits to be derived from a well that does not exceed these limits are many. Our wells are located primarily upon information given by the geologists who in turn base their correlations upon subsurface data gathered from well logs. To be accurate, this data must be taken from wells that are vertical in their course. When, after the flowing life of the well is completed, it becomes necessary to pump the well, the saving in wear and tear on rods and tubing and the decreased pumping loads resulting in lower pumping costs, will amount to far more than enough to pay for the additional care taken to drill the hole straight.

In the early days of the oil industry, when practically all wells were drilled by the cable tool method, very little thought was given to straight holes and, except in occasional instances, none was necessary. Cable tools following the principle of the plumb-bob with the drilling power imparted by the up and down motion of the walking beam drilled, under ordinary conditions, a vertical hole. An occasional encounter with a hard, steeply dipping formation in the course of the well may have caused some slight deviation from the vertical, but it is the writer's

opinion that after penetrating this formation the hole again assumed its vertical course.

With the introduction and rapid adoption of rotary drilling methods the conditions governing the drilling of a straight hole were completely changed. With cable tools, during the major part of the stroke, the entire string of tools is in tension changing to a condition of compression only at the moment of impact of the bit on bottom; with rotary tools, a larger or smaller part of the drilling string, depending upon the amount of weight carried on the bit, is working under conditions of compression at all times. It is the opinion of practically everyone that this one factor is the direct cause of the majority of crooked holes.

Take, for example, a string of four-inch drill pipe 6,000 feet long. On the ground a joint of this pipe would seem to have sufficient strength to prevent its bending very much, but when it is made up into a drilling string and lowered into the hole, we have to change our ideas and compare it to a piece of common No. 14 wire approximately 100 feet long.

Keeping this comparison in mind it will be easy to see that any more weight applied to the string than is necessary to keep the bit digging is going to cause the string of pipe to bend and that the amount of bending will be limited only by the walls of the hole. For the reader to visualize what will happen when this string of pipe is rotated while in this condition it is only necessary for him to take a piece of heavy binding twine and rotate it rapidly between the palms of his hands and watch the lower end of the string.

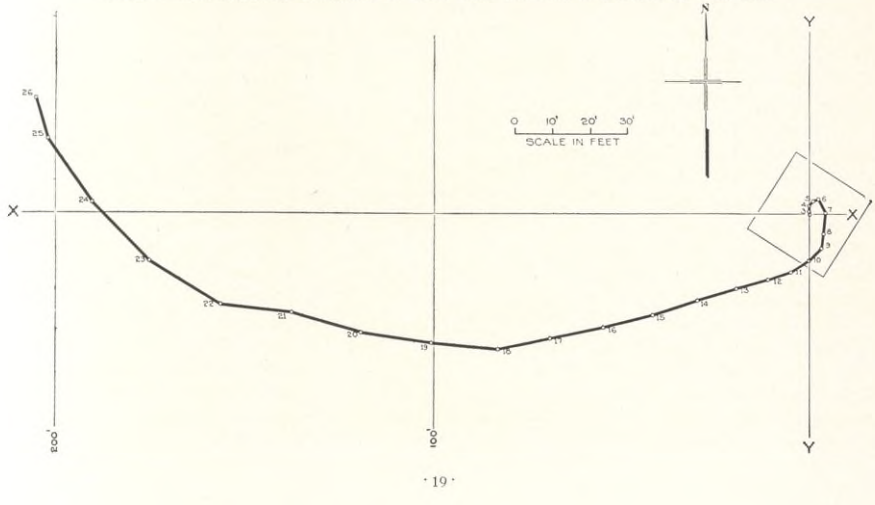
Obviously, it would be impossible to drill a straight hole under these conditions and various devices and methods are used to counteract them.

Before going into the problem of drilling the hole straight, it will be interesting to note some of the other conditions which are thought to contribute toward crooked holes. As in cable tool drilling, the presence of steeply dipping formations may be an important cause, especially in these days of high-speed drilling. Bits which are not concentric with their major axis, or which may have the point of one blade longer than the other, or which are poorly or irregularly hard-faced, and also certain designs of patented bits have a tendency to leave the true vertical course. A jetting action on the walls at the bottom of the hole, caused by the high pressures and fluid velocities which it is possible to obtain with the modern slush pump, may lead to the formation of large cavities which allow the bit to wander around at will.

One cause which would seem improbable, but has been known to have happened in several cases, is that the derrick foundations were not level and the hole was crooked from the surface of the ground. In wells where coring is practically continuous, many instances of crooked holes have been found to have started at the point where the core-barrel was introduced. After a string of casing has been cemented it is very possible, upon drilling out the cement plug, to start the reduced hole slightly off center. The above are just a few of the many factors which have to be guarded against in drilling a straight hole.

The art, if it may be called that, of drilling a straight hole calls for the close observance of good drilling practices by every person actively connected

Plan Showing Horizontal Distance Which a Hole Drilled in California Traveled from the Derrick—This Migration Amounted to More Than 200 Feet at a Depth of 2,300 Feet



with the actual drilling of the well.

F. F. Hill, Manager of Production for the Union Oil Company of California, in a paper read before a meeting of the American Petroleum Institute, at Los Angeles, gave the following rules and recommendations for better hole making:

"1. Do not cause the pipe to bend by applying too much weight.

"2. Keep a definite amount of weight on the bit. This implies a uniform rate of feed.

"3. Use a long, heavy drill-collar approaching as nearly as possible the diameter of the hole being drilled. Sufficient clearance should be allowed for fishing.

"4. Drill the formation clean with as fast a speed of rotation as conditions will permit.

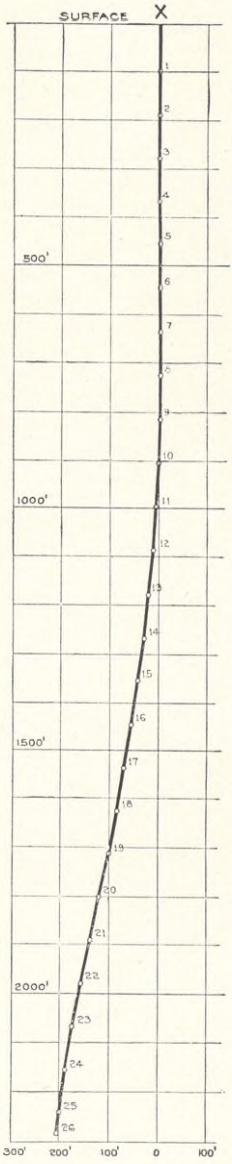
"5. Have sufficient pump pressure and fluid volume to keep the hole washed clear of cutting. [Mr. Hill warned against having the watercourses cut in the bit so that the fluid stream will wash against the side walls of the hole.]

"6. Keep the bit sharp and use the best hard-facing material available. Dress drilling bit and core bits true to gauge so that they will rotate concentrically with the axis of the drill-pipe.

"7. When the hole is reduced it is good practice to use a diamond pointed bit or some type of guide for the first few feet thus centering the new hole.

"8. Last and of greatest importance is the necessity of educating the driller as to what is expected of him, keeping his confidence and getting his coöperation. In the final analysis the driller is the man who is actually making the hole and, when supplied with the proper equipment, it is his responsibility as to the condition of the hole upon completion."

The above suggestions embody most of the approved ideas for drilling a straight hole and when applied as they should be good results can be expected. However, there are times when some of these principles are not strictly adhered to; town-lot drilling calls for extremes in drilling speed that often result in holes that are unbelievably crooked; poor material, inadequate supervision, new and untrained personnel, all enter in. As a result, instruments have been constructed to check the drill-hole's deviation from the vertical and, also, the direction of that deviation.



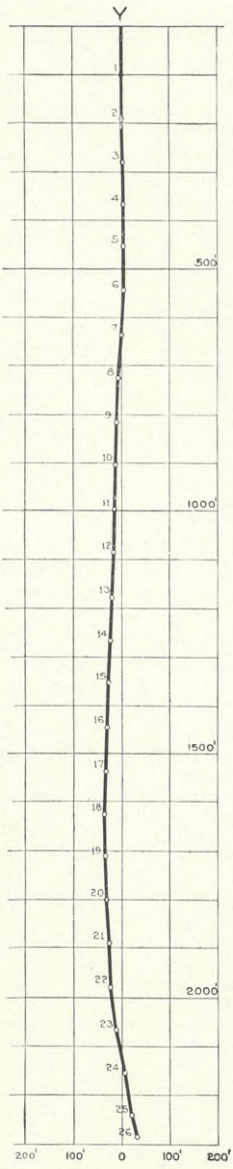
The Same Hole as Shown on Page 19 in Rectangular Vertical Projection Along Line "X"

These instruments fall into two classes; namely, those which record only deviation from the vertical, and those which show both deviation and direction. In the first class the acid bottle is the type most commonly used. The efficacy of the acid bottle depends upon the fact that an aqueous solution of hydrofluoric acid will attack the glass of the containing bottle in such a manner as to leave a sharply etched line showing the position that the level of the fluid assumed upon coming to rest. The instrument is usually run into the hole on a wire line. It is stopped at the desired depth and there allowed to remain for a period of time, depending upon the strength of the acid solution, varying from five to 15 minutes. After removal from the hole the bottle is labeled showing the depth at which the record was taken and the amount of deviation from the vertical and then filed for future reference. The angle is measured with some simple form of a goniometer. As I have already said, the acid bottle is probably the instrument most commonly used for measuring deviation. However, it has its disadvantages; the operator may receive very severe burns from the acid unless extreme care is used in handling the outfit. The bottles which constitute the permanent record are bulky, inconvenient to store, and subject to breakage. In the South Texas Division, instead of the acid bottle, an instrument which works on the same principle is used. In place of the acid a dye is used which makes a record on a graduated paper chart. These graduations are so arranged that the angle of deviation may be read directly in degrees. The charts, being small, are easy to file and the operator is subjected to nothing

more than stained fingers in using the outfit. It has also been our experience that the records given by this instrument are more accurate and far easier to read than those obtained by the acid bottle outfits. As far as is practical every district has been furnished with one of these instruments and the different drilling crews have been instructed in their use. Instructions have been issued to run the instrument every 500 feet as long as the hole remains straight. This interval is decreased if there seems to be any tendency for the hole to leave the vertical or if there is a large amount of coring or rat-holing. This procedure enables the driller to keep his hole straight rather than to discover a serious deviation after the hole is nearly completed.

Instruments which show both deviation and direction are divided into two classes: those which make use of some type of compass and those which depend upon the orientation of the drill pipe as it is lowered into the well. It has been found that the ordinary magnetic compass is inaccurate when run inside casing due to the weakening of the earth's magnetic forces by the absorptive characteristics of the pipe. The use of a gyroscopic compass in one instrument is claimed by the manufacturer to have overcome this disadvantage. The records obtained by these instruments are divided into three general classes: photographic, stylographic and disc. Of the three the first is the one most generally used. The records are obtained upon one or two films, depending upon the instrument. One photographs the shadow of a pendulum in two planes at right angles to each other, thus recording the components of the deviation, the direction of which is obtained by orienting the drill-pipe.

Other instruments make a photograph of a compass needle and a level bubble under a curved graduated glass disc. At the same time a picture is taken of a clock face, the hands of which are synchronized with watches on the surface. This makes it possible to determine accurately the depth of the instrument at the time of each reading.



Again the Same Hole—A Rectangular Vertical Projection Along Line "Y"

From the records given by any of this type of instrument it is possible to construct a plan showing the horizontal course of the well with reference to the surface and also two vertical sections showing the vertical course of the well.

In spite of all precautions, crooked holes do occur and it might be interesting to cite some of the more extreme cases of which the writer has had personal knowledge. Since the last Santa Fé Springs, California, drilling campaign was carried on under the excitement and rush of a town-lot situation, it was the scene of many crooked holes. On one small lease two wells were drilled to a depth of more than 5,000 feet without encountering the producing horizon, which was expected at a depth of about 4,800 feet. These two wells were surveyed at intervals of 100 feet from top to bottom. The initial deviation was found to start about 1,500 feet from the surface, just under the shoe of the surface casing. From this point the departure from vertical increased until at the bottom, the instruments showed a deviation of 51 degrees in one well and 56 degrees in the other. A later directional survey showed that both wells had drifted in the same general direction and that the bottoms of the holes were more than 1,000 feet in a horizontal direction from the surface locations. Of course, the only alternative for this operator was to plug back in both holes to a point where they were still vertical and redrill. Up to the time that the wells were surveyed this particular operator was very proud of the speed that his drilling crews had made. In another case a company was deepening an old well. For several days the driller had been reporting that he was drilling in iron. Inasmuch as they had been doing some fishing in the well, little thought was given to the matter other than that there was a little junk in the hole that would soon be milled up. Finally a report came

from an offset location, 600 feet away, that an excessive amount of mud was coming from their well. Investigation by engineers of both companies concerned showed that when the pumps on the first well were shut down this excess amount of mud disappeared. This left no doubt that the "iron in the hole" that the driller had reported had been the casing of the offset well, and that he had drilled through two strings of casing that had been cemented in this well. A survey of the first well showed that there was some drift in the direction of the offset but not enough to account for the 600 feet between the locations. In this case both wells had drifted toward each other and as the second well was considerably deeper, the first had intersected its course and cut through the pipe. An agreement between the two companies resulted in the plugging back of the first well and necessitated the setting of another string of casing in the other.

It would be extremely interesting to be able to see a cross-section of some thickly drilled area and compare the location of the wells on this cross section with their actual surface locations.

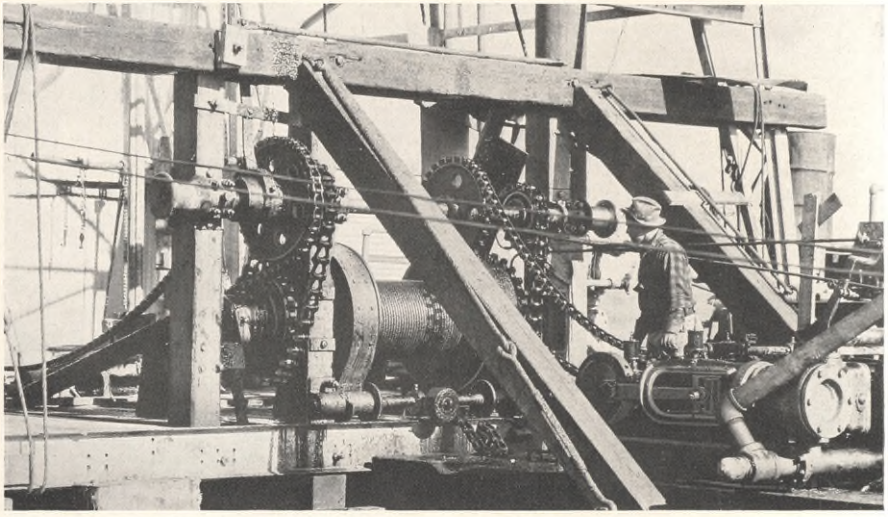
The fact that a well has become crooked to a degree where it misses the producing horizon does not mean that we necessarily have to abandon the hole. The first step is to make a survey of the well at frequent intervals, sometimes no more than 50 feet apart, to determine the exact point where the deviation started. Then the hole is plugged back from bottom with heavy mud, sand, rocks in fact any material that will fill up the hole. This type of material is brought to within 100 or 200 feet of the point where the hole is still straight. Then a cement plug is pumped in to plug the hole to the depth where it has been decided to start redrilling. After the cement has been allowed to harden for several days, the redrilling is commenced. From this time on all the rules for straight hole drilling are followed religiously.

No driller likes to have it said that he drills crooked holes and no company appreciates having to pay twice for the same well. For the first few feet of the new hole no more weight is allowed to rest on the bit than will actually cut the formation and the surveying instrument is run every few feet.

As soon as the hole has a good start in a vertical direction, the driller is allowed to put more weight on the bit and "make hole" as before. From this time on it is never necessary to instruct the driller to survey his well, he wants to know all the time.

It is to be hoped that this short article, presented in a more or less non-technical manner, will prove interesting to readers of THE TEXACO STAR and that it will give an idea of some of the problems that are encountered by the Producing Department in drilling wells which can be classified as straight and through that characteristic be counted as an asset rather than a liability to our Company.

Rotary Drilling: Rear View of Draw Works on Our Polk No. 2, Port Neches Field, Texas



JOLLIFFE STUDIO, WINCHESTER

Texaco Float Used in 1930 *at the Apple Blossom Fête*

Apple Blossom Time

In Winchester, Virginia, They Make the Most of the Signs of Spring

WINCHESTER, Virginia, metropolis of the eastern apple belt, enshrines a heritage of history side by side with success in commercial endeavor. Its monuments of the Revolution and the Civil War bear witness to the struggles with which it has been identified, and some of the largest cold storage plants in the world, with manufacturing and distribution facilities connected with every phase of apple growing, attest Winchester's popularity in the fruit industry.

Winchester stages each year the Shenandoah Apple Blossom Festival, celebrating the fertility of Spring in the region embracing the Shenandoah Valley, Cumberland Valley and Potomac districts;

(Below) Scene from the Pageant Celebrating the Apple Blossom Festival

(Left) A Group of Virginia Belles Who Take Part in the Annual Festivities

JOLLIFFE STUDIO, WINCHESTER

George Washington's Headquarters in Winchester

Sheridan Started His Famous Ride from This House

The Handley Library in Winchester Lighted Up for the Annual Festival

the festival this year will take place sometime between April 15 and May 15 when the blossoms are at their best.

In company with the names of Thomas, Lord Fairfax, Baron of Cameron and Proprietor of the Northern Neck of Virginia; Stonewall Jackson, Sheridan, McKinley, Washington, General Daniel Morgan and others famous in former years, Winchester has in its "hall of fame" living persons who have achieved world-wide recognition, such as Rear Admiral Richard Evelyn Byrd, the only man to fly over both the North and South Poles; Admiral Louis McCoy Nulton of the United States Navy; Willa Sibert Cather, author; Dr. Frederick Henry Baetjer, roentgenologist, and Dr. James Howard Gore, university professor and author of scientific works.

Just as Virginia is the "Mother of Presidents," so is Winchester the "Mother of Governors." Three of her citizens have been chief executives of the Commonwealth of Virginia. From earliest times Winchester has felt the cultural influence of remarkable women and derived benefit from the genius of eminent professional and business men, poets and military leaders. At a time when there were but four newspapers in Virginia, two of them were published at Winchester.

Within the city are Stonewall Jackson's headquarters, Sheridan's headquarters, now the Elks' Club; Washington's headquarters, the home of General Morgan, the Cannon Ball House, the old Taylor Hotel, the room where President McKinley was received into the order of Masons, Fort Loundon, Star Fort and Milroy's Fort.

Seven Apple Blossom Festival queens have been crowned with rituals patterned after those used in the crowning of early English kings at Winchester, England, combined with features of the ancient Spanish coronation ceremony. "Queen Shenandoah the Seventh," crowned in 1930, was Miss Suzanne Pollard, daughter of Governor John Garland Pollard of Virginia.

As a tribute to Winchester in Virginia, Winchester in England, the ancient capital of that country, presented to its American namesake during the World War the flag which had once flown from the Guild-Hall of the older city. This flag is preserved at the Handley Library and is highly prized by Virginians as a symbol of friendship from the mother country.

More than 100,000 persons, it is estimated, travel to Winchester from all over the eastern states to view the Shenandoah Apple Blossom Festival, which lasts two days. The coronation of "Queen Shenandoah" is the outstanding event of the first day, and the Queen, who has been presented with a golden apple and the key to the city, "reigns" until her successor is crowned the following year. During the remainder of the day there are parades, aerial shows, band concerts and Apple *(Continued on last page)*

ROAD BUILDING'S NEWEST WRINKLE

Future Highways May Have Iron Bases

IF you are like nine out of 10 people, you have paused at least once to observe with interest the construction of a street pavement. You will recall among other things that the thickness of the foundation of the pavement was six or possibly eight inches, never less than four inches. Incidentally, the famous Roman military roads of Caesar's time were built on foundations two to three feet in depth.

In striking contrast to these pavement foundations is the experimental road completed in Sangamon County, Illinois, during August, 1930. Its foundation, which consists of iron sheets laid directly on the dirt road, has a maximum thickness of only one-quarter of an inch. There are three sections of the metal base, each 50 feet long. In the first section, one-quarter inch flat metal was employed. In the second and third sections, 10-gauge corrugated metal (about one-eighth of an inch thick) was employed. A one-inch cushion of bituminous material and sand was spread over the iron base. And on this was placed a brick surface, the joints of which were filled with Texaco Asphalt.

If this experimental iron base road proves successful it will undoubtedly influence in no small degree the future of the road building industry.

Proponents of the metal paving base point out a great saving in time and expense, because of the fact that substantially less excavating is necessary to make room for the thin metal base than for a five- or six-inch concrete base. The surface of the pavement may be laid on the metal base without delay; a concrete base must be allowed to "cure" from 10 to 20 days after it has been laid, the length of the period depending upon weather conditions. It is claimed that the labor cost in laying a metal base will be lower than for concrete. A longer life and lower maintenance cost are other advantages attributed to the new type of foundation.

Running alongside the metal base experimental road in Sangamon County, the same type of brick surface with Texaco Asphalt joint filler has been constructed on a five-inch concrete foundation. Both concrete and metal bases will be subjected to the same traffic, climatic and subsoil conditions.

Flat and corrugated metal bases for the experimental highway near Springfield, Illinois

Bricks set upon a leveled cushion of mastic sand are the third layer of the "iron road"

Applying asphaltic filler to the brick surface of the world's first metal base road

The value of roads built on metal is being tested, and may influence highway engineering

World Consumption of Petroleum*

THE United States, with the largest production and the greatest refinery capacity, consumes more oil than any country in the world. In no small part the relatively high consumption in this country has been due to the necessity of meeting the demand for gasoline for the motor car.

Production of petroleum in America dates back to 1859, and from the earliest days the United States has supplied the bulk of the world's oil.

The first important use to be discovered for petroleum was as a burning oil in lamps. Before the general introduction of electricity, kerosene or its predecessor, "coal oil," gave the world light; and the world had to come to the United States for a large part of its supply.

The industrialization and mechanization of Europe created a vast market for lubricants.

In the early days of the twentieth century, automotive development in the United States began to make great forward strides; and by 1910 the automobile was creating a new demand for gasoline—a petroleum product. The obvious success of the petroleum industry's efforts to supply this hitherto unprecedented demand for gasoline, created by the phenomenal growth of the automobile, has resulted in the parallel growth of these two giant industries, whose prosperity is so vital to the economic welfare of the United States.

The world was brought to a full realization of the essential importance of petroleum in every-day life, in industry, and in safeguarding national security, by the World War. The great development in the use of fuel oil in factories and in ships, the remarkable strides of aviation—with its attendant demand for specialized fuels and lubricants—also had their inception during the war.

As of December 31, 1929, a world census accounted for 34,877,000 motor vehicles, of which 26,501,000, or about 76 per cent, were in use in the United States.

Five years ago it was estimated that the world ratio of people to the automobile (as of December 31, 1925) was 71 to 1; a year later the gap had narrowed to 66 to 1; by 1927 the ratio was about 60 to 1; and at the end of 1929 the ratio was 58 to 1.

Aircraft development in certain countries is making a new market of great potentiality for gasoline and lubricating oils.

The growth in the use of fuel oil for industrial and marine purposes is no less sensational than the increase in the use of gasoline. A tendency on the part of the Great Powers toward conversion of battleships into oil burners was noted just preceding the World War, and became an actual development before the war was over. New vessels, as they came off the ways became oil burners; and when the war ended, the conversion was virtually complete. All the navies of the Great Powers are now on an oil burning basis. Of even more significance in its effect upon the petroleum and coal industries—the one favorably and the other unfavorably—was a similar conversion to an oil burning basis of the merchant shipping of the world.

Thus, before the war (1914), of the world's total gross tonnage (steam and gas) amounting to 45,404,000 tons, probably less than 4 per cent burned oil. In 1920 the world's tonnage had increased to 53,905,000 tons, of which oil burners represented about 17 per cent. In 1929 the total tonnage was 66,407,000 tons, of which 24,417,000 tons, or 36 per cent, were listed as oil burners.

The American merchant marine has an oil burning tonnage of 9,028,000 gross tons, the largest of any country. In 1914 its oil burning tonnage amounted to only 656,000 gross tons. Great Britain has an oil burning tonnage of 7,878,000 gross tons, and in 1914 its total was approximately 557,000 gross tons.

The rapid growth of the motor or oil engine ship since the World War is revealed in the preceding tables, showing a gross world tonnage in 1920 of 693,000 tons, as contrasted with the present tonnage of 5,604,000 tons. The world's mercantile marine is being rapidly "Dieselized."

About half of the ships launched in the world in 1929 were automobiles of the sea; that is, their power was furnished by internal combustion engines similar in principle to the motor car engine.

Crude oil supplies which are developed in remote countries, to be marketable, must find their way to refineries and be converted into salable products. The United States, in the development of its own petroleum resources, has built up a great refining industry. Its facilities for manufacturing the prod-

ucts which are in demand have attracted, and will continue to attract, foreign raw material; and its position in supplying the world with petroleum products will remain important, until such time as foreign production and refining facilities are far more extensively developed than they are at present.

For these reasons, imports of oil into the United States do not indicate with any exactitude the barrelage extent of America's actual dependence upon foreign oil. Most of the oil imported is of heavy quality, suitable for use chiefly as fuel oil, and much of it goes into marine use. Some is "topped" or refined, however; and, with modern refining methods, an increasing gasoline recovery is being obtained.

Total exports of domestic merchandise from the United States in 1929, according to the U. S. Bureau of Foreign and Domestic Commerce, were $5,157,409,000, of which crude petroleum and petroleum products contributed $531,173,000, or over 10 per cent. The value of exports of crude petroleum and petroleum products in that year is shown in the following table:

Crude oil	$37,800,000
Refined products	493,373,000
	$531,173,000

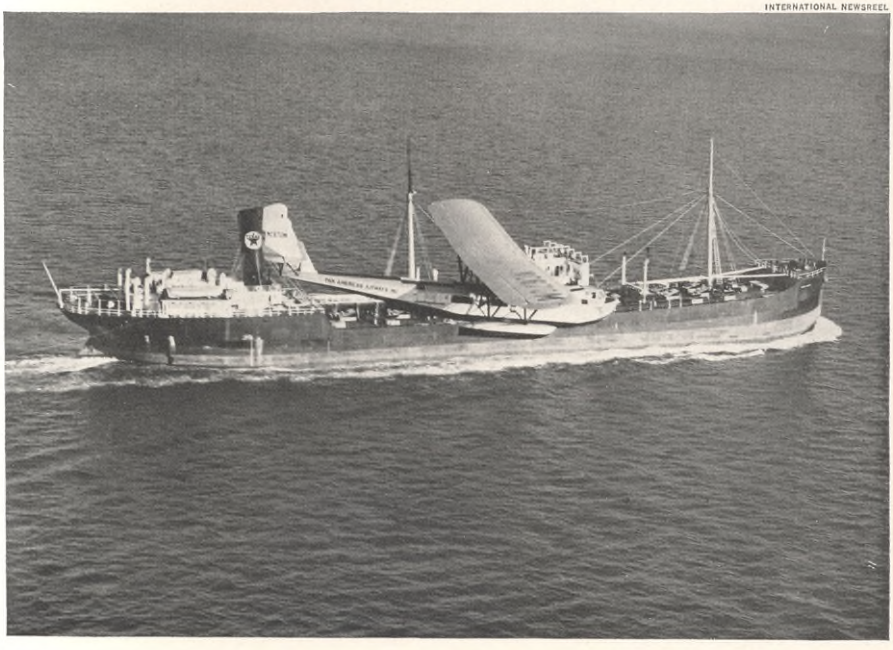
The value of the principal refined petroleum products exported in the same year is shown in the following table:

Gasoline	$266,904,000
Kerosene	83,788,000
Gas and fuel oil	37,200,000
Lubricating oil	102,899,000

Crude oil and each of its refined products are subject in export, as well as in domestic, commerce to distinctly different trade factors—the various products, although they come from a common source, being almost totally different as regards factors of supply and demand. Exports of crude oil are negligible as compared with total domestic production and imports. The bulk of the outgoing crude oil goes across the border by pipe line to supply Canadian refineries. The exportation of kerosene and lubricating oil consumes a considerable proportion of the total of both domestic production and imports. The exportation of gasoline, and of gas oil and fuel oil, is relatively small, according to latest figures available at present regarding this subject.

A Giant Pan-American Airways Plane Passing the Texaco Tanker "New Yorker" Hundreds of Miles from Shore During a Test Flight off the Florida Coast

INTERNATIONAL NEWSREEL



The Texaco Department of N. V. Ruhaak and Company, Soerabaya, Java

Globe-Trotting With Texaco

XIX—JAVA

By R. S. D'OYLY-JOHN

Local Representative, The Texas Company

THERE are few people who, when reading or hearing of the Dutch East Indies, truly visualise the extent of these possessions; and there are fewer still who know of the enormous potential wealth of this "Necklace of Tropical Jewels," as it has been so aptly called, which stretches in an unbroken semi-circle from the Malay Peninsula almost to the southern confines of the Philippine Islands.

This Dutch island empire includes, among thousands of other islands, those of Sumatra, Java, the Celebes, the whole of southern Borneo and part of New Guinea. If we were to place the islands of the Dutch East Indies in a line end to end, this line would stretch from Seattle, Washington, to Cuba.

At the present time, the brightest jewel in the "necklace," is the Island of Java, not because it is the richest, or because it is the largest, but because it is on this island that the Dutch Government has concentrated the greater portion of its efforts and energies to develop, and with truly astonishing results.

The general belief is that before very long the richest of all these islands will prove to be Sumatra, for here not only is the soil marvelously rich and productive, where one can grow almost any crop in the world, but it has been proved to be a highly mineralised island, on which gold, silver, coal, wolframite and last, but by no means least, oil, have been discovered and brought to a stage of economic production.

However, as the theme of this article is to be confined to the Island of Java, we shall have to leave the alluring prospects of describing these other islands for some other time.

The Island of Java, and its "appendix," the small island of Madura, covers some 50,000 square miles, and has a population of about 36,000,000 people, out of the total of about 60,000,000 which combines the population of the whole group of the Dutch East Indies, the area of which is approximately 733,700 square miles.

From these figures, it will be seen how densely populated the island is and to what extent agriculture has had to be carried to support so vast a population. In extent Java alone may be compared to the State of New York.

The mountain range which forms the backbone of this island is one long succession of volcanic

peaks and craters, about 300 in all, some dormant, others still quietly active, emitting masses of smoke and sulphurous vapors, while here and there may be found hot water geysers, mud-fulmaroles and other signs of subterranean volcanic activity.

On this mountain range, which at places rises more than 11,000 feet, are to be found a number of delightfully cool, healthy and pretty "hill-stations," one of which is always within easy reach of the large towns along the coast or on the plains, and where the tired business man may spend a pleasant, restful week-end away from the enervating heat of the coast.

These resorts are easily reached by excellent motor roads which abound all over the island and speak volumes for the work and keen interest that the administration has taken in developing the island, while the beauty of the scenery along almost every road in Java would vie successfully with any in the world.

With a good automobile, running smoothly on Texaco Golden Motor Oil, which can be purchased everywhere and anywhere on the islands, it is difficult to imagine a more delightful journey.

As one travels, one passes through miles of cool, well-kept rubber plantations, and great, green seas of waving sugar-cane, in which the tall chimneys of the modern equipped centrals stand out like sentinels of industry, and in many of which Texaco products do their share in helping to turn out millions of tons of sugar annually.

One of the Active Volcanoes in Java

A Balinese Funeral Procession

As one rises above the coastal belts, the scenery rapidly changes and we see around us tea estates and coffee estates, with their pretty, little, cool staff bungalows, built on the truly attractive Dutch style and covered with "Golden-shower," "Bougainvillia" and other attractive creepers, while here and there one passes through vast rice fields, terraced with an ingenuity which holds one spellbound, and in which the primitive schemes of irrigation are worthy of high engineering skill. Tobacco, maize, groundnuts, groves of coconuts, in fact almost every tropical and subtropical crop follow in riotous confusion and abundance. Finally, as one reaches the highlands, one is surprised to find natives stopping the auto to offer baskets of great, fresh, luscious strawberries and raspberries, or glorious orchids, for sale for a few cents.

It is scarcely necessary to speak of the flowers of Java, as the island is famed for its wealth of flora, not only tropical and subtropical but also purely European, such as hollyhocks, asters, daisies, azaleas, carnations, chrysanthemums and almost every variety of roses, and a sight of some of the beautiful gardens passed gives the traveler a very homesick feeling.

It would be impossible to generalize on the climate of the island, as the variations are so extreme. In the coastal regions and lowlands, it is hot and

humid, and the temperature averages somewhere from a maximum of 90 degrees Fahrenheit in the shade at midday, to 78 degrees minimum at night. On the other hand, in the highlands and the mountain resorts, it ranges from 80 degrees in the shade at midday to as low as 50 degrees at night, while at some points it often freezes at night.

However, as all the industrial centers are, and consequently almost all the motoring is done, on the lower reaches and coastal areas of the island, extreme variations of temperature need not concern the motorist so long as he follows the Texaco Chart for his lubrication, in the compilation of which all these conditions have been taken carefully into consideration.

(Above) Street in Semarang, Showing the Canal Running Through the Town

This Lovely Scene is in the Famous Botanical Gardens of Buitzenborg

★

(Below) Two little Dancing Girls of Java Before the Ancient Royal Cannon

The only important mineral assets of Java are the great tin mines of the small islands off Java (Billiton and Banka). Except for some petroleum produced in the eastern district, Java is not so well blessed as some of the other islands of the archipelago.

The Texas Company, since January, 1921, has been ably represented in the Dutch East Indies by the well-known firm of Ruhaak and Company who for more than 50 years have been doing business in these islands, and it is due mainly to their efforts that a satisfactory outlet for Texaco lubricating products has been established.

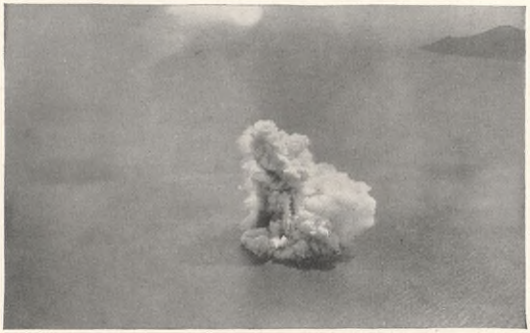
The natives, Javanese, are a docile, happy race, polite to the stranger and with a keen sense of humor, while as domestic servants, they are second to none. Someone once said that the Javanese were a "dying race" but as one passes through the neat, well-kept villages, each with its well-filled canal of water, one is not inclined to agree with this statement, judging from the crowds of happy, care-free children playing and running about the streets.

The history of the Javanese as a people is lost in the dim ages, and it is now generally accepted that they are the remains of a very ancient civilization which invaded these islands many thousands of years ago by way of India, Ceylon and Malaya.

The island is wonderfully rich in interesting old ruins of ancient temples which, like the famous temples of Angkor in Siam, and which they resemble to a marked extent, definitely speak of early Hindu influence superseded and softened later by the

(Above) An Archway of Trees Along a Street Near the town of Cheribon

of its great chain of volcanoes, with their safety valves still gently active. One can sit on the veranda of a mountain hotel and gaze on anything from one to 10 of these "nature's monster chimneys." True, most of them are "dead," but who can say for how long? Recently, just off the eastern shore of Java, a few miles from Batavia, and close to the great volcano of Krakatoa (whose eruption in 1883 shook half the world and was felt in India and Africa, and the ashes and smoke from which put the town of Bata-



K. N. I. L. M. (ROYAL DUTCH AIR SERVICE)

The Birth of an Island: The Smoke and Flames Rose 3,000 Feet High

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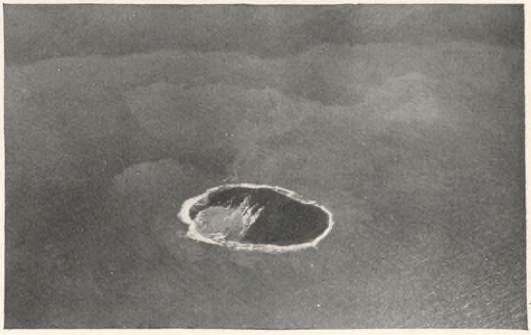
(Below) The Island Emerges from the Sea—Note the Boiling Water Around It



Buddhist. The writer was very much struck by the similarity of the architecture not only to some of the ancient temples of Ceylon and Southern India, to the great ruins of Angkor in Siam but, what is more remarkable, to remnants of architecture in some of the old tombs and temples in the Island of Madagascar.

The story has never been written, but if it ever should be, one would not be surprised to find that these ancestors, from whom the true Javanese sprang, and who thousands of years ago in great hordes overran, invaded and conquered Burma, Malaya, Siam and Java, came from the same stock as those whose vast empire reached to the shores of Madagascar and the African coast, whose descendants are now known there as the "Hova" people, and whose facial characteristics certainly set them as entirely apart from their negroid neighbors of Africa, as we ourselves are.

Who knows but that this once mighty empire may not have been in some way connected with the mythological lost empire of Atlantis which stretched even to the shores of North and Central America, and where we are still endeavouring to solve the riddles of the Maya relics of ancient Yucatan civilization?

The scenery of Java is second only to the wonder

via into black darkness for more than three days), a submarine volcanic eruption occurred and a new island was formed 6600 feet high and several acres in area, which has since disappeared.

Java's volcanic rocks cover about 28 percent of the island. Most of the volcanic cones lie along faults parallel to the island's axis, while lava and ashes are found nearly everywhere.

The whole country bears witness to the travail and agony it passed through in its birth from the sea, and forces one to stop and think how thin must be the earth's crust in this vicinity.

OUR WHO'S WHO

HAROLD L. STRADER, whose article describing the drilling of straight holes appears in this issue of THE STAR, received the early part of his college education at the University of Wyoming, in his native state, and was later awarded a master's degree at Columbia University.

A year and one-half with the Huastecka Petroleum Corporation, spent in geological exploration and production engineering in Mexico, and about a year of petroleum engineering work in California with the Union Oil Company, preceded his employment by The Texas Company in February, 1929. He spent the rest of that year in Santa Fé Springs, New Mexico, which at that time was in the midst of a deep drilling campaign, and was then transferred to the South Texas Division in the capacity of Petroleum Engineer.

ROBERT E. HOWARD, author of "The Ghost of Camp Colorado," appearing in this issue, lives in Cross Plains, Texas. He is a well-known writer of fiction and feature articles and many of his stories have appeared in the magazine *Weird Tales*.

FRANK M. HAWKS, who wrote his impressions of Will Rogers for readers of this issue of THE TEXACO STAR was recently promoted from the post of Superintendent of the Aviation Division of The Texas Company to that of Aeronautical Advisor. Articles concerning his work for the Company have appeared many times in previous issues and in the words of Will Rogers, "any two towns that's got air between 'em, he holds th' record."

IF the well-lubricated, smooth-running machinery of our present age were to stop suddenly for any reason and refuse to run again, twelve billion slaves would be needed to carry on the work that those machines were doing. This is the estimate of Joseph W. Roe, Professor of Industrial Engineering at New York University. Professor Roe believes that for every man, woman and child in this country power is generated equal to that of 100 slaves.

To build the Great Pyramid in Egypt 100,000 slaves labored for 30 years, but with machines the Panama Canal was built in one-third that time with a comparatively small group of laborers busy with the project.

OIL MEN ONCE BELIEVED—

THAT raw crude oil taken internally would cure gout, lumbago, rheumatism and all ills of the body. Today petroleum products are widely used as medicines, but most of them are meticulously refined, filtered and purified.

APPLE BLOSSOM

(Continued from page 24)

Blossom Balls in various public places and visitors are taken on tours of the orchards in full bloom.

The principal parade takes place on the second day, and as homage to "Queen Shenandoah" and her court of princesses an elaborate pageant is staged, setting forth the historical development of the Shenandoah Valley and depicting the growth of the apple industry. On this day there are airplane races, receptions, more tours of the apple orchards, the Queen's Ball and other Apple Blossom Balls. The United States Navy Band and also the bands of various military academies of the region participate in the programs of both days.

Apple blossoms, of course, are the chief decoration used for floats in the parades, which represent historical incidents and different divisions of the apple growing, packing and shipping industries and the products and means of transportation used for the fruit that has helped to make the Shenandoah Valley famous.

MOUNT HOPE BRIDGE

(Continued from page 4)

54 feet below water, and ride on a roadbed designed to bear 6,800 pounds to the square foot. The span is suspended from two 11-inch cables that contain 2,620 miles of wire. A 150-foot girder of the bridge was the longest ever made.

Under the charter of the Mount Hope Bridge Company, the state may take over the bridge five years from the date of its completion, or at intervals thereafter on a cost-plus basis. Already plans have been suggested for the acquisition of this $3,879,820 bridge, and for doing away with tolls.

The tourist finds the motor drive across Mount Hope Bridge to Newport a picturesque one, since it joins the Ten Mile Drive in that city. All those who visit "the social capital of the world" find the bridge a structure of beauty as well as a convenience.

A fire has burned 18 years under the surface of Rikers Island near New York City, where refuse is dumped.

A. S. ALSTON

ALBERT S. ALSTON, Assistant to the Vice-President and General Manager of The Texas Company (California) died suddenly on March 3 at his home in Los Angeles. Although he had been in failing health for several weeks, the news of his death came as a shock to his friends and associates.

At the age of 18 Mr. Alston entered the service of the Company in 1908 as a stenographer in our Houston Offices. A few months later he was transferred to Port Arthur Terminal as stenographer and telegraph operator, which post he held until January 1, 1909, when he was made a timekeeper. From October 4, 1909, to July 1, 1919, he served as stenographer and secretary to Mr. R. C. Holmes, first at Port Arthur, Texas, later at Houston and finally in New York City.

Mr. Alston was next made Assistant to the Manager of The Texas Company of Mexico, with headquarters at Tampico, where he remained until May 1, 1922. He then served six months as an operating auditor out of the Houston Offices, became Assistant to the General Superintendent of Port Arthur Works and returned to the Houston Offices for a short period as Traveling Auditor.

On April 1, 1926, Mr. Alston was made Assistant to the President of The Texas Company, which position he held until January 1, 1929, when he was transferred to Los Angeles as assistant to the Vice-President and General Manager of the California Company. He remained in this capacity until his death.

He leaves his wife, Mrs. Kathryne Cushing Alston; one son, Albert C. Alston; his mother, Mrs. Emma Alston, of Pasadena, California; one sister, Mrs. Mary Alston Allen; and two brothers, Tom, of Los Angeles, and Edwin, of Dallas, Texas.

Mr. Alston was one of the most popular members of the organization, numbering his friends by the hundred throughout the Company. To his bereaved relatives officials and employes alike offer their sincere sympathy.

For the benefit of many school children of Los Angeles who are unable to travel into the country to see farm animals, the Board of Education of that city recently arranged for a truck to carry a cow and two calves into the city. It was discovered that 25 percent of the children in the schools had never seen a cow, and 50 percent had never seen a calf.

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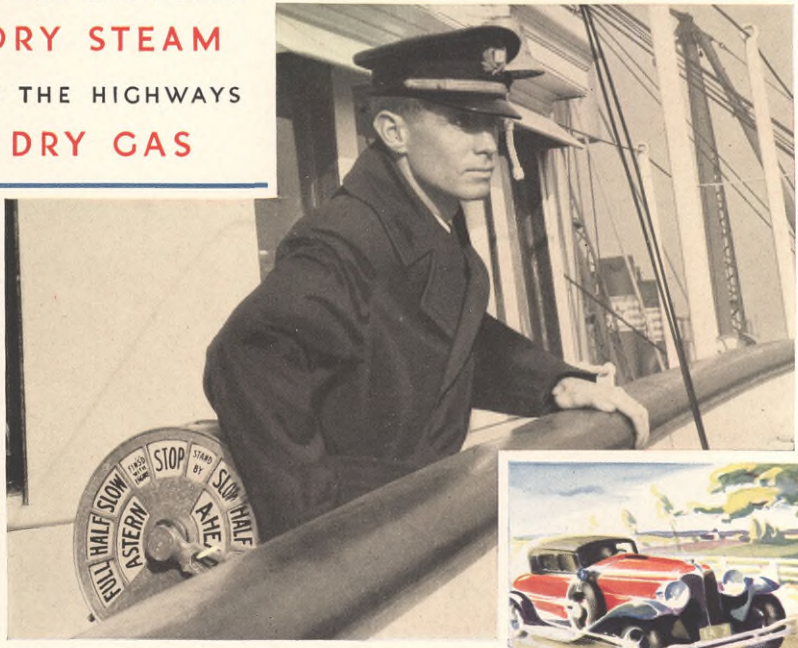

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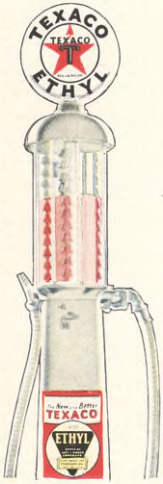

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