

SEVENTY SIX



OCTOBER-NOVEMBER 1965

BROWNING, MONTANA

THE CLIMAX of the annual Indian Days festival here at Browning, Montana, came on July 11th. During the big pow-wow on Sunday attended by the handsomely-robed Blackfoot Nation and hundreds of vacationers bound for Glacier National Park, two Union Oilers were inducted into honorary tribal membership.

W. H. (Bill) Thompson Jr., our roving manager of community services whose long career in youth work and humorous oratory has pleased the tribe, was inducted by Blackfoot Chief Earl Old Person. Bill was given the inspiring Indian name of Chief Fast Buffalo.

Burton D. Thorpe, now manager of real estate development in Los Angeles, but for the past several years manager of our Glacier Division embracing Montana and parts of Wyoming, Idaho and North Dakota, came out of the ceremony with the new name Chief Last Rider. Since all such Indian names are complimentary, we assume that Burt's has nothing to do with horse racing. He was inducted by Blackfoot Chief Bill Spanish.


Appearing in the ceremonial picture at left are (from left) Chiefs Fast Buffalo, Last Rider and Bill Spanish, Mrs. Nora Spanish and W. P. Werner, who nominated the two new Indians. 76

Chiefs Last Rider and Fast Buffalo





This is a symbol of Union Oil Company of California. The trademark, 76, also symbolizes the American freedoms won in 1776 that make possible this nation's industrial development and abundance. SEVENTY-SIX magazine mirrors industrial freedom through the thoughts, skills, accomplishments and appreciations of Union Oil people. We invite your participation in an exchange of ideas and information. Address: Editor, Seventy-Six, Union Oil Center, Los Angeles, California 90017

 Our 75th Anniversary

SEVENTY SIX

UNION OIL COMPANY OF CALIFORNIA

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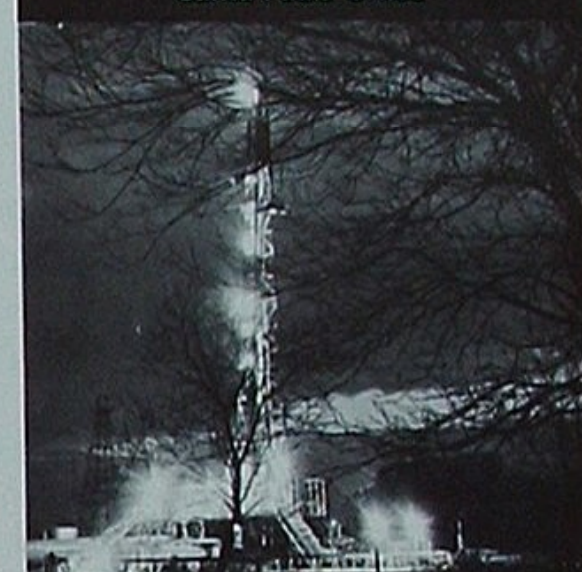
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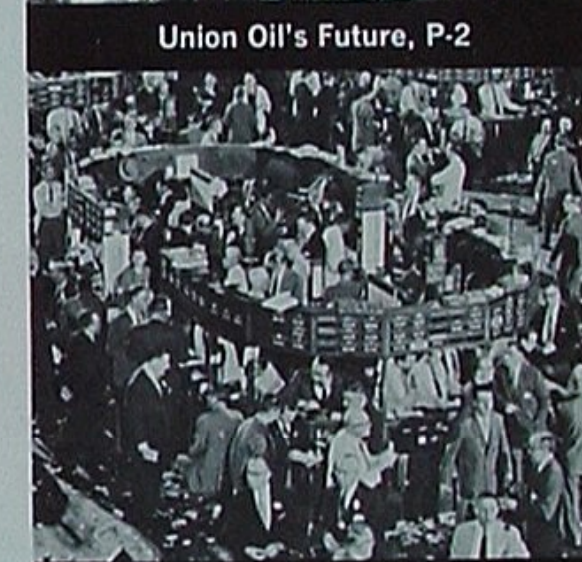
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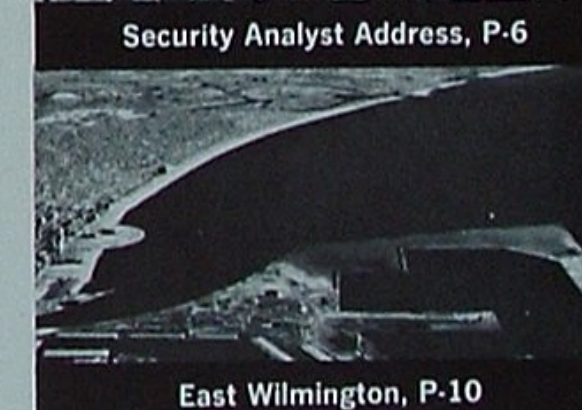
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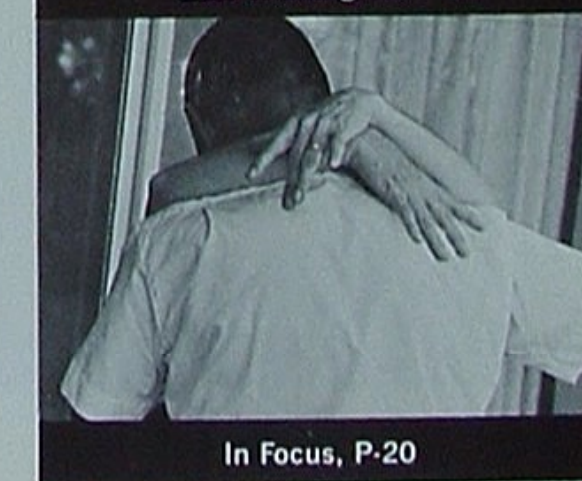
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By FRED L. HARTLEY, President, Union Oil Company

billion feet of natural gas.

To serve our customers, we have 17,000 service stations in 37 states. Sales by these outlets plus sales to commercial and all other accounts total 360,000 barrels of products a day.

Behind these sales is an organization and the facilities capable of delivering the products. We have nine refineries in California, Washington, Montana, Illinois, Ohio, and Texas. These refineries can process 380,000 barrels of raw materials a day.

To transport crude oil and refined products, we have an interest in 10,000 miles of products pipelines and 8,000 miles of raw materials pipelines. Moreover, we have five products tankers and three crude oil supertankers, two of which are the second largest ships afloat.

Our company also has a growing stake in the petrochemical industry. West of the Rockies, we are among the leaders in production of agricultural ammonia, ammonium nitrate, liquid carbon dioxide, dry ice and petroleum carbon. Throughout the country, we produce such basic chemicals as benzene, sulfuric acid, toluene and xylene. Altogether Union's petrochemical sales are now nearly \$130 million a year.

To implement and coordinate the merger with the Pure Oil Company, Claude S. Brinegar, vice president for economics and corporate planning, has been named president of Pure Oil. Brinegar succeeds Robert L. Milli-

THE UNION OIL COMPANY today is the consolidation of two fine regional oil companies into a single, national company. The combination gives us greater competitive strength. It gives us broader geographic coverage, wider product diversification and increased financial and operating ability. Moreover, we feel, the merger enhances competition in what is already one of the most competitive industries in the United States.

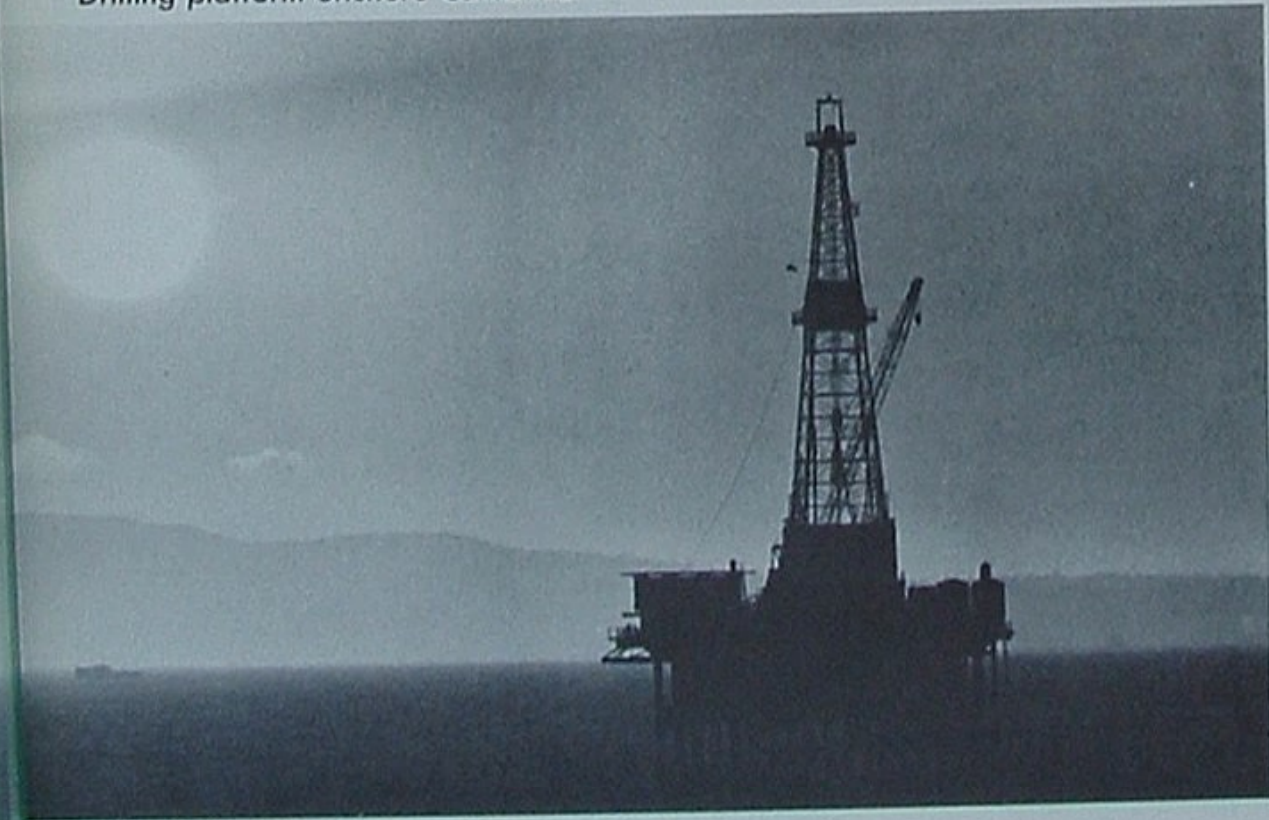
Here is a brief look at what we have today. We have assets of \$1.7 billion, making us ninth largest in the oil industry. Our current annual sales and operating expenditures are in the range of \$220 million.

Our crude oil supply is considerably larger than before the merger. We now have 9,800 producible oil and gas wells in the United States, Canada, Algeria, Australia, and Venezuela. We have 10 million acres of land in the United States and Canada on which to explore for oil, and 48 million acres abroad.

In reserve, we have more than a billion barrels of crude oil and natural gas liquids, nearly nine trillion cubic feet of natural gas holdings. Every day our wells produce 226,000 barrels of crude oil and gas liquids, and nearly a

..... THE STORY OF UNION

Drilling platform offshore California



Union service station, type 300-R



gan, who has reached the mandatory retirement age. Milligan has been appointed chairman of the Pure Oil Company and will continue as a director of Union Oil.

We think of the Pure Oil Company today as having opportunities for profit growth much the same as our western Refining and Marketing Division had in the past. And we're taking much the same approach with the Pure Oil Company as we took in the West. The object is to improve our combined operations.

In the first few months of the merger, we have accomplished several noteworthy objectives.

First, we have put all exploration and production activities under a common head, Vice President Ray A. Burke.

Second, we have made numerous cost reductions, largely in areas of administration and accounting.

Third, we have placed under our petrochemical subsidiary, Collier Carbon & Chemical Company, the operation of two of Pure's subsidiaries. They are Pure Gas & Chemical Company, a distributor of LPG and fertilizer in the Rocky Mountain area, and POCO Graphite, Inc., a producer of high-quality graphites.

Fourth, we have consolidated research activities at our Research Center, Brea, California, under Dr. W. E. Bradley, vice president for research.

Planning techniques. Among the factors contributing

to our company's recent growth has been the application of new planning techniques in our refining and marketing operations. We intend to employ these techniques to realign the refinery output of the Pure Oil Company. In fact, we will coordinate our entire output, and, hopefully, find more profitable markets.

In the days to come, we will search everywhere for greater efficiencies. For example, the Pure Oil Company has been selling more products than it refines. It is possible that some of these sales do not show a satisfactory profit. In the future we will place great emphasis on profitable sales — everywhere.

On the other hand, the Pure Oil Company's refineries have improved our ability to sell our Gulf Coast crude oil at posted prices. As you may know, from time to time it has been necessary to sell slightly below posted price. Although we have always been able to dispose of our Gulf Coast crude in the past, we can now choose the most profitable route: either sell it or refine it.

In the field of marketing, the challenges are great but the opportunities can be rewarding. Our broader geographic marketing area enables us to do a better job of supplying airlines, steamship firms and other large accounts that a national company is best equipped to serve. Moreover, we will be less affected by the impact of local price wars.

Merchandising innovations are another field of opportunity. A good example is the Pure TruckStop system of

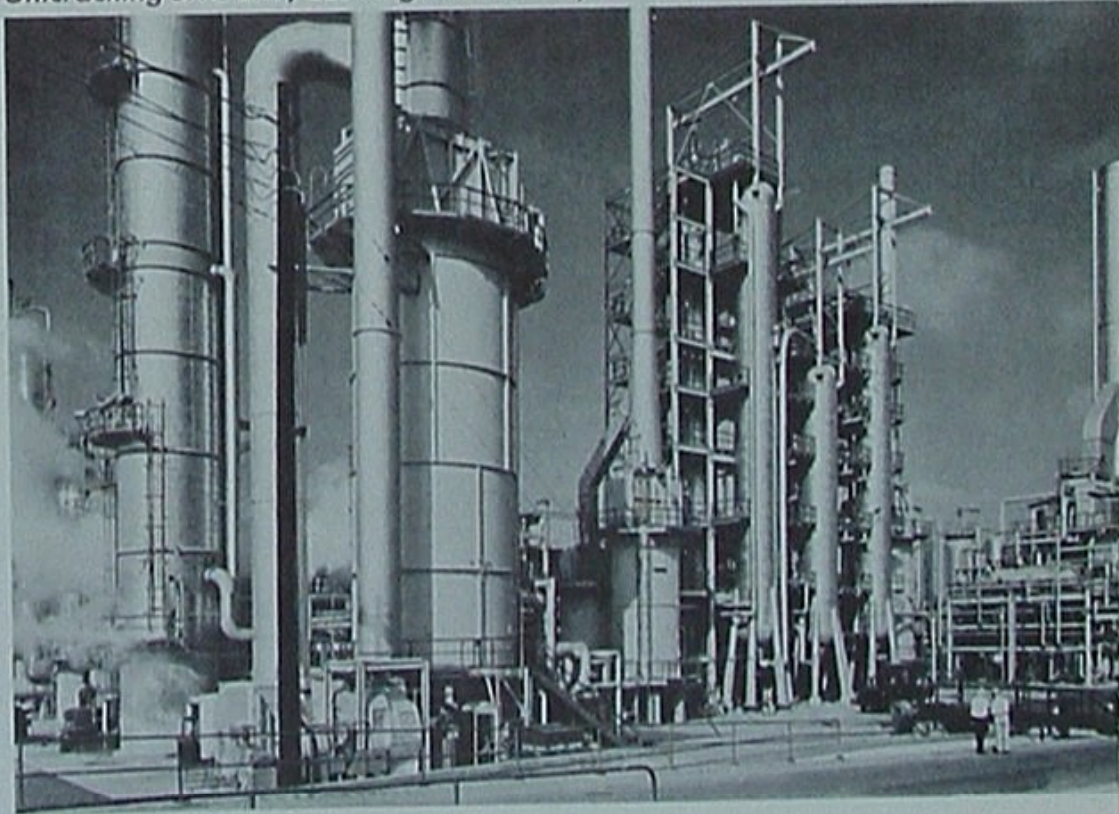
continued

OIL COMPANY TODAY

Pure "Big One" service station



Unicracking-JHC unit, Los Angeles Refinery



... UNION OIL TODAY *continued*

service station centers. We may carry this idea into our western marketing territory.

The combined companies have almost two million credit card accounts. With our broader network of service stations, we expect to attract new customers that were beyond our scope before. Not to be overlooked, too, is the fact that we are now in a position to benefit from the impact of national advertising.

Here are some of our newer exploration and production activities. In California, we have been successful in reversing a long-downward trend in crude oil production. So far this year we have averaged 69,000 barrels a day of crude and gas liquids, our highest rate since 1957, and an increase of 16 per cent over a similar period last year. Some of the best news has come from such fields as McKittrick, Las Cienegas, Santa Susana and Offshore Huntington Beach.

The picture looks good in Louisiana, too. So far this year we have averaged 37,000 barrels a day of crude oil, up 9 per cent over a similar period last year. Natural gas production is off slightly at 659 million cubic feet a day, but the upward trend will be renewed next year.

In the mid-continent area, we have good — though deep — natural gas reserves at the Gomez field, Pecos County, Texas. By March, 1966, we expect to be making deliveries of 90 million cubic feet of gas a day from six wells.

Union of Canada continues to move ahead in oil and gas production, and in profits. In the first half of this year, profits totaled \$1.4 million — more than their entire earnings for the full year of 1964. Union of Canada is now entering the refining and marketing end of the business. The first step will be the construction of a 7,500-barrel-a-day refinery in the central part of British Columbia. Including production from the Pure Oil Company fields in Canada, our total Canadian production exceeded 20,000 barrels a day in the first half of 1965, and development plans promise to add materially to this output.

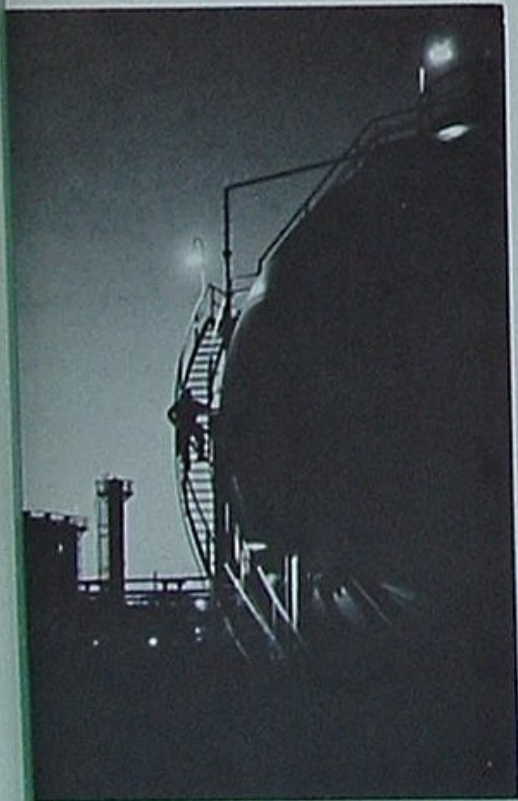
Overseas, Union Oil now has production from Venezuela, Algeria and Australia. We spudded a wildcat in the Persian Gulf on August 31, and will continue to explore this offshore concession as rapidly as possible.

Oil recovery techniques designed to increase the ultimate yield from wells are of great importance. These secondary recovery techniques account for a steadily growing part of our crude oil production—about 28,000 barrels a day throughout the company, or roughly one barrel in eight of the company's total. We are looking forward to opportunities for accelerated secondary recovery operations in old Pure Oil fields in the Illinois basin, Kansas, Oklahoma, and the Texas Panhandle. New fields in southwest Saskatchewan, Canada, also offer good waterflood possibilities.

Turning to research activities, here are several new developments. Our patented Unicracking-JHC process comes immediately to mind. As you know, it converts heavy feed stocks into gasolines — 124 barrels for every 100 barrels of feed stock.

... WE MAY INSTALL A UNICRACKER

Lemont Refinery near Chicago



Jumbo supertanker Lake Palourde



Cumberland field, Okla.



The first Unicracker, which with associated facilities cost \$22 million, went on stream at our Los Angeles Refinery in November, 1964. By December it had reached its full design capacity of 15,600 barrels a day. At present this unit is operating at 19,500 barrels a day with no additional capital expenditure and no noticeable sacrifice in catalyst life.

We are planning to revamp the Unicracker for still more throughput, possibly 23,000 barrels daily. If this throughput is obtained, capital costs on a barrel-per-day basis will have been reduced by about 25 per cent.

The Unicracking-JHC process is an efficient and economical process that is also applicable to Pure Oil refineries. We are now studying the possible installation of a Unicracker at the Smiths Bluff Refinery at Nederland, Texas.

Union Oil will continue to license the Unicracking-JHC process to others. So far, two Unicrackers are in operation and eight are planned or under construction by seven other companies. Royalties from licenses will add to profits in future years.

Two other research developments are Leaf-Dry and Unibeads, each discussed elsewhere in this issue.

The outlook. In the future, we expect to continue using the fiscal planning and budgetary control techniques that have proved so sound over the last five or six years. In essence, these methods demand that we set up profit centers with specific budgets, goals and management incentives.

There is opportunity, too, in the wise handling of capital expenditures. Within the company, various pro-

posals for construction, drilling or investment must compete for available capital on the basis of their comparative returns on investment. Once approved, expenditures are closely controlled. In planning for the Pure Oil Company, these principles are now being applied.

We do not expect to curtail capital expenditures from the present level — about \$220 million a year. In the future, we expect to accelerate these expenditures. As for financial strength, we think we have the resources and flexibility to meet our projected capital requirements. We have no plans for long-term financing.

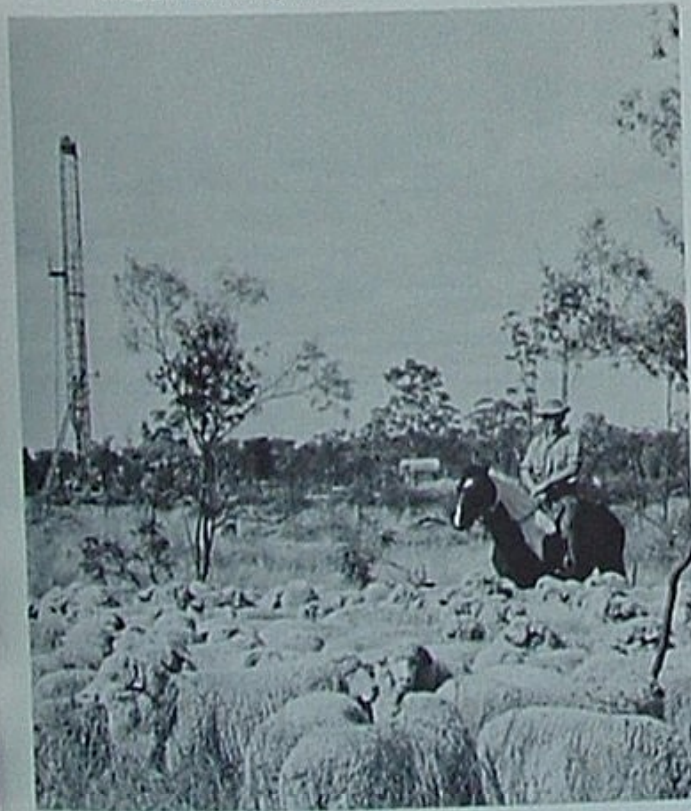
A final word. Our pro forma profits for the first half of 1965 were \$55 million, compared with \$46 million for a similar period in 1964. Today our profits are approaching \$1 million every three days.

Based on first-half results, and barring a severe deterioration of retail prices, we expect our 1965 earnings will be significantly higher than the two companies' 1964 pro forma combined earnings of \$99 million. We have every reason to expect this upward trend will continue at least through 1966. Predictions beyond that are not appropriate, but you may rest assured that our long-range plan is growth oriented.

I hope this outline has given you a picture of the new Union Oil Company. The merger has given us a rare opportunity and we plan to make the most of it. As you can see, Union Oil is a growing company — growing and yet well established in its component parts, large and strong, and increasingly national and international in scope. The developments outlined here add up to a solid and substantial future. 76

AT SMITHS BLUFF REFINERY.....

Moonie field, Australia



Pure terminal, Des Plaines, Illinois



Fertilizer by Collier Carbon & Chemical





WE REPORT TO THE NEW

• • T

THE ARTICLE by President Fred L. Hartley beginning on page 2 is based on a speech delivered on September 10 to the New York Society of Security Analysts.

Hartley was scheduled to personally make the address in New York, but at the last minute he was unable to do so. In his place, Charles E. Parker, senior vice president for finance, stood in for him.

The luncheon meeting was fortuitous in timing, both for the security analysts and for Union Oil. The merger of The Pure Oil Company into Union Oil of California has made national news on the financial pages for six months. Moreover, this was the first major public pronouncement by Union Oil management since the merger on July 16. Because of the interest generated by the speech, the meeting was one of the best attended in the group's history. Indeed, there was standing room only, and a loudspeaker had to be installed in an adjoining room

to accommodate the overflow crowd.

Union Oil officials attending the meeting with Parker were Vice Presidents Claude S. Brinegar and Ray A. Burke, Secretary Robert F. Niven and Assistant Secretary Charles E. Denton.

Interest in the merger and its effects was high. Following the speech, there was a lengthy question and answer session. Owing to space limitations here and the fact that part of the material has already been published in SEVENTY-SIX magazine, we paraphrase the question and answers. Here they are:

Q You expect a lot of production from the East Wilmington field in Long Beach, but you give up about 95 per cent of the profits. Can you tell us something about the economics of that deal?

A (Parker) East Wilmington is beneficial to us because it gives us a long-term supply of crude

oil at reasonable cost. In addition, the field is within a few miles of our Los Angeles Refinery, which is specifically designed to process the type of crude oil produced there. East Wilmington cannot be appraised economically as a typical oil-finding venture because the very large crude oil reserves are considered proven and there is no wildcatter's risk.

Q. You talked about sharply increasing crude oil production in California. Could you discuss the changing nature of District V (West Coast) supply and demand? How will it affect import quotas?

A. (Parker) West Coast demand is about 1.6 million barrels a day. At present, the West Coast produces about 850,000 barrels a day, largely from California. The balance of the supply is made up of imports, both overland and abroad. West Coast demand is expected to grow about 4 per cent a year. If West Coast production increases elsewhere as it has in California, and it may as a result of developments in Alaska, this would increase the local supply. In that case, it might tend to slow the growth of foreign imports.

Q. Would you comment on the outlook for land sales?

A. (Parker) In the West, we have substantial acreage of fee lands which were acquired in years past and which are no longer needed for our operations. Under favorable market conditions, we have sold and will continue to sell parcels of this land. In fact, we are negotiating a large sale now that will be announced later.

but we keep our fingers crossed.

Q. The Federal Power Commission (FPC) recently handed down a decision on natural gas sales in the Permian Basin of West Texas, the Panhandle and Southeast New Mexico that had the effect of rolling back prices. I suppose sooner or later the FPC will get around to reviewing gas prices in the Gulf Coast — where you are a big producer. Would you comment on that?

A. (Parker) I might say that the impact on our combined (Union-Pure) natural gas earnings in the Permian Basin was relatively nominal. So it did not have a serious effect on us. What may happen in Louisiana and other areas we don't know — but we are making adequate preparations. (Aside) Ray, do you see how we can predict what the outcome may be?

A. (Burke) No. The industry — our company included — is objecting strenuously to the FPC's handling of the Permian Basin case. We feel the case will be tested in the courts. No one can predict what may happen there.

Q. Because of the mesh of the accounting systems of Union and Pure, do you see any non-recurring changes in earnings during the second half of 1965?

A. (Parker) There is always that possibility. We are comparing our accounting systems and melding them. The differences we have found so far are in the nature of pricing of inventories and depreciation methods. Our controller tells me he doesn't see any reason yet for any noticeable variation in earnings as a result of any

YORK FINANCIAL COMMUNITY

Q. Could I get an idea of what your long-term debt is?

A. (Niven) Our long-term debt is now about \$390 million. It is made up of convertible debentures, non-convertibles, debt that Pure Oil had, and bank loans.

Q. Was there a tax loss carried forward when you combined operations with Pure?

A. (Parker) Yes. But it will not have an impact on our reported earnings. It has already been accounted for in the Pure reports.

Q. What is the outlook for gasoline prices on the West Coast? A couple of years ago you went through a bad stage. Is there any likelihood of that recurring?

A. (Parker) That's a question I certainly couldn't profess to answer. If you look at it with ordinary, human common sense, you'd have to say the outlook is for stability. But it doesn't always follow that pattern. We are grateful that it has been improved in recent months,

accounting changes we may make.

Q. What is the status of Pure Oil stockholders who are asking for cash?

A. (Parker) Stockholders who have demanded cash in lieu of stock now have their shares, in effect, sterilized — meaning they do not enjoy the usual rights of common or preferred shareholders. These sterilized shares are awaiting settlement, which may ultimately go to a court decision. From our point of view, this problem is not material to our operations or the merger.

Q. What per cent of the shareholders have demanded cash?

A. (Parker) It's a small number of shares. On the advice of counsel, we have not published that figure. But I'd like to impress on you the fact that it is a relatively small number.

C. (Moderator) For the New York Society of Security Analysts, I want to thank you for a complete picture.

*(A new development
by Union Research)*

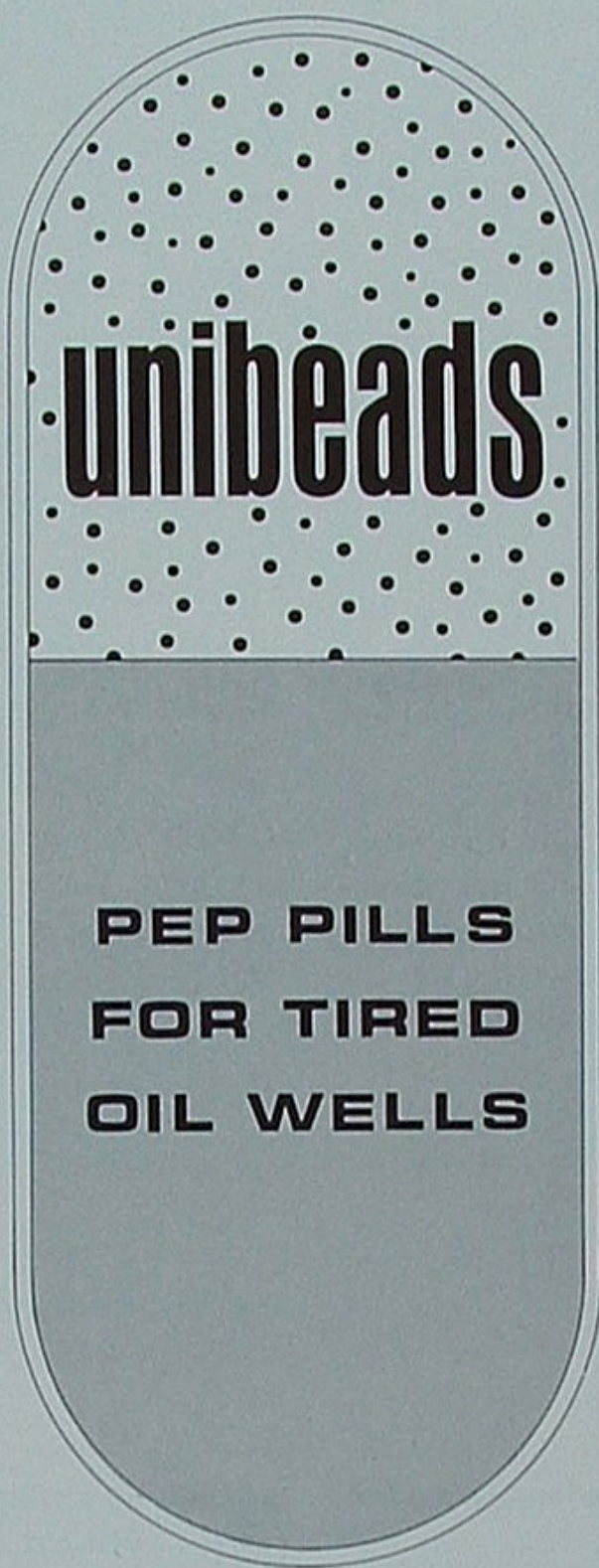
REMEMBER, an oil pool isn't a big, underground cavern laden with glistening crude. And while we're on the subject, although oil formations are frequently called "oil sands," the truth is that crude oil and natural gas usually come from a pretty hard kind of sedimentary rock.

Texas, Oklahoma, and Arkansas oil men often refer to their oil patch as "hard rock country." These mid-continent drillers get much of their crude from tightly packed limestone and another rock called dolomite.

In California, by contrast, the oil man usually encounters more loosely packed, permeable silt, shales and sandstone: hence the term oil sands. As Einstein said, it's all a matter of relativity.

Naturally, it's difficult to coax oil from hard limestone or dolomite. But oil men have developed techniques to lure oil from its rocky prison. One involves fracturing, or cracking, the rock.

In this procedure, oil or water is pumped down the casing of a well under pressures as great as 10,000 pounds per square inch. The pressure causes seemingly solid rock to crack — or fracture — leaving a pattern of fissures through which the oil



can travel to the well bore.

Fracturing doesn't solve all problems, though. Once pressure is released, the rocks tend to compress again, and close the cracks. Oil men meet this problem by introducing propping agents to hold the fractures apart. Thus is born the sand fracture, or sandfrac as it is known. A sand and water or oil slurry is pumped into the fracture; when the fluid is withdrawn, the sand remains behind as a propping agent.

Sand wasn't enough, however. Underground pressures sometimes

compress the sand grains together, embedding them in the formation. To counteract this, oil men then began stuffing walnut shells, even glass and aluminum balls into the fractures. This procedure worked, but not always.

Now comes the commercial, but one we think you'll like because it involves an idea that can increase production from wells at the lower end of the producing spectrum. Union Research Center has developed a new agent, called Unibeads, that promises to help improve fracturing techniques. (There is promise for tired California oil wells, too, but we'll go into that later.)

Unibeads are tiny pellets composed of wax, polymers (plastic materials) and chemicals. The advantages of Unibeads for sealing applications can be explained by a bit of chemistry: Unibeads dissolve in oil, but not in water. The pellets can be made to function as a temporary seal, plugging any openings in a well through which water passes. Oil finds Unibeads no hindrance; within hours oil dissolves them.

To see how Unibeads work, let's look at a Unibead sandfrac. A mixture of sand, Unibeads and water or oil is pumped into a well to fracture the oil-bearing formation. When the fluid is withdrawn, the propping agent holds the cracks apart. As oil

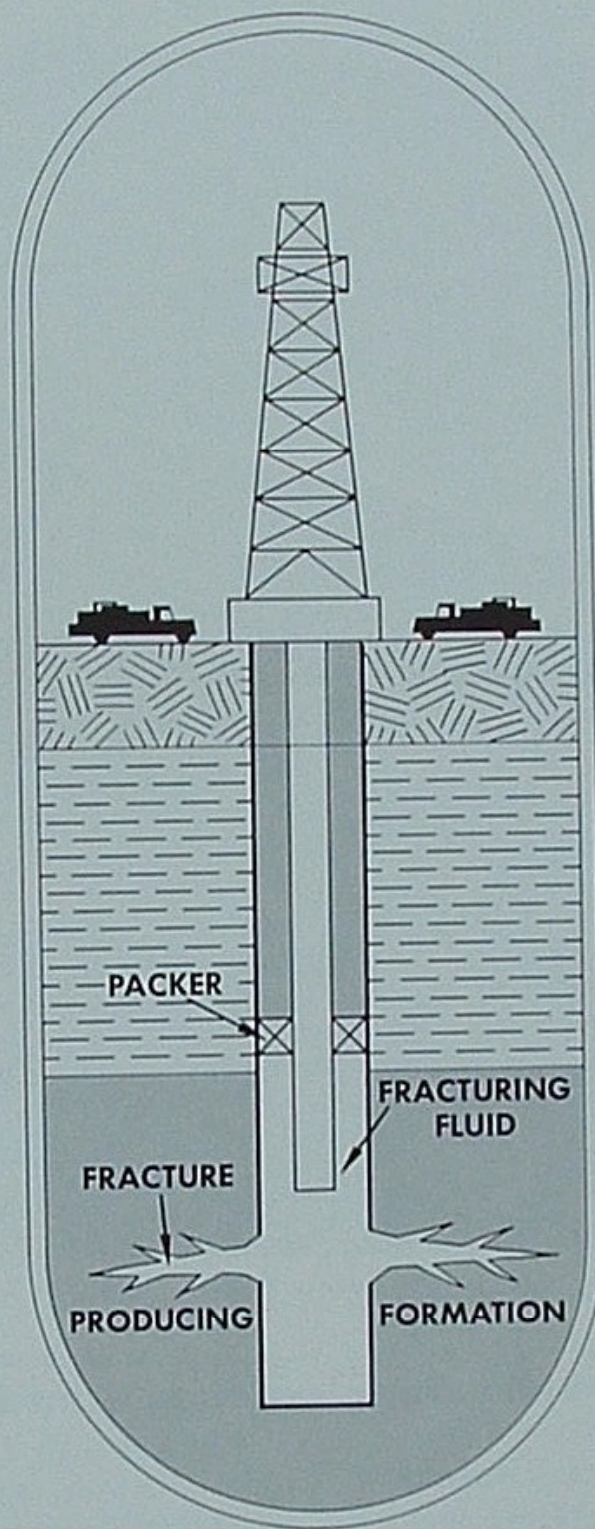
moves toward the well, the Unibeads dissolve, creating highly permeable channels.

Unibeads are available in a variety of dimensions, depending on the job they are called on to perform. The pellets are solid enough so they will not break or powder during normal pumping operations. Under great pressure, though, Unibeads can be deformed to create a solid barrier.

By employing Unibeads, multiple fractures can become relatively simple. When an oil formation is thick, it is good practice to fracture in several places to assure production throughout the zone.

In the past, this was a complicated business at best. When an initial fracture was made, the fluid tended to run into the fissure-like fracture. Pressure would drop and no further fracturing was possible until a "packer" or plug was installed to isolate the fracture zone. With the packer in place, pressure could again be built up for a second frac job. If a third was desired, as is often the case, still another packer was needed, and so on.

With Unibeads, a multiple fracture becomes a single operation. The pellets temporarily plug the fractures, permitting second, third, even fifth and sixth fractures during a single operation. Within a day or two, the Unibeads dissolve and reopen the oil passages.



This diagram shows the path of the fracturing fluid from the trucks at the surface, down the well bore to the producing formation. A packer is set to isolate the producing formation from that above it.

CLEANING CALIFORNIA WELLS WITH ACID

On the West Coast, the oil man faces a different sort of problem. Limestones and dolomites are absent; instead drillers commonly find siltstone, shales and sandstones. Moreover, in California especially, oil formations may run as much as 3,000 feet thick. To produce oil from a California well, operators usually run

slotted liners (pipe) into the well bore. In time, mineral scale collects on the liners and the sand surrounding them, clogging the well.

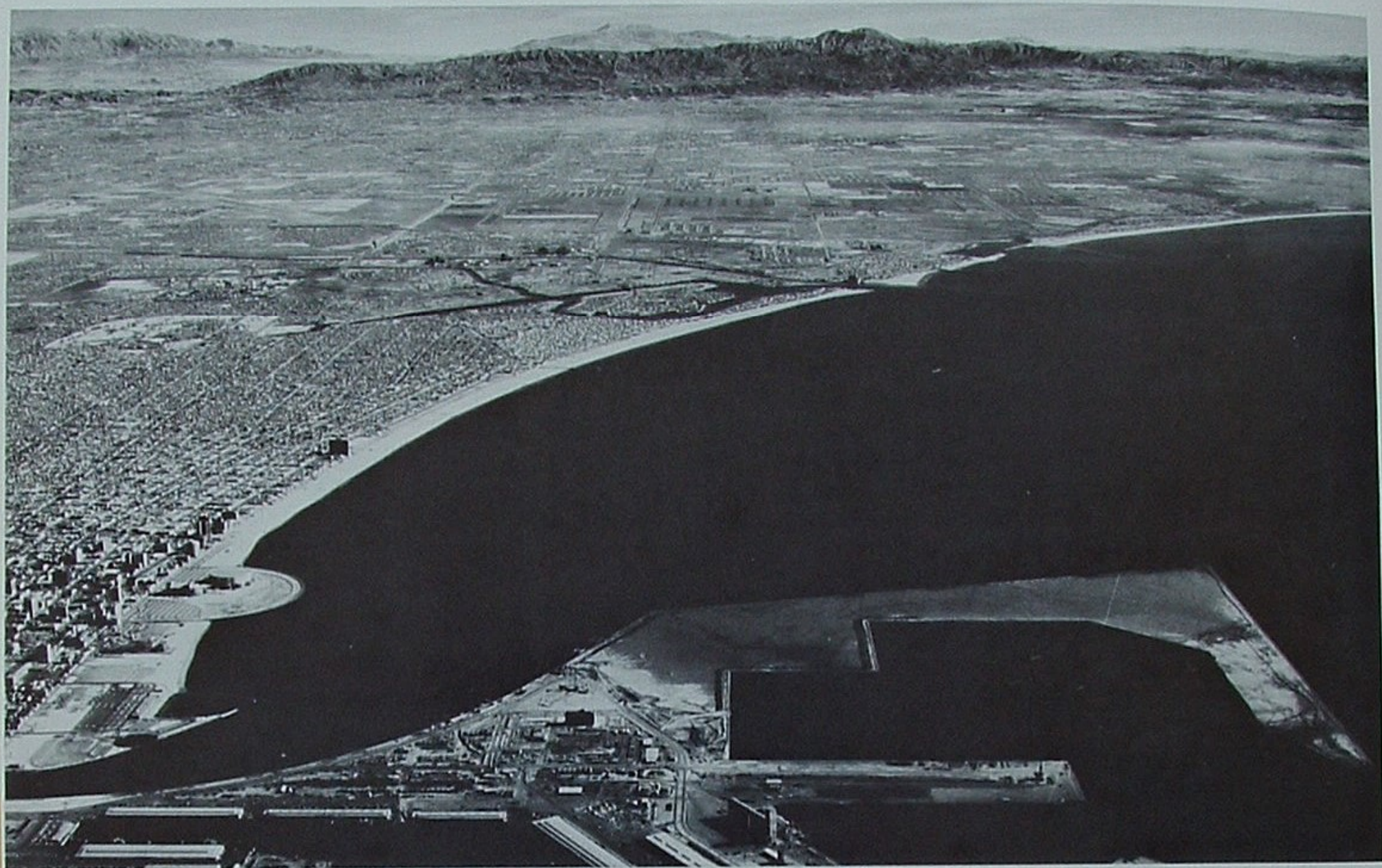
To clean the well, oil men pump a solution of acid into the liner to eat away the scale. The acid tends to break down scale at a single point, permitting the fluid to escape into the formation without treating the rest of the liner or sand face.

Unibeads, unaffected by acid, help answer this problem. As the acid eats through at one point, Unibeads quickly plug the opening, forcing the acid to work in the remainder of the scale area. In this way all the slotted liner may be cleaned. When the acid is removed and crude oil begins flowing again, the Unibeads simply dissolve.

Unibeads have been tested on the West Coast and in the Rocky Mountains. So far they have increased well production in 90 per cent of the tests. Indeed, the experience has been so promising that Union Oil Company has licensed five oil-well service companies to use Unibeads in fracturing and acidizing.

The major use of Unibeads is expected to be for acid treatment in California and for multiple fracturing in the mid-continent. True, Unibeads won't cure every sick oil well; but for many tired wells they can be pep pills.

'LITTLE CATALINAS' TO ENHANCE THE VIEW



Looking East at Long Beach harbor. In the foreground is Pier J where THUMS is drilling. Four islands will be built in harbor.

THUMS will build 4 islands to produce from East Wilmington

LONG BEACH, CALIFORNIA

LACKING THE FORCES, the time and the know-how of the Creator, how do you go about building an island?

To answer the question, we went to Harry Aggers, a Union Oiler on loan to THUMS as their assistant general manager. THUMS, as you probably know, is the independent contracting group formed by Texaco, Humble, Union, Mobil, and Shell (THUMS) to drill and develop the huge East Wilmington oil field here at Long Beach.

Aggers' reply to our island query was direct:

"First, we select an island site and lay down a perimeter of rock, which will be barged across the channel from Santa Catalina Island. So you might call our islands Little Catalinas.

"Then we will dredge up sand from the bay to fill in the rock perimeter. After two or three such lifts, the result will be about 10 acres of first-class new island."

THUMS will build four of these islands — 40 acres. "From specially designed sites around the edges of the islands," Aggers continued, "we expect to drill about 1,100 wells. Of these, approximately 850 will be producing wells and about 250 will be water injection wells for repressuring the formation.

"Landscaping? Well, the property owners (the city of Long Beach and the state of California) haven't quite made up their minds yet. But we're working on a design, subject to their approval. They can have anything within economic reason that the public's inclined to appreciate — from pines out of the north woods to coconut palms from the south seas, even violets if they insist.

"They'll probably settle on shrubbery big enough to be seen a mile away. At any rate, our islands will cost about \$2 million each, and will not offend the Catalina view; they'll no doubt improve it."

Quite as spectacular as their four-island construction project is the timetable THUMS is following to complete their creation. Work on two of the islands has already begun; both will be completed early next year. The other two will then be started and should be completed by 1967.

Aggers revealed other noteworthy facts about this most unusual of oil field developments:

East Wilmington is one of the really rare oil fields where boundaries and reserves of crude oil were defined before the first well had been drilled. The conclusions were drawn through formation studies of adjacent fields and core drilling conducted by the city of Long Beach.

The nearby Wilmington field recently surpassed one billion barrels of production; East Wilmington, a seaward extension of the same producing sands, is believed to contain at least a billion barrels more of recoverable oil. And when fully exploited, the Long Beach-Wilmington fields may exceed East Texas as the No. 1 oil-producing area in the United States.

There are several reasons why the oil-rich tract has not been drilled before. To begin with, the city of Long Beach, with oil production on three sides, declined to permit further encroachment of oil derricks within the city itself or within sight of its world-famous beach frontage.

Recent urban drilling techniques, such as those developed by Union Oil, have eliminated unsightly drilling operations and convinced most cities, including Long Beach, that both drilling and producing can be conducted inconspicuously and quietly.

Secondly, there was a long period of litigation over which branch of government (city or state) held title to the tidelands oil. This dispute has now been resolved and, through a complicated formula, both will share in East Wilmington oil profits.

Lastly, there has been the question of subsidence. In one oil field near Long Beach, a tract of ground had subsided below sea level. This was blamed by some authorities on the removal of oil from the subsurface. Others, including many oil men, contended that oil formations are relatively rigid, receive water as fast as the oil is pumped out, and do not collapse or cave in; hence the subsidence, they said was due to other forces or conditions.

Regardless of who was right, the oil industry has developed a method of injecting water at high pressure into oil production formations. This technique controls subsidence, maintains reservoir pressure and, in most cases, increases oil production. So the final objection to drilling was overcome.

With the barriers removed, the city and state agreed to open East Wilmington to bidding. The field, embracing 6,500 acres, begins in an upland area of homes and business properties in Long Beach and extends across tidelands into the ocean back of the breakwater. (Urban drilling will be conducted from the Little Catalinas.)

When East Wilmington was offered for bidding, there was a great deal of pencil sharpening among all the oil companies. They calculated that only a record royalty offer would win this billion-barrel deposit of oil.

The project was too big for individual companies to handle alone, so many of them compared figures and bid jointly. The big plum was an 80 per cent interest in Tract 1, which represents about 86 per cent of the field. Five other, non-operating shares of this tract, ranging from 1 to 10 per cent of the net profits, were offered separately to guard against monopoly and to permit small operators to bid. Whoever got the 80 per cent interest automatically became what was called the Field Contractor to the city of Long Beach, which is operator of the field.

When the 38 bids were opened, beginning on February 9, 1965, it was found that the offer of THUMS for the major 80 per cent interest was high. These five companies offered the owners a 95.56 per cent share in the net profits. The bidding was close. The second highest bid was 94.771 per cent.

Bidding for the five smaller interests went even higher, ranging from 98.277 to 100 per cent.

What the bidding revealed was the oil industry's willingness to allow the city and state practically full value for this proven oil reserve, receiving in exchange a convenient supply of crude for their Southern California refineries. (The West Coast is, after all, an oil deficient area.)

Of course, there were no wildcatting uncertainties. Moreover, there was very little financial risk. From the profits, the Field Contractor will be reimbursed for investment and operating cost, and in addition receive a 3 per cent management fee. All this, plus an assured supply of crude oil.

Demonstrating the accuracy of the industry's estimate, the first six wells drilled by THUMS were producers. Three injection wells have been drilled and in mid-October production was 5,400 barrels a day. Drilling continues.

Until the Little Catalina islands are completed, drilling is taking place on Pier J, an extension of the Port of Long Beach, said to be the world's greatest man-made harbor. Forty wells will be drilled from Pier J in 1965.

Nearly all of the 1,200 wells in the field will be directional; that is, they will fan off in every direction to penetrate the 4,500-foot deep oil sands at precisely spaced locations. Some will deviate from the perpendicular by as much as 70 degrees, requiring 9,360 feet of hole to reach a subsea depth of 4,250 feet. That should put quite a strain on the equipment and drillers.

When the drilling is completed, probably in the early 1970's, production is expected to reach somewhere between 160,000 and 200,000 barrels a day. Part of this production will flow to nearby Los Angeles Refinery for distillation, Unifining and Unicracking into the finest Union Oil products. 76

TO COMMEMORATE Union Oil Company's diamond anniversary, what could be more fitting than to return to the original building where the company was founded on October 17, 1890?

The two-story, stone and wood structure, built by founders Lyman Stewart, Wallace Hardison and Thomas R. Bard, served for 10 years as the corporate home office. Indeed, the second floor is still used as a field office for geologists and drillers working in the Santa Clara River valley.

In 1950 part of the first floor was dedicated as the California Oil Museum to honor the memory of pioneer California oil men. The museum is now visited by more

SANTA PAULA, CALIFORNIA

than 10,000 visitors annually.

One interested recent visitor was Scott Rushing, son of Mr. and Mrs. Robert Rushing of Santa Paula. Scott's dad is Santa Paula's only full-time fireman and he formerly was a Union Oil dealer in Los Angeles.

Scott was conducted by curator Clark Capehart, who described the workings of an old cable-tool drilling rig and contrasted it with a model of a more modern rotary driller.

In October, the Union Oil Company board of directors held its regular monthly meeting in Santa Paula to commemorate the company's 75th anniversary. Here are some of the things they saw.



Scott Rushing, son of early Union Oil attendant's father.

THE CALIFORNIA

In this building, Union Oil Company was



The California Oil Museum, where Union Oil Company was founded on October 17, 1890.



Early century oil field tools, crude drill bits and early Union Oil records repose in museum.



Special attraction is old cable-tool rig, restored inside the museum — minus the original derrick.



Scott Rushing and Clark Capehart examine a rotary drilling rig from the 1930's.



Scott Rushing models early Union Oil station attendant's cap.

CALIFORNIA OIL MUSEUM

Union Oil Company was founded 75 years ago



Scott Rushing and Clark Capehart examine a scale model of rotary drilling rig from the 1930's.



Scott was intrigued by stock certificates of Hardison & Stewart Oil Company, one of three firms merged into Union Oil in 1890.

BUSINESS HIGHLIGHTS

TEXAS CHEMICAL PLANT

A high-purity hexane-heptane plant was put on stream in mid-July at our Smiths Bluff Refinery, Nederland, Texas.

The plant has an annual processing capacity of ten million gallons of hexane and five million gallons of heptane. Sales will be handled by our subsidiary, American Mineral Spirits Company.

Hexane (C-6) is used principally in the extraction of oils from cotton seed, soy beans and flax. The high quality of hexane produced at Smiths Bluff Refinery also permits its use as a catalyst solvent for making polyethylene.

Heptane (C-7) is used primarily as a solvent in the manufacture of pressure-sensitive adhesives.

ANCHORAGE TERMINAL

Work has been progressing on our new terminal at Anchorage, which is being constructed to replace the terminal destroyed by fire last year after the earthquake.

If you recall, construction had to cease during the winter months and could resume only when the weather cleared this summer. The terminal was scheduled for completion in October.

Cost consciousness has been a factor in building the new terminal. When Marketing Engineering and R&M Purchasing saw the price of locally erecting an asphalt tank, they made a cost study that revealed it would be cheaper to fabricate a tank in Seattle and ship it by barge to Alaska.

TELETYPE TO ALASKA

The Union Oil Communications department has leased a teletype line from Seattle to Anchorage and Soldatna, Alaska, giving the home office direct teletype communications with the 49th state.

Lines were connected to the Exploration and Production department offices in Anchorage in mid-September. In mid-October, when the new Marketing department offices were completed, they, too, were tied into this network.

In the past the only direct communication with Alaska was by telephone; the teletype circuit is expected to result in substantial savings.

PAILS ON A PALLET

When our purchasing people buy an item, they take a close look not only at the initial price but also at the total cost, which may include other processing charges.

Take, for example, the unloading of a box car of 35-pound grease pails at Oleum Refinery near San Francisco. Unloading 4,000 pails by hand required five men working five hours.

A survey revealed that by strapping the pails to pallets and using a lift truck, it requires only one operator working 90 minutes to clear the box car. Little savings like this add up when everyone joins in on the cost reducing program.

PRE-PUNCHED PUNCH CARDS

Some punch cards used in our data processing installations are now partially pre-punched. Although the cost is slightly higher, it saves a lot of gal-hours in the key-punch section. The pre-punched information is "fixed" data that must be put on all such cards. Since it is possible to pre-punch data on cards during manufacture, our IBM cards are now prepared that way.

A PAIR AND SPARE

Customers in our West Coast marketing area this fall were offered a new Minute Man tire promotion.

"Buy a pair and get a spare" was the theme of a major advertising campaign to promote Minute Man tire sales this fall. The theme was advertised on western radio and television and in newspapers, plus a full page ad in the West Coast edition of Life magazine.

The promotion was simple. When a customer bought two Minute Man II or III tires, he received his choice of a Minute Man I tire as a spare or a Union 76 (I) battery. We found many customers who would "go four and get even more."

2 NEW TRUCK STOPS OPENED

Two new Pure Oil TruckStops have been opened on Interstate 75, which runs 1,700 miles from Sault Sainte Marie, Michigan, to Tampa, Florida.

The TruckStops are at Wildwood, Florida, and Lake Park, Georgia. This gives us a total of 13 high-volume outlets on Interstate 75; four are service station-restaurant complexes and nine are TruckStops.

When Interstate 75 is completed next year, we expect to have 28 major outlets in operation, and should command a dominant position on the principal North-South artery that passes through Pure Oil Company marketing territory. 76



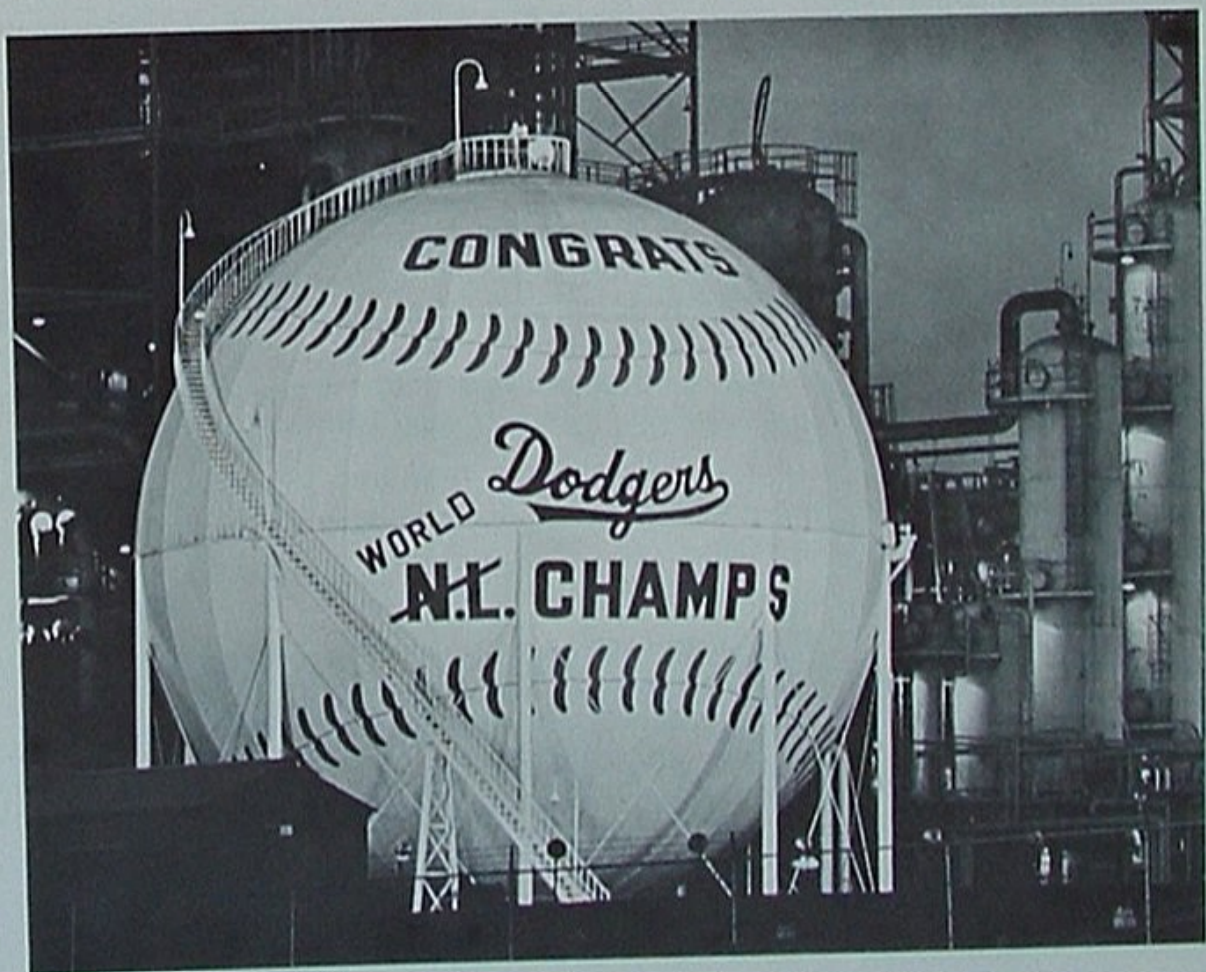
WORLD CHAMPS: Here is an official portrait of the world champion Los Angeles Dodgers, sponsored on radio and TV by Union Oil Company. Team members: (Top row, left to right:) Howie Reed, Maury Wills, John Kennedy, Jim Brewer, Lou Johnson, Sandy Koufax, Carroll Beringer, batting practice pitcher; Mike Kekich, Willie Crawford. (Middle row:) Wayne Anderson, trainer; Lee Scott, traveling secretary; Hector Valle, Claude Osteen, Dick Tracewski, Al Ferrara, Jeff Torborg, Ron Perranoski, John Purdin, Wes Parker, Willie Davis, Jim Lefebvre, Johnny Podres, Nobe Kawano, equipment manager; Bill Buhler, trainer. (Bottom row:) Wally Moon, Ron Fairly, John Roseboro, Jim Gilliam, player-coach; Lefty Phillips, coach; Walt Alston, manager, Danny Osark, coach; Preston Gomez, coach; Bob Miller, Don Drysdale. (Front:) Larry Goldstein, ballboy; Herb Aspell, batboy. (Not shown in photo: Tommy Davis.)


**Congrats
L. A. Dodgers**

Union Oil Company sponsors a number of sporting events, in the East and West, on radio and television: football, baseball, hockey and racing. But no sports team won bigger headlines this year than the Los Angeles Dodgers in their seven-game World Series with the Minnesota Twins. It was a close match right down to the last pitch by Sandy Koufax.

Union Oilers at Los Angeles Refinery were so fascinated with the series they painted the world's largest baseball on a 70-foot high spherical tank, shown at right.

To which we add our hearty congratulations!





Leaf-Dry

Easy Pickin's for Cotton Growers

BREA, CALIFORNIA

LAST MONTH we told you about some of the problems of the cotton growers of Arizona, and how they get their irrigation water. This month we'll tell you about another problem cotton growers face not only in Arizona but also in California's San Joaquin Valley and elsewhere.

With mechanized cotton-harvesting becoming more prevalent, cotton growers have found it necessary to kill the leaves of cotton plants before picking machines go to work. Otherwise, the green leaves would stain the cotton fiber.

Collier Carbon and Chemical Company, our petrochemical subsidiary, has announced a chemical desiccant that does the job, and then some: Brea Leaf-Dry, developed by Union Research Center.

Here is why Brea Leaf-Dry is superior:

- Only one application is needed. One drop of Leaf-Dry desiccant causes mature leaf cells to burst. The broken cells let sap evaporate. Within 48 hours the leaves are brown and the cotton ready for harvest.

- Brea Leaf-Dry can be applied both on the ground or from airplanes.

- Residues have fertilizer value. A 10-gallon-an-acre application of Leaf-Dry desiccant deposits as much as 20 pounds of nitrogen in stalks and soil for plow-down fertilization.

- Leaf-Dry desiccant is non-toxic. It is not harmful to field animals or pets. Neither does it build up soil toxicity nor leave residue harmful to next year's crops.

- Brea Leaf-Dry is approved by government agencies. It has been field tested and registered by the U. S. Department of Agriculture, and has been approved by the Food and Drug Administration.

Brea Leaf-Dry desiccant is now available from Brea fertilizer dealers in California and Arizona. 76

THE PLAIN FACTS ABOUT TIRES & SKIDDING

In heavy rain or slush, your front wheels actually climb up on a film of water, and your car hydroplanes.



On wet roads your car is like a boat

MR. MOTORIST, did you know that in heavy rain or slush your car's front wheels leave the road? They actually climb up on a tough film of rain water and your car hydroplanes.

This discovery was recently announced by the National Aeronautics and Space Administration where scientists at the Hampton, Virginia, research center have been working on plane-handling and ground-handling problems. It is now known that you may drive for miles on the verge of a skid without knowing it. A puff of wind, or a strong gust from a truck may send you spinning. This may explain some of the mystery crashes that happen "for no reason" on rainy days.

On wet roads, your car's a boat. Most people think you slip on wet roads because water is slippery. But NASA engineers, studying plane skids, learned that this is only part of the problem.

Watching a tire spinning on a wet belt one day, they

suddenly saw it come to a full stop — for no known reason — while the belt still traveled at 60 m.p.h.

Later, in full-scale experiments, it was found that at less than 30 m.p.h. (if you carry 24 pounds pressure) your front tires begin to lose contact with the pavement. At around 50 they're lifted up on a tough film of water and only the outer ribs are touching. Yet that tire footprint on the road is what your life depends on.

At about 55 your front tires lose all contact. (Think about that the next time you're rushing in fast traffic in a downpour.) Hydroplaning may begin when you can hear your wheels splashing in one-fifth inch of water or more. Warning clues: You see clear reflections of other cars and poles, or you notice raindrop "dimples" appearing in the road.

Fast driving in heavy rain can lead to what some racing drivers call the "spindown." The same thing the NASA men saw happen to a test wheel in the laboratory

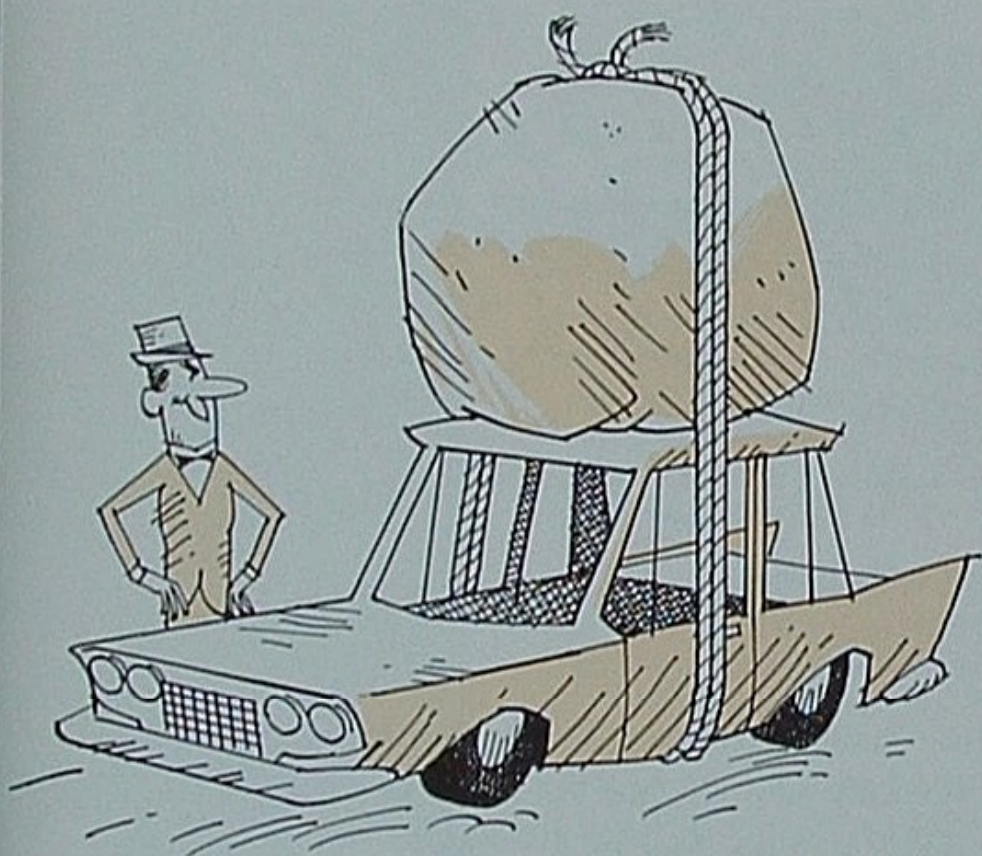
continued

TIRES & SKIDDING *continued*

can happen to your front wheels. At 60 m.p.h. they can actually coast to a full stop.

What can you do? Preventing the spindown is easier than controlling it. Best thing in a heavy rain is to slow down. It's also a good idea to stop and put more air in your tires — yes, more air. (Never let air out; that makes chances of skidding worse.) Most new tires have deep tread grooves through which water pressure can escape. Otherwise they may go completely out of control on water. Most new treads are about $\frac{1}{32}$ of an inch deep. Measure yours; if the mid-treads are worn 80 per cent — or to about one-eighth inch — either buy new tires or get off the road until the hard rain stops. NASA scientists say there's no other choice. You have almost zero traction.

WHAT NOT TO DO. Never add weight in the belief it will give your tire more traction on water. Here NASA made another discovery: It isn't weight that holds trucks to wet roads, as most persons believe. It's



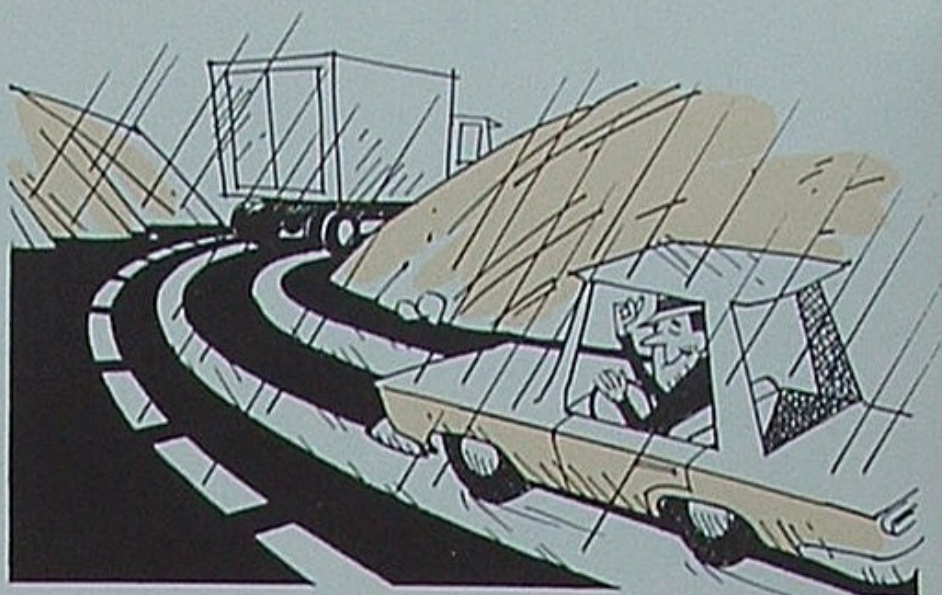
Nix it! In water, extra weight doesn't help.

high tire pressure. Reason: Tests show that high pressure tires can cut better into the rain film.

Most trucks carry 50 pounds or more of pressure, whereas most auto tires carry between 20 and 30 pounds. At these pressures, a 7.60-by-15 tire will hydroplane and lose all road contact at about 60 m.p.h. But if the pressure is upped, a few pounds, it won't hydroplane under 65 m.p.h.

DRIVE THE WIPES: Protect yourself by driving in the "tire wipes" left by cars and trucks ahead. On busy turnpikes at 50-55 m.p.h. these usually leave a fairly wide track where little water remains. Don't tailgate: Even in heavy rain such wipes remain for several hundred feet.

Don't make the common mistake of thinking a



Be safe: drive in the tire "wipes"

warm, dry road is skid proof. This has cost thousands of lives. Not until you've had a long, hair-raising panic skid on a dry road do you realize this truth: A dry road can be as slippery as ice.

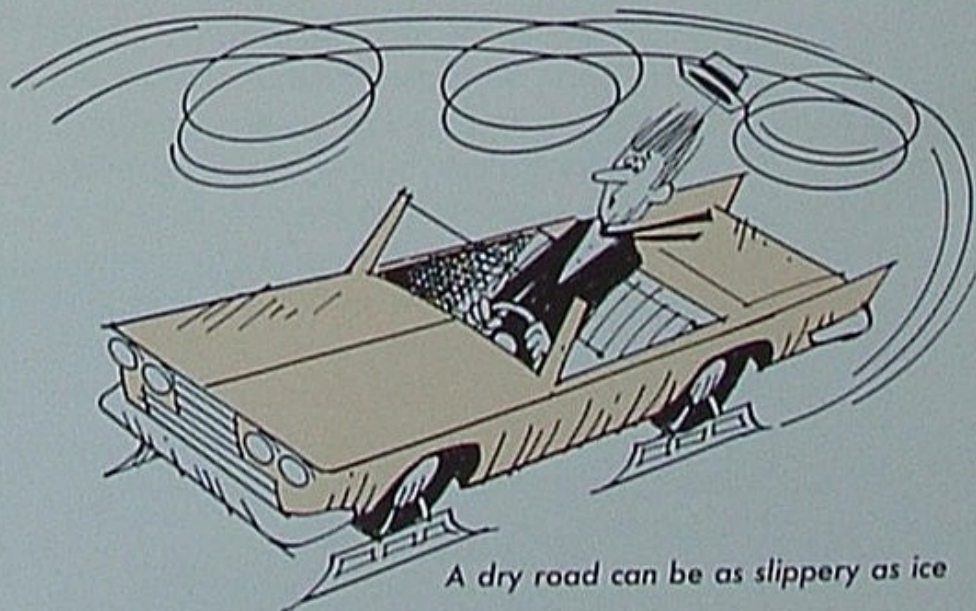
Here's the sequence. You see a car or truck stalled ahead. In panic, you slam on your brakes. A skid begins. Suddenly you think the skid is over. But just then your car seems to get its second wind. It tears off in a scary new slide, may even seem to skid faster. (On a downgrade it probably does.)

What's happened? NASA scientists now know it as the molten-rubber slide. In the first moment of slide your tires get hot, suddenly lay down a long, slick trail of molten rubber. You're greasing your own trail to destruction. The tires ride on this interface of molten rubber — just as a stick of solder suddenly slides easily in its own melt.

FREE YOUR WHEELS. Next time your car skids, remember: Your best friends are four free-rolling wheels. They have enormous side force to help straighten out your car. But they can't do this if you are controlling them. Experts say don't lock them up with the brakes and don't accelerate.

THE REVERSE SKID. All drivers know you should steer into a skid. You do it instinctively, in fact. But what drivers have never been told is to look out for the reverse or counterskid.

Let's say you see a stalled bus ahead. You slam on the brakes, lock them up. Suddenly your rear wheels



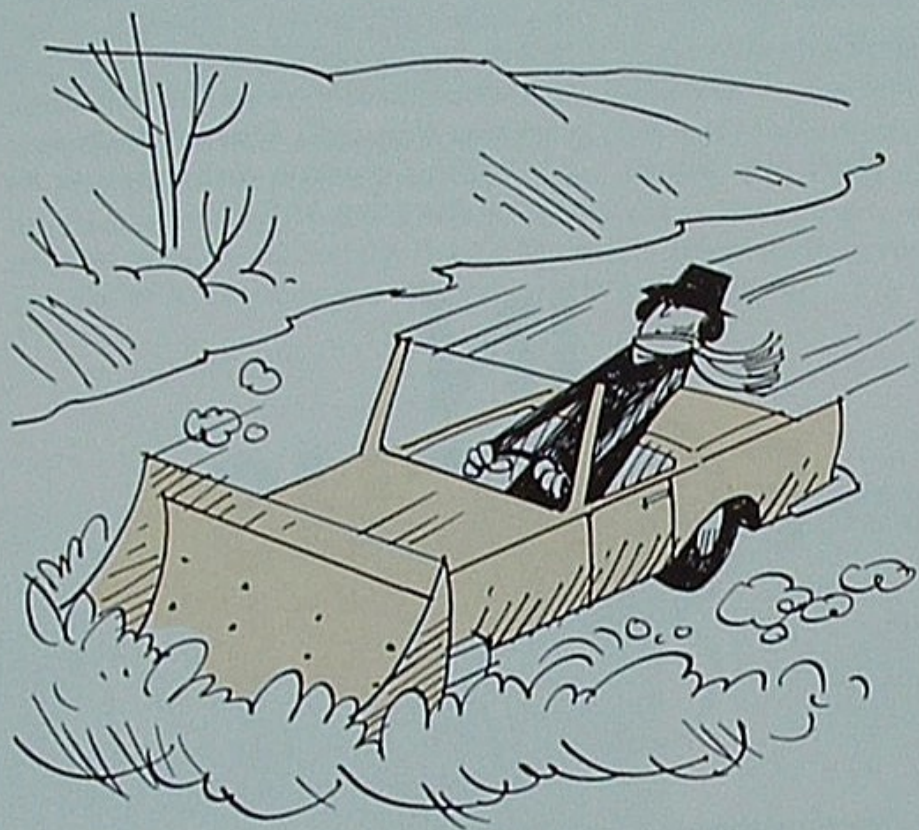
A dry road can be as slippery as ice

break to the left. You countersteer left, release the brakes. And suddenly your car straightens out.

But just as you relax, you feel the anguished reverse skid. The rear wheels are flung out to the right. Caught unaware, you spin off the road.

To avoid this, you've got to remove the countersteering at just the right moment during the first skid. What is the right moment? The only way you can learn is by skidding repeatedly, on a safe skid patch. As you can see, the best way to deal with skids is to prevent them.

ICE AND SNOW: With winter coming up, heed these words of advice on cold weather driving. Wet ice near the melting point has been found by National Safety Council testers to be three times slicker than ice close to zero degrees — so be extra careful on those mild



In slush, beware of the plow-skid

days. Wet ice is only slightly *less* slippery than snow.

If your car wheels lock up on a dry road at 700 pounds' brake pressure (per drum), they should lock up at about 400 pounds on a wet road, at 250 pounds on dry, packed snow, and at only 200 on ice.

But the most treacherous surface of all is harmless-looking slush. In slush you get a different skid. Your rear wheels may not break away at all. Instead, the front end takes charge, refuses to steer, and goes into something called a "plow skid."

Nothing leaves a driver so shaken. In a passing situation it can throw you off the road in a wink, or slide you head on into another car. And it demands a new rule: *In slush, never — repeat, never — pull out to overtake another car.* 76

(This article was adapted from an article appearing in Popular Science Monthly, copyright 1964 by Popular Science Publishing Co., Inc., and used with permission.)

Equip your car to help avoid skids

Obviously it's better to prevent skids than to try to deal with them. Driving slowly in winter weather is helpful, but that's only part of the story. A properly equipped car is vital, too.

Consider tires, for example. The article at left says "most new treads are $1\frac{1}{2}$ inch deep." Minute Man and Pure tires, you will be happy to hear, go this point one better. On the Minute Man II and III and the Pure Pride tires, the treads are $1\frac{1}{2}$ inch deep — extra stopping power in rain. (The Minute Man IV tire has a husky $1\frac{3}{4}$ inch tread.) Check your tires before winter arrives. If the treads are thin, put on new tires.

You may have heard about studded tires. They do give you extra stopping power. In the West, you may be interested in looking at the Union studded Winter Sure mud and snow tire. In the East, ask for the Pure studded Super Silent mud and snow tire. Both tire lines have high quality, steel-jacket tungsten-carbide studs. These studs are not added after the basic tire has been built, as with some brands. It takes special skill to anchor tire studs, so ours are incorporated into the tire right at the factory. Each stud is firmly locked in, because its flanged bottom is sealed into the tread with a special dovetail seating.

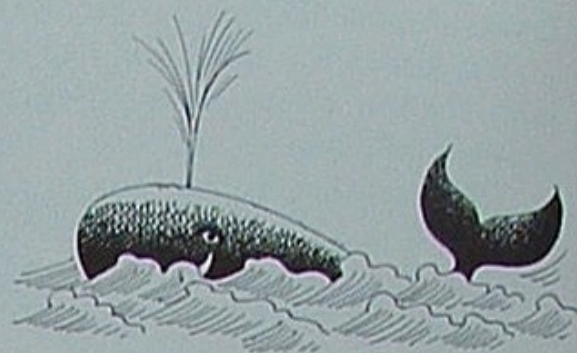
Brakes weren't mentioned in the skid article — because it's assumed you already have good brakes. But do you? The surest sign of worn brakes is a jerking wheel or a tell-tale brake squeal when you step on the foot pedal. Your Union or Pure Oil dealer can check your brakes for you in a few minutes; it may save your life.

Before winter driving starts, take a look at your shock absorbers. Cars with worn shocks are difficult to control on turns and when stopping. To test for worn shocks, rock your car up and down a couple of times. If the car continues bouncing after you let go, you probably need new shocks. Even under the best of conditions, you most likely need to replace shock absorbers after 25,000 miles.

And no matter how well you equip your car, when you drive in rain, snow, ice or slush this winter, slow down. Never mind the other motorist's laugh; it could be his last. Don't make it yours! 76



VIRTUE IS NOT THE ONLY REWARD: Russell G. Garris, winner of the 1964 Credit Card Contest (Seventy-Six, September 1965), can now count his winnings in another medium besides Autoscrip. Effective September 1, 1965, he became plant superintendent of the San Fernando Valley terminal — a nice promotion. That's Mrs. Garris with him in the photo.



INCREDIBLE: The year's most puzzling Union Oil credit card application was handed to Credit Manager "Coffee" Coffman in Seattle. It included all the information — name, address, wife's first name, number of dependents. The applicant, a former resident of British Columbia, was gainfully self-employed as a showman with earnings unlimited. He had been a Seattle resident for 10 days. Coffman immediately caught on. The applicant was Namu, the killer whale, trapped off British Columbia and towed to the marine aquarium at Seattle.

IN FOCUS



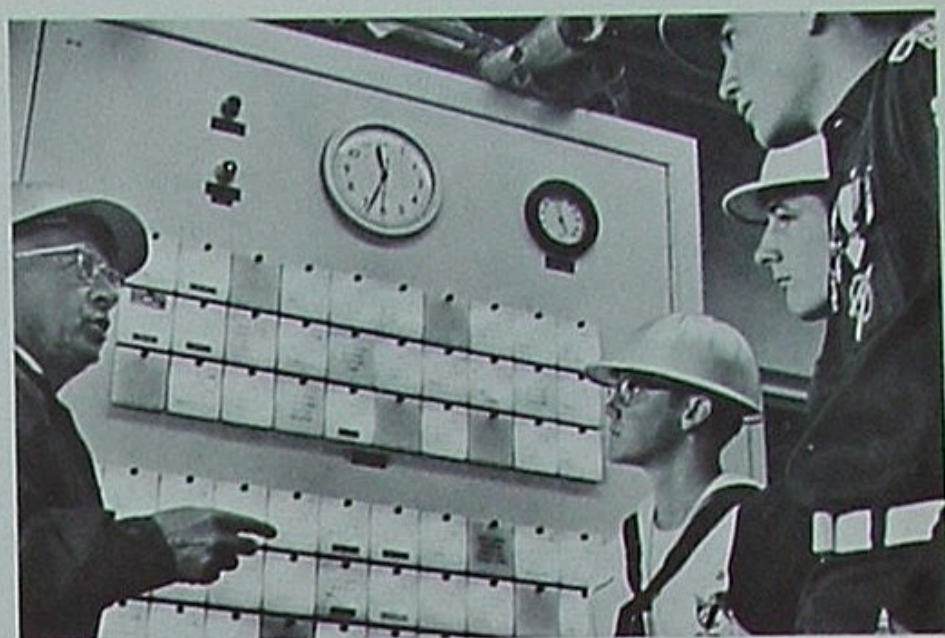
WINS BASEBALL SCHOLARSHIP: Mark Cameron, whose father manages Central Auto Parks, a large Union Oil reseller account in Portland, was recently named winner of a \$500 Portland Beaver baseball club scholarship. The award was made by a radiantly smiling Mrs. Don Walker — with an over-the-shoulder assist from an unidentified young eager beaver.



A TRIBUTE FROM JAPAN: John Story (right foreground), retail sales supervisor in San Francisco, and Milton E. Paige (in Minute Man cap) were recent hosts to 50 service station operators from Japan. As tour guests of the daily Nenryoyushi, a Tokyo newspaper, the Japanese group traveled to California specifically to study merchandising methods of U. S. service stations. When you next visit Japan, don't be surprised to find Certified Car Condition Service there ahead of you.



A BRIGHTER DAY AT ANCHORAGE: First sparkle girl in Alaska is Pat Hluchaniuk, seen receiving the keys to her Sparkle Corps dog sled from Sales Manager Frank J. Kerth. During the colder seasons, she doubles as Kerth's secretary. Dealer Bill West's service station, background, at Anchorage was the first weekly award winner.



OCEANOLOGISTS: John E. Sherborne, manager of exploration and production research, won the rapt attention of Explorer Scouts Larry Jones, Dave Ludwig and Glenn Bassett aboard Eva, Union's drilling platform off Seal Beach, California. He was briefing the boys on various aspects of offshore drilling and producing. In turn the Explorers were preparing to man an exhibit featuring a model of Eva at the National Oceanology Fair held at the Terminal Island Navy Yard, Long Beach, in September. The fair was designed as a career inspiration to young men; it was sponsored by several major corporations.



LOWEST MAN ON THE TOTE 'EM POLE: Dealer George Buzzini of Turlock, California, makes no brags whatever about high-volume sales and such things. In fact, George might very well be the lowest-volume dealer in Union Oil Company. But what can you expect when your potential is limited to 40 gasoline-powered golf carts that hold not more than a gallon of gasoline each? At that he grinds out about 400 gallons a month. "The redeeming-part," George grins, "is that I don't have to wash windshields!" He no doubt broke all of his past sales records on October 16th, when our California Central Division held its golf tournament at the Turlock Country Club. The pump meter boomed to 40 gallons or more.



ON THE TORREY CANYON BRIDGE: Our 118,000-ton supertanker Torrey Canyon, attracted 108 members of the Union Oil Center Girls Club to its August 19th "open ship." Learning from Captain Marco DiCristofaro how he telegraphs his commands from the bridge to the engine room are, from left, Carolyn Cantrall, Joanne Hovden, Liz Fisher and Natalie Mead.

the story of B-T-X

Wherein we reveal the source
of some of those modern miracles
of home and kitchen

MEET JOHN and Sally Marshall, a typical family living in Suburbia. John is a painting contractor, his wife a mother and homemaker. As you can see, John is displaying some of the products he uses in his daily work; Sally is washing clothes.

What does this have to do with BTX?

Plenty! We'll answer the question by showing you some of the products that are made from BTX — benzene, toluene and xylene.

The reason for our story, of course, is that Union Oil Company now has two large BTX units, one at Smith's Bluff Refinery, Nederland, Texas, and one at Lemont Refinery near Chicago. Both refining units came to Union Oil through the merger with The Pure Oil Company.

In contracting to paint a house, John Marshall uses an alkyd-base paint that applies easily and outlasts old-fashioned linseed oil paints. John's paint is made from a xylene derivative.

There's more. The high-gloss on John's pickup truck owes its lasting shine to a xylene-based paint finisher. The tires are made with a benzene derivative (as well as a number of other petroleum products). The high-octane blending stocks in the gasoline that powers John's truck contains BTX compounds. The plastic steering wheel? A benzene derivative went into it. The insulation in the truck's electrical system? It contains materials derived from xylene.

Let's look in on Sally Marshall, busily washing clothes. Her dress

is made from polyester fibre; xylene went into its manufacture. Her nylon hose used benzene in its production. The detergent in her automatic washer is the new biodegradable kind in which the suds quickly disappear; it's a benzene product. The "bug bomb" on the shelf contains an insecticide made from benzene. The dye in the clothing Sally is washing got its lasting colors partly from a process using benzene.

Once the clothes are in the washer (also electrically insulated with xylene-produced plastics) Sally Marshall checks the time (on a kitchen clock whose plastic case is derived from benzene) and decides it's time for yard work. She picks up a can of weed killer (benzene went into it) to attack the dandelions.

The weeding finished, Sally turns to preparing dinner — an easier task today thanks to some gee-whiz BTX products. Her prepared Noodles Romanoff contains a BTX food preservative, sodium benzoate. The picture of brussel sprouts on that frozen food package she is opening was brightly colored with a benzene-derived dye.

When John Marshall comes home from work, he turns on the TV set (whose inner workings are insulated with xylene plastics), and drinks a glass of milk from a refrigerator insulated with urethane foam. (That's toluene at work.)

We could go on with this anecdote for pages, of course, because anywhere you look you see the products of modern chemistry at work. In the department store, the latest fashion creations were manufactured from synthetic fabrics that came originally from an oil well. Almost every consumer product reaches us in its present form through efforts of the research chemist—the master builder of the Twentieth Century.

continued



CHEMICAL

INTERMEDIATE

END PRODUCTS

B

BENZENE

STYRENE

POLYSTYRENE
SBR RUBBER
PAINTS

DETERGENTS

PHENOL

RESINS
DETERGENTS
DRUGS
INSECTICIDES
WEED KILLERS

CYCLOHEXANE

NYLON

NITROBENZENE

DYES

CHLOROBENZENE

INSECTICIDES
DYES

MALEIC ANHYDRIDE

PAINTS, LACQUERS
RESINS

T

TOLUENE

BENZENE

EXPLOSIVES (TNT)

FOOD
PRESERVATIVES

TOLUENE
DIISOCYANATE (TDI)

URETHANE FOAM

X

XYLENE

PHTHALIC
ANHYDRIDE

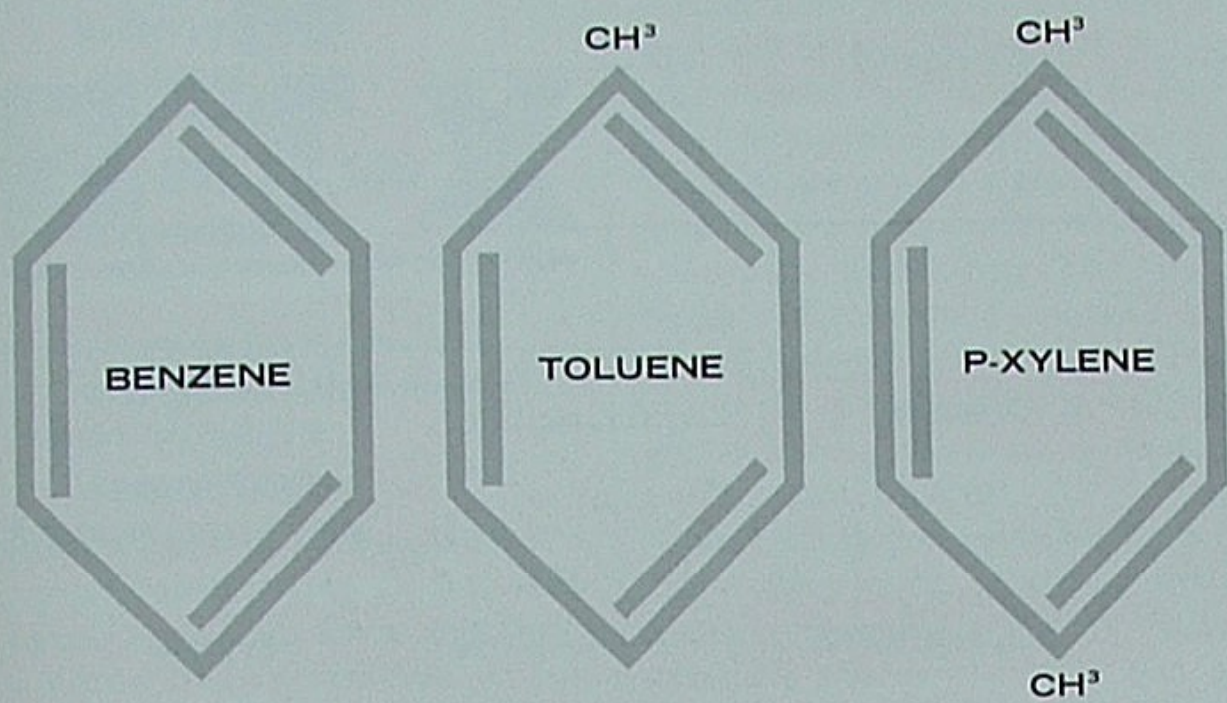
PAINTS, LACQUERS
PLASTICS
INSECTICIDES

DYES
SOLVENTS
PLASTICS

TEREPHTHALIC
ACID

POLYESTER FIBRES
AND FILM

B-T-X *continued*



The chemist uses molecules as a child uses Tinker Toys. By breaking down molecules and reassembling them in different combinations, he creates thousands of new products — most of which did not exist even 20 years ago.

One of the chemist's most useful tools is the aromatic hydrocarbon. Aromatics are stable; they produce plastics that are easy to work with; the cost is reasonable; the list of consumer products is enormous. As a result, the aromatics industry has become a giant, and is still growing.

The most important aromatic compounds are benzene, toluene and xylene — commonly referred to as BTX. Before World War II, coal tar was the only commercial source of aromatics. In the last decade, the use of coal tar as a source has diminished as petroleum has moved to the front.

The booming demand for aromatic chemicals is pushing production to a record high. The Lemont and Smiths Bluff Refineries last year produced about 50 million gallons of BTX chemicals.

Benzene is king of the aromatics family. If you were to place a gallon jug of benzene alongside a gallon of ordinary white (unleaded) gasoline, you probably couldn't tell the difference. They would look much alike. The difference comes from the fact

that benzene is a pure compound (like alcohol) while gasoline is a mixture of many compounds (like alcohol and water). Indeed, benzene is often used in gasoline.

The fact that benzene appears so ordinary is deceiving, because this hydrocarbon turns up in polystyrene plastics, paint, rubber, detergents, drugs, dyes, weed killers, food preservatives and nylon. That's quite a range of products for one compound.

Veteran Union Oilers may be more familiar with toluene; during World War II Oleum Refinery produced an unusually pure grade of toluene for explosives. Toluene finds peace-time application in aviation and automobile gasolines, lacquers, gum solvents, food preservatives and urethane foams. Also a substantial amount of the toluene produced today is converted to benzene to supply the growing demand for the latter.

The xylenes find commercial application in the manufacture of plasticizers, paints, synthetic resins, dyes, pharmaceuticals, paint finishers and polyester fibres and films.

The outlook for petro-aromatics is bright. Demand sets the pace, so we look to the research chemist for new products. The chemist is responding to the challenge, and who knows what tomorrow may bring for Sally and John Marshall? 76

SERVICE EMBLEM AWARDS



CORPORATE

October 1965

30 YEARS

CHARLES H. RENCK Research Center
C. C. SHAMBLIN Union Oil Center

25 YEARS

MANFORD M. RALSTON Research Center

20 YEARS

FRANCIS W. ALLEN Union Oil Center
ARTHUR F. MAYS Research Center
EARL J. ROSS Research Center

15 YEARS

CARL R. ZYLSTRA Research Center

EXPLORATION & PRODUCTION

October 1965

20 YEARS

MAURICE G. BARNETT Richfield, Calif.
MILTON W. BARRY Dominguez, Calif.
WILLIAM V. BENNETT Houston
IVEN E. CRANMER Taft, Calif.
SHELTON J. FUGATE Dominguez, Calif.
ERNEST M. GRAY Coalinga, Calif.
EDWARD A. HALL Union Oil Center
EARL R. HEATON Dominguez, Calif.
ALTON T. McNEIL Orcutt, Calif.
JESSE C. MORGAN Santa Paula, Calif.
WILLIAM H. NOTT Coalinga, Calif.
FRED C. SMITH Bakersfield, Calif.
RITA I. SORK Union Oil Center
WILLIAM D. WHIDDEN Orcutt, Calif.

15 YEARS

HENRY J. ABELS Santa Maria, Calif.
ROBERT F. CLEVENGER Orcutt, Calif.

LESLIE J. FORD.....Santa Fe Springs, Calif.
 ROBERT W. PLUMB.....Richfield, Calif.
 DELBERT E. PYLE.....Toowoomba, Australia

10 YEARS

M. A. MacLEAN, JR.....Santa Fe Springs, Calif.
 EDWARD MARKS.....Houston
 N. W. PANNILL, JR.....Rosecrans, Calif.
 C. E. PHILLIPS, JR.....Houston
 JAMES W. REDDING.....Coalinga, Calif.
 CHARLES K. ROSE.....Coalinga, Calif.
 BETTY M. WATERS.....Union Oil Center
 PATRICIA L. WEHL.....Union Oil Center

REFINING AND MARKETING

October 1965

40 YEARS

BYRON B. NISSON.....Oleum Refinery

30 YEARS

DAVID J. W. EVANS.....Los Angeles

25 YEARS

WALTER E. CLARK.....Edmonds, Wash.
 CHARLES M. DOBSON.....Cut Bank Refinery
 GAIL W. FAIR.....Los Angeles Refinery
 GORDON J. FOLKS.....Los Angeles Refinery
 EDWIN A. GEACH.....Los Angeles Refinery
 VERNON M. LUMAN.....Los Angeles Refinery
 MELVIN H. MANGOLD.....Los Angeles Refinery
 JACK E. MILLSAP.....Los Angeles Refinery
 ANDREW D. PALA, JR.....Union Oil Center

20 YEARS

CARL E. BARTLETT.....Oleum Refinery
 JOHN R. BERNARD.....Oleum Refinery
 ALBERT A. BRISSON.....San Francisco
 WALTER L. BUGG.....Phoenix
 CHARLES W. COOPER.....Oleum Refinery
 LESLIE R. DANA, JR.....Stewart Dist., Calif.
 T. A. DEMBOWSKI, JR.....Los Angeles Refinery
 PORTER E. FAST.....Coalinga Stn., Calif.
 EDWARD V. FRARY.....San Fernando, Calif.
 JOHN R. HOLLAND.....Oleum Refinery
 LEONARD M. JONES.....Colton, Calif.
 FLOYD E. LADWIG.....Oleum Refinery
 MELNA E. MCGEE.....Union Oil Center
 CHARLES R. MEEK.....Cut Bank Refinery
 DONALD L. NIELSEN.....Union Oil Center
 WILLIAM PAPPAS.....San Francisco
 T. A. PETERSON.....Los Angeles Refinery
 EUGENE L. PHILLIPS.....Oleum Refinery
 FRANK J. ROSE.....San Luis Obispo, Calif.
 RAY F. ROTONDO.....Richmond, Calif.
 CLAUDE RUSSELL.....Oleum Refinery
 LAWRENCE W. SARGENT.....Oleum Refinery
 JOE V. SIMAS.....Coalinga Stn., Calif.
 GERVAIS R. TERRELL.....Oleum Refinery
 CECIL E. TODD.....Torrance, Calif.
 FRED A. WIRTH.....Oleum Refinery
 EDLUND J. WUORIE.....Union Oil Center

15 YEARS

CHARLES E. BLAIR.....McKittrick Stn., Calif.
 R. T. H. CHADBAND.....Santa Maria Refinery
 CHARLES K. CRABB.....Honolulu
 JAMES DELARM.....San Luis Obispo, Calif.
 CALEB D. ELLIOTT, JR.....Union Oil Center
 PAUL K. FEROE.....Seattle
 ROY M. ROBINSON.....Santa Fe Springs, Calif.

10 YEARS

HERMAN D. CRIST, JR.....Dallas
 PAUL D. CRITTON.....Oleum Refinery
 WILLIAM I. GRAHAM.....Portland
 RICHARD E. ITHAL.....Anchorage
 DARRELL F. KEATING.....Eureka, Calif.
 JAMES A. LAHEY.....San Fernando, Calif.
 E. E. PEASE, JR.....Phoenix
 ROY W. SCHAEFFER.....Cut Bank Refinery
 O. W. SILLEMAN, JR.....San Fernando, Calif.
 VERN N. WELLER, JR.....Los Angeles

DEALERS

October 1965

30 YEARS

RON FITT.....Mission Hills, Calif.
 C. L. LEEDY.....Tarzana, Calif.

25 YEARS

IVAN HANDY (March).....Troutdale, Oreg.

20 YEARS

WILLIAM R. PALMER.....Los Angeles

15 YEARS

FRED BARRERA.....Orange, Calif.
 V. C. BROCK.....Redwood City, Calif.
 GEORGE FRENN.....Almira, Wash.
 HILLVIEW SERVICE.....Kekaha, Hawaii
 G. W. HOOPER.....Wolf Creek, Oreg.
 TOYOICHI KURIZAKI.....Haleiwa, Hawaii
 ALBERT R. MYERS.....Wrightwood, Calif.
 NINA MYERS.....Wrightwood, Calif.

10 YEARS

ROBERT D. FEDER.....San Francisco
 CURTIS W. GIPSON.....Berkeley, Calif.
 A. R. HALL.....Longbranch, Wash.
 MARK MINER.....Berkeley, Calif.
 VINCENT REICHEUN.....Pasadena, Calif.
 AL ROEHRIG.....Phoenix
 ADOLPH SCHIMPF.....Brush Prairie, Wash.
 D. J. WALLACE.....Modesto, Calif.

5 YEARS

F. BUEHLER.....East Sound, Wash.
 CAR CLEAN CORP.....Palo Alto, Calif.
 AL COLLEY.....Rialto, Calif.
 LAMON COLLINS.....Las Vegas
 JAMES FIDDLER.....Los Angeles
 R. GEHLER.....Glendale, Calif.
 S. GILBERT.....Glendale, Calif.
 DAN GILLUM MOTORS.....Sparks, Nev.
 E. GUILLARD.....East Sound, Wash.
 N. O. HENDRICKS.....Oxnard, Calif.
 ZARKO JEVTIC.....Los Angeles
 THOMAS M. LACKEY.....Los Angeles
 EARLE LITTLE.....Loyalton, Calif.
 GLENN MAULDING.....Nenana, Alaska
 O. K. McFARLAND.....Visalia, Calif.
 HARRY J. MCKINNEY.....La Grande, Oreg.
 BILL MONTGOMERY.....Leupp, Ariz.
 W. C. MORRIS.....Randle, Wash.
 FURLEY O'BRIEN.....Wilmington, Calif.
 EARL PORTZ.....Oakland, Calif.
 WARREN M. SCHULZ.....Alhambra, Calif.
 WILLIAM H. SELVAR.....Winslow, Wash.
 OTTO STARK.....Butte, Mont.
 GWYN E. STOCK.....El Cajon, Calif.
 I. EDWARD VALENTI.....San Diego, Calif.

CONSIGNEES & DISTRIBUTORS

October 1965

35 YEARS

ALBERT GOBBY.....Riverdale, Calif.

30 YEARS

M. M. NELSON.....Independence, Oreg.
 J. C. PELLASICO.....Point Arena, Calif.

20 YEARS

CARL HOEFEL.....Ritzville, Wash.

15 YEARS

TADASHI FUKUSHIMA.....Kaneohe, Hawaii
 HAROLD S. HERMAN.....Colfax, Wash.

10 YEARS

J. W. EARLY.....Port Angeles, Wash.
 CENTRAL STATES TOOL, ENGINE &
 EQUIPMENT CO.....Sedalia, Mo.

5 YEARS

JOHN HODGES.....Westley, Calif.
 PETROLEUM DISTRIBUTING CO.....Houston

RETIREMENTS

September 1965

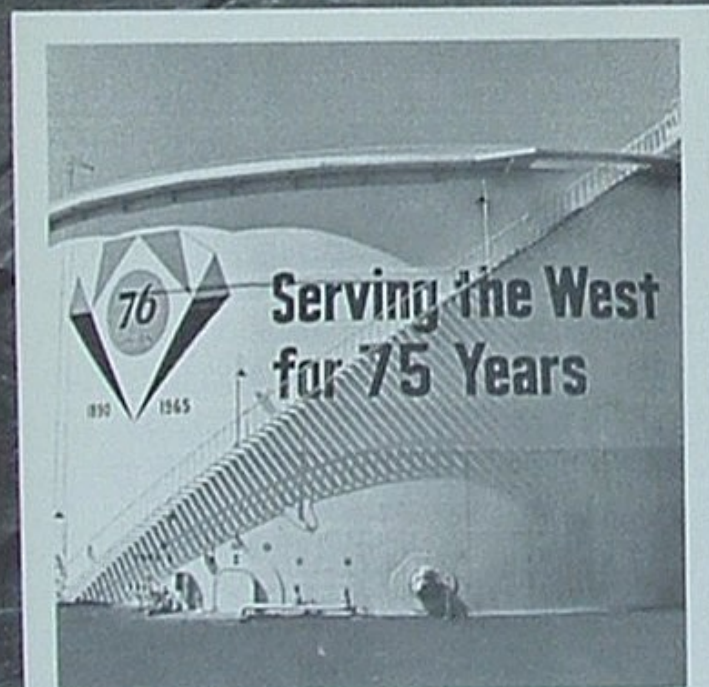
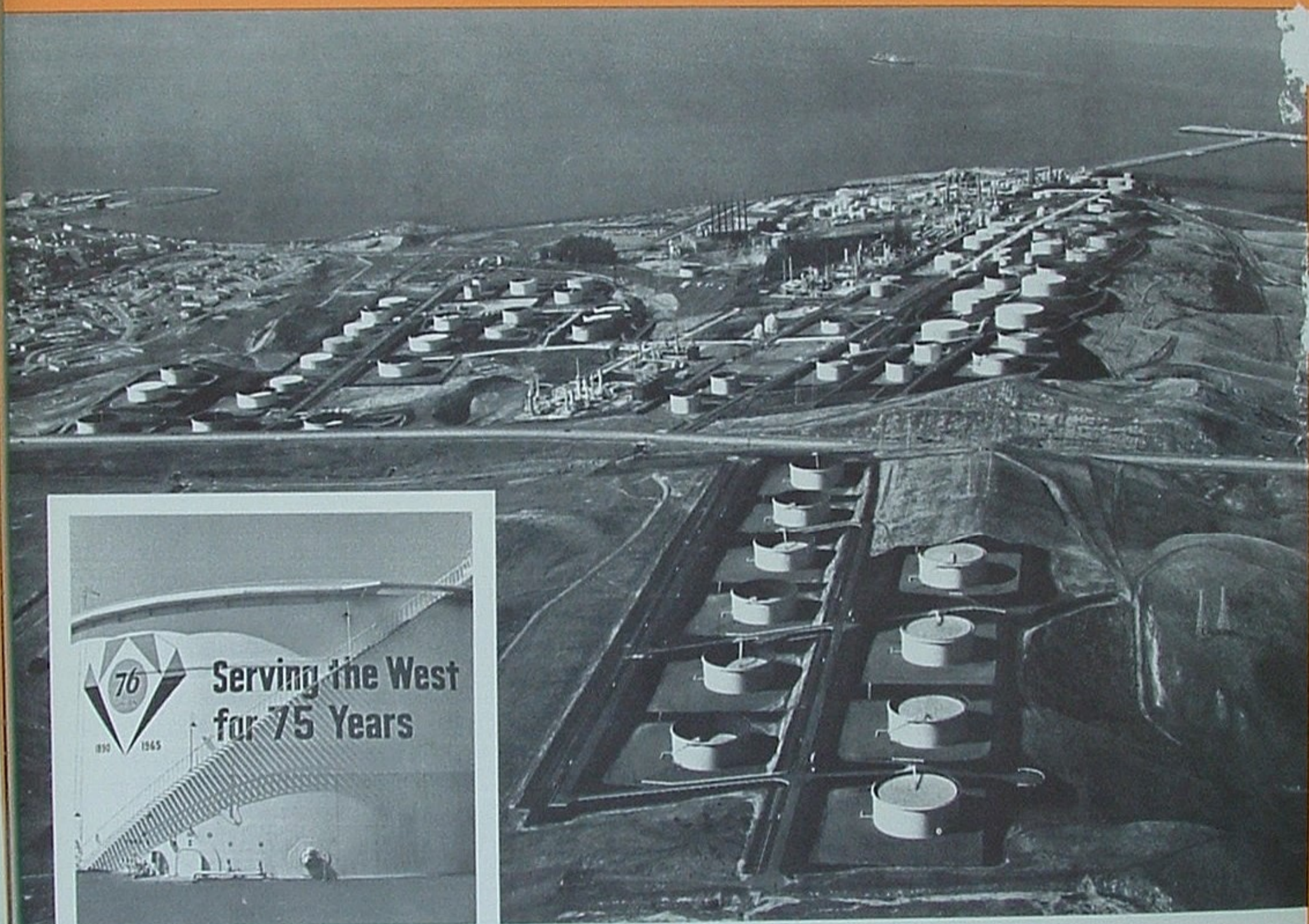
THELMA F. ADAMOLI
 Los Angeles Refinery.....June 18, 1943
 ROY ANDERSON
 Seattle.....May 11, 1926
 HENRY B. CHANDLER
 Seattle.....June 24, 1929
 WILLIAM CHRISTIANSEN
 Cut Bank, Montana.....May 1, 1939
 MARION EVANS
 Santa Maria Valley Unit.....October 24, 1946
 GERALD R. FITZGERALD
 Oleum Refinery.....October 22, 1923
 HERBERT F. JOHNSTEN
 Los Angeles Refinery.....September 12, 1927
 ODUS J. JOHNSON
 Santa Fe Springs.....February 4, 1936
 ORIN MYERS
 Seattle.....May 7, 1927
 HULBERT SMITH
 Long Beach.....October 2, 1941

IN MEMORIAM

Retirees

THOMAS C. ABSHER
 Compton, California.....July 14, 1965
 JOHN L. BISPO
 Pinole, California.....July 24, 1965
 BEN S. BLANCHARD, SR.
 Fullerton, California.....July 27, 1965
 HARRY B. CHANDLER
 Paramount, California.....July 22, 1965
 FRED RAYMOND HOWELL
 Los Angeles, California.....June 24, 1965
 RAYMOND C. TOBIN
 Gardena, California.....July 19, 1965
 WILLIAM G. WAGNER
 Long Beach, California.....July 1, 1965

UNION OIL COMPANY OF CALIFORNIA
P. O. Box 7600
Los Angeles, California 90054



WHERE WE WORK

The company's oldest refinery, Oleum — in steady operation since 1896 — shows no sign of old age. From tank farm to

wharf, it shines like a new dollar. A few years ago a woman living in nearby Vallejo thanked Union Oil for using different tints of paint on the tanks and wrote that she had named the industrial panorama "Rainbow Ridge." Now thousands of

motorists pass through the refinery daily, using the freeway that bisects the refinery and links Sacramento with San Francisco Bay cities. On one of the immaculate tanks (inset photo) they are reminded of our Diamond Anniversary this year. 75