SEVENTY SIX

May/June, 1981

Fred L. Hartley and Robert O. Hedley, company secretary, preside over the 91st Annual Shareholders meeting.

Changing Attitudes Affect Our Energy Future

by Fred L. Hartley
Chairman and President
of Union Oil Company

THE UNITED STATES is in a period of social and political change which, among other things, is affecting the nation's attitudes and policies concerning energy. Free market forces are being allowed to demonstrate their effectiveness in creating equilibrium between supply and demand. Higher prices have effectively held down demand for energy — particularly petroleum based energy — while at the same time providing incentive for increased exploration and development.

In the short term, this reduction in demand has led to at least two important oil producing countries cutting crude oil prices from four to eight percent. Others may follow, as Saudi Arabia keeps its production high in an effort to force prices down to the $32 a barrel it charges.

In the long term, total petroleum demand in the United States is expected to increase, but at a rate slower than the economy. As long as there is continued inflation, we certainly can expect OPEC nations to raise their prices commensurately.

Before the end of the century, available crude oil supplies are expected to be lower in gravity and higher in sulfur, just the opposite of desirable qualities. These kinds of oil will account for nearly 60 percent of refinery runs compared to 46 percent today. For example, in the United States, 26-degree gravity sour North Slope and Beaufort Sea crude oils will replace declining East Texas crudes which are more than ten percent lighter and very low in sulfur.

Lower gravity sour crude oils have been common on the West Coast for years, and Union is the leader in knowing how to handle them. Indeed, many of the im-

portant inventions by our Science and Technology Division over the years have dealt with ways to desulfurize and lighten such oils.

Where high sulfur residual fuel oil used to be typically 70 percent of the product yield from such western oils as San Joaquin heavy crude oil, now they are only 15 percent. The difference is made into gasolines, jet fuels and diesels by upgrading facilities such as our Unicrackers, Unionfiners and cokers.

For petroleum products, long-term projections show a declining overall demand. Within that declining total, however, will be increased demand for chemicals, fertilizers, and unleaded gasoline, areas in which your company is well positioned.

The current product demand decrease of more than five percent from last year's already reduced figures has led to declining utilization of the industry's refining system and the closing of smaller, less efficient refineries. Union's refineries are running at 66 percent of capacity compared to 76 percent at this time last year, about the same as the industry as a whole. Our normal refinery throughput would be in the range of 87 to 90 percent.

The gasoline retail marketing environment is changing, too, with inefficient and high cost service stations the major casualties. For Union, this weeding out process has been going on steadily for a number of years, and we do not expect any greater acceleration will be necessary.

Efforts to increase our country's petroleum self-sufficiency center around an intensive and extensive exploration and development program by oil companies, including Union. In the industry as a whole, 36 percent more drilling rigs were working in the United States last month than in the same month a year ago—about a thousand more rigs. The Reagan Administration is demonstrating its desire to open more federal lands to petroleum exploration, and to expedite lease sales in federal waters.

Substantial contributions to increased oil and gas production also will come from enhanced recovery and extension drilling due to improved economics for fields that already have been discovered.

As a company, we are heavily involved in these activities. More than 45 percent of our total capital and exploration expenditures this year—or $881 million—will be spent on finding and developing U.S. petroleum supplies. An additional $425 million—or 22 percent of the total—will go for overseas exploration and production. That means that nearly seven out of every ten dollars we will spend for capital and exploration expenditures in 1981 are earmarked for petroleum development.

Union expects to improve its position in both crude oil and natural gas production in the next few years.

While we are heavily involved in oil and gas exploration and development, we also are busy developing other energy resources for the future—and the present. These are geothermal, uranium and oil shale.

We are, as I hope you know, the world's largest producer of geothermal energy, supplying much of the energy for The Geysers, the largest geothermal project in the world, and for the Philippines' geothermal project, the second largest in the world.

Another significant step in the development of geothermal energy is being achieved by Union in the Imperial Valley of California. During 1980, the area's first production began from a 10 megawatt project at Brawley utilizing very saline geothermal brines. Another 10 megawatt project near the Salton Sea is currently under construction and scheduled to begin operation in 1982. Success of these projects could mean that Union can harness the geothermal energy potential in the Imperial Valley, which in its entirety is estimated to be at least one and one half times the size of The Geysers.

At our uranium project in Wyoming production, which had been interrupted by fire in October, 1980, resumed in late February. The mill is now running at better than design capacity. Recovery rates are high and so far this year we have sold and delivered over 70,000 pounds of uranium oxide, or yellowcake.

After many, many years of waiting and planning, last year we began work on the largest oil shale project to get underway in our country. It is a 50,000 barrel a day oil shale mine and upgrading plant in Colorado.

The project is being planned in two phases. Phase I will consist of a 12,500 ton per day mine and retort which will produce 10,000 barrels per day of shale oil, and an upgrading plant to produce high quality pipelinable syncrude which will be a premium feedstock for any refinery. Actual work on the mine, retort and upgrading plant is underway.

When Phase I is completed in 1983 and after the plant has operated for about a year and if Phase I is successful, construction of Phase II is scheduled to begin. That will entail additional mine, retort and upgrading capacity to bring total production to 50,000 barrels a day of syncrude by 1988.

Mrs. Alanson Hegeman, Union stockholder, talks to Hartley before 91st annual shareholders meeting in Los Angeles.

We are proceeding with our oil shale development with the expectation that the company will enter into a products purchase contract with the Department of Energy for the full production of Phase I. A proposal to the Department has been accepted in principle and a contract should be signed shortly so the project may continue.

The responsibility for success is strictly ours. This project involves only the use of company funds. No taxpayers' money or government loan guarantees are involved in the construction of the plant. We are taking the full technological and investment risk. The full production of Phase I will be sold to the United States government on a ten-year contract.

While I believe the long-term prospects for your company are excellent, there are some short-term obstacles which appear common to our industry.

First, headway made in the United States both in reducing imports and product demand had the effect of lowering refinery throughput. At the same time free market competition—as it should—made it more difficult for us to recover all our increased costs in the marketplace. These factors adversely affected refining and marketing earnings.

Second, inflation—the most serious problem facing our country—continues to raise unreasonably the costs of doing business.

Third, our major efforts to find energy resulted in higher dry hole, land and exploration expenses. These factors have had their effect on our first quarter earnings.

Nonetheless, for the first three months, earnings were $154.5 million, up one percent from the $152.9 million earned in the record first quarter last year. Per share earnings for the quarter were 89 cents compared to 88 cents in 1980.

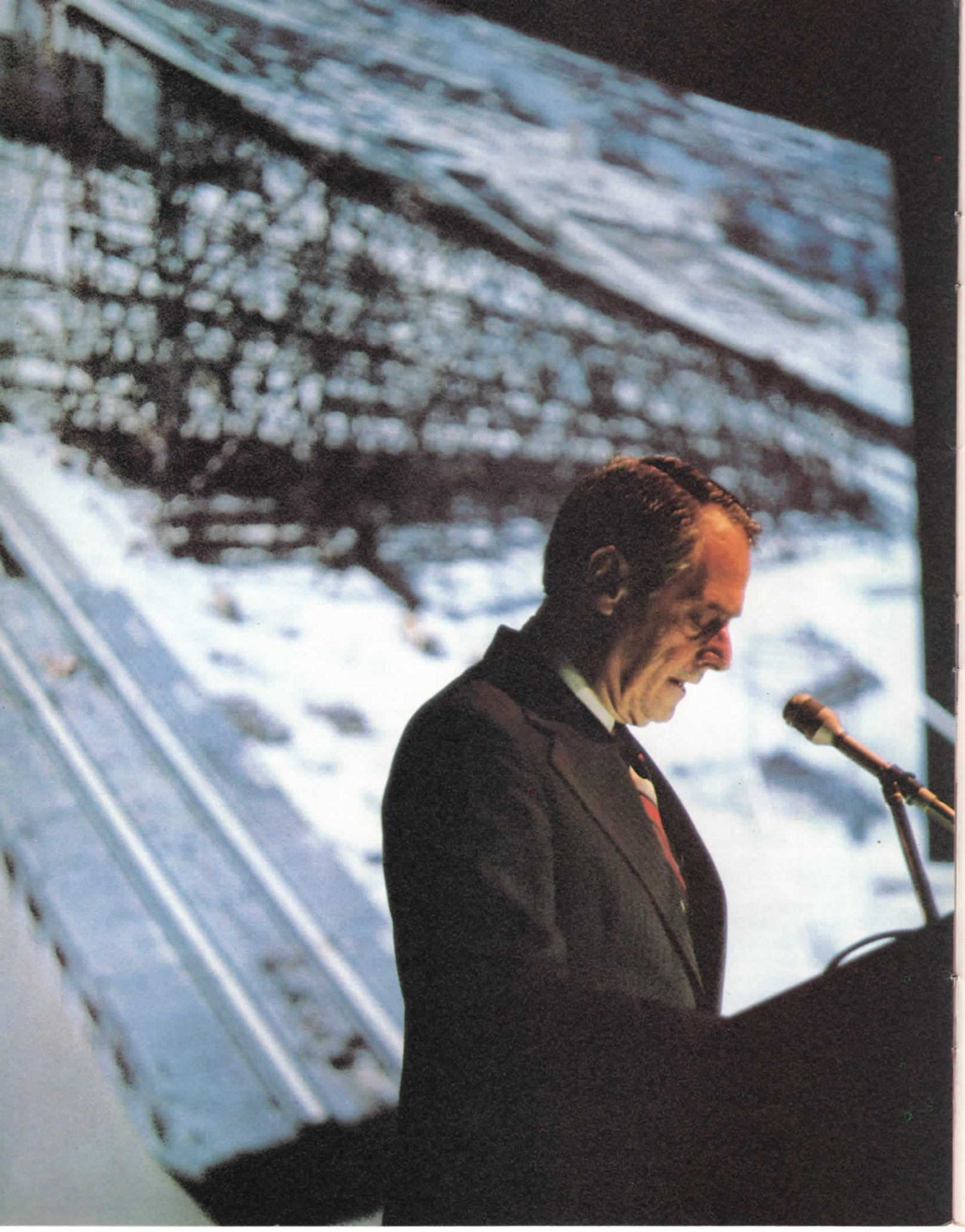
Increased profits came from improved crude oil and natural gas earnings, principally domestic; higher earnings from chemicals production and sales, and higher earnings from geothermal operations.

Offsetting these improvements were the three short-term adverse conditions which I mentioned earlier.

For the rest of the year we expect better overall earnings with continued profitability of our oil and gas operations plus the beginning of sales from our Thailand project and improvements in refining and marketing operations.

Earlier this year I visited with our people in the United Kingdom, Norway, the Netherlands, Indonesia, Thailand and the Philippines as well as a number of operations across the United States. Everywhere I went I found that Union Oil people were doing a fine job under the overall direction of the involved personnel at corporate headquarters here.

To them and to all other employees, to our board of directors and to our shareholders, my thanks for your continued support.



Domestic Success Provides Solid Base

by Harry E. Keegan
President of Union Oil and Gas Division

IT WILL BE MY PLEASURE to take you on a 12,000 mile whirlwind tour of the United States for a brief look at a few of the Union Oil and Gas Division's major operating highlights. Our route will take us from California to central Wyoming—to the North Slope of Alaska—across the continent to the coast of the North Atlantic—south to Mobile, Alabama and the Gulf of Mexico and finally, by way of Oklahoma, back to southern California.

Beginning in California, the Santa Maria and south San Joaquin Valley areas are the scenes of one of our most successful efforts in maximizing recovery from existing fields. Among the many methods of enhanced recovery in use today, one of the most productive has been the injection of steam into relatively shallow, low gravity fields and Union has been an industry leader in this activity.

Under this technique, steam is generated on the surface and injected into the producing formation. The formation oil is thus heated, reducing its viscosity and causing it to flow more freely into the same or other wells. Union's extensive holdings of these low gravity properties and our technological know-how enabled us to embark a few years ago on a program designed to recover approximately 100 million barrels by this thermal method.

This type of effort is by no means confined to California. During the past year, encouraged by our previous success and by improving crude oil prices, we acquired added holdings in the South Casper Creek area of Wyoming—the next stop in this morning's trip—and are well along in a thermal recovery program there. This is the next step toward our nationwide objective of completing the remainder of our 100 million barrel program and developing known projects which will generate an additional 300 million thermal barrels. This thermal program is only one of many techniques we are employing in our total enhanced recovery effort.

Next, we go to the North Slope of Alaska for a look at one of the nation's most exciting geological provinces. In December 1979, Union bidding alone and with others acquired interests in nine Beaufort Sea tracts for a net company cost of $168.9 million. We own one block 100 percent, 50 percent of another block and 33 and one-third percent of the remaining seven. These blocks are located within the Barrier Island chain in water depths of 20 to 30 feet. At present we and our partners are constructing a gravel island on one of these tracts in preparation for exploratory drilling this coming winter.

Adjoining these new tracts to the south is the Duck Island Unit where Union holds a 25 percent interest in two successful wells drilled last year. The first well flowed oil at rates up to 2,600 barrels per day and the second well, one mile to the east, tested up to 1,100 barrels per day. The third well on this discovery is now drilling.

Moving eastward from Alaska to the U.S. North Atlantic coast we come to the Georges Bank area, a major new frontier in domestic exploration. In December 1979, after many environmental and regulatory delays, a lease sale was held in which the industry bid over $800 million for the right to explore some 63 tracts in this area. Union acquired interests ranging from 15 to 50 percent in nine of these tracts. We feel that these leases, comprising about 51,000 acres, are well situated throughout this promising but almost entirely untested geological province. Barring further delays, first drilling by the industry in this area should begin this fall.

Now we take a long jump to Mobile, Alabama, site of our Chunchula field discovered in the mid seventies. You have heard about this field at previous meetings but it warrants another mention in the light of some significant developments in the past few months. The process of unitizing this field, the sixth largest found in the United States in the last decade, was recently completed and the gas processing plant is now on stream at design capacity. The present plant output of 32 million cubic feet per day of gas, 20,000 barrels per day of liquids and 15 tons of sulfur per day generates revenues to Union of $500,000 per day.

Our next stop is the offshore Gulf of Mexico, long one of Union's principal producing areas—contributing over 40 percent of our domestic gas production—and still the scene of a major part of our exploration effort. The extent to which we have been successful in this area can be measured by the job we now have in bringing these past successes to production. ⟶

We are presently involved in the construction and development of 17 major drilling and producing platforms in the Gulf. These range in water depth from 25 to 935 feet, will accommodate from two to 40 wells, and represent a total expenditure of $288 million with Union's share (which varies from 11 to 100 percent) amounting to $115 million.

One such project — and one of which we are very proud — is our "A" Platform at East Breaks Block 160, popularly referred to as Platform Cerveza, currently under construction at Bayou Boeuf, Louisiana. This platform, the largest ever built and launched as a single unit, will be placed in 935 feet of water about 110 miles south of Galveston, Texas, and will be the second deepest offshore oil installation in the world today.

After installation this summer, a two-rig drilling program will commence. The platform has 40 drilling slots and we anticipate first production from this development in 1985 at rates of 25,000 barrels of oil and 96 million cubic feet of gas per day.

Union is operator and one-third owner in this project which will cost $90 million. Ninety million sounds like lot of money and it is, but in a sense it is a number we are pleased with. Your company has been a leader in deepwater technology and these skills have been brought to bear most effectively on the efficiency and economy of this platform.

New concepts employed in this project will save Union and its partners in excess of $100 million. This brings me to the explanation of how we came up with a name like Platform Cerveza. In 1978, Union was a participant in the construction of the world's deepest offshore installation in the Mississippi Canyon Block 194 field offshore Louisiana. This became known as the Cognac Platform. The technological advances employed in our current platform have resulted in relative unit costs so much lower that we were led to the name "Cerveza" since as everyone knows beer, or cerveza, is cheaper than cognac.

This whole project brings into focus some basic facts of life about the struggle to replace energy reserves, particularly in offshore waters. Sight is often lost of the fact that the payment of large bonuses just for the right to hunt is only the beginning. This project was preceded by the drilling of exploratory wells to confirm the reserves necessary to justify the platform and will be followed by $175 million of development drilling and related expenditures before the first barrel of oil or cubic foot of gas is delivered.

Further, the East Breaks field was discovered in 1975 and, as I indicated earlier, we expect production to begin in 1985, ten years later. There needs to be a better appreciation on a national level of just how much time and money lie between a tract being put up for bid and the new production we are looking for.

Although offshore operations are the major and perhaps the most glamorous aspect of our U.S. exploration effort, we have by no means lost interest in drilling on dry land. Last year we participated in drilling 33 onshore exploratory wells in nine states and continue to sustain an active onshore effort in each of our regions.

A typical onshore oil play of current interest is in the Marietta basin of Oklahoma in Carter and Love Counties. We have drilled 13 wells in this general area in recent months of which 12 have either been completed or give indications of success. We are continuing to explore along this trend where we hold some 13,000 acres. Putting together land blocks and otherwise competing in these older areas is a real challenge but we will need continued successes of this type to meet our reserve replacement objectives.

To complete our "Cook's Tour," we return to California and another area of offshore opportunity. This is the Santa Barbara Channel where we have been producing for some 12 years but where recent exploration has led to three new major platforms now being constructed.

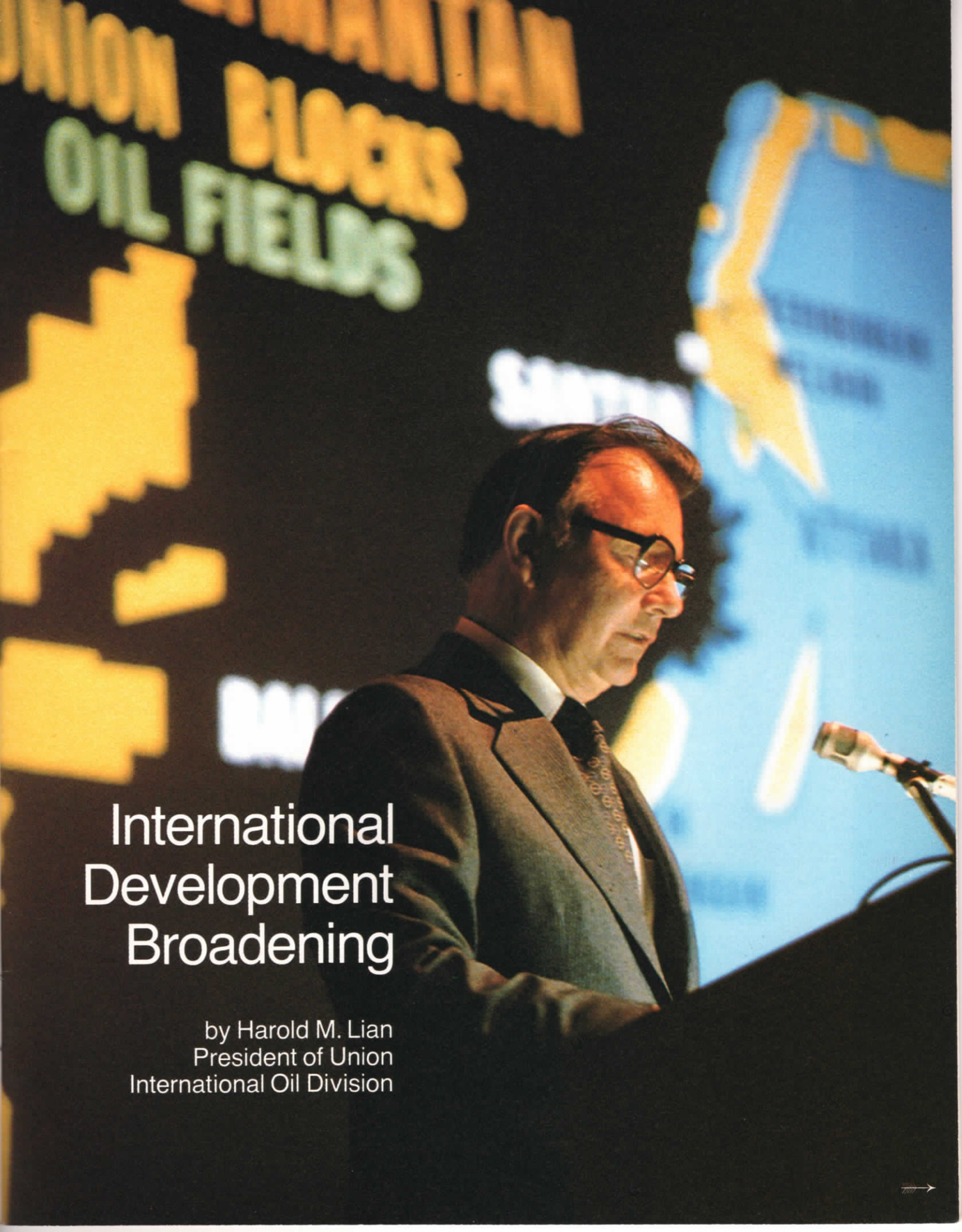
The first of these is Platform "Gina" in the Hueneme field. This is a 100 percent Union project involving two tracts originally acquired back in 1968. It will be a 12-slot platform located in 90 feet of water and when peak production is reached late in 1982 is expected to produce from 4,000 to 6,000 barrels of oil per day.

To the north and also under construction is Platform "Gilda" in the Santa Clara Unit. This is another 100 percent Union project which when completed will accommodate 50 wells—40 producers and 10 injectors—and upon completion of development, estimated for 1984, is expected to reach peak production of 16,000 barrels per day.

Production from these two platforms, expected to begin late this year, will be piped to a common onshore facility north of Port Hueneme. While these projects are more routine than the one I discussed earlier, this source of 100 percent crude oil production represents a significant contribution toward replacing our reserves.

Finally, still farther north we have a 65 percent interest in a platform being constructed by another company to develop a gas discovery at Pitas Point. The 21 wells to be drilled from this platform are expected to yield 15 million cubic feet per day by late 1982, rising to peak production of 60 million per day in late 1983.

These have been brief glimpses of representative projects designed to give some idea of the scope and intensity of our nationwide program to find and bring to production new sources of oil and gas. Obviously this is a difficult and fiercely competitive undertaking; however, the solid base provided by our past successes, the incentives of improving product prices and the caliber of our exploration and production team all combine to make us bullish on America and its energy future—and on Union's ability to contribute toward it. ⑦⑥



International Development Broadening

by Harold M. Lian
President of Union
International Oil Division

THE INTERNATIONAL OIL DIVISION is responsible for all exploration and production activities outside North America. These include geological studies of sedimentary basins, negotiation for exploration licenses, geological and geophysical surveys, drilling exploratory wells, and developing oil and gas fields.

Union has concentrated its international activities in two regions—Southeast Asia and the North Sea.

We have production in Indonesia, in the United Kingdom and in Italy. We will start producing a large gas field in the Gulf of Thailand later this year. We are developing both oil and gas fields in the Netherlands. A well in which we have a 30 percent interest made a significant oil discovery in Norway recently. We will drill exploratory wells in eight countries this year.

In Indonesia, we have been operating in Kalimantan—the Indonesian portion of the Island of Borneo—since 1968. In January of this year we signed a production sharing contract for a four-million-acre block offshore Java. Seismic surveys are in progress and we will be drilling exploratory wells next year.

Exploration of our East Kalimantan acreage has been very successful. We are now producing nearly 100,000 barrels of oil per day from five offshore fields.

The largest field—Attaka—has produced over 287 million barrels of oil during the past eight years, and is currently producing 79,000 barrels of oil per day.

We produce about 140 million cubic feet of gas each day with the Attaka oil. We have been storing the gas in an onshore gas field. A new market for gas is being developed. Indonesia is building a fertilizer plant nearby and an existing gas liquefaction plant is being expanded. Both projects are scheduled for completion in 1983, and some of our Attaka residue gas will share these markets.

We have a continuing exploration program in East Kalimantan. Last year we discovered an extension to the Attaka field. An eighth platform is being fabricated to develop this new fault block, and production will start late this year at 10,000 barrels per day.

Three wells at Attaka found oil, but because of their location, they could not be produced from existing facilities. We have decided to produce these wells by individual sea-floor completions and the oil will be piped by pipeline to the nearest production platform. This will be the company's first use of this subsea completion technology. These completions will add about 3,000 barrels per day to Attaka production by year's end.

Last month we announced an oil discovery near our Sepinggan field, with a well testing over 5,800 barrels of oil and 22 million cubic feet of gas per day. Additional drilling in the near future will evaluate this discovery.

We have a continuing program of training Indonesians in all aspects of oil production. Today we have 1,200 Indonesian employees. Expatriates comprise only five percent of our work force, and their numbers decrease each year.

Indonesia has the potential for many more oil fields. We have an on-going exploration program in East Kalimantan. We are just beginning our exploration of the large and promising Java Sea block. We will continue to look for other opportunities in Indonesia, and we expect it to remain one of our most active areas for many years.

The company's largest project anywhere in the world today is in the Gulf of Thailand, where we are developing the Erawan gas and condensate field which was discovered in 1973. It is 300 miles south of Bangkok, and about 100 miles from the Thai coastline to the west.

Development of the Erawan field was slowed by the fact that Thailand had no oil and gas industry. This was the first discovery of gas in the kingdom. Most natural gas industries developed as a by-product of oil. In Thailand, on the other hand, a natural gas industry had to be developed based on natural gas alone. The first market for Erawan gas will be the generation of electricity. Thailand generates 70 percent of its electricity by burning imported fuel oil. The rapidly increasing cost of fuel oil has made the utilization of its own natural gas a vital project for Thailand.

In 1978, Union and its 20 percent interest Japanese partner signed a gas sales contract to produce 250 million cubic feet per day from Erawan. This is a very big undertaking. We are fabricating and installing five drilling platforms, four production platforms, a central processing platform, a quarters platform, and we are drilling some 40 wells. For its part, the government of Thailand has laid a 260-mile pipeline under the waters of the Gulf of Thailand, and a 100-mile onshore line, terminating at the electrical generating plant on the outskirts of Bangkok.

Production from Erawan field will start in late August or early September. By the end of this year the field will be producing 200 million cubic feet of gas per day, and some 6,000 barrels of condensate. This will increase to 250 million cubic feet of gas per day with 7,500 barrels of condensate by mid-1982. That volume of production will displace 50,000 barrels per day of imported fuel oil, which is approximately 20 percent of Thailand's petroleum imports.

Thailand is rich in mythology. We drew upon this lore in naming the field "Erawan," after the mythical three-headed elephant that could fly, and was imbued with special powers for combating evil. The mythological Erawan helped the good kings defend and preserve the country. We hope Union's Erawan will play a similar real-life role as it helps the kingdom reap the many benefits this domestic source of energy will bring.

In addition to Erawan, we have discovered five other gas condensate fields. We are currently drilling wells on

a series of structures north of Erawan. Ten of the 11 wells drilled on this 45-mile trend have been successful. Further drilling may prove that there is a more or less continuous accumulation along this entire trend, which is longer than the distance between Los Angeles and Newport Beach, California. We are negotiating for another gas sales contract, which will be supplied from some of these fields.

Another area in which Union has been very active and successful is the North Sea, a large portion of which has good potential for oil and gas. We operate in the United Kingdom, the Norwegian and the Dutch sectors. We have offices in London; in Aberdeen, Scotland; in Stavanger, Norway; and in The Hague. License blocks in the North Sea are large. Those in Norway are 190 square miles, those offshore Holland are 160 square miles, and the blocks in the United Kingdom are about 90 square miles in area.

In the United Kingdom, Union has a 31.25 percent interest in, and is operator of the Heather oil field. This field was discovered in 1973; it went on production in October 1978, and it is currently producing 21,500 barrels per day. Development is continuing, with two rigs drilling development wells or water injection wells from the platform which is in 472 feet of water, 80 miles east of the Shetland Islands.

We and our partners have found four additional oil accumulations on our United Kingdom blocks. Further drilling will be needed before commerciality can be determined.

In Norway, Union has a 30 percent interest in two adjoining blocks in a highly prospective area. The first exploratory well was started on the eastern block in June 1979, but the rig could not drill to the objective. The well will be re-entered late this year, and drilled to the objective. We then drilled an exploratory well on another structure in this same block, and in February we announced that it had discovered oil, flowing at the rate of 4,370 barrels per day from two intervals. Additional drilling will be done this year to determine the size of the field.

Offshore Norway has a number of very promising sedimentary basins, both in the North Sea, and in the Norwegian Sea, farther north.

In the Netherlands sector of the North Sea, the F-2 block has a large gas condensate field. The Dutch government has issued a production license, and development plans are being finalized. Union will have a 20–25 percent interest in the field, which extends onto adjoining blocks. Production is scheduled to start in 1986.

We also have a gas discovery on our L-11 block and an application for a production license to develop that field has been filed.

Union and our 20 percent interest Dutch partner have made the first oil discoveries offshore Holland. Two oil fields, which we have named Helm and Helder, have been delineated by drilling, and a production license was granted by the Dutch government last year. These fields are in 75 feet of water, 25 miles from shore.

Drilling and production platforms are being designed, long-lead items are being ordered and plans have been completed for a pipeline to shore and an onshore terminal.

Production start-up is scheduled for late 1982, at a rate of approximately 15,000 barrels per day.

We have also discovered oil on two other structures near Helm and Helder. A step-out well is currently drilling on one of the structures, and if successful, will very likely confirm a third oil field in Dutch waters.

Elsewhere in the world we are participating in the exploration of five blocks offshore Brazil. We have an interest in four wells being drilled by other operators this year.

In January we joined an Argentinean company in a contract to develop an onshore heavy oil field, which was discovered several years ago by the Argentinean state oil company. We will inject steam into the producing sands to reduce the viscosity of the oil so that it can be pumped to the surface.

In Egypt, Union is operator for a three company group exploring in the Gulf of Suez. A drill ship is enroute to drill two exploratory wells.

Union has a one-third interest in a 4,800 square-mile block offshore Kenya. The first exploratory well will be drilled this year. There is no oil production in Kenya at this time. We believe, however, that this unexplored offshore basin has considerable potential.

The People's Republic of China is emphasizing oil exploration as the key to its modernization program. The large continental shelf of China has never been open to foreign oil companies. China has now invited western oil companies to participate in exploring the many sedimentary basins lying offshore.

Together with other oil companies, we have conducted a massive geophysical survey and now are interpreting the data. China intends to invite applications for licenses late this year.

This has been a quick overview of our current international operations. We have a good acreage position in a number of high-potential basins, with good geologic and geographic diversity. Continuing exploration should provide additional discoveries. Our base is solid. That base will broaden as the development projects just described are completed and production commences.

The International Division's revenues and earnings will become increasingly important factors in the company's growth. ⑦⓪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SEVENTY SIX MAGAZINE PHOTO CONTEST WINNERS

From the elegant simplicity of a single glowing candle, to the bold streaks of headlights on a crowded freeway, the entrants' imaginative representations were as varied as the many ways to implement the idea of Energy Efficiency—an appropriate theme for *Seventy Six* magazine's photo contest in these times of energy consciousness.

An enthusiastic response from Union employees, retirees and their families brought over 500 photographic interpretations of the theme weeks before the March 15 deadline. Employees from all levels, professions and geographic areas submitted photographs for the contest, all showing considerable proficiency in the art.

Offering his professional opinion as a judge in the contest was Michael Haering, chief photographer for the *Herald Examiner* in Los Angeles. Haering was runner-up for the 1980 Pulitzer Prize for news photography. Also lending his selective eye was James Caccavo, a freelance photographer whose work can be seen regularly in such magazines as *Newsweek, Time* and *Life.* Caccavo is also a photography instructor at the Los Angeles Art Center. The two were sole judges. Neither *Seventy Six* editors or any other Union employees participated in the judging.

With an abundance of skillfully crafted photographs to choose from, judges had difficulty selecting the seven prize-winners. After poring over the entries, the judges narrowed them down and finally awarded the pictures shown on these pages, the grand prize, first, second and the third place prizes for both black-and-white and color.

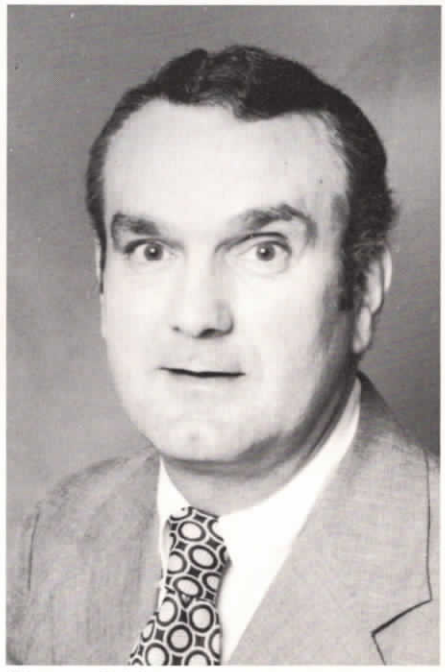
GRAND PRIZE—$400

The grand prize was awarded "All in a Row" taken by Vincent Caldas of New Jersey. Working out of metropolitan New York, Caldas has been a salesman for Union's Chemicals Division for 25 years.

After shooting the quiet and tranquil scene at Playland in Rye, New York, from several different angles and using different lenses, Caldas finally opted for the frame as being the best to convey the mood. "I was attracted to this scene because of the simplicity of color and form," he explains.

The photograph was shot with a Nikon F camera with a 200 millimeter, F 3.5 Auto Aragon lens on Agfachrome 50 film. Caldas used a Gossen Lunasix light meter to determine exposure and underexposed the frame one-half stop to increase color saturation of the gentle hues in the picture.

Caldas credits the Jersey City Museum Camera Club of Jersey City for teaching him the basics of photography. He has been a member of the club for a number of years and has used the same Nikon equipment for over 15 years while learning the techniques that enabled him to produce pictures with the gentle quality of "All in a Row."



Vincent Caldas

COLOR

Color First—$200
"The Efficient Freeway," was taken by Bernal Peralta at the Imperial Highway overpass of the 57 Freeway in Brea, Cal.

The first exposure of the freeway was made with a Miranda Sensorex II camera and a 50 millimeter Soligor lens at F/16 for one minute. On the same frame of Kodachrome 64 film, the second exposure of the moon was taken with a 400 millimeter Tamron lens with a 2X Tel-Xtender at F/8 for 1/60th second. Peralta is supervisor of process engineering at the Brea research center.

Color Second—$100
Inspired by the light given off a Christmas candle, Ken Olivier made the image "Candlelight." With a Nikon F2 camera, a 55 millimeter Nikkor macro lens and a tripod, the photograph was exposed on Ektachrome 64 film for 1/15th second. Olivier is a paper and textile research supervisor at Brea where he is also active in the Fred L. Hartley Research Center's photography club.

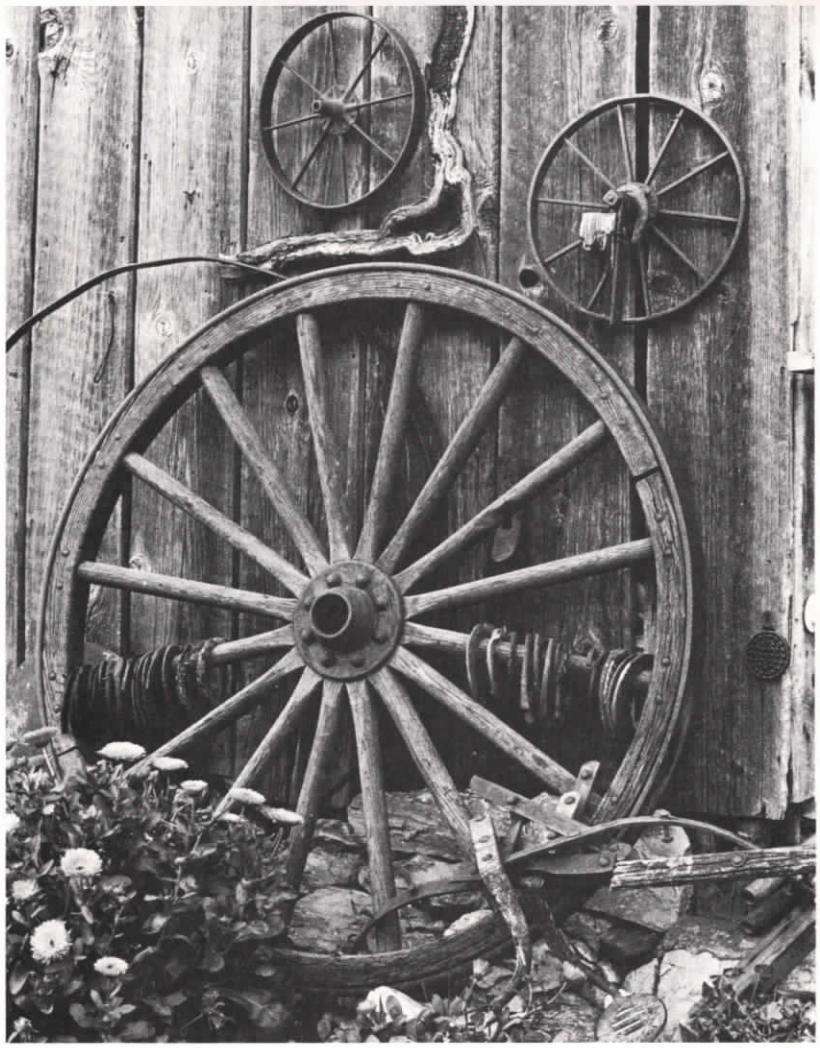
Color Third—$50
Shooting the picture "Railroad Track" with her right arm in a cast took more effort than usual for Dorothy Marsh, wife of Glen Marsh, supervisor of corrosion research at Union's Research Center, but the results were successful just the same. The picture of the narrow gauge railroad track in Blue Ridge Parkway, Virginia, was taken with a Nikon FE with a 20 millimeter Nikkor wide angle lens on Ektachrome 400 ASA film.

BLACK AND WHITE

Black-and-White First—$200
The influence of Ansel Adams is evident in Tom Sawyer's "High Sierra Reflections." Sawyer, a project manager for corporate engineering and construction, shot the picture while backpacking at Royce Lake in the Pine Creek Region of the High Sierras. Sawyer used an Asahi Pentax with a 50 millimeter, F 1.4 lens and 25-A red filter to expose Kodak Panatomic-X film rated at ASA 100.

Black-and-White Second—$100
John Grubb's "Horse Power" was taken in the town of Douglas Flat, Cal., at the residence of an antique collector. Grubb, a commercial representative from San Jose, took the photograph using a Nikon camera with a standard 50 millimeter F2 lens and Kodak Tri-X film. Grubb has been with Union Oil for 16 years serving in various positions.

Black-and-White Third—$50
Don Ambler shot his untitled nighttime scene at Seaport Village in San Diego.
Ambler, a senior analyst from Union's Marketing/Continental Division in San Diego, used a Konica TC camera to expose Kodak Tri-X film for 10 seconds at F/8.



Giving credit where credit is due

When Union Oil first issued credit in 1925, customers were given paper cards which were signed by the company's district manager and were valid for two months. Today, the credit card center's 370 employees serve about three and a half million credit customers who collectively charge $4 million each day. While the issuing and billing of credit accounts has become a highly automated and computerized process, it reduces in short order what begins as mountains of paper into neat, compact computer discs of information. Despite all these electronic wonders there remains, however, one of the most important Union Oil characteristics that was evident even back in the computer dark ages of 1925: a high degree of customer contact and personal attention.

The company's credit process begins when a potential customer picks up an application at a Union Oil service station. That application might wind up as one of some 25,000 received every month at Union's credit card operations center at the foot of the Bay bridge in San Francisco.

The applications are first reviewed and any incom-

Credit Card Center employee Pol Cabang sorts billing tickets and statements into trays as daily mailing is prepared.

plete forms are returned to the applicant. Then personal credit histories requested from national credit bureaus are compiled. The potential customer's credit records are then returned with the original applications to Union Oil credit analysts who then evaluate the information and decline or extend credit.

"We rely heavily on a customer's past credit performance," explains G. H. O'Leary, manager of the credit card center. "Just like the rest of the oil business, we are also governed by various federal and state regulations which dictate everything from fair credit billings and fair credit reporting, to truth-in-lending and equal credit opportunity.

If any applicant is denied credit, he or she must be told the reasons why and then is advised of the right to review the pertinent records with the credit bureau that keeps the credit history.

"A majority of the applications we receive are approved and go on to become good credit accounts," says O'Leary.

After the credit application has been approved, the account number, customer's name, address and the number of cards requested are entered into the records and stored in revolving magnetic tape discs. All relevant billing data regarding the three and a half million credit card customers are recorded on these tapes.

Once this information has been sorted, a magnetic tape is made of all accounts being issued cards. This tape instructs the embossing machine, which is operated under tight security, to emboss the account number, expiration date and customer's name on the plastic cards. This is done with an extremely high degree of accuracy, since the machine is designed to re-read the cards and reject the slightest mistake. The newly issued cards are then mechanically inserted into envelopes and delivered to the post office for delivery.

The customer is now qualified to return to a Union Oil service station and use the credit card for approved purchases.

Approximately eight million credit receipt tickets are received every month at the center from dealers all over the country.

How is it possible to keep track of this mountain of mail?

At a rate of 2,400 per minute, an optical reading machine records on magnetic tape the account number and the amount of sale from the credit card tickets submitted by dealers. This information is then stored in the computer for subsequent billing. At the same time, a microfilm camera photographs each credit ticket. This microfilm is kept at the center and is used as a back-up if the computer should fail for any reason. The original tickets are returned to the customer with the monthly bill.

The computer also prints the billing statements, which are also microfilmed, and the optical reader/sorters sort the sale tickets with the corresponding statements. A highly sophisticated machine inserts these statements, tickets and return envelopes into envelopes and another machine sorts them according to zip code sequence before delivering them to the post

→

Nancy Ramos and Karen Flores sort billing statements according to Zip Code sequence for mailing.

office. About 90,000 statements are mailed every workday carrying transactions worth an estimated $150 million per month.

All payments are received and deposited by the banks who then report such information to Union's credit center.

"It's at this point, after the billing has gone out and when customers are apt to have questions about their accounts, that credit and customer service personnel are essential," says Earl Davis, manager of general services at the credit card center. "It's the computer that helps us make this personalized customer service possible," he adds.

Eight modules, each manned by 10 to 12 employees, keep track of all the accounts. Each module is responsible for a specific set of accounts. These employees answer questions and solve any account problems for Union credit card customers. When they aren't answering letters, these employees are on the phone, since all calls of inquiry are routed to the corresponding modules by the switchboard.

Credit and customer service representatives, aided by screens that can display all the information the computer has stored on its magnetic discs, have immediate access to information about the customer's accounts. They may also enter information into the computer as well. Thus they work in the nerve center of the operation.

In order to keep the up-to-date service at its peak of efficiency, the computer discs must be constantly updated. "It (the credit data) literally changes hour-by-hour," says O'Leary. "Before the development of this system, we were working in the past. Today, the microcomputer age allows us instantaneous access to everything in the computer and all the information is up-to-date. Every sale that comes into this office, every payment, every change, every phone call made, promises and even grievances are all available without having to dig into some horrendous files."

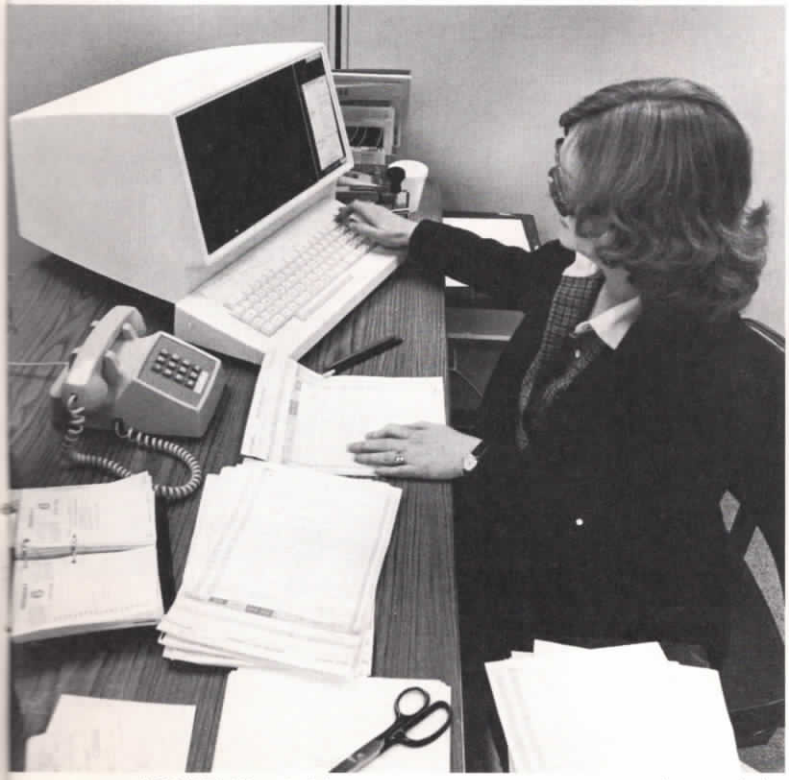
Along with reducing the time span in answering any customer questions, as well as drastically cutting the volume of paper involved in such transactions, the modular system at Union's credit card center has the capacity to hold much more information than was thought possible before the system went into operation.

The center began developing its computer system in 1970 after Union began consolidating credit service, and upgrading the system has been an ongoing process ever since.

One of the reasons the system works so well is due to the insight of its designers—the same people who use it. "The people who worked in the inadequate old system were on the front lines from the start," says O'Leary. "They knew the weaknesses of the previous operation and they knew what was needed. They had a very direct input in planning the operation. The system was designed, tailored and then adjusted to fit the needs."

O'Leary still considers customer contact one of the center's largest responsibilities. "Once the sale is made we are the ones who deal with the customers," he says, "and we take a lot of pride in that."

G. H. O'Leary, manager at Union Oil's Credit Card Center, says that approximately eight million charges are made each month.



ABOVE: Wendy Thompson uses a customer service module.
RIGHT: William Self feeds statements into stuffing machine.

ISLANDS ON STREAM

THE CITY OF LONG BEACH is so typically Californian it could easily serve as a live travel program for luring tourists to the Golden State. It's blessed with golden beaches, warm weather, clean environs, tourist attractions, pleasant citizens and great wealth.

Gazing down from the top of one of the buildings that face its harbor, the good life—as depicted by a zillion motion pictures and novel-induced notions of subtropical Shangri-las—unwinding below

looks more like the French Riviera than a city in southern California.

Sailboats tack swiftly on the harbor near man-made islands which blend with palm-lined waterfront avenues. In the distance, the legendary *H.M.S. Queen Mary* toasts the sky with its three stacks, and, nearby, Howard Hughes' flying boat, the Spruce Goose, is undergoing restoration before being displayed at its permanent position next to the *Queen Mary* in 1981.

It all speaks of sunshine and prosperity.

And well it should. For Long Beach has the fortune of sitting atop one of the largest, most prolific oil fields ever discovered, the East Wilmington field—first found in 1936 and, as the ads for Scotch whisky of that era used to say, still going strong.

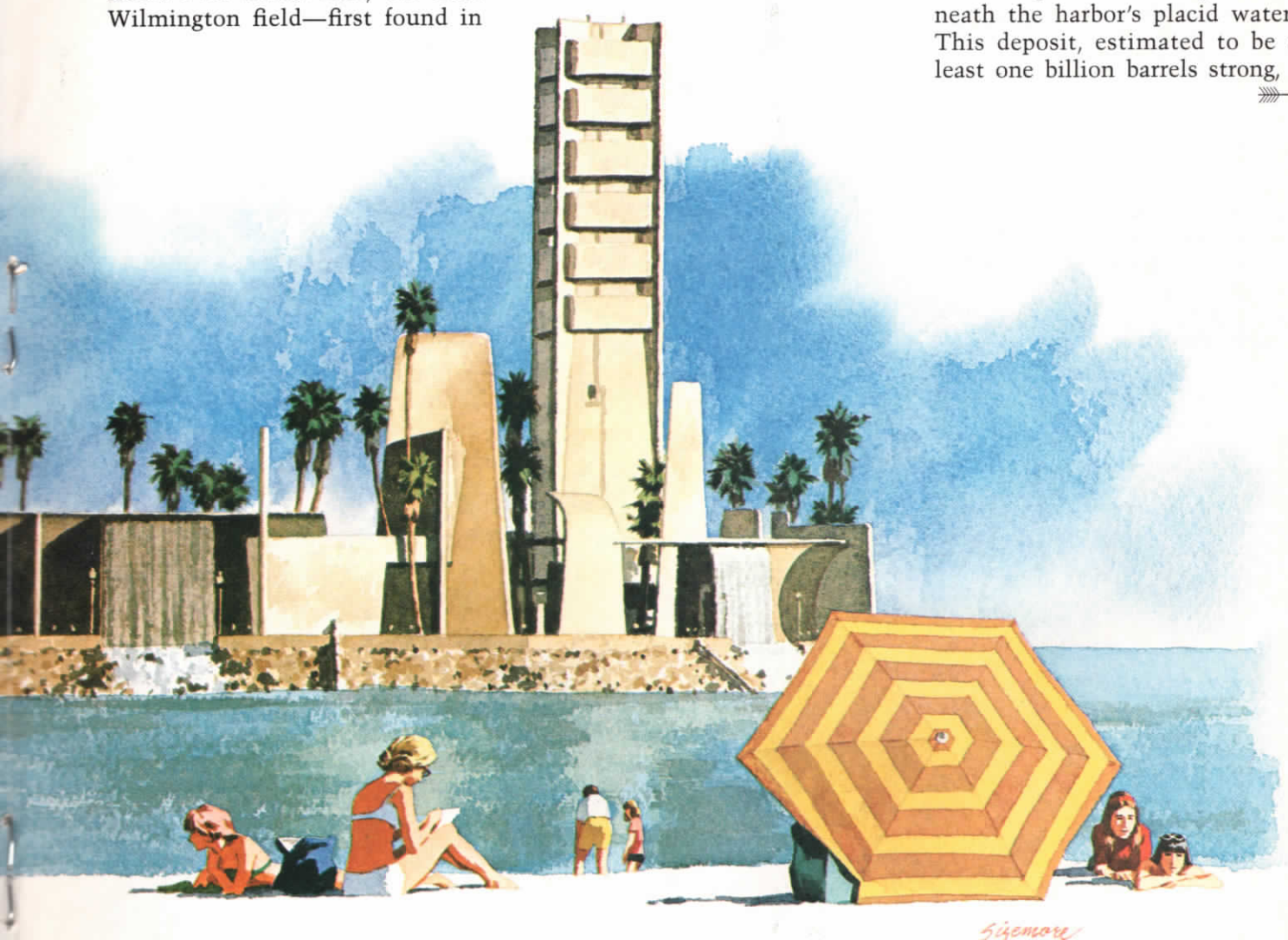
Looking around the harbor one would have difficulty in seeing actual evidence of the most overt symbols associated with the oil industry. There are no rigs, horse-head pumps, pipelines, tanks or pumping stations nearby. Even the most careful scanning of the horizon would bring no offshore rigs into view.

But everything is there, all right. That is, everything needed to produce an average of 165,000 barrels of oil every day and thus make Long Beach—with a population of 340,000—one of the largest petroleum-producing cities in the world.

It's those islands near where sailboats tack into a west-southwest course which are the key to that oil production.

From shore they look like tourist hotels enhanced by waterfalls and palm trees and illuminated at night by soft magenta and lavender lights. But behind that facade, a petroleum producing operation known as THUMS—an acronym for Texaco, Humble (now Exxon), Union, Mobil and Shell—operates in 24-hour shifts.

THUMS serves as the faucet which taps the rich deposits beneath the harbor's placid waters. This deposit, estimated to be at least one billion barrels strong, is



being tapped in a way that is technologically, environmentally and aesthetically unique in the world.

For years experts knew the extent of the vast deposits under the city of Long Beach. Oil was first discovered in 1936 but the necessary offshore drilling techniques for production had yet to be perfected and the demand for crude did not warrant the heavy expense involved in production, so the field remained undeveloped.

In the midst of the population explosion that shook the five western states in the 1960's, economic predictions correctly foresaw these states as soon becoming the fastest petroleum consumer market in the country and the economic picture changed drastically.

As local oil production was not sufficient for this boom, the state—which had never relinquished the mineral rights underneath the harbor—and the city jointly decided to develop the field. Long Beach was designated to serve as unit operator and bids were put out for the right to drill and participate in what was then the largest known undeveloped oil reserve in the United States.

Anyone with any involvement in the industry saw the project as a highly attractive and profitable venture because the risks in exploration had all but been eliminated and the prospects were rosy.

There was one hurdle however.

The project was so large that no single oil company possessed the manpower, equipment and financial resources to develop the field on its own. In addition, the specifications dictated by the city and the state were the most restrictive and stringent in the history of the petroleum industry.

What were some of these guidelines?

First, offshore drilling operations had to be confined to four ten-acre attractively landscaped islands to be built in the harbor plus limited area on Pier J.

Second, pressure maintenance through massive water injection in the oil zones had to be tailored to increase oil production and at the same time prevent land sinkage.

Recognizing these limitations, five major oil companies decided to submit a joint bid and set up a separate operating company under the name of THUMS to do this.

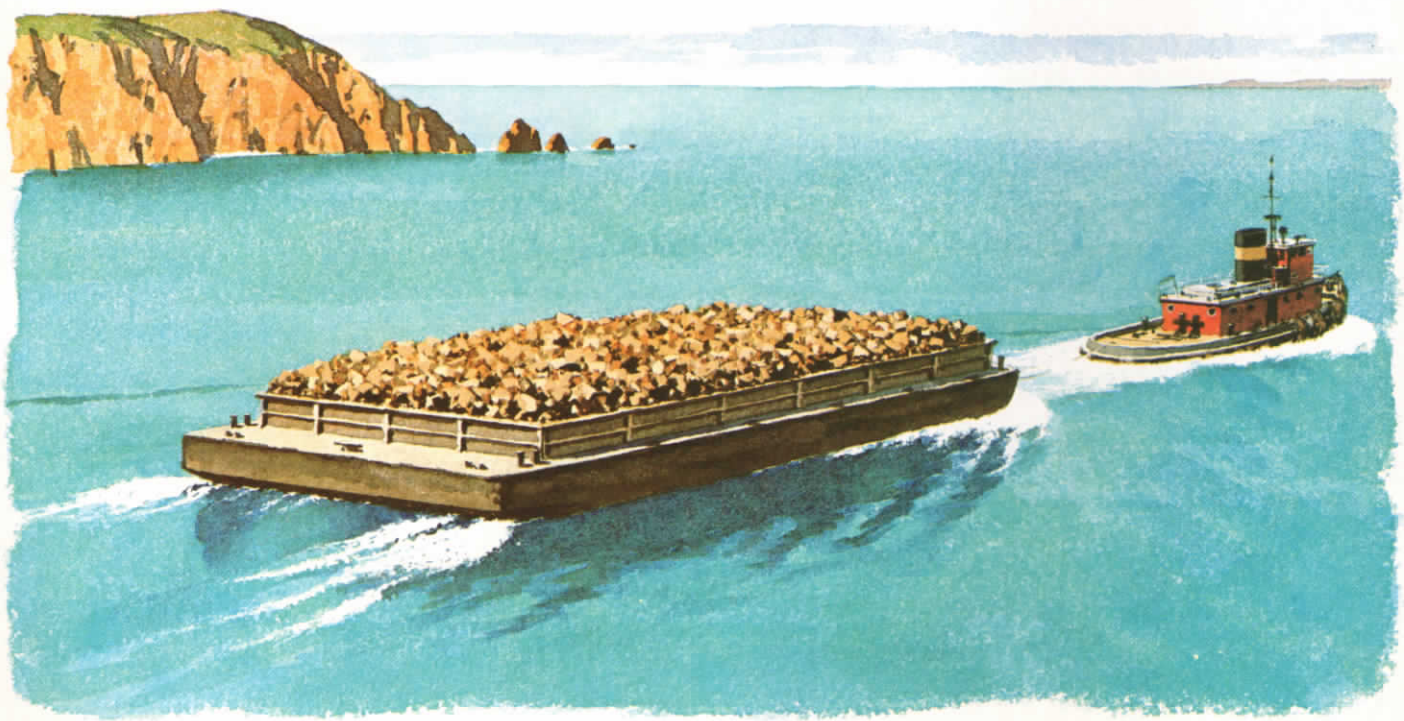
According to Donald E. Craggs, president and general manager of THUMS, "each of the participating companies own 20 percent of THUMS and has one representative on the five-man board of directors."

Craggs, who represents Union Oil, was elected to his current post five years ago.

In addition, the five participating companies agreed to put up most of the capital to build the islands, the facilities, and to drill the wells. The firms participating in the project also agreed to provide management and technical personnel and advance royalty payments to the city. Finally, the five firms agreed to purchase about 68 percent of all the oil produced.

On April 1, 1965, the five participating companies were awarded 80 percent of the contract and the responsibility to act as field contractor for the city of Long Beach. Today, the field is as productive as ever. Late last year THUMS retrieved its 500 millionth barrel from beneath the ocean floor at Long Beach and, according to Craggs, "production is not expected to decline to the economic limit until past the year 2,010."

The early days of THUMS were extremely hectic. After the project's first well was brought in and went



into production (in August, 1965) at a rate of 856 barrels per day, work was started on the proposed four offshore islands that today dot the Long Beach Harbor. These islands were to be completely man-made and were to be located at depths ranging from 25 to 40 feet of water. To create each island nearly 160,000 tons of rock were barged from a quarry on Santa Catalina Island, some 26 miles from land. To form the core of the islands, 900,000 yards of fill had to be dredged from the harbor bottom. Except for one which is rectangular, all the islands are round, contain approximately 10 acres of surface area and stand 15 feet above mean low tide.

According to Craggs, "another thing which makes the THUMS project a one-of-its-kind is the fact that nearly all the enhancements of the islands have been undertaken with the environment foremost in mind."

As a result, the four islands—subsequently named after the four astronauts who perished while training in the space program, Grissom, White, Chaffee and Freeman—are not only extremely efficient, but also beautiful. Particular attention has been paid to visual appeal and environmental blending to the two islands closest to the beach. From shore, these islands resemble tiny tropical paradises complete with a shoreline of rocks and ringed with a variety of plants and palms. Each derrick is enclosed in an outer structure resembling modern high-rise hotels with simulated balconies. In addition, each "hotel" is constructed with soundproofing material to eliminate any noise. Over several of the forms, waterfalls flow onto the islands' shoreline and into the harbor.

So much care has been taken for the cleanliness of the project that not even rainwater is allowed to flow into the ocean. After a rainfall, the water is collected in trenches and then pumped back into the ground.

But THUMS is not just beauty.

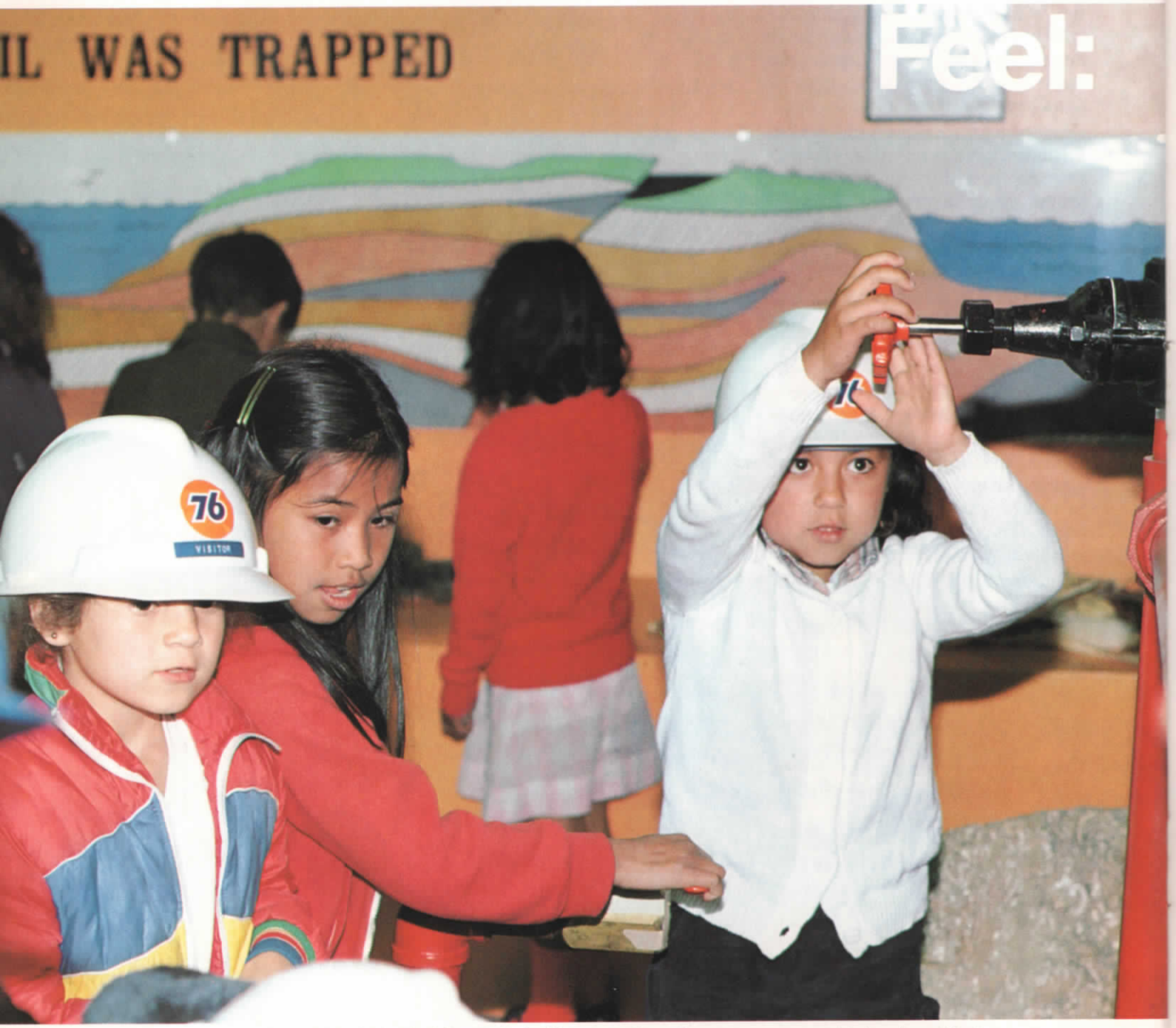
As of August of last year, the islands' operators had contributed in excess of $900 million to the state and the city. The state of California also receives, free, most of the gas produced—currently about 15 million cubic feet per day at THUMS.

For the city of Long Beach, these revenues have contributed to further port development and tidelands improvements and helped finance its convention and entertainment centers without additional cost to the taxpayers.

The four islands have proven that a city and industry can grow while at the same time helping each other.

A perfect example of the allure of THUMS occurred during the Long Beach Grand Prix last year when a French group of car-racing aficionados approached a policeman and insisted he tell the visitors how, during next year's race, they could find accommodations at the beautiful hotels on the harbor islands. ⑦⑥

Look, Touch and Feel:



Learning is an adventure for children in the Lori Brock Junior Museum where they are encouraged to touch and feel.

AN OIL MUSEUM'S CONCEPT

STARTING WITH THE remains of ancient sea creatures which eventually are transformed into bicycle tires, the Lori Brock Junior Museum in Bakersfield, Ca., demonstrates to children how the involved process takes place. "Black Gold—Kern County's Buried Treasure" is the theme of this year's exhibit at the museum. The time, talent and resources of the oil community and museum committee members have resulted in the completion of this unique exhibit in which children can delight as well as learn.

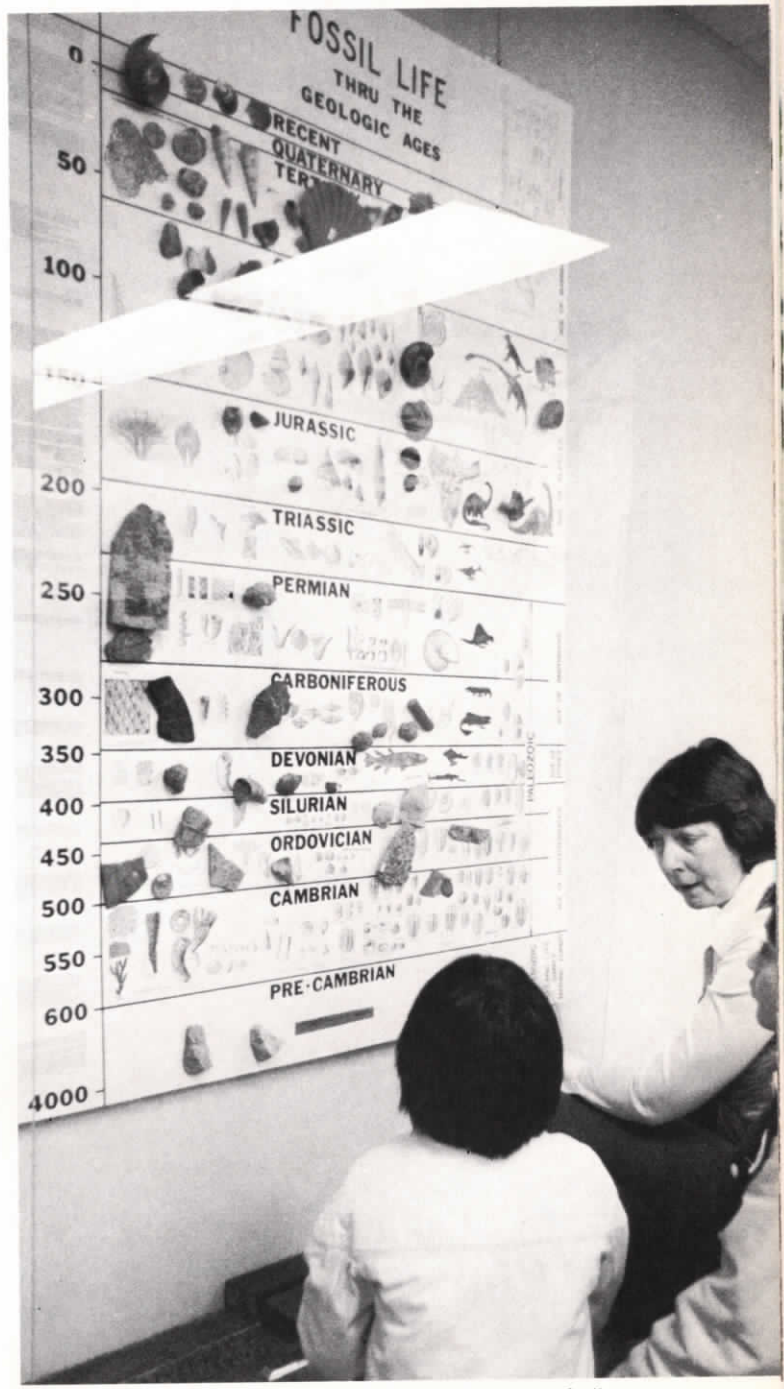
Barbara Jewett, museum director, explains that volunteer docents relate to visiting school-age youngsters the story of how nature turns fossils into oil while geological charts help illustrate the vast time span involved. Cross-sectioned murals on the walls help reveal the earth's layers and the mechanics of oil well drilling. Children may also take strolls through imaginary tar pits that display a wooly-haired mammoth and a saber-toothed tiger hovering over the youngsters during the trek. Even Walt Disney Studios help the museum's effectiveness with an informative 12-minute movie on the search for energy.

The museum also brings the story home with a bas-relief map of the San Joaquin valley, complete with tiny moveable derricks, which allows children to see the exact points where oil is located in their own oil-rich community. The exhibit even includes a model of an oil derrick and an impressive replica of a refining unit.

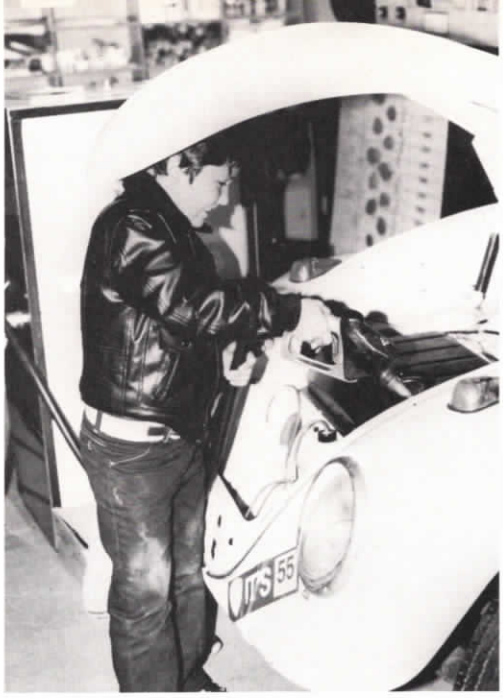
Wearing oil company hard hats, children are taken from the prehistoric beginnings of oil to the exploration phases, the drilling, refining, and eventually to the final transformation of oil into objects like bicycle tires, plastics, chemicals and myriad everyday things. The museum even takes the petroleum concept a step further, since part of the exhibit stresses the importance of energy conservation and recycling.

One of the highlights of the exhibit, created by John Beitia, Union Oil's area production superintendent, and Rick Dunham, a Union production engineer, both of Bakersfield, is a colorful collage of pipelines—which children enjoy climbing on—and valves, which they are allowed to twist and turn.

The distinguishing element of the museum is its



Barbara Jewett explains the geological formation of oil.



Half of a Volkswagen and a backless gas pump make educational playthings.

Children enjoy spinning the valves on this pipeline collage.

hands-on approach. The entire concept was designed with the intention of giving children a free rein at the end of the tour so they may explore the museum and its various displays on their own.

"Usually, at any other museum, it's 'hands off, don't touch this, don't touch that'," says Lorraine Cosner, another Union Oil employee who has dedicated many hours toward the completion of the exhibit. "But it's this touch-and-feel part that really appeals to kids. That's what they want to do."

For example, children need no encouragement to operate a hand generator, donated by a utility company. The generator powers lights which flick on and off in miniature houses as the youngsters switch them on and off. This display demonstrates how a power overload might occur.

Another display has a meter to show how much electricity is used when children flip on different switches labeled with tags designating various household appliances.

Another of the things children are allowed to play with is a gas pump. This equipment has the back panel removed to reveal its inner workings. It shows what happens when gas is pumped into the tank of a sawed-off Volkswagen.

One portion of the two-room museum is decorated with six murals taken from a Union Oil poster called "The Story of Oil." Union and many other companies have teamed with the museum committee to make the exhibit, which took a year to plan and six weeks to assemble, a success.

"Each year a new industry sponsors the museum," says Jewett. "This year we decided to focus on petroleum because it's such an important part of our economy in and around the San Joaquin valley and because so many of us know so little about it. I've lived here many, many years and I have learned more about the petroleum industry in the last two months than ever before. It's unfortunate that we have an abundance of such an important thing as petroleum here in our community and we don't know enough about it."

The Lori Brock Junior Museum, named for the late daughter of John Brock, a Bakersfield store owner, was especially geared for children between the ages of three and 14.

The museum was opened in 1976 after the Junior League of Bakersfield saw a need for the facility and solicited the community for the support needed to bring the museum idea into a reality.

Jewett says that approximately four classes from schools visit the museum each day for the hour-long learning adventure and she estimates that some 25,000 children will see the current oil exhibit before it closes on December 31. ⑦⑥

Pretending to be two feet tall, youngsters walk through a prehistoric forest and imagine the enormity of the wooly-haired mammoth.

On Saving Gasoline and Money

THE ENERGY SHOCKS of the past decade were no passing phenomena. They marked the end of cheap and plentiful energy. This has been made clear by the many crude oil price increases imposed by the oil exporting nations. To combat this situation, one of our most important options is to reduce energy demand through conservation.

A barrel of oil saved is the same as a barrel of oil produced. That's energy efficiency. By using gasoline efficient practices, we can hold petroleum use for transportation to near present levels or even reduce it and make our nation less dependent upon foreign powers.

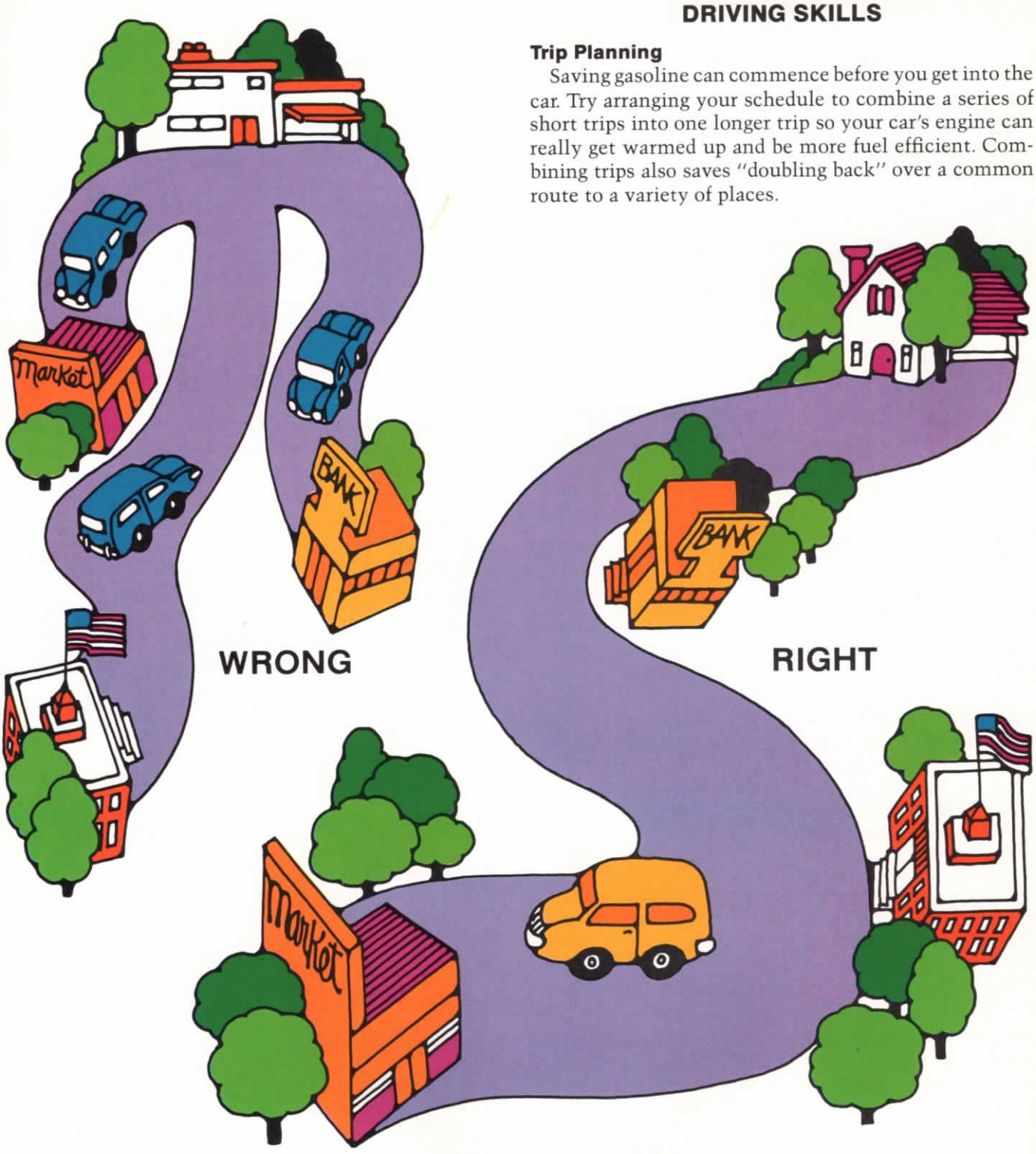
This material is based on data developed by Union's Science and Technology Division and should help you save gasoline and money.

Whether a certain car gets good or bad gasoline mileage, aside from its age, make and model, depends on two basic factors:

- How you drive the car
- How you maintain the car

Trip Planning

Saving gasoline can commence before you get into the car. Try arranging your schedule to combine a series of short trips into one longer trip so your car's engine can really get warmed up and be more fuel efficient. Combining trips also saves "doubling back" over a common route to a variety of places.



Ridesharing

Ridesharing is another way to save gasoline. Join friends and neighbors in shopping trips and in commuting to work. There are important additional benefits from ridesharing in terms of reduction of air pollution, parking fees and finding parking spaces.

Remember, when just two persons share the ride, these costs are cut in half and where three or more commute together these savings become even more significant. ⟿

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Starting

Don't "prime" your car's engine by pumping the accelerator pedal unnecessarily. If the car doesn't start according to your owner's manual procedures, it probably needs maintenance. Similarly, after starting, don't "rev" or race the engine—this not only wastes gasoline but can cause engine damage.

Don't let your engine warm up for more than 30 seconds before starting out. Let it warm up by driving slowly the first few minutes. After 20 minutes your engine is operating at its most efficient temperature.

Idling

Assuming your engine is warm under normal weather conditions, if you expect your car to be at a standstill for 30 seconds or more—long traffic signal, railroad crossing or waiting for a passenger—turn off the engine after stopping. Restarting uses less gasoline than idling. Be sure the idle isn't set up too fast and that the automatic choke is operating properly.

Acceleration

When accelerating from a stop, start out smoothly but briskly, steadily increasing pressure on the pedal, to bring your car up to its most efficient speed—generally between 35–45 miles per hour. By "briskly" we don't mean jamming your foot down on the pedal for a "jackrabbit" start — this wastes gasoline. An inexpensive and easily installed vacuum gauge will quickly show you the most efficient rate of acceleration. Basically the idea is to get into high gear as soon as safety and traffic conditions will allow.

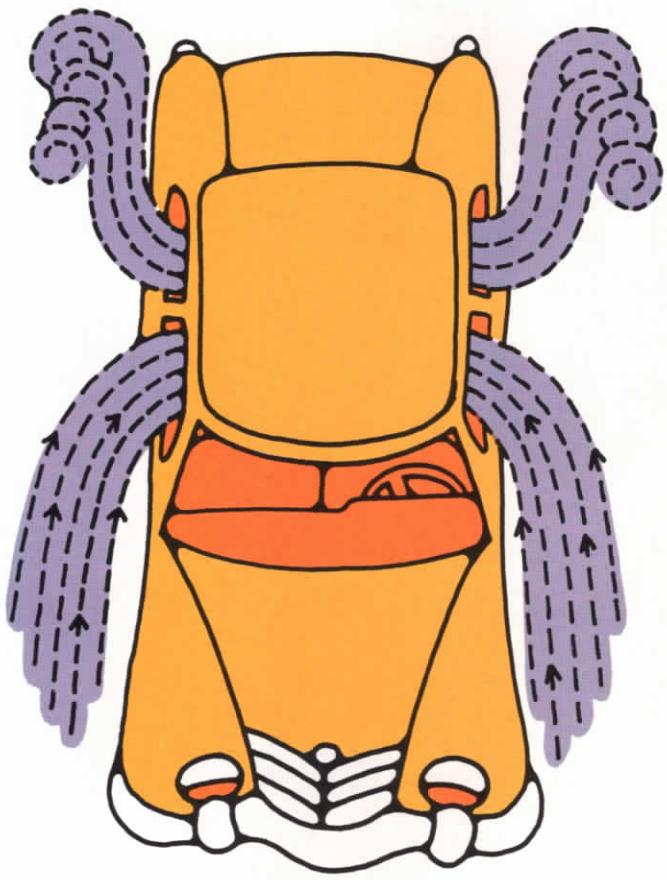
Cruising

While cruising on the road or uncongested streets, use a light and steady pedal pressure. Speeding up and slowing down wastes gasoline. On the highway use the cruise control if your car is equipped with one.

Drive with an awareness of traffic conditions around you to anticipate slowing traffic or lane changing to avoid unnecessary braking. When overtaking traffic, take your foot off the gas pedal as soon as possible and coast as much as you can before braking. Unnecessary braking just burns up gasoline energy and converts it to brake drum heat instead of mileage. The same is true at traffic signals and stop signs — your awareness zone should allow you to anticipate them. In many cases, in approaching signals you can coast until the light changes in your favor, and you do not want to approach a stop sign using any more gas than necessary under the conditions. This also saves brake lining. Don't take your car out of gear to coast, however.

Speaking of your foot — some people drive with the left foot resting on the brake pedal, causing the brakes to be lightly applied. This wastes gasoline, wears out brakes and is unsafe because the brake lights are on continuously, providing no warning to following traffic. Drive with your right heel on the floor and brake by pivoting on the heel to the brake pedal.

Tailgating is another large waste of gasoline. Driving too closely sets up a classic bad example of erratic fuel-inefficient driving, involving sharp stops and gasoline energy turned into brake heat. Allow a buffer zone around you to minimize braking.



Ventilation

As a car approaches highway speed, wind resistance plays an increasingly important role in fuel efficiency. If ventilation is required in a car traveling 50 miles per hour or more, it is most efficient to close the windows and take in outside air through the vents. Opening the windows at highway speeds creates drag, and air conditioning may reduce fuel efficiency even more.

Traffic

Move with the flow of traffic and don't weave from lane to lane. Your gasoline efficiency is highest when your car is moving in a straight line. In most traffic situations the safe thing to do is the fuel-efficient thing also. Defensive driving—keeping a buffer zone of space around your car, anticipating traffic's moves—will save gasoline too.

MAINTENANCE

Use of fuel-efficient driving skills is only half the battle for good gasoline economy. The other half is in proper vehicle maintenance. A vehicle on which the following points are neglected is wasting gasoline and money as well:

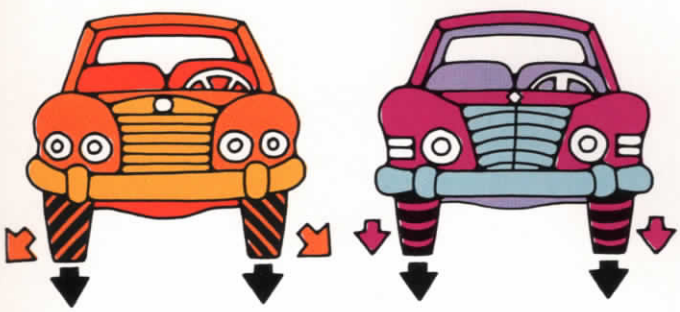
Crankcase and Transmission Oil

Use a good quality multi-grade (10W-30 or 10W-40 as recommended in the owner's manual) oil. This type of oil reduces viscosity drag on internal engine surfaces while the engine is warming up. Do not use an oil of higher viscosity than recommended in your owner's manual since heavier oils produce more drag on moving parts, which diminishes mileage efficiency.

If your car has an automatic transmission, slippage can occur if the transmission fluid level is low. This reduces gas mileage and can also damage the transmission.

Tires and Wheels

Proper inflation of tires is very important to achieve good gas mileage. Keep your tires inflated to the maximum pressure recommended in your owner's manual: if the range is 24–28 pounds, keep your tires at 28 pounds. You can expect a one percent loss in fuel economy for every two pounds of under-inflation below recommended pressure. Always check tire pressure before driving, when the tires are cold.



In the above left illustration you can see that the tire cord is wound on a bias which creates a force on the tire that does not run in the direction of the car's travel. The cord on the radial tire illustrated right is wound perpendicular to the line of travel. This eliminates the counter force, called rolling resistance, thereby, increasing gasoline mileage.

Wheel Alignment

Proper wheel alignment is another important must for gasoline economy. Misalignment pulls the tire against the direction of travel, creating drag or scuffing. Of course, this not only wears tires out quickly but also wastes gasoline.

Tune-Up

A properly tuned engine is absolutely necessary to get your best miles per gallon. All aspects of the ignition, carburetion and smog systems of your car must be in proper adjustment as they vitally affect the amount of fuel consumed. An improperly tuned engine can cost you up to 12 percent of your gasoline bill, to say nothing of possibly damaging your engine.

Air Filters

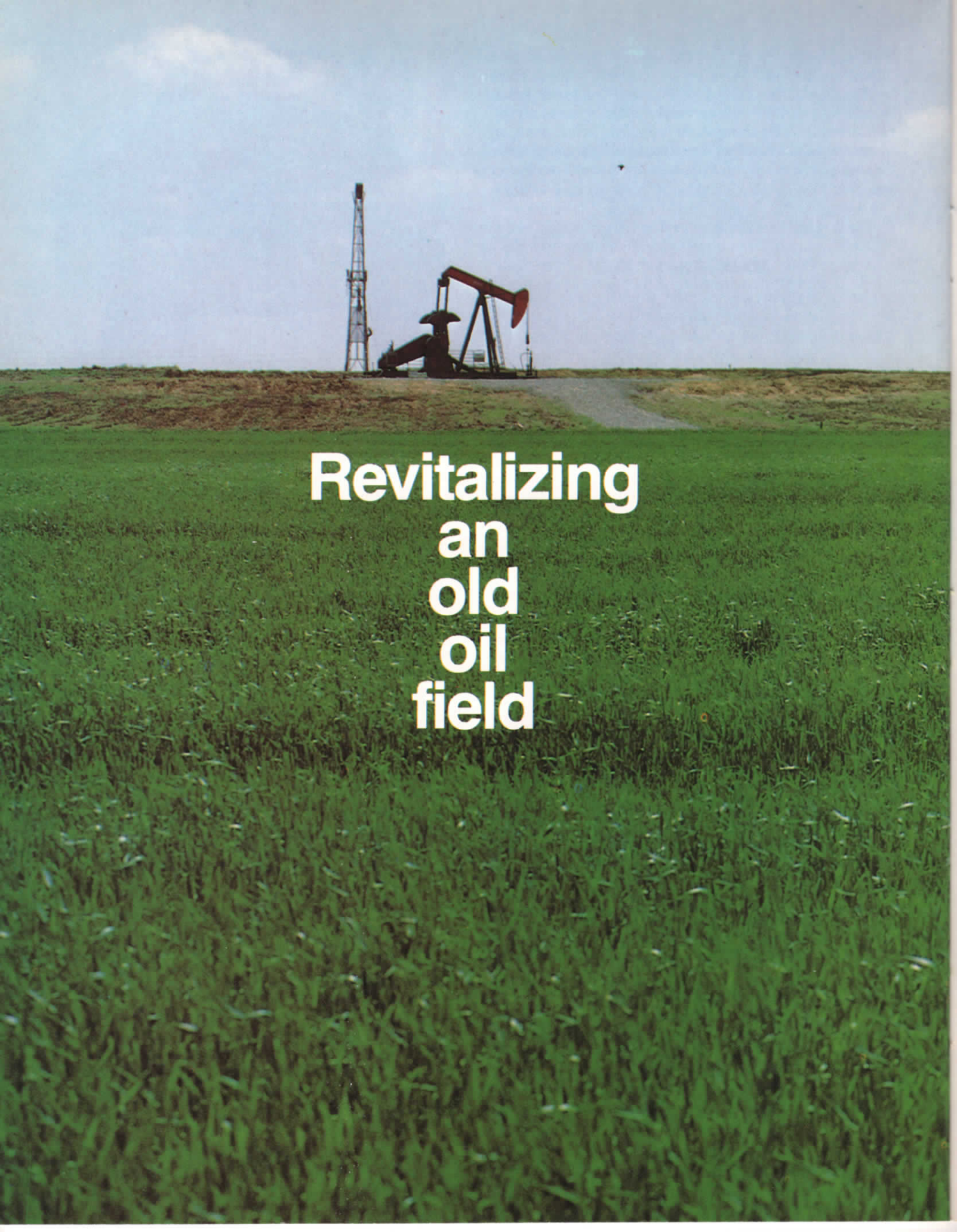
Dirty air filters and good gasoline mileage do not go together. A dirty air filter creates a rich air/fuel mixture with a noticeable increase in gasoline consumption.

Weight

Carrying unnecessary weight in your truck can rob you of gasoline mileage. Articles such as golf clubs, tire chains and unnecessary tools are frequently left in the trunk during periods in which they will not be used.

IN CONCLUSION

Following the foregoing steps you'll almost certainly increase your gasoline efficiency, if you weren't already driving and maintaining your car as recommended. However, we have saved perhaps the most important driving tip for last. Observe the 55-mile-per-hour speed limit. Typically a car uses 20 percent more gasoline at 70 miles-per-hour than it does at 55. It's pretty clear where the greatest fuel savings can come from for a person who does much highway driving. Living by these rules brings observable results and makes a lot of sense in terms of dollars saved. Let's all be energy efficient.



Revitalizing an old oil field

Exemplary of the activity in the Olney oil field, a new well is being drilled while production continues on a well drilled a few years before.

YOU KNOW YOU'RE in the Midwest when wheat fields greener than Astroturf seem to spread all the way to the end of the world from both sides of the road in country that's flatter than a pool table. The only place that looks anything like this is perhaps the Ukrainian Steppes, except that instead of onion-domed Orthodox churches the prevalent structures here are weathered barns with faded *Day's Work Chewing Tobacco* ads painted on their roofs.

Indeed, this is the bread basket of the world, a land blessed with incredible fertility in more ways than one. For it is beneath these lush fields that for more than 50 years men have toiled to tap the vast petroleum reserves that had lain dormant for ages.

For a while, especially during the '40s, this land was as rich in petroleum as it is in soy and wheat and barley and the other crops that have made the Midwest famous. But, unfortunately, oil —unlike land —cannot be enriched by crop rotation. Once it has been used, it is gone for good and no matter what methods man can devise will prevent a well from spending itself.

Such is the case of a Union Oil field in southern Illinois near Olney. First discovered in 1936 and peaking in production in 1941 when over 30,000 barrels of oil per day were produced, production declined drastically to where 10 years ago 600 wells were pumping only 4,000 barrels daily.

When a reservoir is tapped, not all the oil can be extracted. Sometimes the pressure needed to raise the crude oil declines so rapidly that oilmen consider it fortunate if they retrieve 30 percent of the petroleum in a field. While there are methods of extracting a bit more, with alternate forms of recovery, the cost in many cases is prohibitive.

The Olney field, however, is of such a nature that an alternate method of recovery known as water-flooding was first applied to it in the 1950's and production was maintained in the old field for another 22 years at a boosted rate of around 10,000 barrels per day.

But then, as nature dictates, the number of barrels produced at Olney began to decline in 1965 and reached a low point some six years later when the district managed to produce just over 4,000 barrels a day.

Then the gradual decontrol of crude oil prices added new zest to the Olney field. The price of crude suddenly made it worthwhile to invest in costly technology needed to boost production.

According to Harry E. Keegan, president of Union's Oil and Gas Division, "exciting things are happening in Olney. We are literally drilling new wells in an old field. Olney has had a steady decline in production for the last 15 years or so," he adds, "but production has gone up recently. In 1980 we managed to produce more than we did in 1979 and this year we expect to see an additional increase in production." This is what is known as a "bread and butter" operation, but according to Keegan, when Olney and similar projects in the Division's other districts are added together, the results are more like cake and frosting. Again, Keegan: "The results of these individual 'bread and butter' operations throughout the Division are a major factor in our improving crude oil production picture."

Olney is the area where oil and farming seem to get along so well. Farmers plow their fields around the wells and the noise of tractors is undistinguishable from the hum of oil drilling machinery in the area.

Early one spring morning, Richard K. Thomas, district operations manager for Union Oil's Olney district, takes to the road to see two new wells that have been brought in on a farm on the shores of the Little Wabash River in Illinois. As wheat fields blur past his car window, he explains the operations of his district.

"Essentially," he says, "since 1972 we were roughly on a 20 percent decline in production. If that decline would have continued, the field would have phased out somewhere around 1979. But then we started to develop a fairly active drilling program to produce oil in what we call the Salem formation."

Thomas credits new drilling techniques as well as decontrol for the increased production.

"You see," he says, "new technology afforded us the luxury of treating this Salem formation with acid and

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The land around Olney has seen a steady decline of oil production for 15 years, but the situation is currently improving.

other strong fracturing agents. We literally injected this acid and agents into the formation and thus developed production to a level where it was not commercially feasible to do before."

Engineers at Olney also developed new methods to minimize the water most wells produce with the oil. With the knowledge of how to treat the wells and with the water problem diminished, the Olney district went into what Thomas calls the "Salem drilling program."

Begun in 1975, this program maintained the field's production at a steady level.

"We had already tried several methods of secondary recovery, so what this Salem program meant was that now we had to go back to primary recovery—only in a deeper zone," Thomas explains. "In years past, we had drilled in this deeper Salem zone, but we had never been able to drill commercial wells."

It was also at this time that crude oil prices began their upward trend making it feasible for the Olney district to begin an active remedial and drilling program.

"It was during that period," Thomas explains, "that we learned how to finally produce in the Salem formation. Remember, too," he adds, "that when we say 'deeper' in this area of the country, we are talking about a depth of around only 3,700 feet, which is considered very shallow in many oil-producing areas."

Regardless of the well depths, the Olney area shows signs of great drilling and production activity. Currently, there are 400 injection wells which revitalize the pressure needed to bring the oil to the surface. These wells are located throughout the Olney district, an area of operation which encompasses drilling and producing activity in Illinois, Indiana, Kentucky, West Virginia and Michigan.

The wells on the banks of the Little Wabash River are on what is known as the Chaffin lease. "This is the first project that we have developed in Illinois where we have found a fair amount of natural gas," Thomas says. "On previous projects we have found barely enough gas to power the pumping units and the engines to meet the needs of the field."

According to Thomas, Olney serves as a center for the entire district's operations. It just so happens that the district offices are directly over the Olney field, an area which runs approximately 85 miles on a northeastern to southwesterly direction and is about 45 miles wide.

Although the most active area of the district is in the area around Olney and Clay City in Illinois, a good amount of production from another oil field is being produced in an area known as the Beaver Creek Unit of upper Michigan, near Grayling, where about 200 wells produce over 1,500 barrels per day. The district is run by 119 employees, of which 91 work out of the Olney offices, 24 out of Michigan and 4 in West Virginia.

"Right now, on a continuous basis, we have two drilling rigs running in the Olney area," Thomas explains. "We also have four remedial or completion rigs. Because of the nature of the field, it takes us almost as long to complete a well as it takes us to drill it."

To drill a well to a depth of 3,700 feet in the Olney district takes approximately nine to ten days. But since the field lies over a series of complicated zones, the workers must spend about three weeks in completing the well.

"Generally speaking, wells first come in at a high initial rate," Thomas explains. "But the production decline to a stabilized rate as illustrated by the riverside wells near the Chaffin lease. Those wells produce oil at a rate of anywhere from 150 to 200 barrels per day, but Thomas estimates that production eventually will decline to about 20 barrels daily sometime in the future.

"Just recently," Thomas explains, "we returned to the Chaffin lease to drill deeper and the first well came in at over 600 barrels per day."

Although not spectacular, the Olney district production is typical of the current trend at Union Oil in stressing the importance of domestic energy to lessen the dependence on foreign oil.

"We feel we are doing our share," Thomas continues. "Engineers or oil workers accustomed at working in bigger operations would find us to be a 'poor boy' operation and, in many ways, that's true. Because we have stripped all the fields and they are very old, we must operate just as inexpensively as possible. We don't spend a lot of money on frills."

A 32-year veteran of Union, Thomas started his career in his native California before assuming his position

Two wells on the banks of the Little Wabash River are typical of the Olney field's new production.

in Olney.

Thomas relies on C. Richard Hard, district engineer, to keep a close tab on the happenings at the field. "We have a very active program here," Hard explains. "Even as recently as three years ago, we would drill perhaps five to ten wells per year. After the economic situation changed, as far as crude oil is concerned, and with the introduction of the new technology, we drilled last year 24 wells in the Illinois basin alone.

"In 1981 we have budgeted to drill 36 wells, but expect to increase this at our mid-year budget review. That involves the district's other areas, including West Virginia and Michigan."

Although Hard has been dealing with the shallow zones of the formation, he currently is exploring the possibilities of drilling into a deep zone at some 4,600 feet. He admits he likes the prospect of the Olney field's lower zones because he claims that, in eight years of working in the district, he has yet to see one dry hole.

According to Thomas, the oil found in the shallow field around Olney is of high quality.

"But we must fight to extract every drop," he says. "Currently we are injecting some 100,000 barrels of water into the reservoir to extract about 5,000 barrels of crude oil per day. But the effort is well worth it."

Because of Thomas and his fellow workers, the old oil field at Olney has been leased a new life. It may not appear so, but underneath the green fields of wheat and other grains the extensive well stimulation project is paying off.

Richard K. Thomas, district operations manager at Olney, credits new technology and decontrol for increased production.

CORPORATE

MAY 1981

35 YEARS

FRANCIS E. RIES ..... Schaumburg, Il.

30 YEARS

JAMES R. COURTNEY ..... Union Oil Center
EDMOND DOONE ..... Schaumburg, Il.
MURIEL J. SEYFFER ..... Union Oil Center

15 YEARS

MELVIN D. GABEL ..... Taft, Ca.
FLORENCE K. GRAF ..... Union Oil Center

5 YEARS

KEVIN T. SULLIVAN ..... Morgan City, La.

JUNE 1981

40 YEARS

MARY E. WILEY ..... Union Oil Center

30 YEARS

CARL D. MOORE ..... Houston, Tx.
STEPHEN H. NOSLER ..... Union Oil Center

20 YEARS

BARBARA J. WILLIAMS ..... Schaumburg, Il.

15 YEARS

RONALD O. BRUNING ..... Union Oil Center
ROBERT E. BEECHLER ..... Burbank, Ca.
JAMES J. CHEVALIER ..... Union Oil Center
RICHARD T. DAVIES ..... Union Oil Center
KENNETH D. HALL ..... Union Oil Center
RONALD M. JACKSON ..... Union Oil Center

10 YEARS

KENNETH L. RIEDMAN, Jr. ..... Union Oil Center

5 YEARS

JAMES A. MARTINEZ ..... Union Oil Center

UNION SCIENCE AND TECHNOLOGY DIVISION

MARCH 1981

30 YEARS

ROLAND O. DHONDT ..... Brea, Ca.

15 YEARS

HAYDEN T. BOWLES ..... Brea, Ca.
SAMUEL C. HANSON ..... Brea, Ca.
ROY M. MATSUO ..... Brea, Ca.
HELEN F. ROBERTS ..... Brea, Ca.

10 YEARS

WENDY S. LEAVITT ..... Brea, Ca.

5 YEARS

LORI ANN CASSEBEER ..... Brea, Ca.
LaVONN STAUB ..... Brea, Ca.
WILLIAM P. TOROK ..... Brea, Ca.

JUNE 1981

35 YEARS

EARLE R. ATKINS ..... Brea, Ca.
MAX M. ELLIS ..... Brea, Ca.

30 YEARS

LEE C. VOGEL ..... Brea, Ca.

20 YEARS

STARLING K. ALLEY ..... Brea, Ca.
BARBARA J. OROSZ ..... Brea, Ca.

5 YEARS

JAMES R. DURHAM ..... Brea, Ca.
TIM B. KELLER ..... Brea, Ca.
PASCUAL B. PARDO ..... Brea, Ca.

UNION REAL ESTATE DIVISION

JUNE 1981

5 YEARS

ROBERT J. SCHRAG ..... Union Oil Center

Service Emblem Awards

UNION OIL AND GAS DIVISION

JANUARY 1981

30 YEARS

BENJAMIN F. SCHMIDT ..... Coalinga, Ca.

MAY 1981

40 YEARS

IVAN F. NETHERS ..... Olney, Il.
ROBERT K. BLACK ..... Orcutt, Ca.

35 YEARS

BILLY CARNAHAN ..... Woodward, Ok.
DENNIS KIDDER ..... Ardmore, Ok.
KENNETH P. TUCKER ..... Ardmore, Ok.
JOSEPH M. TURNER, Jr. ..... Lafayette, La.

30 YEARS

E. S. DIETRICH ..... Casper, Wy.
ROBERT W. GARDNER ..... Orcutt, Ca.
BERT C. HAMILTON ..... Worland, Wy.
ROSA B. MAGGARD ..... Union Oil Center
WELDON J. SAVOIE ..... Houma, La.
MARVIN L. ZOLLER ..... Midland, Tx.

25 YEARS

BERNARD W. HOLUB ..... Van, Tx.
JAMES M. WORKMAN ..... Houston, Tx.

20 YEARS

RUTH D. JACKSON ..... Orcutt, Ca.
GEORGE T. MAYER ..... Lafayette, La.

15 YEARS

PAUL E. CROSSMAN ..... Bakersfield, Ca.
THOMAS L. DEWITT ..... Coalinga, Ca.
KENNETH E. GUZIAK ..... Ventura, Ca.
ALFRED B. HORAIST, Jr. ..... Lafayette, La.
WILLIAM A. LEE ..... Santa Fe Springs, Ca.
ELTON N. SHRODE ..... Santa Fe Springs, Ca.

10 YEARS

TERRILL L. BARTON ..... Santa Fe Springs, Ca.
STEVEN K. CLEVENGER ..... Orcutt, Ca.
ALFRED HARRIS ..... Houma, La.
CHARLES D. HODKINS ..... Orcutt, Ca.
T. WAYNE JACKSON, Sr. ..... Houma, La.
MARK E. McCREE ..... Santa Paula, Ca.
JOHN A. ROBINSON ..... Houma, La.

5 YEARS

STEVEN J. BENEDETTI ..... Casper, Wy.
HARRY H. BRYAN, Jr. ..... Houston, Tx.
EARL P. CHAMPAGNE ..... Houma, La.
RICKY L. COLTON ..... Anchorage, Ak.
PAUL F. DUHON ..... Abbeville, La.
WESLEY H. GRIESEMER ..... Olney, Il.
TERESA A. O'SULLIVAN ..... Orcutt, Ca.
LEMMIE R. SMITH ..... Houston, Tx.

JUNE 1981

40 YEARS

ROBERT G. BUNKELMAN ..... Orcutt, Ca.
ROBERT E. CARTNAL ..... Clay City, Il.
MALCOLM S. SHEPPARD ..... W. Liberty, Il.

35 YEARS

RALPH A. HOUDYSHELL ..... Andrews, Tx.
LOIS M. JOHNSON ..... Orcutt, Ca.
JOHN C. STALLARD ..... Oklahoma City, Ok.

30 YEARS

BOB L. ADKISON ..... Moab, Ut.
ROBERT N. BONGARD ..... Houston, Tx.
CARL R. CARLSON ..... Bakersfield, Ca.
CHARLES R. CLARK ..... Casper, Wy.
EUGENE F. GRIFFIN ..... Union Oil Center
JOHN F. KOHAL, Jr. ..... Orcutt, Ca.
PATRICIA A. REAGAN ..... Los Angeles, Ca.

25 YEARS

ALLEN J. BRUGMAN ..... Lafayette, La.
C. A. TANNAHILL ..... Houston, Tx.

20 YEARS

JOSEPH E. BARBIER ..... Houma, La.
BEULAH L. LANDRY ..... Lafayette, La.
WILMA C. SHINER ..... Coalinga, Ca.
ROBERT H. STANAKER ..... Houston, Tx.
PHILLIP E. WEBB ..... Ardmore, Ok.
T. A. WINKELMANN ..... Houston, Tx.

15 YEARS

DALE L. ELCHLEPP ..... Orcutt, Ca.
THOMAS E. FISHER ..... Abbeville, La.
PAUL W. HOLDERFIELD ..... Santa Paula, Ca.
ROSALEE F. INGRAM ..... Bakersfield, Ca.
MELFORD C. JONES ..... Midland, Tx.
TIMOTHY C. LAUER ..... Lafayette, La.
KAREN J. McGAFFEE ..... Los Angeles, Ca.
CLARENCE J. MELANCON ..... Lafayette, La.
GEORGE S. PETERSON ..... Lafayette, La.
JULIO SOTO ..... Union Oil Center
CARL H. WHITE ..... Anchorage, Ak.

10 YEARS

JOE D. CECIL ..... Los Angeles, Ca.
JACK L. HEINDSELMAN ..... W. Liberty, Il.
JOE A. HOLLIS ..... Santa Paula, Ca.
EDWARD N. LABAUVE ..... Lafayette, La.
CHARLES E. LENAMOND ..... Moab, Ut.
HAL G. LINDLE, Jr. ..... Anchorage, Ak.
LORETA A. McREYNOLDS ..... Midland, Tx.

5 YEARS

ROLAND P. AUCOIN ..... Houma, La.
GLENN C. FREDRICK ..... Oklahoma City, Ok.
LYNETTE D. W. GEORGE ..... Casper, Wy.
HARVEY KINCHLOW, Jr. ..... Oklahoma City, Ok.
ARDELL A. McGAVIN ..... Los Angeles, Ca.
ROBERT L. MEYER ..... Houston, Tx.
SHIRLEY M. PIZZO ..... Houston, Tx.
SHARON S. PUCKETT ..... Houston, Tx.
WILLIAM D. RUNNALLS ..... Worland, Wy.
ROGER B. STICKNEY ..... Anchorage, Ak.
LARRY D. VINSON ..... Houston, Tx.
JOAN I. WINTERER ..... Ventura, Ca.

UNION 76 DIVISION

MAY 1981

45 YEARS

HERBERT M. HULS ..... Chicago Refinery

40 YEARS

STANLEY CHAPIN, Jr. ..... San Francisco Refinery
CLEO J. GOYETTE ..... Los Angeles Refinery
FRANCIS R. MUDRON ..... Chicago Refinery
CARL W. WATERS ..... Beaumont Refinery
EUGENE J. TAKACH ..... Schaumburg, Il.

35 YEARS

ELTON P. BARNETT ..... Los Angeles, Ca.
CHARLES G. CORSIGLIA ..... Schaumburg, Il.
CLAUDE E. ECHOLS ..... San Francisco Refinery
WILLIAM C. HOLLAND ..... Chicago Refinery
WILLIAM G. LESSMANN ..... Schaumburg, Il.
WALTER P. PRIMBSCH ..... San Francisco Refinery
JAMES A. RIPPETOE, Jr. ..... Beaumont Refinery
JAMES L. SALMON ..... San Francisco Refinery
ANTHONY TRIVISONNO ..... Cleveland, Oh.
GEORGE F. WEBSTER ..... Los Angeles, Ca.
FRANCIS P. WILSON, Jr. ..... Memphis, Tn.
ERNEST D. WILSON ..... Portland, Or.
THOMAS T. M. YOUNG ..... Honolulu Terminal

30 YEARS

EVERETT M. ADAMS ..... San Francisco Refinery
JOE B. BASS ..... Jacksonville, Fl.
WILLIAM R. CALLAHAN ..... San Francisco Refinery
EUGENE G. GARMAN ..... Tallmadge, Oh.
JOHN E. HINES ..... Wheeling, W.V.
LESTER L. KROHN ..... Los Angeles, Ca.
LEO EDWIN OLSEN ..... San Francisco Refinery
NORMAN W. POHLL ..... Los Angeles, Ca.
RAYMOND S. THOMAS ..... Dayton, Oh.
JOSEPHINE C. TIETZ ..... Schaumburg, Il.
WILLIAM F. WELCH ..... San Francisco Refinery

25 YEARS

ROY J. CHAPMAN ..... Columbus, Oh.
JAMES OLIVER GREEN ..... Avenal, Ca.
PHILIP D. JONTZ ..... Los Angeles, Ca.
JAMES T. JORDAN ..... Memphis, Tn.
DOROTHY ROBINSON ..... Los Angeles, Ca.
VIRGINIA E. TRUDEAU ..... Toledo, Oh.
EDMUND A. VASPER ..... Honolulu, Hi.
RONALD R. WINTER ..... Columbus, Oh.

20 YEARS

JOHN I. BUCKLES ..... Schaumburg, Il.
ERNEST W. HATHCOAT ..... Forest View, Il.
FRANCES C. MARADA ..... Schaumburg, Il.
ROBERT R. MITCHELL ..... Los Angeles Terminal
FRANK F. MOLETTE ..... Santa Maria Refinery
DONALD C. NIST, Jr. ..... Columbus, Oh.
ROBERT K. SCHLACHTER ..... Toledo, Oh.
WALTER SCHWEIKERT ..... Reno, Nv.
ROBERT A. STARKEY ..... Southfield, Mi.
FRANK SOUZA, Jr. ..... Sacramento, Ca.

15 YEARS

MARVIN L. BARANSY, Jr. ..... Charlotte, N.C.
BOBBY W. BENTON ..... Charlotte, N.C.
THOMAS J. BRUNNER ..... Cincinnati, Oh.
SID RAY CARTER ..... San Francisco Refinery
VINCENT EGIDI, Jr. ..... Schaumburg, Il.
JOSE E. GARCIA ..... San Francisco, Ca.
JUDITH A. LUSSOW ..... Schaumburg, Il.
GARY E. MYHRO ..... Anchorage, Ak.
EDWARD L. SELVAS ..... Chicago Refinery
GARRY W. WAYMIRE ..... Miami, Fl.
WILLIAM A. WALKER ..... San Diego Terminal

10 YEARS

BETTY L. ASHLEY ..... Wildwood, Fl.
WILLIAM F. BARON ..... San Francisco, Ca.
BEN O. BASHAM ..... Chicago Refinery
KIMBERLY R. BRATT ..... Schaumburg, Il.
MELVIN H. CHIYA ..... Phoenix, Az.
WENDELL L. COX ..... Atlanta, Ga.
RICHARD CRUCKNOL ..... Cleveland, Oh.
EDDIE P. DAVELT ..... Wildwood, Fl.
THOMAS C. FARLEY ..... Dallas, Tx.
JEANNETTE GERTMENIAN ..... Union Oil Center
DANIEL HERRERA ..... Los Angeles Refinery
TERRY T. HOLTHE ..... Los Angeles Terminal
EDWARD C. LACEY, III ..... Columbus, Oh.
LYNNWOOD I. LEMON ..... Tulsa, Ok.
DOROTHEA E. MASON ..... Schaumburg, Il.
MARYJANE NELSON ..... Chicago Refinery
M. A. NOSEK
Pure Transportation Co. ..... Olney, Il.

STEPHEN L. PETLESKI ..... Chicago Refinery
RONALD R. SAARINEN ..... Edmonds Terminal
DOUGLAS M. SALIN ..... San Francisco, Ca.
LARRY T. SHIGETA ..... Honolulu, Hi.
RONALD J. SMITH ..... Los Angeles Refinery
RICHARD L. VEALE, Jr. ..... Houston, Tx.
ROBERT L. WESOLOWSKI ..... Chicago Refinery
WILLIAM E. WESOLOWSKI ..... Chicago Refinery
HENRY J. YNOSTROZA ..... Los Angeles Terminal

5 YEARS

ROBERT H. BARBOSA ..... Beaumont Refinery
HARRY W. CUNNINGHAM ..... Atlanta, Ga.
MONROE DANTZLER ..... Los Angeles Refinery
JOSEPH A. DAUSTER ..... Santa Maria Refinery
GREGORY W. FAULK ..... Beaumont Refinery
DEBRA A. FINCH ..... Seattle, Wa.
RUSSELL R. GOYA ..... Hilo, Hi.
WILLIAM P. LANOUX ..... Los Angeles Refinery
DONALD E. McKINNEY ..... Beaumont Refinery
ROBERT J. PHILLIPS ..... Los Angeles Terminal
MICHAEL S. SAWYER
Pure Transportation Co. ..... Patoka, Il.
SHERYL L. SCHON ..... Schaumburg, Il.
STEVEN E. ULM
Pure Transportation Co. ..... Patoka, Il.

JUNE 1981

40 YEARS

JAMES M. BRAGG ..... Beaumont Refinery
DONALD L. HICKMAN ..... Chicago Refinery
VERNON W. KELLER ..... San Francisco Refinery
RICHARD W. MERTES ..... Los Angeles, Ca.
DAVID E. MURPHY ..... Chicago Refinery
JOHN M. PAYNE ..... Charleston, W.V.
WILLIAM B. WARREN ..... Schaumburg, Il.

35 YEARS

RAYMOND W. BARNES ..... Los Angeles Refinery
FLOYD CARROLL ..... San Francisco Refinery
WILLIAM M. CHITWOOD ..... Indianapolis, In.
RONALD L. FOSTER ..... Union Oil Center
ROBERT R. GOULD ..... San Francisco Refinery
CHARLIE E. LOFTON ..... San Francisco Refinery
HERBERT C. OBRIEN ..... Los Angeles, Ca.
LILLIAN A. SEIDEL ..... Columbus, Oh.
HENRY N. SMITH ..... Collins, Ms.
ALFRED G. SOUZA ..... San Francisco Refinery

30 YEARS

RAYMOND K. BAIRD ..... Los Angeles Refinery
RICHARD R. ELLIS ..... Los Angeles Refinery
JOSEPH HEINS, Jr. ..... Los Angeles Refinery
JAMES A. HESTER ..... Birmingham, Al.
PAUL V. HIGHTOWER
Pure Transportation Co. ..... Van, Tx.
JAMES L. HILL ..... Charlotte, N.C.
GRANT F. LAWRENCE ..... Chicago Refinery
RAMOND T. SATO ..... Honolulu, Hi.
HAROLD J. SCHAPER ..... Schaumburg, Il.
GERALD M. SOLLER ..... Minneapolis, Mn.
WESLEY W. WILLBORG ..... Houston, Tx.

25 YEARS

JOHN L. BOARD ..... Pasadena, Ca.
JERRY T. CARTER ..... Jacksonville, Fl.
ALVIN B. HESS ..... Richmond Terminal
DON M. JACOBS ..... Schaumburg, Il.
RAYMOND L. JUREK ..... Minneapolis, Mn.
JOE R. LONGINO ..... Columbus, Oh.
LEOPOLD A. LUNA ..... Bettendorf, Ia.
JACK L. McDANIEL ..... Atlanta, Ga.
JOHN W. MULLEN ..... Honolulu, Hi.
JAMES T. PEARSON ..... Torrance, Ca.

20 YEARS

ROGER C. BEACH ..... Los Angeles, Ca.
HELEN S. BROWN ..... Los Angeles, Ca.
ROGER E. DANNER ..... Milwaukee, Wi.
JIMMY B. DEERING ..... Santa Maria Refinery
ROLAND D. FINK ..... Miami, Fl.
ANDREW A. GOERGER ..... Schaumburg, Il.
CAROL L. GOERS ..... Hoffman Estates, Il.
ROBERT B. KIMMELL ..... Los Angeles, Ca.
WILLIAM A. MAGERKURTH ..... Columbus, Oh.
BETTY J. NEUBARTH ..... Schaumburg, Il.
WAYNE W. PRITZEL ..... Chicago Refinery
DEMETRA STAIGER ..... Schaumburg, Il.
JOHN W. WHITE ..... Jackson, Ms.

15 YEARS

LAWRENCE J. BATIS ..... Chicago Refinery
JOHN F. CAYBUT ..... Richmond Terminal
ROY A. CHILDERS ..... Seattle, Wa.
DENNIS COOK ..... Union Oil Center
JAMES W. COX ..... Portland, Or.
MERRILEE A. GARCIA ..... Los Angeles, Ca.
HAROLD E. HANNA ..... Richmond Terminal
HOWARD P. HENDERSON ..... Portland, Or.
JOANN M. HODOVAL ..... Schaumburg, Il.
MARLENE ISAACSON ..... Schaumburg, Il.
CHARLES D. JOHNSON ..... Los Angeles Terminal
GENE E. KLEIN ..... Los Angeles Refinery
GEORGE M. LANDBO ..... Schaumburg, Il.
PHILIPPE LANOUETTE ..... Los Angeles, Ca.
JOSEPH LEAMAN ..... Schaumburg, Il.
RICHARD L. LOUDERBACK ..... Bakersfield, Ca.
DAVID C. LUNDGREN ..... Union Oil Center
DEAN R. MASTERTON ..... Richmond Terminal
COLLEEN McGARRY ..... Los Angeles, Ca.
CLAUDE A. MILLER ..... Schaumburg, Il.
BENJAMIN A. NAGEL ..... Coosbay, Or.
RICHARD P. NIELSEN ..... Schaumburg, Il.
GEORGE T. SCHROEDER ..... Allen, Tx.
ROBERT P. SODERDAHL ..... Schaumburg, Il.
MARGARET M. WATSON ..... Schaumburg, Il.

10 YEARS

JOSEPH S. ADELIZZI ..... Schaumburg, Il.
JOHN BARCA ..... Schaumburg, Il.
BRIAN M. BARCH ..... Schaumburg, Il.
BETTY C. CHAN ..... San Francisco, Ca.
SANDRA A. COLLINS ..... San Francisco, Ca.
MARY K. DOYLE ..... Forest View, Il.
JOHN R. FITZGERALD ..... Pittsburgh, Pa.
RANDALL A. KNOLL ..... Minneapolis, Mn.
LEONARD M. KOONTZ ..... Union Oil Center
JAMES C. LAINHART ..... San Francisco Refinery
CLYDE E. LAIRD ..... Beaumont Refinery
RICHARD MACKENZIE ..... Los Angeles Terminal
WALTER T. MALLORY, Jr. ..... Los Angeles Refinery
JOHNNY L. MOSLEY ..... Los Angeles Refinery
MICHAEL J. NORIEGA ..... Los Angeles Terminal
MICHAEL D. RIEHLE ..... Los Angeles, Ca.
JAMES C. TILLOTSON ..... San Francisco Refinery
THEODORE J. WEISBRUCH, Jr. ..... Schaumburg, Il.
MICHAEL A. YOUNG ..... Los Angeles Terminal

5 YEARS

JACQUELINE BENDER ..... South Holland, Il.
YSMAEL A. CEPEDA ..... Los Angeles, Ca.
DAVID L. CRANE ..... Columbus, Oh.
JAMES J. FOSTER ..... Schaumburg, Il.
MICHAEL W. HAWLEY ..... Los Angeles, Ca.
DANIEL W. HOOVER ..... Schaumburg, Il.
BRUCE E. KNIGHT ..... San Diego, Ca.
JOHN T. MARRS ..... Schaumburg, Il.
EDWARD C. McCARTHY ..... Los Angeles Terminal
ERNIE J. MENDOZA ..... Los Angeles Terminal
LYNN M. MURPHY ..... Schaumburg, Il.
JAMES G. PETRUS ..... Beaumont Refinery
DAVID A. SEAY ..... Bakersfield, Ca.
CHARLOTTE A. SMITH ..... Seattle, Wa.
DONALD X. STOKES ..... Richmond Terminal
JAMES M. YAUCH ..... Schaumburg, Il.
EMMANUEL V. YOUNG ..... Nederland, Tx.

UNION GEOTHERMAL DIVISION

MAY 1981

15 YEARS

RUSSELL M. HORTON ..... Manila, Philippines

10 YEARS

JACQUE J. LIGON ..... Union Oil Center

5 YEARS

HARRY O. BAIN ..... Santa Rosa, Ca.
LINDA J. DONDANVILLE ..... Santa Rosa, Ca.
JODIE E. FISHER ..... Santa Rosa, Ca.
BLACKIE O. HALBROOK ..... Manila, Philippines

JUNE 1981

30 YEARS

FRANK L. LEMMON ..... Brawley, Ca.

15 YEARS

JIMMIE E. CHURCH ..... Manila, Philippines

10 YEARS

ALTHEA M. THOMAS ..... Union Oil Center

5 YEARS

DWAYNE P. DAUNCH ..... Big Geysers, Ca.
GARY S. JOHNSON ..... Santa Rosa, Ca.
BRIAN W. MAASSEN ..... Santa Rosa, Ca.
DONALD R. WALKER ..... Brawley, Ca.

UNION CHEMICALS DIVISION

MAY 1981

40 YEARS

WILLIAM A. OUDSHOORN ..... Schaumburg, Il.

30 YEARS

JOSEPH ROSIO, Jr. ..... Sacramento, Ca.

25 YEARS

ROBERT A. GREACEN ..... Conshohocken, Pa.
CARL B. WILLS ..... Baltimore, Md.

20 YEARS

GARY ANKER ..... Brea, Ca.
WILLIAM D. LATHAN ..... Wilmington, N.C.
JAMES A. JOHNSTON ..... Charlotte, N.C.
NICHOLAS J. MASELLI ..... Providence, R.I.
CHARLES N. SCHEMM ..... Baltimore, Md.

15 YEARS

JAMES D. ROBERTSON ..... Charlotte, N.C.

10 YEARS

GEORGE D. FEREE ..... Denver, Co.
MAURICE J. GENDRON ..... Providence, R.I.
W. L. HARRIS ..... Bridgeview, Il.
JOHN J. MURPHY ..... Carteret, N.J.
PAUL H. WOLLY ..... Carteret, N.J.

5 YEARS

MICHAEL R. BRENNAN ..... Minneapolis, Mn.
JUNE BRASSEL ..... Memphis, Tn.
RONALD BURGER ..... Kenai, Ak.
HAROLD COLLINS, Jr. ..... Kenai, Ak.
LAURA GAMBOA ..... Union Oil Center
ANGELA HINDS ..... Brea, Ca.
VALERIE JORDAN ..... Bridgeview, Il.
JOHN P. PARDUE ..... La Mirada, Ca.
DANIEL STECHER ..... Union Oil Center
ROGER THORESON ..... Kenai, Ak.
GEORGE WILL, Jr. ..... Kenai, Ak.

JUNE 1981

40 YEARS

HARRY KINSELLA ..... Union Oil Center

25 YEARS

DONALD FANARO ..... Rodeo, Ca.

20 YEARS

THERESA KAMICHOFF ..... Clark, N.J.
JON D. TIPPETT ..... Clark, N.J.

15 YEARS

ROBERT E. ROWAN ..... Houston, Tx.

10 YEARS

ROBERT COOPER ..... Brea, Ca.
MURTON DePRIEST ..... Kenai, Ak.
WILLIAM A. FIELDS ..... Bridgeview, Il.
KARL A. LUKENS ..... Conshohocken, Pa.
RICHARD OELRICH ..... Kenai, Ak.
ARNOLD OSKOLKOFF ..... Kenai, Ak.
JACKIE PENINGER ..... Schaumburg, Il.
KEITH RAGAINS ..... Kenai, Ak.

5 YEARS

ROBERT ANDERSON, Jr. ..... Union Oil Center
JOHN T. CALLAHAN ..... Bridgeview, Il.
JESSIE J. COOPER ..... Bridgeview, Il.
FRANK FLYNN ..... Clark, N.J.
WILLIAM H. FOGGIE ..... Charlotte, N.C.
CHARLES L. FOX ..... Bridgeview, Il.
BOYCE R. GIBSON ..... Charlotte, N.C.
MARIE HIGGINS ..... Rodeo, Ca.
WILLIE L. JOHNSON ..... Bridgeview, Il.
JAMES R. KING ..... La Mirada, Ca.
LARRY M. McDANIEL ..... Charlotte, N.C.

UNION INTERNATIONAL DIVISION

MAY 1981

25 YEARS

EDWIN H. EAST ..... Union Oil Center

20 YEARS

ROBERT O. HARLOW ..... Union Oil Center

15 YEARS

FREDERIK DEKKER ..... Union Oil Center

10 YEARS

RITA E. MARRS ..... Union Oil Center

5 YEARS

WILLIAM B. WILLSMER ..... Union Oil Center
ARUN K. METRE ..... Union Oil Center

JUNE 1981

35 YEARS

EDGAR STOWE ..... Union Oil Center

25 YEARS

RICHARD MARTIN ..... Union Oil Center
BEN TALLEY ..... Union Oil Center

15 YEARS

WILLIAM D. JONES ..... Union Oil Center
ROBERT ROSE ..... Union Oil Center
BOGDAN TOMASZEWSKI ..... Union Oil Center

10 YEARS

JOHN K. LEONG ..... Union Oil Center

5 YEARS

WILLIAM CLUTS ..... Union Oil Center
WILLIAM LEONARD ..... Union Oil Center

UNION OIL COMPANY OF CANADA LIMITED

MAY 1981

30 YEARS

GEORGE SPRINGER ..... Calgary, Alberta

20 YEARS

DON HOUSTON ..... Calgary, Alberta

15 YEARS

NESTOR SHULAR ..... Calgary, Alberta

5 YEARS

FRITZ PERSCHON ..... Calgary, Alberta
MARTA SMIRA ..... Calgary, Alberta

JUNE 1981

10 YEARS

JERRY BLOCK ..... Ft. St. John, B.C.
JIM McINTOSH ..... Calgary, Alberta

UNION ENERGY MINING DIVISION

MAY 1981

30 YEARS

WILLIAM F. ROBERTSON, Jr. ..... Union Oil Center

25 YEARS

WILLIAM C. GOTH ..... Union Oil Center

MOLYCORP

MAY 1981

20 YEARS

H. LINN WEAVER ..... Washington, Pa.

5 YEARS

ROBERT KRAJEWSKI ..... Mountain Pass, Ca.
LLOYD VORWALD ..... Louviers, Co.
RONALD WALSH ..... Mountain Pass, Ca.

JUNE 1981

15 YEARS

MONTE APODACA ..... Questa, N.M.
MARY BERGMAN ..... Union Oil Center
JAMES KEIM ..... Louviers, Co.

10 YEARS

ZITA CAMPBELL ..... White Plains, N.Y.

5 YEARS

JOSEPH McALEER ..... Spokane, Wa.
PAUL TIEDEMANN ..... Mountain Pass, Ca.

POCO GRAPHITE

JUNE 1981

30 YEARS

CHARLES HEABERLIN ..... Decatur, Tx.

25 YEARS

THOMAS ALBRIGHT, Jr. ..... Decatur, Tx.

5 YEARS

RAYMOND McCLELLAND ..... Decatur, Tx.
JAMES PATRICK ..... Decatur, Tx.

JOBBERS AND DISTRIBUTORS

MAY 1981

35 YEARS

HOUCHARD OIL CO., INC. ..... Plain City, Oh.
KNOLL BROTHERS, INC. ..... Michigan City, In.

30 YEARS

WILLIAM E. GRAHAM ..... Canby, Or.

25 YEARS

CASHION OIL CO. ..... North Wilkesboro, N.C.
ALLEN OIL CO. ..... Murfreesboro, Tn.
THOMPSON OIL CO. ..... Beardsley, Mn.

20 YEARS

G&M OIL CO., INC. ..... Barbourville, Ky.
CARL A. WRIGHT OF VAN WERT, INC. ..... Van Wert, Oh.

15 YEARS

ROBERT E. BONGERS ..... Connell, Wa.

10 YEARS

C. C. PETERSON OIL CO., INC. ..... Sioux Falls, S.D.
HENRY A. COLLIN ..... Dinuba, Ca.
MURPHY ENTERPRISES ..... Lafayette, In.
ALABAMA OIL CO.
OF ETOWAH CTY, INC. ..... Gadsden, Al.
MARCUM OIL CO., INC. ..... Oneonta, Al.

5 YEARS

BENNETT & FISHER, INC. ..... John Day, Or.
HOYT OIL CO. ..... Pontiac, Mi.

JUNE 1981

60 YEARS

FRANKLIN OIL CO. ..... Franklin, Mn.

50 YEARS

WESTVILLE GRAIN CO. ..... Westville, Oh.
ZIMMERMAN FUEL DISTRIBUTORS ..... Jackson, Mi.

40 YEARS

APPLE VALLEY OIL, INC. ..... Yakima, Wa.
RIGHT OIL CO. ..... Seaford, De.

35 YEARS

HUNT OIL & TIRE CO. ..... Grenta, Va.
PUCKETT OIL CO. ..... Shellman, Ga.

25 YEARS

CUMMINGS OIL CO. ..... Hampton, S.C.
SIMMONS OIL CO. ..... Magee, Ms.
TED HEARNE ..... Springerville, Az.

20 YEARS

ALBERTY OIL CO. ..... Dobson, N.C.

15 YEARS

CURTIS-THARALDSON OIL CO., INC. ..... Duluth, Mn.
RALPH RAMEY ..... Yreka, Ca.

10 YEARS

KARREN DEVELOPMENT CO. ..... Logan, Ut.
NORTHRUP OIL CO. ..... Century, Fl.
JOE T. DEHMER, DISTRIBUTOR, INC. ..... Jackson, Ms.

5 YEARS

SENECA SUPPLY CO., INC. ..... Clarksburg, W.V.

RETIREMENTS

FEBRUARY 1981

JOSEPH J. COTTER, Union Chemicals
Newark, N.J. ..... April 20, 1970
EDWARD J. KOPECKY, Union Chemicals
Kearny, N.J. ..... August 18, 1966
IVAN M. SEAL, Union 76 Division
Santa Maria, Ca. ..... October 7, 1942

MARCH 1981

CHARLES E. BLAIR, Union 76 Division
Taft, Ca. ..... October 31, 1950
DANIEL J. HAINES, International
Pittsburg, Tx. ..... September 1, 1950

APRIL 1981

RAIFORD C. BAKER, Union 76 Division
Marietta, Ga. ..... March 16, 1942
C. M. BARCLAY, Union 76 Division
Woodville, Tx. ..... May 17, 1948
ARTHUR F. BATTISTE, Union 76 Division
Vallejo, Ca. ..... January 26, 1971
BYRON M. BEILDECK, Union 76 Division
Los Angeles, Ca. ..... May 24, 1943
LEONARD H. BERGLUND, Union 76 Division
Willow Springs, Il. ..... March 26, 1951
ROBERT A. BROWN, Union 76 Division
Kountze, Tx. ..... October 29, 1946
DELBERT H. CARLISLE, Union 76 Division
Vallejo, Ca. ..... March 26, 1953
JOE V. CASH, Union 76 Division
Nederland, Tx. ..... October 31, 1949
DONALD M. CHAFFEE, Union 76 Division
Sun City, Ca. ..... July 21, 1942
ROY A. CHILDERS, Union 76 Division
Seattle, Wa. ..... June 30, 1966
OLA M. CHILTON, Poco Graphite
Decatur, Tx. ..... August 1, 1969
DEVERE W. CHRISTENSEN, Union 76 Division
Fullerton, Ca. ..... November 2, 1948
VIOLA C. COBERLY, Corporate
Los Angeles, Ca. ..... February 22, 1946
LAREN K. COGGAN, Oil and Gas
Midland, Tx. ..... March 1, 1947
EVERETTE L. COLLIER, Union 76 Division
Port Neches, Tx. ..... October 5, 1953
BETTY C. COX, Corporate
Arcadia, Ca. ..... December 15, 1947
ALLEN B. CROCKETT, Oil and Gas
Midland, Tx. ..... November 16, 1955
WILLIAM H. EVANS, Union 76 Division
Walnut Creek, Ca. ..... July 18, 1949
AMELIA E. FERNANDEZ, Union 76 Division
San Francisco, Ca. ..... September 27, 1953
CLAUDE V. GISTELLI, Union 76 Division
Crockett, Ca. ..... August 28, 1952
LLOYD L. HENDERSON, Oil and Gas
Anaheim, Ca. ..... April 21, 1950
LAWRENCE B. HIGBEE, Corporate
Burbank, Ca. ..... March 6, 1941
MERILYN A. HIGBEE, Union 76 Division
Burbank, Ca. ..... October 28, 1951
JACK C. HUSMAN, Union 76 Division
Toledo, Oh. ..... April 11, 1941
ELMER P. KENDALL, Oil and Gas
Kenai, Ak. ..... September 16, 1962
CLELAND F. LARUE, Union 76 Division
Port Neches, Tx. ..... February 21, 1949
JULIAN F. LEGROS, Union 76 Division
Beaumont, Tx. ..... December 13, 1948
JOHN C. O. LUM, Union 76 Division
Honolulu, Hi. ..... May 11, 1947
FREDERIC A. MADENWALD, Jr., Union 76 Division
Beaumont, Tx. ..... October 1, 1948
KENNETH L. McCRAW, Oil and Gas
Midland, Tx. ..... August 6, 1946
LEON D. NISWONGER, Union Chemicals
Brea, Ca. ..... March 25, 1954
LUTHER E. O'DELL, Union 76 Division
Silsbee, Tx. ..... March 3, 1947
HENRY D. OVERSTAKE, Oil and Gas
Oklahoma City, Ok. ..... February 15, 1951
CHANCEY C. PETRY, Union 76 Division
Port Neches, Tx. ..... August 6, 1941
JACK W. PHILLIPS, Union 76 Division
Vidor, Tx. ..... March 8, 1948
JOSEPH A. PREDAN, Union 76 Division
Buffalo Grove, Il. ..... December 7, 1967
H. N. RICHARDSON, Oil and Gas
La Habra, Ca. ..... October 28, 1941
JAMES A. RIPPETOE, Union 76 Division
Sour Lake, Tx. ..... May 27, 1946
MELVA G. SCALIA, Corporate
La Mirada, Ca. ..... February 25, 1944
JOHN W. SCHEFFEL, Science and Technology
Fullerton, Ca. ..... November 10, 1948
HOWARD A. SCHMIDT, Union 76 Division
Amberg, Wi. ..... December 12, 1966
JOSEPH R. SCHREINER, Union Chemicals
Santa Ana, Ca. ..... August 16, 1954
ESTE A. SIGNORELLI, Oil and Gas
Santa Maria, Ca. ..... June 30, 1950
A. P. VERRET, Jr., Union 76 Division
Beaumont, Tx. ..... July 7, 1949
JOSEPH G. VLCEK, Union 76 Division
Downers Grove, Il. ..... February 9, 1940
FRANCIS F. WHALEN, Union 76 Division
Wilmington, Il. ..... July 28, 1952
ROBERT O. WHITE, Union 76 Division
Costa Mesa, Ca. ..... November 8, 1949
ROBERT L. WHITMAN, Union 76 Division
Port Neches, Tx. ..... February 17, 1947
WILLARD A. WICKHAM, Oil and Gas
Cisne, Il. ..... January 25, 1939
FRANK L. WRIGHT, Union 76 Division
Nederland, Tx. ..... August 20, 1948
ROGER V. WOLDT, Union 76 Division
Vallejo, Ca. ..... April 22, 1970

MAY 1981

EDWARD A. ALTHAUSER, Union 76 Division
Garden Grove, Ca. ..... February 13, 1956
DEWARD L. BAKER, Union 76 Division
Beaumont, Tx. ..... March 14, 1949
DONALD L. BRADLEY, Union 76 Division
Anchorage, Ak. ..... August 5, 1941
CHESTER J. BOBBITT, Union 76 Division
Beaumont, Tx. ..... April 5, 1948
RAYMOND E. CAMPBELL, Union 76 Division
Vidor, Tx. ..... January 12, 1948
HARRY T. CHEADLE, Oil and Gas
Santa Maria, Ca. ..... April 8, 1954
PAUL E. CRAVENS, Oil and Gas
Dundas, Il. ..... May 1, 1941
HOYLE A. DIXON, Oil and Gas
Coalinga, Ca. ..... September 26, 1949
ROY G. HARMON, Union Chemicals
Riverside, Ca. ..... March 6, 1961
WILLIAM H. HAYNES, Union 76 Division
Port Neches, Tx. ..... October 2, 1952
JOSEPH HEINS, Union 76 Division
Los Alamitos, Ca. ..... June 9, 1951
RAYBURN H. HULL, Union 76 Division
Port Neches, Tx. ..... January 5, 1949
DON R. KASERMAN, Corporate
Los Angeles, Ca. ..... September 17, 1956
CARNIS V. KING, Union 76 Division
Nederland, Tx. ..... September 12, 1946
MARTIN MANDERS, Union 76 Division
Los Angeles, Ca. ..... May 1, 1943
PETER R. McGINLEY, Union Chemicals
Kansas City, Ks. ..... December 8, 1941
GERALD E. MEISTER, Union Chemicals
Prescott, Az. ..... December 2, 1957
ELWOOD K. MILLER, Union 76 Division
Beaumont, Tx. ..... March 1, 1949
DANIEL F. MURPHY, Union 76 Division
Rodeo, Ca. ..... March 11, 1946
R. M. NEEL, Union 76 Division
Nederland, Tx. ..... January 2, 1951
DONALD L. NIELSEN, Union 76 Division
Phoenix, Az. ..... October 1, 1945
GRANT H. OBERG, Union 76 Division
Lockport, Il. ..... March 31, 1949
ERNEST C. O'QUINN, Union 76 Division
Port Arthur, Tx. ..... May 16, 1949
WALTER W. PORTER, Union 76 Division
Beaumont, Tx. ..... October 6, 1952
JAMES L. POWELL, Union 76 Division
Lumberton, Tx. ..... March 7, 1946
FORREST S. PURKEY, Union 76 Division
Silsbee, Tx. ..... March 7, 1946
ELTON L. RITCHEY, Union 76 Division
Port Neches, Tx. ..... June 6, 1949
BERNARD A. RUETTIGER, Union 76 Division
Joliet, Il. ..... January 3, 1940
OTTO A. SALO, Union 76 Division
Santa Maria, Ca. ..... April 11, 1946
WALLACE L. SAULTZ, Oil and Gas
Midland, Tx. ..... July 13, 1948
RAYMOND E. STONE, Union 76 Division
Fullerton, Ca. ..... January 4, 1946
CLIFFORD M. STUBBE, Corporate
Claremont, Ca. ..... July 6, 1948
MATTHEW S. THOMSON, Corporate
Lakewood, Ca. ..... June 21, 1940
BILLY J. WOOD, Union 76 Division
Fallbrook, Ca. ..... April 17, 1942

IN MEMORIAM

EMPLOYEES

JIMMY L. CHURCH, Union Chemicals
Charlotte, N.C. ..... March 25, 1981
LAWRENCE E. CREEDEN, Jr., Science and Technology
Fullerton, Ca. ..... March 11, 1981
ROY E. McGEE, Union 76 Division
Berwyn, Il. ..... February 20, 1981
ESSIE INEZ MORRIS, Oil and Gas
Midland, Tx. ..... March 2, 1981
FLOYD E. SHELTON, Oil and Gas
Van, Tx. ..... February 12, 1981
ELTON S. WOODROM, Union 76 Division
Port Neches, Tx. ..... February 18, 1981
JOHN J. WESOLOWSKI, Union 76 Division
Lemont, Il. ..... March 6, 1981
JACK J. YOUNG, Union 76 Division
McHenry, Il. ..... February 18, 1981
FRANK ZAJEC, Union 76 Division
Lemont, Il. ..... March 16, 1981

RETIREES

FRANCIS J. BANNON, Union 76 Division
Lockport, Il. ..... February 13, 1981
NORMAN SIMON BANTA, Union 76 Division
Beaumont, Tx. ..... February 5, 1981
CHARLES F. BLACK, Oil and Gas
Clay City, Il. ..... February 7, 1981
NICHOLAS BOKAN, Union 76 Division
Plainfield, Il. ..... February 4, 1981
RALPH E. BRAVO, Jr., Union 76 Division
Oceanside, Ca. ..... December 10, 1980
WILLIAM D. BROOK, Union 76 Division
Verdugo City, Ca. ..... March 8, 1981
FAYE BUCKLEY, Union 76 Division
Hendersonville, S.C. ..... January 9, 1981
OLIVER BUCKMASTER, Union 76 Division
Toledo, Oh. ..... January 30, 1981
ARTHUR J. BURNELL, Union 76 Division
Belleville, Mi. ..... February 4, 1981
EDWARD M. DAVID, Union 76 Division
Anaheim, Ca. ..... March 17, 1981
LEWIS EARL DAVIS, Oil and Gas
Tulsa, Ok. ..... March 19, 1981
FRANK DI RANNA, Union 76 Division
Northbrook, Il. ..... February 21, 1981
CLARENCE O. EIPPER, Union 76 Division
Harbor City, Ca. ..... February 11, 1981
MARVIN L. FISKE, Union 76 Division
Santa Rosa, Ca. ..... March 18, 1981
PAUL G. FOSTER, Oil and Gas
Wilburton, Ok. ..... February 16, 1981
ROBERT H. FULTON, Union 76 Division
Newark, Oh. ..... March 20, 1981
PAUL GOODER, Corporate
Huntington Beach, Ca. ..... March 3, 1981
WILLIAM J. GORDINIER, Union 76 Division
Farmington, Mi. ..... February 10, 1981
DAVID W. HARRY, Sr., Oil and Gas
Worland, Wy. ..... February 5, 1981
MALCOLM N. HULL, Union 76 Division
Fountain Valley, Ca. ..... January 29, 1981
LEON LANDAUER, Union 76 Division
Norfolk, Va. ..... March 16, 1981
TRIS A. LASSETER, Union 76 Division
Beaumont, Tx. ..... February 20, 1981
WILLIAM H. LESTER, Science and Technology
Brea, Ca. ..... February 5, 1981
FRED LONG, Oil and Gas
Royse City, Tx. ..... February 4, 1981
ANTON MATHY, Union 76 Division
Newark, Oh. ..... March 17, 1981
FRANK S. McCAMEY, Union 76 Division
Lusby, Md. ..... February 24, 1981
GEORGE B. McLEAN, Union 76 Division
Morro Bay, Ca. ..... February 15, 1981
JOHN LLOYD MILLER, Union 76 Division
Newark, Oh. ..... March 10, 1981
JOHN W. MILLER, Corporate
Tarzana, Ca. ..... February 5, 1981
STANLEY T. NOELL, Union 76 Division
Mt. Prospect, Il. ..... February 4, 1981
TIMOTHY E. O'CONNOR, Union 76 Division
La Grange Park, Il. ..... November 26, 1980
EMILY M. PAGLIARO, Union 76 Division
Berwyn, Il. ..... January 27, 1981
WILLIAM H. POLY, Union 76 Division
Columbus, Oh. ..... February 28, 1981
RUSSELL C. PRICE, Union 76 Division
Frankford, In. ..... February 10, 1981
MILDRED A. SCHOCHER, Union 76 Division
Sunnyvale, Ca. ..... February 23, 1981
LAURENCE V. SMITH, Pure Transportation
Merritt Island, Fl. ..... January 30, 1981
JOHN F. SPLITT, Union 76 Division
Lemont, Il. ..... March 22, 1981
JOHN S. STOKES, Union 76 Division
Green Cone Springs, Fl. ..... February 3, 1981
JOHN L. SULLIVAN, Union 76 Division
Newark, Oh. ..... February 6, 1981
EARL DELOSS SUTTON, Union 76 Division
Granville, Oh. ..... March 16, 1981
CHARLES F. WAREEN, Oil and Gas
Rinard, Il. ..... March 13, 1981
MELVIN D. WOOD, Oil and Gas
Oilton, Ok. ..... February 4, 1981

UNION OIL COMPANY OF CALIFORNIA
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Los Angeles, California 90051

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SEVENTY SIX

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CONTENTS

COVER: An oil well in southern Illinois pumps rhythmically by an old school house near Olney where an oil field has been revitalized. Photograph by Sergio Ortiz. Story on page 32.

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