

THE TEXACO STAR

SUMMER 1957



IN FRANCE—CHATEAUX, THE HARVEST, A SEARCH FOR OIL...





ONE LITTLE



TWO LITTLE



THREE LITTLE INDIANS



FOUR LITTLE



FIVE LITTLE



SIX LITTLE INDIANS



SEVEN LITTLE



EIGHT LITTLE



NINE LITTLE INDIANS

TEN LITTLE



THE TEXACO STAR

CONTENTS OF VOLUME XLIV • NUMBER 2 • SUMMER 1957

THE FIND AT FOUR CORNERS	2
WHEN YOU FIND OIL, YOU START GOING OUT OF BUSINESS	8
CHANGING LANDSCAPE IN THE GARDEN OF FRANCE	
THE LAND	11
THE CHALLENGE	12
THE RESPONSIBILITY	14
THE GROWING IMPORTANCE OF INTERNATIONAL OIL	16
by AUGUSTUS C. LONG	
NIGHT FREIGHT	18
ALASKA HIGHWAY	22
BRIEF AND POINTED	24

INDIAN BOYS

lined up in the play yard of the Shiprock, New Mexico, boarding school for Navajo children look about as self-conscious as any group of grade-schoolers would who have been pulled away from their games to satisfy a photographer's whim. Right now they're probably more interested in leapfrog than learning. One day, though, they'll be as pleased as their parents that oil has brought new educational opportunities and new wealth to the proud but traditionally impoverished Navajo nation. The bustle of activity in the Four Corners, on the Navajo reservation (see *The Find at Four Corners*, Page 2), will mean better schools for tens of thousands of Indian boys and girls. Better roads, too, and first-rate hospitals. It's sure to bring more jobs for Indian fathers, irrigation for sun-bleached Navajo grazing lands. Navajo leaders today look hopefully toward a brighter future made possible by revenues from petroleum operations going into the tribal treasury. The Navajo kids here very winningly symbolize one important cultural gain those revenues have already helped to create.



THE COVER: One of France's famous châteaux, the Castle of Maintenon is among the historical riches of the Paris Basin where extensive exploration for petroleum reserves (see Page 11) is now under way. The period from the 12th to 17th Centuries saw the restoration and completion of this château, which Louis XIV acquired for his consort, the Marquise de Maintenon. . . . South of Dreux, the harvesting of a French wheat crop is facilitated by mechanized equipment. Increased mechanization of farming and rapid industrial growth are contributing to substantially rising demand for petroleum products in Western Europe.

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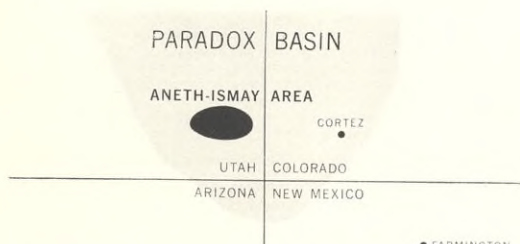
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THE FIND AT FOUR CORNERS



*At trading posts and
airport lounges the talk's the same:
the oil under Navajo land
may be the biggest discovery in years*



Vast emptiness of the Aneth-Ismay area is shown by this wide-angle photo. Barely visible in circle below horizon at left center is one of many drilling rigs which have moved into the lonely Navajo reservation since last year. The clear air and unobstructed views here make distance hard to judge, but it is probably about 50 miles from photo's foreground to Sleeping Ute Mountains in background. . . . Smoke from its Diesel exhaust stack locates a tank truck loaded with crude oil on a road built by oil companies. Cutting through the hilly region, this road provides only route for crude oil shipment. Sometime next year, a pipe line now under construction will replace tank-truck fleet.

They say there's more real estate in the air out there, during the Summer, than there is on the ground. On a day like this you could almost believe it." Squinting across 40 miles of dust-smoked plain from his perch on a drilling platform, the roustabout was talking about the Aneth-Ismay area as he poked into his bag lunch.

Aneth-Ismay, a 20-mile-long football-shaped portion of the enormous Paradox Basin (*see map*), is a booming new oil-producing site many experts predict will become one of the most important areas for reserves in this country within the next few years.

Just a short gallop from the roustabout's lunch spot a stone marker tells the infrequent traveler he is at the Four Corners—where the borders of Colorado, New

Mexico, Utah, and Arizona join. What the marker doesn't say is that the Four Corners region today is the scene of a search for oil by every major producer.

Until two years ago, the Four Corners was a remote stretch of mesa-dotted wasteland most travelers tried to avoid. But in March of last year Texaco completed its No. 1-C Navajo well, drilled after months of geological survey, and announced that it had brought in what looked like a substantial producer. Within a few weeks, this sleepy hollow scooped out of the badlands was jolted awake by the clattering arrival of supply trucks carrying portable drilling rigs, drill pipe, tubing and casing, logging instruments. The boom was on.

At Farmington, New Mexico, some 90 miles south-east of the Aneth-Ismay area, evidence of an oil rush is

THE FIND AT FOUR CORNERS



First step in seismic survey at Four Corners is staking out of test area.



Seismic crew member lays cable used to set off explosive in the shot hole.



At explosives truck, charge is readied... the plume from a seismic shot marks another deep-down inspection of Four Corners possibilities.



easy to find: population has jumped from 3,500 to 15,000 in the last year-and-a-half; trailer camps crowd in on the eight-block business district; motel space is almost impossible to get, unless one makes a reservation weeks in advance. Office space that for years went begging has been snapped up by drilling supply companies, civil engineers, consulting geologists, and operators flooding in from all over the nation.

Cortez, Colorado, another booming community in the Four Corners region, is going through the same sort of hectic growth. Deposits in the Cortez bank have increased by \$2 million since 1955. The ticket agent at Cortez Airport says that until a year ago there had never been a two-engine plane on the runways. Now the aprons are crowded with private aircraft of all sizes, and Frontier Air Lines eases flights in and out of the Cortez canyon daily—most of the arrivals bringing oil field supplies and equipment.

The Aneth-Isamay trend (so called by geologists because it represents an alignment of similar geological characteristics) runs through the Navajo nation—biggest single Indian reservation in the United States—and what oilmen find under places like Yellowjacket, Ruin Canyon, Recapture Creek, Chimney Rock, and Montezuma Wash will affect the Navajos at least as much as it affects the petroleum industry. There are some 80,000 Navajos on the reservation; revenues from oil stand to bring them new schools, modern hospitals, new roads, sorely needed irrigation, better jobs.

Currently, Texaco is working 22 wells in the Four Corners area, and shipping its crude oil production to a Salt Lake City refinery. Although plans have been made by a Texaco affiliate for a pipe line which will start carrying crude out of Aneth-Isamay to the Gulf Coast within the next 18 months, the oil being produced now is trucked out—over some of the West's rawest roads. A tank-truck fleet grinds up and down the bulldozed trails from Aneth to Thompson, Utah, 24 hours a day, hauling Aneth crude to the Thompson rail center for transshipment to the Salt Lake City refinery.

Drilling costs are high in the Four Corners now: the average well runs about \$150,000. This is due mostly to the lack of good roads, which makes hauling equipment and supplies in and out of the field inordinately expensive. As roads are improved, drilling costs are expected to drop to a more typical level. Even at \$150,000 a well, though, producers in the area say the crude being found (it's a high-gravity Pennsylvanian grade) justifies higher-than-average drilling expenses.

In the meantime, successful wildcatting in the area is being carried out at a rate that promises an unusually high yield from the Aneth-Isamay reserve. Out of the last six wildcats Texaco has drilled here, four were completed and are considered good producers.

Taking a break in the shade of the Hatch Trading Post, a field foreman sums up the optimism that runs through the Four Corners:

"This is the first time I've seen it," he drawls, "where an operator is so confident he hauls in a Christmas tree

and gathering pipe and all—before he even brings the oil in.”

Although the Aneth-Ismay trend now is only about 20 miles long, new drilling by Texaco and other producers during 1957 probably will push it westward. There seems to be nothing to stop it from moving into Colorado on the east side. Reserves estimated to date make Aneth-Ismay a major find.

Texaco geologists first began exploring the barren Four Corners outcroppings in earnest about three years ago. What the Texaco crews saw in the prehistoric anticlinal formations that corrugate the Paradox Basin floor convinced them there was a very good prospect of a significant discovery in the area.

On the basis of this surface survey, the Company began buying leases from the Navajos. And in March of last year, Texaco brought in No. 1-C Navajo to touch off the Four Corners boom. Texaco geologists are quite proud, incidentally, that drilling was initiated on the strength of surface observations without the customary follow-up of seismography.

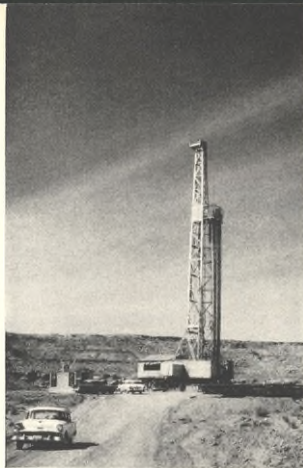
For the men working in the Aneth field, life is not so much rugged as it is lonely. Distances between home and work, even the stretches between rigs in the field, are immense and desolate. Texaco's Aneth drilling foreman figures he usually drives about 175 miles a day—the entire field would take him about 300 miles.

Nearest town to the field is Cortez, and the auto trip from Cortez to Aneth operations means two hours of jouncing through McElmo Canyon, past the Ismay Trading Post, across washes swollen by Spring's flash floods or bone-dried by Summer sun, into the vast Paradox Basin in which Aneth field has been brought to life.

In the Winter months, jeeps and half-tracks are used to get around in the field. Nothing else can muscle through the heavy snows that pile up on the roads. Even during the dry months of Summer, crews use stock cars with truck transmissions—and safety belts are standard equipment in every Company auto. (Fly into the area from Denver, to the north, or from Farmington, to the south, and you'll notice that the "Fasten Safety Belts" sign over the forward compartment of your plane never goes off. No one really *expects* trouble; but even the professionally cheery airline prefers to be ready for a forced landing on the ragged mesas that surround Aneth, or the bumpy rides occasionally caused by strong updrafts from the basin bottom.)

Once in the field, workers are about as removed from civilization as anyone is likely to be in this country. There is almost no electricity, and the only radios are short-wave sets installed in Company cars to keep field foremen in touch with operational headquarters at Farmington. Running water is scarce: artesian wells are drilled to provide water for drilling, and are given over to the Navajos when a well is completed. When an underground spring isn't found near a drilling site, water is trucked in.

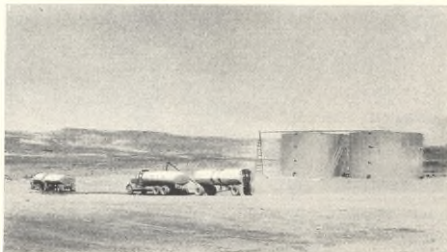
Until two years ago, the Four Corners was the most remote section in the nation. Even now, there is virtually no tourist traffic. The oil crews working here live



Texaco currently is working 22 wells within the Aneth-Ismay area.



Helping set up tank battery, Navajo (center) is one of many working in fields.



At a Texaco tank battery, tank truck takes on load of crude for ultimate delivery to Utah refinery. (Below) Two oilmen passing on their field rounds stop to exchange drilling news and stretch car-stiff legs; hard-driven autos use truck transmissions.



THE FIND AT FOUR CORNERS



Trading posts become civil courts when Indian agents arrive to settle land ownership questions. Navajos here await outcome of a hearing.

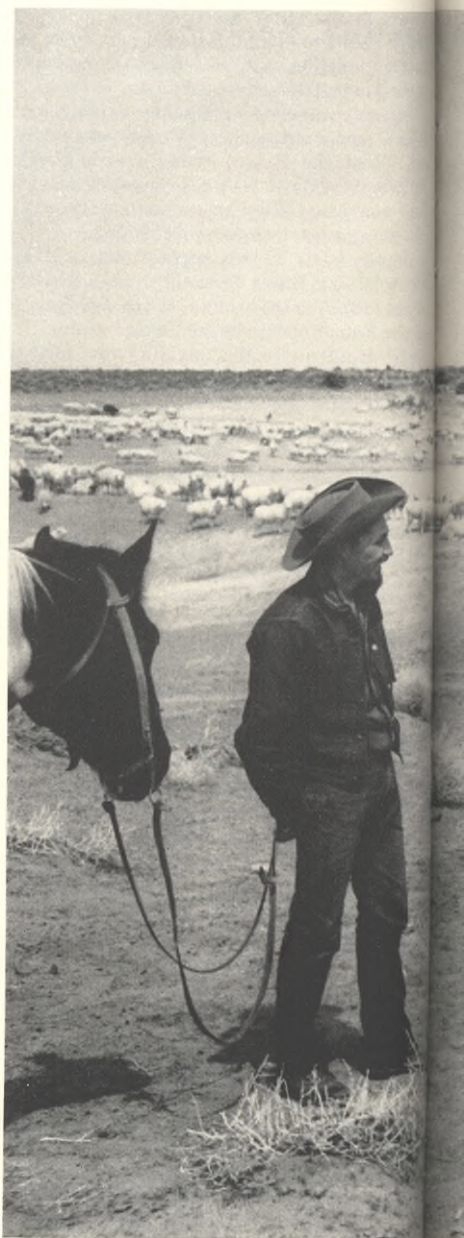
a life cut off from city advantages near other major producing areas like the Louisiana coastal fields.

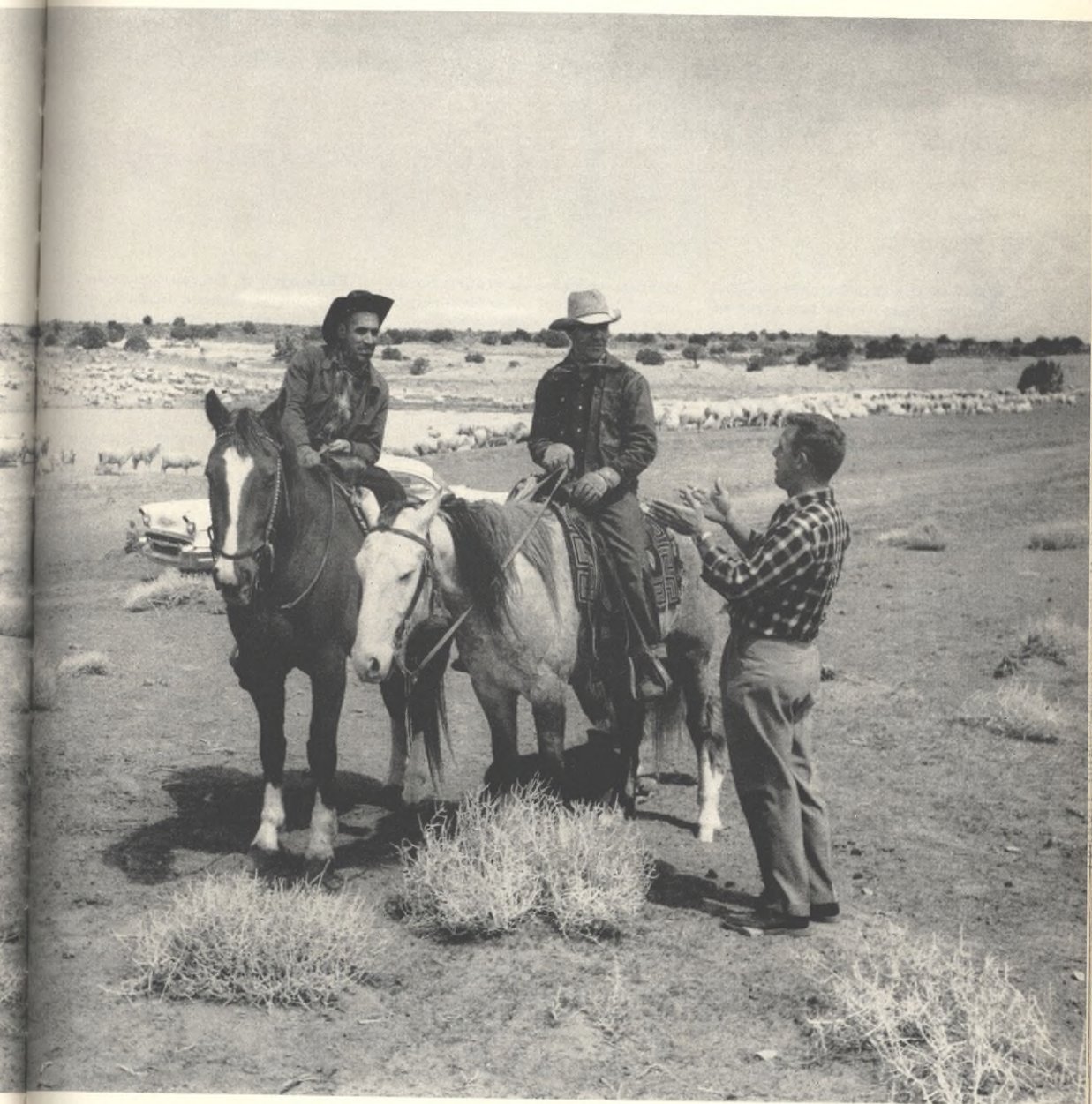
Still, the men at Aneth-Isamay allow, you may get lonely but you shouldn't get lost. "Just take a look at which way the door of the nearest Navajo hogan is pointing and you'll know which way is east. Then you'll know which way town is." Old Aneth-Isamay hands have picked up some other intriguing facts about Navajo customs. They know, for instance, that a Navajo never builds his hogan on a hilltop. That's where the wind-people live, and they cause headaches. Another thing, the most expert Navajo weaver never will turn out a flawless rug. If his product is perfect, evil spirits cannot escape. He will purposely drop a stitch to leave an exit for potential troublemakers.

Working in the Four Corners is strange and wonderful for most Texaco employees, the majority of whom transferred to this territory from the Panhandle of Texas and Oklahoma. In Cortez, the trout fishing in Montezuma Creek is good and family picnics mean a 20-minute ride to the breath-takingly beautiful Mesa Verde. The weather's hot in Summer (85 to 90 during the day), and cold (it gets down to 15 or 20 below zero) in Winter. But always dry.

This year, drilling activity in the Four Corners is expected to double over last year's rate. By the end of 1957, Texaco alone will have from 35 to 40 wells operating, and activity by other producers will have changed the once-silent reservation into a clanging, bustling new oil center. For Texaco and the rest of the petroleum industry this will mean new crude reserves. For the public it will mean new assurance of ample petroleum supplies. And for the Indians, it is bound to mean a change from poverty, illiteracy, and disease to new wealth in the tribal treasury, proper schooling, and the eventual elimination of the illnesses poverty invites.

There may be more real estate in the air than there is on the ground in the Four Corners, but everything points to the fact that there is also a vast pool of petroleum wealth beneath the ground. The importance of last year's discovery well seems sure to grow as the Aneth-Isamay trend is further defined by drilling. •





On a remote road in the Aneth-Ismay area, Navajo herdsman driving a flock of 1,600 sheep to pasture stop to chat with Texaco's assistant drilling foreman. Where possible, he sees that artesian wells dug to provide water for drilling operations are turned over to Navajos after drilling is completed.

Depletion provisions recognize what petroleum producers know—

When you find oil, yost

You're a wildcatter. For the last three years you've had a run of tough luck—one dry hole after the other. You have a desk full of core samples, a lot of red ink in the ledgers to show for your troubles, and that's all.

But you keep on checking maps and renting rigs and sinking new wells, stalking that elusive pool of oil which will put you in the black. When you hit you're going to hit big. Or at least that is what you keep telling yourself and your wife.

Then one day you *do* bring one in. Not a really big one, but a nice producer. Now you're in business!

Wrong. Now you start going out of business, just as fast as you pump your crude out of the ground and sell it. Every barrel of oil that flows out of the wellhead brings you closer to the day you'll have to close up shop. Unless you've turned up another reserve in the meantime, that is.

One fact about petroleum production overlooked by many people is that the oilman constantly is liquidating his capital. His crude compares with a manufacturer's plant and equipment, which are the capital assets of the manufacturing industries. Unlike the manufacturer, though, he cannot predict what replacement will cost, with any certainty.

The oil producer, if he is able to replace his exhausted reserve at all, has no control over the time when new reserves will be discovered; their finding costs; or their ultimate values.

Wisely, Congress has recognized that oil exploration and development are extremely risky undertakings. And, also wisely, back in 1926 a provision was written into our Federal income tax laws that provides an incentive to encourage a producer to sustain a string

of losses and keep on drilling for another winner. It is generally known as the *percentage depletion provision*.

The percentage depletion provision, applied to petroleum production, allows a producer to deduct, in computing his taxable income, up to 27.5 per cent of gross income from an individual oil property—limited to an amount not more than 50 per cent of the net income from that reserve.

The appropriateness of the depletion concept for extractive industries should be obvious. Similar provisions have been made for coal, copper, sulphur, uranium, and others in this category.

Although each has been handled differently, because of differences in operations, one thing is true of all of them: their depletion provisions are not special privileges. The provisions are carefully formulated to encourage men in hazardous businesses to take risks in the interest of the nation.

In spite of the clear reasons for a depletion provision for petroleum producers, bulwarked by the fact that it has been an accepted part of our income tax laws for more than three decades and is generally regarded as one of the most important single factors behind this country's impressive record of petroleum production, percentage depletion remains a subject of controversy among politicians.

But since it was first passed, the depletion formula has been re-examined many times, by many individual members of Congress and various Congressional committees. Invariably, Congress has reaffirmed the formula's necessity and practicality.

When the facts are looked at carefully and objectively, the arguments *against* the percentage depletion provision turn out to be fallacies. Here are some examples:

Fallacy: "If the market price for crude oil were raised to make up for the high risks of exploration and development and the depletion provision abolished, there would be no adverse effect on the national economy."

Fact: In the first place, if producers were deprived of depletion allowances today the average price of crude oil would have to be raised substantially above current levels. Should a price rise such as this occur, the nation's increasing dependence on foreign petroleum reserves would be sharply accentuated.

What's more, the elimination of the depletion provision would almost certainly drive many producers into less risky business fields. They would be more and more inclined to sell a new producing property rather than develop it, and to invest their funds in less speculative ventures. Exploration would be seriously curtailed; oil supplies would become both much more costly and much less abundant.

Discussing the question of price alone as an incentive, the President's Materials Policy Commission (Paley Commission) in a 1952 report concluded: "Because of the erratic behavior of minerals and the long interval between initial investment and yield from production, the Commission concludes that incentives provided through the price structure are unlikely to bring about enough exploration and development to meet national needs for domestic production. The present structure of minerals taxes includes strong and desirable incentives to explore for, develop, and produce minerals of importance to the nation's growth and security."

Fallacy: "The 27.5 per cent deduction is too high; a more reasonable rate would be around 15 per cent."

Important going out of business

Fact: A basic premise of the current depletion provision is founded on the fundamental tax principle that income taxes should fall on income only—not on the capital that provides income. Crude oil is the “capital” that provides a petroleum producer’s income. The depletion provision was created to allow for the tax-free return of the capital value of oil as it is produced. After long experience and much study, the 27.5 figure was arrived at as the one which most closely approximates the level of depletion that permits the producer to recover the capital value of the asset in the process of liquidation.

In practice, the 50-per-cent-of-net-income limitation which is part of depletion laws generally gives a producer a deduction of less than 27.5 per cent.

Fallacy: “The depletion provision allows oil companies to make inordinately high profits.”

Fact: Petroleum profits have not been high in comparison with profits earned by other businesses.

The year 1956 was one of the best, if not the best, in the petroleum industry’s history. But the return on net assets in the industry, according to one recent survey of more than 1,840 manufacturing companies, was 14.7 per cent. This put it not number one, two, or three, but number 14 out of 40 industrial groups.

Fallacy: “The depletion provision encourages too much exploration and wasteful over-production.”

Fact: Critics who make this claim have not said the oil industry is making too much money. What they do say is that it spends too much on exploration and development. Apparently, they would like to see a curtailment in exploration for the development of new reserves. In the face of expert estimates of the world’s future energy require-

ments, this attitude becomes startling.

The President’s Materials Policy Commission in 1952 predicted that the nation’s requirements of petroleum would be 13.7 million barrels a day by 1975. This is a conservative estimate, representing an increase of only 57 per cent during the next 19 years. If such an increase were to be met from domestic production and adequate oil reserves maintained, the industry would have to find in excess of 93 billion barrels of additional reserves over the next 19 years, or an average discovery rate of over 4.9 billion barrels annually. As the annual discovery rate from 1946 through 1956 was only 3.65 billion barrels, the urgent need for continuing the depletion incentive should be clear.

Earlier this year the American Petroleum Institute reported that although net results of crude oil exploration showed increases in the amounts of new oil discovered, 1956 marked the third consecutive year that net additions to proved crude reserves declined.

Fallacy: “Percentage depletion is not desirable from the standpoint of national security.”

Fact: National security has demanded that we have on tap, in the ground, a substantial domestic reserve productive capacity. Obviously, this can be continued only through intensified exploration and development. And the 27.5 per cent depletion provision has for the past 30 years been one of the most important stimuli to the discovery and development of domestic reserves.

In its report to President Eisenhower early in 1955, the Cabinet Committee on Energy Supplies and Fuels Policy stated: “An expanding domestic oil industry, plus a healthy oil industry in friendly countries which help to supply the U.S. market, constitute basically im-

portant elements in the kind of industrial strength which contributes most to a strong national defense.”

Percentage depletion encourages the discovery of oil needed to make the economy and the military forces of the nation strong. Over a long period of time the domestic oil industry has found and developed an average of about 1.5 barrels of oil for every barrel produced. This is why it has been possible in past years to produce increasing quantities and still maintain a reasonable relationship between reserves and production. Incentives based on present tax provisions are essential to assure continued discovery and development of domestic oil reserves in order to meet still larger demands in the future.

• • •

There are other arguments opposing the depletion provision, of course. The petroleum industry is a large and successful one: that alone makes it an obvious target for attack, and the depletion laws have been attacked at many levels.

But the basic facts hold true.

The productive potential of an oil or gas well declines inexorably and persistently until recoverable reserves are entirely depleted. Furthermore, the producing capacity cannot be kept up indefinitely by ordinary maintenance expenditures, as in manufacturing.

So the search for new reserves must go on without interruption simply to replace the constantly shrinking productivity of fields we already have.

The percentage depletion provision, formulated by Congress, helps provide the oilman with the funds he needs to keep up that search. It helps him stay in business, even though each time he brings in a well and begins selling his crude oil—he is, in effect, putting himself out of business.



Changing Landscape in the



The Maid of Orléans.

Garden of France



Chambord, glory of the Valois reign.

✿ THE LAND

In the historic Valley of the Loire, famed for its châteaux, farms, and vineyards, there's a new focus of interest—an intensive search for an additional source of oil

Incurious cattle grazing the fields of France's beautiful Loire Valley in the Paris Basin barely stir at the gentle rumblings in nearby pastures. But Texaco management and its French partners are keenly interested in the quest that breaks the quiet.

Seismographic detonations set off by geophysical exploration crews of Fropey—a French company, France-Outremer de Prospections & Exploitations Petrolieres, S.A.F. (FROPEX), in which The Texas Company, through its affiliate California Texas Corporation (Caltex), has an interest—have been sounding in the Valley since 1955. If the data they provide should help find the oil hoped to lie underground, an exciting new page will be added to the history of a storybook land.

Here in 1429, a teen-age peasant girl made fearless by visions of freedom for her people announced herself in the court of the man who was to become Charles VII, at Chinon: "Noble Dauphin, I am called Joan the Maid." . . . In the château of Chambord, Francis I lavishly entertained Charles V. . . . Leonardo da Vinci spent the last years of his life in Amboise. . . . Perrault was

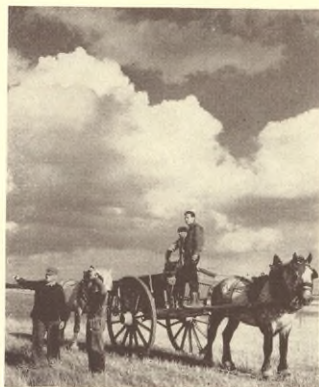
Beyond the slender poplars standing beside the watercourse in foreground, dairy cattle placidly graze in pasture.

inspired to write *Sleeping Beauty* by the fairyland beauty of the Loire. The Valley of the Loire is called the Garden of France, with good reason. It is a verdant, gently configured region of farms, vineyards, and orchards whose yields are eagerly sought by Paris chefs and housewives alike. It was a cradle of French royalty; it remains a breath-taking souvenir of the Middle Ages and Renaissance.

As far back as 1936, the possibility of commercially attractive oil deposits in the Loire was established by a Texaco representative. War, and postwar negotiations, delayed actual exploration until two years ago; but now Fropey teams jounce in jeeps over the fields once clank-

ing with the armor of Saint Joan's followers. If the oil they hope lies beneath those fields is found, France stands to achieve considerably greater self-sufficiency in her petroleum supply.

The search, though, is not confined to France alone. With demand for petroleum steadily increasing on the Continent, oil companies—including Texaco affiliates—are also vigorously exploring in other European and Mediterranean countries.



From a vantage point on paysans' wagon, Fropey permit man studies an area where a seismic survey is to be made.



Last December in the village of Sennely, about 20 miles southeast of Orléans, a monument to the future took its place alongside Sennely's many memorials to the past. The slender drilling mast of an oil well, first to be spudded-in by Fropex crews in the Paris Basin, was raised against the Sennely countryside on December 17. By the end of this year, Fropex hopes to have several more wells spotted over French territory which has been charted as promising.

Exploring in the Paris Basin is slow work, because there are few rock outcroppings to give exploration crews surface clues to underground possibilities. Sector by sector, seismic parties must work across the

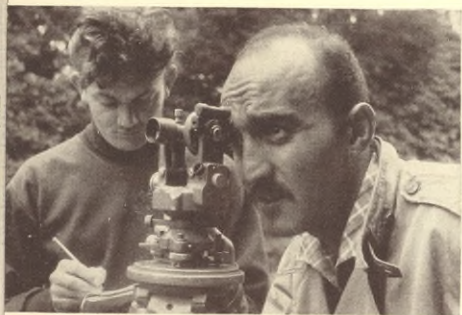
❖❖❖ THE CHALLENGE

Does oil lie beneath the fields where

Joan of Arc once led her armies?

Petroleum explorers in the Garden of France

are striving to find the answer



In a sheltered glade within the Fropex concession area, a surveyor takes rod reading and assistant jots down notes.

Members of the shot-hole drilling crew tighten connection on kelly joint of this small-scale rotary drilling outfit. Holes for detonating explosive are drilled to depth of about 60 feet.

Not far from Orléans, in a stubble-covered field that has yielded a good harvest of wheat, a farm worker watches drilling progress of a shot-hole rig. The driller's helper is shoveling cuttings out of the portable mud pit.



land Fropex has been permitted to explore—thoroughly profiling each new area before recommending another well site. It probably will take two more years before this surveying is completed.

Interestingly, the same limestone that caused the Loire Valley to become celebrated for its châteaux may make it famous for its oil.

Almost circling the Loire area is a rim of oolite, a porous rock with a granular texture that resembles shad roe. Easy to cut and shape, this limestone was used almost exclusively in the construction of the elaborate châteaux built centuries ago by feudal lords. To tourists, oolite makes a charming castle. To geolo-

gists, oolite means a very good bet for oil exploration.

Even the most careful study of an area cannot, of course, assure that oil will be found. In spite of all the technological skills developed by oilmen, actually finding petroleum remains a chancy endeavor. But Fropex management has good reason to hope the Paris Basin may yield substantial amounts of petroleum.

The citizens of the region are watching the progress of the Fropex drilling program almost as closely as Fropex crews do. They know if oil is brought in near their villages they'll have one more claim to fame for the tourist guides, and their government will gain mineral-rights revenues it badly needs.



*** THE RESPONSIBILITY

Winning friends among the paysans

is an important step. It's the job

of Christian Vasseur, permit man

Striding across the puddled barnyard of a Loire Valley farm, past pens of snuffling hogs, past a plump rooster already singled out for tonight's *coq au vin*, FropeX permit man Christian Vasseur ticks off to himself the points he must make clear in the meeting for which he's bound.

Oui, monsieur, *be assured that any damage to your crops caused by our crews will be settled for by my employers. . . . Mais oui, you can be tranquil in the certainty that the crew will exercise all caution to avoid unnecessary damage to your orchard. . . . Certainement, monsieur, you will be reimbursed for your courtesies by FropeX.*

Vasseur has an appointment with one of the hundreds of farmers who own small parcels of land in the Loire. His job is to secure permission to carry out seismic surveys on the man's property, and the assignment takes deft diplomacy.

Like farmers everywhere, the French *paysans* are instinctively chary of a proposal that may spoil the land or ruin a crop. The permit man must reassure them that they will be paid for damage caused by exploration crews (most common is the rutting of fields when teams move in with mobile equipment). Too, he makes it plain that the crews deeply respect the beauties of the Garden of France—and that they do everything possible to preserve them.

The pattern of land ownership in the Loire Valley is a complex tangle of subdivisions tracing back through centuries to feudal times. Actually, Vasseur's first step in securing a permit is to call on the mayor of the village to find out just who owns what.

Lean, personable Christian Vasseur travels from village to village, from farm to farm through the Loire—tactfully paving the way for the teams of FropeX shot-hole drillers and recorders that follow. •



Christian Vasseur (left), FropeX permit man, keeps appointment with a farmer.



Mayor of village is asked by Vasseur to post public notice of seismic operations.



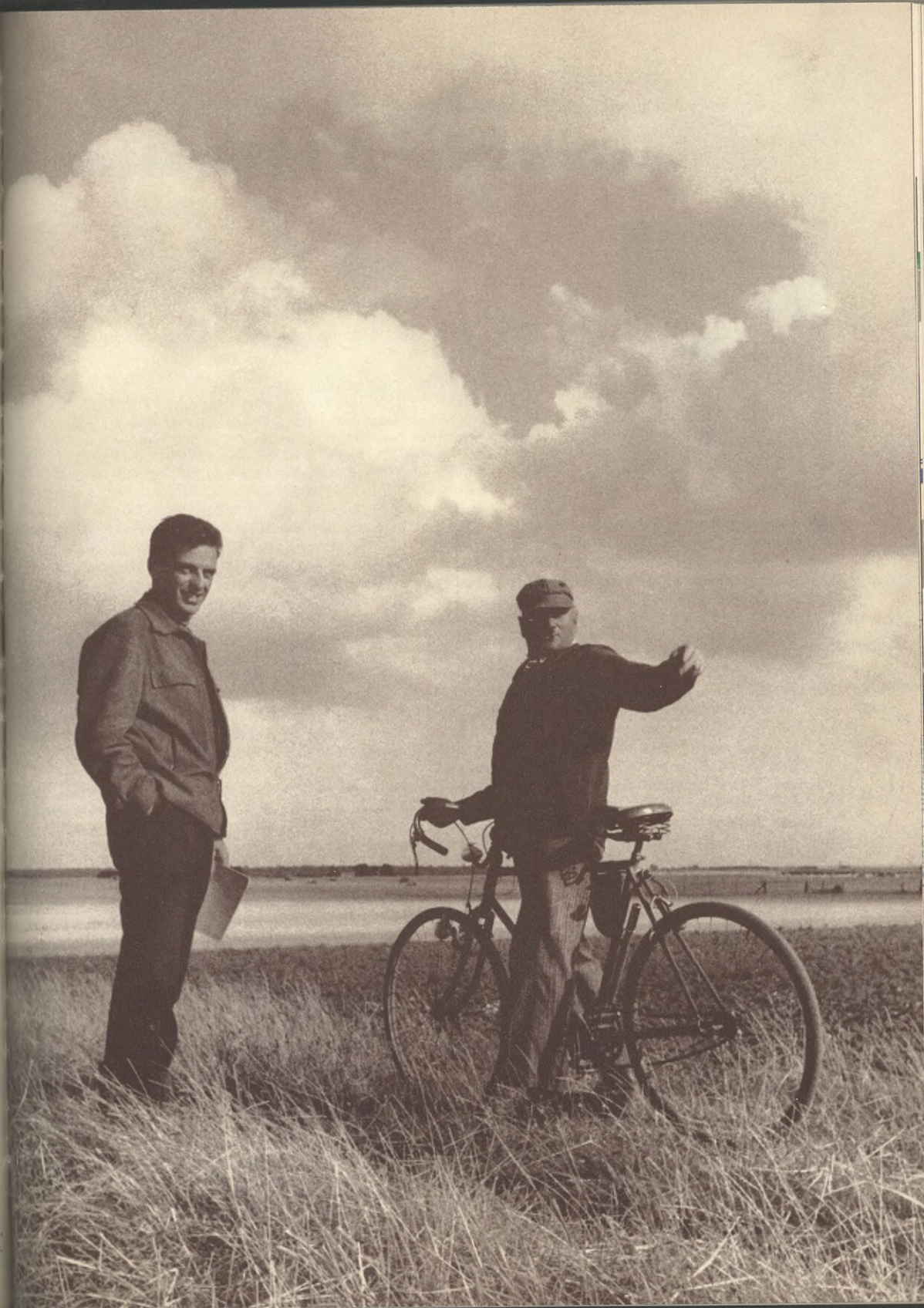
Vasseur talks with villager who helps him find his way about this community.



At the town hall, where he goes with villager, Vasseur studies ownership of land.



He carefully checks to see if shot point is located on the correct owner's field.



To meet global oil demand, investment of another \$30 billion abroad is likely

during the next five years. It serves to emphasize ...

The Growing



by Augustus C. Long

CHAIRMAN OF THE BOARD OF DIRECTORS, THE TEXAS COMPANY

EDITOR'S NOTE: Following are portions of an address by Mr. Long delivered June 6, 1957, before the New York Chamber of Commerce—oldest and perhaps most influential Chamber of Commerce in the United States. On June 11, the honorary degree of Doctor of Laws was conferred upon Mr. Long by Boston College. Earlier this Spring, he was elected a director of the Federal Reserve Bank of New York.

In analyzing the course of events since World War II, it seems to me that there have been two developments of major significance. The first is the fact that the world is indeed smaller than it was back in the 1930's. I do not mean simply that we can now get farther faster than ever before; I mean that the world has shrunk in terms of the affairs of men. A statement on Capitol Hill in Washington can be heard on Radio Moscow in a matter of minutes; a decision by a manufacturer in Bonn can change the plans of businessmen in Bogotá; a freedom fighter from Hungary can find a new life on a farm in Montana.

The second development which I believe has special meaning for all of us today is the amazing economic progress that the free world has made during the post-war period. Not only have countries whose industrial machines were ravished and wrecked by the war put these machines back into working order, they have pushed them on to new heights of economic activity.

In Western Europe, the economic growth has been phenomenal. During the years from 1948 through 1955, for example, the gross national product of various countries—on a per capita basis and in terms of constant prices—increased as follows: the United Kingdom, Sweden, and Belgium more than 2.5 per cent annually; France and Italy more than 5 per cent annually; and West Germany about 10.5 per cent annually. By comparison, the increase in the United States—and this was during the greatest period of sustained prosperity in our history—was 2.4 per cent per year.

A remarkable thing about these statistics is the fact that in each of these countries the rapid rise in economic activity has been paralleled by an even greater increase in the consumption of petroleum and petroleum products. During the 1948-1955 period, the British increased oil consumption by almost 9 per cent

annually, the Swedes 16 per cent, the Belgians more than 13 per cent, the French about 14.5 per cent, the Italians 17 per cent, and the West Germans almost 30 per cent. In the U. S. over the same period, petroleum demand has risen by 5.7 per cent annually.

I do not mean to imply that such progress could not have been made without oil; there are other sources of energy available, of course. But it could not have been as rapid or accomplished as reasonably with regard to cost. I believe the facts make it clear that there is a direct and close relationship between industrial progress, business prosperity, and the availability of adequate supplies of petroleum.

As you may know, 1959 will be the centennial of the drilling of the first oil well in this country. During the span of almost 100 years, the industry has produced within our own borders about 55 billion barrels of oil—or almost twice as much oil as has been produced by the rest of the free world combined. We have been extremely fortunate, thus far, on two counts: first, in having the petroleum beneath our land and our offshore waters, and second, through intelligent conservation laws and the ingenuity, daring, and skill of thousands of men and women, in being able to supply the major portion of our petroleum requirements and at the same time maintain adequate reserves for national security.

Looking ahead, the picture is somewhat different. If living standards are to be maintained in the face of a tremendous growth in population, if the current high level of industrial activity is to be sustained, the petroleum requirements of the free world are going to increase even more sharply. Demand in the United States is expected to reach a level of approximately 12.1 million barrels a day by 1965—almost 40 per cent above

Importance of International Oil

the present level. An even greater increase will occur among the free foreign nations. By 1965, it is expected that the demand outside the United States will have increased by 115 per cent over the current rate.

By 1965, then, the free world consumption of petroleum will have risen to roughly *five times* the level prior to World War II.

The big question is: where is all the oil coming from? On the basis of everything that we know now, there is only one answer to that question. The projected increase in demand for petroleum will be met primarily from foreign crude oil production, principally that in the Middle East.

Proven reserves in the Eastern Hemisphere—according to conservative estimates—have quadrupled in the postwar period and now constitute about 75 per cent of the free world total. By comparison, Western Hemisphere reserves are up only about 60 per cent and now constitute only one-fourth of the world total.

What has been the experience of the United States over the 1946-1956 period? Our share of estimated free world reserves has slipped steadily downward—from 39 per cent to about 17 per cent—and we are still slipping. Furthermore, while our reserves have consistently increased since the war, they have done so at a slower rate than both domestic production and domestic demand.

Last year, for example—a year of record producing activity in this country—we consumed six times as much oil as we discovered in new fields. At the end of the year, our reserves were equivalent to only 11 years' demand—the lowest reserve-demand ratio since these calculations were first published in 1936.

I am not saying that the United States is "running out of oil." But the fact is that oil is becoming increasingly difficult to find in this country. The ratio of dry holes to the total number of wells drilled has been rising, and because wells must be drilled deeper, the cost of bringing in new reserves is increasing.

Moreover, experience indicates that the prospects for discovering major new fields in the United States are not encouraging.

The biggest field ever discovered in this country was East Texas in 1930 with about 6 *billion* barrels. By comparison, one of the largest new oil fields discovered in the United States last year—the Aneth field in Southeast Utah—is estimated to have about 100 *million* barrels.

Now contrast this situation with that in the Middle East. It is estimated that the Persian Gulf area has about three times as much oil as the rest of the free world combined. In looking at the world oil picture as things stand today you simply have to face the fact of the dominating position held by Middle East reserves.

Despite this, however, to further diversify their sources of crude, American oil companies are pushing the search for new fields into every part of the world. All in all, more than 100 American operators are now involved in exploration or producing in more than 30 foreign countries.

This global hunt for new petroleum reserves necessitates a huge expenditure of time, manpower, and—most importantly—money. Not only must the oil be found and produced, there must be pipe lines or tankers to transport it to established markets, and manufacturing facilities to process it.

If the world-wide demand for petroleum is to be met, it now appears that the industry will be required to invest another \$60 billion—not during the next 10 years—but during the next *five* years, and *nearly half of this must be invested abroad*.

This enormous commitment of capital cannot be made, however, unless the political and financial climate both here and abroad is conducive to overseas investment of such substantial funds. In this connection, the seizure and blocking of the Suez Canal last year was of particular significance. It not only brought a new realization of the importance of the Middle East to the Western World, it also emphasized the need for adherence to certain basic principles of international relations—chief among them, the sanctity of contracts.

Earlier I commented on the fact that the world is growing smaller and the lives of men are becoming increasingly interdependent. American enterprise has been a major factor in this revolutionary process. Our business and industrial community has spread its activities to the four corners of the earth with great skill and undaunted spirit. Not only have many staunch friends been won for this country, but whole ways of life have been altered in many distant lands by their operations.

International trade and commerce, in brief, is one of the foundation stones upon which the United States has built its prosperity, its security, and its position as the most influential nation in the world today. •

NIGHT

FREIGHT

*Rumbling through the darkness, a train
pulled by a big "steamer" is a
fast-vanishing part of the American scene*

Photographs by O. Winston Link

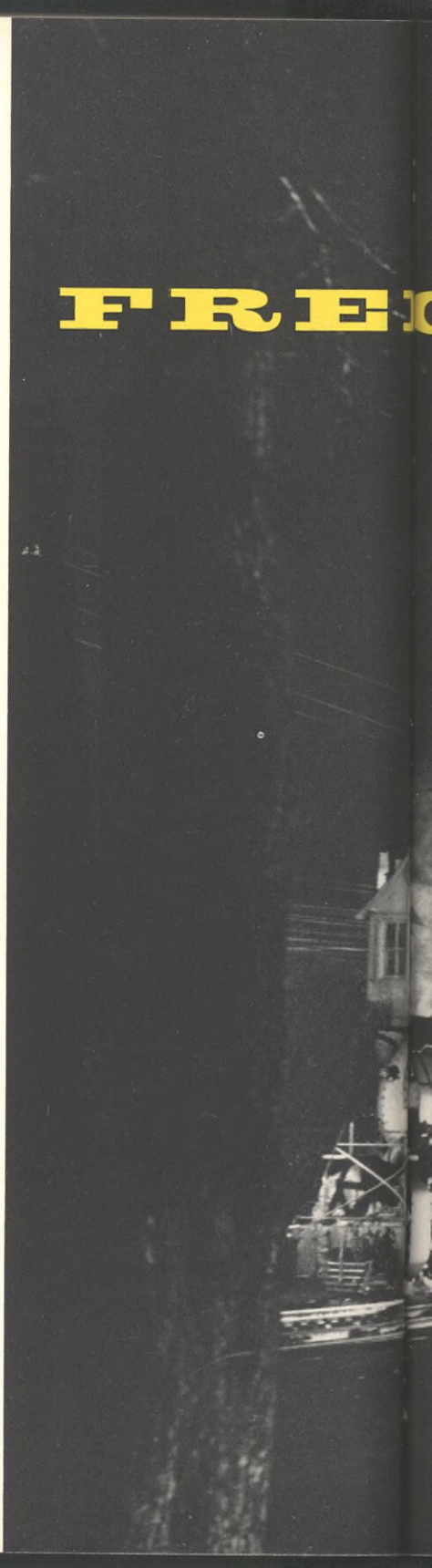
In the soft Summer nights of western Virginia, the comforting huff and chug of a steam locomotive pulling its string of freight cars through the darkness is a poignant reminder of the years when all freight was moved by steam—the years before Diesel power began taking over.

The sounds and smells of steam railroading have almost been lost in the growing hum of Diesel power during the last few decades. Most major railroads have retired their steam-powered equipment in favor of Diesels.

But at least one big line, the historic Norfolk and Western, still operates 396 "steamers." Over its right-of-way, a person with a fondness for the friendly engines can still watch and listen as their huge driving wheels push past a sleepy village crossing or through long cuts in the West Virginia hills.

The Norfolk and Western is making a gradual swing to Diesels (it's operating 99 Diesel-electric units now), but with a certain amount of reluctance. N. & W. people tend to be sentimental about their steam equipment. For one thing, they have always built their own engines. Then, too, it has been a matter of simple practicality to use the coal-fueled locomotives: coal is easy

*At three in the morning, a Norfolk and Western merchandise
freight passes through a sleeping Virginia town.*



IGHT



NIGHT FREIGHT



Alone in the night at Waynesboro, Virginia, a station clerk checks over his traffic reports.

and economical to obtain in the road's area. What's more, a great part of N. & W. tonnage is coal, and it makes good business sense to use your customers' products when you can.

But even on the Norfolk and Western, Diesel power will gradually take over.

Manhattan photographer O. Winston Link, a railroading enthusiast with a soft spot in his heart for the bittersweet spectacle of a steam-driven freight train rumbling by in the night, has tried to make sure that when the steam engines are gone they won't be forgotten. Over the last several years, he has spent most of his spare time recording his favorite sight on film. The photos on these pages were selected from 2,000-odd negatives he now has in his files as a result of his affection for steam trains.

Other railroad hobbyists around the country are collecting *their* memories of the fast-disappearing steamers another way: by taking occasional excursions on the N. & W.'s passenger runs. Along its 2,132 miles of track in six states, Norfolk and Western operates many passenger trains. In the Spring and Summer months organizations of railroad enthusiasts arrange specially chartered trips for members who want to get the feel of the real thing before it vanishes.

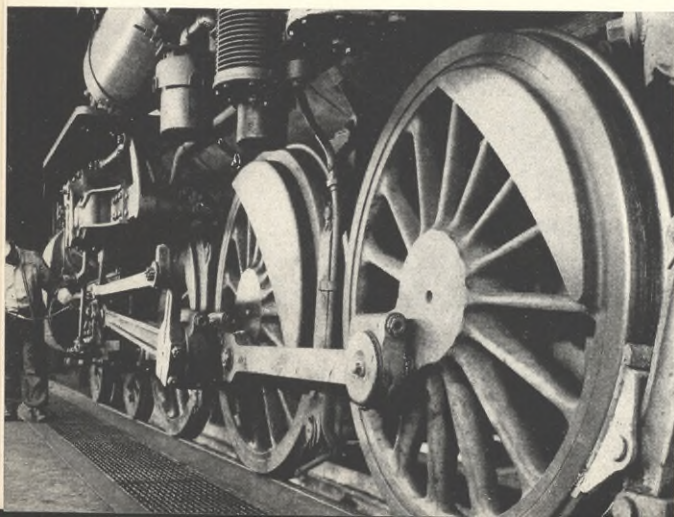
Norfolk and Western craftsmen no longer build steam locomotives, but they lavish all the care on the

engines still operating that a horse fancier would give his favorite palomino. The line's maintenance shops are ultramodern, with fluorescent lighting and gleaming tile walls—a far cry from the murky roundhouses of 50 years ago. Norfolk and Western's "lubritoriums" are models of up-to-date lubricating technique. In them, a typical engine is thoroughly lubricated in 10 to 15 minutes, through a network of one-shot lube lines.

Its special attention to lubrication is natural enough: a typical Norfolk and Western steam locomotive is a brawny maze of 1,051 parts, with about 250 points requiring lubrication by 10 different classifications of oils and greases.

Since 1924, Texaco has been supplying the Norfolk and Western Railway Company with lubricants. (All told, the Company's Railway Sales organization supplies 247 of America's railroads with petroleum products.) A resident Texaco lubrication engineer in Roanoke, Virginia, keeps close tabs on the performance of the Company's products in service on N. & W. equipment, and consults the railroad on day-to-day lubrication problems.

In the history of American railroading, the insistent ding-ding-ding of a steam engine's bell and the hoarse shrilling of its whistle as it barrels down the line into the night are sure to echo for a long time. Photographer Link's picture record of this vanishing bit of Americana should help keep the echo alive.



At the Bluefield, West Virginia, roundhouse (above), an engine supply man distributes containers of oil while a locomotive (left) is swiftly serviced in "lubritorium."

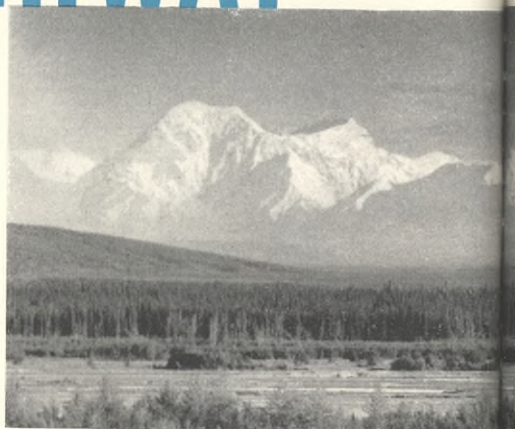


Just before dawn, N. & W. freight Number 51 approaches a crossing in Luray, Virginia. Norfolk and Western still operates 396 steam locomotives, has added some Diesels. Conductor (right) on Number 96 en route to Hagerstown, Maryland, snares message from the night clerk at Waynesboro.



ALASKA HIGHWAY

*A wartime engineering marvel,
this famous Far North road has become
a challenge for venturesome tourists
and a vital aid to oil explorers*



This year, thousands of commercial drivers and tourists will make their way across a 1,523-mile stretch of the Northern Hemisphere that until World War II was known only to trappers and prospectors.

They'll travel the Alaska Highway, an engineering miracle rushed to completion under wartime pressures to give the United States and Canada an urgently needed overland link with Alaska.

Originally, the highway was conceived as a safeguard against the isolation of Allied troops in Alaska by Japanese blockade. Today, though, it is the vital transportation artery that enables American and Canadian oilmen to push farther and farther north in their search for new petroleum reserves. What used to be a way out for the military is now a way in for industry.

The highway also is becoming increasingly popular with adventure-some motorists looking for a "different" kind of vacation trip.

In 1943, after 18 months of top-speed engineering and construction effort, the Alaska Highway was

completed as a magnificent military feat. Then called the *Alcan* Highway, it twisted over mountains, sliced across the vast tundra, spanned hundreds of streams. Army drivers hurtled their big six-by-sixes along it in a succession of nerve-wracking maneuvers.

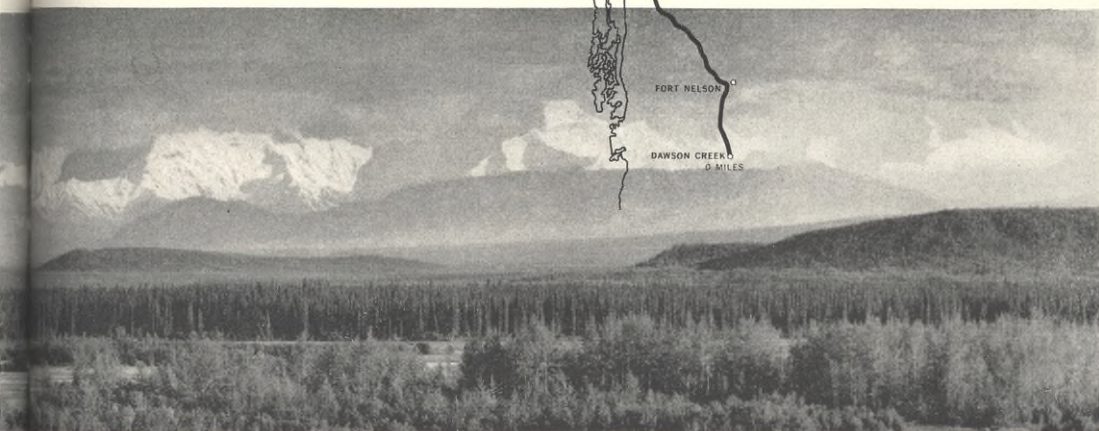
The 1957 driver, whether he's in the family sedan or the cab of a huge tractor-trailer, will find the going a lot easier.

Although most of the all-weather highway is gravel surfaced, the right-of-way is constantly being improved through maintenance and regrading. There are several experimental stretches of asphalt pavement now under test—and it is not unlikely that the highway will one day be completely paved. Motels, hotels, restaurants, garages, and service stations have sprung up along the way.

Texaco Exploration Company (Tex-Ex), a wholly owned Canadian subsidiary of the Company, depends on the highway as a connection between the Tex-Ex district office in

Dawson Creek, British Columbia (where the highway actually begins), and oil field and exploratory operations. The biggest transport job is moving drilling rigs. While it is possible to move a rig 200 to 300 miles a day on the highway, it has taken as long as two weeks to cover 80 miles on "bush" trails.

Although oilmen use the highway year-round, vacationers are advised to stick to the Summer months. Then the careful driver, who heeds the suggestions for motorists that are available to him beforehand and along the way, can travel with little difficulty from Dawson Creek to Fairbanks, the terminus of the highway in Alaska. At Dawson Creek—a lively cattle and wheat town selected by U. S. and Canadian military authorities as the starting point of the highway because it is a railroad—there are facilities for preparing a car for the trip. En route, service stations and garages provide fuel, lubricants, and repairs. Texaco products are available at several places along the British Columbia portion of the highway.



In Winter, highway temperatures may hit a numbing 60 below zero. Ice, snowdrifts, and "white-outs" (a phenomenon in which lighting conditions combine with snow both on the ground and in the air to obscure the horizon and destroy a driver's depth perception) can make the Alaska Highway run tough and exacting. Experienced drivers carry survival equipment with them at all times: sleeping bag, canned food, a shovel, small stove, extra gasoline, chains, gasoline de-icer, an ax.

From Dawson Creek to Fairbanks, the Alaska Highway is a striking example of engineering skill pitted against nature. From the outset, petroleum has served those who built, maintain, and use this unique symbol of a motor age. On the other hand, the highway aids commerce and industry in many ways. For the oil industry, it is essential in the transportation of products to serve the public and in the movement of supplies, equipment, fuels, and personnel to extend the search for petroleum. •



Two mounted spare tires are carried aloft as precautionary measure by a family heading for Seattle from Alaska. Inner tube, stretched across bottom of "gas" tank, will guard metal against damage from flying gravel.



(Above) Awe-compelling vistas abound as the two-lane highway curves along streams and lakes, winds through mountain passes. (Left) The route north starts here, in Dawson Creek, B. C. Fairbanks can be reached in a week.



During a stopover in Whitehorse, tourists use Yukon River water to wash highway dust from car. Abandoned steamers in background brought men and supplies to the Klondike, carried out gold during famous rush.

★ BRIEF AND POINTED ★

Sky Chief Su-preme, Texaco's new premium gasoline, is now on sale in specific markets *throughout the country*. Introduced last December in the East and the South, Texaco Sky Chief Su-preme with Petrox is especially designed to meet the critical demands of new, high-horsepower, high-compression automobile engines, and to improve the performance of older model cars requiring a premium fuel.

Texaco's regular-grade gasoline, Fire Chief, has had its octane rating increased for the 10th time in the last 10 years. It now has the highest octane rating in its history. Climate-controlled and with perfectly balanced volatility the same as Sky Chief Su-preme, Fire Chief has the necessary characteristics to continue to meet the needs of all those automobiles on the highways which do not require a premium fuel.

Safe marine operations by Texaco have been highlighted in the results of the 1956 Tanker Contest sponsored by the National Safety Council. Texaco's ocean fleet won third-place honors in the ocean tanker division; in the inland waterways tanker division, the Company's vessels tied for first position.

A special letter of commendation from the Ship Safety Achievement Award Committee of the National Safety Council and the American Merchant Marine Institute has cited the "remarkable record" of 1,321 days of accident-free operation attained by Texaco's tanker S.S. New Jersey. The letter states that this achievement "reflects the highest credit on the ship, her owners, and the American Merchant Marine."

Expanded nuclear studies at the Texaco Research Center in Beacon, New York, will soon be made possible by the installation at Beacon of one of the world's largest and most fully equipped nuclear radiation laboratories. Construction of the new laboratory has begun, and is expected to be completed by April of next year. One of the major pur-

poses of the new facility is to explore the possibility of using nuclear energy to practical advantage in Texaco's operations. In addition, it is hoped that work done in the laboratory may make material contributions toward new fundamental knowledge science can put to use.

The laboratory will be unique in that it will be equipped with three different radiation sources. It will house a 6-million-volt linear accelerator, the first of its kind in the petroleum industry; a 3-million-volt Van de Graaff generator; and a 35,000-curie cobalt-60 source of gamma radiation, one of the largest of its kind in existence.

Texaco has been active in the application of radioisotopes and nuclear radiation to research problems of the petroleum industry for some time, actually. It initiated work in this field prior to the advent of nuclear fission in 1939. In the new laboratory, the Company's radioisotope investigations that bear on day-to-day problems in the use of lubricants and fuels will be increased.

Texaco scientists who will be responsible for the operation and administration of the radiation laboratory already have received training at other leading nuclear study centers.

An offshore concession in the Gulf of Paria, Venezuela, has been granted to a group of United States oil companies, including Texaco, by the Venezuelan Ministry of Mines and Hydrocarbons.

The concession area covers approximately 150,000 acres. The Texas Company's interest in the concession will be held by a wholly owned subsidiary.

Operations are not scheduled to get under way until late this year or the beginning of 1958. On the Venezuelan mainland, south of the concession acreage, oil production already has been developed. The geological structure underlying the Gulf of Paria is regarded as having excellent prospects for the accumulation of oil deposits.

New touring maps and a new illustrated booklet of helpful automotive travel tips are now being distributed nationally through the Texaco Touring Service. The travel material is available without cost to motorists.

The new maps are now available to motorists at Texaco Touring Service offices in New York, Chicago, Houston, and Los Angeles, and at Texaco service stations in all 48 states.

Texaco dealers forward routing requests to the nearest Touring Service office, and the booklet—entitled *Have Fun*—is included in a new, attractively designed travel kit containing the desired routing outlined on the touring map.

The new booklet provides listings of motel, hotel, trailer park, tourist home, and restaurant directories, as well as sources of information about national parks, monuments, and forests, and places to see in the 48 states, District of Columbia, Alaska, Canada, Cuba, and Mexico.

The colorful 32-page, pocket-size booklet also includes a pre-trip check list, practical safe-driving suggestions, data on toll turnpikes and travel in Canada and Mexico, and other information.

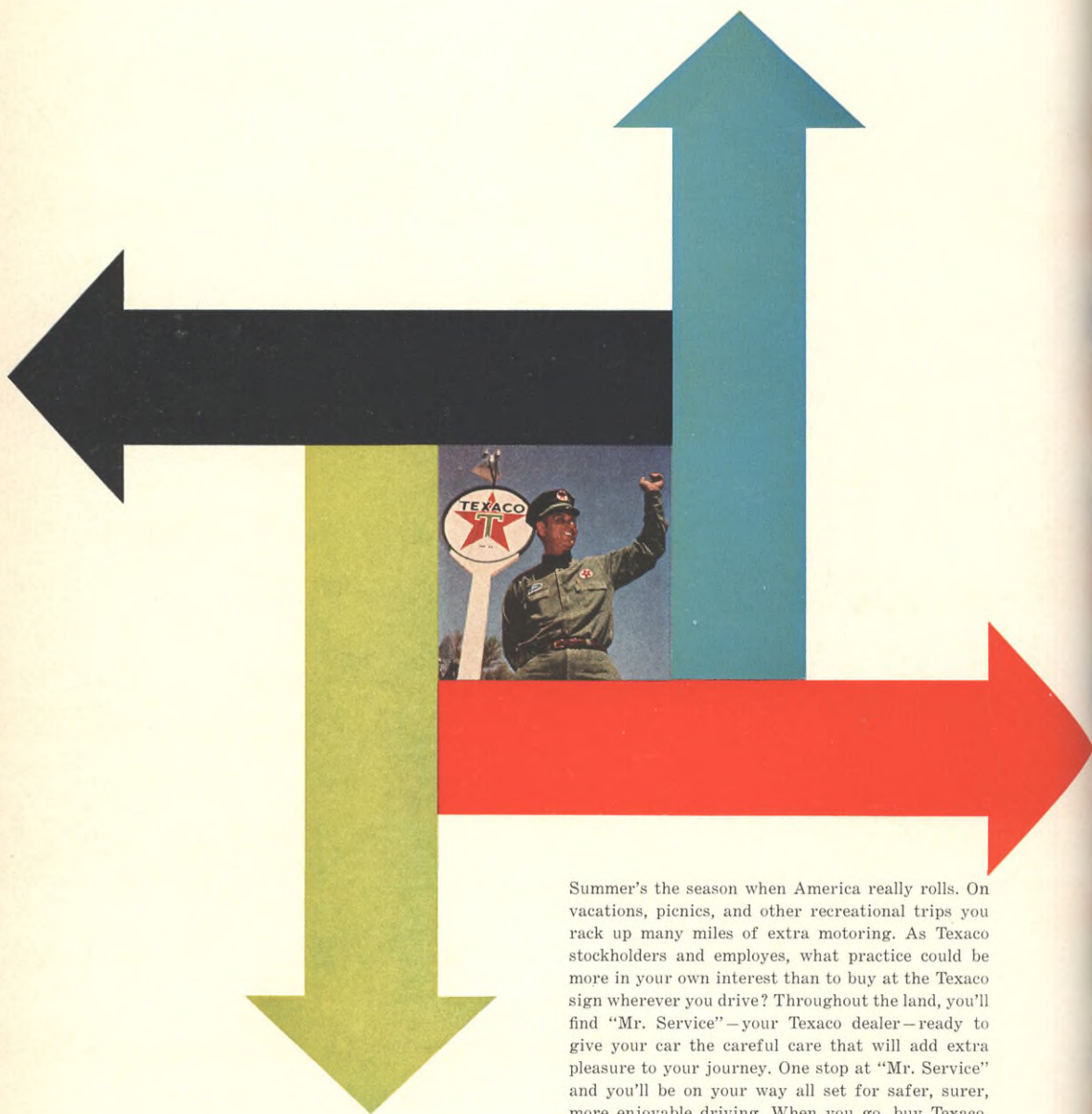
Features of Texaco's new state maps include down-folding for easier handling, four-color design, inset maps of major cities and national parks, radio station listings, and mileage charts.

The Texaco Touring Service is now in its 28th year of service to the nation's motorists.

New laboratories for product control have been completed at Port Arthur Works. Daily, more than 1,500 samples are processed with these facilities. Although the majority are product samples from various points in the manufacturing and shipping departments at Port Arthur, samples also are received from the Port Arthur Research Laboratories, the Research and Technical Department, and from other Texaco refineries. Testing goes on around the clock throughout the year to insure that the high quality of Texaco products is maintained.



At the Annual Meeting of the Stockholders on April 23, 1957, Augustus C. Long, Chairman of the Board of Directors, concluded his remarks by saying: "We believe the growth and development of Texaco over the past 55 years has been due in large measure to its competitive spirit. To compete vigorously and honestly, while working constantly to improve the quality of our products and our service to the public—these have been the Company's basic principles from the very beginning. As they have in the past, these principles will provide the foundation upon which The Texas Company will move forward soundly and steadily in the years ahead." At right of rostrum are J. W. Foley, President, and Wallace E. Avery, Secretary. Represented at the meeting: 82.5 per cent of outstanding shares.



Summer's the season when America really rolls. On vacations, picnics, and other recreational trips you rack up many miles of extra motoring. As Texaco stockholders and employees, what practice could be more in your own interest than to buy at the Texaco sign wherever you drive? Throughout the land, you'll find "Mr. Service"—your Texaco dealer—ready to give your car the careful care that will add extra pleasure to your journey. One stop at "Mr. Service" and you'll be on your way all set for safer, surer, more enjoyable driving. When you go, buy Texaco.

GO! BUY TEXACO