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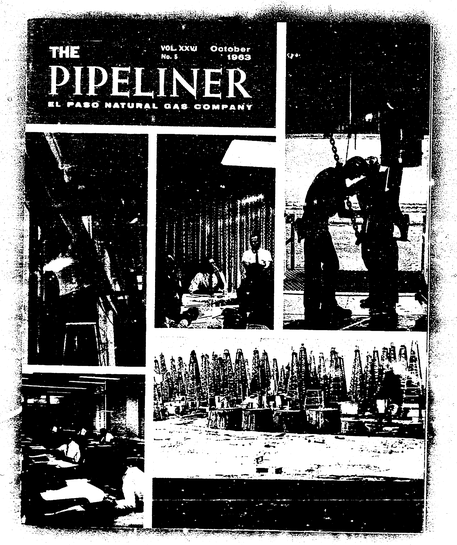
Large Exhibits



W.H.M.C.F. MICROGRAPHICS

As the threshold of his adult career, a young man asked for a reasonable newspaper editor for advice. Horace Greeley, who made America so free and great, summed up his views to his now-famous counsel, "Go West, young man, go West."

In the mid-Nineteenth Century a man with energy, ambition, initiative, and raw courage — a man willing to take a chance in the hope of gain — could start out a penniless youth and end up rich, in America's Frontier West.

There were gold and silver to be discovered, boundless frontier to be plowed and grazed, forests to be felled for the lumber, swift rivers to be fished. It was a land of opportunity, the repository of America's future.

Today, the frontier West no longer exists. There are fourless men have gone in first. Huge cities dot the plains, farms sprawl where buffalo trod, the automobile, the train, the airplane have blurred the horizons, and conquered miles into minutes.

Today, America's frontiers lie elsewhere, in the bleak void of space, perhaps, or the unexplored ocean depths, and when these regions finally yield up their secrets, it will be to men of the pioneer tradition, men of energy, ambition, initiative, and raw courage — men willing to take a chance in the hope of gain.

EL PASO NATURAL GAS COMPANY

THE PIPELINER

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On The Cover

Much is happening on the cover this month: an employee wipes down jacket water pipes at Willcox Station; a scene from the supervisors meeting in Phoenix; men prepare to remove a connecting rod from a piston; the Proration Department's production scheduling section is shown — and one of the reasons for proration's start, a forest of derricks at Spindletop as they looked around 1901.

EL PASO NATURAL GAS COMPANY, EL PASO, TEXAS

THE PIPELINER

OCTOBER, 1963 / VOLUME 26 / NUMBER 5

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They said oil was like a wild animal: It belonged to the one who captured it. The result was chaos. Derricks sprouted like trees with their roots intertwined, and waste of both oil and gas was terrific. But that was before

PRORATION

A SWITCHMAN in the San Juan Division drove to a well last month, turned it on, returned next day to shut it off. It's one of our best wells, able to deliver as much as four million cubic feet of gas a day, yet last month it ran for one day only.

A good well? Then why don't we take its full production every day, every month?

A good question. The answer: Proration.

Out in the Permian Division there's a well that the switcher seldom visits. It runs wide open every day, month after month. Yet it's a small producer, and if we shut it in we could easily make up the loss by running a good well a few extra days. But we don't shut it in.

Why not? One reason is proration.

Once a month, division superintendents and operating personnel from the Northwest, Permian and San Juan divisions gather at the Home Office for a systems operations meeting lasting several hours. In on the meeting are representatives from Engineering, Natural Gas Liquids, Systems Dispatching, Operating, and Proration. Purpose of the discussion is to coordinate operations in the most efficient manner for the coming month and for as far ahead as they can see. And what is one of the strongest influences they must take into consideration?

You guessed it. Proration.

The New Mexico Oil Conservation Commission, the Texas Railroad Commission, the Oklahoma Corporation Commission, and various other governmental bodies concern themselves to a greater or lesser degree with proration.

Proration and the rules and regulations stemming from it control the number of wells that may be drilled, their location, their nearness to each other, their operation and abandonment, and just about every other facet of oil and gas production.

And in our own Company, the major function of a large portion of the employees within the Proration Department is to cope with proration and its related problems.

What, then, is proration?

Essentially this: It is the means

V.P.I.C.F. MICROGRAPHICS

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REPRESENTATIVES of several departments meet monthly to coordinate operations. One of the principal influences that they must take into account: Proration of gas.

by which most oil and gas producing states prevent waste in the production of these valuable resources, and attempt to answer an equal opportunity to all owners of mineral rights in an oil or a gas field.

In principle, it's simple. In practice, though, it's very complicated. Says Norman Woodruff, manager of gas proration operations and in charge of the Proration Department, "We take gas from seven states—Texas, New Mexico, Oklahoma, Colorado, Utah, Arizona and Wyoming—and Canada. There are variations in the approaches to proration in each state: and each has its own set of rules that we must follow.

"Texas, New Mexico, and Oklahoma, for example, key their proration to market demand. To anticipated sales, in other words. While the laws of most of the other states specifically prevent them from considering market demand when they prorate, they restrict production if necessary to prevent waste or to protect the rights of owners.

"Canada is no problem to us from a proration standpoint. We buy our gas at the border, and our supplier is the one who must meet Canadian requirements.

"Problems? Complications? How about these for a start: marginal wells, non-marginal wells, ratable take, balancing, testing, allowables, underages, overages, take-or-pay, contract minimums, deliverability, reserves . . . I could go on and on."

How and when did all these problems begin? Surprisingly enough, between one million and 250 million years ago. That's how long ago the oil and gas being produced today were formed. Though it's not actually known how, the generally accepted theory is that primitive sea life and early forms of vegetation were transformed into crude oil and natural gas by a variety of means including, among others, heat, pressure and certain types of bacterial action. The minerals eventually accumulated in certain areas of porous rock; each of these accumulations today is called a pool, field, or (more technically) common source of supply.

Many of today's proration problems arise from the nature of oil and gas as they exist underground. Gas and oil are normally found together, though in varying proportions. And there's always a certain amount of water present.

Oil won't rise to the surface by itself. The gas or water in the reservoir actually pushes the oil up the well, sometimes with great force, as in a gusher. One of the purposes of proration is to conserve what's called the reservoir energy, or drive, the above given by the gas or water. If the oil is taken out too fast, energy is wasted and some of the oil that would otherwise be recovered remains underground. Or, water may rise too fast in the well and block off the further movement of oil to the well bore, thus killing the well.

But in the early days of the oil industry, little was known about the way oil and gas occur in a reservoir, or of the forces in a reservoir. Court decisions of the day reflected this lack of knowledge, and actually gave rise to the chaotic conditions that later brought on proration.

As early as 1897, in the case of Townsend vs. State of Indiana, a court held oil (and gas) to be similar to a wild animal, owned by no one until actually in someone's possession. Also in 1897 (Kelly vs. Ohio Oil Co.), it was compared to an underground river, which moved across property lines in an unceasing flow regardless of whether wells were drilled. Together, these decisions formed a concept that came to be known as the Rule of Capture.

Thus a property owner, seeing his neighbor drill a well, sank a well himself to capture the oil beneath his property before it could drain away from under him and be lost to his neighbor.

Such practices led to conditions like those in the Spindletop Oil Field at Beaumont, Texas, which was brought in in 1901, and the great East Texas Field, discovered in 1930. Derricks rose shoulder to shoulder, in many instances the legs of one actually overlapping the legs of another. Production was wide open, and waste was terrific.

Broad interest in preventing such waste arose in industry, courts, and federal agencies, and out of this interest, out of years of trial and error and bitter controversy, came proration.

Proration is a state function, administered under each state's basic property laws and laws covering conservation of natural resources. The federal government, however, has contributed to the states' programs in four principal ways:

1. Approval of Interstate Compact to Conserve Oil and Gas. This agree-

WOODRUFF JOHNSON RAINEY MAGRUDER RITTMANN

NORMAN WOODRUFF, manager of gas proration operations, and Burt Johnson, assistant manager, direct activities of Proration Department. Assisting are Dave Rainey, J. B. Magruder, and Dean Rittmann. Department has approximately 50 employees.

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2. Passage of Connally "Hot Oil" Act, 1935. This law prohibits transportation in interstate commerce of any oil produced in violation of a state's conservation laws, rules, or regulations.

3. Enactment of tariffs and other measures to control importation of foreign oil (begun in 1932).

4. Publication of findings relative to demand-supply conditions, by Bureau of Mines. This information is helpful to the market-demand states in setting allowables.

Proration was first applied to oil production. Gas, once it had served the purpose of bringing oil to the surface, was burned because there was no market for it. But markets later developed, and in the areas where El Paso Natural obtains gas, the first attempt to prorate gas was made by the Texas Railroad Commission. In 1935 the Texas Legislature authorized the Railroad Commission to prevent the waste of natural gas. In the late 1930s the Commission issued an order applying to the West Panhandle Field of Texas, but the order was appealed and courts ruled against the Commission's right to issue the order. Not until 1948 was the Commission successful in establishing gas proration rules that were upheld by the courts.

Proration programs of the major producing states have gradually come to embody three main features: Provisions to prevent too-rapid production and waste of reservoir energy; allocation of production among the producers in a given field so that each gets his *fair* share; and adjustment of production to market demand, within the limits of maximum efficient rate of production of any given field.

And how do these provisions affect El Paso Natural?

Explains Woodruff, "Proration touches on every single move we make in producing gas. And if we should fail to conform to any state's rules, that state can put us out of business by shutting in our wells.

"In practice, though, the regulatory bodies are very fair and reasonable, not only with us but with all companies."

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Proration's assistant manager, Burt Johnson, and his staff help in handling the immense amount of information and detail involved in the job.

Dave Rainey, administrative assistant in charge of commission activities,

JANIE HURTT, Billie Boswell, and Steve Marinovic (left to right) check test run.

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JANIE HURTT, Billie Boswell, and Steve Marinovic (left to right) check IBM run.

U.S.N.C.F. MICROGRAPHICS

PRODUCTION SCHEDULE
Where It Comes From

1. TOTAL DEMAND FOR GAS

The total amount of gas the Company will sell in the month to come is estimated. Bearing on the estimate are such factors as the weather prediction and the amount of gas our customers tell us they'll need.

2. ESTIMATE OF RESIDUE GAS

This is the amount of gas El Paso Natural expects to receive from natural gasoline plants.

3. DEMAND FOR DRY GAS

Subtracting the residue gas figure from total demand figure gives us the amount of gas we'll need from wells.

4. NOMINATIONS

The Company tells the regulatory bodies how much dry gas we'd like to receive from each pool to which we have connections.

5. ALLOWABLES

The regulatory bodies set an allowable for each well in each pool. By adding our per-well allowables, we know how much we're to be allowed from each pool.

6. PRODUCTION SCHEDULE

With assistance and cooperation of other departments, Proration Department prepares a well-by-well production schedule for San Juan and Permian divisions. No wells in Northwest Division are switched by our employees, so a lump-sum figure is allotted to each source of supply connected to that division. Using the production schedule, switchers know which wells to turn on, which to turn off, which to leave producing.

maintains contact with the regulatory commissions, presenting the Company's position on various matters and interpreting actions of the commissions as they affect El Paso Natural's daily operations.

Dean Bittmann, administrative assistant, handles contract settlements and operating problems with producers should any questions arise.

J. B. Magruder, analyst, develops ways to use the Company's 7070 electronic computer to lighten the paperwork load and to produce the reports needed to guide operations and analyze past operations.

"Aside from our work directly with the state commissions and the producers, ours is a scheduling and coordinating function where proration is concerned," says Woodruff. "We also do quite a bit of forecasting."

State commissions set allowables monthly, and we schedule our operations accordingly.

Each month, Systems Dispatching in El Paso furnishes the Proration Department with a calculation of the next month's gas needs. Such factors as the weather forecast and customer requirements form the basis for this estimate.

"Part of our gas supply is made up of residue gas," Woodruff notes, "which comes to us from natural gasoline plants, our own and others. We have no control over the amount of this gas that we receive; it's a by-product of the production of crude oil, and its volume depends basically on the amount of crude produced, the proportion of gas in the crude, and the surface temperature at the well. However, we're able to predict the volume of residue gas with a high degree of accuracy, and we attempt to take all that the plants offer us.

"Most of the remainder of our gas comes from about 6,000 gas wells, some of them ours, the rest belonging to other producers. This is our 'controllable gas', and we can take more or less according to our needs. But in doing so we must not only follow the rules of the conservation commissions as applied to those 6,000 holes, but we must also fulfill our agreements with the producers operating the wells."

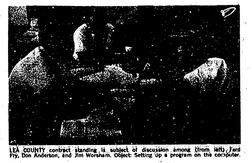
Here's where such factors as ratable take, balancing, undergas and overages, take-or-pay, contract minimums, and many others come into play. Considering them all, Proration decides how much gas we'll want from each common source of supply, or pool. These figures they turn over to the Texas, Oklahoma and New Mexico commissions as our "nominations" — our market demand — for the month.

The commissions lump our requests in with those of all other buyers to arrive at the total demand. Then they set allowables by pools and well-by-well within the pools.

The allowables assigned to El Paso Natural may or may not be what we asked for. We may be allowed more than we wanted from one pool, less than we wanted from another. To give the necessary operating flexibility, commissions permit taking more or less than a well's allowable, as long as the overages or underages are compensated for during the next six-month proration period. This is called "balancing" the well, and it's one reason why a switcher may turn on a good well and let it run only one day in a given month. (Another reason is that where necessary we produce some gas from each lease every month to protect the operator's lease.) It also helps explain why a small well may run wide open all the time (such operation may be necessary to produce the well's full allowable).

Flexibility also comes with the gas available in Colorado, Utah, Arizona, and Wyoming. Within the physical capability of the wells, we can take as much as we want from any well connected to us in any field in those states. Our basic obligations usually are to take the agreed minimum and

CHARLIE JANCUSEK talks with a producer while Jim Bibbers completes a report.



LEA COUNTY contract standing is subject of discussion among (from left) Jerry Fry, Don Anderson, and Jim Worsham. Object: Setting up a program on the computer.

BOB SLEDGE (right) and Bruce Van Cleave develop a Permian production schedule.

BOB KING (standing) and Harold Miller study a Commission production order.

U.N.M.C.F. MICROGRAPHICS

TOM BRASHEAR (second from right) clarifies a point on a thorny problem in huddle with (from left) Cerveth Clements, Frank Kratek, and Johanna Williamson.

GENE COUSER (left) and Ed Wroble check unit status of new well in Big Piney.

RAY SMYTHE of Proration (left) and Walter Black work on computer problem.

ARMFUL OF MAPS used in locating wells is put back in the rack by Ethel Simpson.

MARJIE MILNER, Julie Windham record dates of employees' out-of-town trips.

SIGNATURE of department head will go on letter prepared by Mattie Smith.

to take each well's fair share over a period of time.

The Proration Department prepares well-by-well production schedules each month. Information relating to anticipated customer demand, each well's production position (allowable, overages or underages, deliverability, availability, and so on), and many other factors is translated into electronic computer "language" and fed into the machine. Out comes a complete producing agenda for the San Juan Division, and for Lea County and Panoma fields in the Permian Division. Other areas of the Permian Division aren't yet programmed for the machine; schedules for these are currently made up by hand. Since no wells in the Northwest Division are switched by our employees, no well-by-well schedule is prepared. Instead, a lump-sum volume figure is allotted to each source of supply connected to the Northwest Division.

Copies of the schedule go to the San Juan and Permian division offices, and it's from this schedule that the switchers work.

One outgrowth of the production schedule has been a more systematic method of testing wells. Conservation commissions require an annual test for information such as wellhead shut-in pressure, and the amount the well delivers under certain conditions (deliverability). The Gas Engineering Department also wants to test each well, to gather data necessary for planning as well as for current use. And most of our contracts require periodic GPM (gallons per thousand cubic feet) tests, which are conducted by the Measurement Department.

Previously, these tests were performed at different times, and production had to be adjusted to take the tests into account. Now the tests are conducted at the same time, resulting in better scheduling, fewer complications with allowables, and greater efficiency of operations.

"This is an example of interdepartmental cooperation leading to benefits for all," Woodruff is quick to point out. "Gas Engineering, Measurement, Dispatching, Operating, and Proration people worked closely together on this, in smoothing out the wrinkles."

Proration has been an economic and legal fact of life for upwards of 30 years, although a new ruling or regulation or proposed new law can still touch off a hot debate both inside and outside the gas industry. Steering a calm course through such troubled waters is hardly easy, yet in its eight years of existence the Proration Department, with the cooperation and assistance of other departments, has managed to do just that.

'Dad' Joiner's Amazing Discovery

Late in the year of 1930, C. M. "Dad" Joiner drew a deep breath as he spudded in his third well on Daisy Bradford's little east Texas farm. This was in Rusk County, in a district which geologists had studied and condemned, in which many unsuccessful wells had already been drilled, and in which Dad Joiner himself had already suffered two failures – both on the Bradford farm. Yet on October 3, at a depth of 3,592 feet, he struck oil.

Joiner had discovered what was to become one of the most famous – and certainly one of the most fabulous – oil fields in the world, the East Texas pool.

By the end of December three other important wells had been completed in the same geological formation, several miles from the Joiner location. A road scramble for leases followed, and intense competitive drilling began. Under the Rule of Capture it was every man for himself. Everyone drilled as many wells on his property as he could manage.

The Texas Railroad Commission issued restrictive rules, but the producers countered with injunctions that obstructed enforcement. Thousands of laborers, farmers with their horses and mules, trucks and truck drivers, drillers, equipment salesmen and others swarmed over the field. By August of 1931, more than 1,000 wells were producing more than a million barrels of crude a day. The national gasoline market was thrown into confusion by the millions of gallons from the dozens of small refineries in the district.

In the middle of August, Governor Ross Sterling, himself a wealthy oil man, proclaimed martial law in the area. For three weeks the militia kept guard, while information was collected on local conditions and the market. When the field reopened, all wells were ordered choked to 225 barrels a day. But not only was drilling unrestricted, it was actually encouraged. The more wells a man had on his property, the higher his total allowables.

Conditions worsened as time passed. So many wells bored into the formation and the oil was being removed so rapidly that, in 1934, reservoir pressure dropped sharply and in 1937, water invaded the oil sand. As the pressure continued falling, pumping became necessary for many wells. By 1938, more than a third of the wells were being pumped.

Most of the wells were unnecessary, from the standpoint of getting the oil out of the ground. Some people believed that the enormous pool could have been drained with 7,000 wells – about one-fourth the number actually drilled. The waste in the drilling of thousands of unnecessary wells in the development of the field was variously fixed at 200 million to 1,165 million.

Because of its huge size the East Texas Field points up sharply the problems of unbridled drilling, unchecked production, and waste of reservoir energy. But this was not the first field to suffer these ills, nor was it the last. As these ills became more obvious, more and more people both inside and outside the industry in most producing states began to seek a solution. Statutes were enacted, regulatory bodies were established, and rules were formulated.

And proration became a fact.

M.S.R.C.P. MICROGRAPHICS
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EXPANSION REPORT

El Paso Natural has embarked on a busy construction schedule. Work in progress includes new pipelines, engine additions at several locations, and two new compressor stations.

Keeping up with the West's expanding population calls for a steady program of expansion at El Paso Natural. Throughout the system, men are engaged in a variety of tasks at compressor stations, plants, and along miles of pipeline.

In the sandy desert of northeastern Arizona on the Navajo Indian Reservation work is progressing on a brand new turbine station that will go on stream January 1. The installation, Dilkon Turbine Station, consists of a large boxcar-shaped General Electric turbine that will power a Cooper-Beissemer centrifugal compressor. Located about midway between Leupp and Navajo stations, Dilkon gets its name from a nearby trading post. The station will compress gas moving through Southern Division's San Juan-to-Topock mainlines. Dilkon was the point where the Company's first stretch of pipe was laid on the Navajo Reservation. Pipeliners jumped off at Dilkon when they were laying the 24-inch mainline across the reservation in 1950.

Some pipeline modifications are being done in the Dilkon area during the construction of the new station. Contractor for the station is American Western Company, Inc., of El Paso. Pipeline modifications are being made by C. Hobson Dunn, of Pander, Texas.

On the banks of the Clackamas River near Oregon City, Oregon, another compressor station is now under construction. Called Compressor Station No. 19, the installation is the first compressor station El Paso Natural has built in the Northwest Division, and it is the only compressor station the Company has in the state of Oregon.

Station No. 19 consists of two 2,000 horsepower Ingersoll-Rand 412 KVS reciprocating engines that will compress gas going to a distribution system which is now under construction near Grants Pass, Oregon. The new station was designed by El Paso Natural and is being built by Fluor Corporation. Two houses are being constructed for the men who will operate the new compressor facility.

The Oregon station is being built at an altitude of 340 feet, the second lowest of any El Paso Natural compressor station in the system. Lowest compressor station is No. 18, located at Somas, Washington, a few yards from the Canadian border, which has an elevation of 40 feet. The low altitude at the new station has brought about a problem that has been rarely encountered in the Company's usually high and dry operating area. In the summertime the water table along this stretch of the Clackamas River is about five to seven feet below the surface of the ground. In the winter, however, the water table is only about one foot below ground level. All underground piping and foundations are being designed to withstand the water. Construction on the station began August 5, and the station is expected to be completed and go on stream around December 1.

A third compressor facility was recently added to the system at the Company's metering station in Topock, Arizona. The engine is a T-100 S Solar turbine driven centrifugal compressor that produces 1,040 horsepower when it is operated around 22,000 rpm. It will be used to increase gas volumes going to Southwest Gas Corporation, which supplies gas to Las Vegas, Nevada.

The unit, which weighs approximately 17,000 pounds, is skid-mounted and designed to operate outdoors by remote control from the metering station. The engine's installation will permit an additional 40 million cubic feet of gas to be delivered to Southwest Gas Corporation each day. Arctirican Western Company, Inc., of El Paso was the contractor.

Other construction projects presently going on throughout the system include the following plant and station modifications:

A 2,500 horsepower Worthington engine is being installed in Window Rock Station's "B" plant, which had to be enlarged to accommodate it. This work is scheduled for completion around December 1. The contractor doing this work is American Western Company, Inc.

At Bluewater Station two turbo-chargers are being installed on the station's Ingersoll-Rand 412 KVS reciprocating engines to boost their horsepower to what it would be if the engines were operated at sea level.

In the Permian Division's Goldsmith Plant a new Clark TLA 10 2,400 horsepower engine is being installed in a slot left for its construction when Goldsmith's "C" plant was last expanded in 1955. The additional horsepower produced by the new engine at Goldsmith will be part of a single stage compression system that sends gas north to Plains Station.

Two HRA-8 Clark engines with a total of 1,760 horsepower are expected to go on stream around November 1 at Fullerton Plant in the Permian Division. These engines are being moved from the Weisz-Floyd Plant located south of Midland. Fullerton's compressor building is being enlarged to make room for the engines. Contractor for the job is Bel-Clere of El Paso.

Plains Station compressor building is being extended to accommodate a new Cooper-Bessemer 1,800 horsepower engine being installed there by Bowden Construction Company, of Odessa, Texas. This work, too, is slated for completion around November 1.

Minor modifications are in progress in the piping and engines of Dumas and Dimmitt stations in the Permian Division. All of these changes, and the other Permian Division changes previously mentioned, are part of the same project.

A new dehydration plant went into operation in September at the Company's Lee Station, located 13 miles southwest of Lovington, New Mexico. The plant is a skid-mounted packaged unit that will strip water from about 72 million cubic feet of gas each day. Lee Station is operated by personnel from an adjoining Phillips Petroleum Company plant.

In contrast to the construction now taking place on plants and stations, several pipelining projects are underway throughout the system.

Natural gas recently came to the 2,700-person community of Othello in Washington after the Company laid five miles of 4¼-inch pipe from its Moses Lake lateral to a tie-in with Cascade Natural Gas Corporation.

The Company's Grants Pass line, which extends from Eugene, Oregon, south to Grants Pass is now under construction by the R. H. Fulton company, of Lubbock, Texas. The line consists of six miles of 16-inch pipe and 122 miles of 10¾-inch pipe laid by El Paso. At Grants Pass this will tie-in to an additional 53 miles of pipe laid by California-Pacific Utilities Company. When the line is completed it will bring natural gas service to 17 Oregon communities.

Other construction in the Northwest Division consists of 40 miles of 10- and 8-inch pipe that extends from Olympia metering station in Washington to the communities of Shelton and McCleary. El Paso Natural's customer in that area is Cascade Natural Gas Corporation. From the takeoff point near Shelton, Cascade will build a distribution system serving the communities of Port Orchard, Bremerton, Bangor, Silverdale, Chico, and Shelton. The network, called the Kitsap Peninsula Project by Cascade, will serve a total population of more than 47,000 persons. From the lateral going to nearby McCleary, Cascade will build a second distribution system, called the Grays Harbor County Project, which will serve approximately 35,000 people in the communities of Elma, Montesano, Cosmopolis, Hoquiam, Aberdeen and McCleary. El Paso Natural's portion of these pipelines was scheduled for completion around October 1.

V.P.I.M.C.F. MICROGRAPHICS
BEST AVAILABLE COPY

THE STATION SUPERINTENDENT

FRANK HESTAND, a chief maintenance mechanic, talks with McWilliams about status of routine engine overhaul.

EARLY MORNING meeting with the men going off graveyard shift finds McWilliams in the auxiliary engine room. From left are Cecil Jones, Billy Radcliff, Bill Riggs, McWilliams.

STATE of Alfred Miranda's beautiful landscaping is subject of conversation.

JOE McWILLIAMS stands by the crossover valve which controls gas pressure in the pipelines. He bears the responsibility for every phase of Wilcox Compressor Station's operation.

Everyone at compressor stations has a job to do: oilers oil, operators operate, clerks clerk, and maintenance men maintain. There is one man at compressor stations, however, who does several jobs. He is a businessman, personnel expert, landlord, and judge. He knows the whole compressor station, inside and out, from the powerful engines that compress gas to the schedule of the school bus. He can do any job in the place – and do it well.

The man, of course, is the station superintendent.

At the Company's 114 compressor stations the superintendent is the man on the spot – as much in charge of his station as a captain of his ship. Station superintendents are reputed to be experts on just about everything.

Remarkably enough, most of them really are. By the time a man has earned the position he is a seasoned employee with a solid knowledge of every phase of station operation.

Because the entire station, including camp housing, is his responsibility, the superintendent must attend to all the aspects of community life. Some of his camp responsibilities include making sure that: the water supply is plentiful and healthful; residents have an unfailing source of gas and electricity; school buses are available for camp children; the playground is kept in good shape, and the residents of the small community have adequate recreational facilities. Many station superintendents even keep a chart indicating when employees' pets are due for rabies vaccinations.

The station superintendent's day is a long one, and it doesn't end after a set number of hours. In case of an emergency at the plant or in the camp, he is the first one notified. He usually tells a neighbor where he can be reached if he's taking his family to town. At night his sleep may be disturbed by a telephone call from one of the compressor buildings.

El Paso Natural has no typical station superintendent – they are too individualistic a breed – but most of them share a lot in common with Joe McWilliams, who has been in charge of Southern Division's big Wilcox Compressor Station for the past six years. McWilliams has more than 23 years with El Paso Natural. During that time he has accumulated a wealth of experience extending all the way back to his first Company job, trimming trees and mowing lawns at Station 4, Gage, New Mexico.

The routine part of McWilliams' day includes a long hard session attending to paperwork. He goes over the logs filled out by men on shift which give him important information on the performance of the engines. He keeps track of the station's equipment and attends to requisitions required to obtain replacement parts.

Much of his work consists of planning for the future. He prepares estimates of his station's operating costs for determining his budget. To do this he must take into consideration the maintenance work he knows will come – such as repainting the camp houses, and routine work in the compressor buildings. Costs of some of the items remain fairly constant, such as the chemicals with which cooling water is softened and treated, but other costs are wildly variable. Should he plan now for new pumps on the station's three water wells, or will the ones he now has last for another year? Sometimes it is less costly in the long run to replace a unit than to repair it. He must decide if such is the case this time.

The big engines were put there to do a job and it is costly when they must be taken out of service while they are needed. McWilliams tries to prevent this from happening by scheduling overhauls on the engines during slack times. Fuel and oil costs must be calculated.

Station superintendents arrange their men's vacations so the operation of their installations continues smoothly. They serve as liaison men between the employees in their stations and other departments regarding insurance, retirements, transfers and promotions. Station superintendents spend much of their time answering correspondence and checking invoices of material that has arrived. Helping McWilliams with much of this work is ", Drake, field clerk at Wilcox Station.

The station superintendent does everything he can to promote the safe operation of his installation. McWilliams works with the Safety Department in scheduling meetings, first aid classes, and making sure his men do their work as safely as possible. He – and every other station superintendent – is constantly on the lookout for new ideas that can make his station operate even better than it does. To get these suggestions he spends much of his day visiting men at work in the compressor buildings, the auxiliary building, and in the water-treating building. He discusses

U.W.K.C.P. MICROGRAPHICS

WHILE McWILLIAMS looks on, Mrs. Bennett Noland tells Lewis Pelayo, Camp Maintenance, about the thermostat on the furnace in her house. Men from Camp Maintenance come out frequently to keep Company houses shipshape.

DURING ONE of his frequent rounds through the compressor station, Joe McWilliams inspects the mainshaft bearing caps in the "A" plant area.

every phase of the station's operation with the men, and he is interested in everything, the state of Alfred Miranda's beautiful landscaping, as well as the compression ratio of his plant.

During the course of his rounds, McWilliams keeps a careful check on the pulse of the station. He serves as oil to a complex machine—helping it to run smoothly. When a decision must be made regarding some part of the station's operation, he uses his extensive knowledge of the station's personnel and equipment to make the correct one.

Like other station superintendents, McWilliams finds that most of his decisions are about people. As a superintendent he strives to employ his personnel as effectively as possible, and he does this in an easy relaxed manner that has made him many friends. "The station is my responsibility," McWilliams says. "If it's running the way it should run, I get the credit—and if it doesn't run that way, I get the blame. The personnel here make me feel proud of the way our station operates, and I want them to feel proud, too."

McWilliams, like other superintendents, makes himself available to anybody who has a reason to see him. He is frequently called by housewives in the camp who want chores taken care of such as repairing noisy air coolers, or getting their furnaces checked before setting them on winter operation. If a softball goes through a camp window, the man to call is the superintendent. The camp at Willcox is made up of 51 families, and contains 47 children, but there are few balls thrown through windows; the kids have a well-equipped playground for games, and a softball diamond, nearby.

In addition to eating for the smooth operation of the station and camp, McWilliams spends several hours each week conferring with salesmen who represent firms selling items necessary at the station. He coordinates his station's operation with the operation of other Company installations, and he works closely with the men from Gene Engquist's pipeline district, located at Safford, Arizona, who care for pipeline maintenance in the Willcox area.

In common with other superintendents throughout the system McWilliams frequently is called to give his time to civic affairs, and he does so gladly because he feels a warm affection for Willcox. He is a member of the Rotary Club, the Chamber of Commerce, and has just completed a three-year term as a member of the school board.

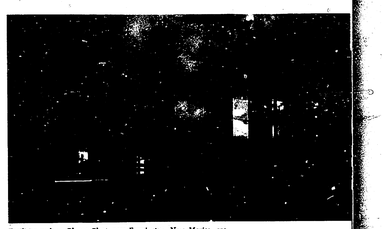
"I wear a lot of hats," Joe McWilliams said recently about his varied job. "The change of pace is one of the things I like about my work."

Superintendents at stations throughout in the system echo his sentiments.

THE COLORFUL GAS BUSINESS

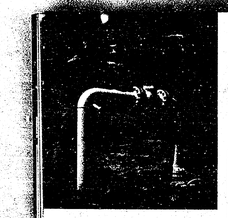
Combine the pastel-colored landscapes of the West, blend them with the brightly-painted installations of El Paso Natural Gas Company, add a luminous sky, and the result resembles an artist's palette. Some of the colors in the various plants are painted that way for ready identification of equipment — others for aesthetic reasons. But they all have their places in the colorful scheme of things along El Paso Natural's pipelines.

continued



Facilities such as Blanco Plant, near Farmington, New Mexico, are frequently beautiful at dusk. Man-made colors fade before nature's glowing skies; the clean, functional design of El Paso Natural's plants, and their isolated locations, make their silhouettes especially striking.

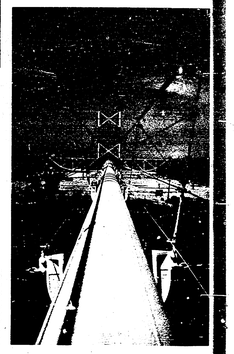
V.F.W.C.P. KODOGRAPHICS



An employee paints a flange on a blowoff near Station No. 1 in southeastern New Mexico. Orange paint is part of the Company's color code, and indicates natural gas piping. Generally there is a blowoff located on all block valves to permit purging the line when necessary.

continued

This section covers the entire spectrum, from the flat bleached colors in the noonday sun to the rich golden shadows of sunset.
El Paso Natural and Mother Nature splash their paint pots in many wonderful ways.



Brilliantly white, the span of Ehrenberg pipeline bridge transverses the Colorado River carrying natural gas into California. The white paint – made with titanium oxide, one of the most stable pigments – protects the pipe, makes it easily visible, and reflects heat.

Overhaul at Gallup Station finds men checking the gleaming pistons of reciprocating engines. Carefully painted floors in stations are covered before overhauls so they will not be damaged by heavy equipment.

Even the language lends color to the gas industry. These brushes are called pigs. Cleaning the interiors of pipelines with them is called pigging.

Metal gleams brightly in the pump room at San Juan River Plant near Farmington. The colors on equipment serve as a code to indicate the substances within the pipes or pumps: orange for gas, green for water, yellow for compressed air, and blue for oil.

U.S.B.C.F. MICROGRAPHICS
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Silhouetted against the blue sky of west Texas, men work on a catwalk grid at Midkiff Plant, south of Midland. Almost straight up at the sky, the camera recorded these two employees as they prepared to overhaul a boiler.

The rich greens and blues of the Pacific Northwest are captured in this picture as a pipeline patrol plane flies above the clouds near the summit of Mt. Rainier in Washington. It's all in a scenic day's work for aerial pipeliners in the Northwest Division who cover every mile of pipeline system, inspecting the line for possible trouble spots.

In much of El Paso's pipeline system, right-of-way patrolling is done by foot, truck, or, when the ground is muddy or covered deeply with snow, by special vehicles called snow cats and swamp buggies.

U.S.B.C.F. MICROGRAPHICS

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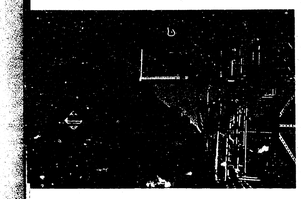
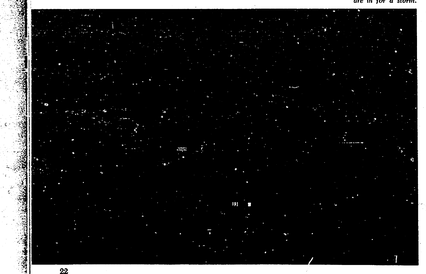
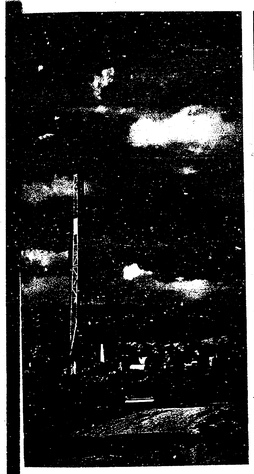


Bulky shape of tank cars and angular design of loading rack contrast to form colorful patterns of light and shadow at Wingate Fractionating Plant near Gallup, New Mexico.



El Paso Natural lends color to El Paso's skyline. The flame topping the Home Office building at left center, indicates the kind of weather residents can expect the next day. When the flame is blue the temperature will be unchanged; when the flame is gold the temperature will be cooler; a red flame indicates warmer weather is coming. When the light flickers it means El Paseons are in for a storm.



Color is a useful aid in many ways. Here a communications technician makes use of color-coded wires to trace circuits in a microwave voice transceiver.

The muted colors of the San Juan Basin, the olive-colored juniper and buff-colored sand, are accented by the man-made colors of drilling rigs and equipment. Then one day a Christmas tree valve assembly indicates the drilling was successful, or a smoothed off area indicates it was not, and soft colors again dominate the landscape.

U.S.B.C.F. MICROGRAPHICS

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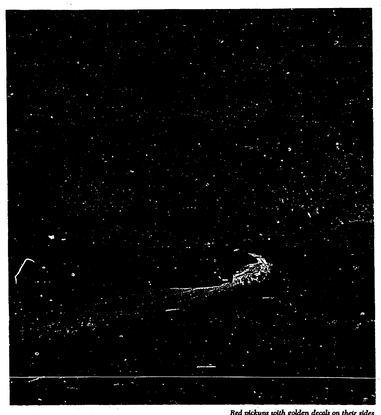

Red pickups with golden decals on their sides are familiar sights in the western states in which El Paso Natural operates. The bright color can be seen from great distances and makes it easier for field men to locate one another. In the West, El Paso Natural's red pickups help identify their drivers as good citizens and neighbors.

WHAT'S GOING ON?

C. L. PERKINS

W. D. NOEL

Management Change In Products Company

C. L. Perkins was promoted to the position of chairman of the board of El Paso Natural Gas Products Company at a meeting of the Board of Directors in September. He was named to the position recently occupied by Paul Kayser, who resigned as chairman. At the same meeting W. D. Noel, of Odessa, Texas, was elected president of the Products Company and a member of its Board of Directors.

Mr. Kayser, chairman of the board of El Paso Natural Gas Company, stated that the moves were carried out for the purpose of strengthening the executive staff of the Company.

Mr. Perkins, under this new arrangement, will have more time to devote to the growing foreign activities of the Products Company which in the past have been absorbing much of his attention. His position as senior vice president of El Paso Natural will continue unchanged.

Mr. Noel is one of the organizers and president of Odessa Natural Gasoline Company, and is a director of the American Bank of Commerce in Odessa, and of the San Angelo National Bank. For the past 25 years he has taken a prominent part in the business life of west Texas and has been particularly active in the development of both Odessa and San Angelo. He was associated with El Paso Natural in the establishment of the first petrochemical development at Odessa. He initiated the negotiations with General Tire and Rubber Company that finally led to the construction of the butadiene plant and the rubber plant at Odessa, the beginning of the refining and petrochemical complex there.

Northwest: San Juan Personnel Shifts

Two or El Paso Natural's Division superintendents changed places effective September 16. H. P. Lugus, former superintendent of the Company's Northwest Division, was transferred from Salt Lake City to Farmington where he became superintendent of the San Juan Division. Ed E. Alsup, former division superintendent of the San Juan Division was transferred to Salt Lake City where he took up the reins of superintendent of the Northwest Division.

Highway Helpers

Company employees continue to make a good name for themselves with their highway courtesy, as evidenced by this letter which was recently received.

Dear Mr. Kayser,

This is a letter of appreciation to two of your employees, whose names I do not know, but who have certainly given me a high opinion of your company and its personnel.

On September 9, I was virtually stranded between Pecos, Texas, and Carlsbad, New Mexico, due to a broken fan belt on my car. If you are familiar with this area, you will agree that it is a most undesirable place for a woman with three small boys to experience car trouble! Your two men were en route from their job on the pipeline back to their home in Jal, N. M., when they stopped to help me. They not only towed me in to Malaga and temporarily repaired the fan belt, they also followed me until they were sure I could safely reach Carlsbad and a qualified mechanic. Needless to say, I have never been more grateful.

Their kindness to me has gained your company not only a customer, but a tremendous amount of good will. You couldn't ask for two better public relations men.

Sincerely,

Mrs. Stephen C. Helbing

P.S. They drove a red Ford pickup with a New Mexico license number 6-9288.

The men who gave Mrs. Helbing aid that day were John W. Collins and Clifford P. Martin, both of Permian Division based at Jal. They had been in the field checking cathodic protection stations along the pipeline.

U.W.R.C.F. MICROGRAPHICS
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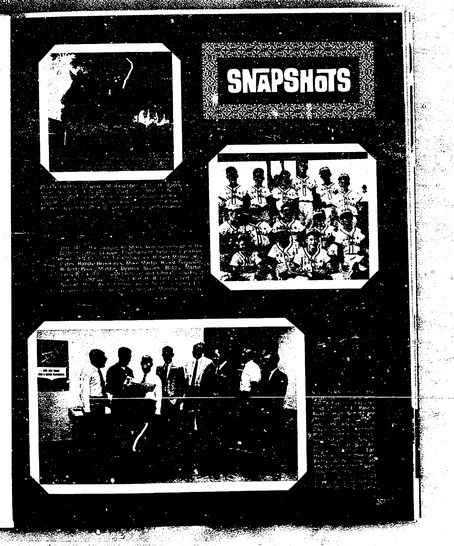
Division Safety Awards

SAFETY is its own reward—but for four installations at El Paso Natural extra safety pays off especially well. Every year the safest location in each of the Permian, San Juan, Northwest and Southern divisions is chosen to receive a handsome plaque. The men and women who staff each of these locations get a steak dinner served to them by their supervisors, and engraved cigarette lighters or money clips.

Selection of the locations is made after an evaluation of every part of the installation's performance, including the number of injuries suffered, its personnel's driving record, the maintenance of vehicles, fire records, attendance of personnel at safety meetings and at first aid classes. Any division location is eligible for the award.

One of the awards presented so far this year went to Northwest Division's Station No. 9 and District 5, near Pocatello, Idaho, which is operated as a single organization under the supervision of H. W. Moles. Another award went to the Instrument Department of the San Juan Division, located in Farmington. The department is under the direction of Garth Harshfield, instrument engineer. Both locations rated exceptionally high in all safety activities during 1962. Neither of them had any vehicular accidents, fires, or lost time injuries during the year.

Presenting the plaque to the San Juan Division location was R. W. Harris, vice-president and manager of the Rocky Mountain Region. Ralph Allen, director of employee relations, presented San Juan employees with the lighters and clips. Northwest Division employees were presented the plaque by H. P. Logan, division superintendent at the time, and now superintendent of the San Juan Division. Lighters and clips were presented by A. E. McElroy, assistant superintendent. T. J. O'Donnell, safety director, made brief talks at each of the award dinners.



V.P.I.C.P. MICROGRAPHICS

SNAPSHOTS

REPUBLIC of China soldiers acknowledge applause of Taft Boys as they march into the Arizona Club. Taft Boys were guests of the Arizona Club and Department Commander Lewis Wolfe and Post Staff.

WORLD SERIES FOR BABE RUTH LEAGUE

NINE OF THE best of more than 9,700 Babe Ruth League teams converged on Farmington, New Mexico, in August to determine the winner of the 1963 Babe Ruth League World Series. Participating were regional champions from Oak Lawn, Illinois; Klamath Falls, Oregon; Frederick, Maryland; Tulsa, Oklahoma; Oakland, California; Orange, Texas; Duluth, Georgia; Puerto Nuevo, Puerto Rico, and Frankfort, Germany. Farmington Babe Ruth League champs also had entry at two-time former present because they were the host team. ■ Competition was based at San Juan Division headquarters in Farmington called to order by Jaycee Bill Hill, chairman of the Babe Ruth League Baseball Committee for Farmington. Hundreds of fans packed the stands for every game, and Farmington merchants, realizing the value of the Babe Ruth League to the community, closed their stores, so that employees could attend the games. ■ Among the Farmington players on the Farmington team were a number of Company personnel, and several of their daughters who were princesses representing teams from the daughters of Company men. ■ The winner of the series for 1963 was the team from Tulsa.

FAST PLAY is typical of Babe Ruth League action during the series.

ELKS CLUB ushers — Charles Harper (left) and Wayne Harris.

SPECTATORS included Ed Alsup, division superintendent (left) and Doc Jones, field foreman.

TAKING TICKETS were Bill Hill, Personnel Department (left), Dispatching's Bud Rodgers.

PRETTY PRINCESSES who represented each region of the league included five daughters of employees. At center is the league's international president.

FOR TWELVE years, Babe Ruth League has provided wholesome baseball for youngsters 13, 14, and 15.

V.V.R.C.F. MICROGRAPHICS

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Southern

SPEAKERS FROM THE HOME OFFICE KICKED OFF A SERIES OF DISCUSSIONS AS OLD FRIENDS FROM THROUGHOUT SOUTH

SHOP TALK FOR SUPERVISORS

Superintendents at compressor stations, plants, and pipeline districts along the Company's stretched out system profit from an opportunity to get together with other supervisors who have the same responsibilities they have. Such meetings bring about an exchange of ideas that is important to the smooth operation of the system.

To stimulate such an exchange of ideas, the Company holds a series of meetings each year at each of the Company's four gas producing and transporting divisions. Such meetings were held recently for supervisors in the Southern Division who met in Phoenix, Arizona, and for Permian Division supervisors, who met in Midland, Texas. In all, more than 200 supervisors attended the meetings. Meetings for the San Juan Division and the Northwest Division were scheduled for October.

Speakers at both meetings were H. F. Steen, vice president and manager of pipeline operations; Estin Scearce, operating manager, Permian Division, and acting operating manager, Southern Division; Marshall Wills, director of advertising and publicity; Carlton Homan, chief engineer, and Mike Crowley, administrative assistant. T. J. O'Donnell, safety director, made a talk at the Permian meeting. Introductions of speakers for the Southern Division meeting were made by Ralph Allen, director of employee relations. F. T. Bailey, superintendent of the Permian Division, introduced speakers at the Midland meeting.

Following the talks, which lasted all one morning, superintendents at the Southern Division meeting formed into three groups, a reciprocating compressor group, a centrifugal compressor group, and a pipeline group, for discussions about the operations of their installations and departments. Permian Division superintendents divided into four groups—one devoted to gas engines and compressors, a pipeline group, a purification and dehydration group, and a group concerned with the extraction of LPG.

Permian

30 PERMIAN SUPERINTENDENTS, CONVERGING AT MIDLAND, TEXAS, HAD AN OPPORTUNITY TO DISCUSS MUTUAL PROB

DIVISION GOT TOGETHER AT THE ANNUAL SUPERINTENDENTS MEETING HELD RECENTLY IN PHOENIX, ARIZONA.

AY THEIR ANNUAL MEETING. THE MEN DIVIDED INTO GROUPS FOR HIGHLY PRODUCTIVE SHIRT-SLEEVE SESSIONS. 31

U.T.M.C.F. MICROGRAPHICS

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Train in El Paso Natural booth caught the fancy of young and old. Viewers pushed button to start it.

J. G. Sosso and son (left) chat with Andy Dineyazhe. All are from Window Rock Station.

Frank Begay, Window Rock Station, shows prize bull to Ila Francis and daughter, Navajo Station.

Watching the rodeo.

Whoa-a-a-a!

Can I ride this next, Mother?

FAIR TIME IN NAVAJOLAND

When you go to the animal fair, the nursery verse tells us, you'll find the birds and the beasts are there.

When you go to the Navajo Fair, you'll find not only birds and beasts on exhibit but also many other educational, agricultural, and industrial displays (including those of El Paso Natural and the Products Company), a carnival, a rodeo, ceremonial dances, sand painting, a fried bread contest, beauty contests, displays of authentic

Famous Navajo head includes Frank Mangold (left) Florida Station, and John E. Hale, Aneth Plant.

Stan Putnam, Products Company, Albuquerque, displays textile used in training.

Alighting.

Fried bread contestant.

Indian jewelry and other handicraft items, a scattering of tourists, and thousands upon thousands of Navajos of every age.

Scores of El Paso Natural employees from the reservation and other areas of the San Juan Division found it all this and more at the four-day 17th Annual Navajo Tribal Fair last month at Window Rock, Arizona. There were hawkers selling balloons and bird whistles, and there were numerous booths offering gustatory delights such as fried bread (a Navajo specialty), pit-roasted corn in the shucks, lamb stew, and goat-on-a-stick.

Most Fair-goers saw the Company booth, which featured a table-top model of the Wingate Fractionating Plant, scenes from other Company activities, and an aerial view of the pipeline system as it would appear to an astronaut looking west from 100 miles above Texas.

Staffing the booth were Andy Dineyazhe of Window Rock Station, Paul Parrish of Aneth Plant, John Bussell of Leupp Station, and Don Daviess, Joe Arnett and Clovis Wooten of Home Office.

The Products Company exhibited its training trailer, which is used in training service station operators and attendants. Staffing the trailer was Stan Putman.

A big event in Navajoland, as it would be most anywhere, the annual Fair grows bigger every year. Next year's presentation will be even more informational and entertaining, say Fair officials, and they invite everyone to attend.

U.S.B.C.P. MICROGRAPHICS

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YOU DO HAVE A WILL!

You do have a Will, even if you never have written one. The laws of every state provide a way to dispose of your property in case you should die without making your own wishes known. In Texas, where many Company employees work, here is what would happen to your property. Employees who live in other states would be subject to different laws, but the same basic problems would be encountered if persons of either sex die without leaving legally binding instructions as to the settlement of their estates.

Your property would go to your children.

Even though your children may be very young and unable to use your property themselves, Texas law provides that they get half of the property acquired by you and your spouse since your marriage. The other half is already owned by your spouse under Texas' community property laws. If you want your spouse to get your share of the property, so that he or she can rely upon your joint savings to care for your children, you had better have your own Will drawn.

The Court would appoint an administrator.

Unless you make up your own mind who should be trusted to settle any debts against your estate (including medical or funeral expenses and taxes) the Judge of the Probate Court of your county may under certain conditions appoint any person he thinks is qualified to do the job. This person could be a stranger to you and your family.

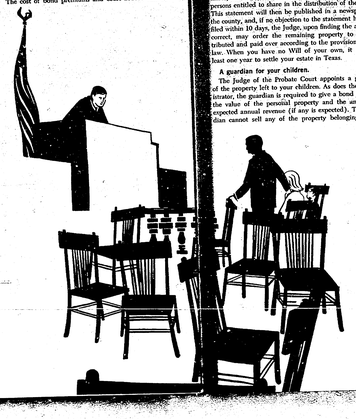
Safeguards for your estate.

To make sure the administrator does not waste or misappropriate your estate he must be bonded by a surety company or by personal sureties. Furthermore, the administrator will be permitted no action pertaining to your estate without first making an application to the Judge of the Probate Court and obtaining an order from him approving the action.

If it should be necessary to sell your home or other real estate to pay the debts of the estate, the administrator must prepare and file an application for the sale in the Probate Court. The Judge must approve the sale before it takes place. After the administrator finds a purchaser, he must report back to the Court for additional approval before the sale can be confirmed. The administrator may be required to make an additional bond in the amount for which the property has been sold.

The expenses of administration.

The cost of bond premiums and court actions can be



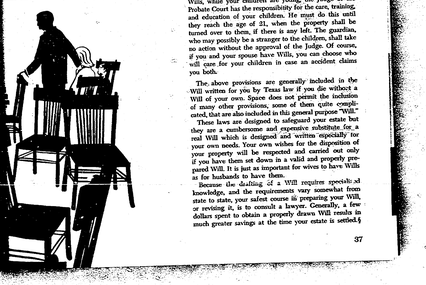
rather expensive and they are paid out of the estate's funds. In addition, the administrator receives five per cent of all money that comes in, and five per cent of all money that he pays out, as a fee for his services.

Closing the estate.

To make sure all claims against your estate have been paid, the administrator must spend at least one year in winding up the estate. After a year has passed, he prepares and files in the Probate Court a final statement under oath showing all property that has come into his hands, all money received, all money paid out, and all persons entitled to share in the distribution of the estate. This statement will then be published in a newspaper in the county, and, if no objection to the statement has been filed within 10 days, the Judge, upon finding the accounts correct, may order the remaining property to be distributed and paid over according to the provisions of the law. When you have no Will of your own, it takes at least one year to settle your estate in Texas.

A guardian for your children.

The Judge of the Probate Court appoints a guardian of the property left to your children. As does the administrator, the guardian is required to give a bond covering the value of the personal property and the amount of expected annual revenue (if any is expected). The guardian cannot sell any of the property belonging to the children to provide for their maintenance or education, or take any other action concerning the property, without first making a written application to the Judge. It is necessary to obtain an order signed by the Judge approving such action.



After selling property, the guardian must get another order from the Judge confirming the sale, and the guardian may be required to make an additional bond for the amount of the sale price, in the same way as is done by the administrator.

Even though the guardian selected by the Judge is your spouse, the same rules apply.

Additional protection for your children.

In addition to the preceding regulations, your children will be protected further because the guardian is required to prepare and file a sworn statement showing the condition of your children's portion of the estate each year. This statement includes an accounting of the property on hand, all receipts, and all disbursements. The guardian will be allowed a fee of five per cent of all money collected and of all money paid out for their benefit. These fees, and the annual premiums of the guardian's bond and sales bonds, court costs, and all other expenses are paid out of the funds belonging to the children.

If both parents die.

If both you and your spouse should die, neither having Wills, while your children are young, the Judge of the Probate Court has the responsibility for the care, training, and education of your children. He must do this until they reach the age of 21, when the property shall be turned over to them, if there is any left. The guardian, who may possibly be a stranger to the children, shall take no action without the approval of the Judge. Of course, if you and your spouse have Wills, you can choose who will care for your children in case an accident claims you both.

The above provisions are generally included in the Will written for you by Texas law if you die without a Will of your own. Space does not permit the inclusion of many other provisions, some of them quite complicated, that are also included in this general purpose "Will."

These laws are designed to safeguard your estate but they are a cumbersome and expensive substitute for a real Will which is designed and written especially for your own needs. Your own wishes for the disposition of your property will be respected and carried out only if you have them set down in a valid and properly prepared Will. It is just as important for wives to have Wills as for husbands to have them.

Because the drafting of a Will requires specialized knowledge, and the requirements vary somewhat from state to state, your safest course in preparing your Will, or revising it, is to consult a lawyer. Generally, a few dollars spent to obtain a properly drawn Will results in much greater savings at the time your estate is settled.

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TOURNAMENT WINNERS included (from left) Chuck Cheshire, third flight; Chuck Chesbro, winner, second flight; Burrell Anderson, third place winner, second flight, and Tom Pofahl, who was the winner of the fourth flight.

THIRD PLACE, runner-up, and first place winners of the fifth flight were (from left) Leo Young, Burt Johnson, and Jim Bexley.

FIRST FLIGHT winners were (left to right) Kim McAbee, first place; Don Brent, runner-up, and Bob Kautz, third lowest score.

WINNERS of the third flight were (from left) Carlton Thomas, third place; Bill Zuccaro, first; Don Janssen, runner-up.

HOW GREEN WAS MY FAIRWAY

When the little white ball lofted straight from the tee down the middle of the fairway, veering neither right nor left, the player felt great. When it didn't, well . . . he could do nothing but choose another club and battle the sphere out of the woods, the rough or the sand trap.

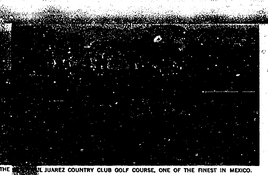
When the ball landed fair on the green and rolled to a stop near the cup, the player felt great. When it didn't . . . well, he could do nothing but aim his putter carefully and hope for the best.

There was a lot of shooting, battling, aiming and hoping last month when members of the El Paso Natural Gas Company Employees' Golf Association met for their second annual tournament at the Juarez Country Club in Mexico just across from El Paso. One hundred fifteen players from the El Paso area eagled, parred and bogied their way over the handsome fairways and elevated greens of one of the finest courses in the area.

Tournament medalist (for the lowest gross score) and also championship flight winner was Bud Henderson, who scored a gross of 146 strokes on the 36 holes, and a net (gross minus handicap) of 128. Other winners: first flight, Kim McAbee; second flight, Chuck Chesbro; third flight, Bill Zuccala; fourth flight, Tom Pofahl; fifth flight, Jim Bexley.

Trophies and gift certificates were presented at a luncheon in the clubhouse following completion of play on the second weekend of play. New officers for next year also took over their duties at that time. Bill Norville is next year's president; Whitney Stevens, vice president; Will Bonneau, secretary. Outgoing officers are Will Bonneau, president; Don Ehrlich, vice president; Bill Norville, secretary. Burrell Shaw was re-elected treasurer.

COMPANY PLAYERS AT THE 18TH HOLE OF THE



EL JUAREZ COUNTRY CLUB GOLF COURSE, ONE OF THE FINEST IN MEXICO.

OFFICERS of the golf association were (from left) Bill Norville, president; Bill Norville, secretary; Don Ehrlich, vice president, and Will Bonneau who was president.

DON BRENT putts his way into the cup.

BUD HENDERSON was winner of both the championship flight and medalist trophy.

SMOOTHLY, smoothly, and into the rough!

HAROLD GEDDES PUTTS, AS JACK PALMORE,

L, JACK THOMPSON, JERRY HICKSON, WILL BONNEAU, WATCH

THE END OF THE LINE—AFTER ALMOST FOUR MILES OF GOLF.

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DO YOU KNOW

These Facts About Your Industry?

If all the natural gas pipelines and mains in the nation – which now total 697,000 miles – were laid end to end they would span the distance between the earth and the moon more than two and a half times.

Total revenues from the sale of gas reached $6.4 billion in 1962 and is expected to hit $7 billion this year. By the end of the decade, gas sales revenues are expected to soar to $10 billion.

Increasing numbers of new buildings throughout the country contain their own "utility plants." By using natural gas turbines and natural gas engines, apartments, schools, office buildings and other structures provide all their own energy, including electricity. There are about 50 such buildings planned or completed.

Many young geologists have joined the never-ending search for natural gas. When they find a likely location, giant drilling rigs are used to probe the ocean floor seeking another of nature's gas storehouses.

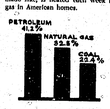
Natural gas was produced by reducing of carbon dioxide and hydrogen mixtures during a four-year study completed recently for the American Gas Association. Because of low-cost natural gas available for the foreseeable future, A.G.A. said there are no plans to produce synthetic gas, however.

The nation's gas industry, which includes pipeline companies, expects to spend $1.8 billion on construction during 1963. By 1965 construction necessary to keep pace with customers' demands will begin to exceed $2 billion annually.

Despite its emergence as one of the great forces in the nation's economy, the gas industry is still a local business. Across the nation almost 1,400 gas utilities continue to give their traditional service to homes, businesses and industrial plants.

More homes are heated by gas in California than in any other state in the nation. It is estimated that 4.5 million homes in the state use gas for heating.

Twice as much water as is held by Lake Mead, the nation's largest man made lake, is heated each week by gas in American homes.



Natural gas now provides 32.5 per cent of the nation's energy requirements. Just 15 years ago, natural gas supplied only 15.5 per cent. The largest supplier is petroleum, with 41.2 per cent. In third place is coal, which supplied 22.4 per cent, compared with 47.2 per cent 15 years ago when it was the nation's leading source of energy.

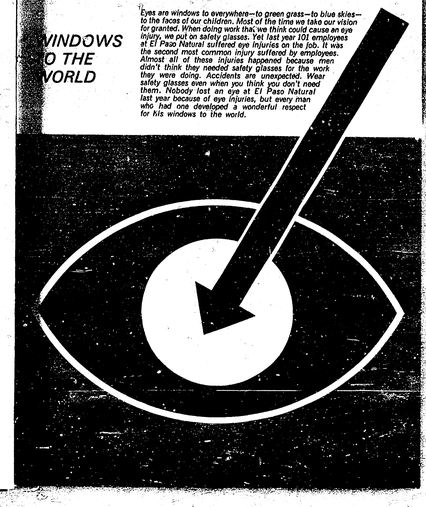
During the past decade, use of gas in the nation's homes has more than doubled. In this same period, residential gas customers have increased a total of 33.8 per cent, or an average of about 800,000 annually.

RETIRED

James N. Wilbourn, painter, Gila Station, has retired. He joined the Company in 1950 as a utilityman in the Compressor Department, station maintenance in El Paso.

WINDOWS TO THE WORLD

Eyes are windows to everywhere—to green grass—to blue skies—to the faces of our children. Most of the time we take our vision for granted. When doing work that we think could cause an eye injury, we put on safety glasses. Yet last year 101 employees at El Paso Natural suffered eye injuries on the job. It was the second most common injury suffered by employees. Almost all of these injuries happened because men didn't think they needed safety glasses for the work they were doing. Accidents are unexpected. Wear safety glasses even when you think you don't need them. Nobody lost an eye at El Paso Natural last year because of eye injuries, but every man who had one developed a wonderful respect for his windows to the world.



U.T.E.P. ICOGRAPHICS

Join the Nelsons for top comedy this fall – Wednesday nights on ABC. This season's brand new series is sponsored in part by member companies of the American Gas Association. Jinx Falkenberg, the gas industry's "first lady of television" will be presenting the gas commercials to customers and prospects all over the nation. The A.G.A. is also participating in ABC's Wide World of Sports and American League Pro Football. Watch them all this fall on ABC.

El Paso Natural Gas Company

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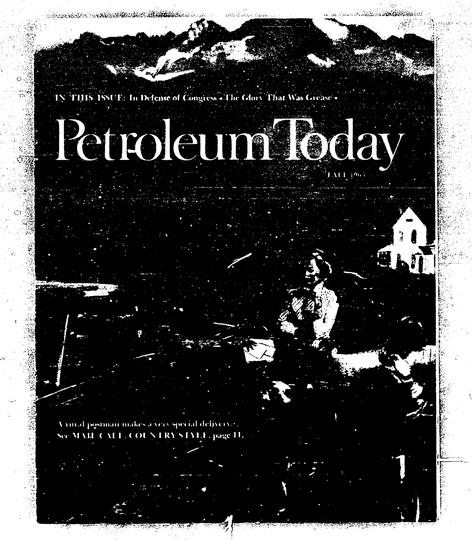
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Petroleum Today
A rural pipeman makes a very special delivery...
See MAIL CALL, COUNTRY STYLE, page 11.

V.F.W.C.P. YOCOGRAPHICS

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Frank N. Ikard, *President*

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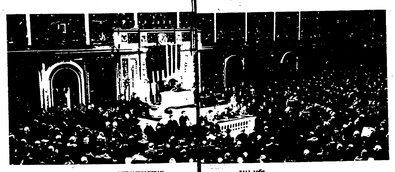
In Defense of Congress

FRANK N. IKARD, president of the American Petroleum Institute and a former Member of Congress, discusses recent demands for the drastic reform of our National Legislature. He finds them based upon misconceptions of the nature and functions of that body.



ATTACKS upon the legislative branch of our government are hardly a new phenomenon. Congress has long been a prime target for criticism, much of it anything but gentle.

In the last century, for example, a Cabinet officer stated flatly: "A Congressman is a hog. You must take a stick and hit him in the snout." If that seems to be an extreme statement, then read what a national magazine had to say on the same subject just a few months ago: "The Congressional system protects and sometimes even seems to nurture a cast of playboys, time-wasters, knaves, and demagogues."

I am not disturbed by such absurdities—though I confess that I sometimes wonder just how a nation governed so poorly has managed to survive, much less prosper. Neither am I bothered by constructive criticism aimed at helping the Congressman to do his job better. I am very much disturbed, however, by the increase in recent years in the serious demands for drastic reform of Congress. For it indicates to me that a growing number of Americans believe that Congressmen either cannot or will not perform their proper functions.

This function, as it was established by the men who framed the Constitution, is based upon two guiding principles. The first is that prospective laws must be carefully examined, and deliberated over, by the elected spokesmen of those to whom the laws would apply; that is, by the representatives of all the people. The second principle is that these spokesmen for the people must have sufficient powers to provide a check on and a balance to the judicial and executive arms of government.

Thus, as his first duty, the Congressman must represent his constituents—with all their various and often conflicting points of view on any given subject. At the same time, he must carefully and painstakingly examine every aspect of a proposed piece of legislation.

Obviously, under these conditions Congress cannot be expected to move very rapidly on any particular issue. Obviously, this was the way the Founding Fathers intended it. Yet it is on this very issue that many of the critical attacks on Congress are based. Commonly the attack is contained in some such phrase as "do-nothing Congress." But whatever form the attack takes, the critic has action in mind. He means, "Don't just stand there, Congressmen—do something!"

Such critics believe that the slowness of congressional deliberations is a weakness. Actually, it is a strength. It guarantees consideration for individuals, it preserves freedom, it protects property—as representative government is intended to do.

Moreover, there are times when it is best to do nothing. Senator J. Glenn Beall of Maryland recently made the point most forcefully:

"By some distorted logic, the worth of a legislative session has come to be judged by the number of laws enacted. If these are numerous, Congress is thought to have done well; if the number of bills sidetracked is high, the session is deemed a failure. This misconception indicates that we have forgotten the whole theory of our form of government. . . . The true measure of a Congress could very well be the measure of bad bills it refuses to pass."

When Senator Beall mentions the "theory of our form of government," he has something specific in mind; namely, the check that Congress, by constitutional mandate and by tradition, puts on the executive branch of our government. For criticism of congressional "slowness" and of "do-nothing Congresses" is often but a prelude to demands for a surrender of substantial congressional powers.

Commonly such demands are based upon this kind of reasoning:

Under our present system, when the chief executive proposes a program to meet important issues, he sometimes cannot even get his program to a vote. When it does come to a vote, it is often defeated. What is required, then, is to make Congress subordinate to the executive branch or, at the very least, to change our system to the parliamentary system in which the chief executive is the majority leader and can always get his programs voted on.

NOW, IT IS TRUE that some desirable legislation has not materialized because it was bottled up in committee or talked to death by filibuster. But it is equally true that at one time or another every shade of political opinion in this country has benefited because delaying tactics of some kind were available. The lengthy debates that characterize a congressional session bring issues to a point, inform

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the public on the particulars, and serve to prevent the nation from being stampeded along dangerous or undesirable paths.

How prevalent is the serious criticism of Congress? I would cite two recent examples of such criticism, both delivered by members of the U.S. Senate itself.

One Senator declared that Congress is subject to such influences as the frequency of elections and the pressures of party organizations, influences that "do not encourage serious and sustained study of international relations. . . . Accordingly, I think that we must contemplate the further enhancement of Presidential authority in foreign affairs."

The other Senator spoke out even more strongly for an expansion of executive power at the expense of Congress. "Surely," he said, "we have reached the point where we can say, for our time at least, that Jefferson was wrong: that government is not best which governs least. . . ." His call for increased control by the Federal executive included the following statement: ". . . I have no hesitation in stating my deep conviction that the legislatures of America—local, State, and National—are presently the greatest menace to the successful operation of the democratic process."

The latter Senator also made a reference to a broader subject, one that encompasses the threat to congressional independence and, in my view, to the individual citizen himself. The Senator said that the "nightmare of Federal control which haunts the dreams of our conservative friends is a hallucination."

In this connection, I should like to call your attention to some remarks made recently by another member of the U.S. Senate, Senator Harry F. Byrd of Virginia. More than 50 million people, he pointed out, are receiving Federal payments that total more than $50 billion each year. "These recipients," he said, "with their families, could total half our population." Senator Byrd added: "Name an area of endeavor, and the chances are there is a Federal subsidy program to go with it. . . [and] every Federal payment takes its toll in centralized restraint and control."

The operative word is "control"; and I would suggest that it is, in our day, something more than a hallucination. I think, for example, of the proliferation of executive and administrative agencies in Washington. Many of those who believe that Congress, with its diverse local loyalties, is too big and too slow moving to meet the needs of the mid-20th century would have Congress pass some of its powers to those agencies as well as to the chief executive. These critics hold that the nation needs more efficiency, more central planning.

I have come to be suspicious of that word "planning," particularly when it is used in connection with our economy. It carries the implication that the private sector of our economy is somehow failing and that only the public, or governmental, sector can set things right—presumably with more rules, more ceilings, more regulations.

Yet it is inconceivable to me that our economy would be stronger and healthier if more business decisions were made in Washington and fewer were made in the marketplace. As a matter of record, private decisions by consumers and the business managers who compete to serve them have done pretty well so far. Our current gross national product, for example, is running at an unprecedented annual rate of $560 billion. . . .

This is a tremendous accomplishment, unequaled at any time in any other nation in the world. We should not now delude ourselves with the belief that pianuation—with all its controls—can somehow substitute for an economy based on intense and imaginative competition among free men.

It seems to me that those who would drastically change our economic way of life have something in common with those who would change the traditional relationship between Congress and the executive branch of government. Both sets of critics believe they are working toward greater efficiency. Actually, in both cases, they are guilty of the same error: quarreling with success.

It is in part because Congress is a slow, deliberative body that our structure of laws is so sound. The rules and interpretations that shape congressional action do not preclude change. They do demonstrate, however, because they have served us so very well, the wisdom of caution—of building carefully from precedent to precedent.

Likewise, the strengths of our form of government can in large measure be attributed to the checks and balances built into the relationship among the three separate branches of government. The history of Congress is a tribute to the wisdom of the Founding Fathers in this regard.

There is today, perhaps to a degree unmatched in the past, a need for serious and thoughtful critics to point up the weaknesses that may appear in the structure of our representative government. Somewhat like the prophets of old, they warn us of pitfalls and wrong turnings that may lie ahead. But it seems to me that we also have a great need for citizens who will speak up and say what is right with our governmental system.

Let it be known that representative government today is not some kind of noble experiment now drawing closer and closer to a tragic end. Rather, it is the steady and ever-developing fulfillment of an ancient and magnificent dream.

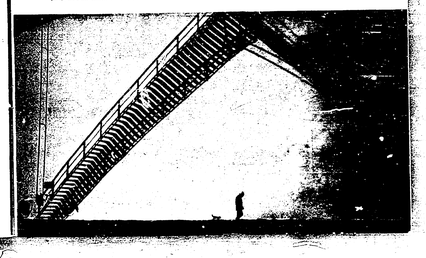
Efficiency is a cat called Tom

The oil refinery in Port Arthur, Texas, is an imposing complex of pipe and equipment representing a company's substantial investment in manufacturing efficiency. It is also the home of a cat called Tom.

Most photographers assigned to capture the refinery on film are impressed by the size or the geometry of its tanks and towers. The closest they come to photographing fellines is an understandable concentration on one of the refinery's most imposing edifices —the catalytic cracking towers, known within the industry as a cat cracker.

When photographer Toni Frissell visited the refinery, however, she was captivated by Tom and his friendship with J. E. Perkins, a gauger. Perkins' job includes the measuring of oil products in storage, and he finds Tom an agreeable companion on his lonely walks among the storage tanks.

"We take good care of him," Perkins reported, "and he earns his keep. Not only is he good company, he's an efficient mouser too."



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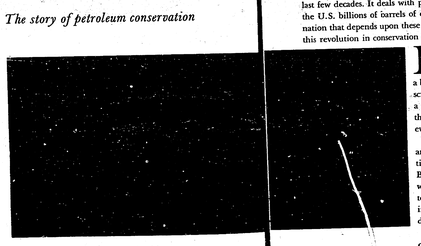
The Quest for the Last Barrel

The story of petroleum conservation

by RUSSELL R. JARVIS

MAN IS NOT AN INHERENTLY PRUDENT ANIMAL. He is inclined, for example, to accept the bounties of nature as no more than his just due and to use them carelessly, thoughtlessly, with little concern for the future. Only when he comes to place a value on these bounties, only when he realizes that the supply of a natural resource is not limitless, does he learn prudence. The long and sometimes painful history of conservation in America is a dramatic case in point.

One of the most colorful chapters in that history has been written within the last few decades. It deals with petroleum conservation, a movement that has saved the U.S. billions of barrels of oil and trillions of cubic feet of natural gas. For a nation that depends upon these natural resources for 74 percent of its energy needs, this revolution in conservation is a matter of no little importance.



"Out of the early confusion and mistakes there grew a movement that has brought benefits to every section of the nation."
A drilling rig is silhouetted against the day's last light.

RUSK COUNTY, TEXAS, has gently rolling hills wooded with pine and oak. In the fall of 1930 the people of the county were struggling under a burden of grinding poverty. Usually they managed to scratch out a living raising cotton and corn or running a few head of cattle; but that year the crops had failed, the Depression was upon them, and they despaired of ever getting out of debt.

There was little entertainment in Rusk County, and less money to pay for it. The best show was a continuous performance playing on the farm of Mrs. Daisy Bradford. There a well known as Daisy Bradford No. 3 was being drilled in search of oil, and the farmers often took their wives and children out to watch the proceedings. Sometimes they took a picnic lunch and made a day of it.

Columbus M. "Dad" Joiner had been trying to find oil in East Texas for seven years. He was 70 years old, an age when other men might have given up the search. But he kept at it, and the farmers and their families who came to watch wished him well. An important oil strike could revitalize the county's economy.

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Most of the visitors had gone home on the night of Friday, October 3, when a workman heard a gurgling sound from deep within the earth. A few seconds later a stream of oil shot over the top of the 118-foot derrick. Dad Joiner had his producing well, and the farmers of Rusk County were 16,706 on the road to prosperity.

The successful completion of Daisy Bradford No. 3 was not an end but a beginning. In the months that followed, it became evident that Dad Joiner's well had opened up a gigantic oil reservoir: the East Texas field, largest in the nation.

Oilmen and oil equipment began crowding into the area. Vehicles of every description choked the roads. The cost of leasing an acre shot up from $10 to $500 and even $1,500. New discoveries in the following months brought more thousands of prospectors to the county. New towns sprang up—collections of green-lumber shanties to dispense food, clothing, and other necessities (as well as pleasures) to the hordes of speculators and drillers pouring into the new oil empire.

A plethora of rigs

Suddenly the countryside was dotted with drilling rigs, sometimes crowded base to base. In one week a new well was completed oftener than once an hour. In Kilgore, it was said, you could walk from one end of town to the other on the drilling rig floors and never touch the ground.

Within a year after Dad Joiner's well came in, East Texas was producing 500,000 barrels of oil a day from 1,600 wells. It seemed, on the face of it, to be the most successful oilfield in history. But the nation, its industries beginning to feel the effect of the Great Depression, could not absorb the vast new oil supplies. The drillers, who had staked their all on bringing in a well, found that their oil was selling for as little as a dime a barrel. The more oil they produced, the less it was worth.

The men who pioneered the East Texas field were expert mechanics and artists with a drill bit, but they had only a limited knowledge of the oil reservoir beneath them. They could not know the damage their gushing wells were causing below the surface of the earth. They could not know that unless some action were taken, the larger share of the oil in the giant East Texas field would become unproducible—lost to future generations.

But action was taken, and here was perhaps the most important result of Dad Joiner's big discovery. Out of the early confusion and mistakes of East Texas there grew today's petroleum conservation movement, a movement that has brought benefits to every section of the nation.

The East Texas field itself is an outstanding example of these benefits. If the field had continued under wide-open production, it ultimately would have yielded 1 billion barrels of oil now, with proper procedures, the total yield is expected to reach 6 billion barrels of oil.

Such conservation achievements could not have taken place without the vastly increased scientific knowledge that has come within the last three decades. Neither could they have taken place without important changes in the laws governing oil exploration and production.

A century ago, when men first drilled in search of oil and quarreled about it, the courts based their decisions upon a principle of common law. The principle held that the owner of a tract of land owned all the substances thereon and thereunder from the center of the earth to the infinite reaches of space projected above his boundaries. It was soon recognized, however, that oil presented special legal problems.

As one court put it, oil and gas have a "fugitive and wandering existence." A reservoir of oil may lie equally under tracts of land owned by two neighbors; but if only one neighbor drills a well and brings up oil, he will eventually be draining oil not only from beneath his own land but from beneath his neighbor's land as well. If the second neighbor does not drill another well to "capture" his oil, it will run away and be forever lost to him.

Faced with this dilemma, the courts of most states evolved a solution known as the "law of capture." It held that the owner of land beneath which there is oil has no interest in such oil until it is produced—until it is actually "captured" by him. If a well on a neighboring tract of land is draining off his oil, he has no recourse but to go and do likewise—that is, to drill a well on his own land as fast as he can and hope to offset the effect of his neighbor's well.

A frenzied race for oil

This ruling left neighboring landowners in much the same stance as two children, each with a straw, sharing an ice cream soda. Oil production became a frenzied race to see who might get the most oil out of the ground the fastest. Unfortunately, in practice the oilfield was not the ice cream parlor, and the "law of capture" was generally translated as the "law of the jungle." And the wide-open production that followed had tragic consequences beneath the earth's surface.

Underground oil deposits are commonly called pools or reservoirs of oil, but the terms are misleading. The oil is actually contained in the tiny pores of sedimentary rocks, much as water is contained in the vastly larger pores of a sponge. Petroleum moves upward through such rocks until it is trapped by surrounding nonporous rocks. There it remains unless and until the driller's bit searches it out.

While waiting for the bit, oil, gas, and water usually arrange themselves in natural order—the natural gas, being the lightest, on the top; then the oil; finally the water. Sometimes the gas is dissolved in the oil. The three are under pressure, straining upward to get past the nonporous rock above them.

"The key to efficient oil production is pressure maintenance. The modern oilman controls production so that the natural underground pressures are economically utilized."
A lonely pumping well draws oil to the surface.

A wasteful phenomenon

If and when the driller's bit penetrates the confining section of nonporous rock, the gas and water rush toward this exit, carrying the more sluggish oil with them. In some cases, particularly when there is a large quantity of gas dissolved in the oil, the pressure is sufficient to send oil and gas rocketing up the well and out over the landscape in the form of a gusher—a dramatic but wasteful phenomenon that has virtually disappeared with the advent of modern control equipment.

Crude oil is by nature a slothful material. It will move only so long as there is a propelling agent. When the pressure is reduced beyond a certain point, the oil will cease moving toward the surface.

If the driller wishes to get the most oil possible out of a reservoir, he controls the underground pressure, allowing the oil to come to the surface at a slow and steady rate. If the driller cared only about getting oil out of a reservoir as fast as possible, he would let the well flow, grab what he could, and leave the scene when the pressure dropped and the well ceased flowing. If dozens of drillers attacked an oil reservoir in this fashion, the pressure would soon be exhausted and the larger portion of the oil would remain underground, unproduced and economically unproducible.

A century ago such elementary production methods realized only about 25 percent of the oil potential in newly discovered reservoirs. The "law of capture" was the order of the day. Over the years some efforts were made to prevent the irresponsible development of oilfields, but by and large the efforts failed.

Then the East Texas and the Oklahoma City fields came in. The boom that erupted in Oklahoma City paralleled that in Kilgore and the other East Texas towns. Forests of drilling rigs appeared; tractors pushed houses aside to make way for them. In both fields the property above the oil reservoirs consisted of thousands of individually owned tracts of land, and the "law of capture" was followed with abandon.

Texas and Oklahoma had other laws on their

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books, laws that sought to prevent surface and underground waste of oil; but despite the efforts of responsible oilmen, the laws were little heeded. When, in 1931, these laws were invoked to curb the wide-open production in the two fields, they were generally ineffective. Finally the two states were forced to shut down the fields.

It was obvious that concerted state action was necessary if a petroleum conservation program was to be effective. A preliminary step toward cooperation among the states was taken in 1931 when representatives of several oil- and gas-producing states formed the Oil States Advisory Committee to study the problem. The committee met several times during 1931-32, spurred on by the events in Oklahoma City and East Texas.

In 1933 the oil industry, along with most of the nation's other industries, was subjected to substantial Federal regulation with the passage of the National Industrial Recovery Act. The NIRA was in effect for two years before being declared unconstitutional by the U.S. Supreme Court. In the same year (1935) that saw the demise of the NIRA, two congressional actions opened the way for effective petroleum conservation in America.

The first congressional move was the passage of the Connally "Hot Oil" Act, prohibiting the movement in interstate and foreign commerce of oil produced in contravention of state law. The act was intended to put much-needed teeth in the state conservation laws.

Interstate Compact approved

Later that same year Congress passed the Interstate Oil Compact Act, providing a framework for voluntary cooperation among the producing states. The Interstate Oil Compact Commission (IOCC) was set up as a fact-finding and technical agency. It has no power to enforce conservation measures in the member states, but in practice the IOCC has played an important part in encouraging and aiding member states to check the waste of oil.

Oil conservation laws, as they have been evolved by state conservation agencies working with the IOCC, have two main objectives: (1) the prevention of waste, both immediate and ultimate, in the production of petroleum and (2) the safeguarding of the rights of individuals under whose land an oil reservoir lies. The two objectives dovetail; for as scientists have learned more about oil reservoirs, they have found that optimum production can be effected when a reservoir is treated as a whole rather than as dozens, or even hundreds, of separate tracts of property.

The key to efficient oil production is pressure maintenance. The modern oilman controls production so that the natural underground pressures are economically utilized. He sometimes maintains these pressures by injecting gas or fluid into a reservoir. By determining the physical characteristics of a reservoir, he is able to know the rate at which the oil should be produced to assure maximum economic recovery.

Learning the details of a reservoir, maintaining underground pressure, and controlling the rate of production—all these imply treatment of the reservoir as an entity. A single leaseholder who refused to cooperate in the development of a reservoir could foil the best-laid production scheme. He might, for example, allow several wells to be drilled on his property, rapidly exhausting the natural underground pressure.

Individual rights protected

Thus most state conservation agencies have sought to amend the "law of capture." Legislation has been enacted to insure proper well spacing in a field and to assure leaseholders that they will receive their fair share of oil and gas revenues without having to drill unnecessary and undesirable wells. In this way, either by law or, in some states, by voluntary agreement among the various parties, optimum production practices can be followed, and the individual leaseholder's interest in the reservoir can be protected.

A producing well normally goes through three stages. A flush well flows by itself. A settled well must be pumped, but it still has considerable pressure and considerable production. A stripper well has lost virtually all its pressure and produces little oil. In recent years, with advances in technology and reservoir management, many wells and oilfields are experiencing still another stage—secondary recovery.

Modern oilmen are going back to fields that were developed in the early days of the industry. Engineers are now able to recover some of the "lost" oil by repressuring the oil reservoirs—by pumping gas or air or water into the rock structures to push the shrinkage oil into the well bottom, whence it can be pumped to the surface.

Thus the business of oil production has come a long way since the day when a workman heard the first rumble of the oil strike that was Daisy Bradford No. 3. Modern conservation techniques and attitudes have virtually eliminated gushers, and wild boomtowns are things of the past. Scientists working with state conservation commissions are helping to assure the nation of a continuing supply of essential fuel. Even the damage done by the wide-open production of the early days is to some degree being repaired by secondary recovery.

Perhaps the distance the industry has traveled in the last few decades is best told, however, in a single statistic. In the era of the gusher about 75 percent of the oil in a reservoir might have been left unproduced. Today, in the era of conservation, it is not unusual for a field to yield up to 75 percent of its oil. And in the decades to come, even that percentage may be expected to grow with the increased knowledge and the improved technology of future oilmen.

Powder Puffs and Pistons

by Jack B. Kemmerer

THE PERT YOUNG WOMAN, TRIM IN HER TAILORED SUIT, guided her auto through the heavy rush-hour traffic along the freeway. Suddenly she realized that her steering wheel was pulling to the left.

It would have been a moment of desperation for most of the the nation's lady drivers, but not this one. Quickly she diagnosed the problem as a tire about to go flat. She eased her car onto the freeway's emergency parking ramp.

A look at the left front tire confirmed her suspicions. She opened the trunk of the car, removed a blue smock and a pair of work gloves from a plastic bag, and set to work. In a matter of minutes the jack was out of the trunk and under the bumper, and the car's nose was in the air. Another few minutes and the low tire was off and the spare tire on.

Just as she was preparing to release the jack, a motorcycle officer pulled up to offer assistance. "I've already changed it," said the lady motorist. And when the officer expressed amazement, she merely smiled and pointed to a sticker on the windshield of her car. It read: "I Took the YWCA Auto Mechanics Course."

The heroine of this tale learned her way with autos at a class called "Powder Puffs and Pistons," sponsored by the YWCA in Santa Ana, California, some 35 freeway-miles south of Los Angeles. She is part of a growing number of lady drivers whose pleasure in driving is multiplied by the fact that they know something about what makes cars tick.

Car-care courses for women have been offered by local YWCA's for close to 10 years. The classes have been conducted in all parts of the country, from Pawtucket, Rhode Island ("Gasoline and Glamour"), to Miami, Florida ("What's Cooking School"). They differ from town to town. Some are taught by garage mechanics or service station dealers, others by amateur handymen or school teachers; some are strictly classroom courses, others are conducted at garages and other "field" sites. But all the courses are based upon a common conviction that a little knowledge about autos can be a most beneficial thing.

Mrs. Betty Glassock, director of adult activities at the YWCA at Santa Ana, first considered conducting such a course almost three years ago. "Most of my time," she says, "is occupied with charm classes, dancing, bridge, fashions. I'm always looking for ideas for new kinds of classes. The auto class sounded just right."

She gathered information about the subject. Then she started looking for an instructor. "I couldn't get a man within 100 miles of Santa Ana to take me seriously," she recalls. "They burst out laughing. They thought it was hilarious. One public school auto-mechanics teacher even had the nerve to say that women are 'too dumb' about such things."

The search was in its sixth month when Mrs. Glassock met Wade Herrin, a service station dealer in Santa Ana. He, too, was dubious about teaching

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the course, but for reasons quite different from those the other men had given. Herrin doubted his ability to handle any class, but particularly a class composed entirely of women.

Wade Herrin is thin and wiry, taller than average, and very much of a rugged individualist. He entered the service station business in Amarillo, Texas, in 1940, served all—six five years in the Army Air Forces during World War II, and has operated his station at the same location in Santa Ana since 1948.

"This is a tough business," Herrin says. "Plenty of competition, always something new. For example, my competitors nearby give trading stamps. Not me. All I offer is a good product and as good service as you can find."

Employees are loyal

Herrin does well with his formula. He has 12 employees to help him run the station, which sells upwards of 40,000 gallons of gasoline a month. His number one man has been with him for 16 years, the next man for 13 years.

When Mrs. Glancock approached him about training a course for women, Herrin hesitated: "It's not exactly in my line," he commented. But once he had agreed to take on the chore, he worked hard at it. And he was a notable success.

His first class, in the fall of 1960, had an enrollment of 29 women, and 25 finished the course. The second class started with 24 students and finished with 21. The percentage of those completing the courses is hailed by Mrs. Glancock as being unusually high for the adult education field.

"We have had one big problem with this course," Mrs. Glancock says. "All the other classes at our building would be over and gone, and the Powder Puffs would still be going strong. I believe they would have kept Wade there all night if we had let them."

The course runs for an hour and a half each week for eight weeks. Using various kinds of illustrations, Herrin explains how the automobile engine works, the factors involved in an engine tuneup, the importance of a number of safety procedures. He uses actual auto parts to demonstrate minor repairs, such as replacing blown fuses. He also explains various types of major repairs and impresses upon his students the importance of doing business with authorized and reliable repair men.

Herrin learned early, he says, the necessity of sticking to one subject at a time. For example, in explaining the brake assembly, he mentioned the cooling system, which the class had been discussing earlier. Immediately one lady asked: "If the car needs water, will it cause the brakes to fail?"

One class meeting is held at Herrin's service station. Herrin has an engine disassembled and carefully washed so that his students won't get their dresses soiled. They reassemble the engine at his direction. They also learn to take a flat tire off a car and put the spare tire in its place.

Before a Powder Puff course is done, Herrin finds that the ladies have asked questions about virtually every aspect of buying, owning, and operating an auto. And he has tailored his classes to emphasize those subjects that seem to be of most interest.

One of his lectures is entitled "How to Buy a Used Car." He finds it has a high rating with his audience. In the course of his talk, Herrin provides his students with a list of 27 items to check before making a purchase. ("A crippled top or body panel is an indication that the car has been in a serious accident at one time or another. Stay away from it.")

The straightforward and practical advice they receive from Herrin is greatly appreciated by his students. Mrs. Edna Ferry, for example, considers herself "very fortunate" to have had him for an instructor. "I have been married for 56 years," she says, "and I have been driving a car for more years than I care to remember; but my husband always handled everything. Now he is ill, and the car is my responsibility."

One young woman joined the course because of a most embarrassing incident. It seems she was driving her new car when it ran out of gasoline. Fortunately, a service station was nearby. She walked there, obtained a can of gasoline ("The man offered to help me, but I told him that my NINTH CAR POINT DID INTO A TANK."), and returned to her auto. There, to her consternation, she discovered that she could not find the gas tank. Finally a passing policeman stopped and came to her rescue. ("Do you know, he guided down the license plate, and there was the hole—only a man would think of hiding it there.") The next day she inquired about entering Wade Herrin's class.

Husbands learn too

Mrs. Carol Blanscet had been driving five years when she enrolled in the course, with her husband's encouragement. When she took home some of the study material Herrin provides, her husband became interested. "He admits he has learned a few things about cars," she says.

Mrs. Blanscet has found that the class has given her a great deal more confidence when she drives. It has also, she discovers, made her a good recruiter of future Powder Puffs.

"One day," she recalls, "I was driving along when I noticed a woman stuck by the side of the road. She looked a little helpless; so I stopped to see if I could give her a hand, though I could tell she wondered how much help I would be."

Mrs. Blanset soon discovered that the woman had stalled the car and then flooded the carburetor trying to start the engine. "I straightened it out and got her car started," she recalls. "Then I told her about the Powder Puffs. The last thing she said was: 'I will be in the next class.'"

● "Hog killings were nice," Charles C. Wall declared. He was thinking back over his half century of delivering mail to the farm folk around Ellaville, Georgia. "There was always a surplus of backbones and ribs," he recalled. "Those parts couldn't be cured and had to be eaten immediately. So I would find a package in the mailbox for me."

● George M. Case had other memories of his 40 years as a rural mailman in Colchester, Connecticut. He described his first route as "bottomless mud in the spring, ankle-deep dust in the summer, and waist-high snow in winter." When the roads improved a bit, he purchased a used 1931 Model A coupe, drove it over the route for 20 years.

Mail Call, Country Style

by John Benjamin

IN MANY PARTS of the nation, I suspect, such reminiscences of the bygone days of rural free delivery have only a mildly anachronistic flavor. Urbanites, for example, have a tendency to consider R.F.D. as a rapidly disappearing price of Americana, the mailbox by the side of the road going the way of the nickel cigar and the corner saloon.

Of course, the facts are very different. Rural mail delivery is a huge, complex operation; and it grows bigger and more complicated every day. A few statistics tell the story.

There are today nearly 32,000 rural mailmen. They are Civil Service employees whose salaries are something less than lavish. They do, however, enjoy better treatment than Ridley did in '01. R.F.D. costs the taxpayer approximately $725 million, about 6 percent of the total Post Office Department budget. This is somewhat ingenuine in view of the fact that R.F.D. serves 50 percent of the nation's population.

During the last three decades the number of people receiving rural delivery has increased by 40 percent and today totals more than 35 million person. During that same period the daily mileage driven by rural carriers has increased by 32 percent, to about 1.8 million miles (enough for 72 trips around the globe each day). And these increases of the last 30 years have taken place while the total number of rural mailmen was decreasing by 25 percent.

The size and complexity of R.F.D. are such that one sometimes loses sight of the true importance of this program in a welter of numbers and dollar signs. What the rural mailman has done for the nation is to provide a vital means of communication between one group of citizens and another.

When R.F.D. was inaugurated on October 1, 1896, America was physically disunited. The cities of that era were becoming increasingly dependent upon the farm community, and the farmer was becoming increasingly interested in state and national affairs. But there was no road system worthy of the name, and delivery of newspapers and correspondence to rural areas was inhibited by its excessive cost.

The free delivery of mail to these areas was a key step in knitting the various segments of the nation together. Those first five routes, established at Charles Town, West Virginia, 67 years ago, were indeed what U.S. Senator Frank Carlson of Kansas has called "a noble experiment . . . and one which has contributed greatly to the social, economic, and cultural life of our citizens in rural and suburban America."

● M. E. Risley remembered the day rural delivery service began in Mount Carmel, Illinois, in December 1901. Risley was one of the first three carriers. He didn't forget his starting salary either: $500 a year, out of which he had to furnish his own equipment. The Fourth of July was his only holiday, and he had no vacation or sick-leave benefits.

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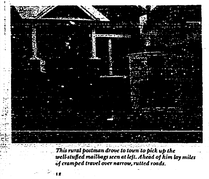
The location of this experiment was chosen as a matter of convenience to the Postmaster General of the day, William L. Wilson, a native West Virginian. Wilson was able to keep a close eye on the project, which involved routes averaging about 20 miles each. The mailmen were to be paid $900 a year.

Melvin T. Snyder, of Charles Town, who died last year, was one of the original five rural mailmen. He was a few days less than 16 years old when he was appointed, and he had to serve without pay until he attained that magic age.

Snyder made his deliveries by bicycle. He became quite friendly with the families along his route; and he would often carry messages between neighbors, his reward frequently being a free dinner. In a sense he might be said to have set the standard for the traditional friendship between the rural mailman and those he serves.

A bicycle was not the usual means of locomotion used by the early R.F.D. mailmen. Most of them either walked or made their rounds on horseback or in horse-drawn vehicles. A mailman's best friend has never been a dog; in the early days it was a horse.

A typical story from R.F.D. annals concerns Eddie C. Nelson, of Kensington, Minnesota, who retired last year after 41 years of service. Nelson was driving his team of horses across a frozen lake when one of the horses fell through a shaved spot in the ice into 10-foot-deep water. Nelson tried to pull the struggling horse from the water but failed; he did succeed in keeping the horse's head above water until help arrived. Then the horse was removed from the water and blanketed back to the rig, and Nelson and his team went on to finish the route.



This rural postman drove to town to pick up the well-stuffed mailbags seen at left. Ahead of him lay miles of cramped travel over narrow, rutted roads.

Even with the advent of the auto, the country mailman had to be a handy sort and weather as he faced the rigors of his route. It helped that he remained the idol of small boys.

Melvin Snyder and his colleagues in West Virginia were a great success. Within nine months of the start of the "noble experiment" the five routes had expanded to 82, and rural mail delivery had spread to 29 states. By the close of the century there were more than 1,000 rural routes.

Despite these early advances, however, the path to today's efficient rural mail delivery proved to be a rocky one. The carriers soon realized that they could not do their job well using the often impassable "roads" of that era. Their battle for better roads began in the days of the horse and buggy, gained added momentum with the advent of the automobile, and continues to this day. It is a little-known fact that the Federal commitment to highways today is in large measure the outgrowth of this fight for better mail service in rural areas.

Congress first recognized its responsibility for post roads in 1912 with an appropriation making possible the improvement of a limited number of country roads. The purpose: to determine the degree to which the improved roads aided rural mail delivery.

The results of the test were apparent when, in 1916, Congress enacted the first major Federal-aid highway statute. The title of the statute indicated the importance of rural mail delivery in the Congressmen's minds: "An Act to provide that the United States shall aid the States in the construction of rural post roads and for other purposes."

In many ways the 1916 statute set the pattern for Federal highway programs for the next four decades. It showed that Congress was aware of the manifold benefits of highways for the nation in general and for the rural population in particular. And it provided that payment for the Federal Government's share of highway costs would come from general funds.

In the years since the adoption of this landmark highway statute the rural letter carriers have continued their struggle for good roads, speaking out strongly on highway matters. They have, for example, urged that state highway-user taxes be allocated in full for roadbuilding and road maintenance. The carriers have more than a passing interest in seeing that such highway funds are expended wisely. Highway-user taxes account for a considerable portion of their operating costs. (Rural letter carriers furnish their own equipment and pay for its operation, maintenance, and replacement.)

As transportation equipment has improved, as today's modern rural road system has developed, the mailman's efficiency has increased greatly. And there have been other changes.

In the days before daily newspapers were common and before telephones and radios became universally used, farmers depended upon the mailman for the latest news. Families would wait by the mailbox for his arrival to hear the results of a local election or the most recent weather forecast. The mailman was a trusted friend in need, often a family's only contact with the outside world.

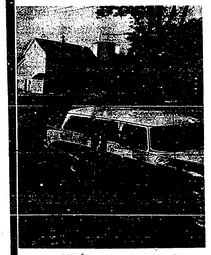
Inevitably this aspect of the role of the rural mailman has changed in recent years. The mailman covers larger territories at a faster pace. Rural families are no longer isolated: they are well informed and well traveled.

Some vestiges of the old days of R.F.D. do remain, however, though often the rural mailman's extra helpfulness is today of a more organized variety. In some states, for example, rural carriers keep counts of the deer, pheasants, and other game animals they see on their rounds; the mailmen report their findings to the state game departments, which in turn use the information as the basis for setting bag limits and seasons. The carriers also participate in civic and charitable programs through the National Rural Letter Carriers' Association and its ladies auxiliary.

Occasionally, though, one hears a report of a rural mailman performing the kind of individual service that would warm the cockles of an oldtimer's heart. A recent example comes to mind.

C. E. Parsons, a rural mailman in Shawnee, Oklahoma, recently found a hen's egg and an unstamped envelope in a mailbox on his route. The note accompanying the two items read as follows: "Dear Carrier: Will you please stamp this letter and keep the egg? I'm broke. Thanks."

Upholding the tradition of the rural mailman, Parsons did as he was asked.



The modern rural postman covers great distances rapidly, driving over enough roads in a comfortable car. He serves 10 percent of the nation's population.

U.S.D.C.F. MICROGRAPHICS

WEST SPRINGFIELD DEPT

Arched along the Gulf Coast from Texas to Florida is a barge canal that has revitalized the economy of an entire region.

Ditches, Dredges, and Dreams

by C. H. Rosenthal

From the deck of the tug your vision is limited. Two- to three-foot-high banks, topped by thick growths of tall salt grass, set the boundaries of a world 125 feet wide and only as long as the next bend in the stream.

It is a colorful world. Red-winged blackbirds fidget along the banks. Seagulls wheel overhead. Egrets and pelicans sail gracefully by. You pass a blue heron at rest; he solemnly returns your stare, one spindly leg tucked to his body. Suddenly he rouses himself and soars out of sight.

It would be easy to forget that this placid stream is more than it seems, easy to lose yourself in the slow rhythm of the tug's engines and the cicada-like song of the marsh hen. But the sound of a ship's horn breaks your reverie; a string of barges laden with yellow sulfur rounds the bend ahead.

You are on the Gulf Intracoastal Waterway, a 1,216-mile canal that links eight of the 15 busiest ports of the nation. Arched along the Gulf Coast from Brownsville, Texas, to Saint Marks, Florida, the waterway carries more freight than the Panama Canal and is 10 times as long as the Suez. Not so renowned as these other "big ditches," it has nevertheless earned some local repute.

In a single year the waterway carries 60 million tons of freight worth untold billions of dollars. Lead, zinc, and other minerals pour into the western end of the canal from Mexico. Texas contributes cotton, petroleum, chemicals. Louisiana sends forth lumber, rice, sugar. From the eastern end of the waterway—from Florida, Alabama, Mississippi—come fruit, soybeans, milk.

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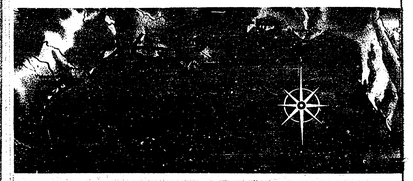


Slowly, ponderously, the tugs and barges move along the canal, dropping their cargoes at ports along the way, turning into the dozens of smaller feeder canals, churning their way up into the giant river network of the Mississippi Valley. Commercial fishing boats share the waterway with the tugs; sailboats and motorboats skim past in flight from the rush of the workaday world. The benefits of the Gulf Intracoastal are too difficult to find.

Yet when it was begun, no one could foresee where the canal would lead. Not even Clarence S. F. Holland, the dynamic young banker who started it all more than 50 years ago, could dream that his waterway would transform and revitalize the economy and the way of life of an entire region.

At the turn of the century Holland and a group of associates in Victoria, Texas, were concerned primarily about the future of their own town. Victoria was almost 40 miles up the Guadalupe River from the Gulf. Under a charter granted by the Republic of Texas in 1840, the town cleared debris from the river and collected tolls from passing stern-wheelers. But sandbars were building up in the river, and soon it would become impassable. If that happened, an important source of revenue for Victoria would be lost, and the town's link with the coast would be severed.

Holland thought a canal might solve Victoria's problem. Then he realized that other towns along the Gulf might face similar problems. A series of connected canals tying the towns together would benefit all, including Victoria.

In the summer of 1905 Holland presented his plan for a canal that would stretch from the Mississippi Delta 300 miles westward through the coastal plains of Texas. He and his associates placed advertisements in Louisiana and Texas newspapers inviting interested parties to a canal convention in Victoria.

The idea of digging a ditch through a virtual wilderness was greeted with a large measure of skepticism. But Holland was not dismayed. The canal, he announced, "is a necessary adjunct to the rapid development of the greatest country in the world."

Skeptics thought they had seen the end of the canal project when the first meeting in Victoria drew a disappointingly small crowd. The entire Louisiana delegation had been quarantined because of a yellow fever epidemic.

However, Holland proved to be a dedicated and enterprising evangelist. He shored up support in his home state and scheduled a second meeting the following year in Louisiana. One result of this second meeting was the formation of a group known today as the Intracoastal Canal Association of Louisiana and Texas. It has met each year since, alternating its conference site between the two states. The association is the principal link and coordinating group between the Gulf Coast citizenry on the one hand and the Congress and the U.S. Army Corps of Engineers on the other. (Sections of the canal are authorized by Congress and constructed by the Corps of Engineers.)

Mississippi sailboats race on canal.

The first section of the Gulf Intracoastal was begun in 1907 between the town of Franklin and the Mermentau River in Louisiana. As other sections were added through the years, Holland's predictions began to come true. Canal tonnage multiplied, and the towns along the waterway flourished.

The canal offers businessmen distinct economic advantages: Its quiet passage protects shallow-draft vessels and their heavily laden barges from the severe weather common in the Gulf. And its length makes possible substantial economies in long-haul transport.

The increasing traffic along the early sections of the canal served as a spur to the completion of the mainstream; and when America entered World War II, the value of the waterway was further underlined. Millions of tons of petroleum, sulfur, and other vital war goods could be moved in safety along the canal while enemy submarines were sinking scores of freighters and tankers in the open Gulf and along the Atlantic Coast.

In 1942 Congress authorized an increase in the depth of the canal from nine feet to 10 percent 12 feet. Authorization was also given for the building of a key section of the main channel, from Corpus Christi to the Rio Grande.

Seven years later, on a searing June day in 1949, Clarence Holland's vision was fulfilled: The Texas-Louisiana section of the main channel was completed. Scores of people watched from small craft as a ceremonial ribbon was cut and tribute was paid to Holland's role in the vast undertaking. However, the tribute was paid with bowed

Autos wait turn at New Orleans ferry.

heads: Holland had died four years before.

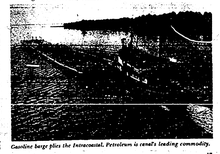
The completion of this section of the main channel did not end the growth of the waterway. Modern locks and floodgates have been constructed; new feeder canals have been dredged. And the economic activity along the waterway has continued to expand.

Among those who early realized the advantages of the canal were oilmen. With the development of Gulf Coast oilfields, petroleum became the leading commodity moved on the waterway—though experts had not expected oil to play so important a role.

An early engineering report on the Port Arthur (Texas) Canal, for example, predicted that this section could ultimately carry 5,000 tons of petroleum a year. Today the port sees it called the Golden Triangle. Its four major refineries turn out almost one-tenth of the nation's daily total of petroleum products. Last year the Port Arthur Canal moved more than 50 million tons of petroleum.

The partnership between oil and the Intracoastal has been vital to the waterway's growth—a growth that has brought impressive benefits to the communities that have burgeoned in recent years along the Gulf Coast. In all of this industrial development, the waterway has had a genuinely part.

The Mississippi coastal development is a case in point. There, in the counties of Hancock, Harrison, and Jackson, dozens of new industries have settled, taking advantage of the close-at-hand water transport facilities. The ports of Pascagoula ("Where Your Ship Comes In") and Gulfport handle both

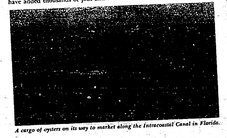


Gasoline barge plies the Intracoastal. Petroleum is canal's leading commodity.

U.S.G.S. TOPOGRAPHIC
MAP AVAILABLE HERE

oceangoing and canal-sized vessels. An industrial waterway is being dredged through Harrison County, paralleling the Intracoastal and connecting with it at both ends.

Industry of many sizes and varieties has been located along the coast; products include such items as metal cans, men's underwear, glass containers, domes, milk of magnesia, and cat food. These firms have added thousands of jobs and



A cargo of oysters on its way to market along the Intracoastal Canal in Florida.

hundreds of millions of dollars to the economy of the three-county area.

The west Florida panhandle has experienced tremendous industrial growth since the Intracoastal was extended to Saint Marks. The impact has been felt in Pensacola, Panama City, and Port Saint Joe as well as Saint Marks. Within four years after construction of this new leg of the waterway, $300 million worth of new capital was invested in plants along its banks—and the growth is still continuing.

Though the Gulf Intracoastal was primarily intended to serve such commercial and industrial ends, it has also brought some benefits of a very different kind. Perhaps the most unusual example is furnished by the National Aeronautics and Space Administration operation in Huntsville, Alabama. There, at the George C. Marshall Space Flight Center, scientists are busy creating giant Saturn rockets, capable of blasting their way to the stars. The scientists have found, however, that moving the rockets about here on earth raises some gargantuan transportation problems. Most of the Saturn stages are too large for conventional highway, rail, or air movement. The solution has been to load the rockets on barges and send them to Cape Canaveral by water—much of the water being that of the Gulf Intracoastal.

The waterway carries other noncommercial craft. The bayous and beaches along the Gulf Coast are attracting hunters and fishermen by the thousands. Sports fishermen have discovered that schools of trout and redfish frequently come out of the bays into the deeper waters of the canal. Determined fishermen have been known to follow the progress of a school for miles, walking along the bank of a canal and filling hampers with fish. Hunting lodges and bathing resorts are easily accessible by boat from the Intracoastal. Water skiers enjoy the canal's placid waters.

The multitudinous uses of the waterway are welcomed by all those connected with the system, with perhaps a single exception: the tugboat captains. They already have their hands full, for running a tug on the Intracoastal has more than a fair share of complications. Traffic patterns are noteworthy for their lack of regularity. A tug captain can go for 80 miles in some sections without meeting another craft. At another time, over the same route, he may meet a boat every 500 yards. This can make for long delays when several tugs barges find themselves arriving at a canal lock at the same time.

Though the inland portions of the waterway are not of the way of the frequent Gulf squalls, those sections that cut through open bays (particularly those east of Louisiana) are less protected. The barges are tall enough to catch the wind; and if they are blown out of the 12-foot-deep channel into a shallow bay, especially at low tide, the tug captain must wait for a change of tide before he can get underway again.

A strong wind is a problem inland as well. It can swing a line of barges to one side; and when this occurs while two strings of barges are passing each other, tug captains need all the skill they can muster.

The continuing success of the Intracoastal, though it provides more work for the tugboat men, also makes for confusion. Canal routes are constantly being improved and relocated. And more changes are in prospect. Congress has authorized an enlargement of the New Orleans-to-Houston section. The Mexican Government is planning a canal from Tampico and Vera Cruz on north to Brownsville. There is even a Louisiana group that seeks to have the state's channel widened and deepened to accommodate oceangoing vessels.

Those who have seen the Intracoastal grow from its modest beginnings view these plans with great pleasure. They do not fail to point out, however, in terms of the fact that Victoria, the Texas town where the waterway was conceived, will be one of the last of the original communities to get its "outlet to the sea." Mr. Holland's hometown channel is less than three miles from completion.

PETROLEUM TODAY

JANE WAS AT LEAST four years old, maybe a little older. But when she talked, it came out baby gibberish; and she walked like a doll that needs winding. She was mentally retarded.

Janie wasn't bashful, though. When I bent down to talk to her, I found myself caught up in the tightest of bear hugs. The bear was blonde and cuddly, and she held fast all the time I was in the room.

Outside, Sister Raphael Marie defused my ego. "Janie's like that with everybody," she remarked. "It's when she came to us a year ago, she'd hide behind furniture at the sight of an adult. You can see why we don't begrudge the hours it takes to teach our youngsters the simplest thing."

Actually the teaching time at St. Rita's Home for Children is seldom measured in hours—months is more like it. The Felician Sisters (the Congregation of the Sisters of Saint Felix) who operate this haven for retarded youngsters in Getzville, New York, accept only the most severe cases. And the Sisters don't speak of them as "cases"; as St. Rita's, as Sister Raphael Marie, the home's administrator, quickly informs you, there are only children.

Retardation is not a disease but a permanent condition of mental deficiency that today claims more than 5 million Americans—about a quarter of them under 10 years of age. The severity of retardation varies from person to person; but for five out of six victims, some degree of marginal independence is possible. All of the children at St. Rita's are from the remaining sixth, the unadoptables. They are admitted without regard to race or religion.

Janie and her friends at the home will never accomplish anything more than simple, homely tasks. The best that can be hoped for any child there is that he will come to achieve his full potential—though the potential may be very limited indeed.

The Sisters at St. Rita's work endlessly and tirelessly at stretching those limits. The retarded do not learn easily: They must be taught and shown, taught and shown—a repetitive and disenchanting process. Success is rare; when it comes, it may take the form of a child's sudden ability to get his spoon into his mouth after months of heartbreaking effort.

There are 50 children at the home, ranging from infants to 18-year-olds; and there are almost as many staff members, half of them nuns. "We are nurse, mother, and teacher," says Sister Raphael Marie. "To be all three, we must staff the home accordingly."

Charges for treatment at the home are modest, not calculated to support this high ratio of staff members to patients. Somehow the Sisters have maintained the ratio since the home was opened in 1926, though in recent years, as the program has expanded, they have had some help from an unexpected quarter. It has come from an organization in nearby Buffalo known as the Dollar Bills.

The nucleus of the Bills is a group of hard-headed, no-nonsense businessmen, the majority of whom are connected with the oil industry. Most of them, incidentally, are not Catholic. They sell up to 2,500 membership cards annually at a dollar bill apiece and turn the proceeds over to needy youth groups. When they learned about St. Rita's, they adopted the home.

Lawrence "Jeff" Fleischmann, the current president, explains: "Those Sisters are the greatest. We give them money from our treasury, and we stage affairs to raise more for them. They're so wrapped up with their kids, they'd never get around to digging

St. Rita's and the Human Dollar Bills

by Walter Young

Anthony J. Celebrezze (right), U.S. Secretary of Health, Education, and Welfare, is greeted by Sister Raphael Marie, administrator of St. Rita's, and Lawrence Fleischmann, president of the Dollar Bills.

for extra revenue. But can you hate them for that?"

The Dollar Bills went to work for St. Rita's because, as Fleischmann puts it, "We liked the feel of the place." There is a word that sums up the atmosphere at the home; it is "love."

You might expect Sister Raphael Marie, as administrator, to be brisk and businesslike; but if she is, there was no evidence of it when she led me through the home. I don't think she missed greeting a single child affectionately by name, even the infants. I don't think a single child went unhugged. And I don't think there was a single face—and a retarded child's face can be very pathetic—that failed to light up when its owner saw who was coming into the room.

When I remarked, "You love every one of them, Sister," she answered simply, "We all do." And it showed everywhere. White-habited nuns and motherly laywomen kept darting, watchful eyes on children in the rumpus room or fussed with tiny charges in immaculate cribs. Outside a nun was keeping two swings in motion; another was acting as slide-catcher at the bottom; another was toying not to outweigh her seesaw partner.

Soon after the Dollar Bills adopted St. Rita's, they began to learn that the home had more than just a local reputation. Retarded children from Hawaii, Europe, and other parts of the world are sent there. Without fanfare the Sisters have won international recognition in medical circles for their efforts to educate the unteachable. The secret of their success, according to one sister, is "patience, loving persistence."

The staff of St. Rita's has long had an extra handicap: lack of space. This condition will be remedied by a current building program that is expected to double the home's capacity. Individual family-type cottages are being constructed, in each building a couple acts as parents to children of various ages. Completion of the program will be a significant step toward what chief physician Dr. Henry V. Mastelovich calls the home's basic aim: to teach the child how to live as an individual, then as a member of the family, then as a member of the community.

The cost of the building program is expected to top $500,000—no small sum for [illegible] like St. Rita's. However, Sister Raphael [illegible] s her Dollar Bills to help out. They have proved their worth.

Late in 1961 Dollar Bills President George W. "Joe" Coburn, an oil company executive, got wind of a huge sum that was scheduled for anonymous distribution among selected charitable enterprises. The Bills diligently went after a share of it, and in March 1962 they were rewarded by seeing a check in the amount of $100,000 made out to St. Rita's.

The Dollar Bills were organized in 1958, the brain child of a service station building contractor named Bud Frank. As Fleischmann tells it: "Bud thought a few of us ought to start doing something for kids. My job was to round up enough men to get the idea off the ground. I figured I might as well hit my business friends, and I sell oil equipment; so our nucleus ended up heavy on oil people."

Since the Bills have been in existence, they have given time and money to children's summer camps, Christmas toy funds, and several other worthy and needy youth programs. And they continue to aid these projects. However, their work for St. Rita's is their biggest project, and it stirs their greatest enthusiasm. Fleischmann insisted to me that he couldn't allow himself to "go overboard" for St. Rita's, what with the other Bills programs and his two boys in Little League. Got where was he when I tried to call him the next two nights? Overboard at St. Rita's, working on plans for a fund-raising event.

It is typical of the Dollar Bills that several of them, independently, told me with great glee of the following incident: Several months ago U.S. Secretary of Health, Education, and Welfare Anthony J. Celebrezze was scheduled to visit the home. A reception had been planned in his honor, and 100 guests—including political leaders of both parties, medical men, and Dollar Bills—were invited to participate.

The Secretary arrived on time and began what was to have been a short tour of St. Rita's while the guests waited for him around the hors d'oeuvres table. He met the children, examined the facilities, asked interested questions, and was obviously intrigued, for his tour stretched on and on.

Finally he made his way to the reception, but by this time he could do little more than pose for a few photographs and race away. Some of the guests might have been put out by their long wait in vain, but not the Dollar Bills. They figured St. Rita's could always use a friend in court. And they were gratified that the Secretary, too, had become an admirer of the Sisters of St. Rita's.

Choo Choo's in Town

The life and times of Charlie Justice

by Al Hirshberg

Charlie Justice carries the ball for the University of North Carolina. During his four years with the team Justice scored 59 touchdowns and passed for 25 more.

AUTUMN neared its end, the midday sun shone benignly on a busy intersection in Asheville, North Carolina. The traffic light turned red, and the middle-aged man brought the car with the Florida plates to a gentle stop beside a truck whose sides bore the words "Choo Choo' Justice Oil Co." He leaned out and called up to the truck driver, "Is Choo Choo in town?"

"Yes, sir, he is," the other said politely. The light changed; and the truck eased away, heading down a steep hill. The man from Florida followed—down the hill, up another, across a bridge, along a winding road that paralleled the railroad track. Finally, the truck turned in to a big fence-enclosed lot.

There a blue-and-white sign swung silently in the soft western Carolina breeze. It, too, read "Choo Choo' Justice Oil Co." and, in smaller letters, "Home Deliveries—Fuel Oil—Kerosene—Tires—Batteries." Beyond it were five sparkling white, monogrammed storage tanks and, beside them, a long, flat building containing offices and a warehouse.

By the time the Floridian had parked his car, two men had started loading the truck he had followed into the lot. The visitor went into the office and asked a woman at a desk, "Where's Choo Choo?"

"Out there," she said, pointing to the truck.

"The man on the platform."

"Loading oil?"

"Mr. Justice," she said, "does a little of everything."

She was quite right. As the visitor from Florida soon discovered, the man on the platform and the man who had been behind the wheel of the truck were one and the same—Charlie (Choo Choo) Justice, oil executive and two-time All-America halfback at the University of North Carolina. "I'm an old fan of yours," said the Floridian grinning. "I just wanted to shake your hand. You could do so many things so very well on the football field. I can see you're a jack-of-all-trades in this business too."

Justice grinned back, for this self-spoken Tar-

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Ernest Slagle stands in the doorway of his service station in Black Mountain, North Carolina, to bid farewell to his famous visitor, former All-America Charlie Justice.

On the loading platform of the "Choo Choo" Justice Oil Co. the boss talks with driver Jack Miller. Justice himself sometimes takes a turn behind the wheel.

The Justice family poses for an informal portrait in the den of their suburban home. With Charlie and Sarah are Bonnie, 15, and Barbara, 11. The boxer is Blazer.

Charlie Justice is backed by a gleaming row of petroleum storage tanks. He is a distributor of oil products, supplies 28 service stations with nearly 4 million gallons annually.

heel football immortal gets as big a kick out of compliments for his work as he did for his play. He's a successful oil distributor who owns, leases, or supplies 28 service stations in Buncombe County; and he didn't get that way by being a contact man living off his football reputation.

Football, of course, made him a big man in North Carolina, but the way he runs his oil business helps keep him that way. And, as any visitor to the lovely city that is Justice's hometown soon finds out, he's a very big man indeed in Asheville.

If you need anything there, ask him to get it and it's yours. An attendant insists you take the biggest, shiniest automobile in the shop when you rent a car. "This was reserved by Mr. Justice," he says. "If we don't give you the best, he'll be upset." A hotel clerk won't let you have anything short of the bridal suite. "Mr. Justice made the reservation," he says.

A meal for a hero

Charlie Justice is always surprised at such consideration, for he is essentially a modest, self-effacing man. But he should be used to this sort of thing; it's been going on for years. Once, after he helped North Carolina beat Duke by scoring two touchdowns and passing for a third, he went with some friends to eat at the Carolina Inn in Chapel Hill; but it was late, and the dining room was closed.

An employee hastened to the manager's office and said: "Sir, you've got to open that dining room. The most important man in North Carolina is out there going hungry."

"The Governor?" asked the manager.

"No, not him," snorted the employee. "I mean the really most important: Choo-Choo Justice."

The dining room was opened.

After Justice was graduated from college, he played for the Washington Redskins and once put on a one-man show against the Los Angeles Rams before nearly 90,000 people in the Coliseum. He ripped off runs of 59, 55, and 65 yards and averaged almost 10 yards to the carry in 11 tries.

Kay Kyser, the band leader and himself a North Carolina alumnus, was making a Hollywood movie at the time. "Up to that game," he said, "I was just another actor out here. But as soon as people found out I knew Choo Choo Justice, I was a big shot."

By Kay Kyser's standards, there are about 60,000 big shots in Asheville, for everyone in town knows Charlie Justice. They knew him as a skinny kid growing up on the wrong side of the tracks. They knew his older brothers as great schoolboy athletes, which they were sure young Charlie couldn't become because he was so small.

But he fooled them. Although he never weighed much more than 150 pounds in high school, he became the star of what must have been one of the most fantastic schoolboy football teams of all time. In 1941, as a junior, he led Lee Edwards High to an undefeated season, scoring 19 touchdowns himself and passing for at least as many more. A year later he scored 17 times in another undefeated season in which the team piled up more than 400 points and gave up only six. When the season ended, Duke University offered football scholarships to the entire starting eleven.

Justice, however, went into the Navy after graduation in June of 1943. When he answered a call for football candidates at Bainbridge (Maryland) Naval Training Station two months later, the equipment chief laughed at him. One look at the fuzzy-faced 18-year-old 165-pound youngster prompted him to snort: "Go home to your mother, little boy. This is a game for men." And what men!

There were Carl Tomasello of the New York Giants and Carl Mullenease of the Green Bay Packers. There were Howard Hickey of the Cleveland Rams and Bill De Correvere of Northwestern. There were Don Durdan of Oregon State and Carl Ramsey, All-America guard from William and Mary.

Besides the big names of the day, there were dozens of smaller ones from college teams all over the United States. Charlie Justice was the only schoolboy in the lot. What chance did he have?

But he stuck around, managed to attract the coach's attention with his magnificent punting, and finally got into a game. The first time he carried the ball he went 45 yards for a touchdown. The next time he went 45. He scored seven touchdowns and intercepted five passes in seven games, and spearheaded Bainbridge to an undefeated season.

One afternoon, after Justice took the ball near midfield, broke into the open, and scampered to a score, a fan near the press box yelled, "Look at him go. Just like a choochoo train." A writer picked it up, and Justice has been Choo Choo ever since.

A scholarship for Sarah

When Justice got out of the Navy in 1946, he had scholarship offers from more than 30 colleges. North Carolina made a routine bid for his services, and Charlie accepted—for his wife, Sarah Justice may be the only woman who ever attended college on a football scholarship. Her husband went through on the GI Bill.

After Justice's decision was announced, somebody asked Carl Snavely, the Tarheel coach, how he felt about having the hotshot back in the country enter North Carolina. "I hope," Snavely commented, "that he comes out for football."

With freshmen eligible for varsity football, Charlie Justice indeed came out. In his four years he scored 59 touchdowns, passed for 25 more, and led North Carolina into three post-season bowl games.

The teams for which he played had 32 victories, including one stretch of 22 straight in regular season competition. In 1948 and 1949 Justice was everybody's All-America halfback.

He was a living legend too. The song *All the Way, Choo Choo* became North Carolina's most popular and was played on the national radio hit parade; Chapel Hill's Airport Road, where the family lived, was renamed Justice Drive. At an orphanage 26 boys were asked to name the nation's foremost citizen. One selected the principal, and two named the President of the United States. The other 23 votes went to Justice.

When Justice moved into pro ranks, he played four and a half years with the Redskins. Occasionally he hit the heights of his college days; but Justice knew there was nothing permanent about the pro game, and he left it with no regrets.

An itch to be on his own

That was when he first entered the oil business. In 1954 an oil company hired him as a public relations man. But Justice soon got the itch to go into business for himself. He liked the oil industry and wanted to stay in it, but he didn't like the kind of travel his public relations job entailed. It kept him away from his family too much, and he was afraid his son and daughter might grow up strangers to him.

In 1956 he got together with Joe Wright, a former Tarheel teammate, and set up a firm to distribute petroleum products in Henderson County. They worked out of Hendersonville, not far from Asheville, and they started from scratch. There wasn't a single station selling their brand in the whole county. But the boys had three things going for them: their energy, their determination, and the magic of their names. The firm of Justice and Wright needed no elucidation in western Carolina.

Because both men worked hard, the business prospered, despite its standing start. Justice covered every service station in the county, talking oil and football, promising service, and building up goodwill.

"It's a strange thing," he says, "but the oil business is much like football. It's one of the most competitive businesses. You have to sell yourself, because you're always trying to win stations away from some other company's products; and somebody is always trying to get your stations away from you. You have to stay on top of everything. You can't let up a minute.

"And that's the way it is with football. As long as you stay in shape, keep alert, and watch your competitor's moves so you can know how to offset them, you're all right. But if you lower your guard or give the game anything less than everything you have, you're dead.

"Football taught me something else I find useful in the c" business," he adds. "That's the ability to meet and get along with people. Nobody will do business with a man he doesn't like, any more than football players can be at their best on the same team with men they don't respect. You have to project yourself and make people want to deal with you."

After three years the firm of Justice and Wright was selling 250,000 gallons of petroleum products a month; and before Justice left to go into business for himself in Asheville, it was up to 350,000. When he returned to his hometown from Hendersonville in 1961, there were in Buncombe County only 11 stations selling the brand he sells. Now the number is up to 28, with more planned. His 1963 sales will be almost 4 million gallons.

Although now years away from his playing days, Justice has maintained his intense interest in football. He rarely misses a North Carolina game, and he watches the Redskins whenever their games are televised. He loves to talk football and is in great demand all over the South as an after-dinner speaker.

He has always enjoyed helping youngsters. He coached Pop Warner football (for boys aged nine to 13) for several years both in Hendersonville and in Asheville. He's a director of the Asheville YMCA and of the Lee Edwards High School Dad's Club. He's also adviser to the Young People's Group of the Western North Carolina Episcopal Diocese.

Justice doesn't smoke, drink, or keep late hours; but his weight is a problem. He played at 170 pounds; but, as happens with many athletes after they retire, he shot up quickly. When he reached 230, he went on a crash diet and got himself down to around 200, his present weight. He is 5 feet 10 inches tall.

Although he's put on weight, and his brown hair has thinned out and is generously flecked with gray, Justice looks much as he did 10 years ago. At 39, there is the same warmth in his friendly smile, and he is still a man of astonishing humility. Folksy and informal, he normally wears slacks and sports shirts.

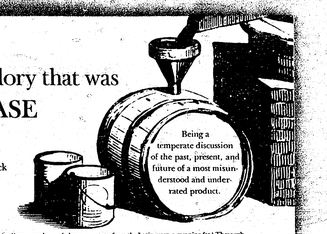
A den full of memories

The Justices live in a comfortable home in Biltmore, an Asheville suburb. The den is full of football memorabilia. The place of honor is reserved for Justice's proudest possession, the handsome trophy he won for being the most valuable player in the 1950 All-Star Game. Close by is his certificate of membership in the Football Hall of Fame.

Justice has many interests, not the least of which is politics. In August he was elected president of a local political organization. And the day may come when he will be a candidate for political office, though it hasn't arrived yet. "I'm not running for anything," he says. "I have my hands full running my business."

If that day ever does arrive, Choo Choo Justice may be expected to do right well. In the meantime, he's engrossed in being an oilman. It keeps him on his toes, and that's the way he likes it.

The glory that was GREASE



Being a temperate discussion of the past, present, and future of a most misunderstood and underrated product.

by Clay Hornick

Of all the multitudinous products of the petroleum industry, none has quite so poor a public image as grease. And understandably so. It is, as even its most fervent admirers must grant, an unlovely substance.

Yet in a very real sense this ubiquitous lubricant is one of the most underrated of our modern industrial phenomena. It is vital to the mechanized world of today, it has a promising future, and it has a colorful past. Indeed, there can be no true appreciation of the subject without some knowledge of the glory that was grease *before* the age of petroleum.

The story begins at the dawn of history. As long as man has used a wheel or any variant of it, just so long has he depended upon some kind of grease to reduce the friction between axle and hub. As long as man has made machines, just so long has he required a lubricant—frequently a grease—to smooth the way at the point where two surfaces come into contact.

The first tangible evidence of such lubricants dates from the 15th century B.C. when Tehuti-Hetep ruled Egypt. On the inner walls of the Pharaoh's tomb are carvings showing the use of various lubricants in the moving of huge stone statues and buildings.

Two centuries later, in the reign of Amenhoeep II, grease was apparently used to lubricate the ancient kingdom's vehicles of war. Modern scientists have analyzed the remains of a chariot of that era and have found traces of animal fat and lime around the axle.

From the earliest days grease included beef, pork, or mutton tallow. (The word "grease" comes to us from the Latin *crassus*, meaning fat.) These substances dominated the grease field from the time of Tehuti-Hetep until the modern era.

"When Shakespeare had Cleopatra speak of 'Methinks slaves with greasy aprons,'" for example, he had in mind the grease common to his own day and to hers: thick, gooey, smoky, rancid tallow. In most parts of the world even a century ago horse-drawn wagons were lubricated with beef, mutton, or pork fat. Various substitutes (among them, whale oil) were tried over the years, but none truly caught hold until the advent of petroleum.

American Indians are credited with being the first to employ crude oil as a grease. They used petroleum obtained from surface oil springs. During the 19th century the same kind of oil springs were tapped by some enterprising U.S. businessmen who mixed oil with lime-based soap to produce the first "modern" lubricating grease.

The first man to use mineral oil as a substitute for tallow is a legendary figure known only as "Old Man Oom." His grease solidified at low temperatures. Apparently the first printed reference to the use of grease made of soda soap and petroleum was in a patent obtained in 1849 by one William Little. He had set out to manufacture a good lamp oil, but he found that the product he obtained after distilling crude oil was more suitable for lubricating machinery than for lighting lamps.

This new kind of grease had some important scientific advantages over its animal-fat predecessors. But only gradually did these become apparent. The immediate, obvious advantage was of a different

stature; Petroleum grease didn't smell so bad. And despite all the changes to which grease has been subjected in the century since it became oil based, it continues to smell immeasurably better than its forerunners.

Animal oils and fats had other disadvantages. They were apt to decompose, in the process developing acids that corroded the metals they were supposed to protect. Vegetable oils were inclined to become gummy. That left mineral oils.

The first grease makers who mixed mineral oil and soap were true craftsmen. Each had his own secret recipe, developed after long hours bent over a bubbling kettle. When a batch of grease was made, he would take a sample, rub it between thumb and forefinger, smell it, even taste it. If he was dissatisfied, he would, with the assurance of a master chef, correct the brew by adding a dash of this or a pinch of that.

Although modern grease makers pursue their task under quite different circumstances (huge electronically operated caldrons, complex research and measuring instruments), the two basic ingredients of grease are still oil and soap. The soap, now as then, supplies the framework of the grease, giving it the characteristic semisolid, gelatinous consistency. Of course, the oil used in today's grease is a refined lubricating oil; and the soap may contain additives ranging from talc to wool or horsehair.

This more complicated kind of grease comes in a wide variety of consistencies and colors, and serves thousands of purposes. But mainly it is used in high-pressure applications under conditions where a liquid lubricating oil would flow away, leaving touching surfaces unprotected. Lubricating oils are used in the far more numerous applications calling for a lubricant that will carry off heat or flush away undesirable materials.

Notwithstanding its second-place role as a lubricant and its less than romantic history, grease has been involved in some important events of our time. Perhaps the most dramatic of these occurred 20 years ago as the Allied armies were preparing for the invasion of Italy. An emergency message was relayed to an oil company, asking for the development and production of a special grease: it was needed to protect the electrical systems of tanks, trucks, and other vehicles from the effects of sand and sea water.

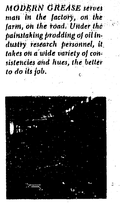
The first batch of 45,000 pounds of "Eisenhower Grease," as it came to be known, was developed and produced within four days. And the grease did its job so well that it also was used in the later Normandy landings.

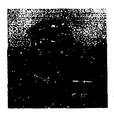
A more recent application of lubricating grease is in nuclear-powered vessels, including both the gigantic aircraft carrier U.S.S. *Enterprise* and the experimental merchant ship NS *Savannah*. It is typical of the complexity of modern grease making that the lubricants used in the *Savannah* had first to be tested by being subjected to massive doses of radiation in an oil company laboratory.

Participation in such advanced scientific programs has done a great deal to improve the image of other products, but it does not seem to have done much for grease. Nothing seems to raise grease in the public's esteem, even though, as one oilman has put it: "Lubricating greases...keep steel mills producing; automobiles and railroads rolling; farm, mining, and construction equipment operating; the weapons of our Armed Forces at the ready; and domestic appliances at peak operating efficiency."

Perhaps the latest development in greases will help; it concerns the moon. Petroleum scientists have warned that all moving parts on satellites and rockets bound for a moon landing must be given a thin film of lubricant that will not evaporate in the vacuum that is outer space. Otherwise, they suggest, the first man on the moon may open the door of his rocket and never be able to get it closed again.

MODERN GREASE serves man in the factory, on the farm, on the road. Under the painstaking goading of oil industry research personnel, it takes on a wide variety of consistencies and hues, the better to do its job.





by Ruth Sheldon Knowles

The Boom That Wasn't

Under other circumstances the discovery of oil might have been the signal for dancing in the streets. But this was Iowa in February 1963.

Two men on the giant drilling rig shivered as a frigid wind whipped across the cornfield in southeastern Iowa. Ironically, they were working to help keep people warm. They were drilling in search of an underground rock formation that could be used to store natural gas. Their company would pipe the gas from the Southwest during the summer so that it would be available to meet extra heating demands during just such cold spells.

As the hole deepened, the drillers brought up cores of solid rock, which were delivered to a nearby warehouse. Eventually these would be examined by geologists from the natural gas pipeline company. Meanwhile, the frozen cores were allowed to thaw.

When the geologists arrived at the warehouse, they noticed a strong odor of petroleum. The porous rock cores had begun to "bleed" oil.

In any other state at any other time under any other circumstances this discovery might have set the local chimney to dancing in the streets. But this was Iowa in February 1963.

No one was looking for oil. There was no commercial oil production in Iowa. Since 1903 some 50 wells had been drilled in search of oil, all of them failures. In 1939 there had been a flurry of excitement in northern Iowa when a well was reported to have struck oil, but neither it nor three others drilled in the vicinity were successful. This false alarm had strengthened the growing conviction among the majority of oil seekers that Iowa's oil prospects were slim indeed.

Moreover, the pipeline geologists had another reason to be skeptical about their oil "discovery." The cores were from a rock formation about 1,000 feet beneath the surface. At an earlier stage the drillers had encountered some very glutinous shale, and the drill had become stuck. They had poured 200 barrels of diesel oil down the hole to lubricate the shale and free the drill. The geologists naturally thought the "thawed" oil was their own diesel oil coming back to them.

However, Bill Clark, the pipeline company's chief geologist, was a true scientist in that he would take nothing for granted. Although everything indicated that the "bleeding" was nothing but "dead" oil, he recommended that the company drill a twin well 50 feet away. When the cores from the second well were examined, there was no doubt. They had discovered oil, but only just. The well pumped 10 barrels a day.

The curtain seemed about to rise on a new act in the drama of America's search for oil, an act that would end in Iowa's becoming the 33rd oil-producing state. Yet the first reactions to the Washington County discovery near Kosta were not unmixed.

The pipeline company was dismayed to have its search for underground storage complicated by the obligation to drill more wells to determine the extent of such a small discovery. Its leases on the adjoining farms required that if the company found oil on one, it would rent for oil on each farm. This discovery would be a dubious blessing if the company had to spend more money drilling wells than it could make from the sale of a small amount of oil.

William F. Flynn, the farmer upon whose land the discovery had been made, was inclined to be cautious about the idea of sudden riches. Like his neighbors, he had a well-groomed, prosperous corn farm to which he had devoted his life. "I'm not going to get excited," he said. "Then I won't feel bad if nothing comes of it."

However, both he and his wife glowed with pride when they received a telephone call from Governor Harold E. Hughes congratulating them upon the discovery of oil on their land. He told them how "extremely pleased" he was, and that the discovery might benefit the state greatly.

The Iowa Geological Survey had been frankly skeptical when the first report of the oil-saturated cores was received. Through the years the state geologists had examined 14,000 sets of rock samples from wells drilled in search of oil or water. Occasionally a trace of oil had been noted, but there had been no indications that any large amounts of oil had been trapped in the pores of Iowa's rocks. "When this thing came through, we just didn't believe it," said Dr. Charles Brown, assistant state geologist.

A fruit jar full of oil from the second well quickly changed their doubts. Dr. H. Garland Hershey, state geologist, announced that it was doubtful whether the discovery could be produced as a profit; but he insisted it was vitally important. He added enthusiastically: "We can look for a tidal wave of oil people coming into Iowa looking for other geological structures that might contain oil."

A state senator promptly introduced a bill urging the legislature to provide a reward of $100,000 to anyone who could bring in an oil well that would produce a minimum of 50 barrels a day for at least 60 days. A well of this size, it was felt, would establish the prospects of commercially profitable petroleum deposits.

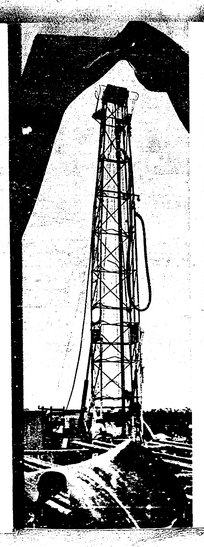
Meanwhile, Dr. Hershey's prediction was coming true. Hundreds of individual oil operators, lease brokers, and representatives of large oil companies thronged the State Geological Survey offices seeking information.

They came from South Dakota, Illinois, Kansas, Oklahoma, Colorado, and Texas. Some were veterans of oil booms in which they hadn't been the lucky ones. One such oilman was, at 75, still hoping to hold a winning hand in this risky game with Mother Nature. They all were aware of the importance of being first.

A carrot on the stick

Moreover, there was a special carrot on the end of this stick. The search for oil has become increasingly difficult. Today 10,000-foot wells that cost anywhere from $100,000 to $150,000 to drill are becoming commonplace; yet the risks remain great. Despite all scientific advances, only one out of every nine exploratory wells finds any trace of oil. The Iowa discovery offered exciting opportunities because it was oil at a shallow depth. A 1,000-foot well would cost no more than $5,500 to drill in that part of Iowa. Risk capital could be spread over a larger number of exploratory wells.

Then, of course, there was the inspirational history of great shallow oil discoveries in America. The giant Spindletop, Texas, well produced from 1,020 feet. Oilfields that produced 100 million barrels or



RUTH SHELDON KNOWLES, *the granddaughter and daughter of oilmen, is married to an oilman and is herself a petroleum consultant.*

more had been found in California, Oklahoma, Kansas, Wyoming, at 1,000 feet, 2,000 feet. Why not Iowa? The nearest oil production was approximately 100 miles away in neighboring Illinois where some wells had produced as many as 2,000 barrels a day from depths of only 350 feet.

Thus the dreamers and doers and optimists, seasoned but not discouraged by failures, streamed into the State Geological Survey offices in Iowa City in March and April of 1948. State Geologist Hershey assured one and all that as a result of the discovery "the possibility of economically important oil deposits in Iowa can be viewed much more optimistically than ever before, no matter what the outcome in the Keota area."

Nevertheless, the excitement gradually began to subside. The majority of the window shoppers didn't buy. The legislature didn't pass the bonus bill, believing that the lure of oil should be incentive enough. Farmer Flynn's cautious attitude was justified when the discovery well declined to one barrel a day. The pipeline company drilled two more wells nearby and found only traces of oil. Visions of gushers stopped dancing in Iowa heads.

Iowa's oil story appeared to have ended before it could really begin—but appearances were misleading. The question of whether or not there is oil in large quantities in Iowa was being debated by geologists in all the nation's major oil centers. They were digging into files, reexamining geological maps, and reappraising accepted ideas.

Many companies had not thought Iowa attractive because in that part of the country granite—the basement rock below which oil is not found—is only a few thousand feet from the surface. They preferred to drill where the basement rock was many thousands of feet below so that they would have more chances to encounter oil-bearing rock formations.

"I hope we've been wrong about Iowa," said one Oklahoma geologist whose company had drilled several dry holes and then left the state. "There is nothing like the discovery of some oil to change your ideas."

Drilling was limited

"Of course there's oil in Iowa!" another prominent geologist said emphatically. "It's just that there hasn't been enough drilling. The companies have been lured to other places that were more exciting because of a big discovery."

A few hardy individual oil operators were not waiting or debating. They were going from farm to farm in the corn country getting oil and gas leases from the farmers and agreeing to drill exploration wells.

Among those who were not waiting were the Smith brothers—Stan and Steve—of Wichita, Kansas, young but veterans and successful wildcatters who have drilled throughout the United States and Canada.

Stan Smith first heard about the Keota discovery one evening as he was listening on his car radio to a national newscaster. "As soon as I got home, I called the Washington County sheriff," he said. "I figured he would know what had happened; and he did, of course. He told me whose farm it was, and I immediately called Mr. Flynn."

Satisfied that oil had been found, and stimulated by the fact that the drilling was shallow and relatively inexpensive, the Smith brothers were in action the following day. By the time they had finished a number of weeks later, they had leased 30,000 acres.

Leasing was difficult

"It wasn't easy," Stan Smith relates. "I've leased nearly a million acres around the country, but I have never gone into an area where it is more difficult to get oil leases. The farmers' land is worth as much on top they don't much care what it's worth underneath."

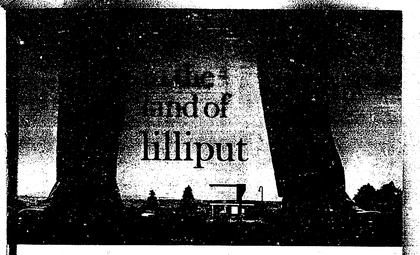
In the potential oil area, farmland is valued from $100 to $300 an acre. It has been estimated that the fertile Iowa soil has a value in excess of all the combined gold mines in the world.

The Smith brothers have already drilled two dry holes on their Iowa leases. They are preparing to drill three more exploratory wells. Half a dozen other equally optimistic oil operators are planning test wells. None of these explorers is daunted by the fact that more people are waiting to see what they find than are actively joining in the search.

"I've always been accused of drilling 50 miles south of nowhere," says Stan Smith with a grin, "and I'm still doing it in Iowa."

In the final analysis, this is what makes Iowa's oil-less-oil boom akin to the great American oil booms of the past. It also explains why America, with only an estimated one-twelfth of the world's potential oil land, has already produced more than half of all the oil produced in the world to date.

The principal reasons why American oilmen have found so much oil—the principal reasons why they will find oil in Iowa if it is there to be found—are that they have been free to disagree about where the oil is located and free to fail in trying to find it, and that there have been and are so many of them looking for oil in the unlikeliest places. As long as men like Stan Smith have the freedom and the incentive to drill "50 miles south of nowhere," the curtain will be forever rising somewhere, as it has risen in Iowa, on a potential oil strike. And the intriguing, frustrating, but dramatically satisfying element of uncertainty will remain a part of the oil picture. For despite all the experts, despite all the tests and the money spent, nobody yet knows how the Iowa oil story is going to end.



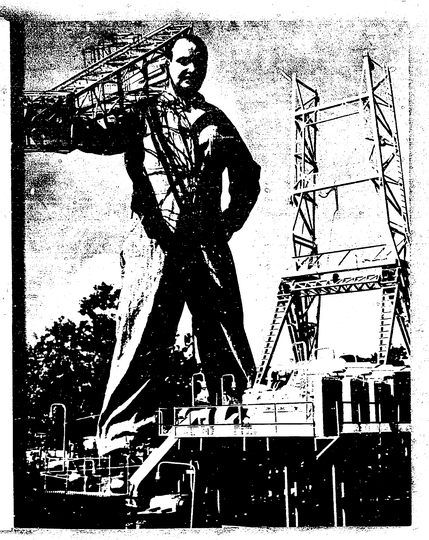
Why, man, he doth bestride the narrow world
Like a Colossus; and we petty men
Walk under his huge legs, and peep about. . . .
—William Shakespeare

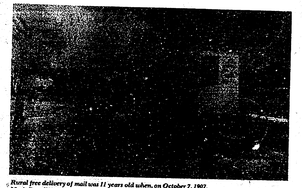
THE SUBJECT OF the Bard's vivid description was Julius Caesar; but the legs of the modern Colossus in the photograph above belong to a more ordinary sort of man, and the setting smacks more of the land of Lilliput than of the harbor at Rhodes.

The "narrow world" of the photo is a pumping station, part of a miniature working model of an oil pipeline system. It was built as a graphic means of acquainting the public with the efficiencies and economies of this method of petroleum transportation. And it illustrates an increasing interest on the part of some very grownup men in the child's world of toys.

We say that a child "plays" with his toys, and we smile at the frown of concentration with which he pursues his game. Yet adults have long taken model ships and miniature glass dogs with great seriousness. And in recent years, with the increase in leisure time, more and more men are playing at Gulliver with ingenious and elaborate model train arrangements. Such toys are not for smiling at. Nor do the businessmen who are finding increased uses for miniatures consider the subject one for levity. The photographs on the following pages set forth some adult uses of toy models for fun and/or profit.

THE MODERN GULLIVER at right is an oil company draftsman by day and a builder of scale models by night. This model of an oil drilling rig stands more than nine feet high when completely assembled, is on a scale of ¾ inch to 1 foot. The models shown above and below are more in the nature of business ventures than of hobbies. The tiny refinery enables engineers to make design improvements before major construction gets underway. The service station model enables dealers tc training to learn improved ways of operating their full-sized stations.





Rural free delivery of mail was 11 years old when, on October 7, 1907, M. A. Detwiler posed beside the he'se-drawn mail wagon he drove to make deliveries to the 84 mailboxes on Route 1, Three Springs, Pennsylvania. In the years since, rural carriers have taken to automobiles, the better to serve the more than 33 million people who now get their mail through R.F.D.

PetroleumToday

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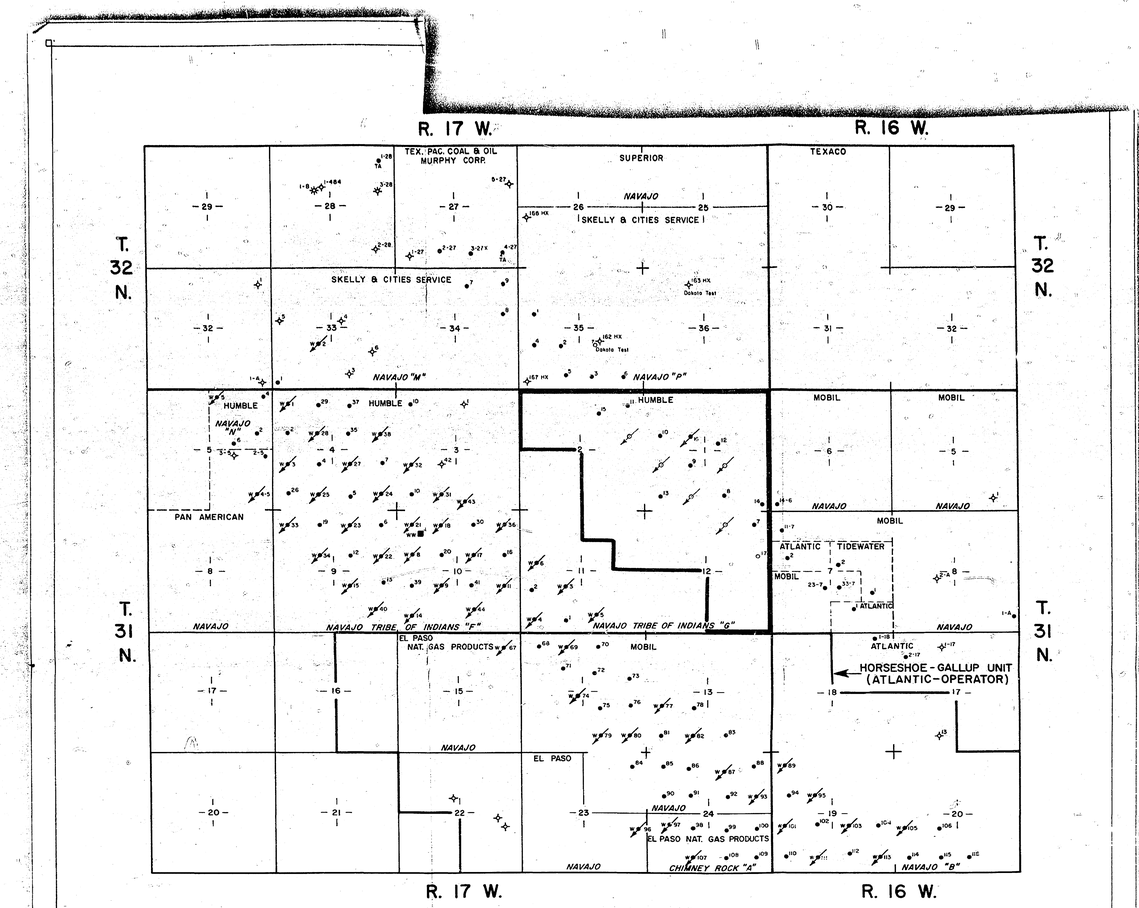


LEGEND

- Gallup Formation Producer
- Current Gallup Injection Well
- Morrison Formation Water Source Well
- Drilling Well
- Proposed Gallup Injection Well – Completed
- Proposed Gallup Injection Well – To Be Drilled
- Project Area

HUMBLE OIL & REFINING COMPANY

HORSESHOE-GALLUP FIELD

SAN JUAN COUNTY, NEW MEXICO

EXHIBIT "A"
To Application of Humble Oil & Refining Company
For
Approval to Institute a Pressure Maintenence Project
Section 1, 2 & 12, T 31N, R 17 W
San Juan County, New Mexico

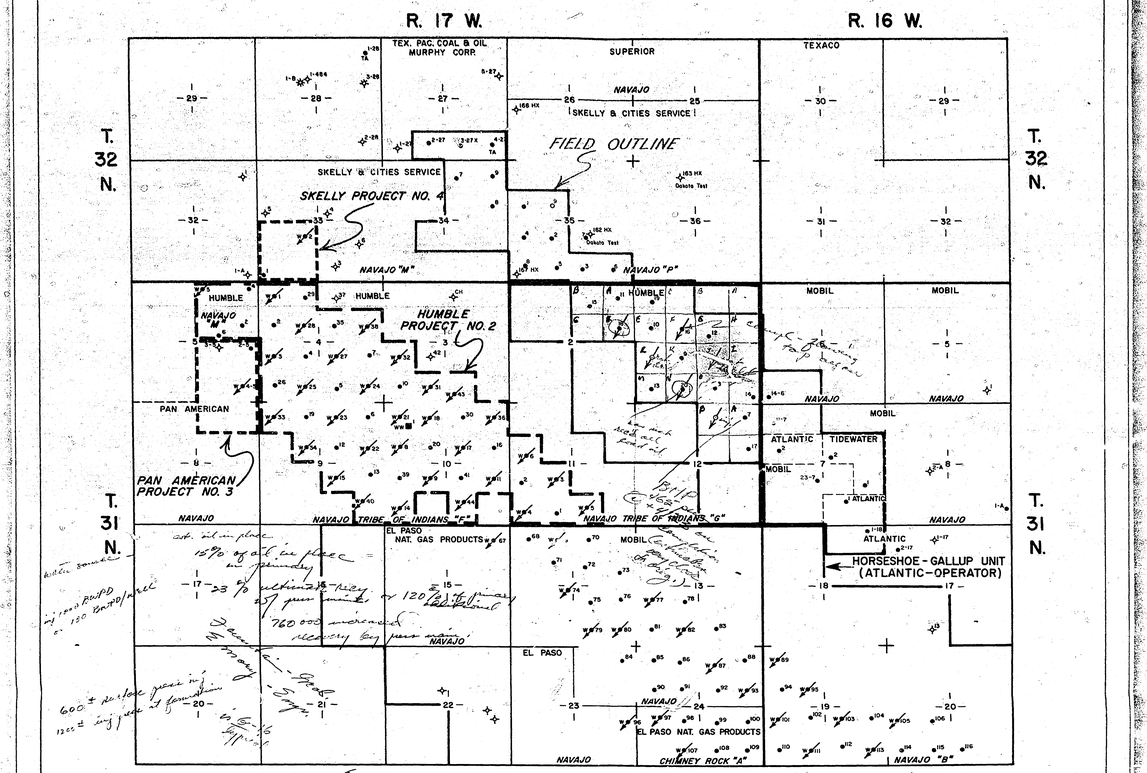
SCHEDULE OF PROPOSED INJECTION WELLS
COMPLETED TO DATE

	Humble Oil & Refining Company
Well Name	Navajo "G" No. 16
Location	SE NW Sec. 1-T31N-R17W
Elevation - Ground	5310'
Height KB above Ground	10'
Total Depth, Drilled	1303' KB
Total Depth, Plug Back	1290' KB
Well Casing	
Size and Depth Set	2 7/8 OD @ 1303' KB
Number Sacks of Cement	85
Calculated Top of Cement	600' KB
Perforations	1231'-1241' (KB) w/2 holes/foot
Fracture Treated	1,150 gallons lease crude and 6,000 pounds of sand
Completion Date	Currently testing to complete

EXHIBIT "B"

To Application of Humble Oil & Refining Company
For
Approval to Institute a Pressure Maintenance Project
Sections 1, 2, and 12-T31N-R17W
San Juan County, New Mexico

U.S.G.S. TOPOGRAPHIC


R. 17 W.
R. 16 W.
T. 32 N.
T. 31 N.
TEX. PAC. COAL & OIL
MURPHY CORR
SUPERIOR
TEXACO
SKELLY & CITIES SERVICE
NAVAJO
FIELD OUTLINE
SKELLY PROJECT NO. 4
NAVAJO "M"
NAVAJO "P"
HUMBLE
MOBIL
HUMBLE PROJECT NO. 2
PAN AMERICAN
PAN AMERICAN PROJECT NO. 3
ATLANTIC
TIDEWATER
NAVAJO TRIBE OF INDIANS "F"
NAVAJO TRIBE OF INDIANS "G"
EL PASO NAT. GAS PRODUCTS
HORSESHOE - GALLUP UNIT
(ATLANTIC - OPERATOR)
EL PASO
CHIMNEY ROCK "A"
NAVAJO "B"
R. 17 W.
R. 16 W.
LEGEND
Gallup Formation Producer
Current Gallup Injection Well
Morrison Formation Water Source Well
Drilling Well
Proposed Gallup Injection Well – Completed
Proposed Gallup Injection Well – To Be Drilled
Project Area – Proposed
HUMBLE OIL & REFINING COMPANY
HORSESHOE & MANY ROCKS FIELDS
SAN JUAN COUNTY, NEW MEXICO
EXHIBIT NUMBER ___
BEFORE EXAMINER NUTTER
CASE NO. 2965