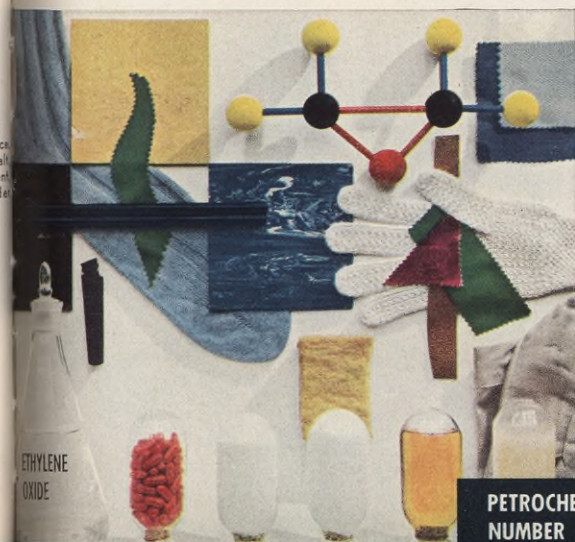
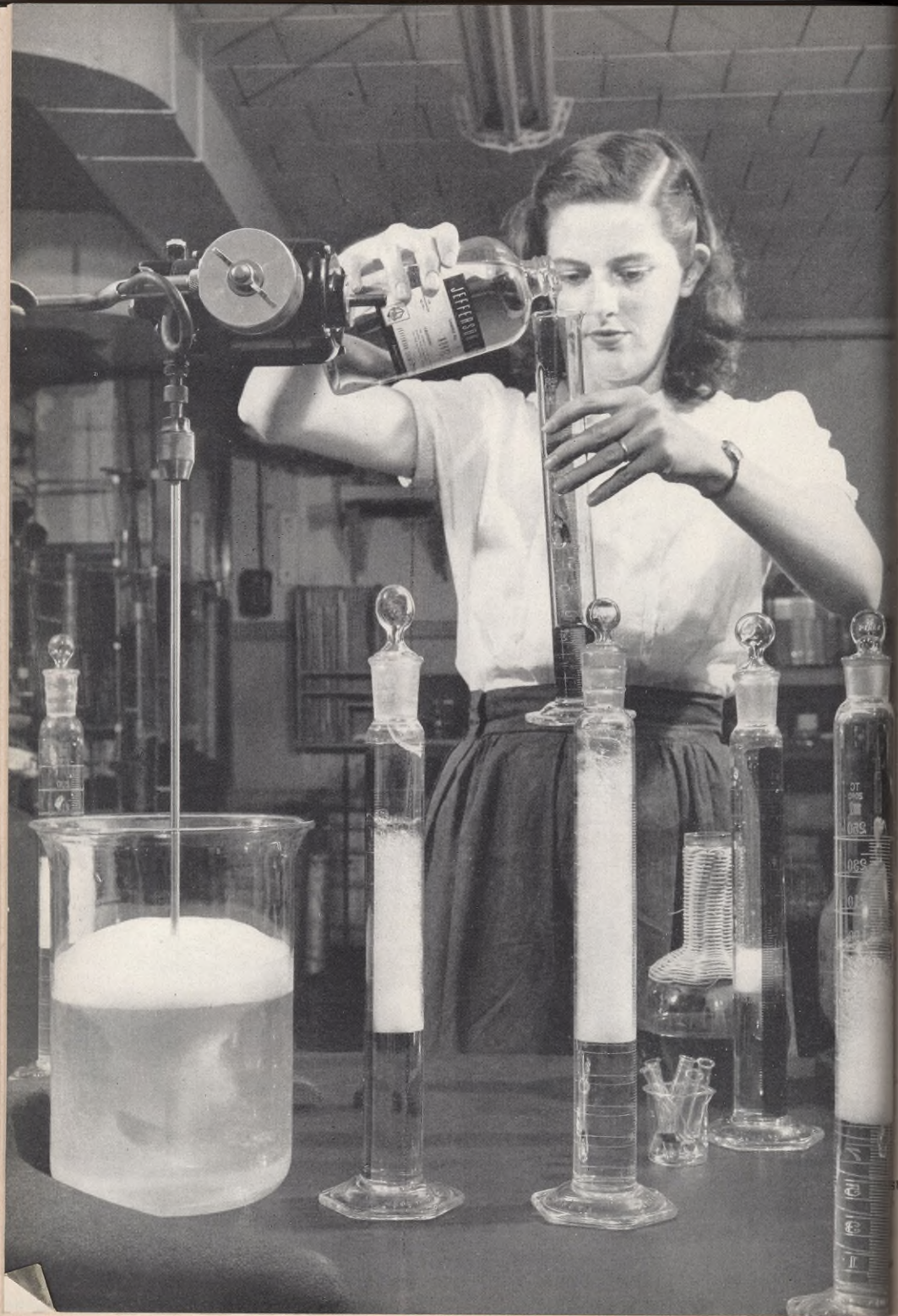


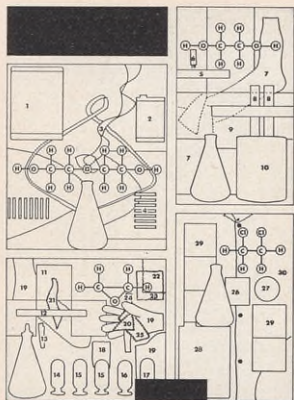
THE TEXACO STAR



PETROCHEMICAL
NUMBER / 1952



ABOUT THE COVER



The products pictured on our cover seem far removed from the oil industry. Actually, these products, and thousands of others in everyday use, contain important ingredients—called “petrochemicals”—derived from petroleum.

Four of the most important petrochemicals are the colorless liquids pictured in the laboratory flasks and symbolized by the molecular models. These petrochemicals are the principal products of a Texaco affiliate, Jefferson Chemical Company, Inc. (see Page 9).

Diethylene glycol is used in products such as printing ink (1) and brake fluid (2); as a softener in cork (3); as a humectant for tobacco (4).

Ethylene glycol gives a low-freezing property to dynamite (5); provides an important constituent of paste used in making dry-type electrolytic condensers (6); makes synthetic fibers (7 and 8); acts as a softening agent in cellophane (9); provides a principal component of permanent type anti-freezes, such as Texaco PT Anti-Freeze (10).

Ethylene oxide is used in floor tile (11), rubber hose (12), rubber bushing (13)—products principally composed of Buna-N synthetic rubber; the pharmaceutical (14) used in special diets; hairdressing (15); synthetic detergent (16); food additive (17); Buna-N synthetic rubber (18); wearing apparel (19), suiting material (21 and 23), curtain material (22), and awning material (25), which are made with synthetic fibers. Fabric used in table topping (20) and upholstery material (24) is impregnated with Buna-N synthetic rubber.

Ethylene dichloride is used to extract microcrystalline wax (26) from petroleum residues; is used in plastic disc (27) manufactured from sawdust with ethylene dichloride as one of the ingredients; tetraethyl lead fluid (28), an anti-knock component of gasolines; floor tile (29); raincoat (30).

ACTING ACTION of detergents developed in the Austin Laboratories of Jefferson Chemical Company, Inc., an affiliate of Texaco, is tested by technician Margaret Owen. More than 100 men and women work at the laboratories

THE TEXACO STAR

PETROCHEMICAL NUMBER • 1952

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A PUBLICATION OF THE TEXAS COMPANY FOR STOCKHOLDERS AND EMPLOYEES

W. S. S. RODGERS, Chairman of the Board of Directors; HARRY T. KLEIN, President; J. S. LEACH and A. C. LONG, Executive Vice Presidents; R. F. BAKER, G. R. BRYANT, M. HALPERN, A. N. LILLEY, L. H. LINDEMAN, A. M. OTTIGNON, J. H. PIPKIN, R. L. SAUNDERS, TORREY H. WEBB, and J. T. WOOD, JR., Vice Presidents; OSCAR JOHN DORWIN, Vice President and General Counsel; W. G. ELICKER, Secretary; ROBERT FISHER, Treasurer; ERNEST C. BREEDING, Comptroller, 135 East 42nd Street, New York 17, New York. . . . Published by the Industrial and Public Relations Department: Philip C. Humphrey, Manager, Public Relations; Wilfred B. Talman, Editor, Company Publications Division; J. Lawrence Filson, Assistant Editor; Ellis Prudden, Donald L. Tullisen, and Lawrence Hoyt, Jr., Associate Editors.

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TEXACO REACHES A MILESTONE

Birthdays generally are festival occasions for the very young and the very old. For others, birthdays call for more matter-of-fact celebrating.

For a company such as The Texas Company, which this year has reached the half-century mark, anniversaries are a time for evaluating accomplishments rather than celebrating survival.

The Texas Company also takes the view that its 50th Anniversary is a time to reaffirm its belief in those fundamental principles—based on our national heritage of freedom—that have enabled this Company, like the nation as a whole, to achieve remarkable progress during the past 50 years.

Had it not been possible for a few men to form a small enterprise in 1902, engage in the oil business, and compete with other firms for the rewards of skill and initiative; to take the responsibilities of providing stockholders with a fair return on their capital investment and employes with good job opportunities; to grow as the demand for petroleum products increased—The Texas Company would not be in existence today. The milestone Texaco has reached in 1952 marks the way for future years of progress.

The significance of Texaco's five decades of growth since the Company's founding in 1902 in Beaumont, Texas, is expressed in the words of our anniversary theme, "Faithfully Yours for Fifty Years." Backing up this statement are these Texaco accomplishments through the years: quality products and good service; increased reserves of crude oil; improved techniques for finding and producing petroleum and for processing crude oil as well as the gases associated with it; more efficient means for transporting crude oil and finished products; new ways in which petroleum can be made to contribute in some helpful measure to the daily lives of all of us.

One of the plans for signaling Texaco's Golden Anniversary during 1952 calls for publishing a history of Texaco's first 50 years. To be called *The Texaco Story*, the history will touch upon the outstanding events in The Texas Company's first half century in the oil business. Distribution will be made later this year, principally to stockholders and employes. **END**

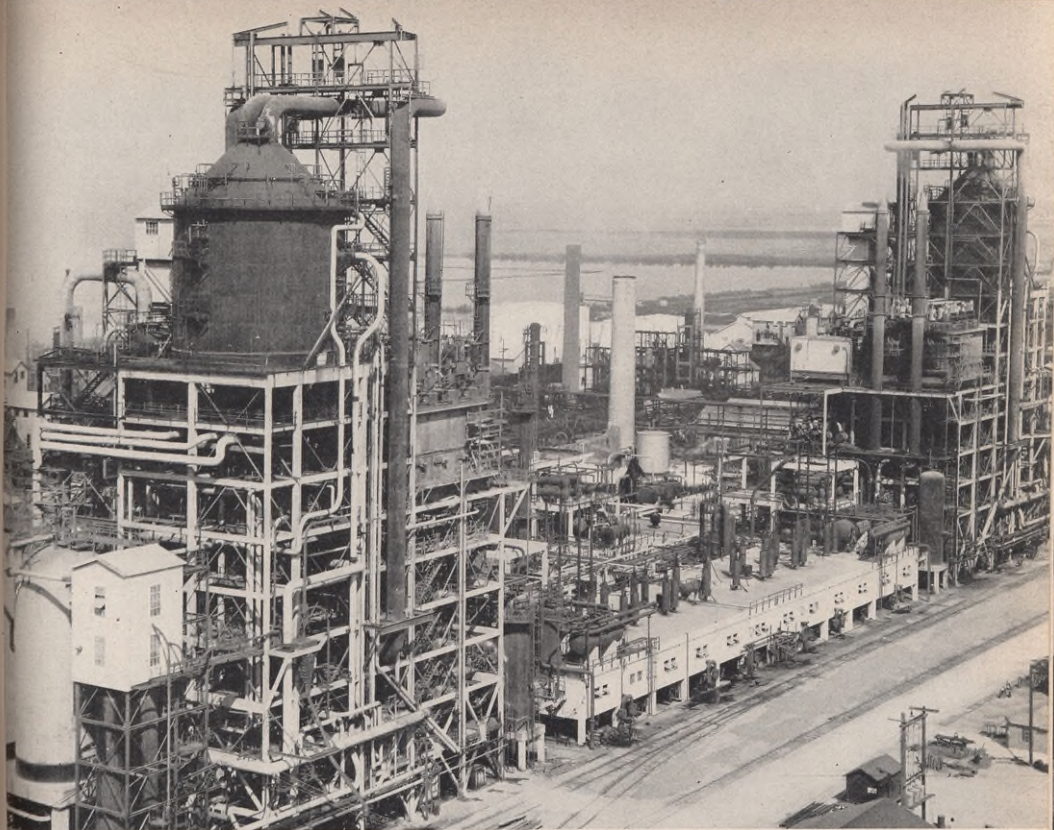
1902

Faithfully yours



for Fifty Years

1952



PORT ARTHUR WORKS: PETROCHEMICAL RAW MATERIALS ARE MADE IN UNITS SUCH AS THESE

Petrochemistry

Comes of Age

AND IS VERY MUCH A "GOING CONCERN"

by W. E. KUHN

Manager, Technical and Research Division,
The Texas Company

John W. ("Bet a Million") Gates placed his money on the vigorous oil industry, a healthy infant that grew to be an industrial giant. Were he alive today, Mr. Gates (who was one of Texaco's founders) probably would also place his money on a strong and healthy offspring of the oil industry—the petrochemical industry.

The traditional aim of the oil industry to recover the energy content of crude oil has now been broadened to include an additional objective. It is to recover, through petrochemistry, the vast stores of organic chemicals which are based on the hydrocarbons of crude oil.

Petrochemistry has altered the Gulf Coast landscape, changed our national habits, and thrown its long and spreading shadow out to the horizon of the American future. It has brought a profusion of gifts to the layman and an even more extensive profusion of potentialities to the chemist and the (Continued on Page 6)

Oil's Expanding Universe

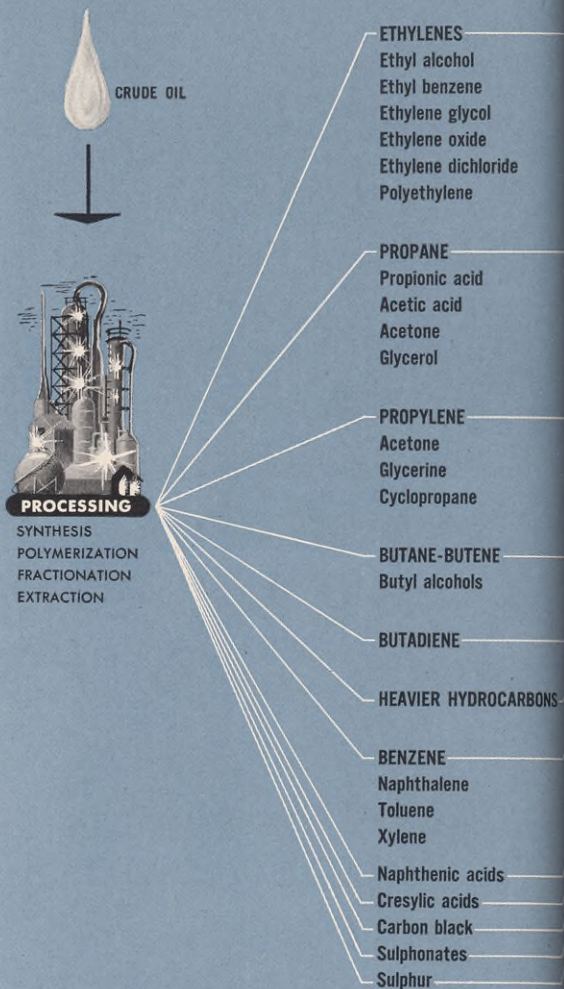
These pages show at a glance how petroleum—through petrochemistry—has widespread usefulness in everyday life in addition to its usefulness as a source of energy.

Oil's expanding universe is furnishing the chemical industry with an ever increasing quantity and variety of organic chemicals which, in turn, are being used more and more in products for the home as well as industry.

In the last decade or two, petrochemistry has thoroughly demolished any significance that might have remained in the old saw that a "silk purse" cannot be made from a "sow's ear."

Although it has been only in comparatively recent years that commercial production of petrochemicals has been undertaken on a wide scale, the petrochemical potentialities of crude oil were evident as long ago as 1855 when Benjamin Silliman, Jr., a Yale College professor, made the first scientific analysis of petroleum for a group of men interested in the commercial possibilities of oil found in an oil spring near Titusville, Pennsylvania. Prof. Silliman's studies of crude oil led him to make the statement, in his historic report, that "... my experiments prove that nearly the *whole* of the raw product may be manufactured without waste."

Today, through petrochemistry, the "*whole*" of the raw material has indeed been utilized for the benefit of mankind.



- Anti-freeze
- Tires and tubes
- Oil additives
- Rubber hose
- Upholstery
- Brake fluids
- Plastic parts
- Lacquer
- Polishes
- Anti-knock components for gasoline



PRODUCTS IN EVERYDAY USE

- Building materials
- Paint, varnish and enamel
- Refrigerants
- Textiles
- Luggage
- Sports equipment
- Pharmaceuticals
- Synthetic detergents
- Fumigants
- Insulation
- Toys
- Electrical appliances
- Decorative objects
- Utensils
- Floor coverings
- Waxes
- Flavors
- Preservatives
- Dishes
- Cosmetics
- Shampoo
- Permanent wave lotion
- Toilet articles
- Soaps
- Clothing
- Frozen food wrappers

HOME



MANUFACTURING

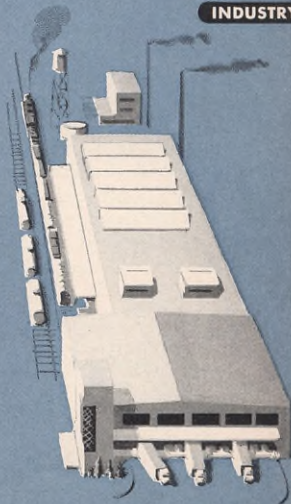
- Fertilizers
- Insecticides
- Weed killers



FARMING

- Textile lubricants
- Leather treating agents
- Plasticizers
- Cellophane
- Dyes
- Synthetic fibers
- Synthetic resins
- Softeners
- Cutting oils
- Chemical intermediates
- Coolants
- Wetting agents
- Emulsifiers
- Adhesives
- Solvents
- Paper coatings
- Printing inks
- Hydraulic fluids
- Corrosion inhibitors
- Synthetic rubber
- Plastics
- Demulsifiers
- Explosives
- Film

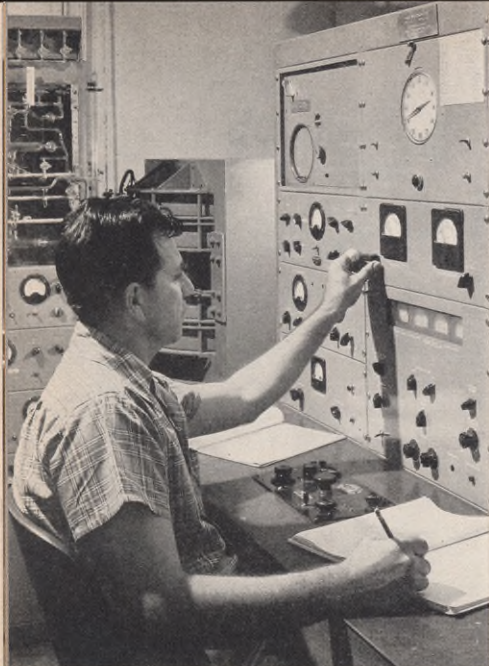
INDUSTRY



- Components of aviation fuel



AVIATION



PRINCIPAL RAW MATERIALS of the petrochemical industry are refinery and oil field gases. (Above) Refinery gases are analyzed for components with a mass spectrometer at Port Arthur Works



FROM HANKIES TO HOUSECOATS, synthetic materials have won acceptance for the wardrobe of milady. Today, synthetics are important not only in clothing but in almost all family possessions

PETROCHEMISTRY IS ADDING TO NATION

(Continued from Page 3) businessman. Today, the banker, the journalist, the investor, the financier, and all other consumers are aware of the fact that petrochemistry is very much a "going concern."

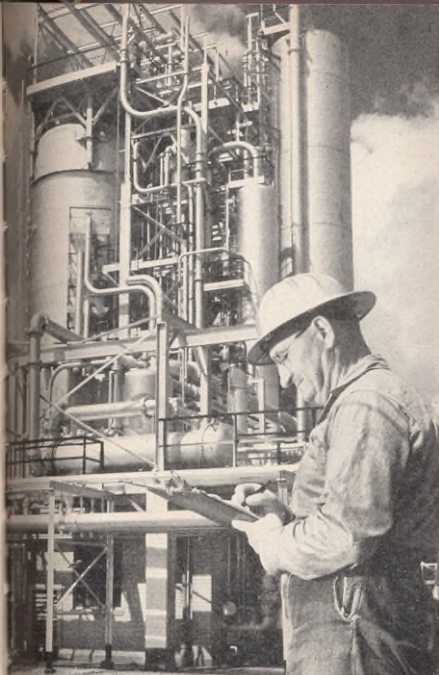
Perhaps the most important industrial development of the past several decades, petrochemistry is setting the pace in the fast advancing age of chemistry. It is contributing to a spectacular flow of new products of superior merit which are daily pushing our living standards to higher levels. It is creating a growing payroll. It is continuously adding to national wealth and security by making greater and more efficient use of precious resources which automatically expend themselves in use.

"Gibberish" That Makes Sense

Though petrochemicals are becoming more and more necessary to the conduct of everyday life, the layman is not aware that the oil derivatives are so basically a part of the varied and numerous products that he encounters daily. To him, the technical terminology of

petrochemistry is so much gibberish. Propylene polymers, hexylene glycol, methyl methacrylate, and isopropyl alcohol (but a few of the hundreds of petrochemicals) are key words to the petrochemists. The layman, however, associates them only with the mysterious world of science. But many of the products he buys at his local service station, department store, food store, and drug store employ petrochemicals in their manufacture.

For instance, when a motorist says to a Texaco dealer, "Fill my tank with Sky Chief," he is talking petrochemistry because petrochemicals are used in components of Texaco Sky Chief Gasoline that help to create its outstanding performance characteristics. If you have your Texaco dealer fill the crankcase of your car with Custom-Made Havoline Motor Oil, petrochemistry helps—in the form of additives in the oil—to give Havoline its remarkable stamina under the most severe, heavy-duty operating conditions and its ability to clean the engine as it lubricates. And petrochemistry is again at work when your Texaco dealer puts Texaco PT Anti-Freeze (a permanent type anti-freeze, the



LUBRICATING DISTILLATES produced in this pipe still at Port Neches Works yield naphthenic acids and sodium sulphinate—important petrochemicals—with further processing at Port Arthur

WEALTH AND SECURITY

principal component of which is a petrochemical—ethylene glycol) in the cooling system of your car to protect it from frigid Winter temperatures.

“Synthetic” has become a popular word in every American’s vocabulary. The jokes and jibes that sprang up a decade ago have disappeared with the appearance of hundreds of products made wholly or in part of petrochemicals that are synthetic materials. Cartoons no longer rib “soapless soaps” and other synthetic innovations. To the contrary, the subject is a serious matter today, for synthetic materials are meeting urgent needs. They are replacing many natural materials that are difficult or impossible to obtain in sufficient quantities, and at the same time are proving that synthetic materials possess superior qualities. Petrochemicals have been one of the major factors in the beneficial revolution.

Currently, petrochemists know that 500,000 compounds can be made from petroleum, and they will undoubtedly know of 1,000,000 before many years pass.

Petrochemicals are employed in products that are in evidence everywhere. In every room of today’s home,

they are present in useful and decorative objects. Plastics alone, in which petrochemicals are highly important, have widespread use in both home and industry. The uses of plastics are so numerous that it would require a separate article to enumerate them. There are some 200 plastic parts used in the manufacture of a single automobile. The casing of your telephone is more than likely plastic, as well as the handle of your coffee pot, your shower curtain, and the light switch that brings illumination into your room. Most of the numerous plastic products of which any reader can think, contain petrochemical ingredients.

Activity After World War I

Petrochemicals serve you personally in soaps, face lotions, hair tonics, shaving creams, rubbing alcohol, cosmetics, medicines, brushes, and many, many other modern products.

Throughout your home, petrochemicals contribute to fabrics, paints, varnishes, waxes, fuels, roofing, floor covering, insulation, and cleaners.

Though it had long been known that crude oil contained numerous hydrocarbon combinations of potential value as chemicals, economic and technological factors restrained oil companies from producing organic chemicals in commercial quantities until comparatively recent years. After the first World War, The Texas Company, as well as a number of other oil companies, began to engage in petrochemical research and to develop methods for commercial production of chemicals from petroleum raw materials, in addition to the ever increasing development of new and better petroleum products that have steadily increased in quality but not in price.

Actually, petrochemistry can hardly be said to have

ABOUT THE AUTHOR



W. E. KUHN

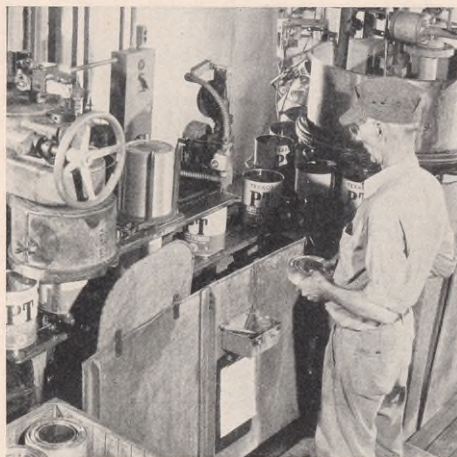
Born in Wisconsin and raised in Oregon, Dr. Wayne E. Kuhn was graduated (1925) from Reed College, Portland. He earned his Ph.D. degree at Cornell University in 1929, the year he entered Texaco service as a Chemist at Bayonne, New Jersey. Shortly after, he was transferred to Port Arthur, Texas, where he became Assistant Chief Chemist. Transferred to New York in 1937 as Assistant to Director of Research, he was made Manager, Technical and Research Division, Refining Department, in 1938. His article is based in part on a paper he presented at the National Petroleum Association’s 1951 annual meeting.

NEW WONDERS WILL BE PRODUCED

started at any given date. As early as 1912, a young Texaco chemist, J. G. Detwiler (who is now Supervisor, Tests and Specifications, in the Refining Department), was pioneering in extracting naphthenic acids, which fall in the classification of petrochemicals, from crude oils to determine properties, amounts available, and uses. During World War I, Texaco produced some toluene for explosives. At that time, little use was made of gases and other by-products of oil refining. Today, refinery and oil field gases are the principal raw materials of the petrochemical industry.

By the time of World War II, the American petroleum industry had progressed sufficiently in the development of petrochemicals to contribute a new source of vital war materials. During the emergency, The Texas Company, together with other companies, developed a process for combining certain hydrocarbons—called alkylation—which made possible the economical production of high-octane aviation gasoline. Texaco also made cumene (a very high anti-knock component of wartime aviation gasoline) and toluene (the basis for TNT) in large quantities.

Today, The Texas Company manufactures such chemicals as sodium sulfonate and naphthenic acids,



CANS OF TEXACO PT ANTI-FREEZE are filled (above) in Case and Package Division at Port Arthur. Refinery gases from Port Arthur Works are used to make its basic ingredient, ethylene glycol

but the main contribution of the Company toward the production of chemicals made from petroleum is through its connection with Jefferson Chemical Company, Inc., whose activities are described in the following article. Chemicals are also being produced by Carthage Hydrocol, Inc. (in which The Texas Company is the largest stockholder), at its Brownsville, Texas, plant where synthetic fuels are made from natural gas. The Texas Company is placing considerable emphasis on research for the development of various chemicals made from petroleum.

Progress Through Teamwork

Perhaps the biggest contribution of the petroleum industry to a higher standard of living in our country has been the development of techniques to utilize the *whole* of the crude oil that is processed in refineries. This accomplishment is now dramatically highlighted by the development of more and more petrochemicals.

Contrary to the spectacular growth of the coal tar industry, the start of which was essentially the result of the efforts of one man (Sir William Henry Perkin—in whose honor the Perkin Medal is awarded annually to the American chemist who has most distinguished himself by his service to applied chemistry), the petrochemical industry is the result of teamwork. No one man today can occupy a position comparable to that of Perkin, the father of chemicals from coal tar, because it has been organization and the combined efforts of many men in the petroleum and chemical industries that have created the petrochemical industry.

The present rate of expansion of the petrochemical industry probably will not slacken for some time to come. Petrochemistry has grown from a 350 million dollar industry to an industry of one-and-one-quarter billion dollars in just 10 years. It has come of age, but it is far from mature. By 1962, it should assume its permanent position in the expanding field of synthetic chemicals.

Today, about 25 per cent of all chemicals being made in the United States are petrochemicals. During the next decade the figure will increase to more than 50 per cent. Ten years from now, this relatively new American industry will be worth more than five billion dollars and its production will have increased from the present 16 million pounds annually to about 64 million.

There is no doubt that the petrochemical industry will, in the future, produce new wonders in plastics and synthetic materials which will continue to change the format of American life from the fuels we burn to the food we eat and the clothes we wear. **END**

Ethylene Petrochemicals Today and Tomorrow, by Dr. Kuhn and John W. Hutcheson, Project Leader at Texaco's Beacon Laboratories, is available in reprint form upon written request to the Editor of THE TEXACO STAR.



YOUNG COMPANY

With a Big Future

A TEXACO AFFILIATE
IS GROWING RAPIDLY
IN A NEW INDUSTRY

by P. M. DINKINS

President, Jefferson Chemical Company, Inc.

More amazing than all of the magician's diverting tricks are the very real, very utilitarian wonders of modern science, among them the recent and current achievements in the tremendously important field of petrochemistry—an outgrowth of two great American industries, petroleum and chemical.

The chemical industry is fairly young in our country. Not until World War I shut off the supply from Germany did resourceful Americans start a feverish race to produce badly needed chemicals, dyestuffs, and drugs. In building up this infant industry, the nation naturally did the thing it could do most rapidly, and that was to copy the German method of manufacture, which was based almost entirely on coal and coal by-products.

After a few years, some of the chemical people in America began to see that petroleum raw materials offered a versatile basis for an industry of this kind, and the development of industrial facilities to utilize them began. The chemical raw materials and intermediates derived from petroleum came to be known as petrochemicals, a name chosen to delineate them from chemicals derived from coal and other sources.

Production of chemicals from petroleum, starting

AROUND THE CLOCK, ethylene unit (left) and other Jefferson Chemical plant units are "on stream"

A 50-50 PARTNERSHIP FORMED IN 1944

in the early 1920's, had a slow but steady growth up to the time of World War II. The war provided a major impetus, and petroleum-derived chemicals quickly assumed a highly important position in the United States chemical industry.

"Doubled in Size" on Drawing Boards

Before and during World War II, The Texas Company and American Cyanamid Company had given considerable thought to the business of making chemicals from petroleum. In 1944, the two companies jointly formed Jefferson Chemical Company, Inc., a 50-50 partnership that the parent companies felt would benefit by the petroleum technology, know-how, and raw materials of The Texas Company and the knowledge of the chemical industry of American Cyanamid Company. Deciding to build a plant close to Texaco's Port Arthur refinery, the partners chose 1,100 acres near Port Neches, in Jefferson County, Texas. While the plant was in construction, process development work was under way in facilities made available to Jefferson at The Texas Company's refinery at Port Arthur.

While the plans were still on the drawing boards, the plant was doubled in size, and it was put into operation in early 1948. In 1950, a further 50 per cent enlargement was completed. At present, yet another expansion of the original plant is being engineered.

Activity has literally bubbled at the Port Neches

plant, where Jefferson produces a variety of important petrochemicals for the manufacture of new and better aids to industry and home. The front cover of this issue illustrates some of the many everyday products in which Jefferson's petrochemicals are used.

This new and revolutionary phase of the oil industry was an important factor in the victory of World War II. Toluene, which had previously been made entirely from coal, was produced from petroleum. (One plant making toluene from petroleum turned out more than the entire production from coal tar before the war.) The petrochemical industry also made its contribution to the phenomenal production of synthetic rubber and the enormous output of high-octane aviation gasoline, which is really a synthetic organic chemical.

Today, nearly all of our acetone and more than half of our industrial alcohol (both formerly produced from molasses) come from hydrocarbons associated with petroleum. And almost half of the synthetic ammonia produced in the United States, importantly used in large tonnage for fertilizer and explosives, is derived from natural gas.

Indicative of the new industry's progress is the increase from 100 tons of petrochemicals produced in 1925 to the millions of tons produced in 1951, plus the fact that in each of the last three five-year periods the tonnage has doubled.

Following World War II, it was increasingly evident that the chemical industry had outgrown coal and agricultural products as raw material sources and would have to rely more and more upon petroleum.

In the months after the outbreak of hostilities in Korea, the demand for such important products as naphthalene and benzene greatly exceeded the amounts that could be produced from coal and agricultural sources. These vital materials became desperately short, and plans were rushed to augment the supply of benzene from petroleum.

All the worth of petrochemicals, however, is not related to war. To the contrary, petrochemicals are a valuable and integral part of our high standard of living. They are used in the manufacture of such new and revolutionary products as synthetic detergents, plastics, and wonder fabrics such as Nylon, Orlon, Dacron, Dynel, and Acrilan; and in fertilizers, insecticides, humectants, floor tiling, hairdressing, pharmaceuticals, explosives, gasoline, lubricating oils, anti-freeze, and numerous other products that have simplified everyday life for people the world over.

Jefferson's Principal Products

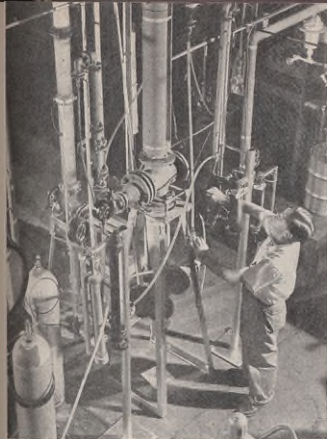
One of the most versatile products being turned out at Jefferson is ethylene oxide, a water-white liquid which boils at 51° F. and becomes a colorless gas at ordinary temperatures and pressures. Ethylene oxide

ABOUT THE AUTHOR



P. M. DINKINS

Georgia-born, Philip M. Dinkins is a graduate chemical engineer of Massachusetts Institute of Technology. In March, 1923, he was employed by the Kalbfleisch Corporation, which was later purchased by American Cyanamid Company and, subsequently, became the nucleus of American Cyanamid and Chemical Corporation—a wholly owned subsidiary of American Cyanamid Company. He became vice president of the corporation and was a motivating factor in the formation of Jefferson Chemical Company, Inc., of which he was made Vice President and General Manager at its conception in 1944. In 1946, he was elected President.



PILOT PLANT (above) at Jefferson Chemical Company's Austin, Texas, Laboratories is a "test tube" in which processing techniques are worked out for full-scale production of the company's products



IN THIS CONTROL ROOM for the ethylene oxide unit at the Port Neches plant, one of Jefferson Chemical Company's highly trained operators sets a gauge. Pilot plant for this unit was originally set up in The Texas Company's laboratories at Port Arthur Works, was later moved—as it appears in the photo left—to Jefferson's Austin Laboratories

can be easily liquefied and shipped as a liquid in pressure tank cars and pressure drums and cylinders. A highly reactive intermediate, it is employed in the making of a wide variety of chemicals. Among them are ethylene glycol and the ethanolamines, described later in this article.

Another important chemical resulting from ethylene oxide is acrylonitrile which, although it has been on the market for only a few years, is advancing in importance for manufacture of Buna-N synthetic rubber (widely used in military and civilian aircraft and ground vehicles because of its resistance to attack by oil) and for manufacture of synthetic acrylic fibers such as previously mentioned Orlon, Dynel, and Acrilan.

Ethylene oxide is also included in surface-active compounds for detergents, emulsifiers, and demulsifiers. Still another important group of compounds made from ethylene oxide are the glycol ethers, utilized as lacquer solvents and in brake fluid.

In recent months, the demand for ethylene oxide has been so large that Jefferson's sales of the material have been greater than those of the entire industry in 1948, when the company began production.

Ethylene glycol is also produced at the plant. A water-white liquid, it is the base of permanent-type automobile anti-freeze. Some of the ethylene glycol from Jefferson Chemical Company goes into popular Texaco PT Anti-Freeze. Other end uses of ethylene glycol are nonflammable hydraulic fluids. Still other quantities are absorbed in the production of industrial explosives, cellophane, certain resins, and the synthetic polyester fabric, Dacron. The United States production of ethylene glycol for 1951 was more than 600 million pounds, which is four times the annual production of this product before Pearl Harbor.

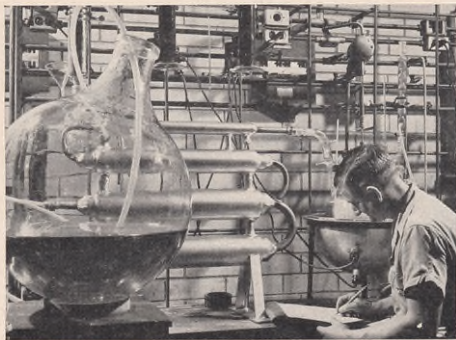
Jefferson produces ethylene dichloride, a raw material for vinyl resins which, since the beginning of World War II, have assumed a position at the forefront of the plastics field. Ethylene dichloride is also an important ingredient in tetraethyl lead fluid for automotive gasoline. Other uses are in grain fumigants, as a spotting agent in dry cleaning, and as an extractive solvent in manufacture of such products as pharmaceuticals and microcrystalline waxes.

Somewhat similar to ethylene glycol in its chemical and physical properties, diethylene glycol from Jefferson is used in brake fluids, in printing inks, as a humectant in cigarettes and pipe tobacco, and in the manufacture of resins.

Though the foregoing is by no means a complete list of the uses of these products, it indicates the wide variety of their applications. Along with them, Jefferson obtains several by-products, such as aromatic distillate and hydrocarbon polymer, used in making resins and insecticides.

During the past year, a unit to make one of two groups of new products was constructed at Port Neches. A second unit, to make the other group of new products, is scheduled for completion by the middle of this year. The first unit is producing monoethanolamine, diethanolamine, and triethanolamine, used for removal of hydrogen sulfide and carbon dioxide from sour natural gas and from feed streams used in the manufacture of aviation gasoline, and in manufacturing petroleum demulsifiers, cement additives, waxes and polishes, cutting oils, and synthetic detergents. The second unit will make a group of products including alkyl phenols, used in making synthetic detergents and lube oil additives and for plasticizing and stabilizing cellulose plastics.

These new developments, and the many others that



WHAT LOOKS LIKE A GOLDFISH BOWL and lattice of water pipes is actually a pre-pilot plant for ethanolamines. This laboratory "plant" at Austin, Texas, was set up before larger tests were conducted with experimental output facilities at right

JEFFERSON IS PUSHING NEW PRODUCT DEVELOPMENT

Jefferson has under consideration, are the result of research. The first research facilities set up in The Texas Company's Port Arthur Works were known as the Experimental Unit. Here all of Jefferson's early research was done. Somewhat later, a small laboratory was also maintained in New York.

The desirability of centralizing all research facilities at some location which would afford opportunity for expansion was soon realized. After a detailed search, buildings and land were located in Austin, Texas. The buildings were converted for laboratory and pilot plant use and Jefferson's Austin Laboratories were established in the middle of 1949. Early in 1951 construction was completed on experimental output facilities at Austin and large experimental quantities of ethanolamines were turned out in these facilities. The commercial ethanolamines unit at Port Neches was completed in February and has made it possible for Jefferson to increase greatly its production of these chemicals.

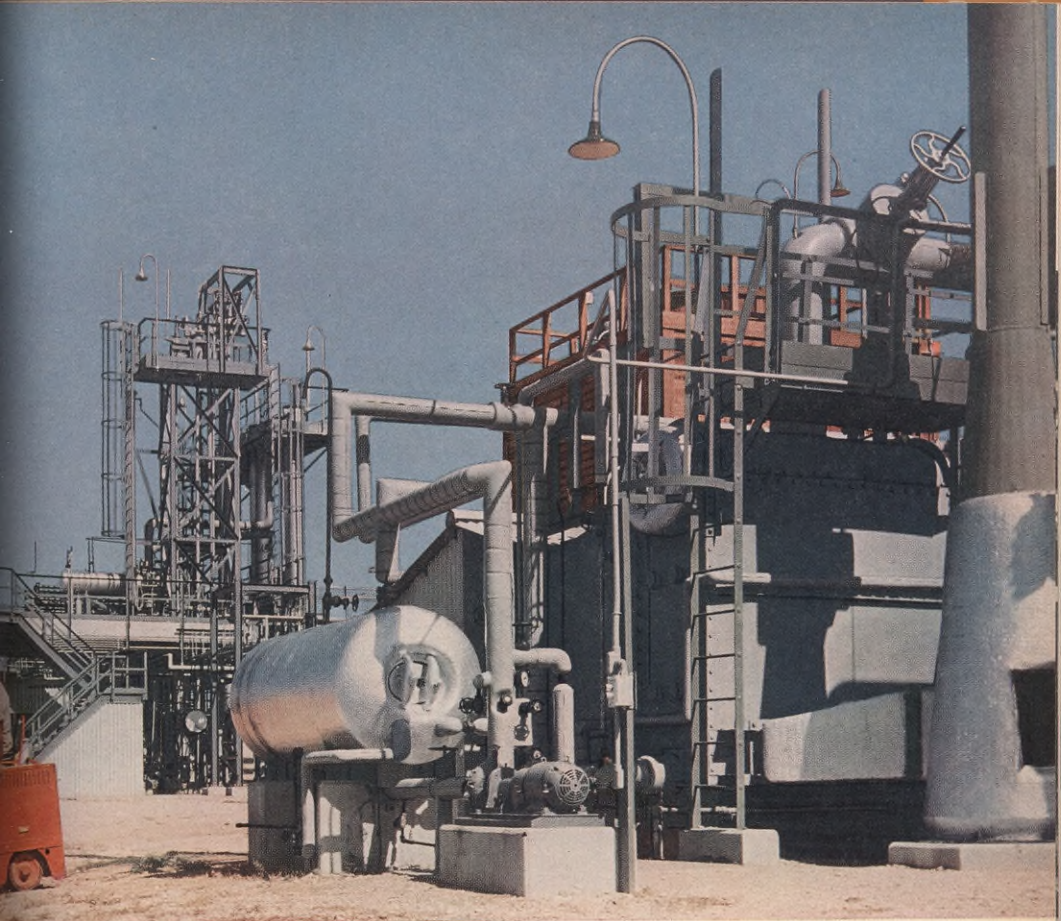
In the seven years that Jefferson has been in existence, its employes have worked closely with those of The Texas Company and American Cyanamid Company. It is impossible to overestimate the assistance which has been afforded Jefferson as a result of these relationships.

In addition to representatives from American Cyana-

mid Company, the Board of Directors of Jefferson Chemical Company includes the following: W. S. S. Rodgers, Chairman of the Board of Directors of The Texas Company (who is Chairman of Jefferson); Harry T. Klein, President of The Texas Company; M. Halpern and R. L. Saunders, who are Vice Presidents in charge, respectively, of Refining and Domestic Sales for The Texas Company; W. M. Stratford, Texaco's Patent Counsel and President of Texaco Development Corporation; and W. E. Kuhn, Manager of the Technical and Research Division of Texaco's Refining Department.

Many of Jefferson's key employes were formerly employed by the parent companies. Among those in the Jefferson organization who were once employes of The Texas Company are two Vice Presidents—Max Neuhaus, formerly a Supervisor at Texaco's Beacon Laboratories and now head of Jefferson's Technical and Research Department, and Loren P. Scoville, a Senior





PILOT PLANT AT AUSTIN PRODUCES LARGE EXPERIMENTAL QUANTITIES OF NEW PRODUCTS

Engineer with Texaco and presently head of the Production Department at Jefferson. Lynn R. Strawn, Plant Manager at Port Neches, was previously in the Process Division at Texaco's Port Arthur Works, and Stuart P. Smith, head of Jefferson's Traffic Department, came from The Texas Company's Traffic Department.

The future of the petrochemical industry looks bright. Although a comparative newcomer, Jefferson already enjoys an established position in the industry. Being young, the company is at present devoting a larger portion of income to new product development than the average of the chemical industry as a whole—and the chemical industry applies more of its income to such development than any other industry.

It is clearly visible that the parent companies do not intend Jefferson to stand still, and its employees look forward with enthusiasm to a period of vigorous growth. **END**



LARGE SCALE COMMERCIAL PRODUCTION of ethanolamines began at Port Neches plant in February, following completion of construction (above) of ethanolamines unit. Ethanolamines are among the most versatile of petrochemicals

Rubber from Oil

In the entire field of petrochemicals probably the best known development is synthetic rubber. Several methods of making rubberlike substances had been used some years before World War II, but production in the United States almost could be classed as experimental.

After Pearl Harbor, however, it was apparent that for an indefinite period the United States would be cut off from its Far Eastern supplies of natural rubber. For a nation almost literally on wheels, and also at war, our existence depended upon whether enough man-made rubber could be produced to keep America's wheels—

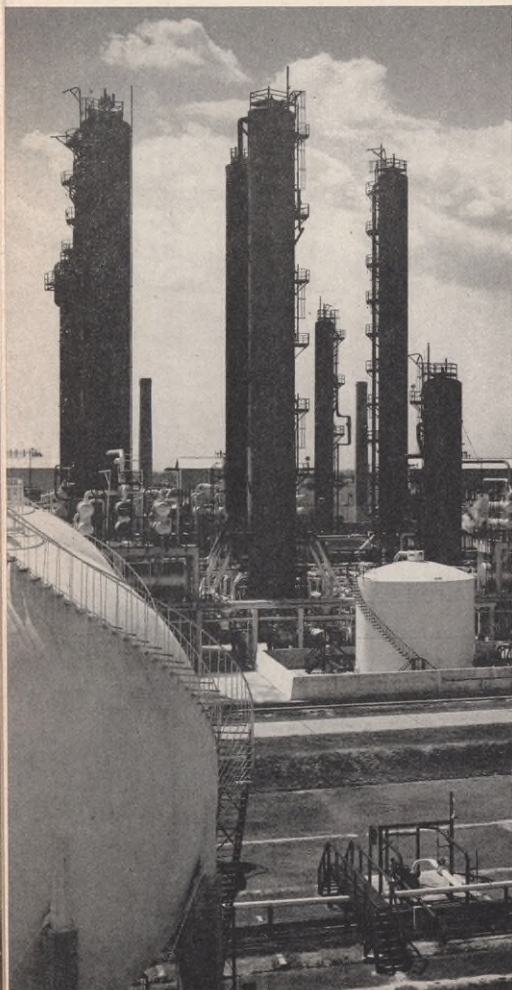
the wheels of industry, of civilian life, and of war—turning at an ever accelerating rate. The Texas Company, and other oil companies, played an important part in meeting this demand.

The size of the job can be expressed in two ways. In 1941 production of synthetic rubber in this country was around 10,000 tons, which was less than two per cent of our peacetime needs. When the war ended, our capacity for producing synthetic rubber had reached about 850,000 tons annually, or 200,000 tons more than our 1940 consumption of natural rubber.

The country was so stunned by the disaster at Pearl Harbor that it took some months to decide on the scope of the synthetic rubber program. A goal of 800,000 tons annual capacity was set and of this it was decided that 700,000 tons would be for production of the all-purpose Buna-S rubber, a synthetic made from butadiene and styrene. Butadiene can be produced either from petroleum or alcohol. Production from petroleum is much cheaper and it was therefore decided that 85 per cent of the needed butadiene would come from petroleum, and only 15 per cent from alcohol.

To produce a major part of the required butadiene from petroleum, The Texas Company and four other oil companies suggested that a large butadiene plant be located in the vicinity of their Gulf Coast refineries, which could supply the feed stocks. This proposal was accepted and the five companies agreed to supervise the design and construction of the plant, as well as operate it for the duration of the war without profit. The site chosen for the plant was at Port Neches, Texas, a few miles from Texaco's mammoth refinery at Port Arthur.

The Texas Company, Gulf Oil Corporation, Socony-Vacuum Oil Company, Inc., The Pure Oil Company, and Atlantic Refining Company organized the Neches Butane Products Company to carry out this project. Most of the executive personnel of the company has been drawn from the participating oil companies. W. H. Hoffman, President, was an employe in the Managerial Division of Texaco's Refining Department, from which F. W. Cooper, Secretary and Treasurer, and M. L. Rosenberg, Assistant Superintendent, also transferred. The



TANKS, TOWERS, AND TEXAS SKY tell a silent story of the miracle of synthetic rubber at the Neches Butane Products Company plant. Spherical tank in left foreground contains liquefied butane-butylene feed stock from Port Arthur Works and other nearby refineries. Modern processing equipment in background "turns" refinery feed stock into butadiene—prime factor in synthetic rubber production

PETROCHEMISTRY'S BIGGEST CREATION IS SYNTHETIC RUBBER



TO CUSHION AMERICA'S RIDE, shining columns of newly made synthetic rubber automobile tires await shipment from one of the nation's big rubber plants. Part of the Government's wartime program, development of synthetic rubber was a remarkable technological victory. Magnitude of the synthetic rubber project was exceeded only by the atom bomb, air research, and development of the proximity fuse



A PORTION OF NECHES BUTANE PRODUCTS COMPANY, LARGEST BUTADIENE PLANT IN THE WORLD

PEARL HARBOR HASN'T BEEN FORGOTTEN

Texas Company has two representatives on the Neches Butane Board of Directors: M. Halpern, Vice President in charge of Refining, and J. S. Worden, General Manager of the Refining Department. Mr. Hoffman, who is on leave from Texaco, is also a Board member.

The plant constructed on the flat coastal prairie at Port Neches is the largest in the world for the production of butadiene, one of the two basic ingredients of Buna-S, or (in Government nomenclature) GR-S, which stands for Government Rubber-Styrene.

Among the products of petroleum refining are the butylene compounds. The refineries supplying feed stocks to the Neches Butane plant produce the butylenes by the catalytic and thermal cracking processes. When removed from the refining equipment, the butylenes are in a gaseous mixture also containing isobutane and normal butane. Under pressure, this gaseous mixture changes into a liquid and as such is moved through pipe lines to the butadiene plant at Port Neches.

The first major job at the Neches Butane plant is to separate the butylenes from the two other petrochemicals, isobutane and normal butane (these two are returned to the refineries where isobutane is further processed into aviation gasoline, and normal butane becomes a component of motor gasoline).

The next job is to change the butylenes into buta-

diene. Molecules of butylene contain four carbon atoms and eight hydrogen atoms, and since butadiene, the desired compound, contains four carbon and only six hydrogen atoms, it is necessary to knock two of the hydrogen atoms out of the butylene molecules.

The all-important butadiene is a colorless, almost odorless gas. This is piped to an adjoining synthetic rubber plant where it is mixed with styrene, a colorless liquid hydrocarbon which is made from either coal or petroleum. The mixture of butadiene and styrene is poured into vats of soapy water where the molecules of both latch on to each other to form new chain-like molecules. The filaments formed in this way become twisted and kinked. They can be stretched or pressed together, and when the pressure is removed they return to their original shape. This is the material which becomes GR-S. The Neches Butane Products Company achieved its wartime goal of turning out product to make more than 100,000 long tons of synthetic rubber annually.

After the war the petroleum butadiene plants were designated as the sole peacetime sources of butadiene for synthetic rubber manufacture, and the Neches Butane Products Company was kept in operation. Since V-J Day, its operating rate has averaged 20 per cent above design capacity. Last year, a new high record of over 180,000 tons was established. **END**

TEXACO'S CHEMICAL PURCHASES


MANUFACTURING

PROCESSING CHEMICALS

Solvents 

Clays 

Catalysts 


Other chemicals 

COMPOUNDING CHEMICALS

Fats and fatty acids 

Soaps 

Additives 

Other chemicals 



Equals 100 box cars each containing 80,000 pounds

Although production and sales of chemicals by the petroleum industry are expanding rapidly, the "traffic" is by no means on a one-way street. The oil industry requires very substantial tonnage of chemicals in its manufacturing and oil producing operations and is one of the chemical industry's biggest customers. For example, Texaco's chemical purchases by its Refining Department alone for just one year—1951—are depicted

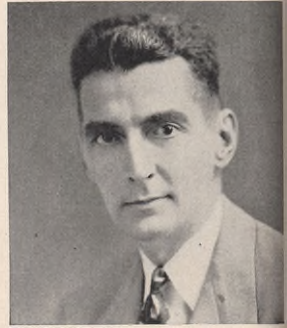
above. Purchased from many different suppliers, these chemicals represent the expenditure of millions of dollars. The chemicals Texaco uses are derived from many different sources. For instance, cattle provide stearic acid, used in grease manufacturing; furfural, used in solvent refining of lubricating oils, comes from agricultural wastes. This list could be expanded to include all major industries and innumerable minor ones.



O. J. Dorwin
*Vice President
 and General Counsel*



A. N. Lilley
*Vice President
 Foreign Operations—Eastern Hemisphere*



A. M. Ottignon
*Vice President
 Supply and Distribution*

Board Elects Four New Vice Presidents

CHAIRMANSHIP OF PIPE LINE COMPANIES IS CREATED

At the December 7, 1951, meeting of Directors of The Texas Company, O. J. Dorwin, A. N. Lilley, A. M. Ottignon, and J. H. Pipkin were elected Vice Presidents.

Also in December, Directors of The Texas Pipe Line Company—a wholly owned subsidiary of The Texas Company—elected R. B. McLaughlin to the newly created position of Chairman of the Board. Mr. McLaughlin has also assumed chairmanship of The Texas-Empire Pipe Line Company and Texas-New Mexico Pipe Line Company, which are affiliates of The Texas Company.

J. W. Emison, formerly Vice President and General Manager of both The Texas Pipe Line Company and Texas-New Mexico Pipe Line Company, and Vice President and Assistant General Manager of The Texas-Empire Pipe Line Company, succeeded Mr. McLaughlin to the presidency of the three companies.

Oscar John Dorwin, formerly General Counsel of the Indian Refining Company, joined Texaco when Indian passed into control of The Texas Company in 1931. He was elected Texaco's General Counsel in 1944.

A. Neil Lilley has had wide experience in foreign operations. He was assistant manager of the French company, Societe des Raffineries de Petrole de la Gironde, before he resigned to become General Manager of Foreign Operations-Eastern Hemisphere for Texaco in 1949.

A. M. Ottignon has been a Texaco employe for 36 years, starting as Office Boy. Before assuming his present duties, he was Assistant to the President.

James H. Pipkin started with Texaco in the Legal Department at Houston in 1934. He was transferred to New York as Assistant to the Executive Vice President and, successively, became Assistant to the President, Assistant to the Chairman of the Board, and General Manager of Industrial and Public Relations.

Ralph B. McLaughlin and **John W. Emison** are both veteran pipeliners. Mr. McLaughlin started work for The Texas Company in 1906. When The Texas Pipe Line Company was organized in 1917 he became its Assistant Secretary. He was elected President and General Manager in 1947. Mr. Emison started as a Clerk with the Company in 1920. He was elected Vice President and Assistant General Manager in 1947. **END**

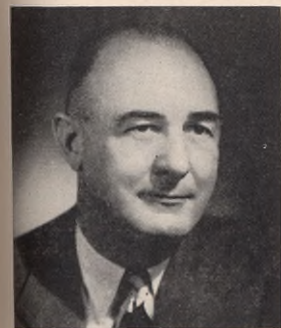
SUPPLY AND DISTRIBUTION DEPARTMENT IS ESTABLISHED



J. H. Pipkin
Vice President
Industrial and Public Relations



R. B. McLaughlin
Chairman of the Board
The Texas Pipe Line Company



J. W. Emison
President
The Texas Pipe Line Company

Establishment of the Supply and Distribution Department, which is headed by Vice President A. M. Ottignon, was effective on January 1, 1952. The new department was created because the management of your Company believes that supply and distribution problems will become even more complex in the future than they have been in the past and would, as a consequence, demand more of the time of the executives who have heretofore been responsible for these matters than they can devote to such problems in the ordinary conduct of their business.

Also on January 1, the Manufacturing and Marketing Committee was abolished.

The Supply and Distribution Department is responsible for:

1. That portion of the Manufacturing and Marketing Committee's procedure which dealt with the coordination of supply and demand and the allocation of products between departments where shortages might exist. The Supply and Distribution Department receives the demand figures from the selling departments and is responsible for the coordination of these figures with refinery supply.

2. Seeing that Texaco products reach the point of sale at the lowest possible transportation cost.

3. Making continuing studies of long range estimates and demand so that information may be available to all operating departments for their guidance in handling such matters as crude supply, marine transportation, pipe lines, refinery capacities, and similar affairs.

4. Making transportation studies involving pipe lines and marine movements.

A "Supply and Distribution Policy Committee" has been created and consists of J. S. Leach, Executive Vice President (Chairman); A. C. Long, Executive Vice President; M. Halpern, Vice President in charge of Refining; R. L. Saunders, Vice President in charge of Domestic Sales; and Mr. Ottignon.

To take over functions of the Manufacturing and Marketing Committee other than those assigned to the new department, a Refining and Sales Committee has been organized. J. S. Worden, General Manager, Refining Department, heads the newly formed committee.

E. O. Perkins, formerly Assistant General Manager of the Marine Department, has been named General Manager of the Supply and Distribution Department.

An Analysis of Synthetic Liquids

W. S. S. RODGERS HEADS NATIONAL PETROLEUM COUNCIL COMMITTEE

It has been a well-known fact that coal and oil shale could be utilized to provide liquid fuels in the event—now only a remote possibility—that the world's supply of crude oils be exhausted or inadequate as a source for future needs.

The American oil industry, operating as private enterprise under competitive conditions, has long been exploring the frontiers of producing liquid fuels from coal and oil shale, as well as from natural gas. The industry, which has never failed to fulfill the nation's military and civilian needs during peacetime and wartime, will be ready with suitable processes for manufacturing synthetic oil products if the day ever comes when the world's crude oil production might not equal the demand for petroleum fuels and lubricants.

However, because of the unprecedented demand for petroleum fuels during World War II and the postwar period, and because of the uncertainty in some quarters as to whether this country possessed an adequate supply of petroleum to face another emergency, President Truman in March of 1948 approved a three-year extension of a program originally approved in 1944 for the Bureau of Mines of the Department of the Interior to investigate and develop processes for producing synthetic liquid fuels from oil shale and coal. Since 1948, the Bureau of Mines has constructed demonstration plants, where experimental work has been in progress.

In connection with their work the Bureau of Mines has made and published various estimates on the costs of manufacturing synthetic liquid fuels from coal and oil shale. Since these costs as estimated by the Bureau of Mines are considerably lower than those calculated by well informed industry groups, a controversy developed through various publications on the matter.

As a means of resolving at least some of the

differences in the Bureau of Mines and industry figures, the Honorable Oscar L. Chapman, Secretary of the Interior, in April, 1950, requested the National Petroleum Council to create a committee to:

1. Review estimates made by the Bureau of Mines of the cost of producing synthetic liquid fuels, and its estimates of comparative costs of producing liquid fuels from crude oil.
2. Prepare independent cost estimates.
3. Make recommendations as to ways and means, if any, for improvement of future cost estimates by the Bureau of Mines.

In response to this request, the National Petroleum Council organized the Committee on Synthetic Liquid Fuels Production Costs, and appointed W. S. S. Rodgers, Chairman of the Board of Directors of The Texas Company, to the chairmanship.

One of the initial steps taken by the National Petroleum Council Committee was to establish a subcommittee made up of experts in the synthetic fuels field to assist in analyzing the technical aspects of the highly complicated problem. Contributing companies made available the services of a large number of qualified specialists in research, development, and engineering.

Inasmuch as the Bureau of Mines was not prepared to offer estimates of the costs involved in the production of products from crude petroleum, it was necessary—and the Bureau of Mines so agreed—to remove this phase from the scope of the project.

On October 31, 1951, Mr. Rodgers presented the report of his Committee on Synthetic Liquid Fuels Production Costs to the National Petroleum Council. The substance of the report is presented here as a matter of interest to stockholders and employees of The Texas Company and to other readers of THE TEXACO STAR.

Fuels Production Costs

The National Petroleum Council's Committee on Synthetic Liquid Fuels Production Costs reported that the synthetic fuels work done by the Bureau of Mines falls into three categories: (1) production of synthetic liquid fuels by hydrogenating coal; (2) production of liquid fuels from oil shale; and (3) production of synthetic liquid fuels by gasifying coal and converting the resulting mixture of carbon monoxide and hydrogen to liquid fuels by some modification of the Fischer-Tropsch process.

However, the Committee's report included work completed to date on only the first and second processes since the Bureau of Mines did not have adequate information for the proper appraisal of the process identified in the third category when the National Petroleum Council began its part of the project. Only recently, the Bureau of Mines presented additional data on that process for review by the subcommittee.

In accordance with the scope of the work assigned to the Committee, the investigation was limited to the process steps upon which the Bureau of Mines cost data had been based.

To increase the general usefulness of the study the Committee considered it desirable to determine costs not only for possibly unique situations that might arise from a particularly favorable or unfavorable first-plant location, but also for a more nearly average case in which a number of plants would produce a combined total for each process of around 200,000 barrels of liquid fuels per day. Thus estimates of costs and of material requirements were determined for both single plant and multi-plant cases.

Coal Hydrogenation

The estimates for the coal hydrogenation operation were based on procedures which were developed in Germany and on the assumption that coal was available in sufficient quantities, at a mineable depth and thickness and at a location having sufficient

water required for the operations.

The coal is prepared for hydrogenation by cleaning and crushing operations which reduce the ash content to as low a value as is practical and which bring the coal to a size suitable for the hydrogenation operation. In the cleaning and crushing operations a large amount of higher ash content and other off-grade coal is produced. This is used for steam generation and other heat duty.

The clean fine coal is mixed with heavy oil recycled from the process to produce a paste. This paste is charged to the liquid phase hydrogenation operation along with a small amount of catalyst. At approximately 10,000 pounds per square inch and at a temperature of 900° F. a large portion of the coal is liquefied. The material leaving this stage of the process is distilled to obtain a light oil and a heavy oil. Part of the heavy oil is recycled to the pasting operation and the remainder is coked to provide a means of rejecting the ash and used catalyst. In a second stage the light oil is hydrogenated over a fixed bed of catalyst at 10,000 pounds per square inch and 900° F. to yield gasoline and liquefied petroleum gas. Certain chemicals (phenol, cresols, xylenols) can be recovered from the first stage product. If not disposed of as chemicals, these products can be processed in the second stage to yield gasoline and liquefied petroleum gas. Conventional petroleum refining procedures are used for the final treatment of the products from coal hydrogenation operation.

Oil Shale Operations

The Committee's estimates for the oil shale operation were based on the assumption that shale is mined in large scale operations according to techniques developed by the Bureau of Mines. The shale from the mines is then crushed to a suitable size and charged to a retort in which the oil is broken out by the action of high temperatures. The necessary heat is ob-

tained by burning—in a separate part of the retort—the carbon remaining in the shale after the oil has been driven out.

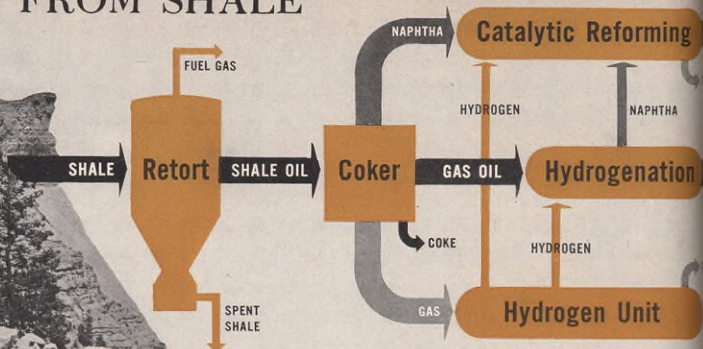
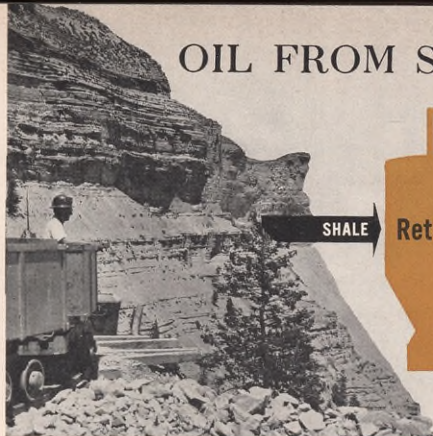
The crude shale oil thus obtained contains sulphur and nitrogen compounds and is highly unstable. The oil is subjected to coking operation and the resulting coker distillate is catalytically hydrogenated under moderate conditions (1,100#/sq. in. and 835° F.). This hydrogenated distillate yields materials which are processed by conventional means to recover finished and semi-finished products which are transported by pipe line from the plant to a major consuming area. Finishing operations as required are carried on at the pipe line terminus.

In each of the coal hydrogenation and oil shale cases the Committee set as a minimum a raw material reserve of 20 years. Costs were based upon operations conducted predominantly for production of gasoline and Diesel fuel conforming to present market specifications. All labor, material, and equipment costs were adjusted to January, 1951, levels. The derived product costs do not include allowance for marketing expenses. Chemicals and liquefied gas were credited as by-products in developing primary product costs.

Discussion of Results

When it was requested that the National Petroleum Council review estimates made by the Bureau of Mines of the cost of producing synthetic liquid fuels, the only datum available from the Bureau on the cost of producing synthetic liquid fuels from coal was its Report of Investigation 4,564, issued in 1949. The Committee found it necessary to escalate these cost estimates to adjust for inflation of material and labor costs. After this adjustment and on the basis of comparable facilities, the Bureau of Mines investment cost estimates were approximately 20 per cent below the cost estimates prepared by the Committee. However, the Bureau of Mines esti-

OIL FROM SHALE



mates omitted such items as certain off-site facilities, necessary interest on borrowed capital, income taxes, reasonable profit on investment, and treatment of other important capital cost items which the Committee felt need be considered. Detailed analysis of these differences was presented in the subcommittee reports made available to the Bureau of Mines, emphasizing that costs developed by the subcommittee were as authoritative as can be obtained without actual commercial operating experience of the processes considered.

In the case of shale oil operations, the Bureau of Mines had no formal report as a basis of reference for the study made. However, the Committee's representatives worked with the Bureau of Mines people in setting up a processing basis for the oil shale case. The Bureau of Mines personnel generally agreed to accept the subcommittee's estimate of investment and operating costs of producing liquid fuels from oil shale according to the processes reported on at that time. Therefore, the only large difference

between the subcommittee and Bureau of Mines estimates in this case was that resulting from capital cost treatment such as interest, taxes, and profit.

On the matter of preparing independent cost estimates, the conclusions reached represent the combined efforts of the most qualified people in the petroleum and coal industries. As an independent check, the Committee retained the services of Price Waterhouse & Co. to review procedures and basic accounting data used by the Committee in determining the estimated operating costs for the two processes. Price Waterhouse & Co. necessarily had to accept certain engineering data used in determining these cost figures, but insofar as the estimates used could be tested by the experience of the petroleum industry in refining operations, it was their opinion that the basic accounting data used were computed in accordance with generally accepted accounting principles and that the estimated cost figures developed from such basic accounting data were reasonable.

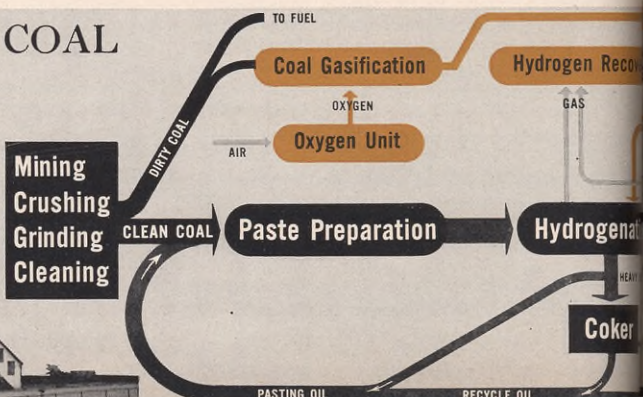
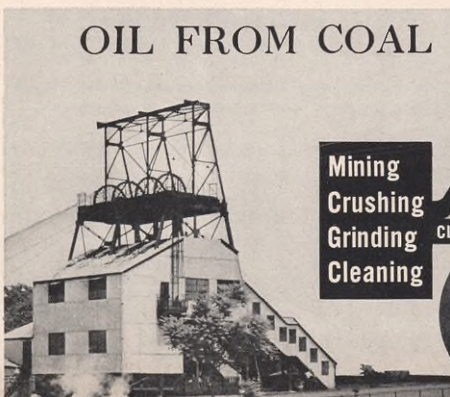
A summary of the data developed by the Council's Committee follows:

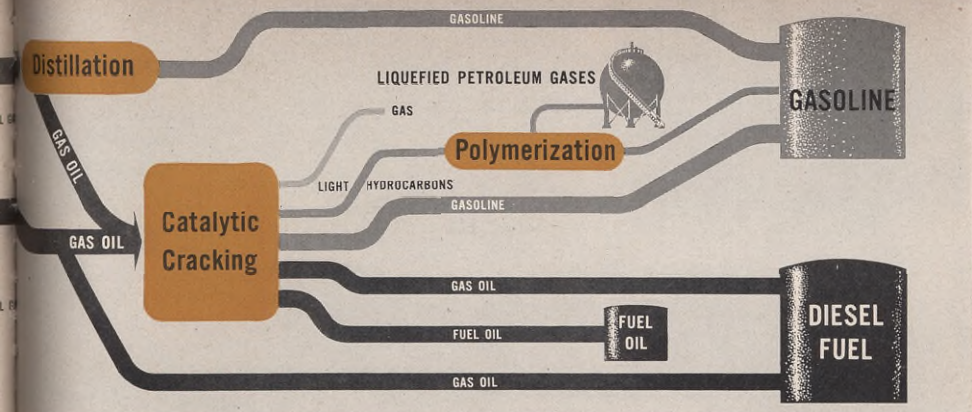
	Coal Hydrogenation	Oil Shale
Coal or Shale: Tons/Calendar Day	112,590	384,000
Products: (42 gals.)/Calendar Day		
Gasoline	163,830	126,900
Other Liquid Fuels	52,170	74,330
Total Liquid Fuels: Barrels/Calendar Day	216,000	201,230
Construction Materials Steel: Thousand Tons	1,710	694
Investment: Total—Millions of Dollars	4,074	1,518
Cost of Gasoline (with 6 per cent return on investment after income tax): Cents/Gallon	43.5	14.7

In the Committee's study, the income tax rate was taken at 50 per cent of income before taxes, and no effect was given to excess profit taxes.

Price Waterhouse & Co. stated the "opinion that an annual rate of earnings of not less than 15 per cent on the total capital invested in or retained in a business subject to the risks of a highly competitive and speculative enterprise would be necessary and

OIL FROM COAL





reasonable in order to attract investment of private capital." This compares with six per cent used by the Committee in its study.

The prices which synthetically produced gasoline would have to meet in free competition today are indicated in the following price quotations (as of October 1, 1951) for gasoline at refinery, terminal, or purchaser's bulk plant for four locations in the United States:

	<i>¢/gallon Regular</i>	<i>¢/gallon Premium</i>
Los Angeles	12.00	13.30
Denver	12.30	13.30
Salt Lake City	12.625	13.625
St. Louis	12.50	13.50

With regard to making recommendations as to ways and means for improvement of future cost estimates by the Bureau of Mines, the report points out that the preparation of reliable cost estimates is a most complicated and extensive undertaking. During the course of the study, Bureau of Mines representatives had numerous opportunities to review in detail the methods employed by the

industry organizations. With this experience to supplement their own backgrounds and with the information which is contained in the technical reports made available to them by the subcommittees, the Bureau of Mines experts should now be in a position to prepare comparable cost estimates for any known or new process combination.

An idea of the complexity of the problems and the thoroughness with which the project has been studied is indicated by the following tabulation of the Committee's time and efforts:

Number of subcommittee members	47
Additional technical personnel used	105
Total attendance at meetings (man-days)	590
Number of meetings	197
Number of man-trips	338
Total miles traveled	400,000
Total dollars spent	300,000
Outside companies consulted	115

Since the Bureau of Mines now has sufficient data for proper evaluation,

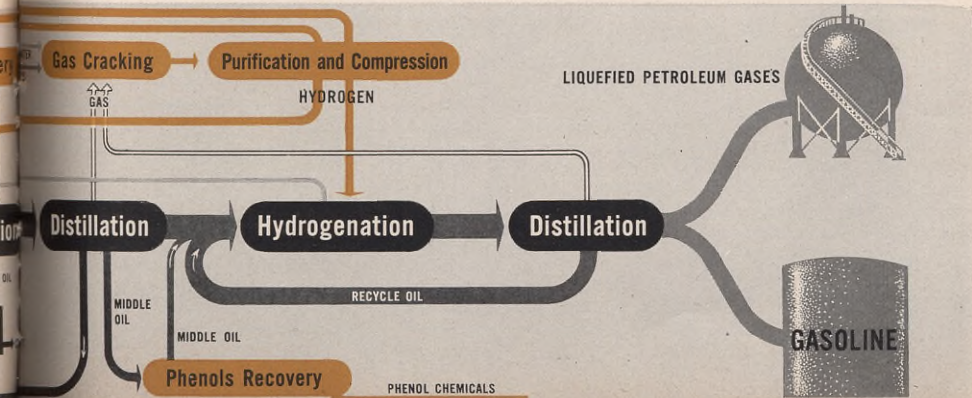
the Committee will continue its work, in order to prepare estimates of the cost of producing synthetic liquid fuels from coal gasification and the Fischer-Tropsch process.

Conclusion

The conclusion reached by the Committee is that coal hydrogenation for the production of synthetic liquid fuels is uneconomical.

The oil shale phase of the synthetic fuels program, the Committee found, was in a much more favorable position as to steel requirements, capital cost, and operating costs. It was estimated that known oil shale reserves will yield in excess of 100,000,000,000 barrels of oil.

Although excellent work has been done by the Bureau of Mines in the development of shale mining on a large scale, the resulting product costs are still significantly higher than those from petroleum. However, the Committee agreed that this source of fuel warrants continued attention by the petroleum industry. **END**



The Case of the Hypothetical Stockholder

A SHORT STORY APROPOS
OF OUR GOLDEN ANNIVERSARY

If you believe in fables, you can count on finding a pot of gold at the end of a rainbow.

If you are more practical and believe that a "pot of gold" is more likely to be found at the end of a long-term investment in a good common stock, you'll find corroboration in the case of the hypothetical Texaco stockholder.

"Cracking" the case in Texaco's Golden Anniversary year, "sleuths" in the Stock Transfer Division of the Company's Treasury Department have uncovered facts to illustrate how profitable a long-time investment in Texaco shares could have been.

They have traced a case of a shareholder who might have purchased one share of stock in The Texas Company on September 30, 1910—the first day the Company's stock was traded in on the New York Stock Exchange.



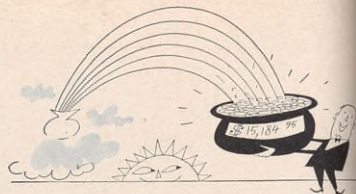
It was found that, if the hypothetical stockholder took advantage of rounding out stock issues, retained his stock dividends, and participated in the recent stock split, he would have accrued 174 shares, which would have cost him \$2,671.07 including his investment of \$136.50 in the original one share. In the meantime he would have

received \$5,614.95 in cash dividends. The 174 shares at \$55 a share would have been worth \$9,570 at the end of 1951, and the combined value of the stock and cash dividends would have been \$15,184.95—quite a "pot of gold" at the "rainbow's end"!



The facts compiled by the Stock Transfer Division are proof that, so far as Texaco stock is concerned, it is a good proposition to save dividends and plow the money back into additional stock. In the case of the hypothetical Texaco shareholder, "plowing back" would have given the stockholder by 1930—20 years after the purchase of the one share—a cash return in dividends equivalent to the amount of the investment at that time. In other words, the investment would have been \$1,600 in 1930 and by the middle of that year the accumulated cash dividends would have equaled that figure.

In the early years, the stockholder would have had to use other funds to meet various calls in stock subscriptions, but later events show that it



would have paid him to borrow, if necessary, to maintain his equity.

From 1930 on, cash dividends would have been more than adequate. The accumulation of \$645 between 1930 and 1937 would have topped the \$400 required for the 1937 Subscription Issue, and by the end of 1947 there would have been \$1,300 left in his dividend account after meeting the 1947 Subscription Issue call for \$630.

This year, when The Texas Company is observing its 50th Anniversary, there are many ways in which the Company's growth can be evaluated. The fact that Texaco stock, over the years, has been a sound investment—not only for the few score shareholders in 1902 but for the more than 115,000 owners of Texaco stock at the present time—is of special significance for Texaco stockholders in 1952.

Today, Texaco's stockholders—who for the most part are individual men and women, although many fiduciaries and estates, corporations, and banks are included in the total—are located in the 48 states and the possessions of this nation and in 52 foreign countries. More than half of the individuals holding Texaco shares are women.

Since 1903, when Texaco declared its first dividend (which was distributed to 109 shareholders in 13 states), the Company and its predecessors have paid 198 consecutive dividends, and numerous extras, to its shareholders up to the time this issue went to press.

Through the years of Texaco's growth, Texaco stock has afforded investors a regular and, we believe, a fair return on capital. Sound management, backed by a loyal and skilled organization of employees, has made Texaco stock a sound long-term investment during the past 50 years.

ETHYLENE GLYCOL for anti-freeze is going into this tank car at Jefferson Chemical's Port Neches plant. At Texaco's Port Arthur Terminal, the car's contents will provide the principal ingredient used in making Texaco PT Anti-Freeze



The year 1952 marks The Texas Company's 50th Anniversary—

a half century of service and progress, of more and better petroleum products, of American industry at high-level best.

Age of power and momentous production, the 20th Century

has found The Texas Company ready to serve the nation in peace, at war.

From a handful of stockholders and employees,

Texaco has grown to a Company that now numbers more than 115,000 stockholders and 40,000 employees, a Company producing more than 700 petroleum-derived products for America and the free nations of the world.

Today,

The Texas Company ranks as one of the major, fully-integrated oil companies engaged in all phases of petroleum operations from exploring for oil to marketing fine finished products.

In 1952,

the Company looks back upon great achievements from a modest beginning, but it also looks forward to the endless opportunities that lie ahead and to more years of improving and increasing Texaco products and services.

1902

*Faithfully
Yours*



*for
50
Years*

1952