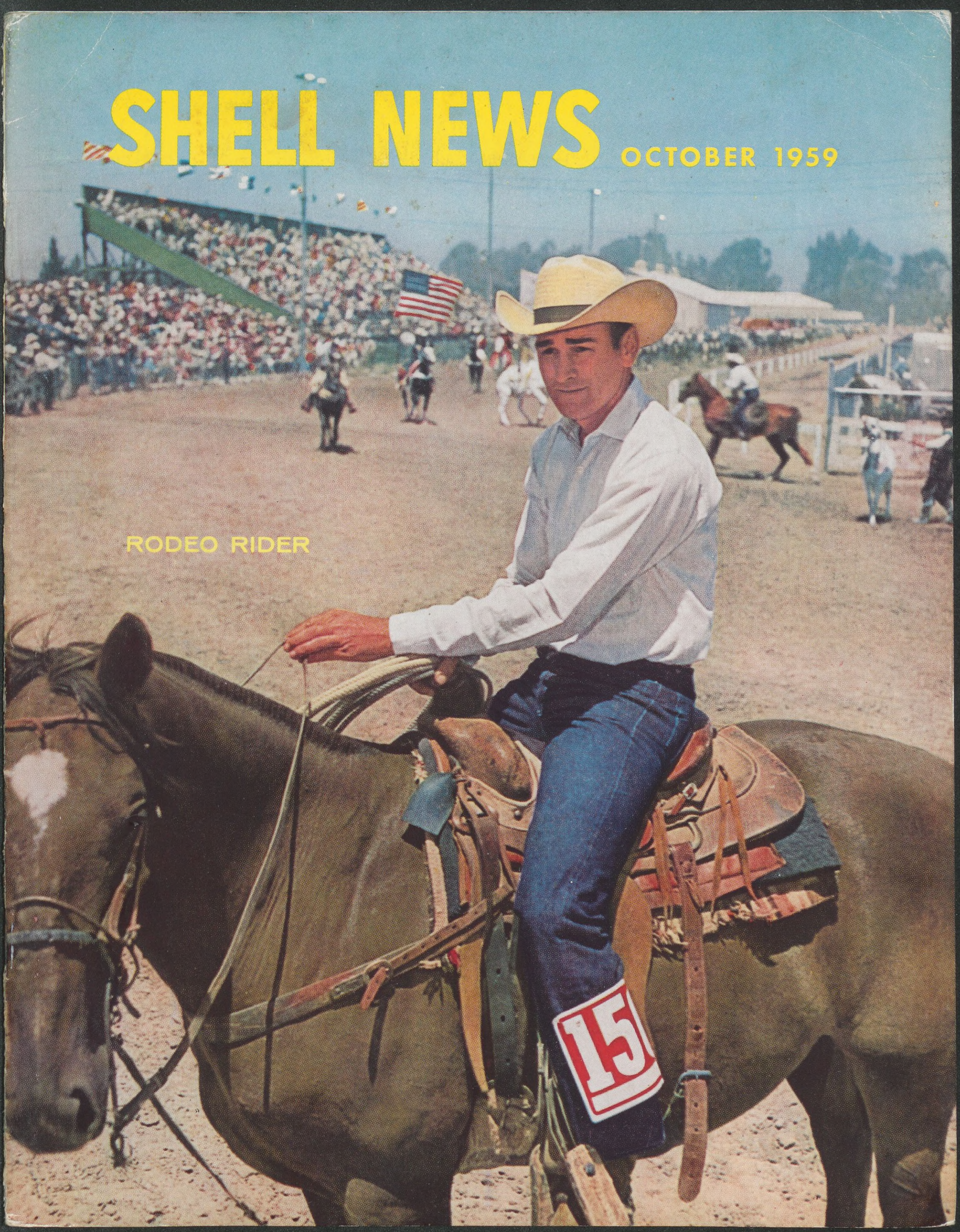
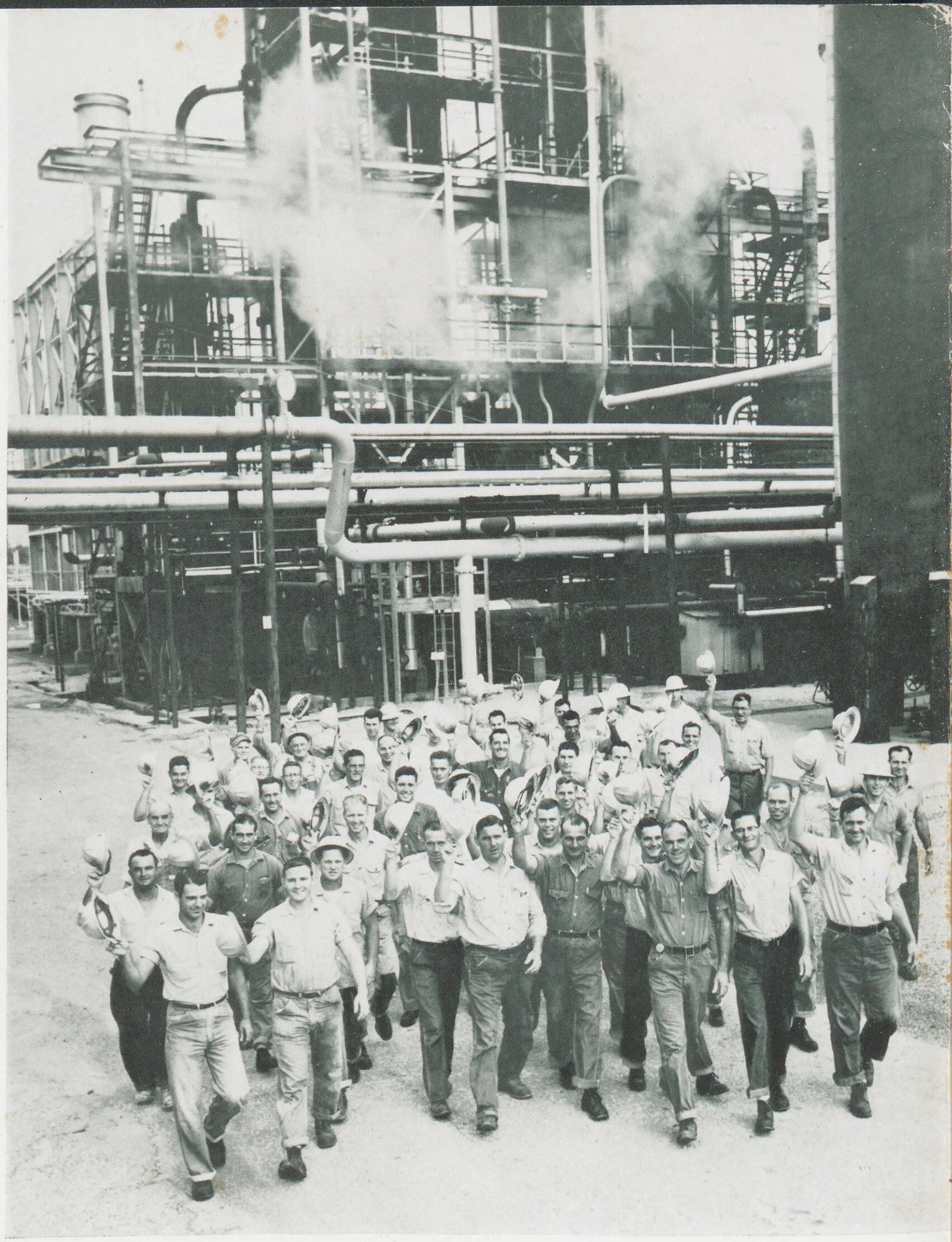
SHELL NEWS

OCTOBER 1959



RODEO RIDER



A salute to safety was given by this group of employees at the Norco Refinery after they learned they had topped the safety record of Shell Oil Company refineries. But for one accident, Norco would have a world record now.

REBOUND TO A RECORD

IN boxing, a true champion is one who can rise from the floor, shake off the effects of momentary setback, and go on to win.

When employees of Shell's Norco Refinery celebrated Achievement Day on August 29, they—like a champion fighter—proved that success is often sweetest when it follows temporary frustrations.

Achievement Day was an Open House program to honor all Norco employees for establishing a safety record among Shell Oil Company refineries. On July 30, Norco's 1,200 employees reached 3,973,369 man-hours without a lost-time accident. This record, accumulated in 583 days beginning Christmas Day, 1957, exceeded the previous Shell mark of 3,973,204 man-hours, established during 1953-54 by the Wilmington-Dominguez Refinery. When this issue of SHELL NEWS went to press, the Norco record was continuing to mount with 4,291,667 man-hours.

But the current record is only part of the story of Norco's safety achievement in recent years. The day before Christmas, 1957, Norco employees had amassed nearly 3,610,000 safe man-hours—the best mark in the Refinery's history. An accident on Christmas Eve blasted their chances for a Shell record.

This disappointment might have caused a general letdown in the drive for safety. But, instead, the general feeling was: "We're glad it wasn't a bad accident. Let's get going again." And in little more than a year and a half, Norco people had surpassed the record.

But for that one accident in 1957, Norco would have by now established a world refinery safety record.

Presenting the National Safety Council's "Award of Honor" is National Safety Council President Howard Pyle, former Governor of Arizona, left. Receiving the plaque are Norco Refinery Manager R. W. Faulk, center, and O. T. Troxler of the Engineering Field Department.

A pennant, symbolizing the "Safest Refinery Award," to be flown on Norco's flagpole, is presented by M. P. L. Love, Vice President Manufacturing, right. It was accepted on behalf of Refinery employees by V. E. Bradley, Head Fire and Safety Inspector.

SHELL NEWS

VOL. 27—No. 10 OCTOBER, 1959

Dedicated to the principle that the interests of employees and employer are mutual and inseparable

Employee Communications Department
New York, N. Y.

contents

Published by Shell Oil Company (H. S. M. Burns, President; C. C. Combs, Treasurer; E. A. Hugill, Jr., Secretary) for its employees and those of Shell Chemical Corporation, Shell Development Company and Shell Pipe Line Corporation. Address communications to Employee Communications Department, Shell Oil Company, 50 W. 50th St., New York 20, N. Y.

ABOUT THE COVER

H. B. (Bronc) Curry of Shell's Pacific Coast E&P Area, hopes to compete next month in the "World Series" Rodeo at Clayton, N. M. On the cover, he sits astride his sorrel, "Slats," at the Santa Maria (Calif.) Rodeo. In the background, the rodeo's Grand March is starting around the track. An article about Curry, one of the country's top rodeo riders, starts on page 8.

This fact was emphasized by several speakers at the Achievement Day presentation ceremonies, which followed tours of the Refinery by employees and their families and a picnic lunch. The program also saluted the opening of the new Refinery Laboratory and the $14 million Platformer refining unit.

Howard Pyle, former Governor of Arizona and now President of the National Safety Council, was principal speaker at the ceremonies. He congratulated Norco people on their fine record but reminded them of the need for safety in all aspects of daily life. Norco employees, he said, are many times safer inside the Refinery at work than they are off the job. He urged greater safety on highways and in homes.

Governor Pyle presented the Refinery with the National Safety Council's "Honor Award for 4,000,000 Man-Hours." Other safety awards received included:

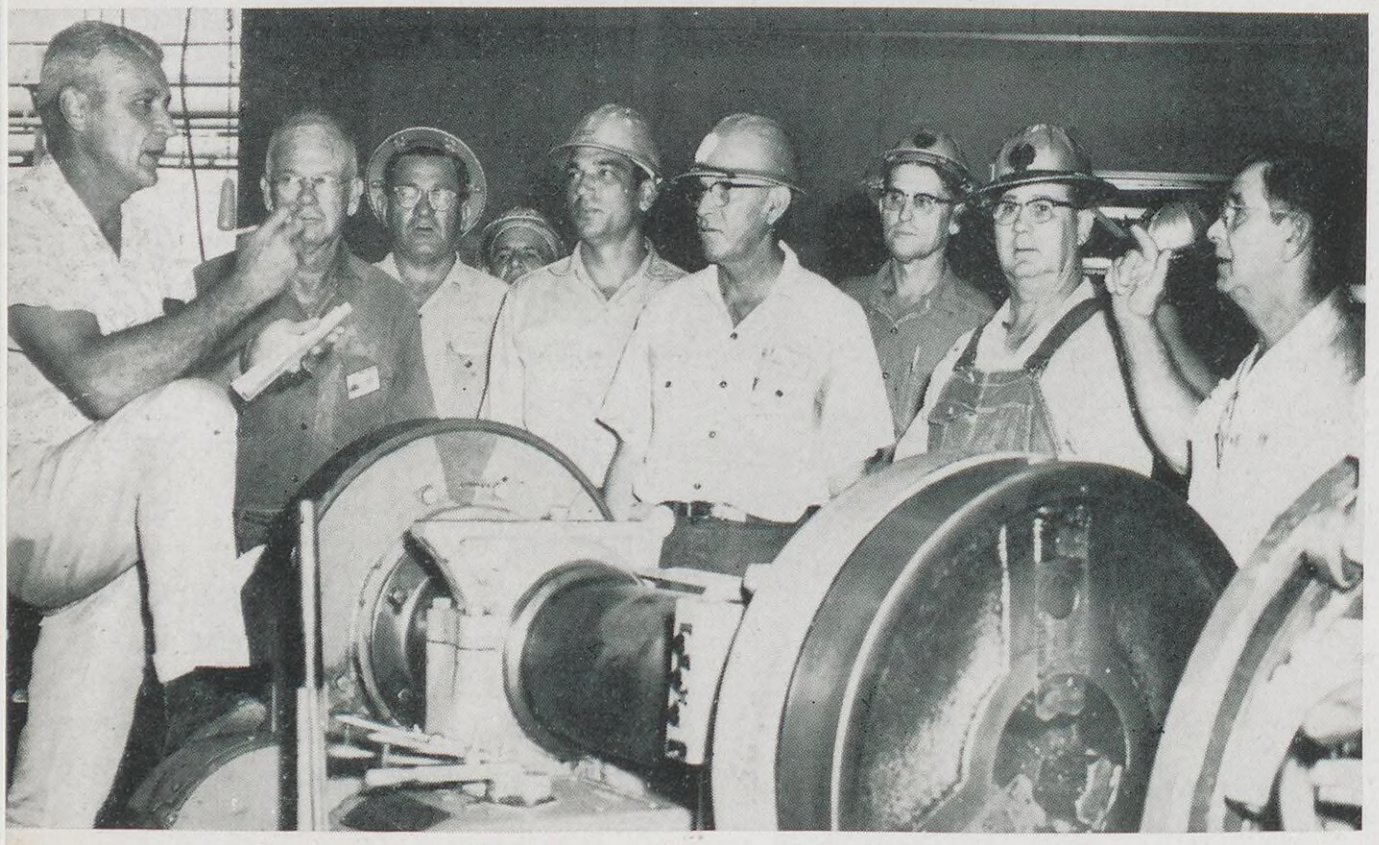
The American Petroleum Institute Honor Award, for achieving 4,000,000 man-hours without a lost-time accident, presented by Bouwe Dykstra, Vice President of Shell's New Orleans Exploration and Production Area.

A new award from Shell's Manufacturing Organization, presented by M. P. L. Love, Vice President Manufacturing. This award is in the form of a pennant that will be flown under the U. S. flag on the Refinery's flagpole. The pennant bears the words, "Safest Refinery Award," and a Shell pecten.

R. W. Faulk, Norco Refinery Manager, told employees the safety record is especially significant because of the exceptional cooperative effort it represents. "No individual or department played a greater part in the endeavor than any other," he said. "Had one person faltered, all would have failed. The credit goes to each individual."

Some aspects of the way Norco Refinery people act and think about safety are told below and on the following pages.

THE WAYS OF A WINNER



Craft Safety Meetings, held every Monday morning by craft groups, deal with current safety problems and suggestions. Left to right are Craft Supervisor T. O. Hendry, J. K. Jackson, A. N. Webre, L. T. St. Amant, P. J. Poche, Jr., K. J. Weber, W. J. Friloux, B. Vicknair, and O. J. Schexnayder (hand raised).

MANY factors, both individual and group efforts, go into a safety achievement such as Norco's. In a good position to appraise all elements of a safety effort is B. S. Graves, Manager of the Effluent Control and Fire and Safety Department.

He noted that at Norco, as at other Shell refineries, employees have a full range of safety equipment—hard hats, goggles, protective clothing, emergency shower equipment and other devices—and they learn how to use them to best advantage. Also, all refinery facilities have built-in safety features, designed to give those who operate them the maximum possible protection.

Graves emphasized, however, that there is obviously more to safety records than built-in and auxiliary safety equipment.

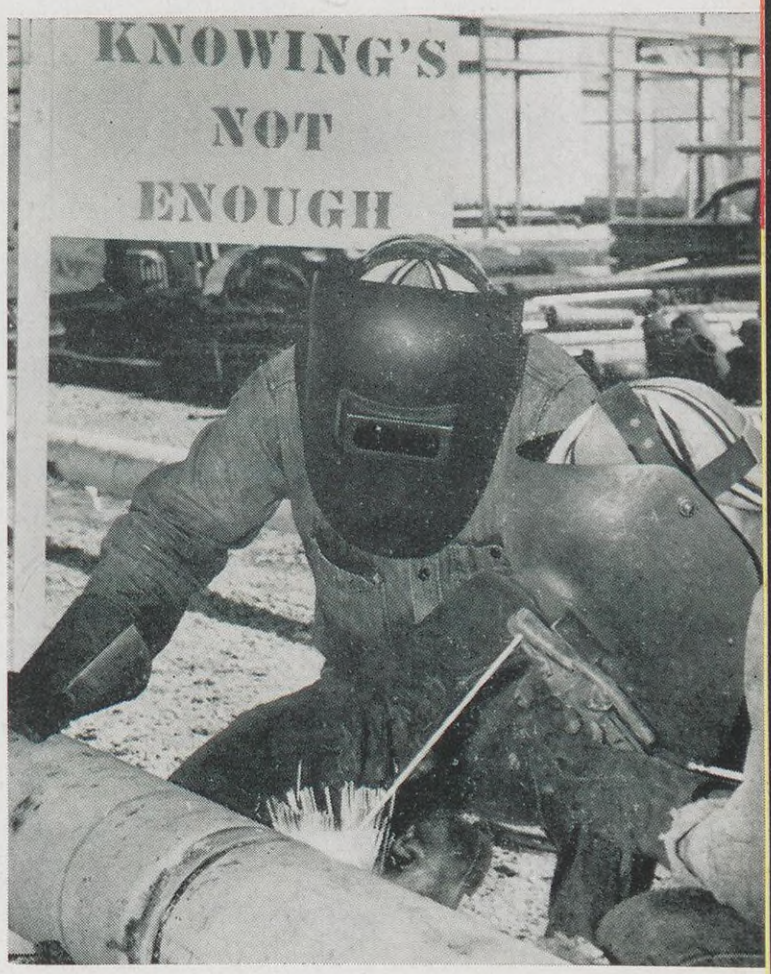
The banner hanging at an entrance to the Refinery reminds employees that "Knowing's Not Enough—Use Your Know-How."

"At Norco, everyone is safety-conscious," he said. "We never forget about it. We have all become so safety conscious we just don't let down. And everyone is enthusiastic about our special efforts to maintain safety.

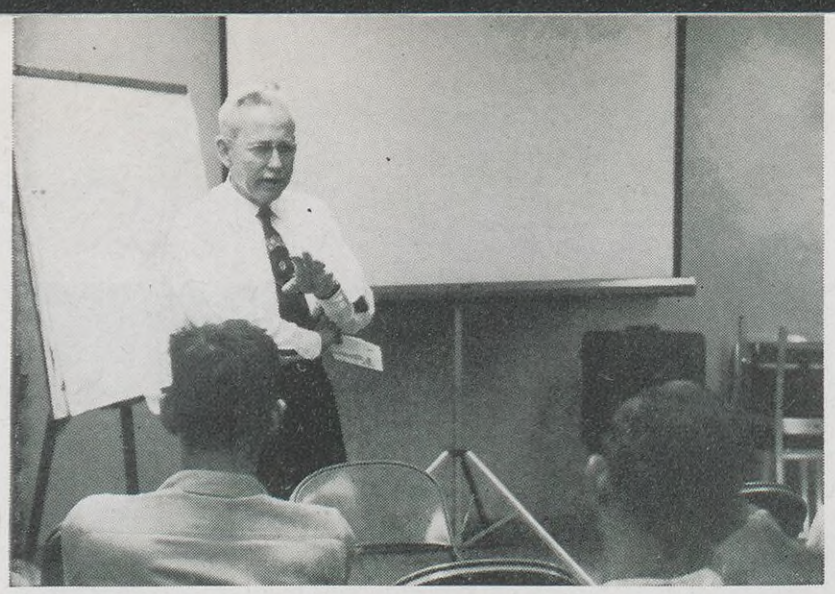
"Everyone understands that each individual must carry a safety load. He must take care of himself, but he must also help take care of the man next to him. When everyone does this conscientiously, it's unusual to have an accident."

Participation of everyone in helping to frame the continuing safety program is encouraged through regular meetings, similar to those held in other Shell refineries. For example, members of each Craft group gather at their own work areas every Monday morning in the Central Shops building for a 15-minute discussion of current safety problems. Everyone is urged to ask questions and to point out any condition they think might be hazardous. Reports of the meetings are given to Graves and he replies on action taken.

Similar meetings are held regularly in all other refinery departments and at all operating units. Also, General Safety Meetings are held once a month by supervisors, foremen and department managers.

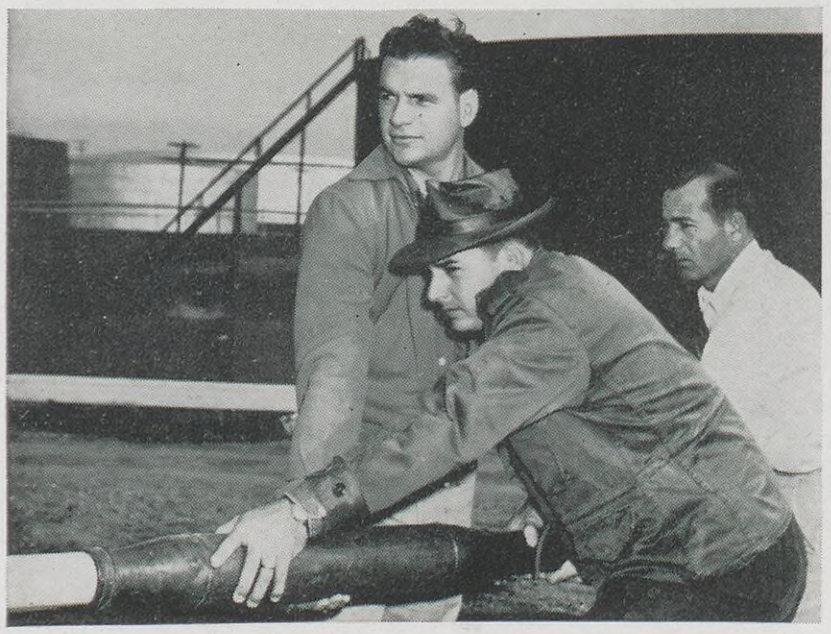


"Knowing's Not Enough" is the watchword for a continuing program in which flags like the wooden one at right, are placed at various work locations. Installing a new line are Welder Helper J. P. Clement, left, and Welder R. A. Decareaux.

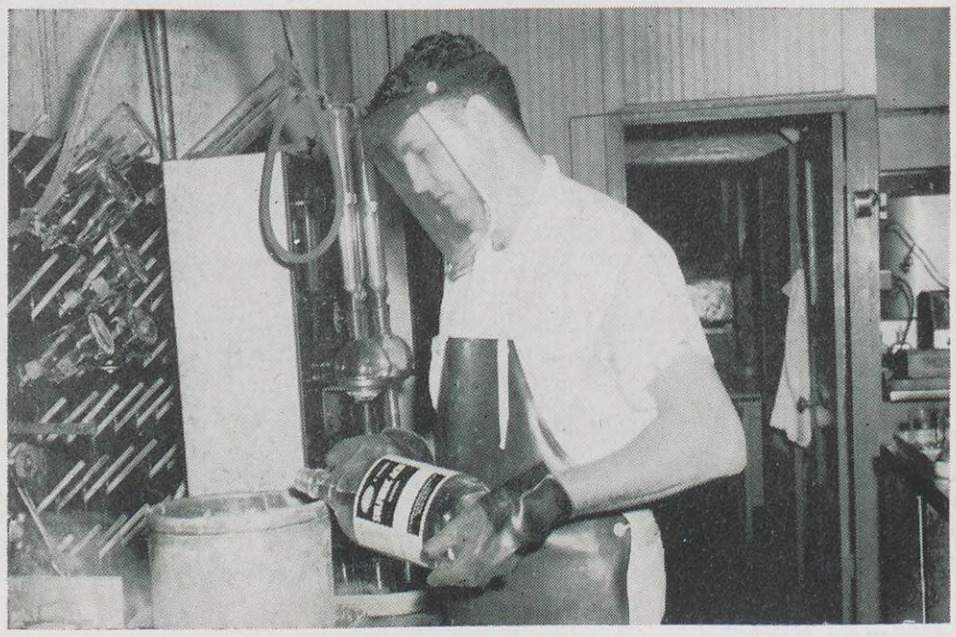


Discussing the Refinery's safety program with a group of employees is B. S. Graves, Manager of the Effluent Control and Fire and Safety Department. Graves noted that all at the Refinery are safety-conscious on every job.

Wearing life jackets as safety equipment in the event of a fall while helping to tie up a tanker at the Norco Refinery's docks on the Mississippi River are, from left to right, Andrew Dupre, W. R. Picard, and L. J. Leblanc.



Fire-fighting drills are a regular part of the Refinery's safety training. Practising use of chemical foam are, left to right, F. C. Cambre, W. J. LeBlanc, and R. S. Gilardi. A blanket of the foam can smother a fire in minutes.



Safety equipment used by R. M. Kuebler, Special Tester in the Refinery Laboratory, includes protective gloves, apron and face shield, while he handles such potentially-dangerous fluids as sulfuric acid in various laboratory tests.

REBOUND TO A RECORD continued

At a Craft Safety Meeting recently, a suggestion was made for constructing a protective guard around the operator's seat on a bulldozer used at the Refinery for clearing land. The hazard to be overcome was that of falling trees and branches. As a result of the suggestion, a guard made of metal piping was built for the bulldozer operator's seat.

The protective guard suggestion was only one among many that have been followed. Such proposals are considered a normal course of events at Norco. In fact, about 25 formal safety suggestions are turned in each week from the safety meetings. Besides, all employees know their supervisor or any member of the safety staff will welcome any safety suggestion at any time. The Safety Staff includes V. E. Bradley, Head Fire and Safety Inspector, and six Fire and Safety Inspectors — C. J. Brashear, R. A. Waguespack, N. C. Sardegna, J. Louque, L. A. Poche and W. L. Williams. Two nurses, Mrs. G. G. Rousel and Mrs. F. L. Ribbey, staff the Norco Refinery's emergency hospital.

Norco employees have a way of reminding themselves about safety—should they ever forget. The reminders are yellow flags placed at various work locations. Small cloth flags are used indoors and large wooden ones outdoors.

The flags are part of a program called "Knowing's Not Enough" — with those words printed on the large wooden flags. The idea behind the program is that it isn't enough to *know* how to work safely, one must also *apply* his know-how.

For Norco people, thinking about safety comes naturally now, Graves said. Contributing to the Norco safety achievement are continuing programs, built-in safety features in facilities, good housekeeping and safety equipment. But essentially, the individual efforts of each person at Norco have made possible the Refinery's safety achievement ●

news and views

CENTENNIAL CELEBRATION

More than 50,000 persons visited the small town of Titusville, Pa., during the last week of August to help celebrate oil's centennial.

And more than 800,000 letters went through Titusville's small post office during the week. The mailings of letters with the centennial stamp constituted the second largest first-day cancellation in history. Shell's first-day mailings to employees and pensioners totalled 44,000.

Leaders in government and industry attended or sent messages on centennial day, August 27. President Eisenhower sent this message from Europe where he was visiting Western leaders:

"Petroleum and its products are now so basic to our way of life and to our national defense, that this Centennial imposes a solemn obligation upon us all. We must renew our determination to make the fullest possible use of this vital natural resource."

In the keynote speech, Gen. Ernest O. Thompson, Chairman of the Texas Railroad Commission said:

"There is at present time in the U. S. the reserve daily producing ability of three million barrels of oil. . . . More wells are brought in every day to supply more oil. In Texas last year, we brought in 12,268 new oil producers. . . . It should always be kept in mind that the oil surplus, ready to be produced from the reservoirs, is stored at the exclusive cost to the producers. . . . The wise 27½ per cent tax recognition in depletion helps to keep on building these reserves."

Postmaster General Arthur E. Summerfield said in an address: "This great industry has been outstanding in fighting inflation by holding down prices. In the 10 years from 1949 to 1958, gasoline prices, exclusive of taxes, increased less than six per cent on a national average, while the cost of living rose more than 20 per cent. And these were prices for gasoline constantly improved in quality through huge expenditures in research and development."

In the picture above, children of Titusville pose during the centennial week with a wax figure of Colonel Drake, in front of the replica of his historic oil well. The figure was made by the National Historical Wax Museum in Washington, D. C.

STORAGE CAVERN STARTED

While the oil industry celebrated its centennial August 27, miners, armed with pneumatic drills and explosives, were lowered in a bucket 405 feet down a shaft to begin excavating one of the country's largest underground butane storage caverns of its kind at the Wood River Refinery.

The miners are blasting working room in the vast St. Louis limestone geological formation, to make room for bulldozers and larger equipment, which will be lowered piecemeal down the shaft and reassembled in the cavern.

When completed in 1960, the cavern will accommodate about 500,000 barrels of butane in a series of tunnels carved in a three-acre area. The limestone, impervious to butane, will safely store the product until it is needed as a

news and views

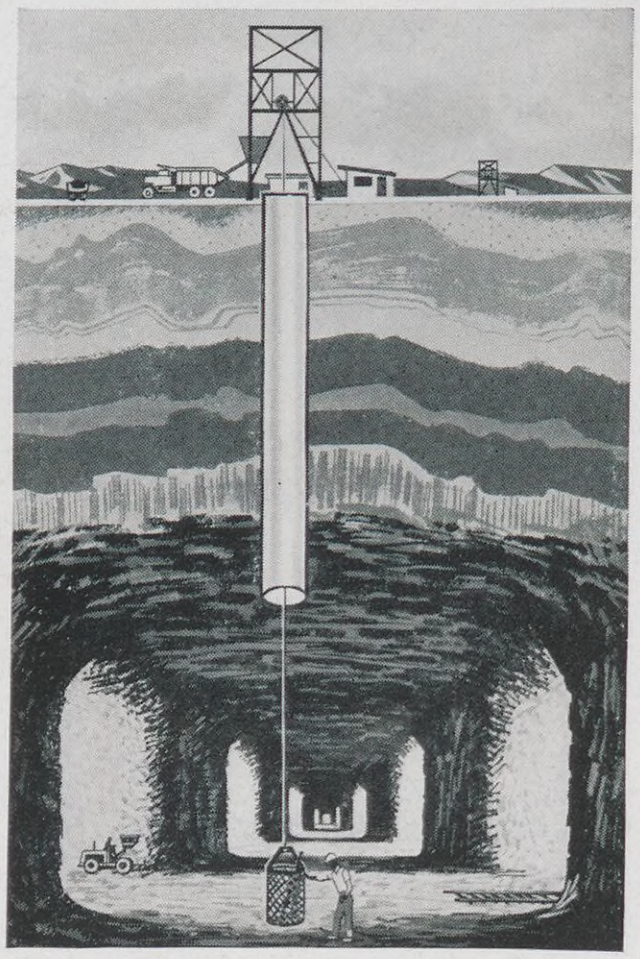
STORAGE CAVERN continued

winter component of gasoline. It will be pumped from the cavern by two units located in the cavern floor.

During excavation, all rocks and rubble are brought up the shaft in a bucket. The complete circuit of the power-operated bucket takes less than one minute.

The artist's conception below shows what the underground caverns will look like when completed.

Wood River's underground cavern



ELECTED TO INDUSTRY POST

F. G. HAWK

F. G. Hawk, Manager, Purchasing-Stores-Production, has been elected First Vice Chairman of the Petroleum Industry Buyers' Group in the National Association of Purchasing Agents.

Mr. Hawk also is Chairman of the Philadelphia-New York branch of the Buyers' Group for 1959-60.

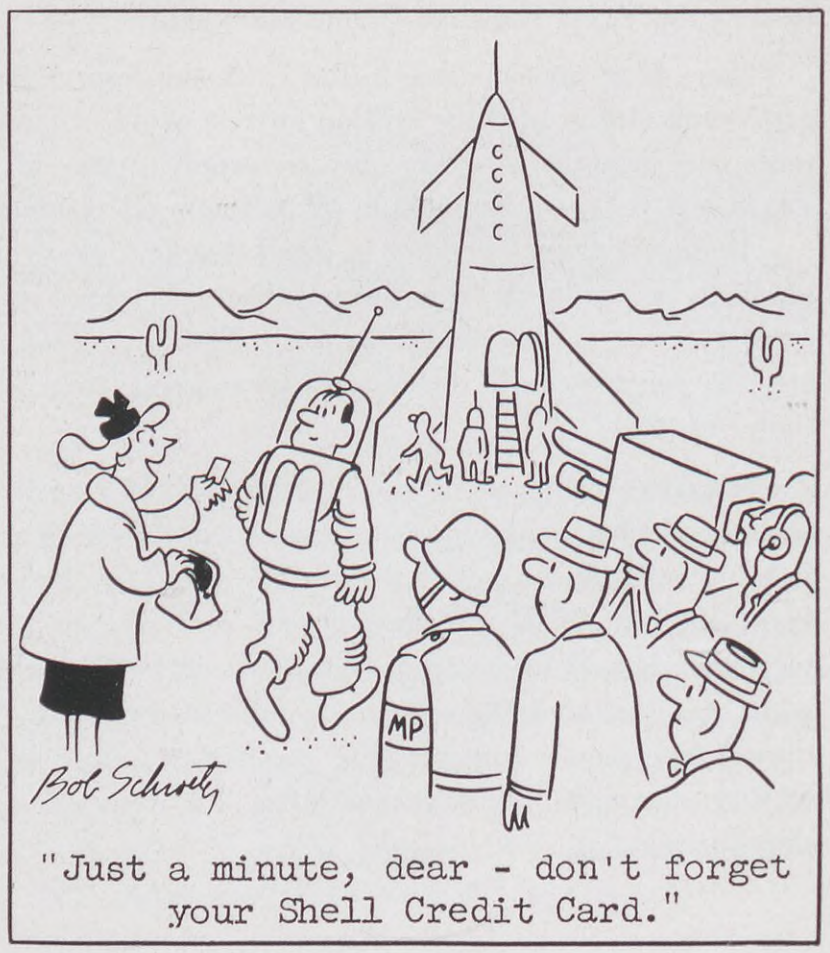
SHELL ROCKET FUEL LAUNCHES DISCOVERER SATELLITES

A unique high-performance Shell hydrocarbon fuel recently powered the first stages of two Discoverer Satellites, V and VI, now successfully orbiting around the earth.

Originally developed by Shell's Products Application Department engineers as a supersonic ramjet fuel, Shell UMF* Grade C (also called RJ-1 by the Air Force) now is a fully-proven operational rocket fuel.

Its principal advantages over conventional kerosine-type rocket fuels (RP-1) include greater uniformity of fuel properties from batch to batch, much higher flash point for greater safety in handling, and higher heat content per gallon. Improved rocket engine performance also has been reported.

Lockheed's Missiles and Space Division is the prime contractor for the Discoverer program. The first stage is a Douglas-built Thor missile powered by a 150,000-pound thrust North American Rocketdyne rocket engine which burns 4,500 gallons of UMF-C fuel with liquid oxygen in less than two minutes time. A second stage, using alcohol and liquid oxygen, takes over to put the satellite into orbit.

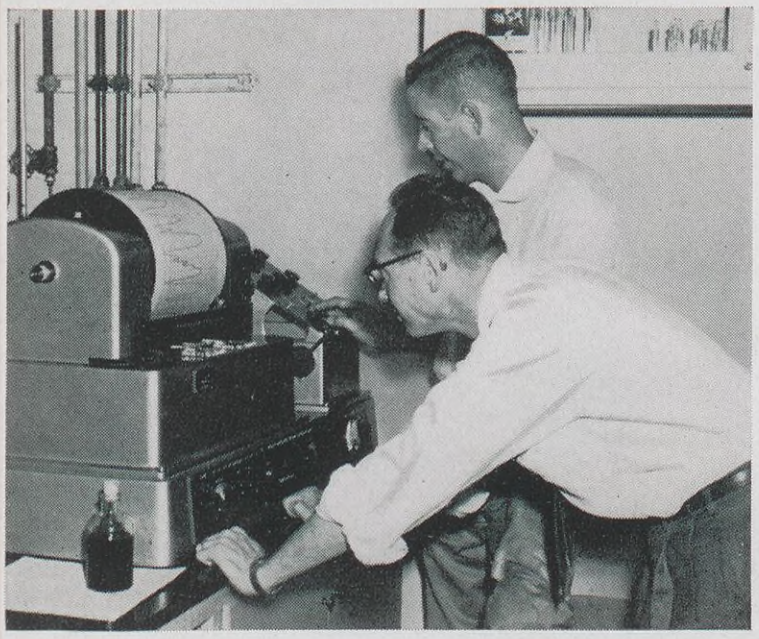


"Just a minute, dear - don't forget your Shell Credit Card."

*Trademark Shell Oil Company

Hugging her doll, pretty Joy Hanson of Martinez, Calif., is healthy after her recent brush with death caused by drinking poison in a neighbor's garage.

A spectrographic analysis at the Martinez Refinery by Research Technologist R. C. Eiffert, front, and Senior Inspector W. J. Nicholson, identified the poison (foreground) that Joy drank. Doctors treating Joy had requested that the refinery make the analysis.



Life-Saving Analysis

Martinez Refinery Laboratory employees help save a little girl's life

EMPLOYEES at the Martinez Refinery Laboratory, who normally confine their activities to problems relating to manufacture of petroleum products, recently teamed their knowledge and facilities to help a little girl whose life was endangered.

Four-year-old Joy Hanson of Martinez, Calif., had been playing in a neighbor's garage when she came upon an open, unlabeled bottle filled with a brown, pungent liquid that had been left there by a previous occupant. With typical little-girl curiosity, she swallowed some and minutes later ran to her mother screaming that her mouth was burning.

Her mother examined the liquid and then rushed Joy and the bottle to the Martinez Community Hospital. When doctors there could not identify the poison, they contacted the local sheriff's office which in turn called Shell's nearby refinery.

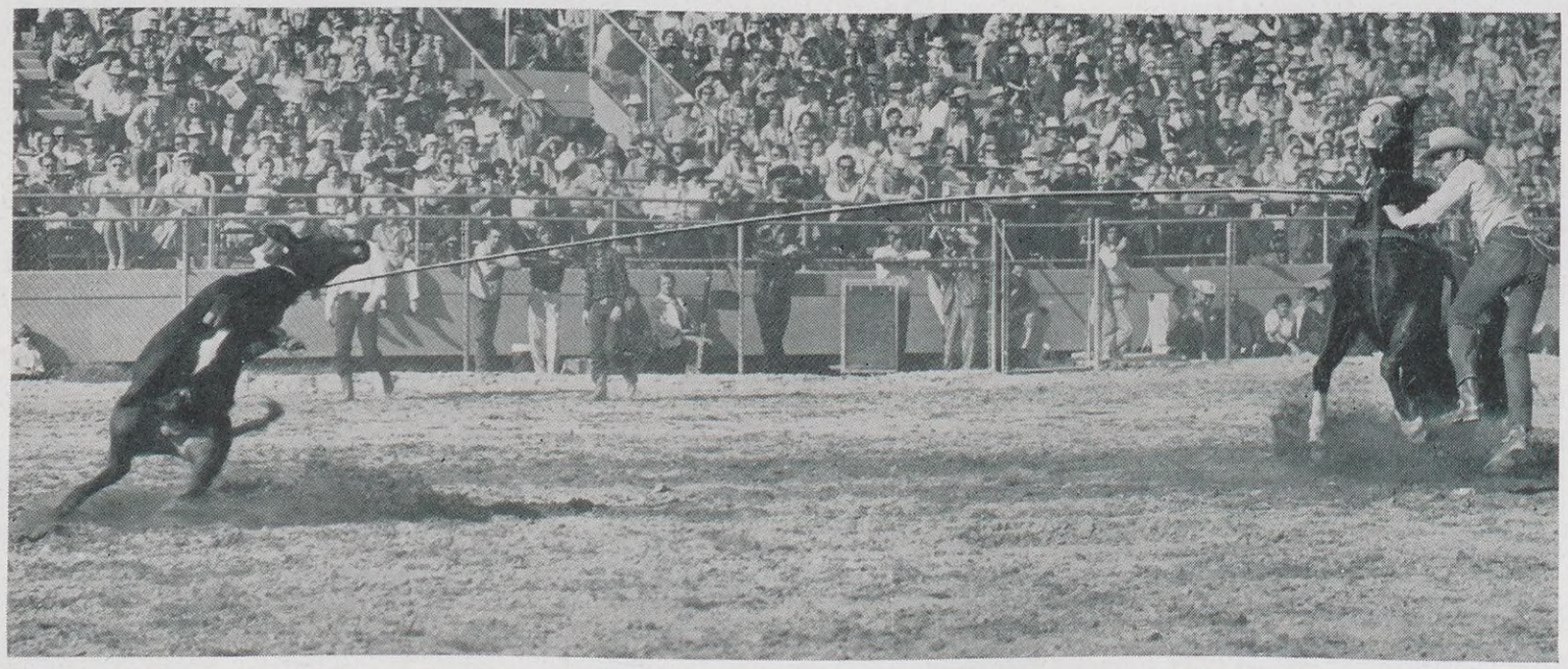
At the refinery laboratory, Manager R. F. Evenson and Analytical Supervisor E. R. Dalbey were notified and they prepared their equipmnt for a quick analysis. When detectives arrived, Evenson and Dalbey smelled the liquid and thought it to be furfural, a chemical reaction agent derived from combining oat hulls and sulfuric acid.

Not trusting their sense of smell alone, they turned the liquid over to Senior Inspector W. J. Nicholson of the Refinery Laboratory, and Research Technologist R. C. Eiffert of the Research Laboratory, to make a spectrographic analysis. This was done by putting a sample of the liquid through an infrared spectrometer. This instrument identifies organic compounds by measuring and recording the wave lengths of light that the compound absorbs. The results of the test verified that the liquid was the highly-toxic furfural.

Since furfural is used at the refinery in the extraction process for manufacture of lubricating oils, the antidotes for this poison — and all other poisons used at the refinery— were on file. Within minutes the information was telephoned to the hospital. And within an hour after Joy had swallowed the poison, the doctors began their treatment and she was out of danger.

By the next morning, Joy's condition was termed "excellent" and she was released from the hospital. Although her curiosity has not abated, her mother reports that her taste now is more discriminating ●

Swinging a lariat in the team roping event is Shellman H. B. Curry, left, aiming for a steer's back legs as his partner tugs on the horns.

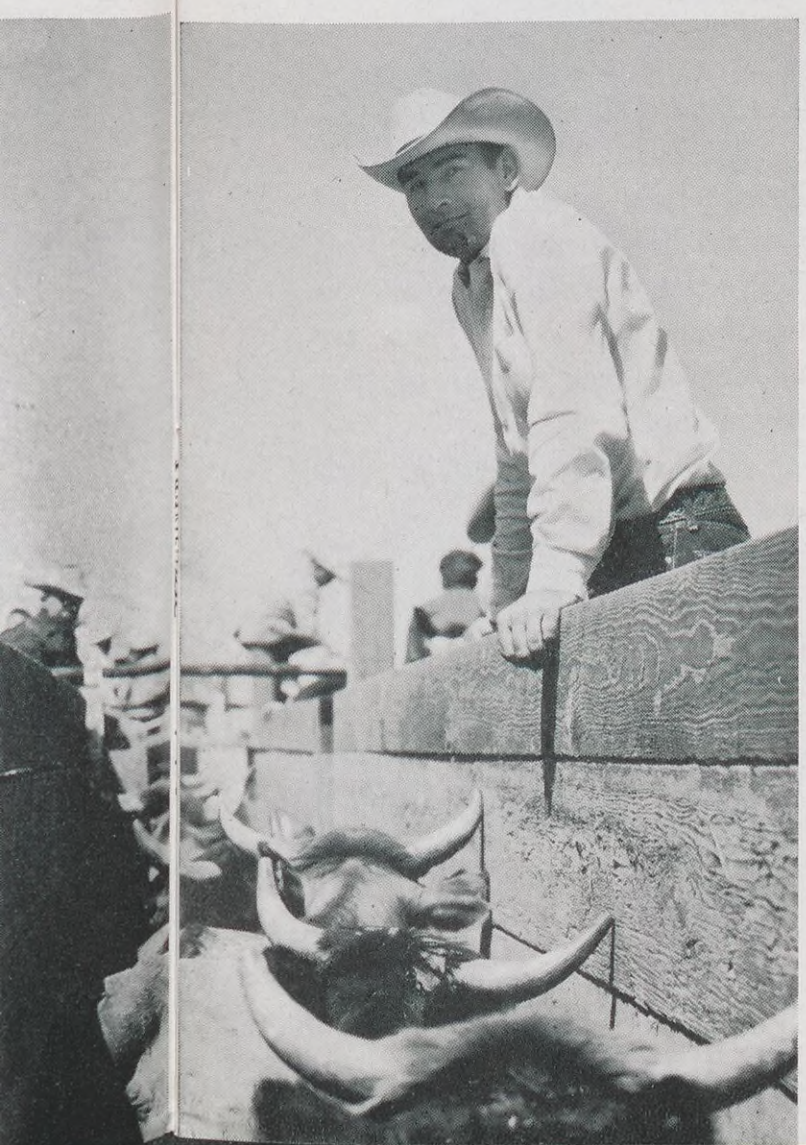


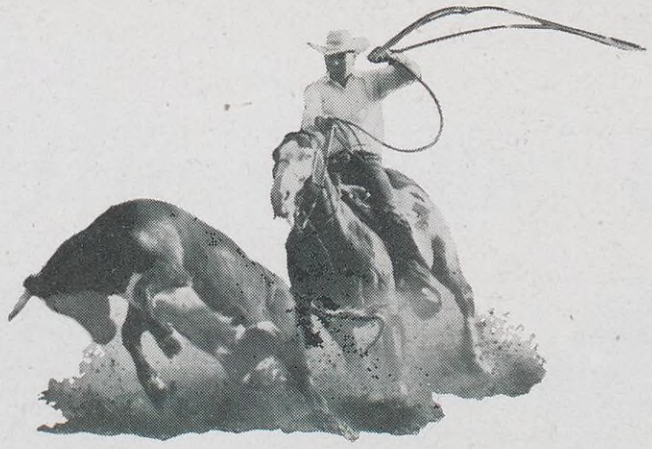
Leaping from the saddle as his rope pulls a calf off its feet, Curry will wait until it scrambles up again and then will throw the calf to the ground before tying its legs.

Watching steers lined up in a chute, Curry waits for the team roping event — which is his best rodeo specialty. Curry is one of the nation's top rodeo riders — in his spare time.

the horns.

They work together smoothly as a team.





heading for a FAST ROUNDUP

H. B. (Bronc) Curry expects to head for the "World Series" in rodeo riding as a competitor next month

THE cowboy was off his horse the moment his lasso looped around the calf's neck. As his horse backed off to keep the rope taut, the rider threw the calf to the ground, whipped a short rope around its legs, tied a knot and raised his hands to show he was finished.

Only when he tried to step back did H. B. (Bronc) Curry realize he had tied his left leg with the calf's.

That happened several years ago, when Curry—a Mechanic's Helper in the Ten Section Gasoline Plant of Shell Oil Company's Pacific Coast Exploration and Production Area—was relatively new to roping competition. Today, he is one of the nation's top rodeo riders and looks forward to appearing in the "World Series" rodeo at Clayton, N. M., during his vacation in mid-November.

Entry in the "World Series" rodeo is by invitation only. For cowboys, it is the equivalent of golf's Masters' or bowling's Invitational Match Game tournaments. Invitations are issued by the Rodeo Cowboys' Association to the top 15 performers during the year in each of seven events—saddle bronc riding, bull riding, bareback riding, calf roping, steer wrestling, and single and team steer roping. The first five events will be held at Dallas, Tex., and the last two at Clayton.

In effect, a cowboy "buys" his invitation with his winnings during the year. The Cowboy Association awards one point for each dollar won in competition and the 15 high-point performers in each category go to the "World Series."

Curry — nicknamed Bronc because his middle name is Broncson—expects to compete in team roping, an event in which two men simultaneously rope the head and back legs of a steer. At the last count, he stood third among about 2,000 ropers in the nation in that category.

If he is invited, it will mark Curry's first "World Series" opportunity in 13 years of performing. He has reached championship caliber by competing—only in his spare time and against many full-time performers—in rodeos within 800 miles of his Bakersfield home. Though Curry was born and raised on a ranch near Tucumcari, N. M., and has worked with horses and cattle most of his life, he never has been a full-time rodeo rider. (Because rodeo events basically require the skills of a working ranch-

In the corral behind the Curry home in Bakersfield, Calif., Curry watches the calf-tying technique of his son, Hank, nine. Though Hank is a good hand with a rope, he says he would rather be a veterinarian than a rodeo star.

HEADING FOR A FAST ROUNDUP continued

Curry has competed in rodeos for 13 years

hand, many cowboys naturally turn to rodeos for both fun and profit. Calf roping, for example, is a speeded-up version of a cowboy's capture of a stray to be branded, and bronco-riding is a shorter version of a cowboy's job of breaking a horse to saddle.)

When he started competing, Curry was a bronco rider and steer wrestler as well as a roper. But a broken leg in 1954, suffered when a horse fell on him, plus injuries to both ankles later while trying to twist a steer to earth, caused him to restrict his rodeo work to roping.

Curry's years on cattle ranches made him a sure-handed roper and he had another advantage: his well-trained horse. A roper is no better than his mount. The horse must work as quickly and smoothly as the rider. Curry has trained horses for rodeo work since 1951. He said his present horse, a big sorrel named "Slats," has "everything but looks."

In calf roping, the calf gets a 15-foot head start on the roper. "Slats" must catch up with the calf and as soon as Curry lassoes it, the horse must stop suddenly and pull back to keep the rope stretched tight. Curry is off his horse before the calf is tumbled. He must then pick up the 300-pound calf and throw it down, hold one of its front legs in the air to keep it down, and, finally, tie its feet with a rope he carries in his teeth. Split seconds count, because prize money goes to the fastest times. (Curry's best time is 10.2 seconds.)

Team roping, Curry's "World Series" specialty, is perhaps the most difficult rodeo event because two partners must coordinate perfectly. A single mistake by either puts them out of the money. (Once, Curry remembers, a partner began swinging his rope too soon and lassoed Curry's foot.) One partner ropes the steer's horns, and the other lassoes the steer's back legs. Time is called when both ropes are in place and both horses are facing each other pulling the ropes taut. Again, prize money goes for the shortest times.

Rodeo performers have a special interest in prize money because they put up most of it. The prize funds come from contestants' entry fees, which vary with the size of the rodeo, plus contributions by rodeo promoters. (At the "World Series," for example, the entry fee is $100.) The amount a cowboy can win depends on the total number of entries and the number of events he enters.

Curry won his largest single amount this year without even knowing it until several days later. When he left the Tucson Rodeo—one of Arizona's largest—he thought he had won only $145 for a fourth place in calf roping. But when the rodeo ended a few days later, Curry was named the Rodeo All-Around Champion. He and his partner had won first place in one go-around of team roping and second money for the over-all championship in that event. These winnings brought his weekend total to $1,686.

But for every winning rodeo weekend, there may be several in which Curry earns only bruises. Recently, for example, he made a 1,600-mile round trip drive to an Arizona rodeo —his longest drive so far—and did not win a cent.

Curry tries to ride in a rodeo every weekend from February through October. After work during the week, he usually practices roping calves in a small corral behind his home.

"You've got to keep it up or you lose the timing," he said. "There are lots of fellows ready to step up past you if you slip."

This summer, however, his practice sessions were postponed because of dry weather. This has been one of Bakersfield's driest years, and Curry's neighbors complained about dust raised by his one-man rodeos.

To make this his best year yet, Curry is hoping for a series of dust-laying showers along with a "World Series" bid ●

SHELL PEOPLE in the news

SHELL OIL COMPANY

E. D. CUMMING

E. D. CUMMING, Vice President of the Houston E&P Area, will retire December 31, 1959, after completing more than 36 years' service. Mr. Cumming, who holds a bachelor's degree in chemical engineering from Alabama Polytechnic Institute (Auburn), joined Shell in 1923 as a Fireman at the Long Beach, Calif., natural gasoline plant. He was named Manager of the Martinez Refinery in 1937, Manager of the Wood River Refinery in 1938, and was elected Vice President Manufacturing in 1939.

During World War II, Mr. Cumming served as National Director of Refining for the Petroleum Administration for War. He and his staff co-ordinated the nation's petroleum refining industry and supervised a two billion dollar construction program for the speed-up in production of aviation gasoline. In 1944 he was named Vice President Exploration and Production, Pacific Coast, and from 1946 to 1948 was employed by the Royal Dutch/Shell Group in London as Manager of the American Department. Upon his return, he was appointed Regional Vice President in Houston and was named to his present position in July, 1951.

J. E. WILSON

J. E. WILSON, Director of Exploration Research at Shell Development Company's E&P Research Division, has been nominated to succeed Mr. Cumming. Between now and the end of the year, Mr. Wilson will spend some time in Head Office and in Houston familiarizing himself with Area Operations.

Mr. Wilson joined Shell Oil Company in 1938 as a Geologist at San Antonio, Tex., upon graduation from Texas A&M College with a bachelor's degree in geological engineering. When he returned in 1945 from a three-year military leave, he held various positions in exploration in the Houston and Tulsa Areas, including Division Exploration Manager at Wichita Falls, Tex., and at Oklahoma City. He was named Area Geologist in Tulsa in 1953 and moved to the Denver Area in a similar position in January, 1954. He was appointed Exploration Manager at Denver in 1955 and joined Shell Development Company in his present position in July, 1958.

E. A. HUGILL, JR.

E. A. HUGILL, JR. has been elected Secretary of Shell Oil Company. He has also been appointed Secretary of Shell Chemical Corporation, International Lubricant Corporation and Shell Canadian Exploration Company.

Mr. Hugill has also been appointed a Vice President of Shell Development Company to be in charge of the Licensing Division later in the year.

Mr. Hugill, who holds an LL.B. degree from the University of California, joined Shell in 1933 as a law clerk in the San Francisco Office. He became an Attorney there in 1936, and subsequently served in both the Legal and the Exploration and Production departments at various California locations. He transferred to New York in 1949 as Executive Assistant to the Vice President—Economic Development. In 1951 he joined the Legal Organization as an Attorney in Head Office and was appointed General Attorney of Shell Oil Company in July, 1954.

O. L. STONE

SHELL OIL COMPANY LEGAL ORGANIZATION

W. F. Kenney, Vice President and General Counsel, has announced the following organization and staff changes to facilitate the handling of legal matters for the Shell Companies.

The responsibilities and functions of Head Office Legal Organization will be administered by three General Attorneys.

O. L. STONE, presently a General Attorney, will handle Exploration and Production and Industrial Relations legal matters. He will act for the Vice President and General Counsel in his absence.

S. R. VANDIVORT

S. R. VANDIVORT, Attorney, Head Office, has been appointed General Attorney, handling Manufacturing, Transportation and Supplies, Marketing, Purchasing-Stores and Public Relations legal matters.

R. M. HART, Attorney, Head Office, has been named a General Attorney, and will handle legal matters concerning Financial, including taxes, the Secretary's Office, Personnel, including benefit plans and Shell Development Company.

Mr. Stone, who holds an LL.B. degree from Louisiana State University, joined Shell in 1937 as an Attorney in the Legal Department of the Houston Exploration and Production Area. In 1947 he was transferred to the Legal Department of the New Orleans E&P Area and in 1950 he became an Attorney in the Head Office Legal Organization. He was appointed an Assistant Secretary of the Company in 1953 and assumed his present position in January, 1959.

R. M. HART

Mr. Vandivort, who received an LL.B. degree from the University of Missouri Law School, joined Shell in 1947 as an Attorney in the Head Office Legal Organization, and in August, 1950, moved to San Francisco on special assignment in connection with the West Coast Anti-Trust Suit. He returned to Head Office last August.

Mr. Hart, who holds an LL.B. degree from Oklahoma University and an LL.M. (Taxation) from New York University, joined Shell in 1950 as an Attorney in the Legal Department of the Tulsa E&P Area. He was transferred to the Head Office Legal Organization in 1952.

SHELL OIL COMPANY EXPLORATION AND PRODUCTION ORGANIZATION

E. C. TABER

E. C. TABER has been appointed Manager Planning in Head Office Exploration. In his new assignment, Mr. Taber will assist with the general geological activities of the Exploration Department, planning for future exploration, and the recruitment and training programs for geological personnel. He will also work closely with the geological staff of the Areas and of Shell Development Company's E&P Research Division.

Mr. Taber, who holds a B.A. degree in geology from Stanford University, joined Shell in 1939 in the Tulsa Area. He served as Division Geologist at Wichita Falls, Tex., and Oklahoma City before becoming Division Exploration Manager there in 1952. He was appointed Area Geologist at Tulsa in 1955 and assumed a special assignment for Head Office Exploration in Houston early this year.

SHELL DEVELOPMENT COMPANY

S. A. BALLARD

S. A. BALLARD, Director of Chemical Research at the Emeryville Research Center, has accepted employment abroad as Research Coordinator, Chemicals, for the Bataafse Internationale Chemie MIJ. N.V., effective October 1, 1959. He will make his headquarters in The Hague. Mr. Ballard has been granted an indefinite leave of absence in order to undertake this assignment and the position of Director of Chemical Research will remain vacant during his absence. Mr. Ballard, who received B.S. and Ph.D. degrees in organic chemistry from Yale University, joined Shell in 1937 as a Research Chemist at Emeryville. In 1944 he was appointed Department Head of the Organic Synthesis Department and in 1952 became Department Head of the Petroleum Chemistry Department. He assumed his present position in 1955.

R. H. NANZ

R. H. NANZ has been appointed Director of Exploration Research of the Exploration and Production Research Division at Houston. Mr. Nanz, who holds a Ph.D. degree in geology from the University of Chicago, joined Shell Oil Company at Houston in 1947 as a Geologist. He joined Shell Development at Houston in 1953 as a Senior Geologist and was appointed Manager, Geological Department in July, 1958.

F. T. CONNOLLY

F. T. CONNOLLY has been named Manager, Geological Department at the E&P Research Division at Houston to succeed Mr. Nanz. Mr. Connolly, who holds a M.S. degree in geology from the University of Cincinnati, joined Shell Oil Company at Tulsa in 1949 as a Junior Stratigrapher. He was named Geologist there in 1950, Senior Geologist in 1957, and transferred to the Houston Area in a similar capacity in August of this year.

A. S. GINZBARG

A. S. GINZBARG has been named Manager, Physics and Mechanics Department at the E&P Research Division at Houston. Mr. Ginzbarg, who holds a Ph.D. degree in physics from Purdue University, joined Shell Oil Company at Houston in 1949 as a Physicist. He joined Shell Development Company in 1953 and was named Senior Physicist, Physics and Mechanics Department, in 1954.

SHELL CHEMICAL CORPORATION

R. C. McCurdy, President of Shell Chemical Corporation, has announced the following staff changes:

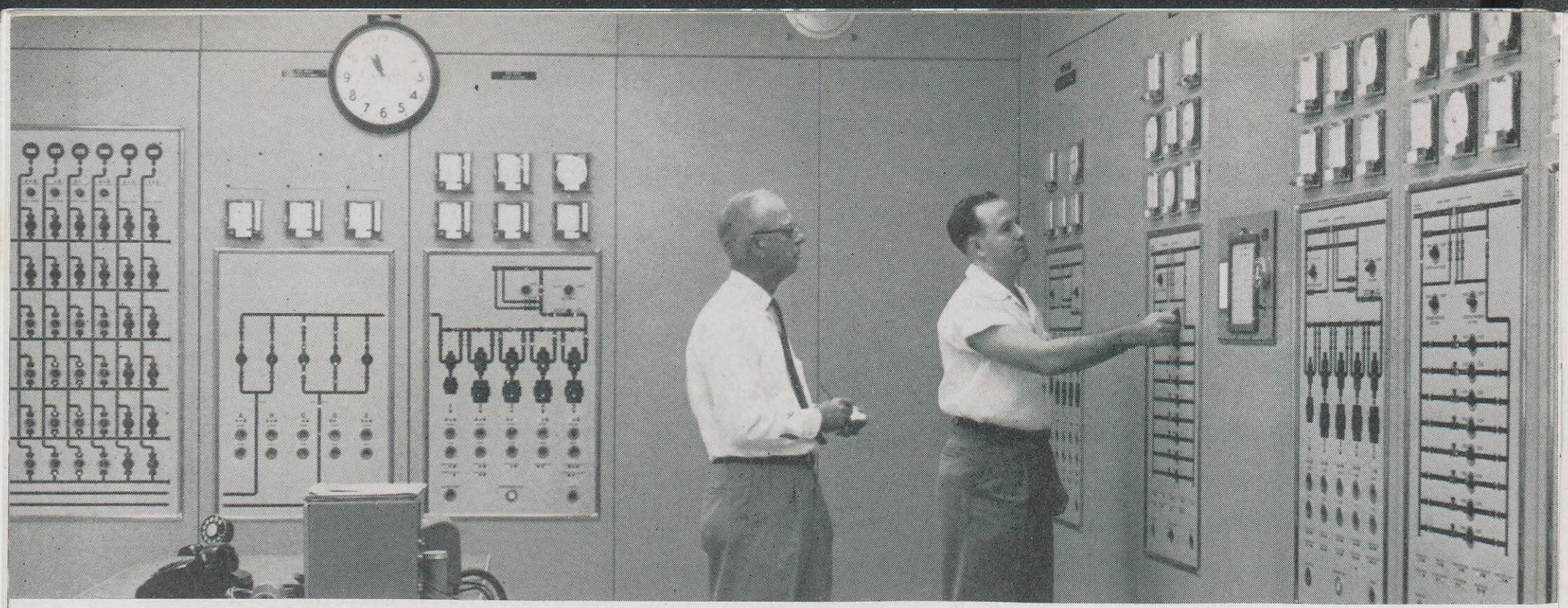
NAME	NEW POSITION	FORMER POSITION
H. E. HUGHES	Special Assignment, Head Office	Manager, Denver Plant
O. M. WILLIAMS	Manager, Denver Plant	Manager, Dominguez Plant
E. W. CASAGRANDE	Manager, Dominguez Plant	Manager, Martinez Plant
H. J. THOMAS	Manager, Martinez Plant	Assistant Superintendent, Martinez Plant

H. E. HUGHES

O. M. WILLIAMS

E. W. CASAGRANDE

H. J. THOMAS



The main control room of the Four Corners Pipe Line system is shown above. F. E. Fitzgerald, left, Supervisor, Oil Movements, for the Four Corners Line, and Terminal Dispatcher K. W. Maloney are checking one of the station control panels.

MICROWAVES MOVE OIL

Radio Beams Help Operate the Four Corners Pipe Line

RADIO waves linked across a series of mountain peaks near the route of the 750-mile Four Corners Pipe Line help move 70,000 barrels of oil a day from Utah and New Mexico storage tanks to refineries in the Los Angeles area.

Signals sent over the pipe line's microwave radio system do a variety of jobs: They turn valves and pumps on or off, gauge amounts of oil in storage tanks; indicate when local safety devices shut down faulty equipment in the stations — and even report the cause of trouble.

Shell Pipe Line Corporation, operator of the Four Corners Line (jointly owned by six oil companies including Shell Oil Company), has microwave systems on other lines in Texas, Missouri, Louisiana and Oklahoma. But none of them covers such a great distance or such desolate terrain.

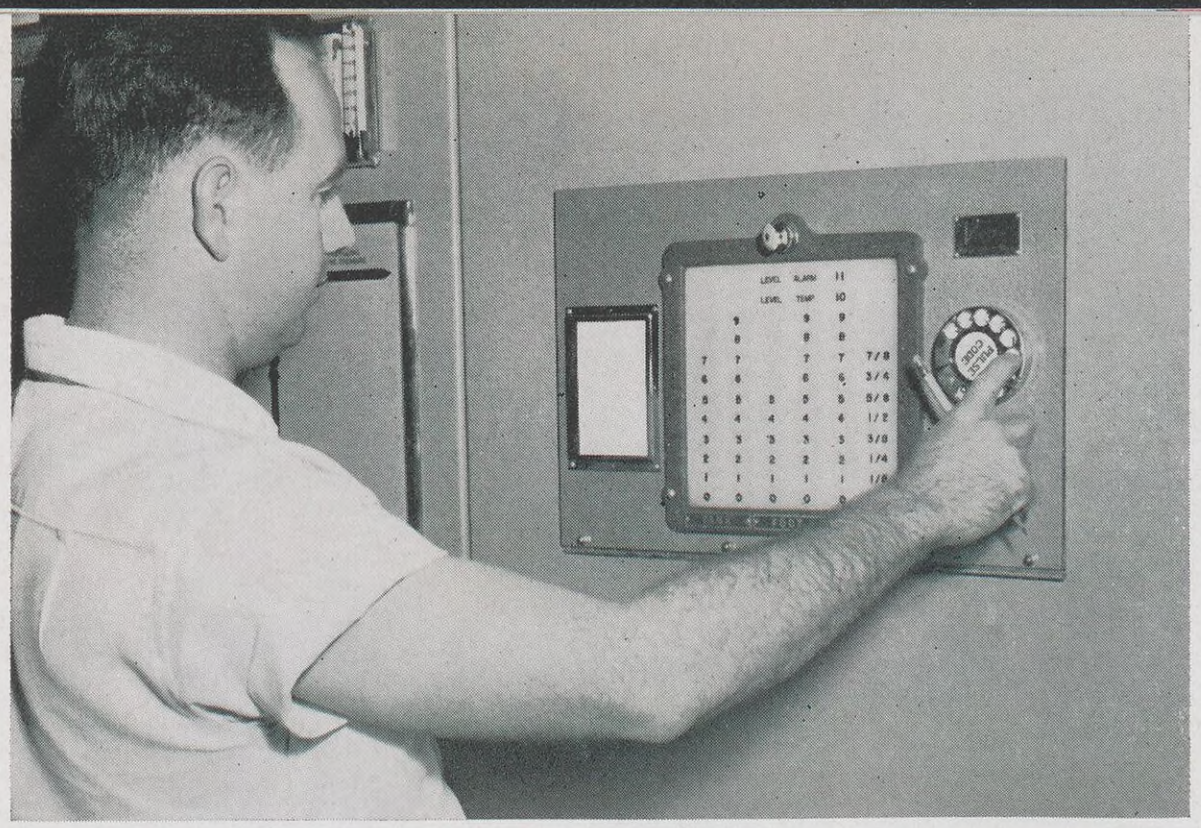
Because the Four Corners Line runs through long stretches of uninhabited land, telephone lines are not available for operating the pipe line by telephone control. "We could have built our own telephone system," said R. W. Guthrie, Supervisor, Operations Engineering, "but it would have been more expensive than a microwave system."

The control center of the Four Corners system is in the one-story red brick headquarters of the Four Corners Pipe Line Company, in Compton, Calif., across the street from the Dominguez facilities of Shell's Wilmington-Dominguez Refinery.

In the main control room, gray metal panels, stretching from floor to ceiling, conceal tubes, relays and multi-colored wires that control the pipe line through the microwave system. Only intermittent clicking from behind the panels and occasional blinking of lights indicate the system is operating.

The five stations along the line (three pump stations and two pressure-reducing stations) are represented in the control room by separate control panels. Each station panel is, in effect, a diagram showing how pumps, pipes and tanks are laid out and how oil is flowing at any moment. Instruments above the panels keep a dispatcher informed about pressures and other variables. He can send radio signals to control oil flow through each station by pushing buttons.

The microwave network now operates on 14 different channels; the number can be increased to 25. Five channels send electronic instructions to pipe line stations; one channel checks equipment located on mountain peaks; two channels are used for voice communications among all stations; one channel provides voice communications between the Division (Compton) and District (Farmington, N. M.) offices; and two connect



By dialing a code number in the Compton control room, Maloney can get the measurement of the amount of crude oil in a storage tank and the oil's temperature.

VHF radios in automobiles and trucks with the system. The remaining three channels are used for voice communication between offices of the Pacific Coast Exploration and Production Area in Los Angeles and the Farmington (N. M.) E&P Division.

Microwave radio is an outgrowth of radar developments during World War II. Its high frequency radio beams travel in a straight line like beams of light and can be aimed to hit specific targets — just as a flashlight can be aimed. The targets along the Four Corners microwave system are saucer-shaped antennas located at each microwave station site.

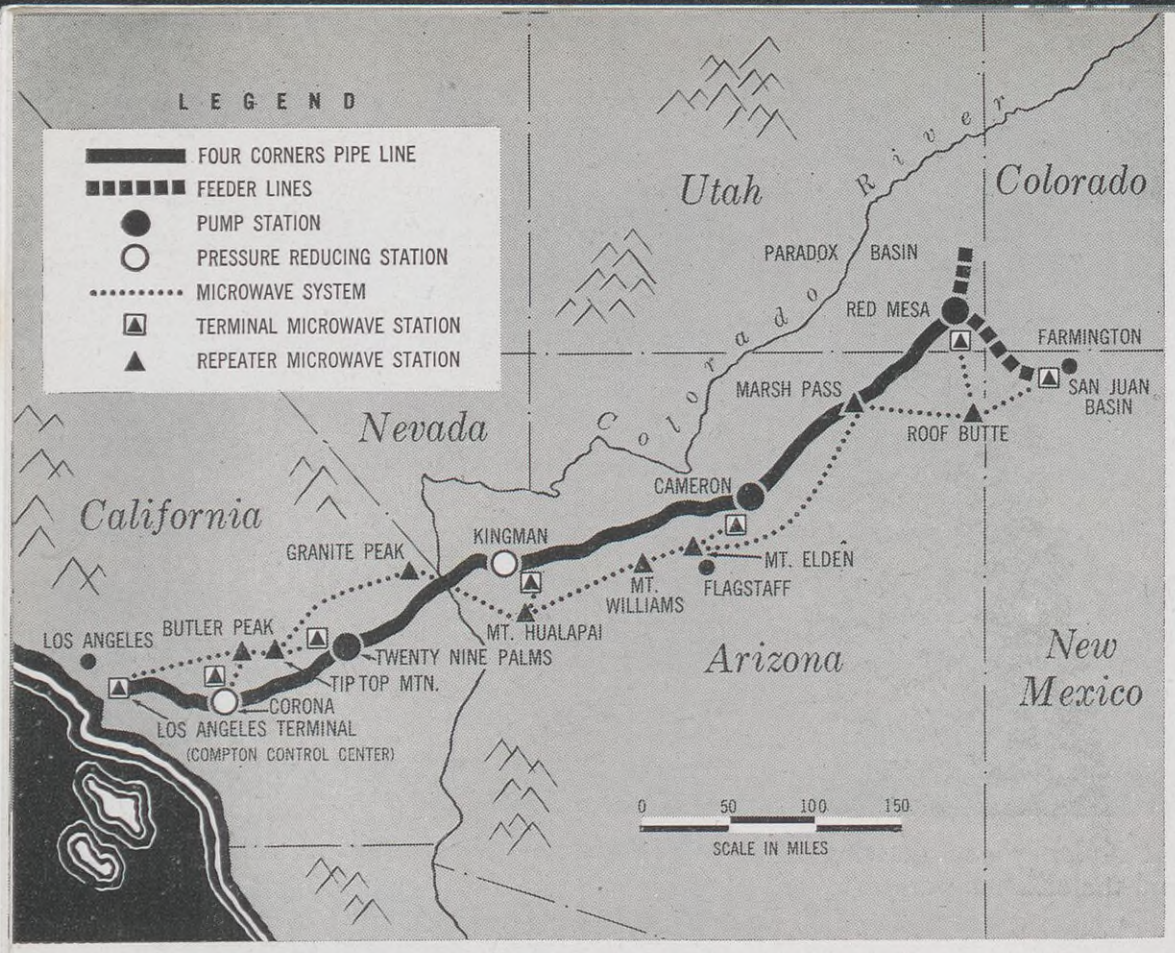
The system has 15 microwave installations — eight mountain-top "repeater" units, which send messages up and down the line, and seven "terminal" units, located at the five pipe line stations, at Farmington, and at the Compton control center (see map on next page). The repeater stations are on mountain peaks so the radio beams will not be blocked by intervening mountains.

Two Shell Pipe Line employees — R. L. Hauschild, now Communications Supervisor at Compton, and W. F. Garvin, Communications Engineer — worked three months on choosing and testing mountain-top locations. First they studied maps of the terrain along the pipe line to find where repeater units were needed. After the peak locations were picked, they started tests to learn whether microwave radio would operate between them.

Because microwaves travel like light, the two engineers knew that if they could see light from one peak to another, then microwaves also could travel the same route. So Hauschild would go up one mountain by jeep while Garvin went up another, each taking along binoculars, a large mirror and a small two-way radio. Each would reflect sunlight with the mirror toward the other. If both could see the reflections through the binoculars, then the peak locations passed the test.

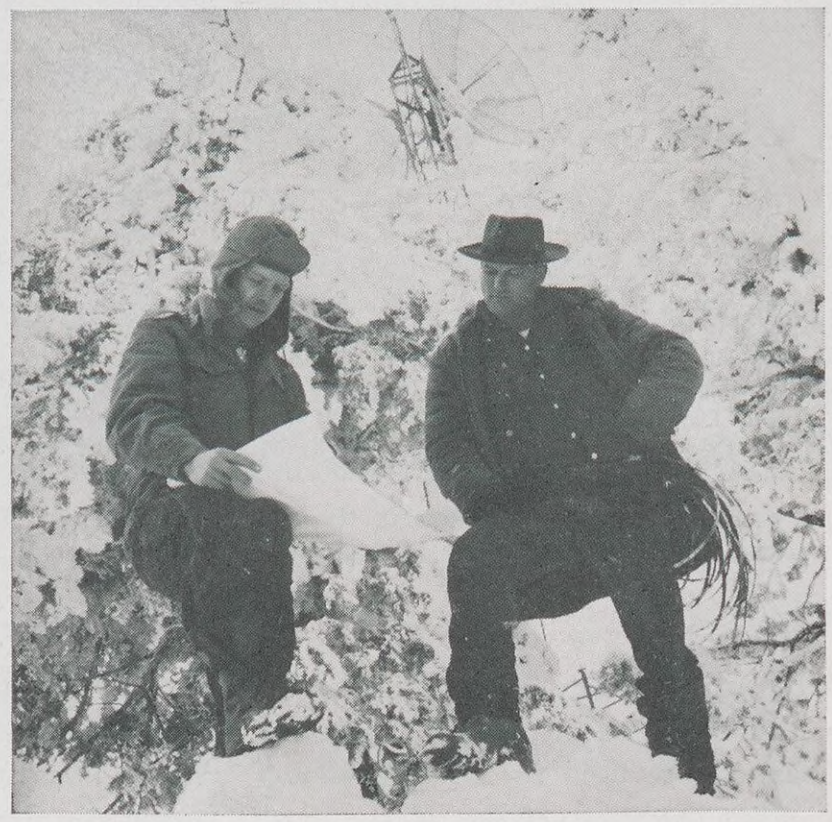
Occasionally, desert dust made visibility too hazy for the mirror test. In one such case in Arizona, the engi-

Framed by snow-covered branches is the antenna tower on top of Mt. Williams in Arizona. The large 10-foot disc is aimed at the microwave station on Hualapai Peak, which is about 100 miles away. The smaller six-foot disc is aimed at the Mt. Elden station, 35 miles away. (See map of microwave system on following page.)



The microwave system, shown on the map above, travels from mountain peak to mountain peak along the Four Corners Line, which crosses some of the most desolate terrain in the U. S.

Discussing the aiming of a mountain-top antenna disc, shown in the background of the photo below, are Communications Engineer R. L. Hauschild, left, and John Giroux of the Utility Tower Company of Oklahoma City.



MICROWAVES MOVE OIL continued

neers decided to make a test at night between Roof Butte and Marsh Pass, 78 miles apart (see map). Hauschild drove a jeep up Roof Butte and climbed the last 800 feet to the top carrying a pair of photo-flood lamps and a portable generator. Garvin, meanwhile, took off in an airplane and flew over Marsh Pass. With their timing pre-arranged, Hauschild turned on the lamps while Garvin's plane descended. When Garvin could no longer see Hauschild's lights he made a note of the plane's altitude at that moment. With this information, the engineers later estimated how tall an antenna tower would be needed on Marsh Pass.

After the microwave station sites were selected, the land was leased and surveyors fixed the exact latitudes and longtitudes of the locations to fulfill requirements for a Federal Communications Commission license. Construction then started under supervision of General Electric Company's Communications Products Department.

Contractors were able to truck materials and equipment to every location except the tallest — 9,800-foot Roof Butte. Trucks carried construction materials as close to the top of the peak as they could and a mule team took over for the last 800 steep feet. A small ski-lift had to be constructed to pull the antenna tower from the end of the road to the summit. But a jet helicopter — the only kind that could reach that altitude — was needed to lift electronic equipment to the top of the butte; this equipment was too delicate to trust on bumpy trucks and mules.

Diesel generators had to be installed to operate five of the mountain-top installations because they are located in areas where commercial power is unavailable. Each of these stations has two generators, although only one is operated at a time; the other, used for standby and emergencies, is started automatically when needed. The delicate microwave equipment also is installed in duplicate (excluding towers and antennas) so that if one radio unit fails the other can be used.

To minimize breakdowns, complete maintenance checks are made regularly at all Four Corners microwave installations by four communications technicians assigned to strategic locations along the system. In addition, the system checks itself each time an order is given with the press of a button in the control center. Less than one second after a signal reaches a pipe line station, the same signal is sent back to the control center to inform the terminal dispatcher that it was received as sent. If the two signals are not the same, the electronic order is not carried out.

Setting up the microwave system was a complex, arduous and adventurous task. Now the work is paying off in the Four Corners Pipe Line's automatic and remote operation ●

Shell Chemical Corporation

October—1959

Shell Chemical Corporation
Ammonia Division
Organization

General Manager
L. M. Roberts

Operations Manager
F. A. Horsley

Manager Treasury
J. B. Corkins

Sales Manager
V. C. Irvine

Manager Marketing Engineering
C. L. Hedman

Manager Development
L. L. Baldwin

Manager Distribution
C. R. Rehbock

Manager Ammonia
S. J. Hastings

Manager Sales Development
L. E. Gould

Manager Marketing Service
K. W. Dedrick

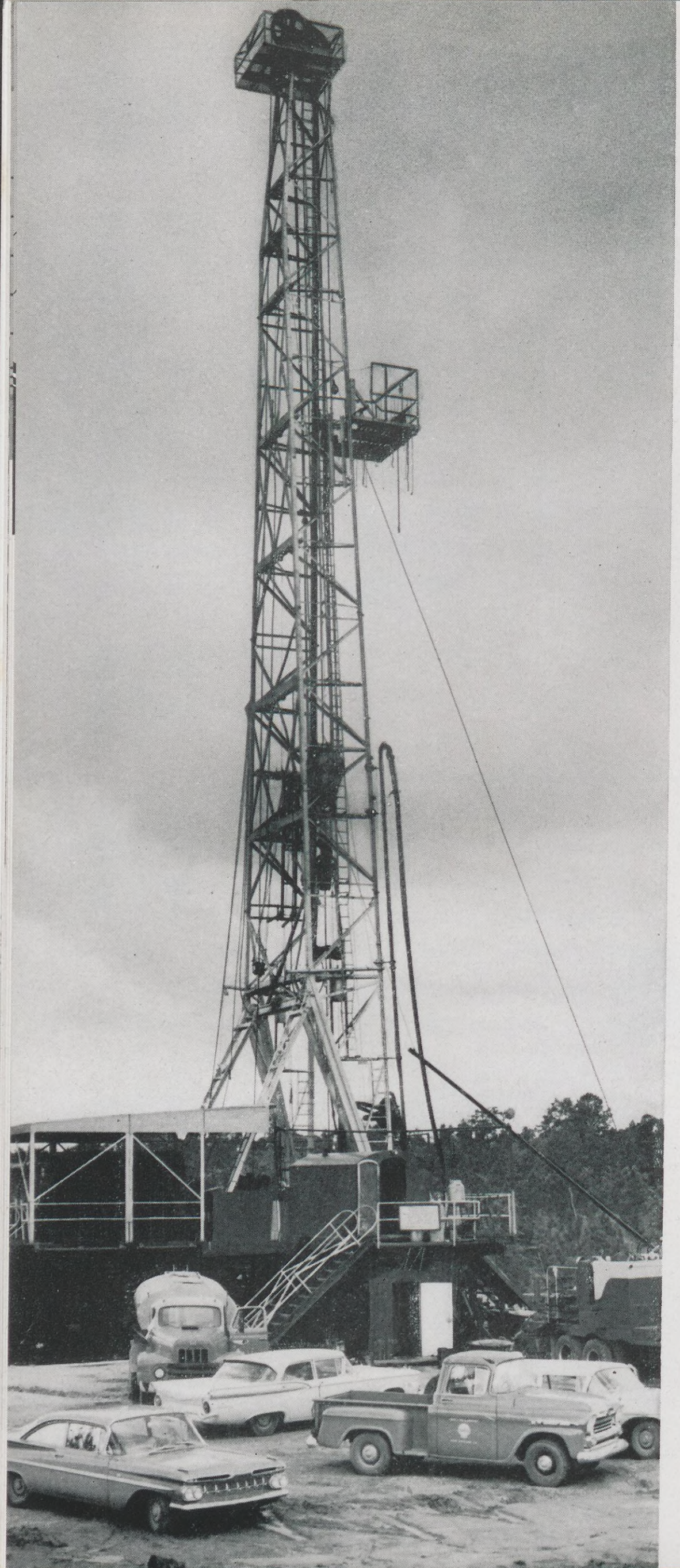
Plant Manager Shell Point
F. G. Watson

Plant Manager Ventura
F. D. Kuenzly

District Manager Sacramento
M. G. Folsom

District Manager Fresno
D. H. Walbolt

District Manager Yakima
H. T. Johnson



$7 Billion To

The oil industry gathers $800,000 in taxes every hour, but the bill continues to rise

By M. J. KENNEDY
New Orleans E&P Area Tax Representative

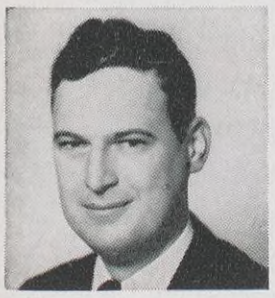
HOW much is $7,000,000,000? It is about $155 for every wage earner in the United States. It is more than the total Federal taxes collected annually before World War II. It is a third of the value of all the gold in the U. S. Treasury. Also, it is the approximate amount the oil industry funnels into treasuries of the Federal, state and local governments each year.

Among the many taxes collected and paid annually by oil companies are income and franchise taxes, production taxes, gallonage taxes on manufacture and distribution of gasoline and oils, sales and use taxes, payroll taxes, property taxes and others. They all add up to the staggering figure of $7,000,000,000.

Each state, as well as the Federal Government, gains revenue from taxes on petroleum and/or petroleum prod-

Drilling and production taxes paid by the oil industry include property tax, severance tax (paid on production of oil and gas), state and local excise tax, sales and use tax, as well as Federal and state income tax and payroll tax.

Tax Bill



PRICE AND TAX MASTER INSTRUCTION SHEET (REV. 1/59)

FIELD _____

STATE _____

DATE _____

NOTE: CUT "X" IN CARD COLUMN-2 FOR ALL 61 CARDS

	CARD NO. 1-2	DATE 3-5	FIELD LOCATION 6-12	PRICE 13-19	DEHYD. RATE 20-26	COMP. RATE 27-33	DISP. 43	TAX RATE 73-77	WELL CL 80
LOUISIANA ONLY									
Production From Flowing Wells under 50#, From Wells on Gas Lift, From Incapable Gas Wells, and From Wells on Pump									
2 Non Tax. Flare	61	---	----000	-0-	. -------	. -------	2	-0-	1
4 Sale Others(Non-Tax)	61			. -------			4	-0-	1
4 Sale Others (Tax)	61						4	.01300	5
5 Sale P.L.	61			. -------			5	.01300	1
7 Used Off Cons.(Non-Tax)	61						7	-0-	1
7 Used Off Cons.(Tax)	61						7	.01300	5
7 Used On Cons.(Non-Tax)	61						9	-0-	1
9 Used On Cons.	61						9	.01300	5
Production From Flowing Wells Over 50# Except From Incapable Gas Wells									
2 Non Tax. Flare	61			-0-			2	-0-	2
4 Sale Others(Non-Tax)	61			. -------			4	-0-	2
4 Sale Others	61						4	.02300	
5 Sale P.L.	61			-------					
6 Used Off G.L.	61								
7 Used									
7									

The form at left illustrates the complicated job of feeding computing machines tax information. This form contains codes for figuring various taxes on Louisiana gas production.

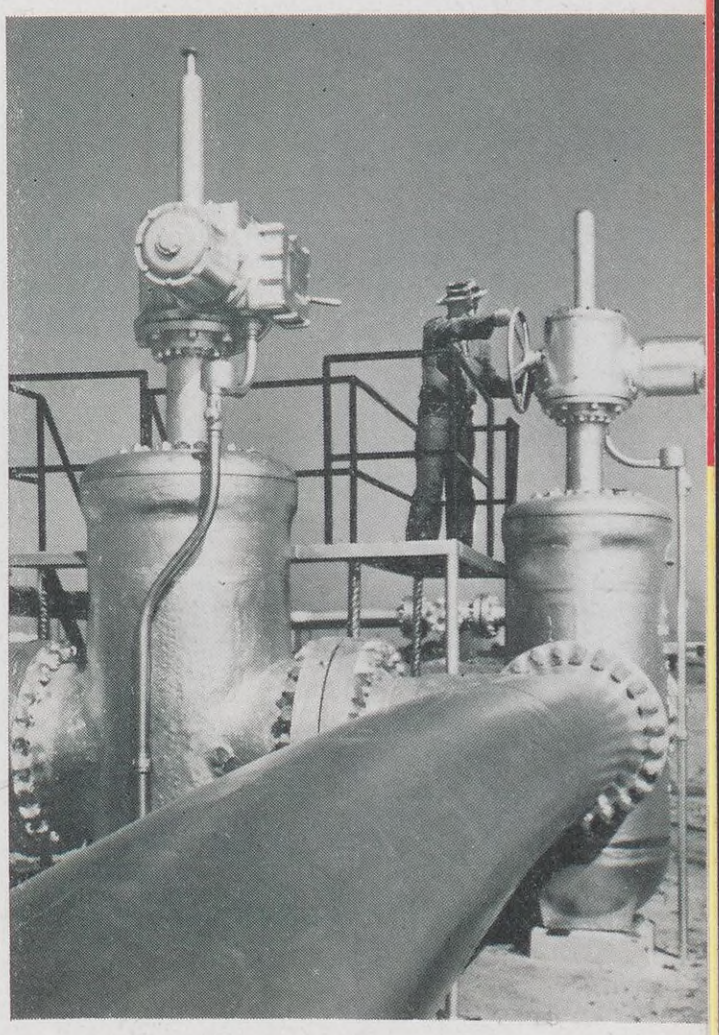
ucts. Because the oil industry is responsible for so much government revenue, it is constantly involved in political problems—as well as the administrative burdens of recording and reporting the various taxes.

The magnitude of this recording and reporting job can be easily illustrated. Consider, just as an example, that every month the New Orleans Marketing Division must prepare 31 separate gasoline and oil gallonage tax returns and 11 separate sales and use tax returns. Also, the New Orleans Exploration and Production Area must calculate and withhold each month the production taxes on about 27,000 royalty interests, in addition to calculating and paying Shell's portion of the tax on these interests.

The wonderful new accounting and computing machines are a great help in operations which lend themselves to uniformity. However, feeding them the required information is not a simple matter. You can get an idea of the complexity of this job by looking over the chart of instructions (see illustration above) for coding taxes on the gas portion of Louisiana production.

The recording and reporting process would be enough in itself, but in many cases the rules for doing the job are far from clear. For example, changes in 1954 in the Federal income tax law affecting the oil industry have yet to be clarified, so that in most cases the amount of tax due is still undetermined for each of the years since then. Also, issues affecting the industry under the Louisiana income tax law leave taxes indefinite as far back as 1949. And this does not include the Federal-state offshore title ownership dispute, which will leave the amount of many types of taxes uncertain for as many years as that issue remains unresolved.

In the oil producing states, it is not surprising to find a considerable reliance on the industry for government revenues. For example, here is a tabulation in round numbers of various



Transporting oil and products by pipe line involves property tax, state and local excise tax, sales and use tax, in addition to income and payroll tax.

amounts the oil industry paid the State of Louisiana during the year ending June 30, 1959:

Severance and Gas Gathering Tax	$120,029,800
Gasoline Tax and Fuel Use Tax	62,261,700
Mineral Royalties	42,598,200
Mineral Rentals and Bonuses	60,099,400
Mineral Leases on the Rockefeller Wildlife Reserve and Sage Foundation	4,693,100
Lubricating Oils Tax and Kerosine Tax	2,258,000
Natural Gas Franchise Tax	300,800
Inspection Fees on Petroleum Products and liquefied petroleum gas permits	53,800
Power Use Tax	1,000,000
Sales and Use Tax	7,100,000
Income and Franchise Tax	2,207,000
Property Tax	16,300,000
TOTAL	$318,901,800

These taxes and fees amount to 48 per cent of the total state revenue. Shell's portion of the total is a whopping $36,000,000. While these figures are for Louisiana alone, comparable taxes are common in other major oil-producing states. Shell's total tax bill for 1958 was $354,000,000.

You might consider it a commendable undertaking by Shell and the rest of the industry to gather so much of the money needed for carrying on governmental functions. This is true, but it is only part of the picture. The money is not like so many coconuts which have fallen from trees and need only to be gathered together. It has been earned by someone, and the process of separating that someone from the money is something less than automatic.

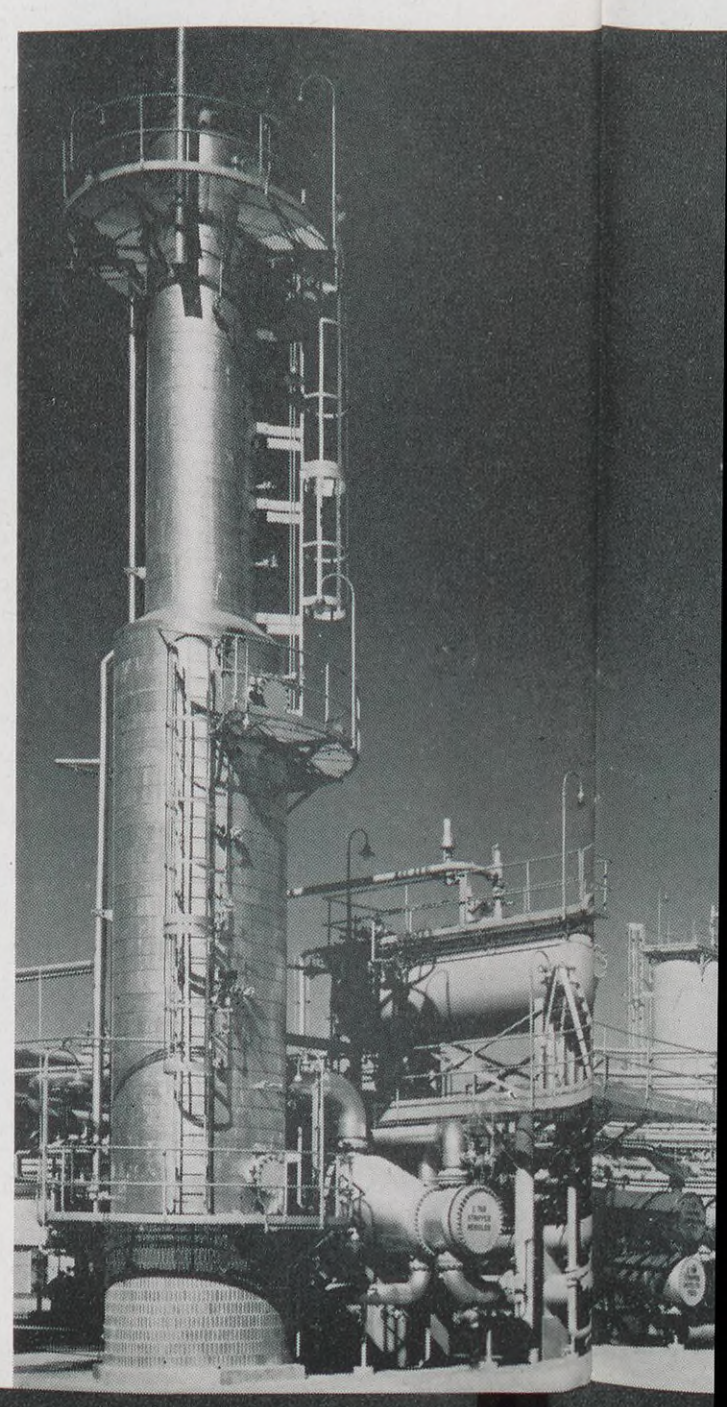
Try to convince the man behind the wheel of his automobile at a Shell service station that he is not paying *us* the posted price for a gallon of our gasoline because a considerable portion of the price represents various taxes. He might realize that about one-third of the price is for direct Federal and state gallonage taxes. But what about the other taxes—the production tax on crude oil, the power tax at the refinery, the income and franchise taxes and property taxes, the sales and use taxes, the payroll taxes on all of the producing, marketing and refining operations. He must pay all of these, too.

The plain fact is that these taxes—plus the considerable cost of recording and reporting them — somehow must be fitted, along with the Company's other expenses, within the limit of what our customer is willing to pay for our products. For only people pay taxes.

The principle is simple but often ignored: No tax is self-generating; each dollar spent by government must be borne by some productive activity. Even deficit financing becomes a tax, because it is merely a method of printing more money and putting it into circulation. This results in a decrease in the value of dollars already in use.

Somewhat related is the fallacy that the dollars a corporation such as Shell spends are worth only 48 cents. The argument is that, with the Federal income tax for corporations set at 52 per cent, every dollar a company spends reduces the income tax bill by 52 cents. On the contrary, the high tax bill makes it doubly important for a company to preserve the amount of its net income before taxes. This is necessary so that after the tax bill is paid, the remainder will be sufficient to allow for a return to stockholders for the use of their money and still have enough left over to replace reserves, plants and equipment and to provide for expansion.

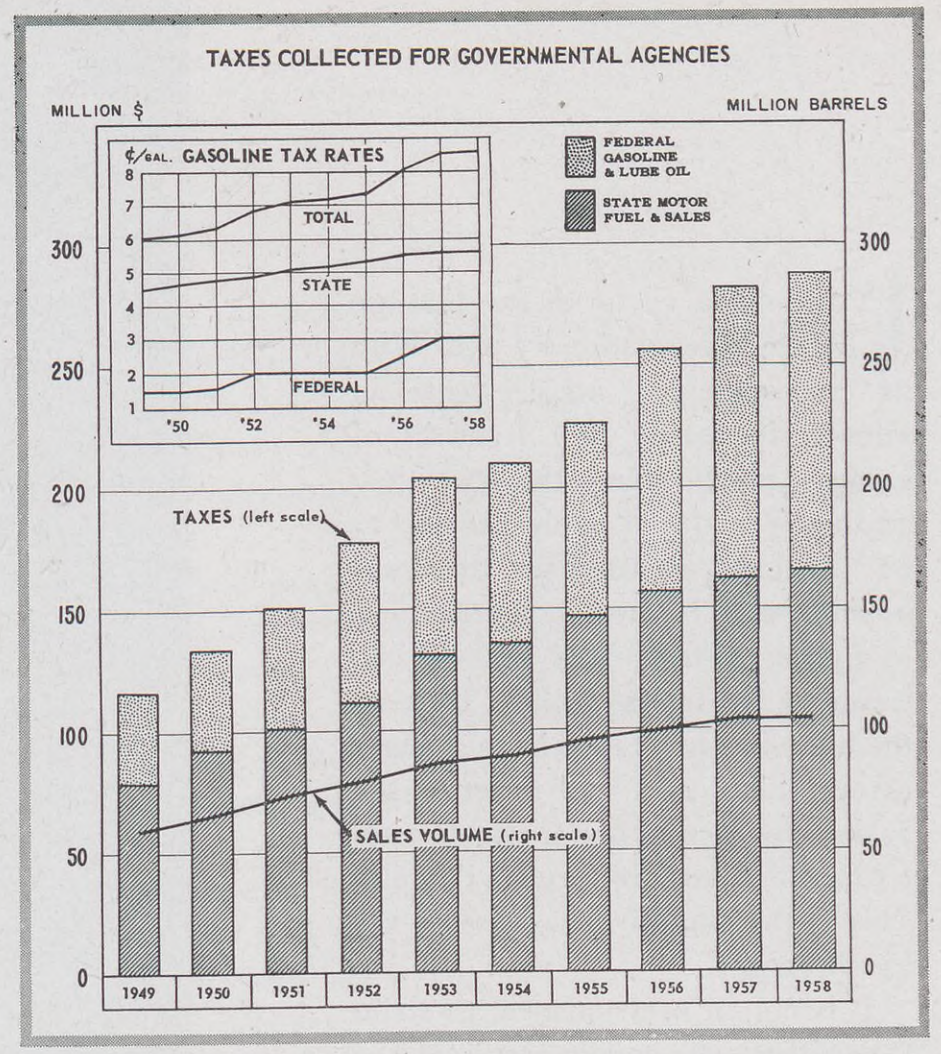
Each year the squeeze gets tighter between the selling price of petroleum products on one hand and costs and taxes on the other. Take the case of gasoline, the industry's most important product and one of the most lucrative sources of tax revenue. Since 1953 the cost of finding and producing a barrel of crude oil has increased about 30 per cent. In this same period, the cost of manufacturing gasoline has increased sharply because of the many quality improvements the industry has made in this product. Also, the average state and local tax on gasoline has jumped 23 per cent and the Federal gasoline tax has risen 100 per cent. Yet, the tank wagon price of regular gasoline has increased less than two per cent since 1953.



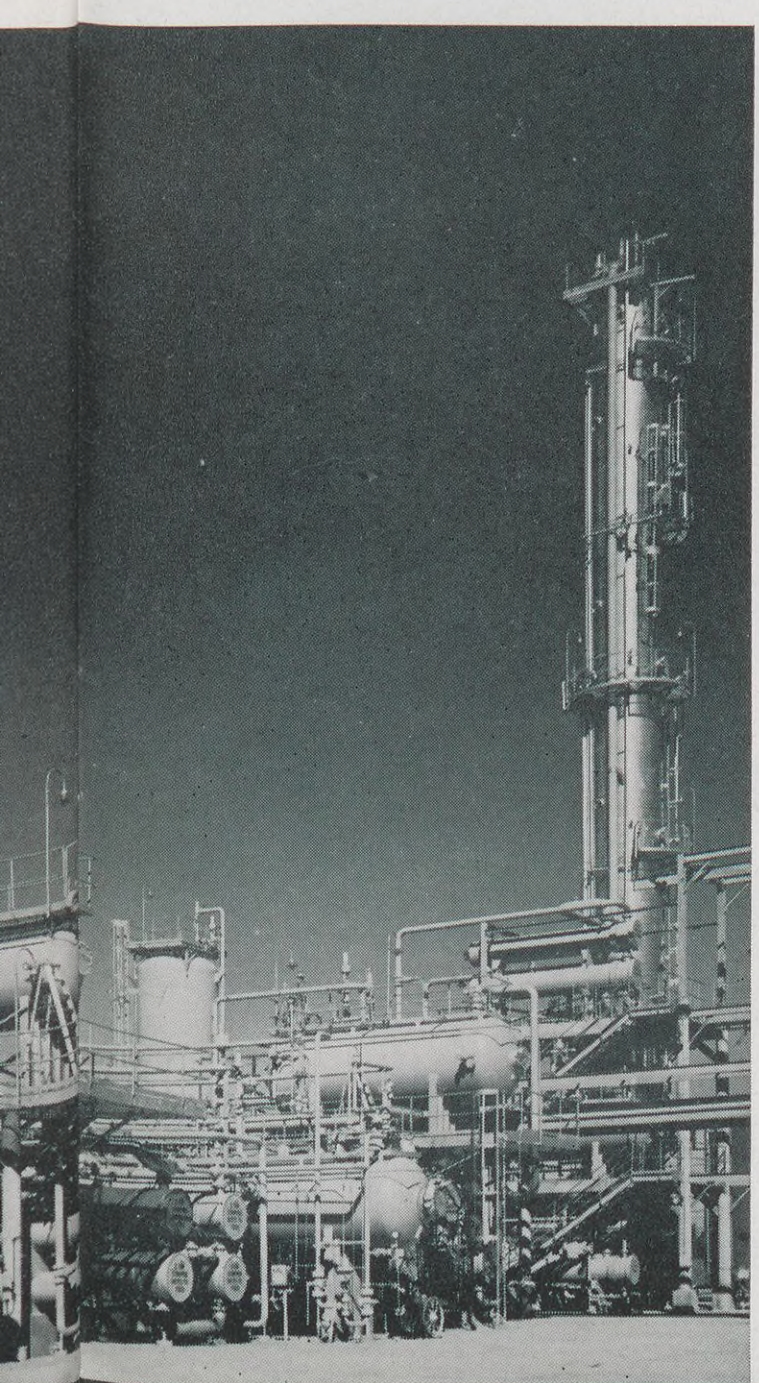
Several states increased their tax on gasoline by one or two cents this year. And at the first of this month a one-cent increase in the Federal gasoline tax went into effect.

Have motorists reached their limit? Will they start reducing their use of gasoline? If this point has not been reached as yet, we are mighty close to it. And reduced gasoline sales might decrease tax revenues, as has happened in several other countries where taxes forced motorists to use less gasoline. In these countries, decreased sales reduced the total gasoline tax revenue to less than what would have been raised by a lower tax on a larger volume of sales.

No one can forecast the outcome of our gasoline tax problem or the tax and cost squeeze on other oil products. But it is obvious that, as the song goes, "Something's Gotta Give" ●



The chart above shows taxes Shell collected for governmental agencies from 1949 through 1958. Also shown, in the graph at upper left, are increases in Federal and state gasoline and lube taxes.



Service station operations require payment of property tax, sales and use taxes, income and payroll taxes, state and local excise taxes. Also, the company must collect Federal and state gasoline and lubricating oil taxes, plus state and local sales taxes.

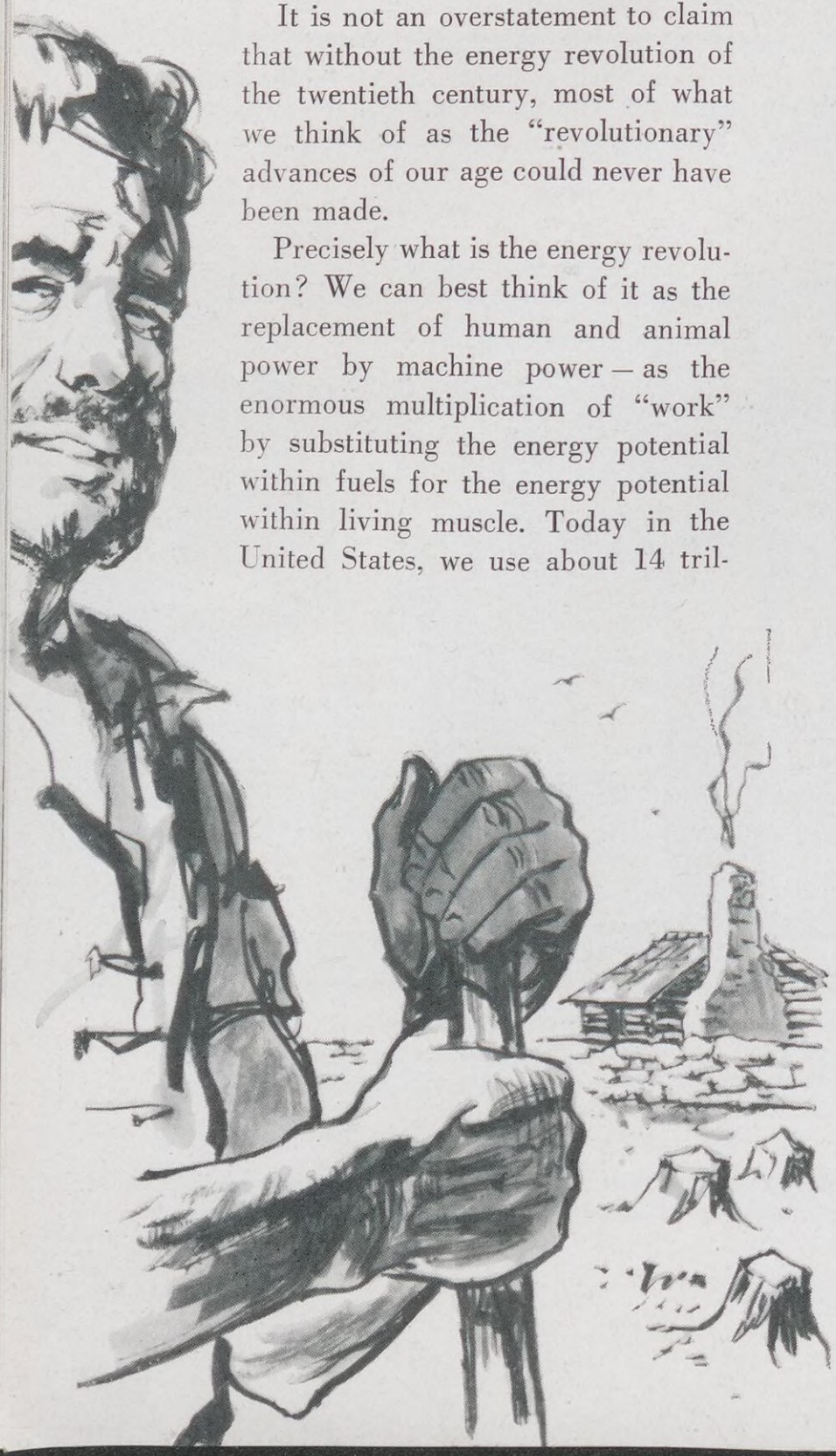
Manufacturing operations require the payment of property tax, sales and use taxes, state and local excise taxes, transportation tax, as well as income and payroll taxes.

The Energy Revolution

IT is only a cliché to say that we live in a revolutionary age. With its unprecedented achievements in science, its totally new frontiers of human possibilities, the twentieth century is unquestionably proving to be the most challenging, the most hopeful—and the most dangerous—era of human history. And yet, an historian of the future, looking back on the full panorama of the huge changes of our times, may well select as the basic revolution of our century a matter to which we rarely give a thought. This is the explosive increase in the use of energy.

It is not an overstatement to claim that without the energy revolution of the twentieth century, most of what we think of as the "revolutionary" advances of our age could never have been made.

Precisely what is the energy revolution? We can best think of it as the replacement of human and animal power by machine power — as the enormous multiplication of "work" by substituting the energy potential within fuels for the energy potential within living muscle. Today in the United States, we use about 14 tril-



The energy revolution has made possible replacement of human and animal power by machine power

By ROBERT L. HEILBRONER

lion horsepower-hours of energy per year. Sheer muscle power, human and animal together, produce only about two or three per cent of that; all the rest comes from mineral and other fuels. But only a little more than 50 years ago, at the turn of the century, the picture was entirely different. Our total horsepower output was considerably less than 100 billion hours of energy. And of that, man and beast accounted for very nearly *two thirds!*

In other words, the twentieth century has seen an accelerating sweep, a true explosion, of power. What that has meant in terms of our living standards hardly needs to be explained. One man working with power-driven mechanical equipment can do as much work in 40 hours as three men working 70 hours a week could do with the hand tools of a century ago. Most of that fabulous increase in productivity has come within the last 50 years.

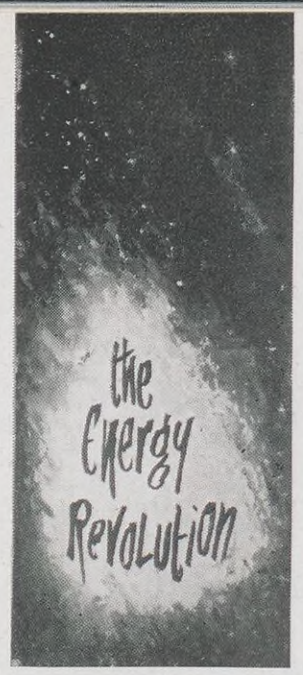
What was it that sparked this energy explosion? Many factors contributed to the final result: the invention of the internal combustion engine; the perfection of the transmission of electricity; the improvement in technology along a hundred fronts. Yet there cannot be any doubt as to what has been—and what continues to be—the central impelling factor. This is the phenomenal growth of petroleum as a source of energy.

In 1900, oil had barely emerged from the first hectic days of discovery and careless use. The proportion of the nation's total energy expenditure which it supplied was negligible. But in less than 60 years, petroleum was to account for almost 70 per cent of our total energy consumption.

Moreover, the energy revolution is far from over. Indeed, the curve of energy use is rising more steeply than ever before. By 1975, the United States will require almost twice as much power as it is now using. Europe's rate of power use will grow even more rapidly. And the underdeveloped lands, which are now desperately seeking a rise in living standards, will doubtless increase their consumption of energy even more spectacularly.

Most of this increase in future energy use will also come from petroleum. Three-quarters of the prospective doubling of America's energy requirements will be based on oil and

Robert L. Heilbroner, the author of this article, which is reprinted from the American Petroleum Institute Quarterly, is an economist, and has been a Military Intelligence officer and a lecturer at the National War College. His writing has appeared in national magazines and economics journals. He is the author of two recent widely-read books on economics for laymen, THE WORLDLY PHILOSOPHERS and THE QUEST FOR WEALTH.



continued

gas. Probably a larger fraction of the world's monumental increase will come from the same source.

Thus, when we speak of the energy revolution, we are speaking in the same breath of the revolution in petroleum use. Oil, energy, and a revolutionary increase in output have all gone hand in hand.

It is an interesting and significant fact in itself that we take the energy revolution so much for granted. At no other time in history—and probably in no other country today—could we be so blasé about so fundamental a development. For what we Americans tend to forget is that the chronic and crippling condition of most of mankind's existence, past or present, has been a shortage of energy.

For man himself is not a very good energy machine. From each 100 calories of food he eats, he can deliver only 20 calories worth of mechanical effort. On a decent diet, he can produce just about one horsepower hour of work daily, and with that he must replenish his exhausted body. With what is left over he is free to build a civilization.

Hence, it is not surprising that he has often failed to build very well. In India, for example, the standard of living of the average peasant is usually described as "less than $100 a year." In effect, this means near (and sometimes actual) starvation.

But no wonder India is desperately poor. Only a decade ago, some 65 per cent of all the energy produced in India came from man and beast. Of the remaining 35 per cent, three quarters was obtained by the burning of animal dung. If all the energy produced in India could have been converted into electricity, it would not have sufficed to light up the city of New York.

Yet, when we look compassionately at India, we are also looking back into history. In India's lack of power, in her lack of fuels, we find a situation which is representative of man's plight throughout most of his existence.

For man has continually been plagued by a lack of adequate fuels. Wood has, of course, been the most readily available resource at hand—and indeed until only a century ago, it was the primary source of fuel. As a result, parts of the world have actually been denuded of their forests. In England, only the timely invention of coke in 1753 by Abraham Darby, Jr., saved the British ironworks from the extinction threatened by a lack of charcoal fuel.

Darby's invention was only a link in that sudden burst of technological progress we know as the Industrial Revolution. Within the space of a few decades, an astonishing succession of inventions literally transformed the basic nature of society itself and set into motion the first long and sustained improvement in material standards of life. The steam engine alone—developed by James Watt in 1790—marked a summit in man's ability to utilize the energies of nature for his own account. And, interestingly enough, one of the first main uses of the steam engine was to increase the supply of available fuel. By permitting larger and more efficient pumping engines to clear the coal mines of water, it allowed shafts to be sunk to hitherto "impossible" depths.

What the Industrial Revolution brought, however, was not only an enormous leverage in man's ability to produce, it also created the need for a fuel supply ample enough and versatile enough to set into motion the machinery which now began to take over the functions of muscle power.

At first, that fuel was coal. By the 1850's, when the first fruits of the Industrial Revolution began to appear in terms of improved living standards, coal had replaced wood as the main source of motive energy. But coal had its severe limitations. The machinery it required was bulky and heavy. Coal could not be used as a fuel for small mobile engines. It was not an efficient fuel when used in small quantities. There was no doubt that without the use of coal, the Industrial Revolution would never have gotten under way, nor maintained its momentum. But had coal been the *only* source of combustible fuel, the subsequent course of industrial progress would have met a fundamental and perhaps insuperable bottleneck. Had the petroleum industry not developed in "the nick of time," our energy revolution would still be in the future.

But what of the future? We have seen that the sudden steep incline of the energy curve—and of the curve in productivity with which it was integrally connected—was directly traceable to the spectacular growth of the use of petroleum after the turn of the century. Looking ahead to a rate of increase of energy use which bids fair to proceed even more rapidly than in the past, one cannot help asking: How long can the energy revolution go on? Will we run out of oil? Out of fuel?

It is worth thinking about the question as a whole, first. Actually, there is not and cannot be a shortage of energy as such. It is not energy but the technology to make energy economically available that is the problem at any time. Just to utilize the solar heat falling on a square mile of ground would provide us with the heat energy of a small atom bomb. Wind and waterpower, the heat of the earth, and the drag of the tides are virtually limitless sources of energy. These sources of power can be utilized. But we will not bother to harness them while cheaper and more accessible sources exist.

Among these methods for the future is, of course, the burning of nuclear fuels, and beyond that, the burning of hydrogen—the commonest of all elements—in a true nuclear furnace. This is not "burning" in the traditional sense of combining with oxygen, but actual release of fundamental energies which bind together "matter" itself.

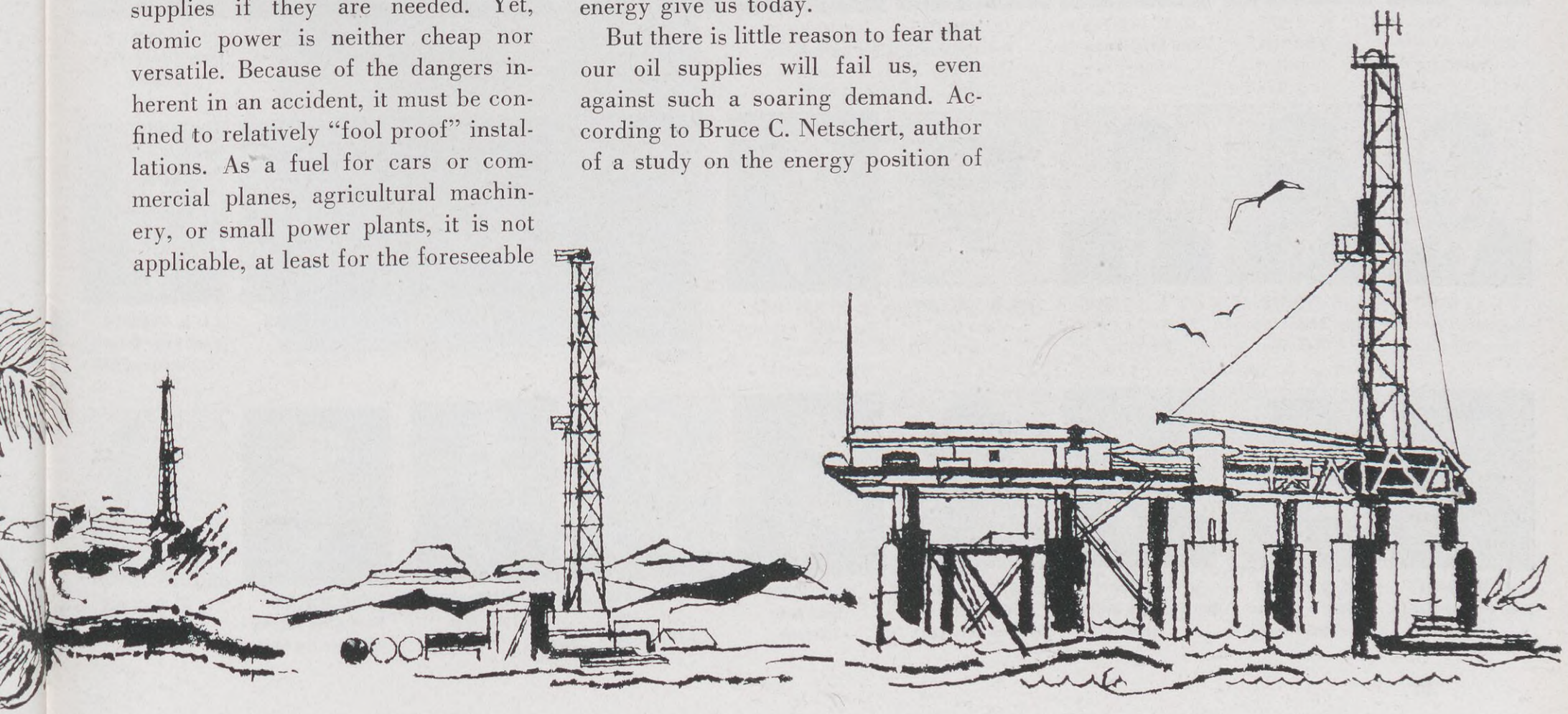
Hydrogen fusion, with its astronomical energy potential, is still only in the theoretical state; nuclear fission already exists as a source of power and promises enormous energy supplies if they are needed. Yet, atomic power is neither cheap nor versatile. Because of the dangers inherent in an accident, it must be confined to relatively "fool proof" installations. As a fuel for cars or commercial planes, agricultural machinery, or small power plants, it is not applicable, at least for the foreseeable future. Atomic fuels are a magnificent "reserve" for the long-run energy needs of mankind. But they will not displace the conventional fuels for ordinary use.

And what of the supply outlook for the conventional fuels? Taking them as a whole — coal, crude oil, natural gas, oil shale, even peat—the supply is staggeringly large. It is calculated that the life expectancy of the reserves of all fossil fuels in the United States alone is probably around 150 years. So far as the world as a whole is concerned, we can only guess. Vast portions of it are still geologically unknown. Only a few years ago, oil was discovered in the "barren" Sahara—and what is more surprising than that, in France itself! What fossil fuels remain to be discovered in Africa, South America, Asia, and the offshore areas no one can guess. But if the past is any indication of the future, what we will find will exceed by far what we expect.

Of those huge fossil fuel reservoirs of energy, petroleum will continue to be by far the most important. By 1975, for example, petroleum alone will have to supply us with 20 per cent more energy than all sources of energy give us today.

But there is little reason to fear that our oil supplies will fail us, even against such a soaring demand. According to Bruce C. Netschert, author of a study on the energy position of the U. S. through 1975 conducted for Resources for the Future, Inc., the total crude oil potentially available for future recovery is on the order of 500 billion barrels. This is enough to sustain the entire world at its present rate of oil use for another 80 years. Furthermore, it makes no allowance for technological advances either in techniques of oil discovery or recovery. And, behind this lies the still untouched secondary sources of oil shale. In the U. S. alone, this would add another 365 billion barrels of oil recoverable by presently known methods.

Hence, the outlook promises an abundant supply of the fuel on which our energy revolution must continue to depend in the future as it has in the past. It is hard to believe that so profound a change in man's ability to command power has come about within the short span of the last 50 years. It is perhaps even harder to believe that the future offers as revolutionary an increase as the past has brought about. But the energy revolution is still young. On its future development will hinge much of the outlook for man himself ●



RETIREMENTS

L. F. BARTELS
Wood River Refinery
Thermal Cracking

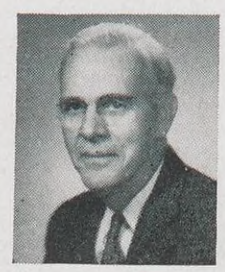
G. L. BULAND
Midland Area
Gas

W. E. COLLINGE
Boston Division
Marketing Service

F. M. COX
Midland Area
Production

W. H. DAVENPORT
Houston Refinery
Engineering Field

H. H. DAWSON
Shell Pipe Line Corp.
Mid-Continent Division



W. H. ESSER
Tulsa Area
Transport

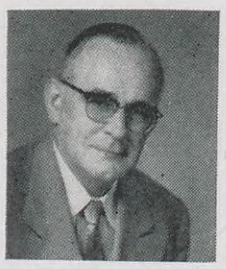
E. J. FELLOWS
New York Division
Operations

L. H. FITZGERALD
Shell Pipe Line Corp.
West Texas Division

W. J. FORBES
Boston Division
Treasury

J. A. FOSTER
Pacific Coast Area
Production

A. G. GEARHEARD, JR.
Norco Refinery
Treasury



F. GOLDSTONE
Shell Development Co.
Houston

J. R. GONZALES
Norco Refinery
Engineering Field

J. C. HAVLICEK
Head Office
Marketing

A. W. JAHNS
Tulsa Area
Treasury

G. M. JAYNES
Wood River Refinery
Engineering Field

J. KURANT
Wood River Refinery
Engineering Field

F. J. LEE
Martinez Refinery
Dispatching

W. C. MAY
Tulsa Area
Production

W. M. McPHERSON
Shell Development Co.
Emeryville

L. H. MONCRIEF
Midland Area
Exploration

R. F. MOORE
Midland Area
Production

W. R. MORRISON
Tulsa Area
Administration

F. S. PHILLIPS
Martinez Refinery
Engineering Field

W. PULLWITT
New York Division
Operations

J. H. REDDICK
Wood River Refinery
Utilities

F. L. RHAMY
Shell Pipe Line Corp.
Texas-Gulf Division

J. F. RICHARD, SR.
New Orleans Division
Operations

E. A. RITZMAN
Pacific Coast Area
Production

EVA M. SCHLENDER
Tulsa Area
Gas

W. S. SCHNEIDER
Wood River Refinery
Treasury

C. J. SPURLOCK
Houston Refinery
Engineering Field

C. B. STARNES
Wood River Refinery
Engineering Field

C. B. STEDMAN
Denver Area
Production

J. B. SWEENEY
Wood River Refinery
Engineering Field

M. W. TAMELE
Shell Development Co.
Emeryville

J. D. TENTER
Seattle Division
Operations

W. N. TETRAULT
San Francisco Division
Sales

MARGARET M. TOWNSEND
Martinez Refinery
Research Laboratory

M. R. UPSON
Tulsa Area
Transport

E. O. VAN WINKLE
Tulsa Area
Administration

B. F. WHAYMAN
Tulsa Area
Gas

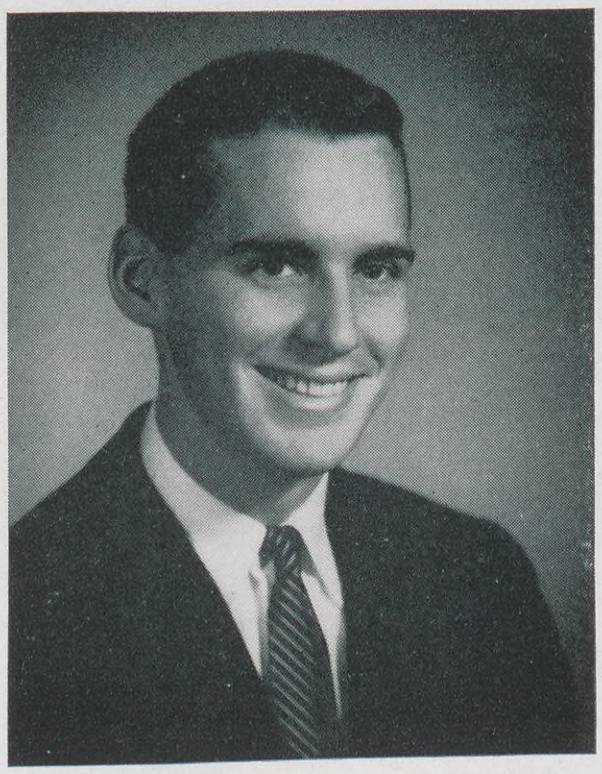
J. C. WILLMAN
Wood River Refinery
Engineering Field

A. R. WOOLERY
Tulsa Area
Production

SHELL Coast to Coast

FOR CHILDREN ONLY

More than 775 youngsters registered for the ninth annual Shell Employees' Club's Summer Youth Program at the Norco Refinery this year. The eight-week program featured instruction in gymnastics, baton twirling and archery, as well as league competition in baseball, track, football, bowling and other sports. At left, above, a junior archer takes aim at the bullseye as other participants wait their turn. At right, Norco youngsters learn bowling from Alton Durocher, a local high school coach, who assisted in the program.



SHELL SCHOLAR

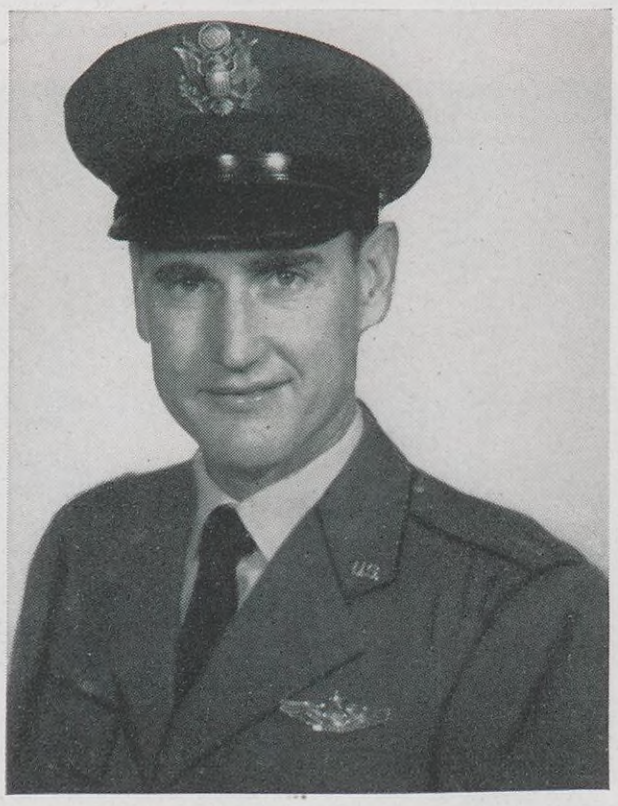
Ward L. Reed, Jr. whose father was Trust Manager of the Shell Provident Fund and Pension Trust until his retirement in September, 1958, has been selected by the Wharton School of Finance of the University of Pennsylvania for a Shell Companies Foundation graduate fellowship there in business administration. He is the first member of a Shell family to receive a Shell fellowship.

Reed, who is 24, holds a bachelor of arts degree with an economic major from Yale University, and is a former lieutenant (j.g.) in the U. S. Navy. His fellowship includes tuition and fees, $1,800 for his personal use, and an additional grant is made to the school to cover cost-of-education expenses. He was among 51 students selected for Shell fellowships by 37 schools for the 1959-60 year.

The Foundation and Shell Companies this year will spend approximately $750,000 to support academic activities, $169,000 of it on graduate fellowships. Other phases include research grants, merit fellowships for high school science and mathematics teachers, Shell Assistance Grants, and donations to leading national education associations.

SHELL Coast to Coast

continued



SENIOR NAVIGATOR

Engineer L. C. Tuggle of the Houston Refinery is one of the few Air Force Reserve navigators who have earned the wings of a Senior Navigator — and the only one at Ellington Air Force Base, Tex. He won his wings by accumulating 2,000 flying hours in 15 years—most of them as a reservist.

BEAUTY AND THE BATON

Virginia Gerber, whose father is Production Foreman C. G. Gerber of the Midland Exploration and Production Area, has been selected as a majorette of the Eagle Band of North Texas State College, where she is now an honor student.

TANKMAN'S HOLIDAY

During working hours, Superintendent F. B. Johns of Shell Oil Company's Pipe Line Department Terminal at Charlotte, N. C., is concerned with tanks — containing oil. During his off-hours, Johns is still concerned with tanks — containing tomato plants. Using the hydroponic or "tank" farming method, he plants his tomatoes in a box of excelsior and sand, through which a solution of water and plant food is circulated. The results: a bumper crop of tomatoes.

JAMBOREE JOURNEY

When 14-year-old Jerry Reynolds was working to become an Eagle Scout, his father, Portland Marketing District Manager R. W. Reynolds, promised him a trip to the Boy Scout World Jamboree if he made it—thinking it was to be held in Canada. Jerry got his Eagle but the Jamboree was in the Philippines. Dad more than lived up to his promise and Jerry went around the world.

MORE THAN THE BEAR COULD BEAR

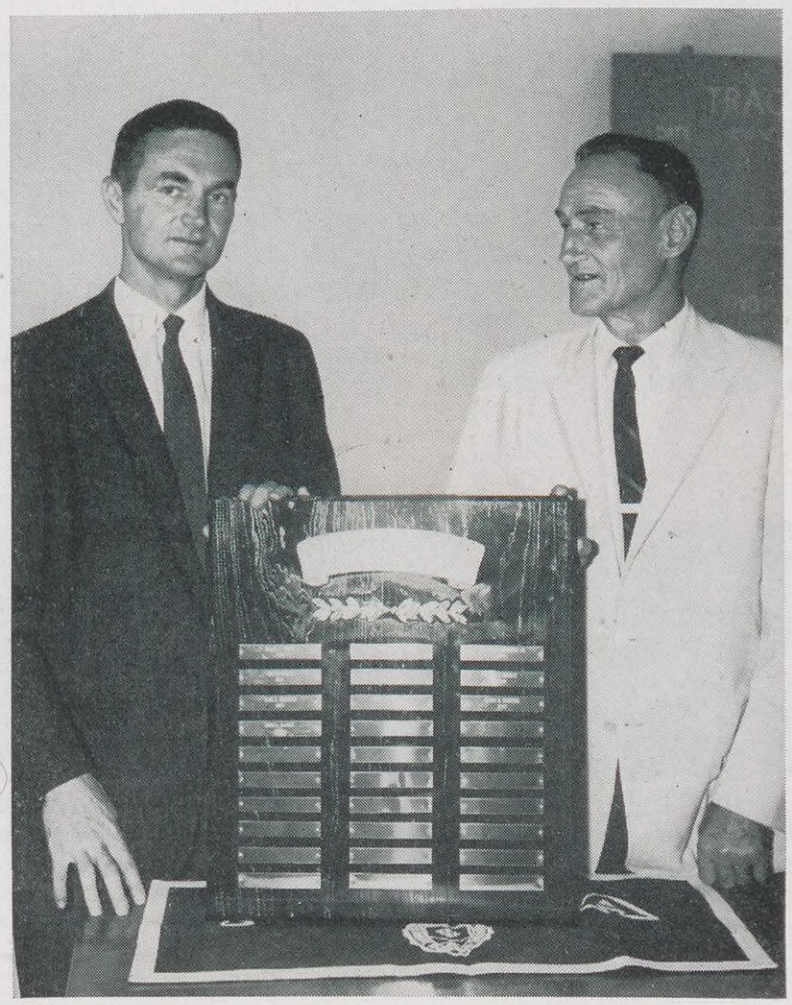
Laboratory Technician W. M. Alberta of the Denver E&P Area, has been hunting with a bow and arrow for nine years. But recently his years of practice brought a huge reward. While hunting in the Beartooth Mountains of Montana, he spotted a 250-pound black bear. Circling in his jeep to within 660 yards, he then stalked on foot to within 50 yards. Firing one arrow, he killed his prey and earned a fine trophy for his wall.

NEVER TOO OLD

The graduation roster of California State Polytechnic College recently listed the name of Mrs. Hall F. Clement as the recipient of a bachelor's degree in social science. What the list did not include, however, are the facts that Mrs. Clement has four children and eight grandchildren and is 63 years old. Her son is Division Stratigrapher J. H. Clement, Denver E&P Area.

MERRITTS MERITED

Physicist Jack Merritt of the Emeryville Research Center and his father, Earl J. (Fuzz) Merritt have been elected to the Pomona College Athletic Hall of Fame. During his undergraduate years, Jack Merritt was captain of his football team and received several All-America mentions. He was also on the basketball, track and ski teams. His father was an outstanding Pomona College football coach.



Service BIRTHDAYS

Forty Years

R. W. BESTOSO
Norco Refinery
Engineering Field

R. R. SHERWOOD
Wood River Refinery
Distilling

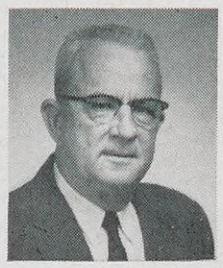
T. WEED
San Francisco Office
Marketing Service

Thirty-Five Years

C. E. BEASON
Wood River Refinery
Alkylation

A. A. DART
San Francisco Office
Sales Prom. & Adv.

J. J. DVORAK
Pacific Coast Area
Production



E. W. FLICKINGER
Houston Area
Production

L. R. GARNETT
San Francisco Division
Marketing Service

F. A. KIRCHMER
St. Louis Division
Sales

W. R. MEYER
Portland Division
Sales

L. T. QUICK
Pacific Coast Area
Transport

H. J. WOEHRMANN
Shell Chemical Corp.
Shell Point Plant

Thirty Years

A. A. ANGLESEA
Los Angeles Division
Operations

L. C. BERESFORD
Boston Division
Treasury

O. E. BERRY
Wood River Refinery
Engineering Field

O. H. BLAIR
Wood River Refinery
Engineering Field

K. A. BURGE
Head Office
Manufacturing

F. P. CARNAHAN
Shell Pipe Line Corp.
Mid-Continent Division

D. C. COE
Wilmington Refinery
Engineering Field

K. T. CONNOR
Cleveland Division
Public Relations

L. J. DEWART
Los Angeles Division
Treasury

E. H. FOSTER
Pacific Coast Area
Purchasing-Stores

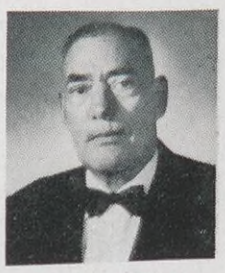
N. L. GAIN
Boston Division
Operations

N. F. GILLIAM
Houston Refinery
Engineering Field

E. B. GILLIS
Wood River Refinery
Research Laboratory

J. E. HARMAN
Head Office
Financial

F. W. HIGGIE
Cleveland Division
Operations



C. J. JIMENEZ
Houston Refinery
Engineering Field

F. B. JOHNS
Pipe Line Department
Charlotte, N. C.

V. W. KAFTON
Sewaren Plant
Terminal

D. M. MAHONEY
Boston Division
Operations

Thirty Years continued

W. J. MATHES
Shell Pipe Line Corp.
West Texas Division

D. A. MATLOCK
Shell Pipe Line Corp.
Texas-Gulf Division

J. B. MAY
Houston Refinery
Thermal Cracking

J. M. McGINNIS
Boston Division
Operations

H. E. MISGEN
Portland Division
Operations

C. M. MOCKLER
Head Office
Marketing

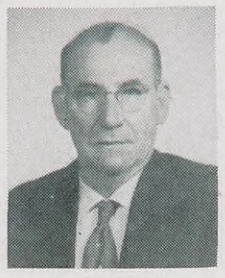
W. Q. MOONEY
Shell Chemical Corp.
Industrial Chemicals Div.

HELEN M. MOORE
Albany Division
Treasury

G. H. NATOLE
Albany Division
Sales

E. W. NYSTROM
New York Division
Operations

A. R. OLSON
Portland Division
Sales



A. H. PASSMORE
Shell Pipe Line Corp.
Texas-Gulf Division

H. S. RANDALL
Head Office
Marketing

J. T. REGAN
Chicago Division
Operations

J. B. ROACH
Martinez Refinery
Cracking

M. ROBISON
Houston Refinery
Engineering Field

A. V. ROCHE
New York Division
Operations

R. S. RUSSELL
Los Angeles Division
Sales

J. W. SANDUSKY
Martinez Refinery
Dispatching

W. F. SCHEIMAN
Indianapolis Division
Operations

GLADYS S. SCHROEDER
Detroit Division
Treasury

C. W. SCHWARTZ
Chicago Division
Operations

R. M. SMELTZER
Pipe Line Department
East Chicago, Ind.

B. SPRAYBERRY
Martinez Refinery
Cracking

R. K. STALCUP
Pipe Line Department
Indianapolis, Ind.

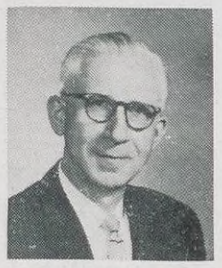
B. C. SYKES
Houston Refinery
Dispatching

R. F. TABELING
Boston Division
Operations

D. H. THOMAS
Atlanta Division
Operations

L. D. TRUNNEL
Pacific Coast Area
Production

A. L. VALTER
Cleveland Division
Sales



K. A. VOIGT
Portland Division
Treasury

H. J. WARD
Shell Chemical Corp.
Houston Plant

E. WHITING
Wood River Refinery
Gas

F. X. WILLER
Martinez Refinery
Compounding

G. L. WITT
Wood River Refinery
Alkylation

C. D. YOUNG
Houston Refinery
Treating

T. W. ZEMPER
Detroit Division
Administrative

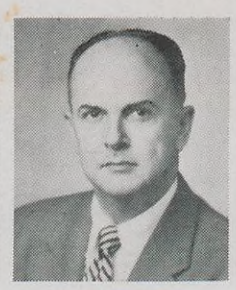
Twenty-Five Years

A. G. CATTANEO
Shell Development Co.
Emeryville

L. M. COCHRAN
Wood River Refinery
Engineering Field

S. G. COLBURN
Seattle Division
Sales

D. S. COYE
Pacific Coast Area
Legal



G. H. DELZELL
Chicago Division
Operations

E. D. DENNIS
Portland Division
Operations

H. C. DUANE
Martinez Refinery
Engineering Field

H. Q. DUGUID
Shell Chemical Corp.
Head Office

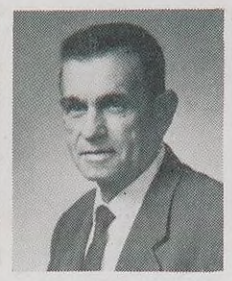
A. L. GARDNER
Pacific Coast Area
Transport

BESSIE I. GLENN
Pacific Coast Area
Exploration

P. P. GUIZERIX
New Orleans Area
Land

L. N. HARLING
Houston Refinery
Thermal Cracking

C. A. INGRAM
Pacific Coast Area
Production



A. F. LOFTON
Houston Area
Production

J. L. JACKSON
Wood River Refinery
Research Laboratory

C. R. JONES
Atlanta Division
Sales

C. LAACK
Chicago Division
Operations

O. P. MARLINGHAUS
Wood River Refinery
Engineering Field

K. T. McCAMMAN
Pacific Coast Area
Production

G. McCULLOUGH
San Francisco Office
Treasury

R. V. MILLER
Head Office
Financial

D. S. NUTTER
Pacific Coast Area
Production

J. W. OBENHOFF
New York Division
Treasury

M. W. OOSTDAM
Wilmington Refinery
Refinery Laboratory

W. J. PATON
Seattle Division
Sales

G. V. PORTIER
Norco Refinery
Utilities

R. F. RUCKSTUHL
Wood River Refinery
Engineering Field

W. J. RUPNIK
Wilmington Refinery
Refinery Laboratory

J. W. SANDERSON
Houston Refinery
Engineering Field

G. L. SHEELY
Pacific Coast Area
Treasury

W. B. SHIPMAN
Shell Pipe Line Corp.
West Texas Division

E. SIMONSEN
Sewaren Plant
Compound

L. B. SMITH
Wood River Refinery
Light Oil Treating

J. A. STROUD
Wilmington Refinery
Engineering Field

T. E. WHITESIDES
New Orleans Division
Sales

R. B. WING
Head Office
Expl. & Prod.

D. R. WISDOM
Shell Pipe Line Corp.
Texas-Gulf Division

G. T. WULF
Wood River Refinery
Treasury

J. B. YODER
Shell Pipe Line Corp.
West Texas Division

matters of *fact*

$76,000 PER EMPLOYEE

In 1958 Shell spent $263 million for plant and equipment, increasing the Company's investment in such facilities to about $76,000 per employee. Such expenditures enable Shell to grow and increase job security and opportunities for Shell employees.

SHELL OIL COMPANY
50 West 50th Street
NEW YORK 20, N. Y.
RETURN POSTAGE GUARANTEED

J. B. Bradshaw
10231 Edlystone Dr.
Houston 24, Texas

SPL

RIOT in the nursery

Now you're getting brighter colors in cloth, thanks to one of the most potent bleaches known to science—hydrogen peroxide.

Because brilliant dyes are dulled by the natural yellows and grays of unfinished fabric, hydrogen peroxide is used to bleach away dingy color . . . turn cloth white as baby's first tooth. When the bleached fabric is dyed, the result is a wonderful riot of color in anything from cloth nursery toys to sports clothes and furnishings.

By providing hydrogen peroxide for bleaching, Shell Chemical Corporation helps brighten a colorful world.

(This will appear as an advertisement this month in national magazines.)