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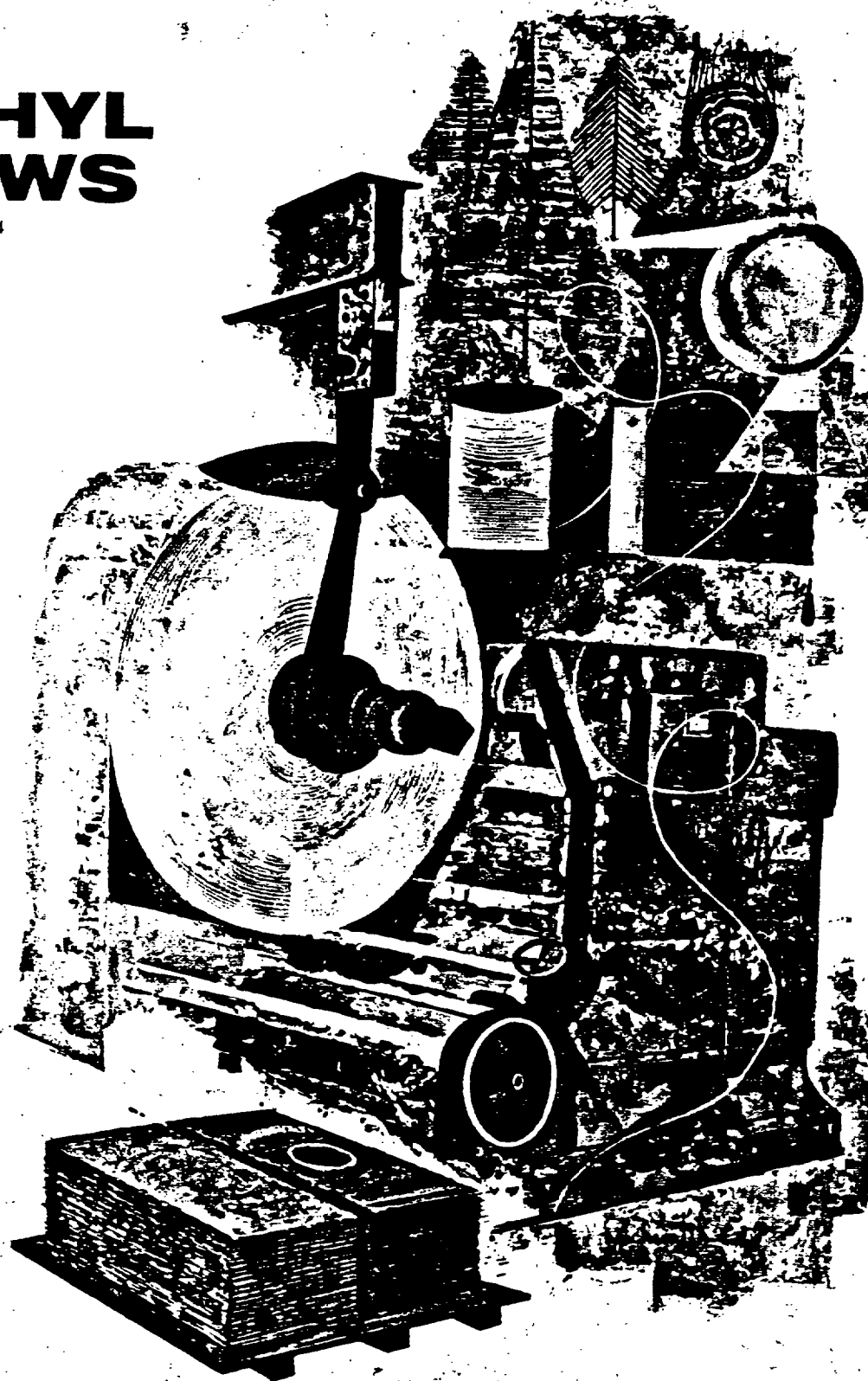
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ETHYL NEWS

FEBRUARY 1964



Multiwall Sacks—from Pine to Printed Product

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ETHYL NEWS

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Contents

A Better Buy than Ever 1

Multiwall Sacks 6

Come Test Your Driving Skill 10

Chemicals for Canada 13

TML Probes the Heavens 14

What's Behind the Income Tax? 16

Memorial Fund Honors E. L. Shea 20

"Ethyl" Products at Work 22

It's Time for Frostbite Fishing 24

Newsbriefs 28

THE COVER: See Multiwall Sacks,
Pages 6-9

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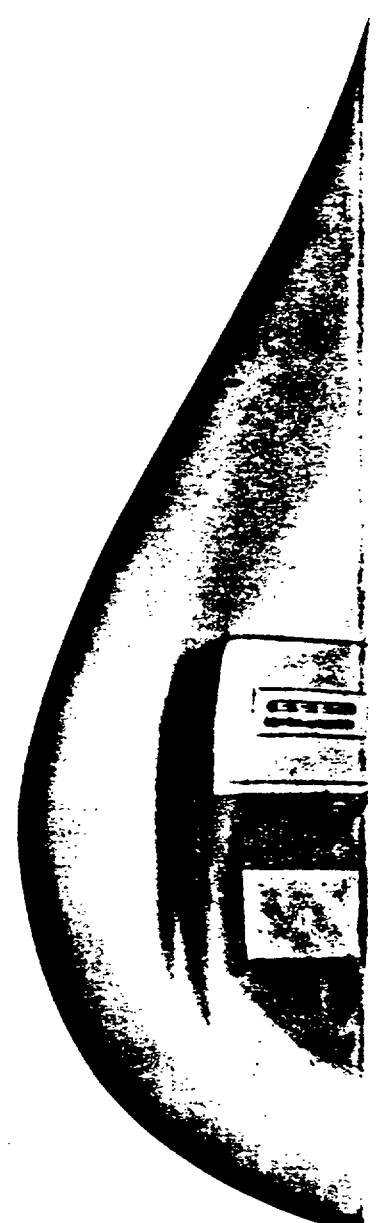
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A Better Buy than Ever

Gasoline does more work for the average motorist,
but he pays less for it than a decade ago

WHenever motorists put gasoline into the tanks of their cars, they are getting more for their money than ever before.

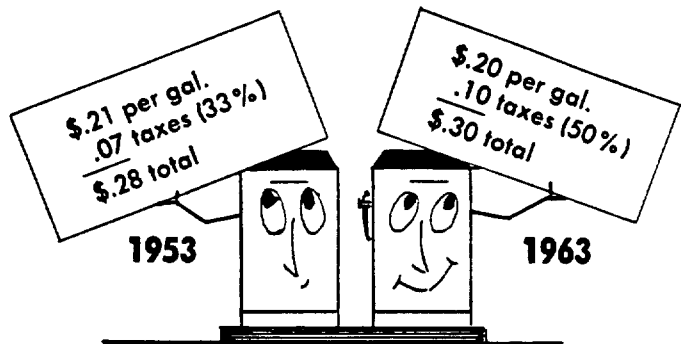
Surveys show, however, that not only car owners, but also truck drivers, commercial fleet operators and other motor fuel consumers aren't aware of the value they receive for every gasoline dollar spent.

They don't realize that gasoline today not only *costs less* than it used to, but that it also *gives more miles per gallon* for the average motorist than it did 10 years ago. Together with modern engines, modern gasoline provides Americans with more power, performance, safety and dependability — a package representing the world's best and most economical highway transportation.

Unfortunately, there is widespread unawareness that retail gasoline prices include federal, state and sometimes local taxes, and that these taxes increase gasoline costs to consumers by at least 50 percent. Nationally, taxes average 10 cents a gallon, giving rise to the valid slogan: "Gasoline is a good buy — only the tax is high." In fact consumers last year paid a thumping \$6.4 billion in gasoline taxes. Few luxuries are subject to more burdensome levies.

Although the owners of the country's 68.5 million automobiles will purchase and use most of the estimated 67 billion gallons

COST OF REGULAR GRADE GASOLINE

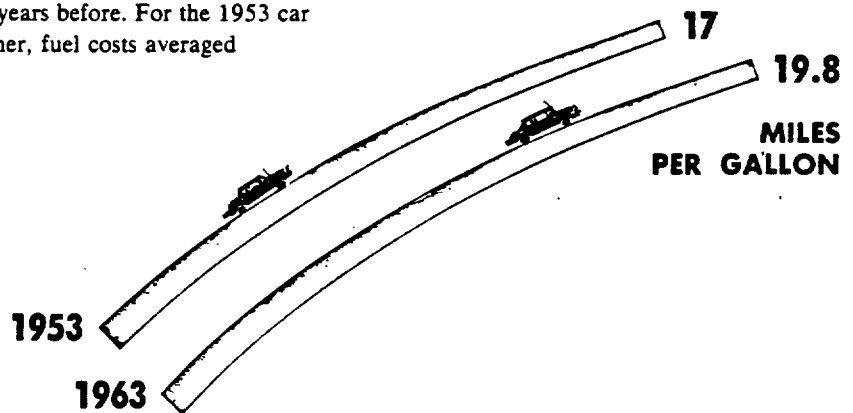


of gasoline to be sold in the United States this year, they seldom realize the bargain they get at service station pumps.

Road tests show that the average new 1953 car, using 1953 gasoline, traveled 17 miles on a gallon. In contrast, recent tests and estimates show that 1963 models — when new and operating on 1963 gasoline — went about 19.8 miles per gallon — a 16.5 percent improvement!

Contrasting the performance of the average car on the road in 1963 with the average car on the road 10 years earlier shows a 15 percent improvement in gasoline mileage.

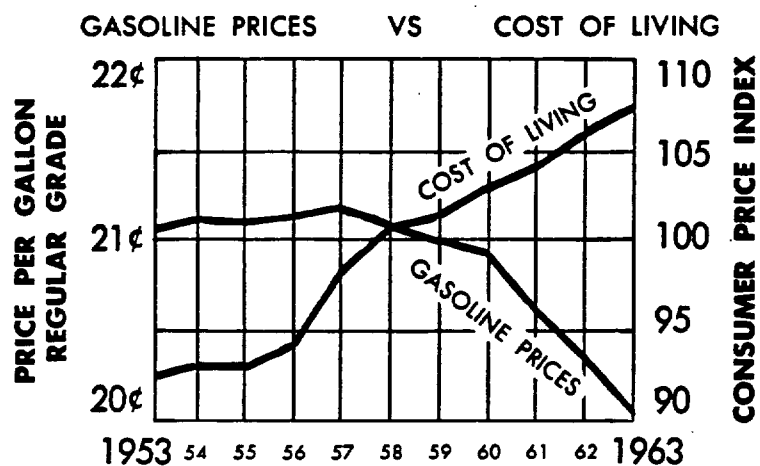
At the same time — while the price of almost everything else Americans buy had gone up — owners of new 1963 cars *paid 19 percent less* per mile for gasoline than the motorist with a new car 10 years before. For the 1953 car owner, fuel costs averaged



about 1.25 cents a mile, with taxes boosting the total to 1.69 cents. Last year, on the other hand, gasoline for driving the average 1963 car a mile cost only about 1.01 cents, excluding taxes, and 1.53 cents with taxes.

Considering all cars on the road, their owners' per-mile cost for gasoline was 18 percent less in 1963 than it was for the owner of the average car on the road in 1953. Specifically, the cost was down last year to 1.09 cents a mile from 1.33 cents, aside from taxes. When federal and state levies are included, the saving was still noteworthy: down from 1.78 cents a mile in 1953 to 1.66 cents last year.

These enlightening facts—and considerable additional data—are among significant findings compiled by Ethyl Corporation in continuing studies of gasoline prices,

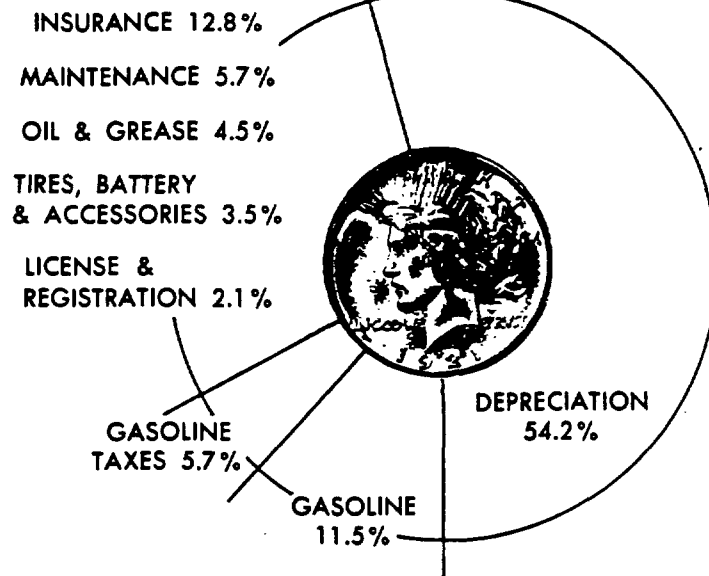


taxes, quality and performance over the years. Developments of the 1953-1963 decade demonstrate the tremendous technical and economic strides that the oil and automotive industries have made during the period — with the motorist the principal benefactor.

The oil industry's ability to produce and market better gasoline at less cost to consumers is particularly remarkable in the light of a 16 percent increase in the cost of living between 1953 and 1963, as measured by the Bureau of Labor Statistics.

In considering the cost of automobile ownership, operation and maintenance, most motorists think more about expenditures for gasoline than for other items — probably because they buy gasoline comparatively often. Actually, however, fuel costs are only a small part of total costs.

Many people overlook depreciation, for example, and seldom consider outlays for insurance, registration and driver's license fees. According to the American

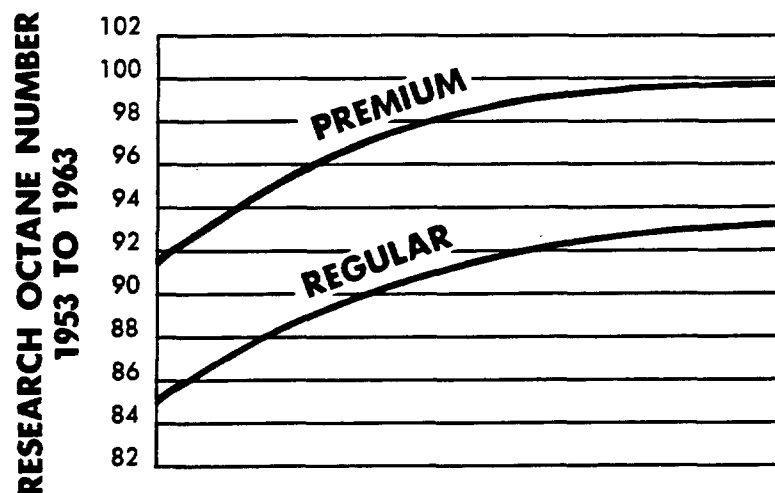


AVERAGE COST OF NEW CAR OPERATION: \$1,144 FIRST YEAR

Automobile Association, these fixed charges total about \$792 in the first year of ownership of a new model, popular-priced car, over and above garaging.

In addition, there are costs of 3.7 cents a mile for tires, batteries, lubricants, maintenance, accessories, and, of course, gasoline.

With the average automobile traveling about 9,500 miles annually, it costs about \$1,144, including fixed charges, for the first year of car ownership and operation, with this amount reduced thereafter when yearly depreciation is less. Of the \$1,144 total,



ETHYL NEWS

ETC 29739

only some \$132, or about 11.5 percent is for motor fuel, aside from taxes. When federal and state taxes are included, AAA statistics indicate that gasoline's cost is still only 17.2 percent of car ownership and operating expense — a much smaller proportion than the public generally realizes.

While gasoline costs are lower, gasoline quality improved in every way during the last decade. In octane number, for example, Ethyl Corporation's national surveys show that the level of regular grade gasoline in 1963 was higher than that of most premium grade gasoline in 1953. Octane number, of course, is a measure of a gasoline's ability to produce power without knocking under the severe pressure and temperature conditions encountered in modern engines.

Car Owners Profit from Better Gasoline and Engines

In keeping pace with engine demands for improved quality fuel during the decade, oil refiners had increased the average Research octane number of premium to 99.8 and of regular to 93.3 by the end of 1963. Modest additional increases are anticipated in 1964.

While successfully satisfying constantly growing demands for more automobiles, the automotive industry helps car owners profit from improved octane quality by increasing the compression ratio of engines.

In combination with higher octane gasoline, higher compression engines produce more power with practically no increase in engine size or weight. Together, they give motorists better performance and new margins of safety for passing.

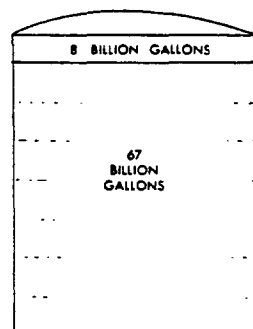
Ethyl statistics show that compression ratios rose from an average of 7.34 to 1 in 1953 to 9.17 to 1 last year. Current 1964 automobiles have a still higher compression ratio — averaging 9.24 to 1.

Better engines and better fuels also play an important part in conserving petroleum — one of our most vital natural resources. Without the progressive contributions of the oil and automotive industries since 1953 alone, close to eight billion more gallons of gasoline would be required annually to power cars, trucks, buses and other mechanized equipment. For that much gasoline, some 400 million barrels of petroleum would be required — 15 percent of all American crude production for an entire year, or the total annual production of the wells of 20 of the country's oil states.

Savings at the individual level are comparable. If there had been no improvements in gasolines and engines since 1953, the average car owner would need about 100 more gallons of fuel a year. Buying this gallonage and paying taxes on it would increase his annual gasoline bill by at least \$30.

Instead, oil and automotive industry progress has given the motorist a bonus of more than 1,500 miles of free transportation a year — enough for a trip from Houston, Texas, to New York City. •

Without better fuels and engines, the U.S. would need some eight billion more gallons of gasoline annually than the estimated 67 billion gallons to be consumed in 1964.



Multiwall Sacks

from Pine to Print



THE COVER artwork traces the progression of Raymond multiwall sacks from pine trees, through pulp and paper making, to bag printing and fabricating, ready for packaging and shipment to ultimate users.

Raymond Bag, a division of Ethyl's
Albemarle Paper Manufacturing Co.,
is big producer of shipping sacks

A HEAVILY-UNDERLINED note from the Oklahoma chemical company's packing department superintendent was attached to the requisition for two carloads of multiwall shipping sacks the superintendent sent to his purchasing agent.

"Greatly prefer bags from Raymond Bag Company," it stated in no uncertain terms.

The chemical company packing superintendent is not alone in his preference for Raymond Bag Company's multiwall sacks. Hundreds of well-known companies throughout the East, South and Midwest have long used Raymond bags for packaging millions of tons of chemical, fertilizer, building material, seed, food, feed and many other products in 25 to 100 pound quantities.

One of the converting divisions of Albemarle Paper Manufacturing Company, wholly-owned Ethyl Corporation subsidiary, Raymond is a leading multiwall bag manufacturer. In efficient plants in Middletown, Ohio, and Richmond, Va., Raymond produces an impressive array of millions of attractively printed, high-strength multiwall bags, especially designed and constructed for the products they package and the markets in which they are sold.

Raymond bags are made in constructions of 3, 4, 5 and 6 plies of special shipping sack papers manufactured in Albemarle mills. Shipping sack kraft is made to rigid specifications and made of long fibers properly interlaced to obtain maximum strength, flexibility and durability.

product



Tons of food, feed, building materials, fertilizers, chemicals, seed and many other products are packaged and shipped in Raymond bags.

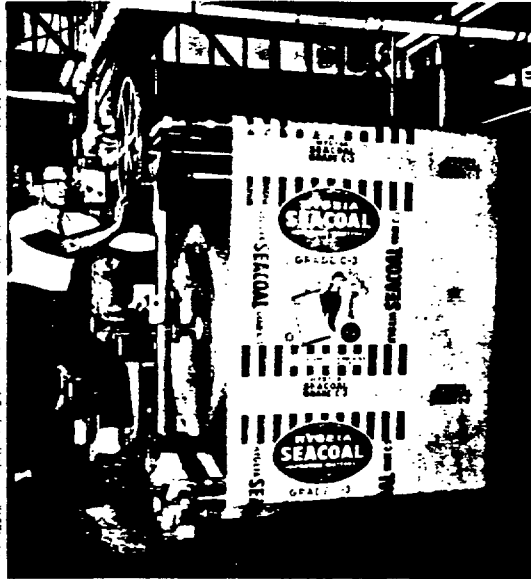
To provide the exact type and degree of protection required for the product to be packaged, Raymond uses flexible waterproof and moisture-proof barriers and papers containing special coatings, laminants and other treatments that make bags insect resistant, greaseproof, acidproof and scuff resistant. Special coatings also are used in sacks for packaging such commodities as synthetic rubber, asphalt, waxes and resins to prevent the material from sticking to the paper.

Raymond was the originator two years ago of a unique, modern bag with a polyethylene tube inner liner, the Raymond MPS (Multiwall Perfect Seal), for maximum protection of contents from moisture. The liner is built into the bag during its manufacture and the bottom is sewn

and heat sealed. Raymond MPS offers a number of construction and use advantages over imitations that have followed its introduction.

Creation of Raymond bags to meet the individual requirements of products and customers starts far ahead of production lines in the company's plants. Raymond sales representatives work with bag users and suggest the size, type and design of bag and the most appropriate construction. Then, helping customers take advantage of available advertising space on the bag, they cooperate in the preparation of attractive layouts and designs. These may include product name, information and instructions for use, company identification and trade mark, or any other data that may be desirable.

Multiwall Sacks—from Pine to Printed Product



Above, paper stock, which will form the outer ply of Raymond multiwall sacks, is imprinted with words and illustrations on multi-color presses. Right, sewn-bottom bags come from sewing machines on conveyor belt and are prepared for packaging and prompt shipment to customers.

Raymond's art department usually creates designs for approval by customers — or works with supplied artwork — and follows through with the production of printing plates to insure the accuracy and quality of reproduction.

Paper from which bags are to be fabricated is delivered in large rolls. Stock for the outer ply is run through high-speed, multi-color presses, where it is imprinted with words and illustrations, and then rerolled.

Formation of the bags starts on "tubers" where the outer ply and the inner two or more plies



are assembled, pasted longitudinally and cut to proper lengths. Bottoms and tops are closed in several ways, depending on the type of bag and its intended use. They may be pasted on a "bottomer," or taped and sewed, heat sealed or completed in a combination of ways.

Bags left completely open at the top are closed, usually by sewing, by the user after the product has been put inside. Bags closed at both top and bottom at the Raymond plants are equipped with a paper "valve" through which contents are inserted. A sleeve may be attached to the valve which is tucked into position to prevent leakage.

Provide Prompt Service

Raymond's strategically located plants, efficient equipment and the know-how of its experienced personnel enable the company to provide prompt delivery of high quality bags. Orders can be processed, bags printed, made, packaged, and dispatched by railroad car or motor truck in a matter of days.

Besides Raymond's salesmen working with multiwall bag users in recommending the best design and construction, its engineers design and assist customers in the installation and use of modern bag-filling equipment that fills, weighs and closes bags automatically.

Looking ahead, the Raymond packaging laboratory is constantly testing and evaluating the physical and barrier properties of possible new paper, plastic and other bag-making materials and the qualities of all-plastic or other new types of bags.

The company plans to install a modern new machine to manufacture all-plastic bags early this year, as well as a new six-color flexographic press. The press will not only print on plastic bag materials but also will produce fine quality color screen printing on paper for dog food bags, lawn and garden fertilizer and seed bags, and other packages for retail consumer markets,

where unusually attractive and colorful containers are important.

Because of Raymond's established reputation in the multiwall shipping sack field, built by the quality of its products and services, its list of customers reads like a Who's Who in American industry and agriculture. It includes such names as Dow, Allied, duPont and Goodyear, in chemicals; Celotex, National Gypsum, Ideal Cement and Aetna Portland Cement, in building materials; Land o' Lakes, Central Soya, Morton Salt and International Milling, in food and feed; and many others.

Raymond's improvements in conventional types of multiwall shipping sacks and its pioneering in new types of high-strength bag packaging are expected to win new friends for the company and its products in the years ahead. •



Besides creating and producing special bags to suit customers' requirements, Raymond designs and supplies modern, efficient bag-filling equipment.

A challenging invitation awaits
visitors to the Mobil Oil pavilion
at the New York World's Fair. It's . . .

Come Test Your Driving Skill



At the wheels of simulated cars, participants in Mobil Economy Run "games" will respond to typical highway situations appearing on TV screens in windshield positions. Winners will be drivers whose abilities give them the best gasoline mileage, as computed automatically by special electronic devices.



- **W**HAT ARE THE ADVANTAGES of a steady foot on the accelerator, instead of an irregular, nervous one?
- Are there serious hazards in following the car ahead too closely?
- How should a good driver pass other cars safely and courteously?
- Do sudden stops and jackrabbit starts waste much gasoline?

Mobil Oil Company will dramatically demonstrate the answers to these and related questions, and their effect on miles-per-gallon performance, for visitors to the New York World's Fair—which opens its two-year run this April. At Mobil's Economy Run pavilion in the Fair's transportation section, motorists will be invited to test their driving in simulated cars and see how their skills affect safety, performance and fuel economy.

Up to 36 visitors will be able to participate in Mobil's driving "game" at one time, matching their abilities against actual Economy Run records and against each other. While listening to instructions

Moments of tension and anxiety are in store for less experienced motorists when picture sequences with emergency potentials appear, calling for quick and skillful reaction to avoid accidents. Serious blunders will trigger flashing red lights over offending drivers.



Come Test Your Driving Skill

by attractive hostesses, contestants will be seated in mock-up units which include driver's seat, steering wheel, accelerator, brake, speedometer and other equipment duplicated from a standard 1964 medium priced car.

"Drivers" will face closed circuit television screens on which moving pictures of actual urban and open road situations appear. For the most part, scenes photographed and put on sound track film will represent circumstances which professional drivers encounter during Mobil's cross-country runs.

Pictures to Change

In general, all contestants will face the same driving situations through their "windshields" (TV screens) simultaneously. But if an individual driver makes a serious mistake that would cause an accident on the road, a red light will flash and his picture sequence will change to show the disastrous results—with full sound effects. Moments later, however, his screen will put him back on the same road with the others, so that he will be able to finish the drive.

All participants are able to see how their driving skills would affect their comparative progress on a long trip. Lights representing each car will move across a huge map of the United States, along a typical Mobil Economy Run route eastward from California.

Each driving "game" will last for four minutes. At the conclusion, the miles-per-gallon performance of each participant will be automatically calculated by special electronic devices wired to essential driving components of the simulated cars. The result will be flashed on a panel in front of each driver, and the winner will be announced and presented with a memento testifying to his skillful performance. All participants will be given windshield stickers for their own cars.

Mobil is sure that the New York World's Fair model of its Economy Run will be popular, since a similar but smaller version at the Seattle exposition of 1962 drew record crowds. The company expects some 10 million visitors to its pavilion, now nearing completion, and estimates that at least 1,200,000 people will want to test their driving abilities. ●

Of clean-lined simplicity, the Mobil Economy Run pavilion at the New York World's Fair is expected to attract some 10 million visitors, with close to 1,200,000 of them testing their driving skills.





Chemicals for Canada

CONSTRUCTION WILL START in April on a new industrial chemicals plant which will produce antioxidants, aluminum alkyls and additional additives for gasoline and other petroleum products at Ethyl Corporation of Canada's antiknock compound manufacturing center at Sarnia, Ontario. Scheduled for completion about September 1, the new manufacturing facilities will implement Ethyl of Canada's expansion and diversification program.

The aluminum alkyls will be the first such products made in Canada, just as "Ethyl" antiknock compounds were the first Canadian-made antiknock compounds when the Ethyl of Canada plant went into production in 1956.

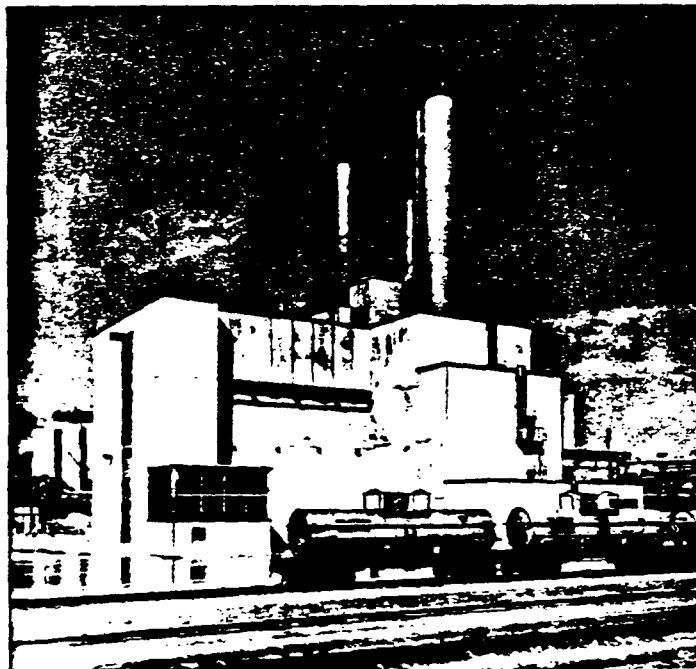
Aluminum alkyls are modern chemicals used in detergents, as catalysts in the manufacture of synthetic rubber and plastics, and as chemical intermediates. Their self-igniting properties make them potentially useful in jet engine ignition systems and in some rocket fuels.

"Ethyl" antioxidants, which are manufactured by a patented process developed by Ethyl, are used in gasolines, jet fuels, and industrial and lubricating oils, to inhibit oxidation, prevent rust and wear, control gum formation and preserve the products'

desirable properties. The antioxidants also have applications in preventing deterioration in natural and synthetic rubbers, and in plastics, fibers and resins.

Other additives to be produced initially at Ethyl of Canada's new facility include "Ethyl" Multi-Purpose Additive 9, a widely used gasoline detergent, de-icer and corrosion inhibitor; and "Ethyl" Metal Deactivator, a gasoline and distillate fuel additive which effectively prevents gum formation.

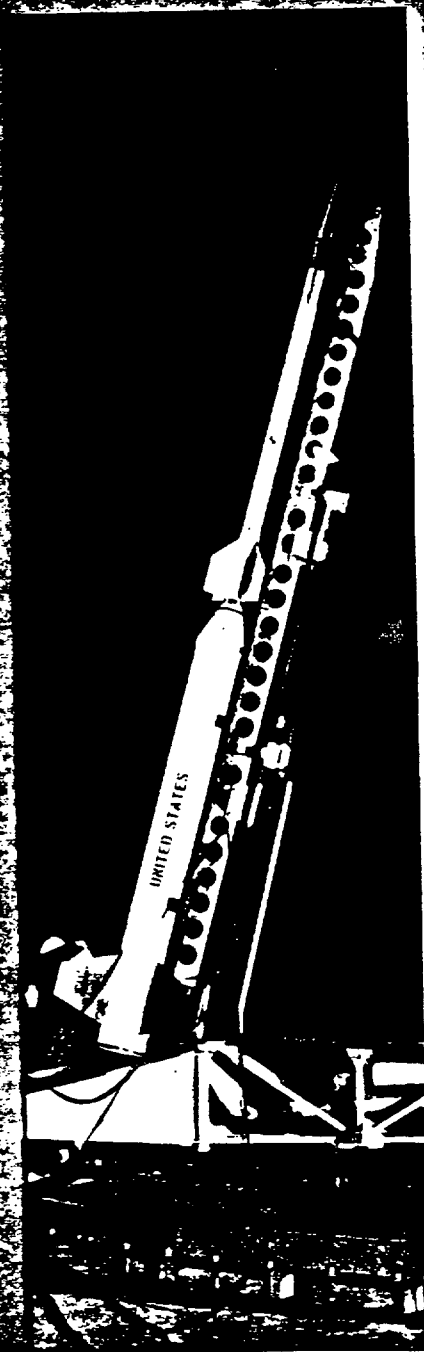
Possible new uses for all of these products are constantly under study in Ethyl research laboratories. •



New facilities for producing industrial chemicals will be built at Ethyl of Canada's antiknock compound plant at Sarnia, Ontario.

WILL

the Heavens



...highly effective ... gasoline man- ... by Ethyl Corpora- ... use by the ... Space Adminis- ... and character- ... earth.

... mixture of 80 per- ... (TML) and 20 percent ... Ethyl Re- ... launched into ... upper atmosphere by a Nike-Cajun, two- ... solid-propellant rocket.

... The space exploration shot was fired from ... under the direction of ... NASA Langley Research ... Hampton, Va. Near an ... 60 statistical miles, the chemical ... ejected from the special ... rocket.

... the TML vaporized when ... reaction took place. The lead ... reacted with the atomic oxy- ... and emitted a ... the blue portion of the ... about 20 seconds.

... the glow was ... cameras and the

ETHYL NEWS

resulting pictures are now being studied by NASA scientists to learn more about high-altitude winds and air turbulence.

The Langley Research Center describes the flight as "the initial phase of a program to study the upper atmosphere." Experiments of this type help "determine the characteristics of the upper atmosphere through the use of chemically-produced luminous clouds. Optical measurements of such clouds will provide information on high-altitude winds, turbulence, and the composition of the lower reaches of the ionosphere."

Besides preparing and supplying the TALL-toluene mixture, Ethyl provided a field engineer, W. W. Sweeney, of Lynchburg, Va., to demonstrate safe filling and handling techniques to NASA personnel. Mr. Sweeney loaded the compound into the special container in the nose of the Nike-Cajon launch vehicle.

After the compound was ejected from the container, the burned-out rocket and empty payload continued their flight through the upper atmosphere and several minutes later dropped into the Atlantic Ocean about 100 miles offshore, as planned.

Ethyl supplied enough of the TALL-toluene mixture for about three launches. The remainder of the material is at the Langley Research Center for possible future use.

FEBRUARY 1964

What's Behind the Income Tax?

By Frank L. Remington

AS TAXPAYERS throughout the nation roll up their sleeves to battle with Form 1040, returnable to the Collector of Internal Revenue on or before April 15, most people hope for evidence of President Johnson's announced intention to get a dollar's worth of value for every dollar Washington spends.

John Q. Public has every reason to want the federal government to get its money's worth. So do American business and industry. Of some \$100 billion in federal taxes collected last year, by far the largest proportion came from levies on income. Again this year, income taxes will provide the government with more revenue than any other source. And nobody enjoys seeing tax money wasted.

The United States depends more on income taxes than any other nation in the world. Eighty-six percent of what the government takes in comes



It's a brutal job, of course, to answer questions Form 1040 asks, above, but even so, this kind of torture is mild in comparison with floggings, left, suffered by reluctant taxpayers in ancient Egypt, Greece and Rome.



from such sources, in comparison, for example, with 53 percent in Sweden, 31 percent in Switzerland and 26 percent in Italy. Khrushchev and his colleagues get only 15 percent of Russia's needs from income taxes, collecting 85 percent from stiff sales levies and other ways of tapping Ivan's pocketbook.

Most Americans work from three to four months a year to cover what Uncle Sam asks. The average 30-year-old citizen will pay some \$47,000 in taxes by the time he retires at 65, with a major share going to the U. S. Collector of Internal Revenue. It takes most companies from January until early July to earn enough to meet their federal income tax obligations, to say nothing of other tax bites.

Contrary to popular opinion, income taxes are neither new nor original with Americans.

Torture for Delinquents

There is evidence that China, Egypt, India and Greece imposed income taxes long before the Christian era. Collecting was anything but a routine procedure, however. Frequently it involved armed agents rounding up sheep and cattle from unarmed taxpayers. The Romans had income taxes too, with torture for anyone who refused to ante up.

By the nineteenth century, most major European nations were using some kind of income taxes as important sources of revenue.

In the United States, a federal income tax was suggested for the first time during the War of 1812 by Alexander J. Dallas, secretary of the treasury. If hostilities with England had lasted a few more months, the tax probably would have been imposed. In those times, incidentally, total government expenditures were \$11 million annually—about what Uncle Sam now disburses in an hour.

Congress enacted the United States' first income tax legislation in 1862, when President Lincoln was in the White House. It was a temporary levy to help raise money for Union expenses in fighting the Confederacy, and called for a three percent payment on individual incomes over \$800 annually. A year later, the tax was applied to

What's Behind the Income Tax?

all incomes over \$600. On incomes exceeding \$10,000, the rate was five percent.

Some politicians, enthusiastic over the income tax's revenue potentials, proposed higher rates. When one solon recommended progressive levies up to 25 percent, a contemporary Congressman compared taking such large proportions of peoples' incomes with "highway robbery." What would he call taking up to 91 percent today?

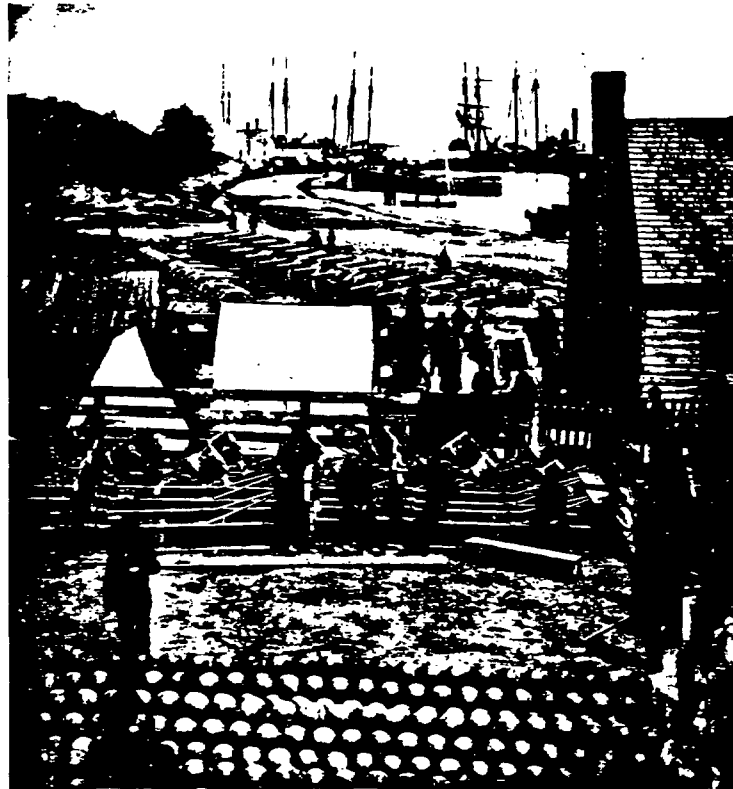
In 1870, Representative Dennis McCarthy of New York moved to kill existing collection statutes. "This tax," he said, "is unequal, perjury-provoking and crime-encouraging, because it is at war with the right of a person to keep private his business affairs and financial matters . . . It makes the tax collector a spy . . ."

The effective life of the wartime income tax

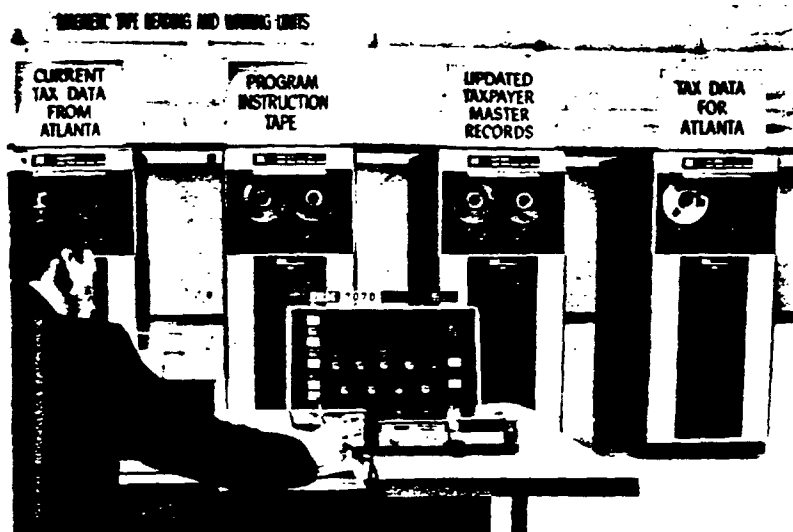
expired a year later, and was not revived until 1894, when Congress approved a two percent levy on all incomes over \$4,000. The tax applied to all "gains, profits and incomes derived from any kind of property, rents, interest, dividends or salaries, or from any profession, trade, employment or vocation."

The Supreme Court declared the tax unconstitutional in 1895 and Americans paid no federal income taxes for the next 18 years.

In 1909, an amendment to the Constitution began making the rounds of state legislatures, but was bitterly opposed in many quarters. Virginia's Richard E. Byrd, father of today's Senator Harry F. Byrd, called the proposed amendment "A hand from Washington stretched out and placed on every man's business. The eye of the federal in-



Yankees became the first American income taxpayers during the Civil War, when the Union needed money to buy military supplies and equipment.



More automatic equipment is being installed at Internal Revenue Service centers to process tax returns quickly and accurately. These machines can handle up to 250,000 numbers a second, compute refunds and credits and keep individual taxpayers' records.

spector will be in every man's counting house," he said. "The law will of necessity have inquisitorial features . . . An army of federal inspectors, spies and detectives will descend upon the states."

In spite of such arguments against a federal income tax, the Sixteenth Amendment was ratified in 1913. Congress lost no time in passing a specific income tax law.

Under provisions of this pre-World War I legislation, a married man with two children and an annual income of \$10,000 paid Uncle Sam \$60. Taxes on larger incomes were comparably small. Even so, the first year's collection netted \$28 million.

Income taxes have fluctuated considerably, of course, since 1913—mostly upward, as older taxpayers know. Only a little more than three million people had to pay anything in 1938, when nobody was taxed as much as \$500 unless he was a bachelor earning at least \$10,000 or a married man with two children and an income of \$12,500 or more.

In recent decades, however, income taxes have mushroomed to their present high rates, and reductions in the offing notwithstanding, almost everybody with a job and income large enough to support himself must pay.

The Internal Revenue Service today ranks as the biggest and most successful collection agency

in human history. It has close to 60,000 employees in 1,225 offices and processes about 100 million income tax returns annually.

This year the agency is introducing more automatic data processing equipment, which can verify the accuracy of returns at speeds up to 250,000 numbers a second, compute refunds and credits and maintain individual tax records.

As collector of the nation's bankroll, the Internal Revenue Service operates at a cost to the government of only half a cent on every dollar collected. Business and industry shoulder heavy additional expenses in their roles as collectors through withholding tax systems.

Although no American in his right mind enjoys paying income taxes, to say nothing of the headaches involved in preparing Form 1040 and its supplements, everyone recognizes them as almost inevitable.

People with a sense of values agree with the late Supreme Court Justice Robert H. Jackson's observation that our national response to income tax requirements, "often in highly burdensome amounts, is a reassuring sign of the stability and vitality of our system of self-government." The Internal Revenue Service adds its practical estimate that 97 percent of all those filing returns make every effort to do so honestly and with accuracy. ●

Memorial Fund Honor



Edward L. Shea, right, late director, former chairman and president of Ethyl, was active philanthropically on the board of the Crooked Mountain Foundation for training, educating and rehabilitating the physically handicapped. James E. Chandler, Foundation president, left, says that Mr. Shea "was one of our most devoted friends" and "a continuing inspiration to all of us at Crooked Mountain."

Edward L. Shea

AN EDWARD L. SHEA MEMORIAL FUND for the Shea Clinical and Research Wing of the Crotched Mountain Treatment Center for Children and Adults, at Greenfield, N. H., has recently been established in honor of the late director and former chairman and president of Ethyl Corporation.

Mr. Shea, who died last December, was a member of the corporate board of Crotched Mountain Foundation. The Foundation supports the Treatment Center, a complete modern organization for the training, rehabilitation and education of physically handicapped children and adults, and a research and training center for students of physical medicine and rehabilitation.

The Shea Clinical and Research Wing will contain a medical and technical library on rehabilitation, an audiological clinic for children and adults, x-ray facilities, an ophthalmological clinic, a dental unit, an adult therapy clinic and a research center for disabled adults.

In announcing establishment of the Edward L. Shea Memorial Fund, James E. Chandler, president of the Crotched Mountain Foundation, said: "Mr. Shea was one of our most devoted friends. His concern for handicapped children and adults is a continuing inspiration to all of us at Crotched Mountain."

Mr. Shea, who was 71 years old at the time of his death, was born in Nashua, N. H. in 1892 and was graduated from Princeton University in 1916. He was a naval aviator in World War I.

Shortly after graduation from college, Mr. Shea became associated with the former Tide Water Oil Company. He was elected a vice president of the company in 1925, executive vice president in 1931, and president in 1933. In 1939, he became president of the former North American Company, serving in that office until 1947, when he became president of Ethyl Corporation.

Mr. Shea was president of Ethyl Corporation from 1947 to 1956 and chairman of the board from 1956 until his retirement in 1960. He continued as a director of the Company until his death.

Mr. Shea was a member of the board of directors of the American Petroleum Institute from 1933 to 1939 and from 1947 to 1959. He was an honorary director from 1959 until the time of his death. He also was a director of the Equitable Life Assurance Society of the United States, Middle South Utilities, Inc., Pullman, Incorporated, Union Electric Company and A.V.C. Corporation.

Mr. Shea was a member of the board of managers of the Memorial Hospital for Cancer and Allied Diseases, a member of the board of trustees of the Presbyterian Hospital in the City of New York, and a director of the John and Mary R. Markle Foundation. •



"Ethyl

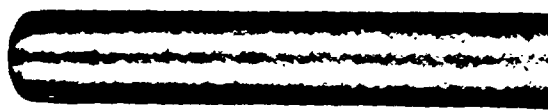
USED BEHIND THE SCENES — often in relatively small quantities — many of the chemical additives manufactured and marketed by Ethyl Corporation are rarely seen as they improve the quality and performance of petroleum products. But while the additives themselves are not seen, the results of their work can be captured by the camera. These sets of "before and after" photographs dramatically demonstrate the effectiveness of just a few of Ethyl's chemical products.

"Ethyl" Combustion Improver 2 (CI 2) is an organic compound of manganese which increases the cleanliness and efficiency of oil heat and at the same time promotes flexibility in refinery operations. CI 2 is highly effective in improving combustion characteristics of heating oil, in reducing its tendency to smoke (top) and in improving oil burner efficiency. The additive reduces smoke formation (lower photo) as much as 50 percent at low concentrations and up to 80 percent at higher concentrations. For dealers, CI 2 helps reduce burner maintenance calls.



"Ethyl" Antioxidant 703 is a grease and synthetic lubricating oil additive to inhibit oxidation, prevent rust and wear, and impart alkalinity and dispersancy. A grease containing a common aromatic amine deteriorates after exposure to ultraviolet light and turns dark (left). "Ethyl" 703 stabilizes grease (right), preventing deterioration and preserving lubricating properties.

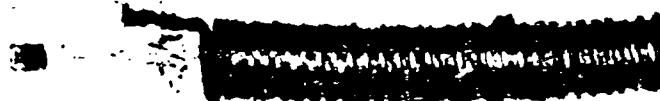
Products at Work



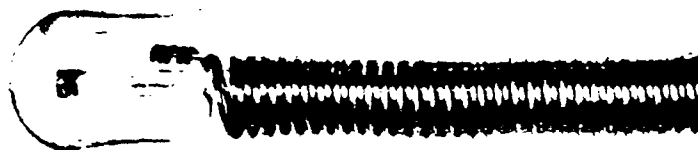
"Ethyl" Multi-Purpose Additive - Diesel (MPA-D) improves engine performance, protects critical engine parts against rust and deposits, lowers the smoke level of exhaust and reduces engine maintenance costs. As demonstrated on metallic spindles, severe corrosion (left) can occur on such vital engine parts as pumps and plungers. The addition of MPA-D to diesel fuel prevents corrosion (right) and promotes savings in operations and maintenance.



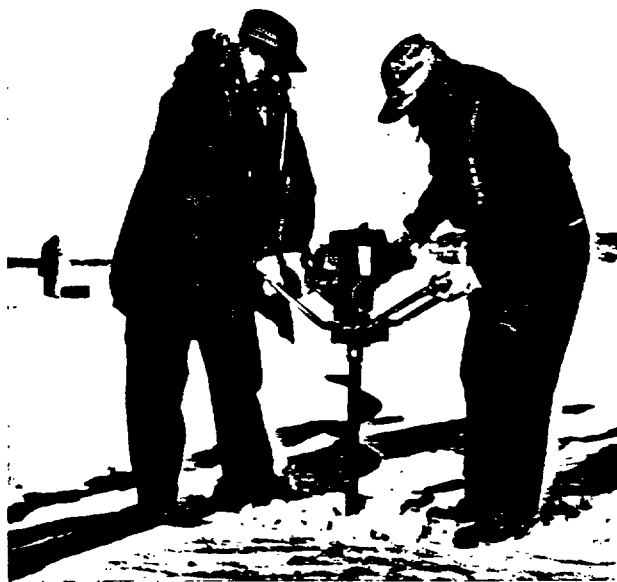
"Ethyl" Ethylene Dibromide (EDB) added to outboard engine oils extends spark plug life materially. Without EDB, plugs can misfire from gap bridging caused by the build-up of deposits (above). Used in concentrations of 1.7 weight percent, "Ethyl" EDB reduces the accumulation of deposits (below) and assures proper spark plug firing.



"Ethyl" Antioxidant 733 is a gasoline, jet fuel and industrial oil additive to inhibit oxidation, control gum formation and antiknock decomposition. In most applications "Ethyl" 733 is more effective than other available additives - often at lower cost. Severe rusting and considerable emulsion occurred on the copper-iron catalyst coil (above) after exposure to industrial oil containing a competitive inhibitor. A duplicate coil (below) remains clean after continued contact with oil containing a 0.25 percent concentration of "Ethyl" 733.



It's Time for Frostbite Fishing



Fishermen using compact gasoline engines to drill holes through ice, above, are spared yesteryear's hand-chopping efforts. A pilot's license and a plane, right, give some anglers wings to get away from crowds and find remote lakes for their favorite sport.



ETHYL NEWS

By Thomas A. Hoge

JUST AS IT HAS in many other activities, the oil industry is adding comfort and convenience to an increasingly popular winter sport—ice fishing.

Today, thanks to petroleum, modern ice-time Izaak Waltons don't have to trudge for miles to likely fishing spots, endure wintry blasts, hack holes in flint-hard ice, or sit through chilly hours in semi-darkness, waiting for a bite. Across northern reaches of the country, from New England to the Upper Midwest and in Canada, ice fishermen can:

- Drive in their cars to mid-lake fishing spots through lanes cleared in the snow-capped ice by gasoline-powered plows.
- Cut fishing holes in the ice with gasoline-powered drills.
- Fish from comfortable propane-heated huts.
- Watch television, listen to the radio or read by electric light on current from portable gasoline-powered generators.

Such comparative luxury is adding new devotees to the million-odd members of the frigid fishing fraternity once composed only of the most hardy sportsmen who sought trout, perch, wall-eyed pike and other fish lurking under the frozen surface of lakes, ponds and rivers.

Except for a few die-hard stoics who like nothing better than



FEBRUARY 1964



25

ETC 29760

It's Time for Frostbite Fishing

emulating the old-time Eskimo, the modern winter angler awaits his prey in a portable fishhouse. At the first sign of a deep freeze, these brightly-colored huts on runners are towed out onto the ice. Fishermen who live any distance away can load portable shacks or fabric shelters into station wagons and hasten to the nearest patch of ice. Those who don't own a fishhouse need only drive to an area where the sport is prevalent and they'll find scores of huts for rent.

For the spear fisherman there are windowless shacks that screen out sunlight so that he can peer into the shadowy depths, jiggling a baited decoy line with one hand and poising a five-pronged fork in the other, while he waits for his quarry to swim into view. Most ice fishermen prefer hook and line, however, and their huts boast such refinements as windows, night lighting and comfortable chairs where they read or listen to the radio while waiting for their lines to snap taut.

Fishhouses come in all varieties, ranging from portable structures that can be bought for \$25 and assembled in a few hours to plush abodes with carpets, reading lamps, gas hot plates and

wall heaters. The use of bottled propane gas for heat keeps occupants warm without subjecting them to smoky wood stoves.

The floors of most huts have trap doors over holes, with pulleys overhead to hold weighted lines. Some huts are equipped with buzzers that tell a dozing angler when he has a bite. The commonest method, however, is to tie a matchstick to each line and wait for the splinter to wiggle a warning when fish grab the bait.

In the old days, frostbite buffs had to hack holes in flint-hard ice with steel chisels. Then came the ice auger, a brace-like instrument that made the chore a good deal easier. Now the new gasoline-powered hole cutters do the job in minutes. On some of the bigger lakes, operators with tractors cruise over the ice offering to bore holes with mechanical drillers for nominal fees.

Auto travel has become so popular on lakes in northern states that some communities stage fishing carnivals at midlake and advertise plowed roads to the scene. In some areas, winter shanty towns mushroom out on the ice, complete with power lines, marked streets, telephone service and concession stands. There are about 60,000 fishhouses in Minnesota alone.

Colonies of fish-huts like these, some using propane gas for heating and cooking, dot many a frozen lake and river in northern states and Canada.

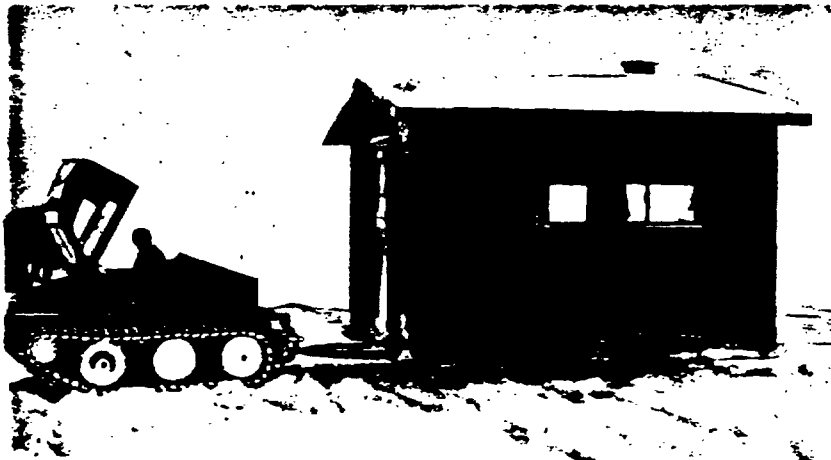


Ice fishing starts after Thanksgiving and runs until near spring, depending on location. Residents of Michigan and Wisconsin don't get their season into full swing until mid-February, contending that fish don't bite well in early winter.

The normal ice fishing "village" in the north-west and Canada sits over hundreds of schools of tomcod, sunfish or trout that range in size from a few fish to many score. When one of these schools drifts under huts, fish will begin to hit lines, often faster than they can be baited. When the school moves on, action stops just as abruptly.

For those who like to live dangerously, there is a nightmare variation on ice fishing. They can put on insulated rubber suits and masks, arm themselves with spearguns, and dive under the ice to stalk their piscatorial prey. Nylon lifelines to escape holes in the ice are these stalwarts' only links with the world above. After no more than 30 minutes under water, the agonizing cold drives the most rugged swimmer to the surface.

Ice divers are an elite clique, with the average sportsman considering this perilous pursuit a dubious substitute for the heated fishhouse. ●



The portable house, above, is easily towed to a good fishing spot. . . . Below, a deluxe model hut with a gasoline-powered generator supplying current for lights and television.



Robert A. Douglass Named Sales Manager; Other Personnel Changes Announced

ROBERT A. DOUGLASS, formerly manager of Ethyl Corporation's Mid-Continent Region, with offices in Tulsa, Okla., has been appointed sales manager for all Ethyl petroleum chemicals in the United States. Mr. Douglass is at Ethyl's executive head-



Robert A. Douglass

quarters in New York, succeeding Stuart Forbes, who has resigned to accept a position with another company in the petroleum industry.

Mr. Douglass, who has been with the Company since 1945, has come up through the ranks from sales representative to field management to his present position. He was with Ethyl's Central Region until 1950, when he became assistant manager of the Mid-Continent Region. He was promoted to regional manager in 1952.

Laurence D. Reis, Mid-Continent region assistant manager, is now in charge of the regional office. He has had extensive experience in Ethyl sales since 1936.

After managing the Ethyl San Francisco District Office since 1957, John H. Koehnle will become executive assistant to H. J. Philp, vice president in charge of sales for Ethyl Corporation of Canada, Ltd., on April 1. Mr. Koehnle's

headquarters are to be in Toronto.

At the same time, William O. Van Wyck, national account manager in San Francisco, will succeed Mr. Koehnle as district manager.

Mr. Koehnle, who joined Ethyl in 1947, has spent most of his career with the Company on the Pacific Coast. He became manager of the San Francisco District Office in 1957. Mr. Van Wyck's Ethyl associations began in 1944 in the same territory, and have included sales and field service responsibilities.

Other changes affecting Ethyl personnel in petroleum chemicals:

William S. Alexander of the Los Angeles District is being promoted to chief product service engineer of the Western Region, effective March 1, to succeed A. H. Chenault, who is retiring after 37 years with the Company.



John H. Koehnle

About April 1, Clemens W. Maassen, Eastern Region refinery technologist, will become chief refinery technologist in the Central Region, with headquarters in Chicago. He is to replace Hans R. Wolfe, who is being transferred to Ethyl International for assignments abroad. •

New Plastic Drapes Use VisQueen 777

HIGH-QUALITY PLASTIC draperies with unusually desirable properties are being introduced through the use of Ethyl VisQueen 777, a superior new plastic film created and manufactured by the VisQueen division of Ethyl Corporation.

Made with a special blend of resins, the Company's plastic film is of heavier gauge than competitive materials, and offers a number of advantages. Among the characteristics of VisQueen 777 are appealing texture and flexibility.

It also retains its shape and resists wrinkling. The improved appearance, feel and durability of Ethyl's new product are readily apparent. VisQueen 777 closely resembles familiar fabrics woven from natural or chemical fibers. It can be easily embossed and printed with designs during the film's processing into finished draperies.

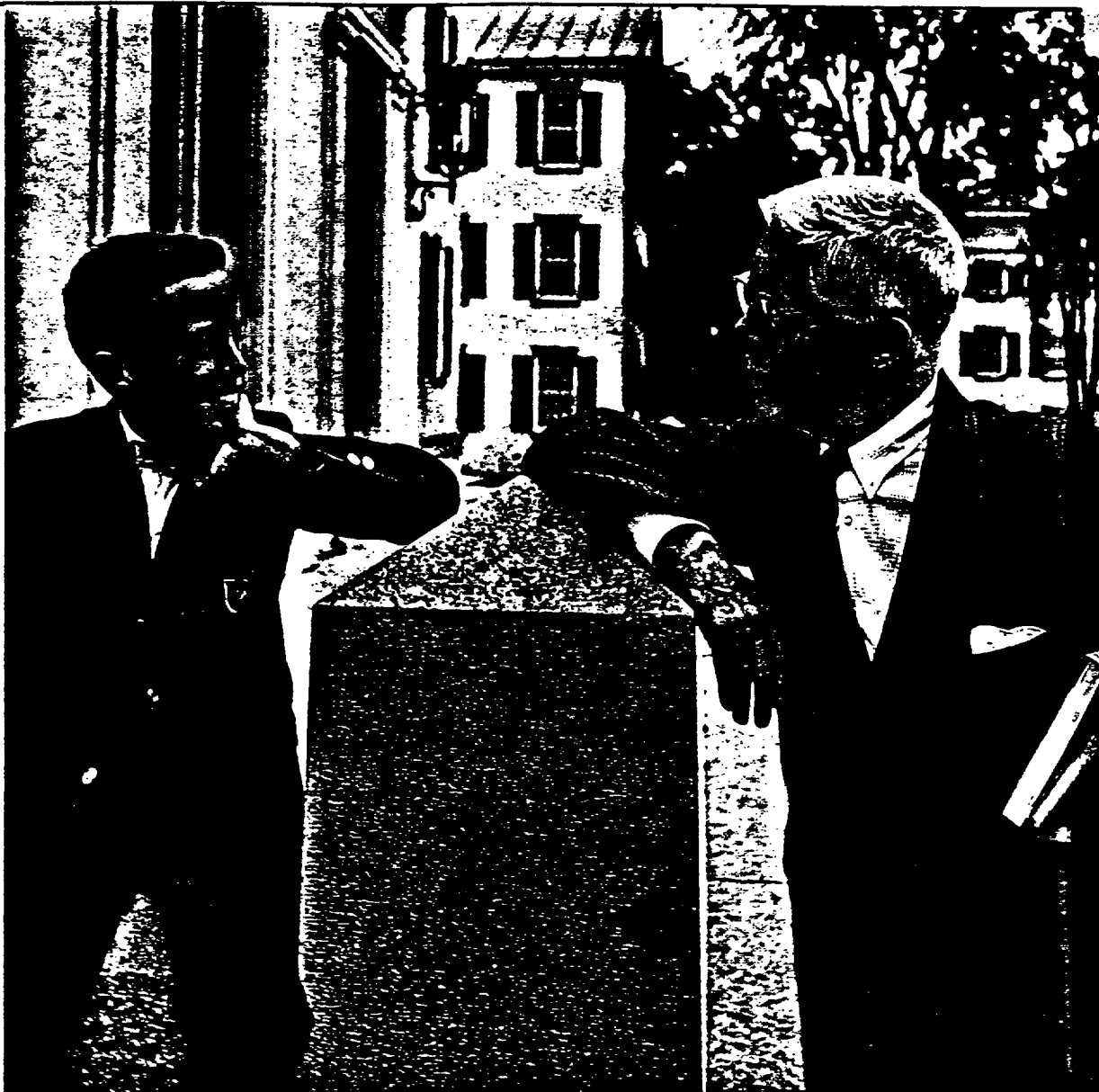
One of the first promotions of VisQueen 777 was undertaken early this winter by Kay Line, Inc., film converters of Trenton, N. J. and New York, in conjunction with leading drapery manufacturers. Some 15,000 retail outlets are expected to feature certified VisQueen drapes in a variety of styles, colors and patterns.

Ethyl's VisQueen division is a leading producer and marketer of polyethylene film, an extremely versatile material with numerous applications in packaging, agriculture, building construction and other fields. •



Image . . .

Reputation can be completely shattered by failing to do things that have been promised. On the other hand, it can be built by doing things that aren't expected. At Ethyl, we've been putting forth extra effort for many years and that's one of the ways we've built our reputation as a partner in our customers' progress.



Photographed by Raymond Jacobs at Dartmouth

"By far the best proof is experience."—FRANCIS BACON

A very young man visits a very old campus—and sees for himself what college really means. Clean white buildings sparkle against a background of tradition. A friendly professor stops—and plants the seeds that will blossom into a rewarding future.

This is the kind of experience that stays with a child forever. And it lies all around you in a Magic Circle, just a pleasant drive away. Think of the wonders it holds for your child—a college campus—an observatory—or an old fort where history was written. Why not let him see—and learn—by doing.

This weekend, get a map from your service station. Draw a circle around the place where you live. This is your Magic Circle—and the key to everything it offers is in your car. Pack it with family! Fill it with gasoline, and explore.



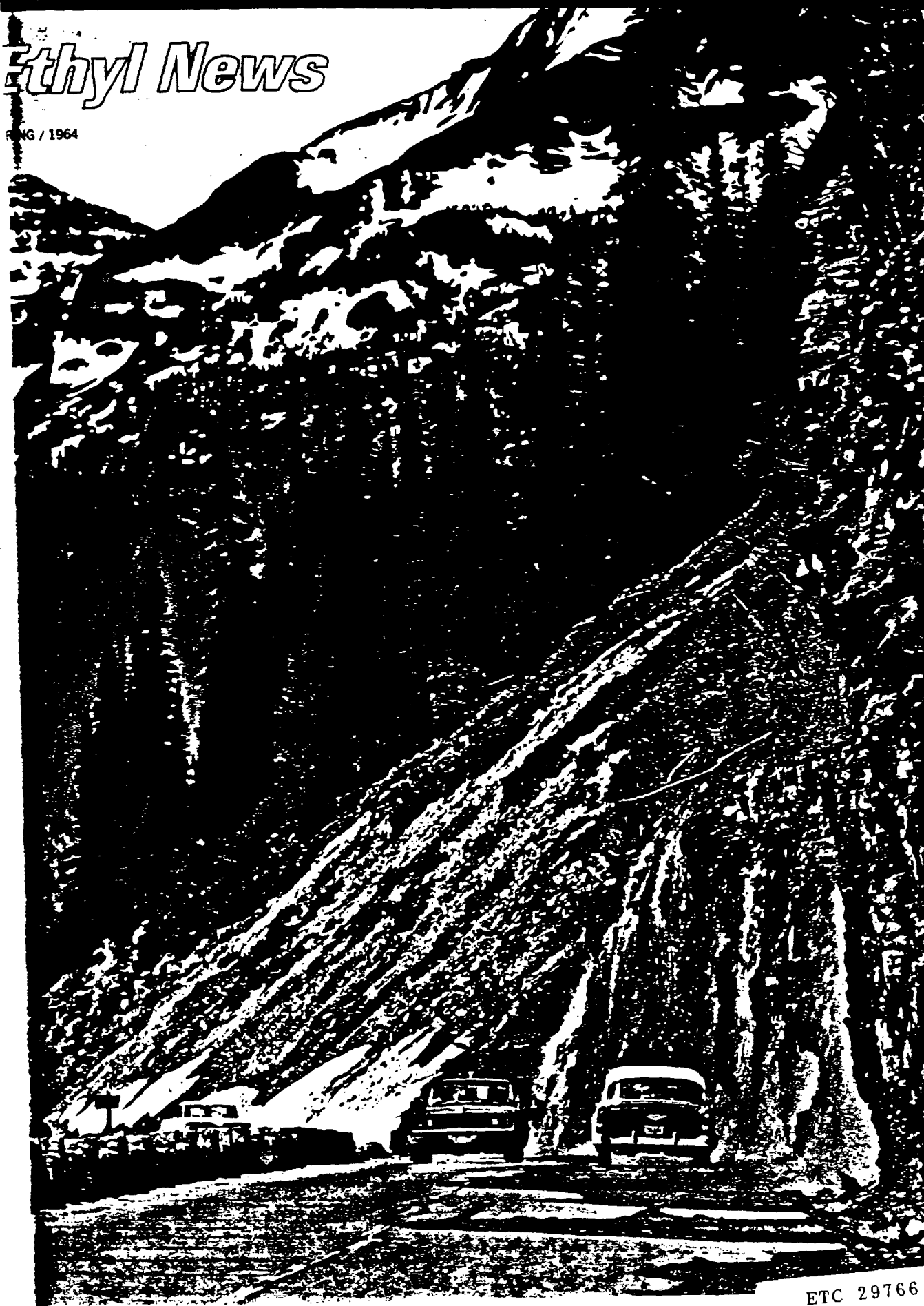
ETHYL CORPORATION New York 17, New York. These Magic Circle advertisements are published to help you get more enjoyment out of your car. Ethyl motor additives used by all companies to improve their gasolines and your driving pleasure.

ONE OF A SERIES OF ADVERTISEMENTS DIRECTED TO THE MOTORING PUBLIC

ETC 29765

Ethyl News

RING / 1964



ETC 29766

Ethyl News

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Executive Vice President and Treasurer

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Vice President and Secretary

Richard F. Cook, Editor, Ethyl News
Stanton P. Nickerson, Associate Editor

CONTENTS

More Motivation for Motorists	1
Clear the Water!	4
Trust that Hunch!	6
Chlorinated Solvents— A Natural for Ethyl	10
Treat Her with Care	13
New Symbol of Quality	16
Introducing MPA 85	17
Golden Anniversary	18
Afternoon in a Woodyard	22
All about Antiknocks	24
Outlook	27

THE COVER: Motorists passing Wailing Wall in Logan Pass, Glacier National Park, Montana, on the Old West Trail. For the story of trail promotions and other API and Ethyl market expansion programs, see "More Motivation for Motorists," pages 1-3.

PICTURE CREDITS: Cover, Jack Zehrt through Shostal; pages 3 (center) and 4, A. Devaney; page 10, National Institute of Dry Cleaning; page 12 (left), G. S. Blakeslee & Co.; pages 18-21, The Pure Oil Company; pages 22-23, Charles Van Maanen; page 27, University of Cincinnati.

Design: Roberts, Reinhardt & Ong, Inc.

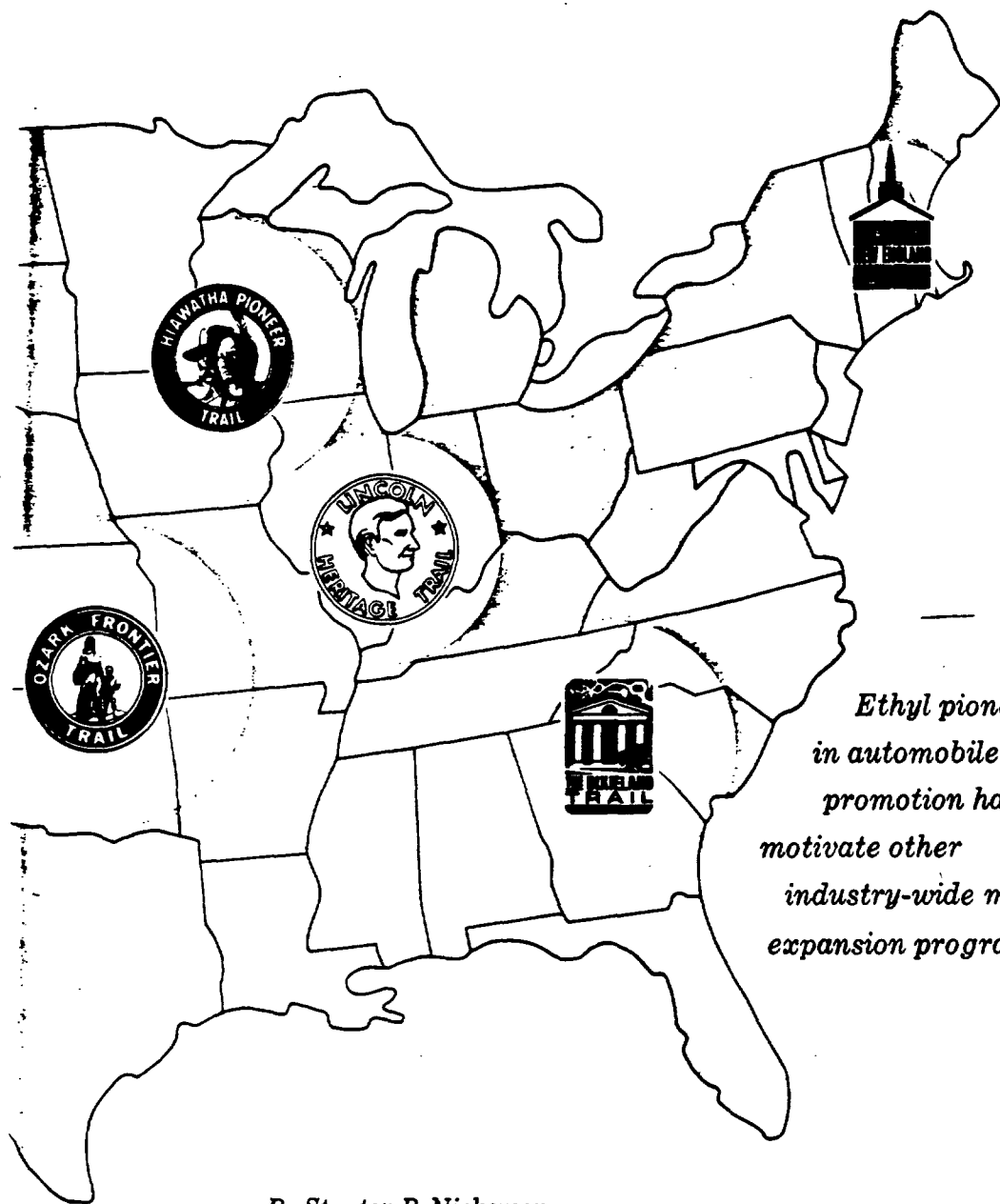


More Motivation For Motorists

"Unspoiled and unsung mountain magic is yours for the auto exploration of Arkansas over the newly designated Ozark Frontier Trail. It's a photogenic, breeze-swept land of forests, caves, domed hills and lush valleys . . . a sylvan countryside of quiet hamlets with quaint names."

"On the Hiawatha Frontier Trail in Wisconsin, there's a fascinating logging museum with a replica of a logging camp kitchen and dining room. From the size of the cooking ware and plates, it's no myth that yesteryear's lumberjacks were large men and large eaters."

ETC 29767



*Ethyl pioneering
in automobile trip
promotion has helped
motivate other
industry-wide market
expansion programs*

By Stanton P. Nickerson

THESE HIGHLIGHTS from articles about points of interest on two newly charted automobile trails are typical of what is being published in hundreds of newspapers throughout the United States. Appearing on vacation, resort and travel pages, the articles—from Ethyl Corporation's Magic Circle Travel Clinic—support oil company and oil industry efforts to expand the demand for gasoline and other service station products.

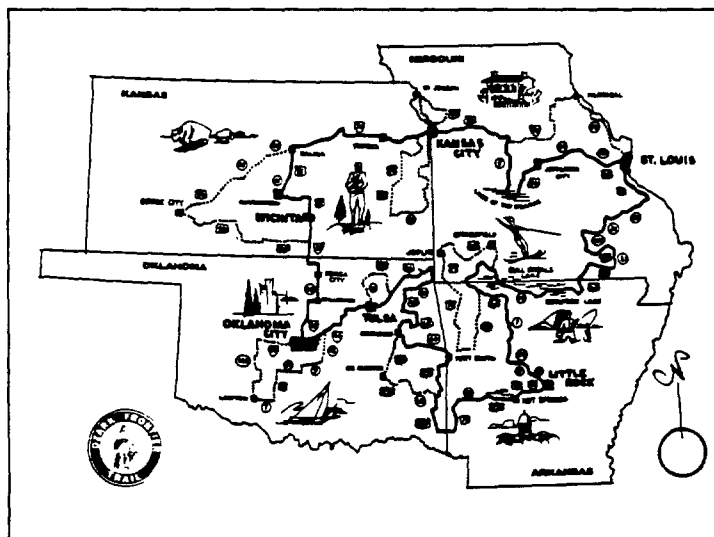
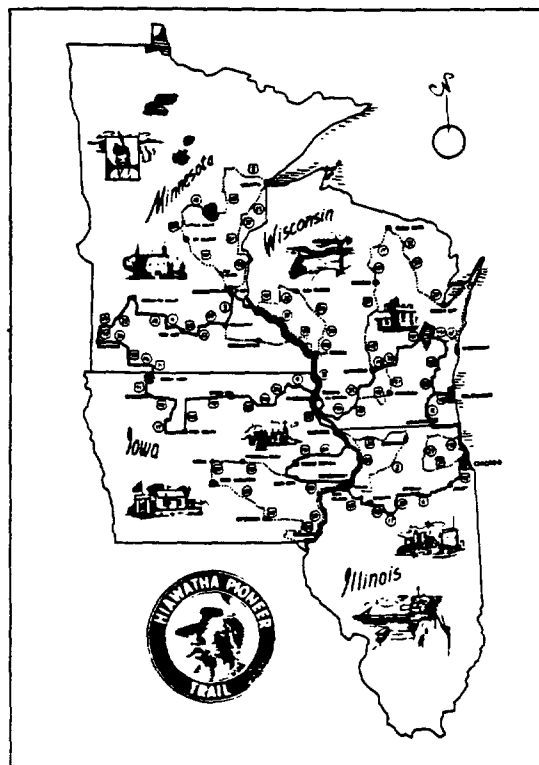
This is the tenth year that Ethyl has helped promote automobile travel—to nearby points of interest and to more distant natural and man-made sights, recreational areas, and cultural and historic attractions. Ethyl pioneered in such travel promo-

tion starting back in 1954. Its success over the years has helped motivate other industry-wide market expansion programs.

Since 1961, the American Petroleum Institute's Travel Development Committee has been active in such promotion. Some 35 states now recognize the API as a cooperative travel promotion agency.

The Travel Development Committee's promotion is expected to have a greater impact than ever this year. For one thing, the committee is focusing attention on almost 7,000 miles of new "trail" routes for sightseeing and vacation trips: the Hiawatha Pioneer Trail in Illinois, Wisconsin, Minnesota and Iowa; and the Ozark Frontier Trail

More Motivation for Motorists



Six million attractive folders about the trails, with supplementary travel tips, are being distributed widely under API auspices

in Missouri, Arkansas, Kansas and Oklahoma. At the same time, it is continuing to promote the four other trails it helped create and sponsor in past years—the New England Heritage Trail, the Dixieland Trail, the Lincoln Heritage Trail and the Old West Trail.

Each trail is a recommended tour of 1,000 to 3,700 miles over main highways and secondary roads, including optional or alternate segments.

Trails Cover 20,000 Miles

API promotion of automobile travel over all six trails, which cover a total of 20,000 miles in 18 states, helps support regional, state and local travel promotion organizations and oil company market expansion efforts.

Some six million illustrated folders featuring trail maps and travel tips are being distributed under API auspices through automobile clubs, oil company touring bureaus, newspapers, camera stores, service stations, chambers of commerce and camping and sporting goods stores. Hundreds of newspapers, magazines, radio and television stations and business publications are receiving press kits containing articles, pictures and other materials on trail attractions.

The API also is: using more newspaper advertising; preparing travel promotion manuals for use by oil jobbers; cooperating with trail organizations in producing motion pictures; and helping develop magazine articles such as the recent Dixieland Trail feature in *Better Homes and Gardens*.

Again this year, the API is joining with *Made-moiselle* magazine in national sponsorship of Vacation Planning Week late in May. This cooperative merchandising venture underscores the importance of getting ready for vacations and trips by car. Hundreds of department stores, specialty shops and suppliers of leisure time equipment are participating with advertisements, window and floor displays and other promotions.

API Co-sponsors Cruises

Two marine trails co-sponsored by the Travel Development Committee and *Motor Boating* magazine are the New England Heritage Cruise, from Long Island Sound to Maine's Mt. Desert Island, and the Chesapeake Bay Heritage Cruise, a recreational and sightseeing itinerary on Maryland's shores. The API is distributing descriptive folders through oil company marine departments, yacht clubs, boat and engine manufacturers, power squadrons, marinas, outdoor magazines, the Coast Guard and boating suppliers.

In its "See America Best—by Car" campaign, the API looks for continuing support and cooperation by individual oil companies. As a part of this support, Ethyl's expanded Magic Circle Travel Clinic is supplying illustrated feature stories and

trip maps to some 250 large daily newspapers and shorter stories and maps of Magic Circle tours to 500 smaller city dailies and key weekly newspapers. Special travel-by-car-for-fun features and pictures are being prepared for 200 well-read Sunday newspapers.

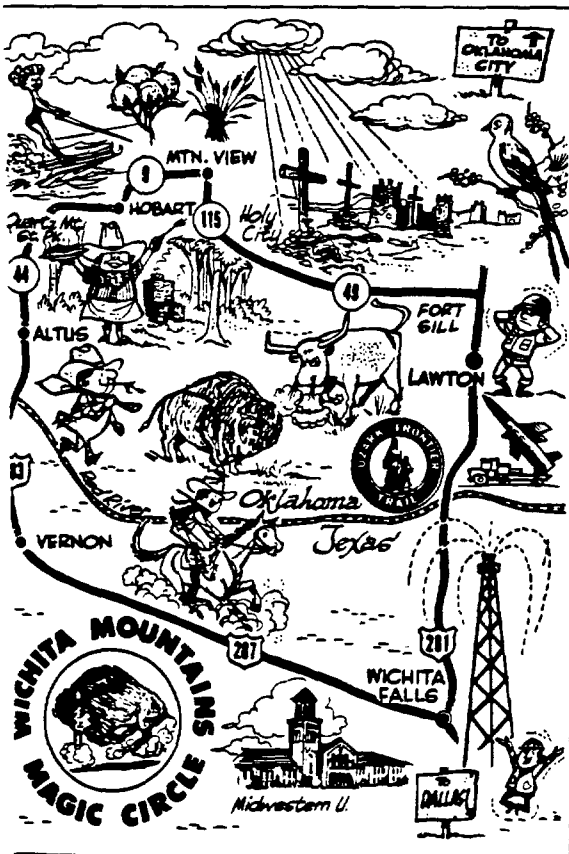
The Magic Circle articles feature points of interest on the new Hiawatha Pioneer and Ozark Frontier trails, and on the New England Heritage, Lincoln Heritage, Old West and Dixieland trails. Itineraries for scores of other trips throughout the country also are suggested.

For World's Fair Motorists

Ethyl's Magic Circle tie-in with *Parents Magazine* was so successful last year that the magazine is publishing at least three comprehensive articles on family trips by car this year.

For those traveling to the New York World's Fair by car this year, the Ethyl Magic Circle Travel Clinic has an added feature—articles outlining trips to sights and attractions adjoining the greater Metropolitan area. ○

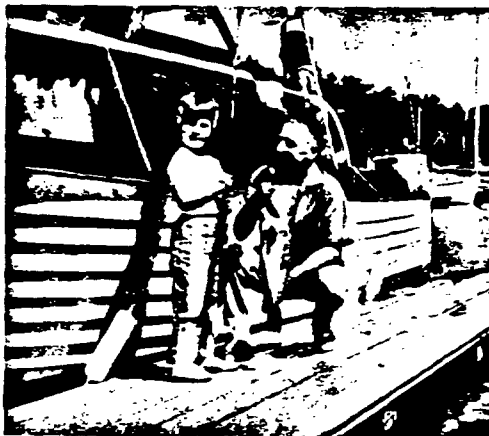
In expanding its Magic Circle Travel Clinic services for 1964, Ethyl is sending feature articles and trip maps like this to hundreds of newspapers.



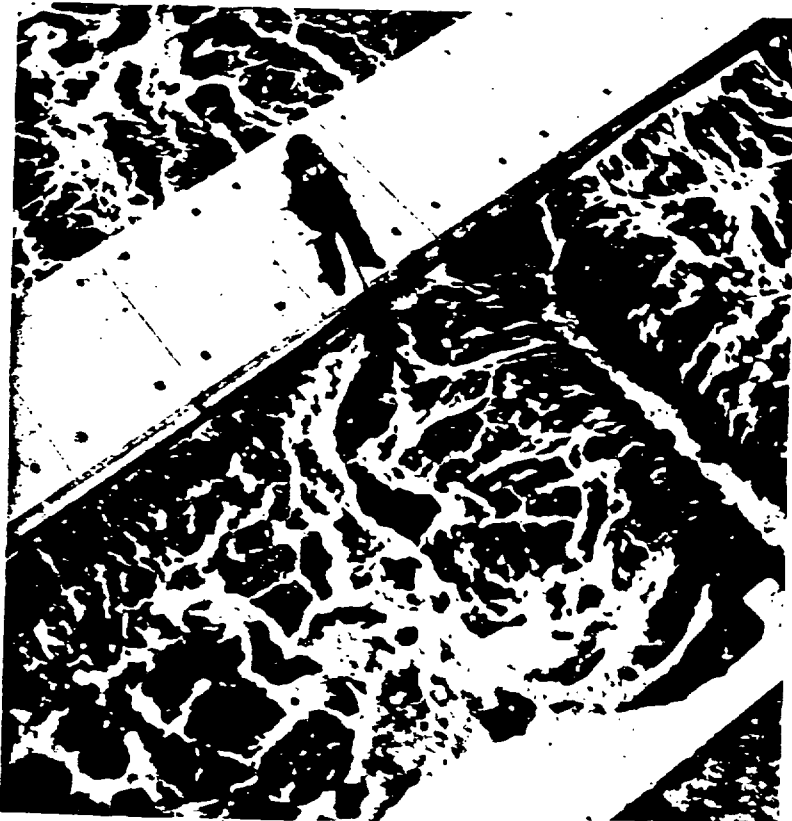
Huge figures of Paul Bunyan and his ox are near the Hiawatha Pioneer Trail in Bemidji, Minn.



Paul Revere's house in Boston is among historic sights on the New England Heritage Trail.



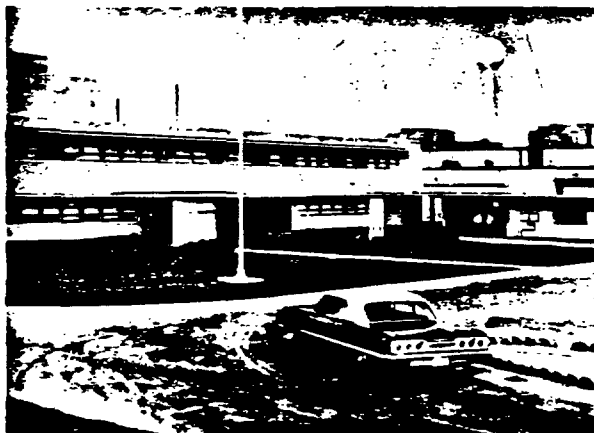
Recreation and sightseeing by boat are being encouraged by API and other promotion campaigns.



ETC 29771

CLEAR THE WATER!

"Soft" detergents, which eliminate sudsing problems, will be made from synthetic primary alcohols to be produced in new Ethyl plant



The alcohols plant is being built at Ethyl's Texas manufacturing center on the Houston Ship Channel.

PRODUCTS to help solve the problems of persistent sudsing of modern detergents in waste water—in sewers, septic systems, disposal plants, and in surface and underground lakes and rivers—will come from a new Ethyl chemical manufacturing plant. Now under construction at Ethyl's manufacturing center near Houston, Texas, the multi-million-dollar plant will produce synthetic "straight-chain" primary alcohols. It is planned to go on stream in 1965.

The advantages of Ethyl's straight-chain alcohols in the manufacture of detergents are their biodegradable qualities. They can be used to make "soft" detergents that will break down and disappear under the bacterial action encountered in disposal systems.

In contrast, most modern detergents, or "syn-dets," made from so-called "branched-chain" chemicals, are "hard" detergents. While these products have outstanding washing and cleaning properties, they continue to foam and bubble long after they have done their job. Lasting suds create no toxicity problems in water supplies, but they can be eliminated by changing the chemical composition of the detergents themselves, such as by using straight-chain alcohols.

Currently, the most widely used products in the manufacture of hard detergents are alkylbenzene sulphonates. It is expected that producers of these products will gradually modify their chemical make-up to increase their biodegradable qualities so that they also will be used to produce soft detergents.

The manufacturing process that will be used at the Company's new primary alcohol plant represents a major break-through in modern chemistry. The process was developed and the plant designed

by Ethyl's Research and Development and Engineering departments, which have been working intensively in these areas for several years. A pilot plant employing the process has been operating successfully since last year.

Ethyl's Texas manufacturing center, site of the new alcohol plant, is strategically located on the Houston Ship Channel, in the heart of one of the world's largest oil refining and chemical manufacturing areas. Built in the early 1950s, the Ethyl center manufactured antiknock compounds for gasoline exclusively for several years. Subsequently, a plant to produce vinyl chloride monomer, intermediate for polyvinyl chloride, a widely used plastic, was added. The alcohol plant is being built on some of the additional acreage available on the spacious property.

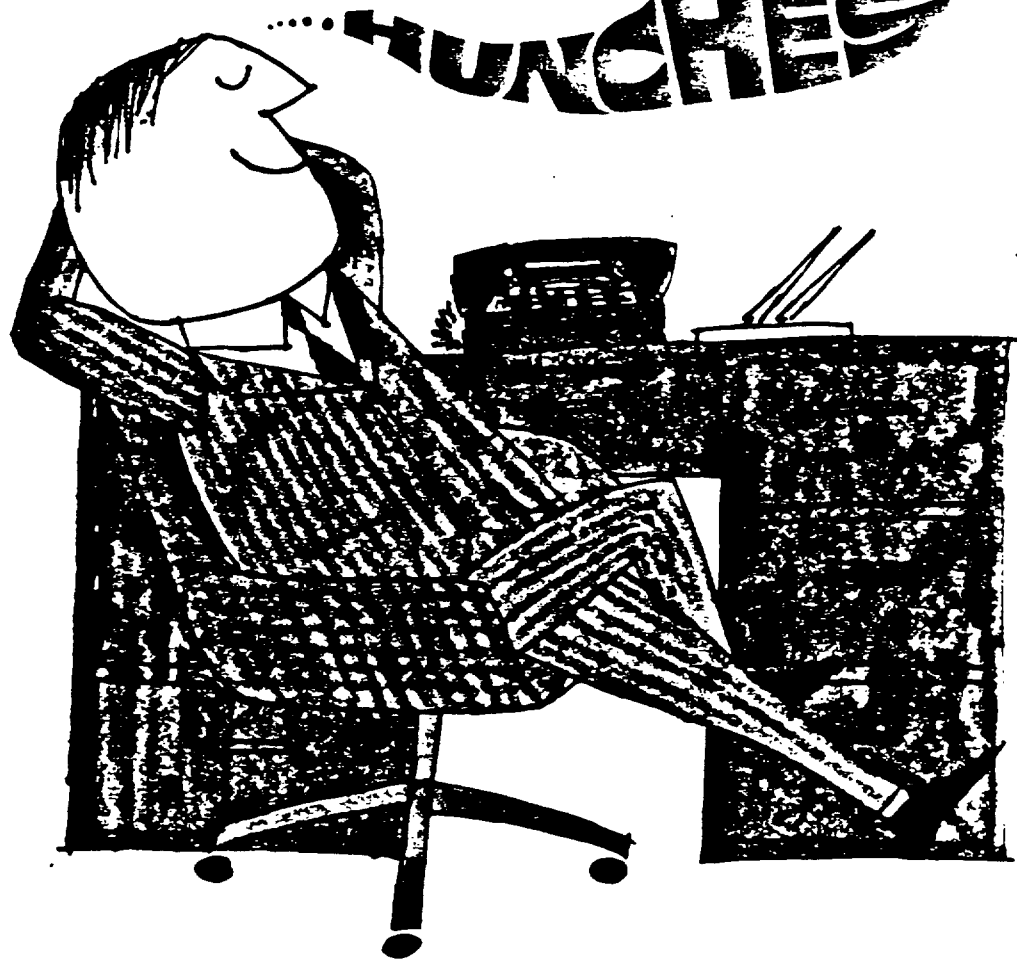
The straight-chain alcohols are expected to be sold for use in the manufacture of plastics and in other chemical and industrial processes, as well as in biodegradable detergents. ○

Ethyl's Research and Development and Engineering departments developed the process and designed the plant.



◁ Biodegradable detergents, made from straight-chain alcohols, break down and do not continue to foam in sewers, disposal plants and septic systems.

IDEAS HUNCHES
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Executives, scientists,
professional men and others
capitalize on intuitive
powers when they ...

trust that hunch!

By Frank L. Remington

"I HAVE A HUNCH!"

Almost everyone of us has uttered these words when the solution to a problem suddenly dawned—and more often than not proved to be the right answer. But instead of realizing that one of our most remarkable mental faculties—intuition—was at work, we probably congratulated ourselves on some astute "guessing."

This reaction is not surprising. For years, intuition was regarded as a mystical form of clairvoyance. Today, however, many psychologists tab intuition as an extremely important mental process for businessmen to cultivate in themselves and encourage in their employees.

Psychologist Mason Haire, a consultant to some of the country's top companies, stresses the value of hunches: "The business organization which insists that all major decisions must be based on demonstrable facts and analytic judgment," he says, "reduces its chances of being right in a spectacular way."

C. G. Suits, General Electric's chief of research, declares that many laboratory discoveries come as hunches during times of relaxation, after periods of intensive thinking and fact-gathering.

Something Will Happen

Just what is a hunch? The dictionary defines it as "a strong, intuitive impression that something will happen" as a result of a course of action. Hunches are based on intuition, and intuition comes from knowledge acquired through the years.

Leading psychologists say intuition is an ordinary function of the human mind, and can be developed and used. One authority explains intuition as the power or faculty whereby an individual can know something without knowing how he knows it.

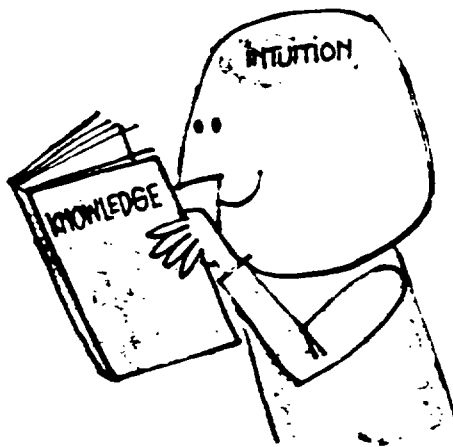
Almost invariably, the person whose hunches are consistently correct is well-informed in the field to which his hunches relate. Pure guessing takes place when an individual doesn't know the facts or understand the problem. But intuitive thinking, which fosters hunches, is based on a sound and through knowledge of the subject currently under consideration.

Researchers Report Results

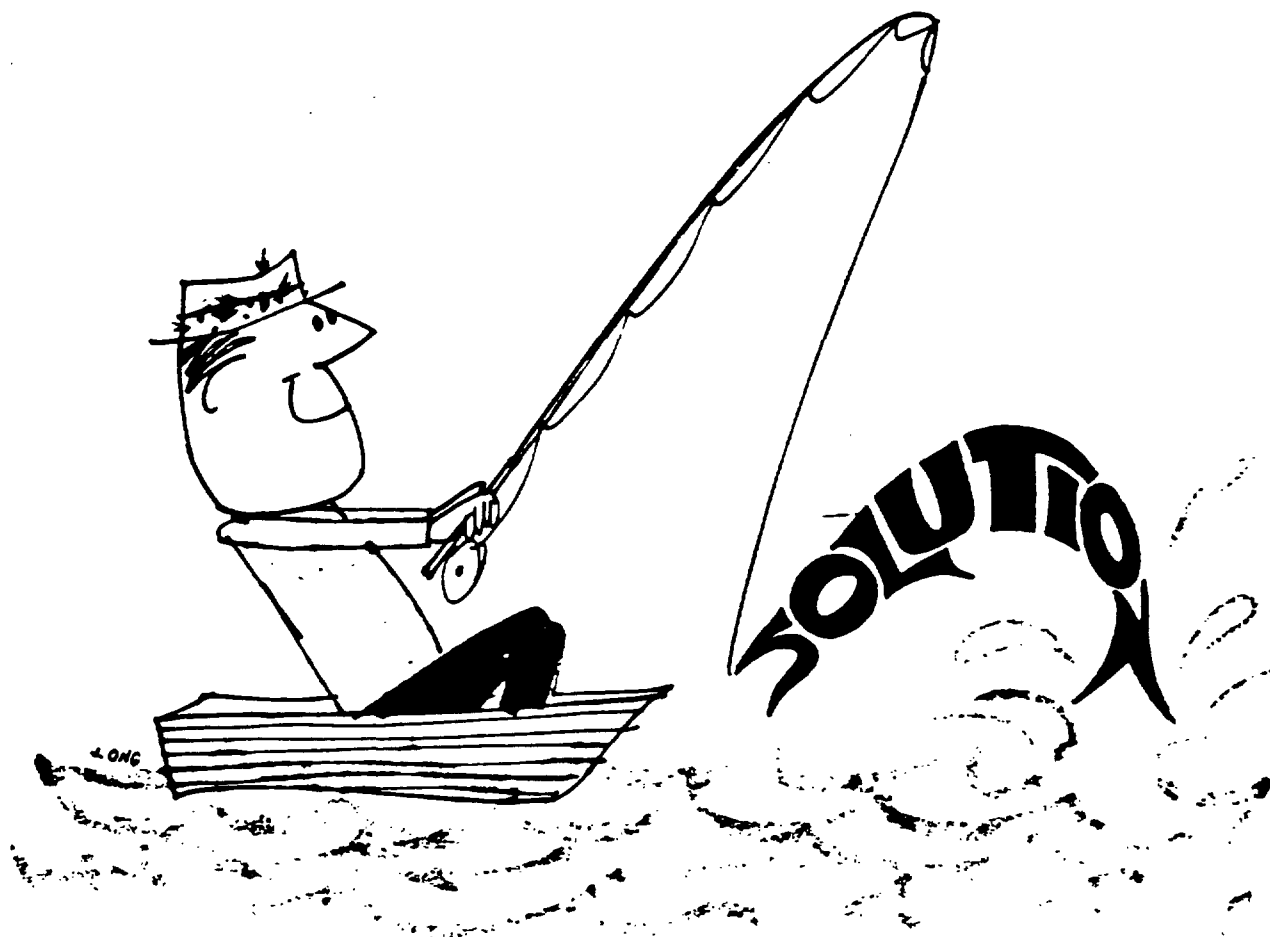
When the American Chemical Society questioned 232 eminent researchers in chemistry, physics, mathematics and biology, a whopping 83 percent reported success with intuitive hunches after continuous and vigorous study of a problem had failed to produce results.

Henry Ford's revolutionary price and production theories were largely the product of his intuition. He wrote that these ideas seemed "self-evident" to him; yet they were radical surprises to his contemporaries. And many another business leader has found success by trusting his hunches.

How does this fascinating mental phenomenon take place?



Trust That Hunch!



Relax, play golf, go fishing, bowl. The answer will come.

The human brain, though it weighs only two-and-one-half pounds, stores incalculable amounts of information. The mind records and remembers everything that has ever happened to the individual: every experience, every thought, every smell, every taste, every fact, every word. The conscious mind, however, can recall only about 10 percent of this prodigious amount of data. The remaining 90 percent lies buried in the subconscious. Under proper conditions, the subconscious can recall things that the individual has long since forgotten and push them back into consciousness.

Louis Pasteur once observed: "Intuition is given only to him who has undergone long preparation to receive it." Consequently, professional people become quite intuitive about their own line of work.

A businessman, for example, thinks about his problems unconsciously. Often when he's out walking, casting for fish, or playing bridge, his inner mind goes into action, choosing, classifying, and collating facts and figures from his buried library of experience and knowledge until he comes up with an answer. The hunch that results in a new product or a cost-cutting suggestion is the offspring of this mental process.

Edison Had a System

When Thomas A. Edison faced a tough problem, the brilliant inventor would carefully review all pertinent facts at his command and then deliberately forget the entire matter. More often than

not, a solution would suddenly pop into his mind before the day had elapsed.

Likewise, one successful businessman habitually drops into an easy chair in his office for half an hour each day and forgets his business concerns. As soon as he relaxes, ideas begin to boil up from his inner mind. It is behavior like this—setting the stage for hunches to be born—that sets the highly productive person apart from the mediocre and unsuccessful.

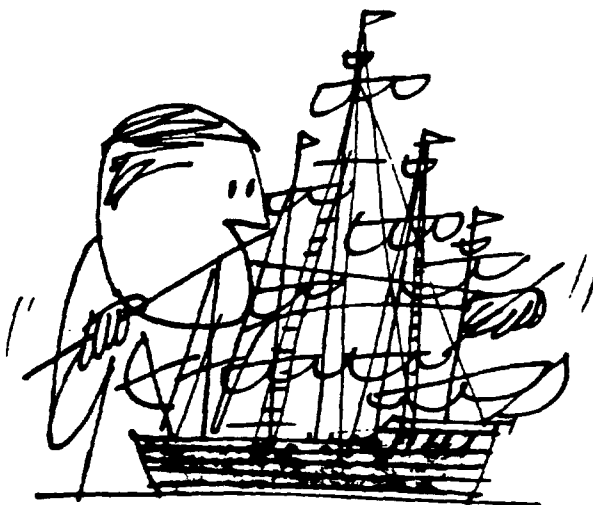
If intuition is potentially so powerful, what can be done to develop it?

One of the most important helps is broadening interests to stimulate the mind. Reading good books, practicing the art of conversation and cultivating a large circle of friends are all helpful. Such activities can lead to valuable clues in unexpected fields and help crystallize shapeless thoughts lurking in the subconscious. The wider an individual's experience and the more open his mind, the better chance there is for his intuition to operate productively.

Worrying Won't Help

Relaxation is also of prime importance, for intuition can't operate when the conscious mind is tied in knots or cluttered with worry and anxiety. One business executive discovered that his mind is more likely to be full of fresh ideas at the morning conference if he spends the evening before fiddling with his ship models instead of poring over the company's sales reports.

In his book, *The Subconscious Mind in Business*, Robert D. Updegraff offers some excellent tips on the modus operandi of developing hunches. Sit



yourself down with your problem, he advises. Get a pencil and a sheet of paper. Write down the details. If it involves a decision, write the arguments in favor on one side, the arguments against it on the other. Read what you've written—and then crumple the paper and throw it away. Some time later, when you're relaxing, the correct decision will come to you.

Forget the Whole Thing

Another way, says Mr. Updegraff, is to consider the problem until you are dog-tired and then, if no solution appears, forget the whole thing. Relax, play golf, go fishing, bowl. The answer will come.

The lives of successful people, the observations of psychologists and scientists, and the experiences of individuals furnish guideposts toward a fuller use of the subconscious. As a person learns to use his intuition, his hunches will become more numerous and satisfactory. Then, when it is incumbent upon him to make a decision or solve a problem, where his conscious learning alone will not help, he can trust his hunches and act upon them with assurance. ○

*Write down the details,
read what you've written —
then throw the paper away.*

Chlorinated Solvents...



ETC 29777

...a Natural for Ethyl

Research, manufacturing and marketing know-how in related products provide Company with background for expansion into new field

CAPITALIZING on extensive research, manufacturing and sales experience in chlorinated hydrocarbons and other industrial chemicals, Ethyl, in a new expansion move, has entered the field of chlorinated solvents. These solvents, which include trichlorethylene, perchlorethylene and 1,1,1-trichloroethane, are widely used by some 60,000 industrial consumers in the United States for dry cleaning, degreasing, metal finishing and other purposes.

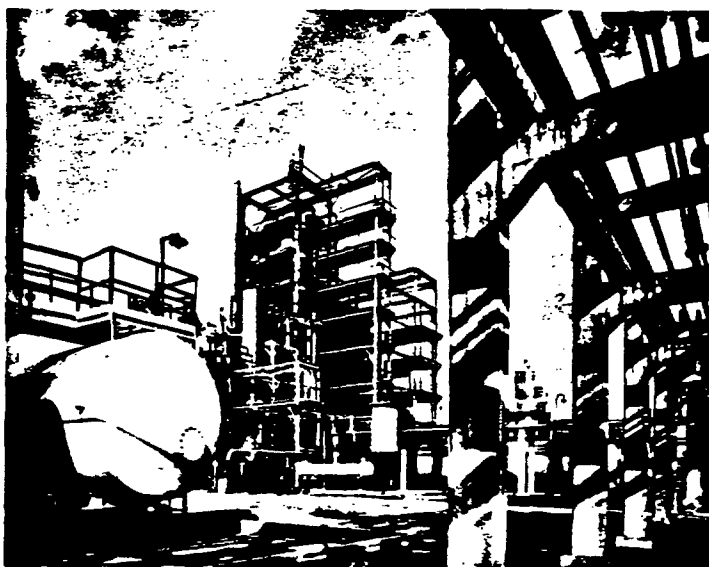
Over 850 million pounds of chlorinated solvents were consumed in this country last year. Automobile, aircraft, home appliance, electronic, missile, textile and other major industries accounted for more than half of this total, while dry cleaning took about 375 million pounds. About 50 percent of all metal cleaning and dry cleaning is done by these effective liquid chemical products.

Smaller quantities of chlorinated solvents find important uses in photography, mechanical refrigeration, chemical intermediates and other special purposes.

In cleaning metals, the solvents remove oil, grease and grime that normally accumulate during machining and fabricating operations. They also prepare metal surfaces for paint, plastic and metallic coatings. In a third effective application, the products clean delicate and complex parts of electric motors, electronic computers and space missile mechanisms.

The new chlorinated solvents operations are a part of the Ethyl's Industrial Chemicals division which is headed by Joseph A. Costello, Company vice president. James M. Gill is general manager of industrial chemicals and Stanley A. Harris is chlorinated solvents sales manager. Sales headquarters are located at the Company's executive offices in New York.

Trichlorethylene, perchlorethylene and 1,1,1-trichloroethane marketed by Ethyl are shipped in distinctively designed 55-gallon steel drums and rail-



Manufacturing facilities are under construction in the hydrocarbons area at Ethyl's Baton Rouge plant.

road tank cars from strategically located points throughout the country. The locations of these shipping points assure customers of prompt delivery to meet their individual requirements.

Ethyl plans to spend several million dollars for new facilities to produce chlorinated solvents at the Company's chemicals manufacturing center at Baton Rouge, La. The first unit is now under construction. It will manufacture 1,1,1-trichloroethane and is expected to be in operation this fall. Additional installations to produce perchlorethylene and trichlorethylene will be added later.

The Ethyl manufacturing center at Baton Rouge already is one of the country's largest sources of chlorinated hydrocarbon chemicals. Ethyl chloride, methyl chloride, ethylene dichloride, vinyl chloride and vinylidene chloride, used in the manufacture of antiknock compounds for gasoline and in plastics and a variety of other chemical products, are produced there. Ethyl also is a major producer of chlorine, which accounts for about 80 percent, by weight, of the solvents.

Thus, the entry of Ethyl into chlorinated solvents is a logical extension of the Company's present operations.

From its beginnings in the 1930s, the chlorinated solvents story is another example of American ability to put laboratory chemicals to work successfully on broad industrial fronts. The non-flammable

◁ Perchlorethylene is widely used in dry cleaning—in both commercial and self-service operations.

Chlorinated Solvents — A Natural for Ethyl

properties of the chlorine-base products and their adaptability to faster and more efficient mechanized cleaning procedures were among their initial selling points. Neither acid nor alkali, they could be used safely and effectively in a number of ways.

Some early limitations, including high cost and chemical instability, were overcome by developments made just prior to and during World War II. By the mid-1940s, chlorinated solvents had replaced more hazardous hydrocarbon solvents and slower alkali cleaners in a great many industrial operations.

Perchloroethylene has been firmly established in the dry cleaning industry for almost 20 years. More recently, 1,1,1-trichloroethane has almost completely replaced carbon tetrachloride in the cold degreasing solvent market because it greatly reduces the toxicity problems associated with carbon tetrachloride.

Market growth for chlorinated solvents as a whole has been substantial and reasonably consistent. Future growth in the metal cleaning market is expected to be steady. At the same time, it appears that practically all new dry cleaning capacity will use perchlorethylene for the foreseeable future.

Overall, demand for the three solvents is expected to increase to one billion pounds annually by 1970.

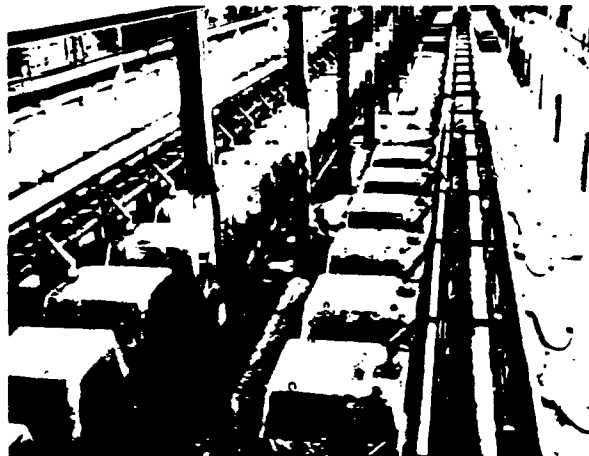
In addition to established uses, new applications under development include:

- A complete metal preparation process which uses trichlorethylene as the solvent for phosphatizing and painting steps as well as for degreasing.
- Substitution of 1,1,1-trichloroethane for semi-narcotic aromatic solvents in glues and certain resin formulations.
- Blends of chlorinated solvents with hydrocarbon, alcohol, ether and other chlorinated solvents to produce a tailor-made solvent for a specific job.

Possible long-range growth possibilities include:

- Deeper penetration into alkali and hydrocarbon cleaning markets in metal and textile industries as available space and fire hazard considerations become more acute.
- Development of a stabilization system which would permit 1,1,1-trichloroethane to break into the hot vapor degreasing and dry cleaning markets. The 1,1,1-trichloroethane would have a better cycle rate and is a better solvent.

In entering the chlorinated solvents field, Ethyl expects to benefit from its technical and manufacturing experience in chlorinated hydrocarbons and to gain new marketing outlets. The Company's extensive background and ability in the production of these and other industrial chemical products, combined with this expanded marketing capability, provide a sound growth basis for Ethyl in the industrial chemical field. ○



Ethyl is an important producer of chlorine, which accounts for about 80 percent, by weight, of the three chlorinated solvents.

◀ In cleaning metal parts, the solvents effectively remove oil, grease and grime that normally accumulate during machining and fabricating operations.



TREAT HER WITH CARE.

NEW ETHYL MOVIE FOR OIL INDUSTRY EMPHASIZES
IMPORTANCE OF WOMEN AS SERVICE STATION CUSTOMERS



To the accompaniment of the words and music of an original catchy song, the unique film presents women in a number of scenes which reveal typically feminine characteristics and emphasize why service station dealers should "Treat Her with Care."



ing message and may well remind their husbands that women like to be treated with care.

Additional reminders of the film's message are available from Ethyl for use in connection with showings—and afterward.

A small, four-page pink-and-gray folder emphatically titled "Treat Her with Care" is available for widespread distribution to service station personnel. The folder summarizes the film facts that underscore the importance of women customers. It is perforated so the cover, with the words "Treat Her with Care" in brilliant color, can be detached and posted in a prominent place in service station offices—as a reminder.

Also available to oil companies are inexpensive flexible plastic phonograph records containing six minutes of words and music of the appealing "Treat Her with Care" song.

Marketing executives and service station dealers who have seen "Treat Her with Care" are enthusiastic about its unique presentation of an important message.

One of the first uses was a series of showings by one oil company to dealers and their wives at which attendance totaled 10,000. It is expected to be widely used throughout the industry in coming months. Copies of the film and related materials are available at Ethyl Corporation offices throughout the country.

Ethyl also offers to help oil companies in their individual training programs by providing charts, slides and other materials containing data on the subject of women motorists as potential customers in the companies' marketing areas. ○



Treat Her With Care

A UNIQUE, entertaining, full-color motion picture has been produced by Ethyl Corporation. Called "Treat Her with Care," it is a refreshing reminder for service station dealers throughout the country of the importance of women in the gasoline, motor oil and TBA market. The movie is another Ethyl service to the oil industry.

No admonishing "do this" or "do that" messages come from the pictures or sound track of the new film. Many of the scenes are staged against delicately feminine rose-petal-pink backgrounds. The words are the lilting lyrics of an original song also called "Treat Her with Care."

Together, the words and pictures point up the moods, the thoughts, the desires, the actions and reactions, the likes and dislikes of women — and show how they differ temperamentally from men. They also remind viewers that a woman "has a mind behind her lovely face."

"Treat her like she'd like us to," the catchy song says. "Just treat her with care, and she'll always be grateful."

The implications are obvious to petroleum marketers and service station dealers: Neat, clean stations and attentive service attract and retain women customers.

The dozen verses of the song comprise almost all of the commentary of the 10-minute film. Meanwhile, on camera, six strikingly attractive actresses appear in different scenes to demonstrate that women are gentle, kind, sweet, dainty—and appreciate special attention.

Why the emphasis on women for petroleum marketers?

The reasons snap sharply into focus as the film headlines pertinent facts on the screen:

FACT: *More than 40,000,000 women now drive!*
FACT: *10,000,000 more than five years ago!*
FACT: *More than two drivers out of every five are women!*

"Treat Her with Care" goes on to point out that women behind the wheel have different reasons than men for buying at a particular service station:

FACT: *When traveling away from home, clean appearance of the station is the most important reason for stopping!*
FACT: *When driving near home, car service is the most important reason for returning to a particular station!*
AND: *The second most important reason is the careful, courteous treatment they receive!*

Fact:

**MORE THAN
40,000,000
NOW DRIVE**

Fact:

**SERVICE
IS MOST IMPORTANT
FOR REPEAT BUSINESS**



"Treat Her with Care" is not a conventional dealer-training film. It is a unique sequel to *Women on Wheels I* and *II*, surveys on the importance of women in the gasoline market conducted by Ethyl in the last few years. These surveys have provided petroleum marketers with information helpful in conducting dealer training programs and in planning advertising and promotion campaigns.

Since petroleum marketers are increasingly aware of the growing numbers and importance of women motorists, "Treat Her with Care" can be a valuable training aid. The film, with its appealing musical message, can provide a welcome change of pace at dealer meetings, where the emphasis is on products, promotions or service station operating procedures. It is expected to be especially effective at meetings where dealers' wives are present. The ladies are sure to enjoy and appreciate the flatter-

New Symbol of Quality



FIRST ADOPTED more than 40 years ago, and modified several times in the last four decades, the well-known Ethyl Corporation trademark has recently been redesigned. In its new form, the trademark will be used on labels, shipping containers, signs, advertisements and other literature to identify the many products of the "new" Ethyl Corporation.

In its original form, the trademark came into use in 1923 to identify "Ethyl" antiknock compounds and "Ethyl" gasoline, the new, high quality motor fuel that resulted from the addition of the effective new chemical additive. The trademark

was used so successfully that it became one of the best recognized devices of this type in the world.

In more recent years, the trademark has continued to identify "Ethyl" antiknock compounds and also has been used in connection with the Company's 50 or more other chemical products.

Now, with Ethyl Corporation diversifying still more in petroleum and industrial chemicals, and in paper, packaging and plastics, and expanding its marketing activities in new product and geographical areas, the redesigned Ethyl trademark is expected to become even better known throughout the United States and around the world. ○



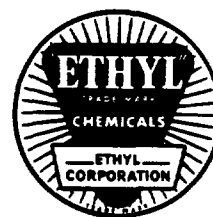
Within a few months after "Ethyl" gasoline first went on sale in 1923 as a product of General Motors Chemical Company, predecessor to Ethyl Corporation, the now-famous trademark was introduced. The circular outline, inverted triangle, horizontal banner, and prominence of the word ETHYL have continued to the present.



Formation of Ethyl Gasoline Corporation in 1924 was promptly reflected in the trademark. "Ethyl" antiknock compound was identified as the active ingredient in gasoline that eliminated knock and helped automobile engines produce more power.



After the corporate title was shortened to Ethyl Corporation in 1942, that new name naturally appeared in the trademark. The flowing ruffles were trimmed from the ends of the banner and it became a trapezoid, but overall the device became even more widely recognized as a symbol of quality.



In recent years, the word "Chemicals" was introduced as the Company's list of petroleum additives and industrial chemicals grew—a result of research and diversification. In this form, the trademark was used to identify "Ethyl" products until the current modification.

INTRODUCING... "ETHYL" MPA 85

A new formulation of multi-purpose additive, which can cut oil refiners' gasoline treatment costs—and at the same time provide effective detergency, anti-icing and anti-corrosion protection—is now available from Ethyl. Designated "Ethyl" MPA 85, the new mixture is fully as effective as MPA and MPA 9, the Company's other widely used multi-purpose additives for gasoline.

An improved manufacturing process enables Ethyl to make the new concentrated formulation from the same active ingredients used in the two other multi-purpose additives. Since MPA 85 is more concentrated, smaller quantities do the job. This, in turn, cuts refiners' storage and handling expenses and reduces their treatment costs per barrel of gasoline.

Extensive experimental use of MPA 85 in gasoline used in typical automobile operations has demonstrated the new formulation's effectiveness. The three problems that it overcomes are:



Carburetor Deposits

The additive's detergent action removes deposits, cleans up dirty carburetors, prevents new deposits from accumulating, and thus *keeps* carburetors clean. This action is especially important in newer model cars equipped with positive crankcase ventilation systems, since such systems can increase carburetor deposits.



Carburetor Icing

MPA 85 stops carburetor icing in most cars under most conditions. It forms a coating on throttle blades and carburetor walls so that any ice formed passes harmlessly through the carburetor and does not cause stalling.



Corrosion

A surface-active material, the three-in-one additive coats, and thus protects, all surfaces with which it comes in contact: automobile fuel tanks, fuel lines, fuel pumps and carburetor bowls; service station pumps, lines and tanks; even long-distance pipelines and storage tanks.

Added to gasoline in recommended concentrations of 29 parts per million, or 7.4 pounds per thousand barrels, MPA 85 is less expensive than any combination of three additives in doing all three jobs with the same degree of effectiveness. It thus offers obvious advantages to oil refiners. ○

ETC 29784



Golden Anniversary



Dramatizing progress in highway during the past 50 years, two 1914 leave Miami for Minneapolis.

HOW SHOULD an oil company observe its fiftieth anniversary?

Looking back to founding days, reviewing growth and evaluating past achievements are in order, of course. But the occasion becomes a more meaningful milestone when attention is directed to the present and the future, too.

That's what The Pure Oil Company is doing this year. Incorporated half a century ago to supply a few Ohio customers with natural gas, Pure has long since become an important refiner and marketer of diversified petroleum products. The company sells some 3.3 billion gallons of fuels, lubricants and petrochemicals annually, serving customers in 24 states from Minnesota southeastward to Florida. Yearly gross revenues exceed \$700 million. Headquarters for the 10,000-employee Pure Oil organization, which also has interests in Canada and overseas, are in suburban Chicago at Palatine, Ill.

All this is a far cry from the April days of 1914 when Pure was born as the Columbus Production Company, a small natural gas business in the Buckeye State. In a matter of days the name was

changed to the Ohio Cities Gas Company. Then late in the same year, an event destined to shape the firm's entire future took place—drillers struck oil on West Virginia lease holdings.

After building a refinery and acquiring other properties including The Pure Oil Company (New Jersey) in 1917, the present corporate name was adopted in 1920. Pure's growth and contributions to petroleum industry progress in the succeeding years have been outstanding.

Rather than celebrate its golden anniversary with a concentrated program, Pure Oil has scheduled a balanced series of interrelated activities extending through most of 1964. They include preparation of historical oil and automotive publications, sales promotion efforts linked with the anniversary, special advertising, open houses and "birthday parties" for employees, business associates and civic officials at various company locations.

Colorful and nostalgic events include tours by two 1914 automobiles through Pure's marketing territory between Miami and Minneapolis, with drivers wearing the goggles and dusters of yesteryear. One circuit is taking the cars through Ohio



This four-horsepower wagon was typical of equipment for product transportation in The Pure Oil Company's early years, when demand was small and service leisurely.



Yesteryear's flat tire pumping and the dusters, goggles and clothing motorists used to wear live again in this re-enactment, part of Pure Oil's anniversary celebration.



Beman G. Dawes, left, was the first of Pure Oil's five presidents. Today's is Robert L. Milligan, who is also chief executive officer.

communities with which the company's early years are associated. Collectively, the tours contrast 1914 conditions with the ease and convenience of modern automobile travel, and call attention to Pure Oil's role in serving the highway users of 1964.

One of the company's many contributions to better motorized transportation is its "Truck Stop" chain. The chain consists of 278 complete service centers which supply trucks and truckers with fuels, lubricants, maintenance, repairs, TBA equipment, and even sleeping quarters, showers, restaurants, laundries and related facilities. Many even have barber shops.

Pure operates more truck centers than any other oil industry marketer, handling some 40 percent of the truck-stop business in its territory. The company is promoting and expanding these outlets during its anniversary.

After record sales in 1963, Pure has set its sights on still better marketing achievements in its fiftieth year. In this connection, the company is merchandising its Firebird gasolines, which contain additives for reducing engine wear, stalling and carburetor icing; a new all-season, long-life motor oil;

a spray-on undercoating to protect cars, trucks and other vehicles from rust and corrosion; and Pure's own brand-name automobile tires.

The company's more specific bids for increased urban patronage and sales to motorists on limited-access highways hinge on new Care/Port and TOURest complexes.

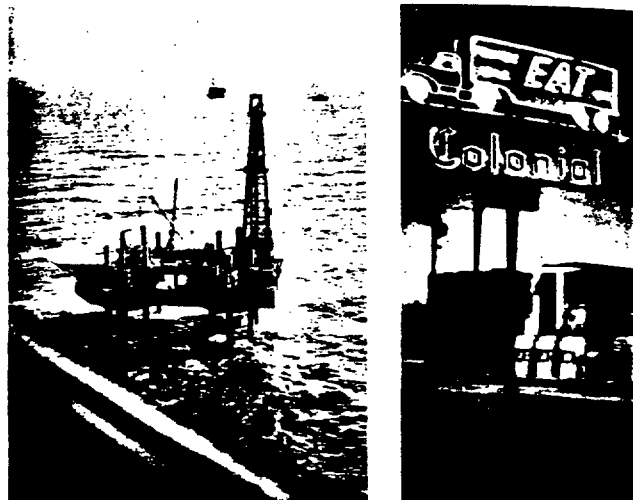
The Care/Ports—still experimental—are complete, one-stop auto servicing units, with at least eight car-servicing bays, high-speed automobile-washing equipment, electronic "diagnostic" apparatus to pinpoint engine problems quickly, and well-stocked shelves of TBA items and other driver needs. Seven new TOURest installations have been opened adjacent to express highways, offering vehicular supplies and services and restaurant and motel facilities. More units are being designed and constructed.

Among Pure Oil's principal assets and resources are interests in producing fields in 18 states and in foreign countries; four refineries which last year processed 66 million barrels of crude oil; five natural gasoline plants; 17,000 miles of wholly-owned and part-interest pipelines; a fleet of tankers and barges; nearly 16,000 retail outlets in addition to "Truck Stop" stations; a modern research center at Crystal Lake, Ill.; and the Amsco (American Mineral Spirits Company) division, a leading marketer of solvents and petrochemicals.

The framework of the firm's current structure began taking shape during the 1920's after "The Pure Oil Company" name was adopted. With co-founder Beman G. Dawes as president, rapid expansion included the acquisition of five other oil companies from Pennsylvania to Texas. Further growth continued during the administration of the next chief executive, the first president's brother, Henry M. Dawes. This growth included pioneering in offshore production in the late 1930's and construction of additional refining facilities.

Earlier emphasis on market expansion was stepped up after World War II with the purchase of four more companies. At the same time, crude sources, refinery capacities and pipeline mileage were increased. Pure extended its horizons further by successful drilling in Venezuela in 1958 and acquiring Canadian properties two years later. Prospecting for oil in Middle East sheikdoms is among the company's anniversary year overseas undertakings.

Pure entered the burgeoning field of petrochemical manufacturing and marketing in 1932 through interest in Amsco, which became a wholly-owned subsidiary three years ago. New petrochemical installations were built after the consolidation, making the company an important source for domestic and foreign consumers of such products as benzene, toluene and xylene.



(3)

Looking back on Pure Oil's past and contemplating its present and future, President Robert L. Milligan has this to say:

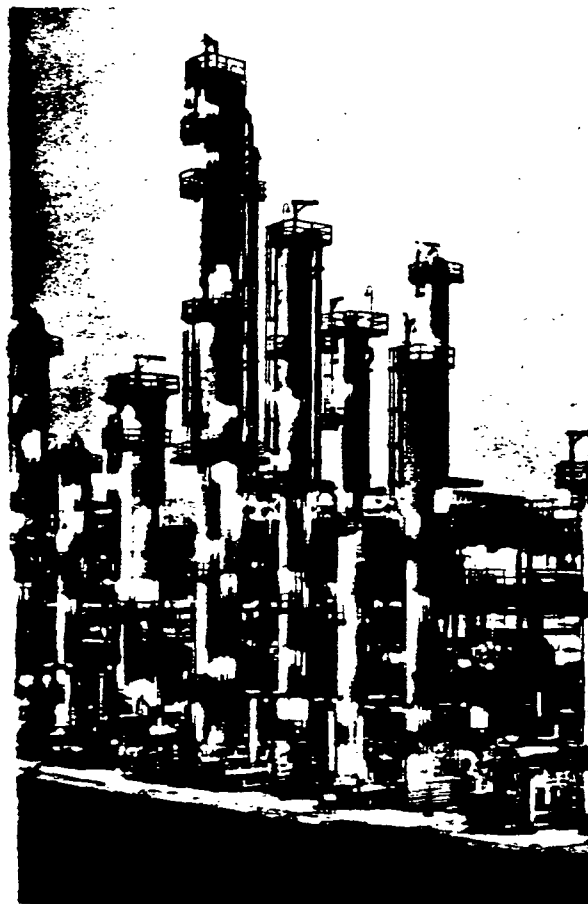
"We are moving forward in a number of areas. Over the past 10 years, The Pure Oil Company has built for the future through carefully planned capital expenditures totaling \$580 million. Of this amount, \$380 million was invested in crude oil and natural gas exploration and production, and the remainder has gone into refinery and petrochemical units, pipelines, service stations and other facilities.

"The company's exploration for new reserves covers such diverse areas as offshore Louisiana, the Middle East, west Texas, Honduras, Alaska, Oklahoma, the Rocky Mountains and Canada. During its first 50 years, the growth of The Pure Oil Company has been substantial. Now we are looking forward to the challenges, problems and opportunities of our second half-century of corporate existence."

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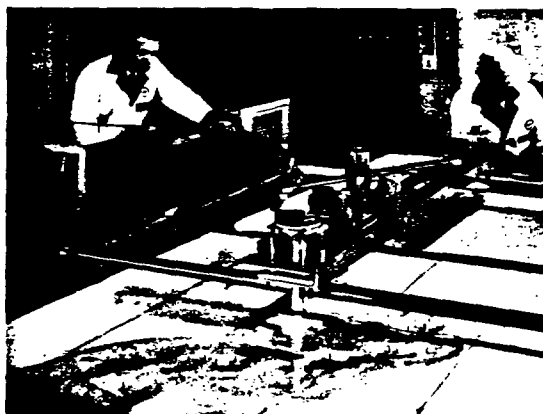
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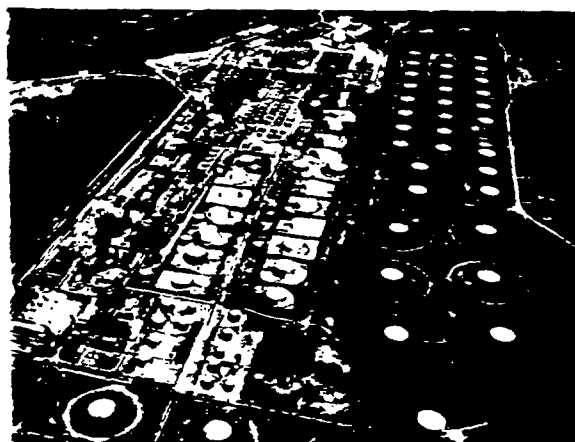
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(6)



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(5)

(1) A pioneer in offshore drilling, The Pure Oil Company today is pumping more than a million barrels of crude annually from tideland wells up to two miles deep.

(2) Golden anniversary expansion includes increasing the number of Pure's Truck Stops, equipped with complete servicing facilities and accommodations for drivers.

(3) The company's central offices in the Chicago suburb of Palatine, Ill., make this interesting pattern of buildings and parking lots when seen from the air.

(4) Pure's refinery at Lemont, Ill., includes complex units like this, added during recent expansion and modernization of production facilities.

(5) Among sources of supply for Pure Oil customers is the company's big refinery at Smith's Bluff, Texas.

(6) Pure Oil's research is concentrated in these spacious quarters at Crystal Lake, Ill.

(7) The use of such equipment as a potentiometer helps the company determine production from its oil fields.

ETC 29788

AFTERNOON IN A WOODYARD

The woodyard at the Albemarle Paper Manufacturing Company's pulp and paper mill at Roanoke Rapids, N. C., and an employee there, are featured in this full-color photograph which illustrated an advertisement in seven widely read national magazines this spring.

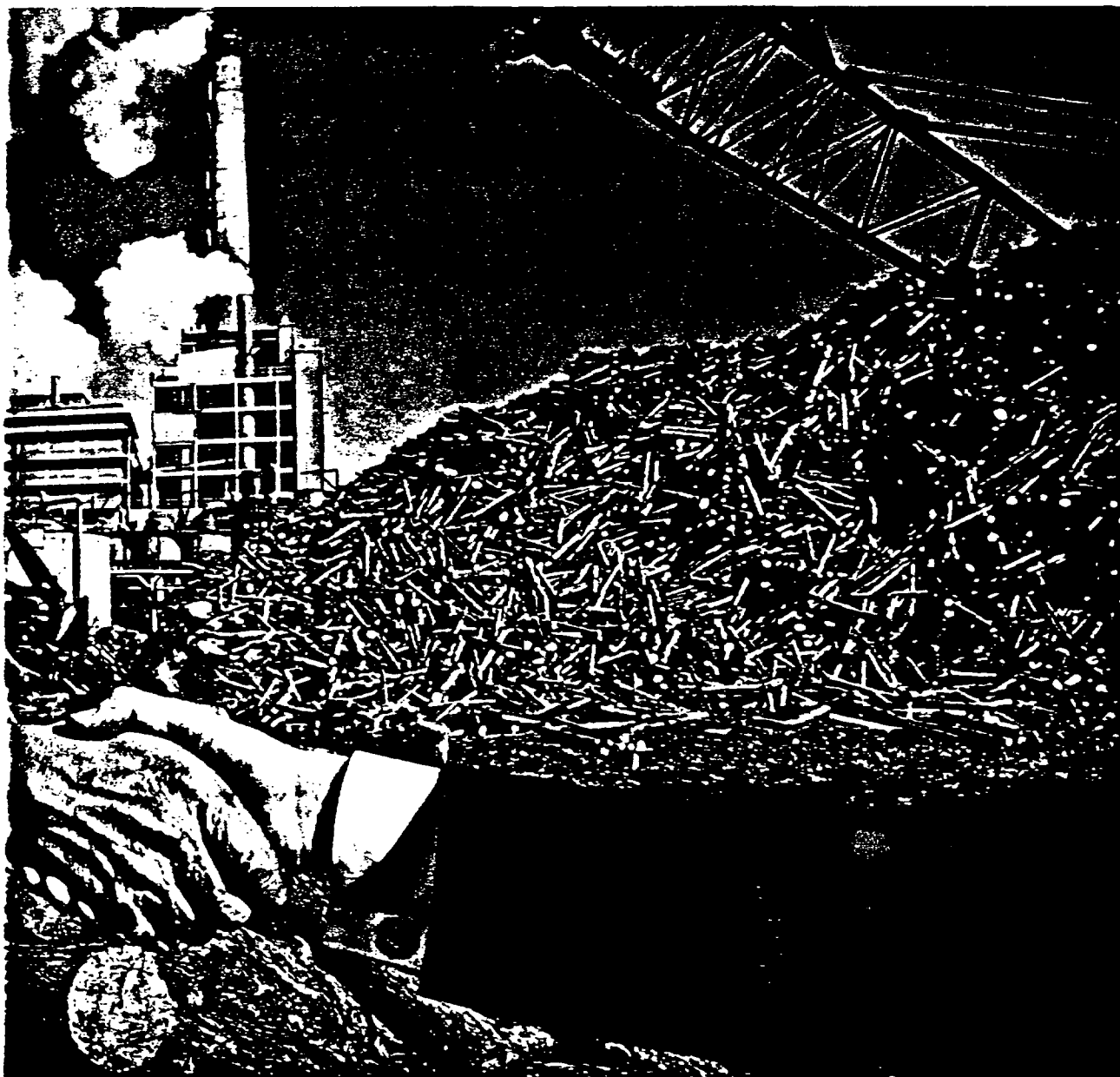
The advertisement, published by New York's Chase Manhattan Bank in *Time*, *Newsweek*, *Business Week*, *Forbes*, *Harper's*, *The Atlantic*, and *Dun's Review and Modern Industry*, is one of a series highlighting various industries. It does not identify the installation or the

employee, but points out that "paper has a friend at Chase Manhattan."

The employee is Maynard S. Spence, a crane operator at the Albemarle woodyard. He is shaking hands with an otherwise unseen bank representative. In the background are some of the 500,000 cords of pulpwood Albemarle purchased last year in establishing new Company records in the production of both pulp and paper.

The Ethyl subsidiary currently has an \$11 million improvement program under way at the mill to further increase efficiency and output.

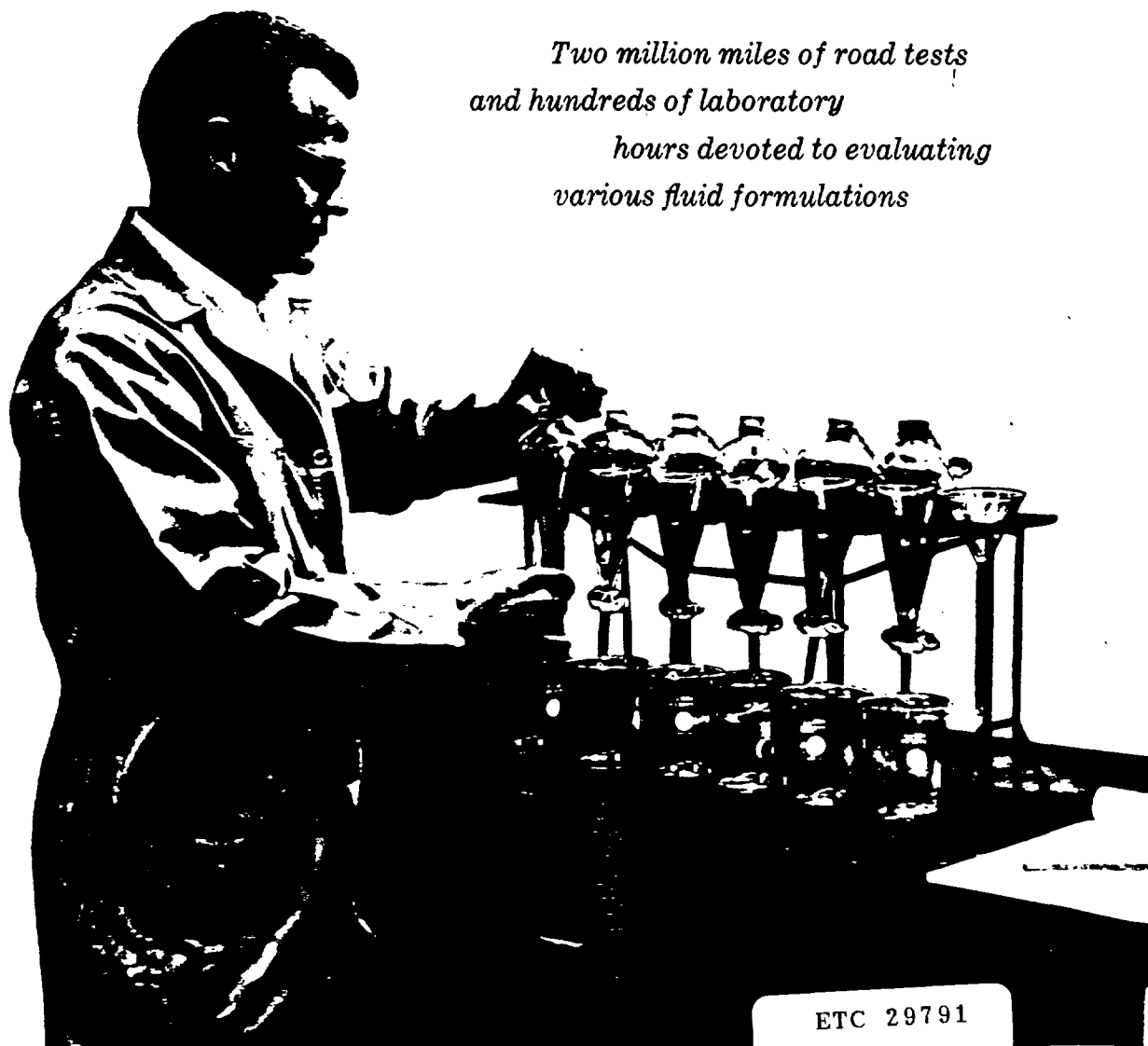




ALL ABOUT ANTIKNOCKS



*Two million miles of road tests
and hundreds of laboratory
hours devoted to evaluating
various fluid formulations*



ETC 29791



Thirty-six new cars, equipped with the most popular and newest design engines and power options, were specially purchased for the antiknock compound road tests.



The cars were driven night and day in and around Detroit in all kinds of weather and traffic conditions.

THE RESULTS of recent comprehensive evaluations of antiknock compounds have been presented to customer oil companies by Ethyl Corporation. The evaluations, which involved more than two million miles of road tests and hundreds of hours of laboratory tests, are part of Ethyl's continuing studies of the cost-effectiveness of various antiknock compound formulations.

The formulations involved in the recent tests contained varying amounts and types of halogens, or scavengers, which are used in antiknock compounds in combination with tetraethyl lead, tetramethyl lead or mixtures of the two. While the lead alkyls are the active antiknock ingredients in the compounds, the scavengers—ethylene dibromide and ethylene dichloride—prevent the formation of deposits in gasoline engines.

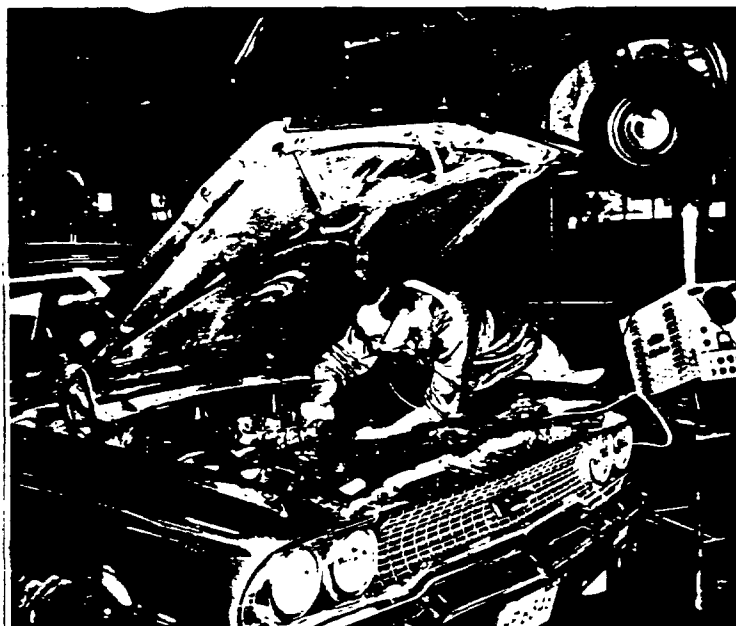
Variations in the types and quantities of scavengers can affect the cost of antiknock fluids, and also can be an important factor in determining fuel and engine performance and the durability of such vital engine parts as valves and spark plugs.

Since the type of crude oil involved, the refinery process equipment used and the desired characteristics of finished gasoline vary from one refinery to another, no one antiknock compound formulation is necessarily best throughout the industry. Therefore, the results of the Ethyl test program were made available to the various oil companies for evaluation in their own particular situations, to determine cost-effectiveness at their refineries and in their marketing areas.

For the test program, which was conducted by experienced Ethyl personnel at the Company's research laboratories at Detroit, three experimental antiknock formulations were prepared. Their performances were compared with each other and with Ethyl's standard Motor Mix, which is designed for maximum results in the regular gasoline of most refiners and marketers.

Road tests started last summer in a fleet of three popular makes of new 1963 model passenger cars specially purchased for the purpose—12 each Fords, Chevrolets and Ramblers. The cars, which were equipped with the most popular or newest-design engines and power options, represented a high percentage of new car sales. They were driven a total of some 120,000 miles a week for a period of some six months.

The cars were exposed to typical driving conditions and speeds—on limited access highways and



The performance of all cars involved in the antiknock compound road tests was carefully checked by experienced technicians at the Ethyl Research Laboratories. The condition of valves, spark plugs and other vital engine parts was thoroughly analyzed and evaluated.

... a part of Ethyl's continuing studies to develop the best possible products for its customers

in heavy city traffic. Part of the course they traversed is the Automobile Manufacturers Association route, used by automobile companies for road performance tests.

All during the tests, specialists from the Ethyl laboratories maintained close supervision and control. When a driver reported unsatisfactory operation of a vehicle, its performance was checked by a trained technician or engineer. If these observations confirmed a complaint, a complete engineering check was made. In any case, each car was road tested weekly by a technician.

In the laboratory phase of the tests, the experimental antiknock formulations were added to gasolines used to fuel production model automobile engines run under controlled conditions on engine dynamometers.

Throughout the road and laboratory tests, and at their conclusion, detailed accurate data were compiled on fuel and engine performance with the different antiknock compound formulations. Valves, spark plugs and other vital parts were carefully studied and their condition analyzed. All these data were compiled in the test results prepared and presented to customer oil companies by Ethyl representatives.

New Compounds Introduced

As the pioneer producer of antiknock compounds and the company with the outstanding background in antiknock compound formulation and use, Ethyl has for years conducted evaluation programs and is continuing to conduct them. For some 40 years, as engine designs, fuels and operating conditions have changed, Ethyl has made intensive studies to determine the best possible products for its customers throughout the petroleum industry. As a result of these studies, the Company has made several changes in antiknock compound formulations and has introduced a number of new compounds. Today, Ethyl offers the broadest range of antiknocks in the industry.

The results of the current phase of these studies are undergoing intensive analysis by Ethyl personnel and by the technical personnel of oil companies throughout the country. Meanwhile, Ethyl is making further evaluations of antiknock compounds and intends to pursue them in the future. As they have over the years, the facilities, the know-how and the services of Ethyl and its personnel continue to work with individual companies. ○

OUTLOOK

ETHYL BOARD CHAIRMAN SPEAKS ON CHALLENGES TO PAPER INDUSTRY



Board Chairman F. D. Gottwald's speech at the Kraft Paper Association meeting in New York received nationwide publicity earlier this year.

Mr. Gottwald urged the paper and paperboard industries to put aside "time-worn processes, methods, teachings, practices and thinking" and modernize. He emphasized that "daring" research is needed if the paper industry is to meet the challenge of competitive products made of other materials.

"We had better be thinking of strengthening our companies financially, producing at the lowest possible costs, and pricing our products to keep out replacement by other materials," Mr. Gottwald said.

The paper industry has enjoyed a consistently high ratio of production to capacity and increasing demand indicates that production records may be set in paper and paperboard this year and next, the board chairman noted. He added that high demand also increases the possibility of recent price increases holding firm. However, he cautioned, competing products pose a real threat to further growth and expansion of the paper industry.

PETROLEUM REFINERS HEAR ABOUT SELECTING BEST ANTIOXIDANTS

Care must be used in selecting the best antioxidant for gasolines, if refiners are to achieve maximum economies in fuel handling and storage, Dr. J. D. Bartleson of Ethyl told the National Petroleum Refiners Association annual meeting this spring. Ethyl is the leading supplier of gasoline antioxidants in the United States.

In a paper co-authored by C. C. Shepherd, also of Ethyl, Dr. Bartleson said that the markedly changed chemical composition of gasoline in the last two decades has "gradually but significantly modified the nature of storage stability problems, the type

of antioxidant best suited to today's gasolines, and the amount required."

Three outstanding developments have taken place in the antioxidant field in the last decade. Dr. Bartleson said: a trend toward greater natural fuel stability which permits lower antioxidant concentrations, a marked reduction in antioxidant prices, and a change to the use of lower-cost alkylated phenols. These factors have combined to produce savings of several hundred thousand dollars per year for large refiners.

Selecting an antioxidant should be based on such factors as its cost-effectiveness, stability in storage and handling, toxicity, and its available physical forms.

MEDICAL CENTER WING NAMED IN HONOR OF DR. R. A. KEHOE

A new \$1.5 million wing on the Kettering Laboratory at the University of Cincinnati Medical Center has been named in honor of Dr. Robert A. Kehoe, former medical director of Ethyl Corporation. Dedicated in April with ceremonies at which Dr. Luther L. Terry, surgeon general of the United States Public Health Service, was the principal speaker, the wing is called Robert A. Kehoe Hall.



Dr. Robert A. Kehoe and Surgeon General Luther L. Terry at dedication ceremony.

Dr. Kehoe was medical director of Ethyl from 1925 until his retirement in 1958. He has been a consultant to the Company since that time. Dr. Kehoe is professor of industrial medicine at the University of Cincinnati and has been director of the Kettering Laboratory since it was founded in 1930 as a result of his research in the areas of industrial medicine and health. Subsequently, Dr. Kehoe has directed many studies in these fields and has become widely known as an outstanding authority in them.

The laboratory, a renowned industrial health research center, is named for Charles F. Kettering, industrial

research pioneer, under whose direction the antiknock properties of tetraethyl lead were discovered. Mr. Kettering was responsible for the formation of Ethyl Corporation and served as its first president.

ETHYL OF CANADA APPOINTS NEW ASSISTANT MANAGER

Reginald G. W. Hollingshead has been appointed assistant manager of the Chemical Products division of Ethyl Corporation of Canada Limited, with headquarters in Toronto. In his new position, Mr. Hollingshead is assisting Robert H. Shannon, the division's manager, in technical coordination and liaison with Ethyl of Canada's customers and with Ethyl Corporation.

Mr. Hollingshead has been sales manager for Lithium Corporation of America, Inc., New York, for the last two years. Previously, he was employed for eight years by British Drug Houses and by Charles Pfizer & Company, Inc., in Europe.

INDUSTRIAL CONFERENCE BOARD ELECTS WILLIAM R. PERDUE, JR.

William R. Perdue, Jr., executive vice president and treasurer of Ethyl Corporation, has recently been elected a regular board member of the National Industrial Conference Board. The Conference Board, founded in 1916, is an independent, nonprofit institution for business and industrial fact finding through scientific research. It is a source of data on all aspects of economic life and business operations.

Ethyl has been represented on the Conference Board since 1937 by Earle W. Webb and Edward L. Shea, former Company presidents, and more recently by President B. B. Turner.

ETHYL PUBLISHES NINTH ANNUAL REVIEW OF GASOLINE QUALITY

Copies of the ninth consecutive edition of Ethyl's *Annual Review of Gasoline Quality* have recently been distributed to executives of customer oil companies. A comprehensive report on premium and regular grade gasolines sold in the United States during 1963, the publication is widely recognized as an authoritative source of essential data. It also contains information on gasoline marketed in Canada and on the octane number of

motor fuels on sale in 19 countries outside North America.

Domestic data are derived from tests conducted in Ethyl's gasoline testing laboratories on some 12,000 gasoline samples purchased at service stations in 57 marketing areas throughout the country during the year. Included are facts relating to trends in the octane quality of motor fuel on a national, regional and city basis, and comprehensive statistics on volatility, gum and sulfur content, and the hydrocarbon composition of gasolines.

JACK H. LAUBACH APPOINTED HEAD OF DENVER DISTRICT



Jack H. Laubach has been named manager of the Denver district of Ethyl Corporation, succeeding A. F. Ryan, who is leaving the Company.

Mr. Laubach, who joined Ethyl in 1946 as an engineer-in-training, has had broad sales and service experience, particularly in the South and Southwest. Following field assignments in New Orleans and Birmingham, he served as a fleet engineer for four years, and in 1953 he became an Ethyl account representative in Shreveport, La. For the last five years, he has been an account representative in the Company's Gulf-Mid Continent Region, with headquarters in Houston.

HOLLYWOOD MILL TO BE IMPROVED AND MODERNIZED

A \$350,000 capital improvement and modernization program is under way at Albemarle Paper Manufacturing Company's Hollywood mill in Richmond, Va.

Scheduled for completion next January, the project involves changes in operating equipment to increase production capacity and further improve product quality. The Hollywood mill produces blotting, absorbent, filter, saturating and other high grade specialty papers made from wood pulps, cotton linters, wool, rayon, and a variety of other special celluloses and fibers.

Plans also have been drawn up to make additional improvements in the paper making machine at the Hollywood mill by June 1965.



ETHYL AWARDED TWO HONOR MEDALS BY FREEDOMS FOUNDATION

Two George Washington Honor Medals have been awarded to Ethyl Corporation this year by Freedoms Foundation at Valley Forge, Pa., for "outstanding accomplishments in helping achieve a better understanding of the American Way of Life." Ethyl was honored for the contributions of ETHYL NEWS, the Company's external magazine, and for the work of the management club at the manufacturing center at Baton Rouge, La. ETHYL NEWS was cited for continuing to publish articles that explain and support the American free enterprise system. The management club was recognized for presenting the National Management Association's "Selling America" program to high school classes, church groups, civic and service clubs, professional societies and television viewers.

DR. GEORGE ROUSH, JR., BECOMES ETHYL'S NEW MEDICAL DIRECTOR



Dr. George Roush, Jr., has been promoted to medical director of Ethyl Corporation, succeeding the late Dr. Frank Princi who died in 1963.

Dr. Roush, who had been acting medical director, is also associate professor of industrial medicine in the Department of Preventative Medicine and Industrial Health in the College of Medicine at the University of Cincinnati. He joined Ethyl's medical staff early in 1963 and subsequently was promoted to assistant director. Previously, he had been consultant and medical director of Callery Chemical Company, consultant to the U. S. Air Force, and assistant professor of occupational health at the Graduate School of Public Health at the University of Pittsburgh.

A native of Fort Wayne, Ind., Dr. Roush holds a bachelor's degree from the University of Wisconsin, an MD

degree from Washington University, and a Master of Public Health degree from the Graduate School of Public Health at the University of Pittsburgh. He trained in internal medicine with the U. S. Public Health Service and at the University of Pittsburgh medical school. He held a fellowship from the Atomic Energy Commission, a postdoctoral fellowship from the U. S. Public Health Service and a travel fellowship from the World Health Organization.

ALBEMARLE PAPER MANUFACTURING ANNOUNCES PROMOTIONS

In a series of management promotions in Albemarle Paper Manufacturing Company, Ethyl Corporation subsidiary, a number of new appointments have been made recently. The individuals involved and their new titles are listed below.

In Albemarle Paper Manufacturing Company: Kirkwood F. Adams, executive vice president—pulp and paper manufacturing; S. Douglas Fleet, executive vice president—marketing; Lawrence K. Norton, vice president—sales; Brenton S. Halsey, vice president—planning; Kenneth D. Running, vice president—assistant manager Roanoke Rapids division; A. Edward Moorer, Jr., manager of market research; John A. Comly, general manager, Richmond Container plant.

In Albemarle's Raymond Bag division, manufacturers of multiwall shipping sacks, headquartered at Middletown, Ohio: John T. Walton, vice president—general manager; Donald R. Russell, vice president—general sales manager; C. K. Watters, marketing manager; W. E. Noble, marketing services manager; T. H. Bacon, vice president—northeastern sales manager (New York); R. G. Roberts, vice president—southeastern sales manager (Richmond, Va.); R. J. Stevens, vice president—midwestern sales manager (Chicago); R. W. Drury, vice president—western sales manager (Kansas City, Mo.); J. R. Clements, corporate accounts manager (Chicago).

In Albemarle's Interstate Bag Company, handle shopping bag manufacturing division at Walden, N. Y.: Harford K. Steen, chairman of the board; Goble W. Bryant, president; Arthur S. Francis, Jr., sales manager; James H. Heiny, treasurer; Claude V. Allen, secretary and chief engineer.



The high-compression engine could not have been built without some way to quiet engine knock. Ethyl solved that one some forty years ago with an antiknock compound. Now we also make highly reactive catalysts, chemicals that make

tires last longer, de-ice carburetors. Plastic film that keeps out moisture and paper that blots it up. These are some of the things we're doing today. Where will Ethyl products turn up next? Wherever research and our imagination take us.

ETHYL CORPORATION New York, N.Y. Petroleum Chemicals • Industrial Chemicals • VisQueen Plastics • Ethyl of Canada • Ethyl International • Albemarle Paper • Raymond Bag • Interstate Bag

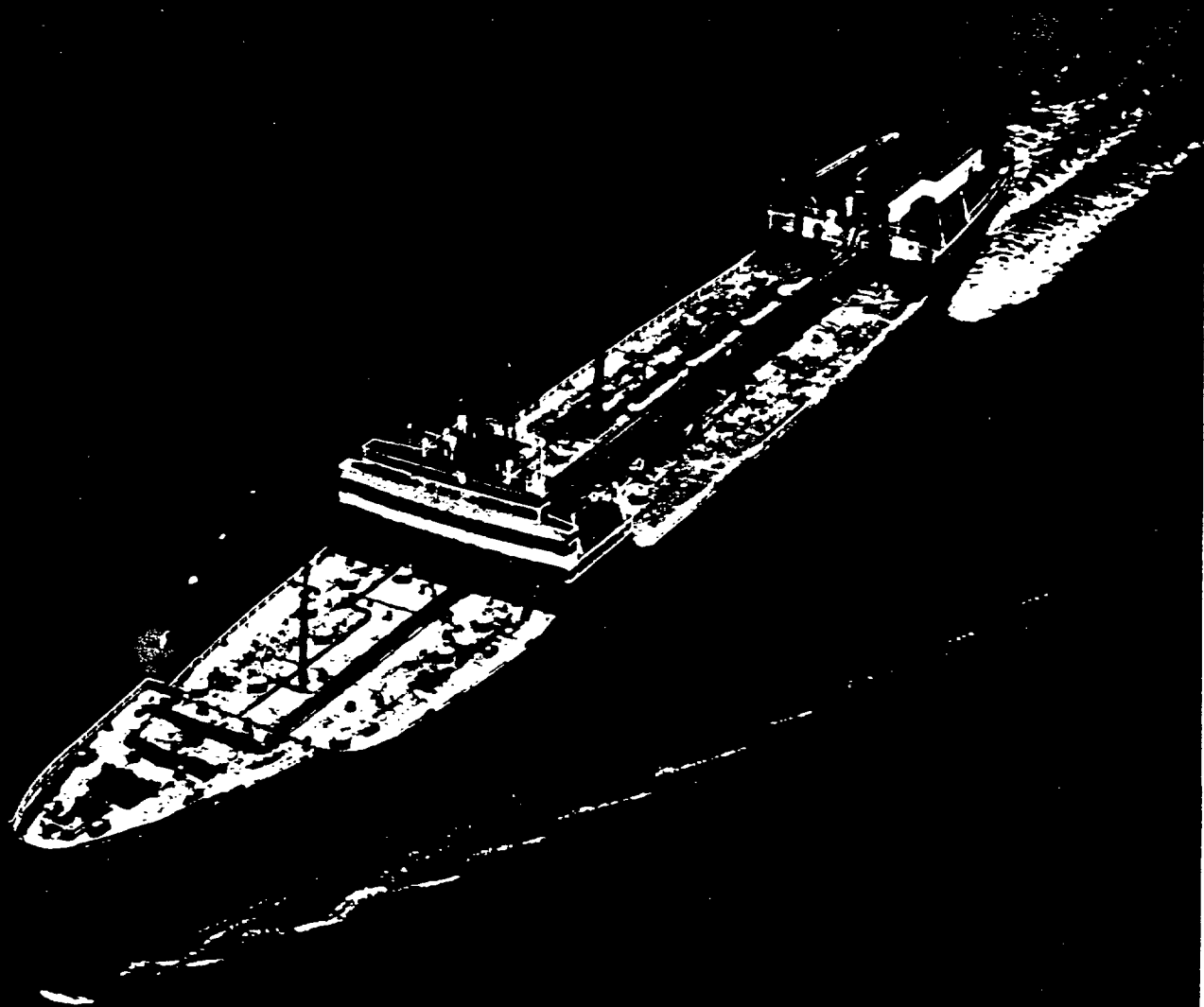


Some quickly wash away; others last forever. Many of our customers tell us that one of their lasting impressions about Ethyl comes from our willingness to share research findings. This kind of cooperation is just one of the many things that has helped make Ethyl a partner in our customers' progress.

ETC 29797

Ethyl News

MMER / 1964



ETC 29798



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Ethyl News

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TABLE OF CONTENTS

Plurality in Plastics.....	2
Arsenal of the Confederacy.....	6
The Things They Buy!.....	10
CI 2 Goes to Sea.....	14
Business for Beginners.....	16
One out of Many.....	18
Ponds in the Desert.....	22
The Ethyl Management Team.....	24
Outlook	27
Blazing New Trails.....	29

ON THE COVER

Texas City Refining, Inc.'s "Four Lakes," one of the T-2 type tankers in which the effectiveness of "Ethyl" Combustion Improver 2 (CI 2) has been convincingly demonstrated. For more about the savings and efficiency that result from the use of CI 2 in bunker fuels, see "CI 2 Goes to Sea," pages 14-15.

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100 PARK AVENUE, NEW YORK, N. Y. 10017

*manufacturers of petroleum chemicals,
industrial chemicals, paper and plastics.*

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Research at Ethyl...

way of life.
r since the early 1920's, when—
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as are carried on in modern
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ETC 29800

PLURALITY IN

PLASTICS



PVC is used in floor tile . . .



automobile seat covers . . .



rainwear . . .

Polyvinyl chloride production from new plant will supplement Ethyl's position in "VisQueen" film, PVC pipe, and vinyl and vinylidene chloride

IN ANOTHER EXPANSION and diversification move—the third in the plastics field in the last nine months—Ethyl Corporation is building a new plant to manufacture a broad range of high quality polyvinyl chloride resins and compounds.

Polyvinyl chloride (PVC) is one of the most widely used plastics. It can readily be made in a wide range of colors and degrees of flexibility, ranging from rigid extrusions to thin, pliable film and sheeting. It has a high degree of toughness and excellent resistance to acids, alkalis and alcohols. PVC resins and compounds go into the manufacture of floor tile, shower curtains, upholstery material, raincoats, garden hose, pipe, electric wire and cable insulation, phonograph records, building panels and many other household and industrial products.

Ethyl's new polyvinyl chloride plant, which is expected to be in production in less than a year, is under construction at the Company's manufacturing center at Baton Rouge, La. It will cost about \$8 million, is employing about 300 workers in construction, and will require about 80 to 100 production employees when it goes into operation under the direction of the Ethyl Manufacturing department.

Construction of the plant follows extensive research, engineering and economic studies. Ethyl

has a number of years of experience in technical developments in plastics and has concluded agreements relating to process and application technology with three of the largest international companies in the field—Imperial Chemical Industries (United Kingdom), Solvay of Europe, and Solvic, a joint company of Solvay and I.C.I.

Vinyl Chloride Made at Baton Rouge and Houston

For a number of years, Ethyl has been a major producer of vinyl chloride monomer, the chemical intermediate from which polyvinyl chloride is made. In producing vinyl chloride at its Baton Rouge and Houston manufacturing plants, Ethyl was able to draw extensively on its long experience in the manufacture of such chlorinated hydrocarbons as hydrogen chloride, ethyl chloride and ethylene dichloride.

Ethyl produces vinyl chloride monomer by thermally cracking ethylene dichloride in a highly efficient process. This operation yields both the monomer and hydrogen chloride as a byproduct. The latter is used in other intermediate chemical manufacturing operations.

Subsequently, the Company has gone into the manufacture of vinylidene chloride, intermediate for the production of polyvinylidene chloride, a plastic that is used for paper and paper board coat-



hose...



pipe...



and phonograph records.

ing, automobile seat and outdoor furniture coverings and other modern applications. More recently, Ethyl has entered the chlorinated solvents field.

At the new PVC plant now under construction, vinyl chloride monomer will be polymerized, or converted into polyvinyl chloride. In the form of pellets or powder, the PVC will in turn be sold for the manufacture of plastic products.

Since different manufacturers like to buy PVC in different forms, Ethyl will manufacture and sell both resins and compounds. For those who simply want PVC resin and prefer to add various other chemicals in prescribed amounts, the basic product will be available. Those who prefer to buy a more complete "package," including plasticizers, dyes, stabilizers, antioxidants and other additives which impart added strength, flexibility, color and other properties, will find Ethyl completely equipped to supply their requirements.

Besides the new polyvinyl chloride plant, other recent additions to Ethyl's plastics operations include the acquisition of the "VisQueen" polyethylene film operations last November and the purchase this April of the Plastics Products division of Texacon Industries, manufacturer of polyvinyl chloride pipe, conduit and related products.

Ethyl's VisQueen operations, a part of the Plastics division, include manufacturing plants at

Terre Haute, Ind.; Flemington, N. J.; and Fremont, Calif., and a nationwide sales force. The Company is the leading manufacturer of polyethylene film, producing the versatile material by a unique melt-extrusion process. Ethyl supplies "VisQueen" film in the greatest selection of film types, forms, folds, colors, widths, thicknesses and patterns. The film is widely used in modern packaging, building and agriculture, and around the home.

Pipe Operations Being Enlarged

Ethyl's new polyvinyl chloride pipe operations have been absorbed into the VisQueen division and their scope and volume are being enlarged.

In making pipe and electrical conduit, PVC resin and other ingredients are mixed together in powder form, charged into a machine, and extruded in various seamless thicknesses and diameters. In addition to supplying the pipe and conduit in diameters ranging from $\frac{1}{4}$ " to 6" and in a range of thicknesses and lengths, Ethyl also supplies a complete selection of PVC fittings, including caps, flanges, tees, elbows, crosses, bushings, adapters, saddles, nipples, etc. Pipe, conduit and fittings are sold to building materials suppliers by the Building and Agriculture sales group of the VisQueen division, and to plumbing contractors through manufacturers' representatives.

Ethyl's PVC pipe bears the seal of approval of the Plastics Pipe Institute (a division of the Society of the Plastics Industry) and of the Testing Laboratory of the National Sanitation Foundation for the conveyance of drinking water. Likewise, the conduit has been approved by the Underwriters' Laboratories for electrical work.

Polyvinyl chloride pipe is rapidly gaining in popularity and use because of its many economic and physical advantages. It has exceptionally high resistance to chemicals, corrosion and galvanic action, is one-seventh the weight of steel and costs 30 percent less. The smooth interior of PVC pipe reduces friction with liquids passing through and thereby permits the use of smaller diameters for comparable jobs. It has high impact resistance, an important consideration in backfilling pipe trenches. The material itself has an estimated service life of 2,000 years.



In the Company's continuing research and development programs, Ethyl scientists emphasize the study of new plastics and new uses for plastics.

In addition to its light weight and other advantages, PVC pipe is attractive to farmers, plumbing contractors, engineers and homeowners because it can be readily handled and can be cut with hand saws. Fittings and connectors can be attached easily by the application of a plastic solvent, to form a so-called "solvent weld."

With a major position in vinyl chloride monomer, vinylidene chloride and polyethylene film, with a growing polyvinyl chloride pipe business, and now its entry into the PVC resin and compound market with a new plant under construction, Ethyl is becoming increasingly active in the growing plastics field.



Vinyl chloride produced in these facilities at Ethyl's Baton Rouge plant—and at the Houston plant—is the chemical intermediate from which PVC is made.

PLASTICS DIVISION MANAGEMENT



C. M. Neher



H. M. Zimmerman



M. M. Koenecke



T. A. Hoyle



L. B. Andrew



H. C. Byrne, Jr.



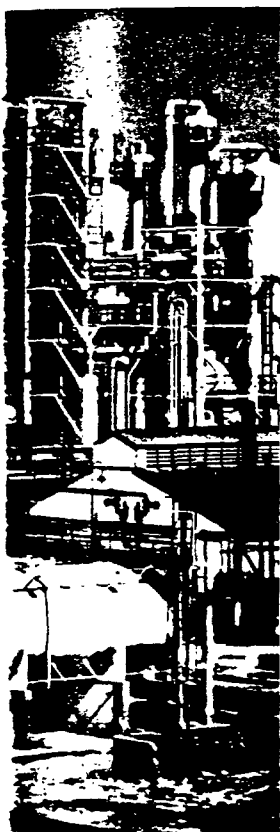
J. C. Wright



F. T. Tulley



B. J. Tate



Ethyl's Plastics division, which was organized in 1963 to handle the Company's growing operations in this product area, is directed by Dr. Clarence M. Neher, division vice president and general manager. The Plastics division includes "VisQueen" polyethylene film and polyvinyl chloride pipe operations. It will also include polyvinyl chloride resin and compound operations, when the new plant now under construction goes into production, and other future plastics developments.

Dr. Neher, who has been serving as general manager of the Plastics division since its formation, was recently promoted to his new position. Since joining Ethyl in 1941, he has had broad experience in the Company's research and development activities, was manager of several expansion projects, and was director of Commercial Development for six years.

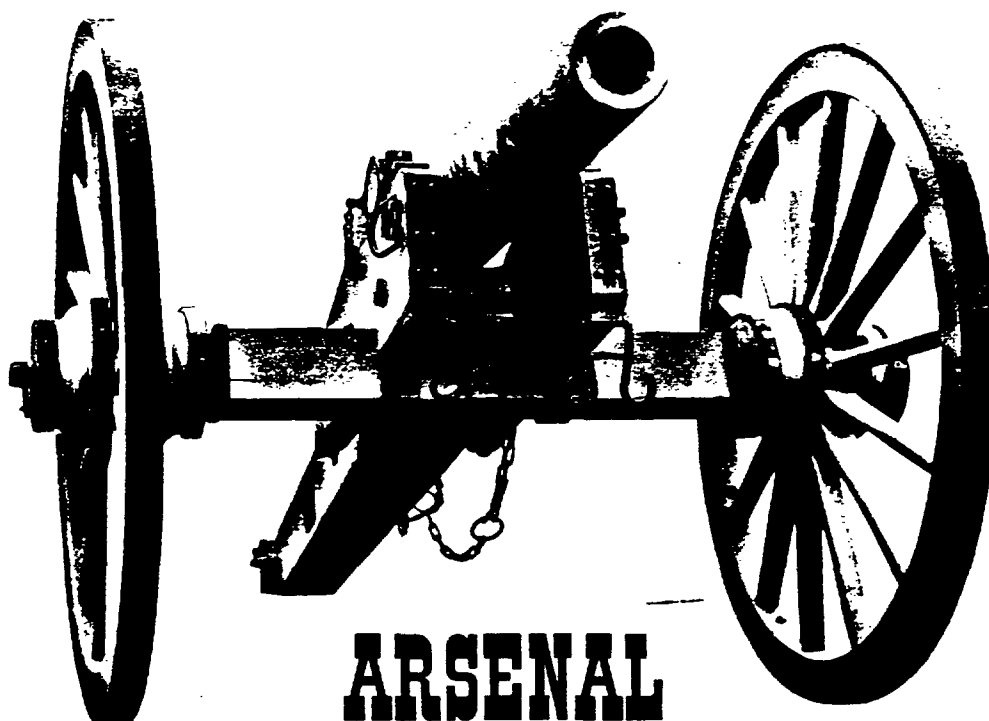
H. M. Zimmerman is general manager of the Polymers division which includes PVC resins and compounds. Mr. Zimmerman, who joined Ethyl in 1963, has extensive experience in the plastics industry with which he has been associated for the last 20 years in a variety of management positions.

Merlin M. Koenecke is superintendent of PVC plant operations, and T. A. Hoyle is sales manager of PVC resins and compounds.

General manager of the VisQueen division is Lloyd B. Andrew, a veteran Ethyl executive. Harry C. Byrne, Jr. is general sales manager of "VisQueen" film, and J. C. Wright is operations and research and development manager.

Frederick T. Tulley, formerly of the Ethyl Plastics division staff, has been manager of polyvinyl chloride pipe products since the acquisition of that business in April. B. J. Tate, who was active in sales when the pipe operations were a part of Texacon Industries, is sales manager of pipe products.

ETC 29804



ARSENAL OF THE CONFEDERACY

Now a part of Ethyl's Albemarle Paper Manufacturing Company, and the site of modern paper research, production and storage operations, the Tredegar Iron Works was for 120 years a venerated machinery and munitions maker.

ONE HUNDRED YEARS AGO this summer, when Union forces under U. S. Grant were slogging relentlessly toward Richmond, Va., one of their prime objectives was the soot-blackened, productive defense plants known as the Tredegar Iron Works on the banks of the James River in the Confederate capital. Now a part of Ethyl's Albemarle Paper Manufacturing Company, and the site of modern paper research, manufacturing and storage operations, Tredegar's buildings and land were then the "arsenal of the Confederacy," turning out shot and shell for Robert E. Lee's armies.

Already 25 years old at the time of the Civil War, the Tredegar industrial complex had made productive contributions to the development of a growing young nation. It was to continue to serve the country in war and peace for some 92 years after Appomattox, until its foundry fires were quenched in 1957 and its properties sold to Albemarle.

In its long industrial life, Tredegar produced untold tons of iron and steel to help satisfy the ravenous appetite of the robust American economy. Its clanging mills, forges and shops built railroad locomotives, cars and equipment to help span and settle the country; cannon balls, guns and army and navy projectiles to defend it; and sugar presses and other industrial and agricultural machinery to help feed and clothe it.

Rolled Armor Plate

Probably the company's most notable rendezvous with history was at Hampton Roads, Va., on March 9, 1862, when the former *Merrimac*, rechristened the *Virginia*, met the *Monitor* in history's first naval battle between iron-clad war vessels. Tredegar had rolled the 800 tons of two-inch armor plate that protected the *Virginia's* sloping sides from the balls fired from the *Monitor's* guns.

ETC 29805

In other war production, the Richmond-based concern turned out some 1,160 cannons for the Confederacy and 90 percent of its cannon balls.

When Richmond finally fell in April 1865, the Tredegar was confiscated—but not destroyed. The following year, bowing to the pleas of industrialists, President Andrew Johnson returned the plants to their owners and they played a vital role in the rehabilitation of a war-ravaged country.

Directed by General Anderson

Tredegar's vitality and longevity are a tribute to the indomitable character and business talents of Joseph Reid Anderson, one of Richmond's most venerated citizens. A graduate of the United States Military Academy at West Point, and then assistant to the chief engineer of Virginia, Anderson joined Tredegar in 1841, five years after it was established and named for the town of Tredegar, Wales, the birthplace of its first iron workers. Two years later, Anderson assumed active control of the firm and directed its growth and diversification until his death in 1892, at the age of 79.

When North-South hostilities broke out in 1861, Anderson joined the troops in gray, was named a brigadier general and saw action in several major battles. But realizing the importance of his industrial enterprise to the Southern cause, General Lee prevailed on Anderson to return to Richmond to direct Tredegar's war work.

"The demoralization of war," General Anderson recounted some years later, "disorganized some branches of the business. This was especially true of coal mining and blast furnace operations. We had to buy a mine and raise the coal needed to operate our eight or nine blast furnaces which supplied us with iron; to bring corn and bacon for our people from Alabama; to establish shops to make shoes for our people; and finally to start two tanneries to supply us with leather."

With a peak payroll of 2,500 war production workers, the availability of food and clothing as well as raw materials was of vital importance.

Reconverted to Peacetime Production

Following the war and the return of the Tredegar properties to his control, General Anderson went north and sold some \$100,000 worth of stock in his company to finance its rehabilitation and re-conversion to peacetime production — steel rail, spikes, angle bars and fishplates, iron castings, practice shot and shell for the United States Army and Navy, freight car and log car wheels, chemical castings and horse and mule shoes. Right up to the end, Tredegar remained a major producer of animal shoes, which it shipped by the carload, and even trainload, to all parts of the country.

In the Spanish-American war, Tredegar made shells for the Navy, and in World War I its more than 1,000 employees produced large-caliber munitions for United States, English and Russian forces. The company received several coveted "E"

awards for excellence in defense production in World War II and continued to make projectiles for the armed forces during the Korean war.

Despite its vital defense contributions over the years and its former pattern of change and diversification to meet the needs of a changing economy, Tredegar's business declined steadily in recent decades. Once it had weathered wars and economic recessions, but without modernization it began to fall behind in the competitive race, and modernization did not come.

Gradually, the old brick buildings along the James grew more dingy and neglected, the grass and weeds grew up, and broken smoke-gray windows went unrepaired. Despite the dedication of veteran employees, antiquated methods and equipment could not compete with other companies' modern blast furnaces, rolling mills and steel fabricating plants. The organization, the equipment, the methods that had been so productive in bygone years were inadequate in the 1950s.

Then in 1956 a fire destroyed two machine shops and matters became worse.

Properties Purchased by Albemarle

A growing Albemarle Paper Manufacturing Company, in need of more space for its expanding operations, acquired the Tredegar properties in 1957. The acquisition provided Albemarle with the remaining Tredegar buildings, some 22 acres of land connecting the paper company's Hollywood and Brown's Island mills, rail sidings and Tredegar's rights to take water from the historic Kanawha Canal, paralleling the James River.

Today, on land that for some 120 years was the home of Tredegar iron and steel operations, modern paper company activities are in progress. In the renovated office building, Albemarle chemists and technologists are developing the paper products of tomorrow. One of the old foundry buildings houses a modern paper coating plant. In and around other

Mounted in a wall of one of the remaining buildings, this tablet recounts some of the Tredegar's historic past.

THE TREDEGAR IRON WORKS

FOUNDED 1836

MADE FOR THE CONFEDERATE GOVERNMENT

1861—1865

THE GREATER PART OF THE CANNON AND PROJECTILES PRODUCED IN THE SOUTHERN STATES AND THE WROUGHT IRON ARMOR OF

THE FRIGATE

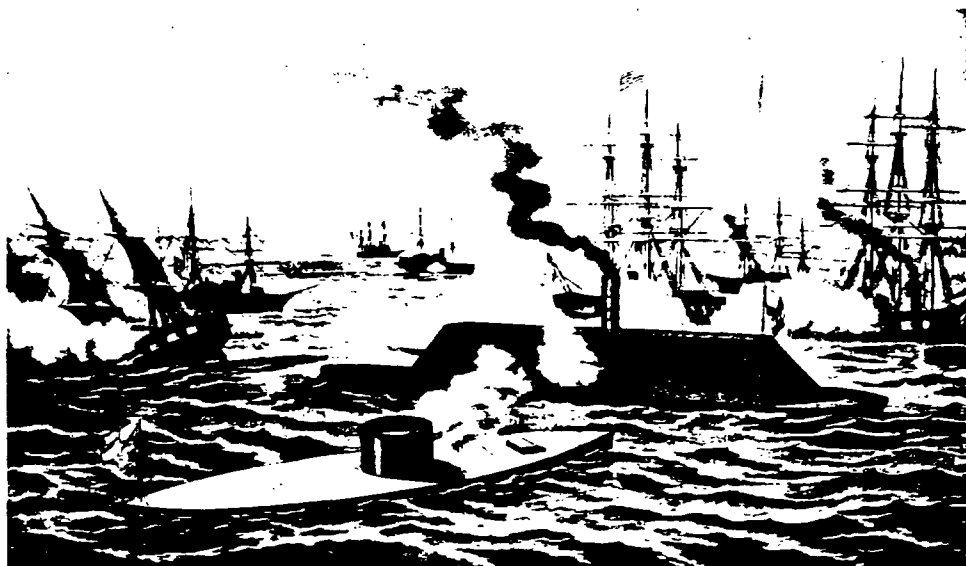
MERRIMAC—VIRGINIA

THIS TABLET IS PLACED AT THE REQUEST
OF THE
CONFEDERATE MEMORIAL LITERARY SOCIETY
A. D. 1910

buildings where horse and mule shoes were once forged, automobile trucks and passenger cars that put horses and mules out of business purr back and forth. For some of the Tredegar area is now a parking lot for Albemarle employees' cars and some of the buildings store raw materials, pulp, spare parts for paper-making machinery, and rolls of finished paper awaiting shipment to converting plants.

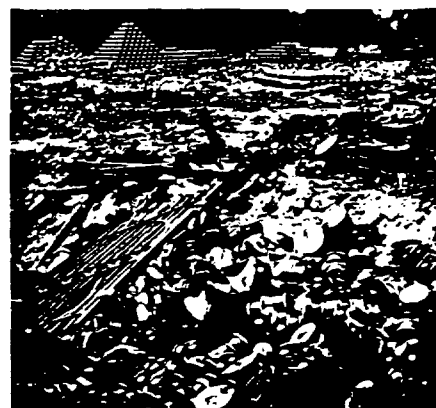
From the top of door arches in the old Tredegar cannon foundry building, cast iron keystones dated 1861 look down on the bustling activities of 1964, and remind passersby of Tredegar's history.

Up on Gamble's Hill, overlooking the Tredegar property, in the office of Floyd D. Gottwald, Ethyl's board chairman, hangs another reminder of an industrial era that is gone. Neatly enclosed in a black and gold frame, its edges yellow with age, is a pardon for "taking part in the late rebellion" signed by President Andrew Johnson, for Joseph R. Anderson, sometime general in the army of the Confederacy and longtime chief executive of the historic Tredegar Iron Works. ○



△ The Tredegar Iron Works played a part in one of history's most significant naval engagements, the battle between the *Merrimac* (renamed the *Virginia*) and the *Monitor*. The 800 tons of two-inch armor plate that shielded the *Merrimac's* sloping sides were rolled in the Richmond firm's productive mills.

Like most of the Tredegar buildings, some of the firm's munitions production apparently survived the fall of Richmond, while tons more lie scattered on the grounds in this 100-year-old photograph. ▷





◁ The former iron works buildings, shown here as they appeared several decades ago, occupy some 22 acres of property between Albemarle's Brown's Island and Hollywood mills.



In contrast to its former use, a one-time Tredegar office building now houses a laboratory for modern paper research.



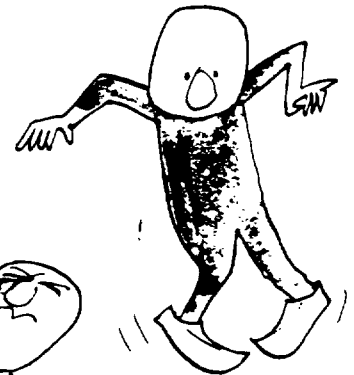
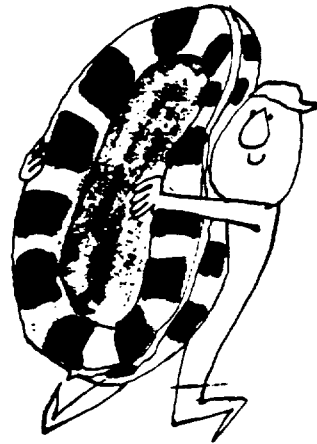
n. Joseph Reid Anderson, a West Point graduate and long-time proprietor of the productive plants, saw action in several major Civil War battles, but returned to Richmond to direct the arsenal of the Confederacy."

WANTED A Tredegar Cannon

Of the 1,160 cannon fabricated in Tredegar foundries for Confederate forces in the Civil War, few are known to be still in existence—and those few are the property of government agencies. Since the Tredegar properties were acquired by Albemarle Paper Manufacturing Company in 1957, the Ethyl subsidiary has been interested in obtaining one of the cannon as a memento of the historic past. ETHYL NEWS readers knowing of the availability of any such cannon are requested to communicate with Albemarle Paper Manufacturing Company, Box 2189, Richmond Va.

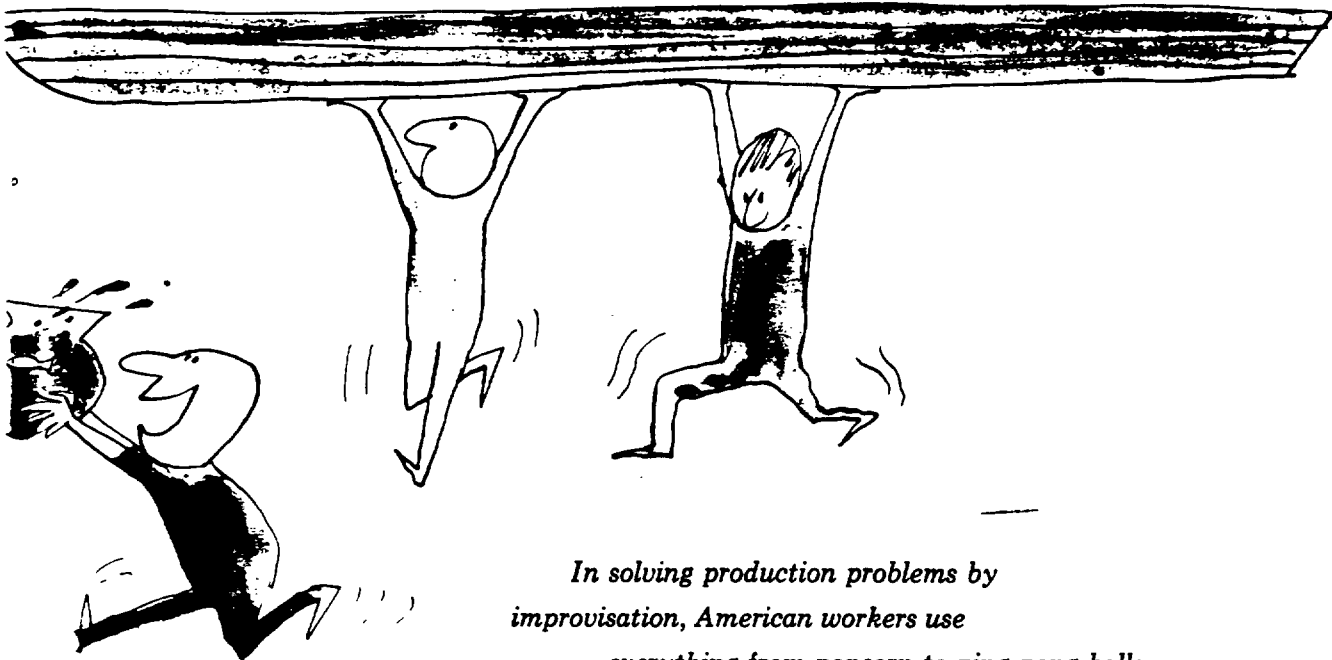
the things they BUY !

*Purchasing agents are called on
to come up with a weird assortment of
offbeat items for use in
modern research and manufacturing*



ORDERS FOR FIVE DOZEN hypodermic needles, a carload of red talcum powder, a gross of guitar picks and 1,000 pounds of popcorn obviously would never appear on a housewife's shopping list. But they're all in a day's work for the purchasing agent of an automobile manufacturer in Detroit. These and dozens of other seemingly offbeat items play unique roles in modern mass production.

The hypodermic needles come in handy for injecting tiny droplets of oil into delicate assemblies. The talcum powder goes into a "mudding compound" used to patch cores in foundry casting operations. Guitar picks, in the hands of dexterous employees, are just the thing for separating fine strands of motor wire. The popcorn is used in tum-



*In solving production problems by
improvisation, American workers use
everything from popcorn to ping-pong balls*

bling machines where it helps polish metal parts.

The things that can be done with the items on this particular list, multiplied several hundred times, are more indications of Americans' native talent for solving industrial problems by improvisation. From another angle, the use of such highly specialized products shows how large companies depend on smaller ones to supply them with everything from clothes pins and violin strings to hair dye and snake venom.

In many manufacturing plants, everyday products are put to work in unexpected and ingenious ways—often as a result of employees' suggestions for saving time and/or money.

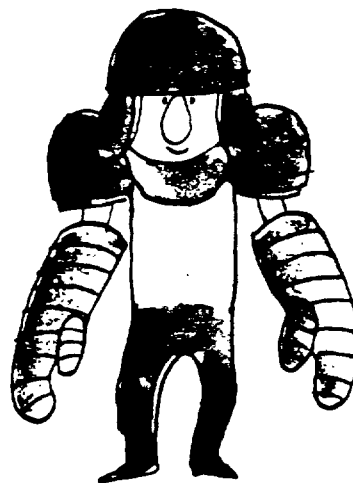
Wading Pools Protect Jet Engines

Consider the case of children's plastic wading pools, now used at a jet aircraft plant in the Pacific Northwest. The aircraft company once paid \$57 each for plastic covers to protect jet engines from dust and grime. Then somebody discovered that the same job could be done with inflated wading pools—at a cost of \$3 each.

In other cases:

- A manufacturer of electrical equipment had trouble safeguarding sensitive plungers extending above the tops of switch boxes—until a worker found that baby-bottle nipples fitted neatly over the plungers and provided the needed protection during handling and shipment.

- Machine operators at a nylon plant complained that static electricity was interfering with the operation of equipment until it was discovered that a few strands of Christmas tree tinsel suspended from each machine eliminated the trouble.



Football helmets, shoulder pads and lacrosse gloves protect workmen repairing furnaces.

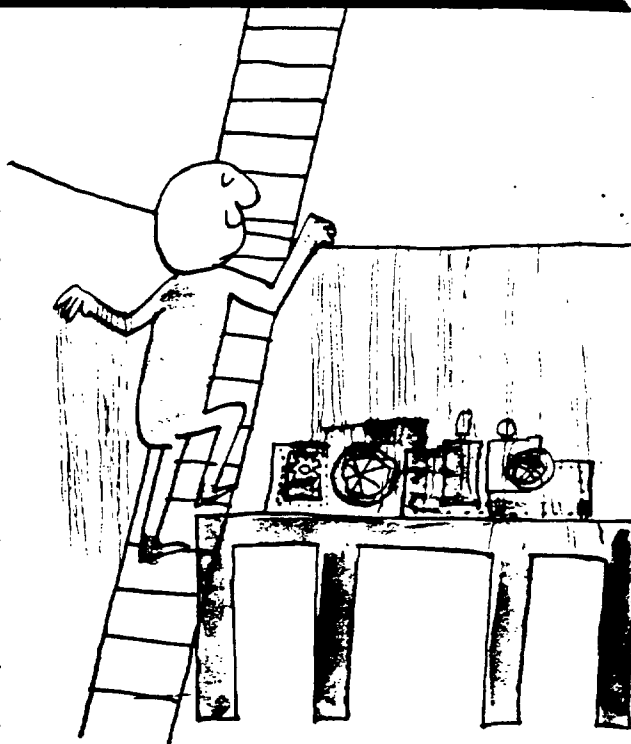
Usually, it's not the item, but its application that is unique.

The purchasing agent for a steel company, for example, raised his eyebrows at a request for five football helmets and five pairs of shoulder pads—not enough even for a six-man team.

Investigation revealed that a maintenance foreman had ordered the equipment to protect workers who made repairs inside a furnace. He wanted to safeguard his men against bricks or masonry that might tumble down while they were on the job. For added protection, the alert purchasing agent threw in five pairs of lacrosse players' gloves to protect the workers' hands and forearms.

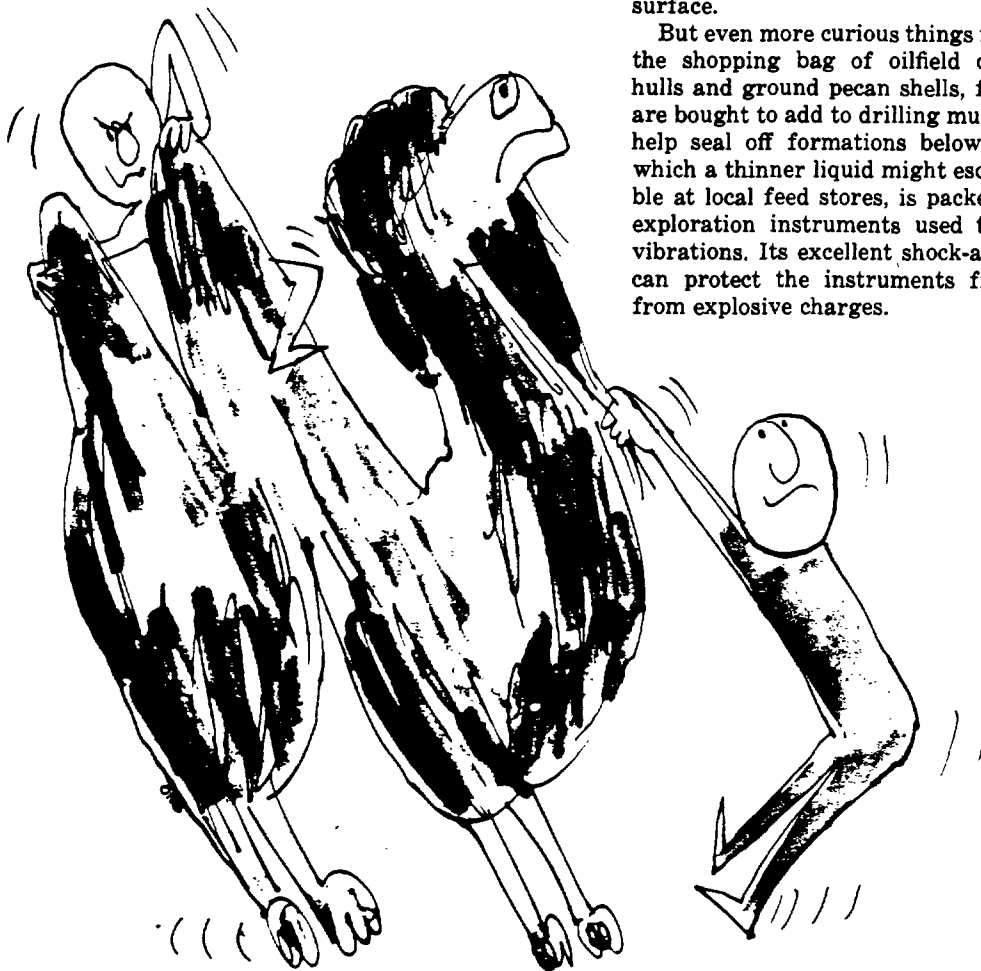
Mud by the Sackful

Some people are surprised to learn that oil companies buy thousands of sacksful of dry mud for use in well drilling operations. Mixed with water, the mud becomes a thick, soupy substance especially effective in lubricating and cooling drilling



bits and in carrying earth, sand or rock chips to the surface.

But even more curious things find their way into the shopping bag of oilfield crews. Cottonseed hulls and ground pecan shells, for example, often are bought to add to drilling mud to thicken it and help seal off formations below the surface into which a thinner liquid might escape. Bran, available at local feed stores, is packed around delicate exploration instruments used to measure sound vibrations. Its excellent shock-absorbing qualities can protect the instruments from shock waves from explosive charges.



A careful examination of industry's purchase orders turns up such other unusual items as:

- Wooden shoes for workers in chemical plants where acids attack leather footwear.
- Castor oil, a necessary ingredient for lacquer used on electrical cable.
- Violin strings to be made into pulley belts for sensitive recording instruments.
- Goldfish for testing water for pollution.
- Glass eyes and black eye patches for safety promotion campaigns.
- Plastic catsup squeeze bottles for applying special lubricants.
- Dress dyes to color nylon gears for easy identification.

Besides these, a synthetic fibers manufacturer bought 12,000 razor blades last year—not for shaving, but for cutting yarn; 2,000 paint brushes—not for painting, but for cleaning machines; and 80,000 paper cups—not for drinking water, but as containers for samples of yarn.

Ping-Pong Balls by the Wingful

An aircraft manufacturer in Santa Monica, Calif., buys thousands of ping-pong balls—not as equipment for an employee recreation program, but to fill empty spaces in airplane wings before submitting the wings to air pressure tests.

Some of the items purchasing agents are asked to procure aren't as easy to come by as paper cups and ping-pong balls. Where do you look for several pounds of pig hair, a lock of camel's hair, a bottle of snake venom, and a sackful of household dust, for example? These are some of the things that the buyer at the University of Michigan Medical Center was asked to obtain not long ago. The curious assortment was needed for allergy research.

Howard Fanning, the enterprising purchasing agent, persuaded the Chicago zoo to send him clippings from one of its camels. He bought venom from a commercial snake farm. And members of his staff emptied their vacuum cleaners and supplied him the house dust. But he could find no professional pig barbers. Packing houses, while sympathetic, weren't able to help.

"It took weeks to fill the order for the pig hair," Mr. Fanning explains. "We finally located a cooperative farmer, but his pig was suspicious—and then elusive. A young college student ultimately took on the barbering job for \$5."

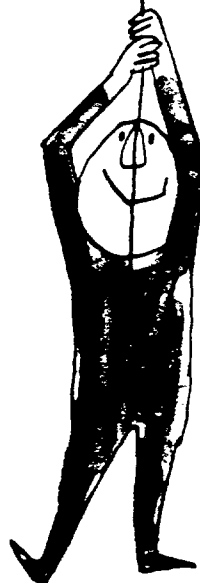
The laboratory got the hair, the student got his money, and the farmer had an afternoon's entertainment.

"The pig's opinion," says Mr. Fanning, "wasn't available." ○

Ethyl buys

Like other American industrial concerns, Ethyl Corporation purchases a number of items for unusual plant and laboratory uses. Among them are:

- Ground corn cobs for cleaning copper bus bars on sodium cells.
- Volleyball bladders for collecting samples of gas for analysis.
- Women's hair dryers for warming test tubes.
- Pool table cloth and jeweler's rouge for polishing instrument parts.
- Rubber hose segments for joining handles to brooms to give them flexibility.
- A 16-foot fiberglass fishing rod for measuring the contents of an acid tank.
- A 14-foot boat for inspecting pipes crossing a bayou.
- A 16-gauge shotgun for destroying containers of liquids at disposal grounds.



Fuel and maintenance costs drop and operating efficiency rises sharply when "Ethyl" Combustion Improver 2 is added to the bunker oil used to power ships

THE EFFECTIVENESS OF "Ethyl" Combustion Improver 2 (CI 2) in improving the operating efficiency of ships powered by heavy (No. 6) fuel oil can provide ship owners and operators with significant economies. Savings of more than seven percent in fuel consumption, and sharp reductions in the cost and complexity of maintenance, have been achieved by adding small amounts of CI 2 to the petroleum fuel used in ships under actual operating conditions at sea.

The additive's effectiveness in marine applications was first demonstrated in four-month tests in two T-2 type tankers sailing between ports on the Texas coast and the Atlantic seaboard. It has been further confirmed in subsequent commercial use of the additive in these two vessels and in other oil tankers.

The two T-2 tankers are the "Four Lakes" and "The Cabins," owned and operated by Texas City Refining, Inc. Both are of approximately 20,000 tons deadweight. They make eastbound trips loaded with petroleum products and westbound runs with water ballast.

When the tests started, "The Cabins" had just undergone her annual inspection and overhaul. The "Four Lakes" had a six-month accumulation of fire-side deposits in her boilers. Subsequent inspections revealed that the use of CI 2 in the ship's fuel:

- Increased average relative efficiency four percent—equivalent to net fuel savings of eight to 15 cents per barrel of fuel, depending on the cost of the fuel.

- Substantially reduced fire-side deposits.
- Made fire-side deposits easier to remove, reducing the number of man-hours required for periodic furnace clean-up.
- Eliminated the need for commercial soot destroyers.

A manganese-base organometallic liquid compound, CI 2 improves combustion by catalytically accelerating the combustion of fuel oil carbon. In so doing, it provides more complete combustion of atomized fuel droplets before they come in contact with heat exchanger or refractory surfaces, thus reducing the formation of deposits. The additive also makes it possible to reduce the amount of air in the fuel-air mixture without increasing smoke output, thereby cutting stack loss.

In another advantage, the addition of CI 2 to bunker oil limits the amount of soot that accumulates and simplifies and speeds up soot blowing—a daily routine at sea. On "The Cabins" and "Four Lakes," for example, soot blowing time has been shortened as much as 40 percent.

The performance records of the ships using CI 2 in their fuel and the observations of ship operating personnel and of the port engineer are summarized in a report published by Ethyl's Petroleum Chemi-

CI 2 GOES TO SEA



ETC 29813

cal division. The results parallel those obtained when CI 2 is used as a combustion improver in domestic and industrial fuel oils and point to a potential new market for the additive in heavy marine fuel oil.

In marine operations, CI 2 provides two-fold advantages at little expense—better thermal efficiency, resulting in lower fuel costs, and reduced fire-side maintenance. At recommended concentrations of 9.4 pounds per thousand barrels of fuel, costs of treating the fuel are only about 1.6 cents per barrel.

CI 2 has been used successfully as a combustion improver for heavy and light fuel oils for at least two years. Its value in promoting efficiency and cleanliness—and therefore cost reduction—in industrial boilers, steam generating plants and homes furnaces has been firmly established.

In industrial power and steam generating plants, CI 2 has significantly increased steam production and combustion efficiency at treating costs of as little as one cent per barrel of fuel, providing net savings of approximately 15 cents per barrel. At the same time, it has reduced deposits on heat exchanger surfaces by as much as 60 percent or more.

In lighter, No. 2 domestic heating oils, CI 2 offers advantages to oil refiners, fuel dealers and home owners.

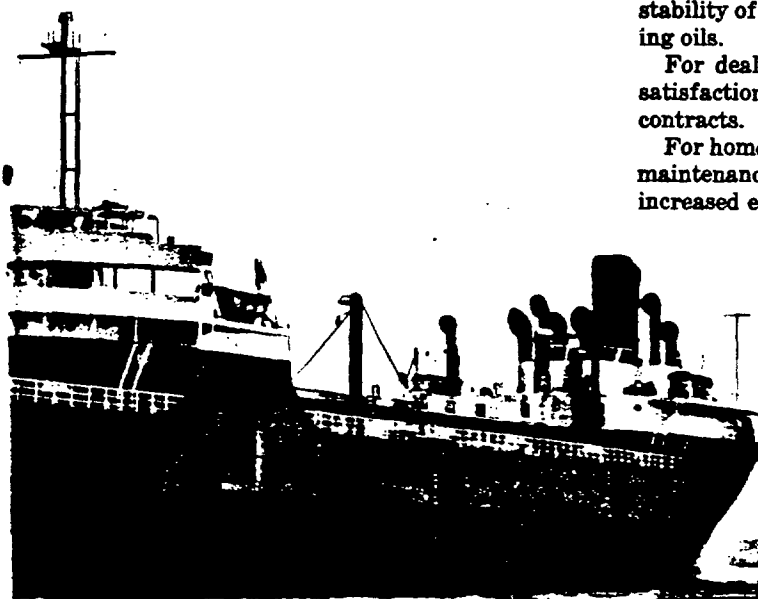


An Ethyl research representative checks fuel blend on board ship to assure maximum effective utilization of additive.

For refiners, it helps improve the burning quality of present fuel oil blends and enables them to include more catalytically cracked components and aromatics without loss of burning quality. Since CI 2 is not detrimental to diesel engines, its use presents no problems to refiners who do not segregate diesel fuels and heating oil stocks. Neither does it have undesirable effects on the storage stability of straight-run catalytically cracked heating oils.

For dealers, it helps provide greater customer satisfaction and cuts costs on oil burner service contracts.

For home owners, it provides cleaner heat, lower maintenance costs and lower fuel costs through increased efficiency.



Texas City Refining's "Four Lakes" was one of two T-2 type tankers in which the value of CI 2 in bunker oil was first demonstrated.



How do companies decide what products to make and sell? Why is stock sold and who buys it? What are the relationships between production, inventories, salesmanship and demand? What are the major costs involved in doing business?

These and similar basic questions about what makes the free enterprise system tick are being answered for thousands of teenagers through their first-hand experience in setting up, managing and working for their own model companies. The youngsters belong to Junior Achievement, a training organization sponsored and endorsed by some 30,000 firms in the United States and Canada.

Ethyl Corporation—active in this “learning by doing” method of economic education since 1952—is among industrial pioneers in supporting Junior Achievement, which is now flourishing in more than 350 localities from coast to coast. The Company’s participation ranges from financial support of JA programs to providing experienced personnel who counsel teenage business world beginners.

The five Junior Achievement companies sponsored by Ethyl during the past school year produced and/or sold such practical products as luminous house numbers, purses, key cases, retractable electrical extension cords, memo-jotters, dual-purpose lighters, Christmas trees, holiday decorations, packaged bird seed and table coasters.

All the companies operated successfully from a business standpoint, and some even set sales and profit records for Ethyl-sponsored JA firms. Local investors, who bought stock at the standard Junior Achievement price of 50 cents a share, received dividends of up to 10 and 12 percent on their investments. Annual reports prepared by the companies show properly balanced books, with no outstanding bills, tax obligations, excess inventories or other loose ends when the businesses were liquidated according to plan in May.

With sleeves rolled up and energies in high gear, the JA companies’ “employees” normally spent one night weekly at their local Junior Achievement center, using its shops and equipment in turning out products to be sold by teenage salesmen. Volunteer advisers from Ethyl were on hand to assist the boys and girls in all phases of their companies’ operations. The work sessions not only helped develop handicraft skills and ability to operate power-driven tools, but provided practical lessons in such essentials as quality control, safety, manpower utilization and record keeping. Officers and directors of each company met periodically throughout the school year to resolve administrative, production, operating, marketing and financial problems.

A continuing supporter of the program since it started in the community seven years ago, Ethyl’s manufacturing, research and development center at Baton Rouge, La., sponsored two Junior Achieve-

ment companies this year. The “E-Co” made and found buyers for 228 memo-jotters—specially designed notekeeping devices for recording messages, names and addresses, grocery lists and similar household memoranda. “Safe-Co” produced and sold 434 “Safe-Lite” packages containing wax-impregnated strips of bagasse board for use primarily as charcoal, fireplace and campfire lighters. Motorists also bought “Safe-Lite” to use as warning flares in case their cars were disabled on highways at night.

Active in Texas Junior Achievement circles since the start-up of its Houston plant 12 years ago, Ethyl again sponsored a company there during the past school year. The “EthyCo” organization of teenagers made and sold 152 sets of luminous house-numbers, easily seen after dark, which local homeowners bought to set in their front lawns. “EthyCo” also sold Christmas trees profitably.

“Cord-JA” was the name chosen by suburban Detroit boys and girls for the 1963-64 Junior Achievement company which operated under the wing of Ethyl’s research laboratories. This company designed and assembled 200 retractable electric extension cords, complete with plastic cases, and sold them for use with toasters, power tools, rotisseries, vacuum cleaners, flatirons, mixers and other household appliances. Other “Cord-JA” products included key cases, women’s purses, and combinations of key cases and purses with pen-sized flashlights attached.

BUSINESS FOR BEGINNERS



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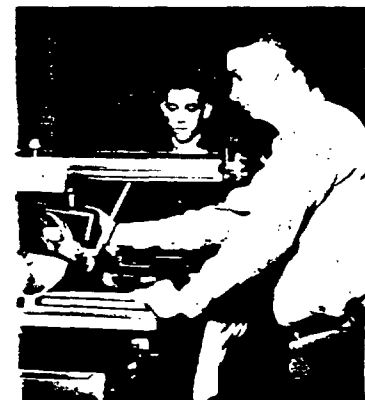


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The Raymond Bag Company at Middletown, Ohio, a division of Ethyl's Albemarle Paper Manufacturing Company, has been a Junior Achievement sponsor since 1960-61. This year's "J-Ray" Company was organized and operated as a diversified business venture. After such holiday enterprises as selling Christmas trees and icicle ornaments, and finding customers for all the colorful bows of ribbon they could tie, "J-Ray" youngsters found a ready market for heat-sealed plastic bags containing bird seed. The year's last successful project was making, packaging and selling fiber-board table coasters decorated with mosaic tiles.

A total of some 135 teenagers, 15 to 19 years old, participated in all the Ethyl-sponsored Junior Achievement companies during the last school year. Their salaries, as determined by each JA company's board of directors, averaged about \$2 monthly—payable from income—plus commissions to salesmen and year-end bonuses in some cases. Fifteen Ethyl representatives served as volunteer operating, production and financial advisers.

Soon after school bells ring once again this September, Ethyl will again support Junior Achievement. When it does, it will help new groups of boys and girls learn about business and industry first hand.



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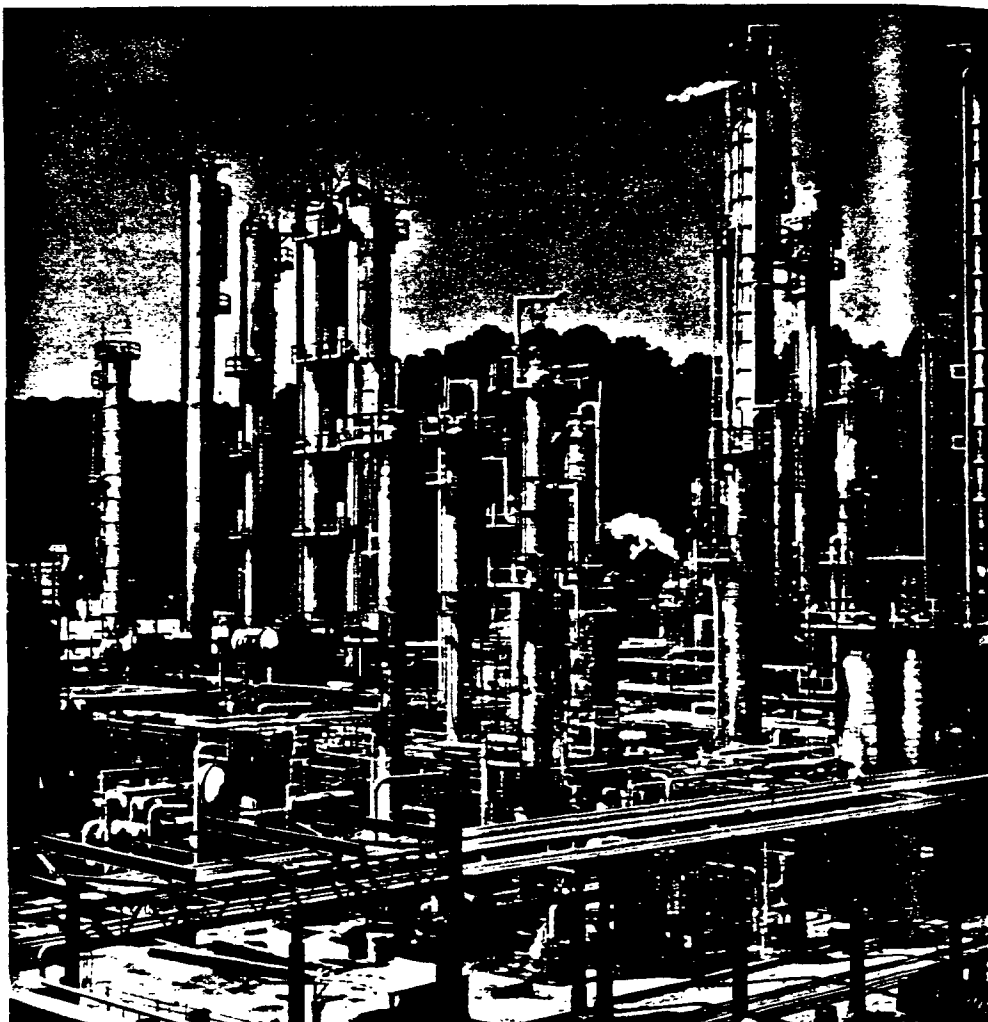


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1. Officers of Junior Achievement companies meet periodically with their Ethyl advisers to resolve business problems.
2. These teenagers are learning how a demonstration helps sell their retractable electric extension cords.
3. By door-to-door canvassing, other youngsters find customers for luminous house numbers, easily seen after dark.
4. Selling stock for 50 cents a share gives JA companies capital.
5. Working in well-equipped Junior Achievement centers, boys and girls develop remarkable handicraft skills.
6. Pitching in to assemble and package their products promotes teamwork and gives everybody a chance to help.
7. Display booths at trade fairs help Achievers win local recognition and increase sales to the public.
8. Advisers' assistance includes teaching teenagers how to keep full and accurate records of their companies.

One out of Many

The Ashland Oil & Refining Company of today, now 40 years old and a long-time customer of Ethyl Corporation, is made up of scores of formerly individual oil industry components obtained through acquisitions and mergers



ETC 29817

ETHYL NE



1. The Catlettsburg, Ky., refinery, near Ashland, has a crude oil capacity of over 80,000 barrels a day. Besides conventional refinery products, it makes asphalts, naphthas, solvents and other specialties.
2. The highly efficient Canton, Ohio, refinery receives crude by pipeline direct from the Morrow County field.
3. Ashland Oil stations are increasing branded gasoline sales throughout an 11-state marketing area.
4. Exploratory and development drilling are conducted in the United States, Venezuela and the Middle East.
5. The company's 10 boats and more than 100 barges transport crude oil and refined products along the Ohio and Mississippi rivers and their tributaries.

3



FROM A 25-MAN, 500-barrel-a-day refinery on the banks of the Big Sandy River in eastern Kentucky to a 6,000-employee, diversified international oil company. From sales that totaled a scant million dollars a year to sales that now total more than a million dollars a day. That, in a nutshell, is the story of the amazing growth of Ashland Oil & Refining Company, which this year is celebrating its fortieth anniversary.

Now just about the largest of the independents, Ashland Oil can rightfully claim "E Pluribus Unum," a title that founder Paul G. Blazer used on a speech about the company a few years ago, as a descriptive slogan. From the very beginning, a continuing program of acquisitions and mergers has created one corporate organization out of many formerly individual oil industry components. Ranging in size from big United Carbon Company, purchased last year for \$150 million, through pipelines, refiners and distributors, down to almost miniscule retailing operations, each acquisition has played a part in the formation of the Ashland Oil & Refining Company of 1964.

Today, Ashland Oil conducts research activities in Ashland, Ky., Houston, Akron and Louisville; drills for oil from Kansas to Kuwait; operates barges on the Ohio and Mississippi Rivers and tankers on the Great Lakes; manufactures petroleum and petrochemical products in six refineries in New York, Ohio, Pennsylvania and Kentucky and carbon black in a series of plants circling the globe from Louisiana to Australia; and sells products in markets that range alphabetically and geographically from Akron and Africa to Zanesville and Zanzibar.

One of the keys to the company's successful growth has been the consistent ability to recognize the potentialities in what in many cases were small, unprofitable operations, to acquire such operations and to weave them into the fabric of the Ashland organization—profitably.

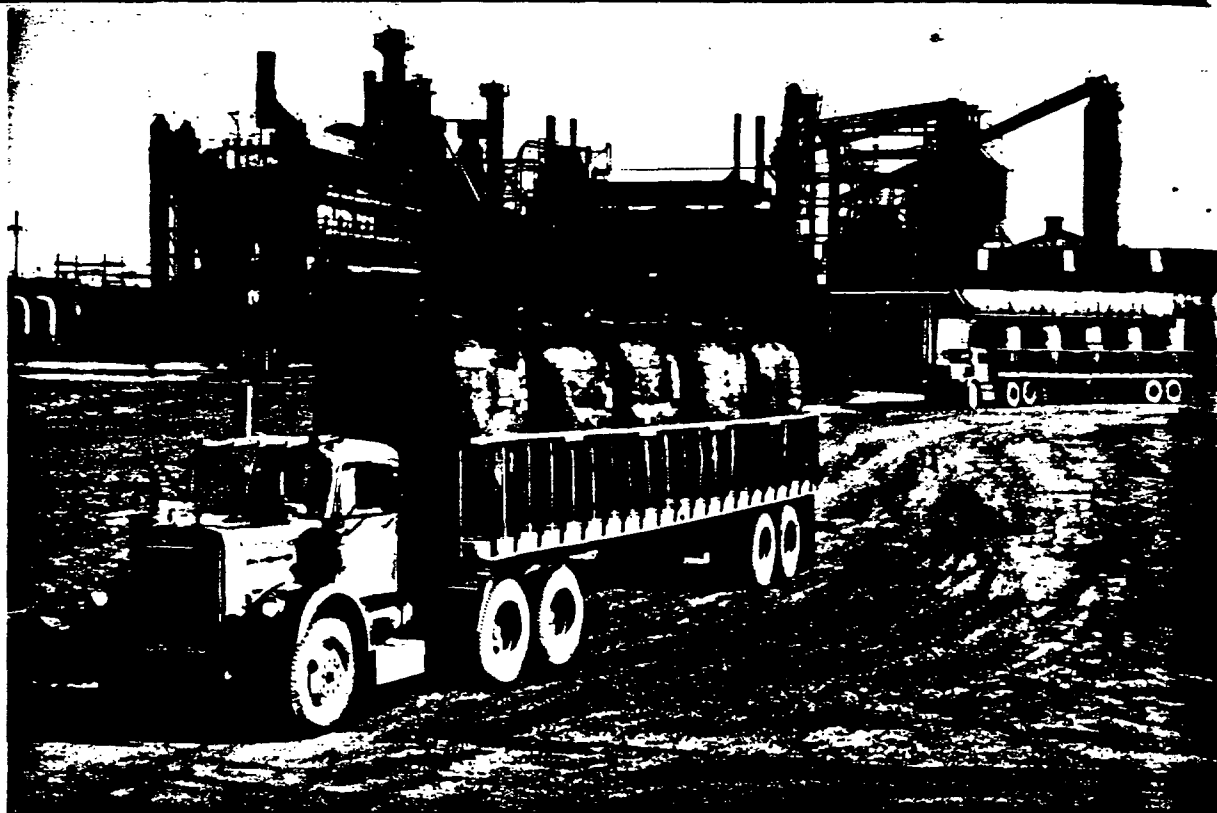
Not all acquisitions have been small, however. Besides the United Carbon deal, other significant purchases in the years since World War II have included: *Allied Oil*, a major marketer of fuel oil



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ETC 29818

ONE OUT
OF MANY

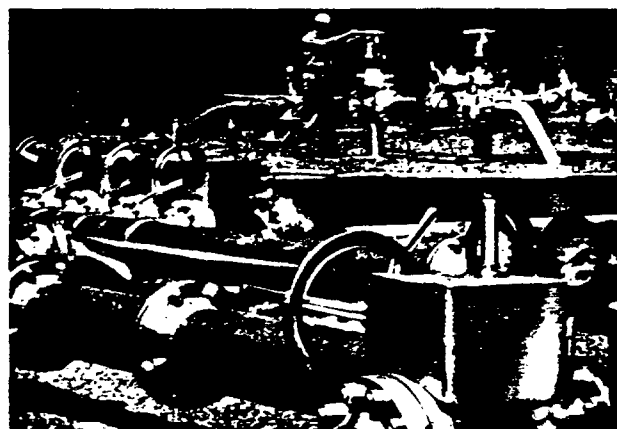


Packed in huge rubber shipping containers, a shipment of carbon black leaves the Ivanhoe, La., plant of United Carbon Company, one of Ashland Oil's newer affiliates.

to industry; *Cleveland Tankers* and *Lakeland Tankers*, largest transporters of liquid cargoes on the Great Lakes; *Aetna Oil*, a leading branded marketer in Kentucky and Indiana; *Freedom Valvoline Oil*, manufacturers of one of the world's oldest petroleum lubricants, internationally-known Valvoline; *Frontier Oil*, oil refiner and marketer in western New York; *National Refining*, refiners and distributors of Enarco brand greases and lubricants and White Rose gasoline; *Kellogg Petroleum Products Company of Buffalo*; *The R. J. Brown Company*; one of the country's largest distributors of naphtha and solvents; Ohio and Indiana distributing facilities of *Anderson Pritchard Oil Company*; and *Louisville Refining Company*.

Unlike most larger oil companies, which were founded on discoveries of oil fields and expanded later into transportation, refining and marketing, Ashland Oil has worked in the opposite direction. Thirty-five years ago, Paul Blazer said that a 5,000-barrel-a-day refinery should be supported by a 10,000-barrel-a-day sales department. Consequently, Ashland's thinking has centered primarily on sales and the company has developed back through refining and transportation to production.

Over the years, Ashland has combined the marketing of gasoline and conventional petroleum products with a major sales effort on tailor-made products for specialized uses, which yield extra profits. Last year, Ashland Oil's sales of refined



Some 4,000 miles of crude oil and products pipelines are an integral part of the company's transportation system.

products totaled almost 62 million barrels, while sale of carbon black and synthetic rubber were at an annual rate of 500 million pounds.

While the company's largest market for gasoline is independent distributors who sell under their own brand names in the company's principal market in the Midwest, a large percentage of Ashland gasoline is sold through its own branded marketing division. Ashland Oil stations are increasing branded gasoline sales throughout the 11-state marketing area from Michigan to Tennessee and from New York to Illinois. Ashland's internationally-known Valvoline lubricants are sold from coast to coast and in 67 foreign countries.

Besides automotive petroleum products, Ashland

ETC 29819

Oil is a leading manufacturer and marketer of middle distillates, including heating oil, diesel and jet fuels. It was the first oil company in the world to manufacture naphthalene from petroleum, and is one of a few manufacturers of such special fuels as those used to power the famous U-2 reconnaissance planes. In asphalt production, Ashland ranks among the country's top 10, and last year the company enjoyed its biggest year in naphthas, solvents, aromatics, light chemicals and other industrial products.

Before acquiring United Carbon, Ashland's crude oil production activities were confined largely to secondary recovery of crude oil by water flooding and to the purchase of oil producing properties. United Carbon, in contrast, had an outstanding record of developing new gas and oil reserves.

The combination of the two oil and gas producing organizations into a single department has enabled the company to expand exploratory efforts. Through long-term crude oil contracts, additional gathering lines connected to wells in important oil fields, part ownership in producing companies and the United Carbon acquisition, Ashland has made important additions to its oil and gas production and reserves.

One of Ashland's important new areas of crude oil development is Morrow County, Ohio, where it is producing more than 5,000 barrels of crude oil a day. The company's discovery well, which attracted widespread attention to the area a few years ago, has produced almost a half million barrels to date. Other wells are expected to be almost as productive and the company's seismic work indicates the presence of a number of good new locations.

With Ashland pipelines serving the Morrow County field, the company is transporting about 30,000 barrels a day of high gravity crude to its Canton, Ohio, refinery for processing. Other productive domestic properties are located in Kansas, Texas, Louisiana, Oklahoma, Illinois, Kentucky, Indiana and West Virginia.

Transportation Costs Kept Low

The cost of moving crude oil to refineries and manufactured products to consumers is, of course, one of the most important increments of any oil company's operations. Ashland emphasizes an efficient combination of pipeline and water transportation facilities linking producing areas, principal refineries and product storage terminals to keep overall transportation costs as low as any in the industry.

Research and development play an important part in Ashland's future plans. One important such area for the Kentucky-based company is the production of chemicals and intermediates from coal and coal byproducts. Ashland chemists are looking to a combination of oil refining techniques and coal chemistry to open up new areas of technology.

A big supplier of industrial fuel oils, the company has developed and engineered processes for

injecting fuel oil into blast furnaces and cupolas, which offer new economies to the iron and steel industry. Several steel companies are using Ashland's fuel oil injection process in manufacturing operations, and the company's process for combining fuel oil and coal in a liquid slurry stream as a blast furnace injectant is being tested by a major steel company.

The company's laboratories have developed a wide range of special high-purity fuels which engine manufacturers are using in the development of power units for supersonic aircraft of the future.

Ethyl Customer since 1926

Long interested in the development of ever-improved motor gasoline for America's car and truck owners, Ashland Oil became an Ethyl Corporation customer as early as 1926, when the company signed its first contract for the purchase of anti-knock compounds. Using "Ethyl" products over the years, Ashland Oil has continued to take advantage of new and improved additives and refinery processes to upgrade the quality of its motor fuels.

Last fall, Ashland introduced new gasolines throughout its marketing territories with extensive advertising and sales promotion campaigns. Both premium and regular grades, which contain a blend of eight types of hydrocarbons and eight chemicals, were subjected to more than five million miles of road testing over a two-year period, following extensive research and development work.

Today, 40 years after its birth, Ashland Oil & Refining Company is directed from executive offices in Ashland, Ky., by a management group headed by Board Chairman Rexford S. Blazer and President Everett F. Wells.

Mr. Wells joined Ashland soon after its inception, became the company's first regular salesman and moved steadily ahead in management responsibility. Mr. Blazer came to Ashland after a successful career at Allied Oil in Cleveland. There he had started as a sales trainee and worked his way up.

Founder Paul G. Blazer continues active in the management of the company as chairman of the Executive and Finance Committees.

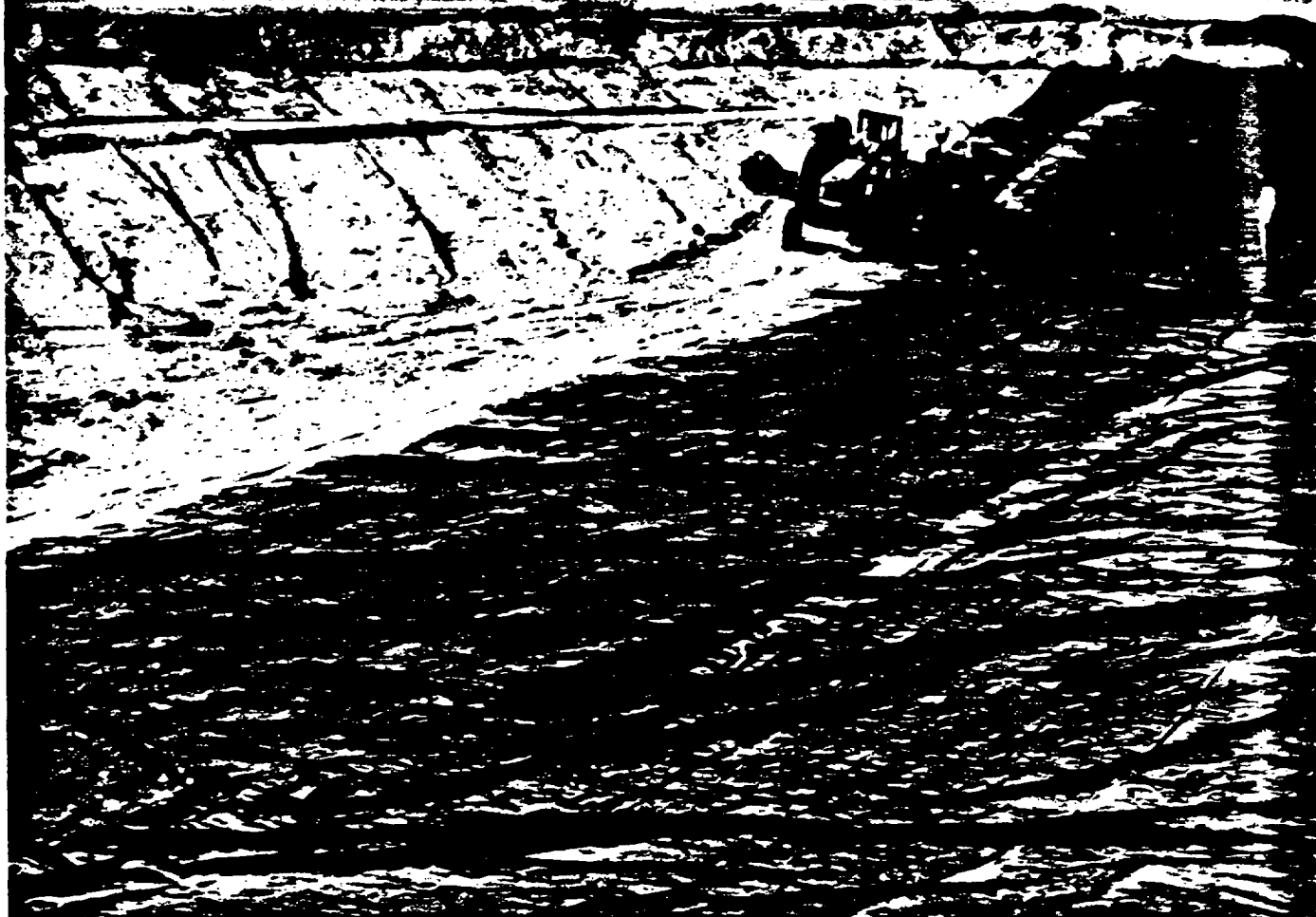
As unique as Ashland's growth has been its management philosophy. The company's files and its office walls are bare of organization charts. It avoids the use of restrictive titles and job definitions wherever possible, and seldom has it printed anything representing a rigid company policy.

"From the beginning," says one top official, "Ashland Oil has sought to maintain flexibility and an atmosphere conducive to the development and use of individual initiative."

That this policy has been successful is seen in the great strides the company has made in all directions from the banks of the Big Sandy River in the last 40 years and in the four-word description a national business magazine used recently when it called Ashland "the company morale built."

O

Ponds in the Desert



OUT AROUND PALM SPRINGS, CALIF., widespread golf course construction in the last several years has created huge green oases of beauty and recreation on the once-drab desert sand. In contrast to their parched surroundings, the championship golf courses boast lush, palm-fringed fairways, carpet-like greens and even water hazards and decorative lakes and ponds.

On at least one of the classic Palm Springs layouts, the exclusive Bermuda Dunes Country Club, the two sparkling ponds that flank the club house retain their water, despite the thirsty soil, because of an Ethyl Corporation product. The ponds are lined with "VisQueen" polyethylene film.

Lining ponds with "VisQueen" film prevents seepage of water into dry soil, an especially important consideration in the desert where ground

absorption can account for water losses of up to 33 percent. The film also reduces erosion and maintenance problems.

Both Bermuda Dunes ponds were constructed by Palco Linings, Inc., of Indio, Calif., specialists in building polyethylene-lined ponds and lakes. One of the ponds, installed six years ago, was Palco's first such job. The other, completed more recently, was the company's one hundredth installation.

The key to successful pond lining, according to Palco, is the ability to work with polyethylene film in such applications. Palco uses black "VisQueen" film and its own methods and specially designed equipment for laying and sealing it. Since the company built the first Bermuda Dunes pond in 1958, Palco has installed liners for agricultural reservoirs, other golf course ponds, recreational lakes, sewage

ETC 29821

◁ In making ponds, Palco Linings, Inc. uses black "VisQueen" film and its own methods and specially designed equipment for laying and sealing it.

lagoons and municipal water storage reservoirs.

In the preliminary stages, building a polyethylene-lined pond follows basic procedures for pond construction. The site is marked out, excavated, and debris is removed. The base, or subgrade, which may be sand or other fine material, is firmed and smoothed. Finally, the sides are sloped.

When the base is ready, sheets of black "VisQueen" film, which comes on large rolls in widths up to 40 feet, are unrolled to cover the pond bottom. Using its specially designed equipment and process, Palco lays the film and seals the sections together.

The outer edges of the pond lining are anchored in a trench. Exposed slopes are protected with a layer of sand or similar material. The pond is then filled with water and is ready for use.

"There are other ways to line lakes and reservoirs," explains Paul Ames, president of Palco Linings, "but we feel that polyethylene film properly installed by our methods is by far the most economical means of achieving complete and permanent seepage control."

Many other contractors throughout the country use versatile "VisQueen" polyethylene film for pond, lake and irrigation ditch lining and for a variety of other applications. In building and agriculture it also is used for hay, coal, silage and materials coverings; temporary enclosures and greenhouses; insulation and moisture barriers; shrub and lawn protection; and as an effective mulch. In modern packaging, "VisQueen" film makes attractive sturdy bags and wrappers for bakery goods, fruits and vegetables, confections, toys, novelties, hardware, clothes and other soft goods, seed, chemicals, fertilizer and many other everyday products. ○



After outer edges of the lining are anchored in a trench, ponds are filled with water and are ready for use.



The second pond on the Bermuda Dunes Country Club in Palm Springs, Calif., was Palco's 100th such installation.

The Ethyl Management Team

As a result of recent promotions and additions to the corporate staff, the Company's officers now include . . .



FLOYD D. GOTTWALD *Chairman of the Board*

Mr. Gottwald has been chairman of the board of directors and chief executive officer of Ethyl, chairman of the Executive Committee, and chairman of the board of Albemarle Paper Manufacturing Co., wholly-owned subsidiary, since November 1962. Previously he had been president of the former Albemarle organization.

Mr. Gottwald was born in Richmond, Va., attended the College of William and Mary, and joined the Export department of Albemarle in 1918. Over the years, he was promoted to positions of increasing responsibility, serving as export manager, production manager, assistant secretary, secretary, vice president and executive vice president. While he was president, Albemarle made a number of acquisitions and scored impressive gains in diversification, production and sales. Mr. Gottwald assumed his present positions at the time of the merger of Ethyl Corporation (Delaware) and Albemarle to form Ethyl Corporation (Virginia).



FLOYD D. GOTTWALD, JR. *Vice Chairman of the Board*

Mr. Gottwald, who had been executive vice president of Ethyl since November 1962, has been elected to the new office of vice chairman of the board of directors. He continues as president of Albemarle Paper Manufacturing Company, wholly-owned Ethyl subsidiary, and oversees the activities of the Ethyl International division.

Mr. Gottwald, who was born in Richmond, Va., holds a B.S. degree in chemistry from Virginia Military Institute and an M.S. in business administration from the University of Richmond. Following service in the Army in World War II, he joined Albemarle as a chemist. He subsequently held increasingly important assignments in research, manufacturing and management, and was elected vice president. He became president of Albemarle and executive vice president of Ethyl at the time of the Ethyl-Albemarle merger. Besides being a director of Ethyl and a member of the Executive Committee, Mr. Gottwald is a director of Albemarle and of Ethyl Corporation of Canada Limited.



GEORGE F. KIRBY *President*

Dr. Kirby, who had been executive vice president since November 1962, is the new president of Ethyl Corporation. He succeeds B. B. Turner, former president, who resigned in June for health reasons.

A native of Cheneyville, La., Dr. Kirby has a B.A. degree from Louisiana College and M.S. and Ph.D. degrees in chemistry from Louisiana State University. He started with Ethyl at Baton Rouge in 1940 as a research chemist, and has served in a variety of technical, engineering, and research and development assignments. He was vice president—research and engineering, and then vice president—operations, in charge of the Research and Development, Engineering, and Manufacturing departments. As executive vice president, Dr. Kirby was responsible for those departments and for the Industrial Chemicals division and the Purchasing and Traffic department. He is a director and member of the Executive Committee of Ethyl and is a director of Ethyl Corporation of Canada Limited and of Ethyl-Dow Chemical Company.



BRUCE C. GOTTWALD *Executive Vice President and Secretary*

Mr. Gottwald, who had been vice president and secretary of Ethyl Corporation since November 1962, has been elevated to executive vice president. He continues also as secretary and oversees the Ethyl Plastics division.

Born in Richmond, Va., Mr. Gottwald was graduated from Virginia Military Institute with a B.S. degree in chemistry and also studied at the Institute of Paper Chemistry in Appleton, Wisc. He joined Albemarle Paper Manufacturing Company as a chemist, served in a number of development, production and executive assignments, and was elected vice president and secretary of the company early in 1962. He became vice president and secretary of Ethyl at the time of the Ethyl-Albemarle merger and continues to serve as vice president and secretary of Albemarle. He is a director of Ethyl, a member of the Executive Committee, and a director of Albemarle.



WILLIAM R. PERDUE, JR. *Executive Vice President and Treasurer*

Mr. Perdue has been executive vice president and treasurer of Ethyl since November 1962. In this position, he directs the activities of the Finance, Public Relations, Advertising and Sales Promotion, Medical, and Employee Relations departments and Ethyl Corporation of Canada Limited.

A native of Macon, Ga., Mr. Perdue is a graduate of Emory University and holds an LL.B. degree from Duke University Law School. During World War II, he was in the Military Intelligence Service, was awarded the Legion of Merit and the Order of the British Empire, and attained the rank of lieutenant colonel. He joined Ethyl as general counsel in 1950, after having been associated with the New York law firm of Cahill, Gordon, Reindel & Ohl for 13 years. Mr. Perdue was promoted to vice president and treasurer in 1955 and to his present position at the time of the Ethyl-Albemarle merger. He is a director of Ethyl, a member of the Executive Committee, and a director of Ethyl-Dow Chemical Company and Ethyl Corporation of Canada Limited.



MALCOLM P. MURDOCK *Senior Vice President*

Mr. Murdock, who has been a vice president of Ethyl since 1952, has been elected to the new position of senior vice president. In this capacity, he will continue to direct the activities of the Petroleum Chemicals division which is responsible for the sale and service of all "Ethyl" additives for petroleum products in the United States.

Mr. Murdock was born in Melrose, Mass., and graduated from Cornell University with a B.A. degree in economics. He joined Ethyl Corporation as a field representative in 1933 and held positions of increasing responsibility in the Sales department. He was manager of the motor tune-up clinic, assistant manager of the Los Angeles and Chicago divisions, sales manager of the former Ethyl Specialties Corporation, manager of the Central region, assistant general sales manager, sales manager and vice president in charge of sales. He became vice president in charge of the Petroleum Chemicals when that division was organized last year. He is a director of Ethyl and of Ethyl Corporation of Canada Limited.



JOSEPH A. COSTELLO *Vice President*

Mr. Costello has been a vice president of Ethyl since 1949. In this capacity, he directs the activities of the Industrial Chemicals division and of the Purchasing and Traffic department.

A native of Scranton, Pa., and a graduate from Pennsylvania State University with a B.S. degree in electrical engineering, Mr. Costello joined Ethyl in 1928. He served as a field representative and in various management positions in the Sales department. During World War II, Mr. Costello was on leave of absence to serve the federal government as special assistant to the director of refining in the Office of Petroleum Coordinator in Washington. Subsequently he was promoted to assistant general manager of the Manufacturing and Traffic department, vice president in charge of coordination and planning, and vice president in charge of Purchasing and Traffic and Chemical Sales. He assumed direction of Industrial Chemicals when that division was organized last year. He is a director of Ethyl, Ethyl-Dow Chemical Company and Ethyl Corporation of Canada Limited.



GLENN O. HAYES *Vice President*

Mr. Hayes, who had been general manager of manufacturing, has been elected a vice president of Ethyl Corporation. In this position, he will continue to direct the Manufacturing department.

Mr. Hayes was born in Ontario, Canada, and was graduated from Milwaukee (Wisc.) College of Engineering with a B.S. degree in electrical engineering. After extensive experience in the public utilities and chemical industries, he joined Ethyl as sodium plant superintendent at Baton Rouge, La. He later became assistant manager of operations, manager of maintenance and construction, and acting assistant plant manager at Baton Rouge. In 1954, Mr. Hayes was appointed manager of Ethyl's then-recently-completed antiknock compound manufacturing plant at Houston, Texas. Three years later, he was named director of employee relations and then general manager of manufacturing. Mr. Hayes is a director of Ethyl-Dow Chemical Company.



ROBERT HERZOG *Vice President*

Mr. Herzog, who had been director of planning and profit improvement, has been elected a vice president of Ethyl Corporation. In this position, he will direct the activities of the group responsible for corporate-wide, long-range planning, economic evaluation and profit improvement studies.

A native of New York, Mr. Herzog has a bachelor's degree in chemical engineering from Cooper Union Institute of Technology and an M.S. degree in chemistry from the University of Michigan. He joined Ethyl as a chemist and chemical engineer at Baton Rouge in 1940. He has served in a number of research, engineering and product development positions in Baton Rouge, Detroit, New York and Houston and has been active in planning and economic evaluation studies. He was technical assistant to the general manager of research and engineering operations, staff assistant to the vice president in charge of research and engineering and a member of the economic research staff. He became head of planning and profit improvement earlier this year.



JOSEPH M. LOWRY *Vice President*

Mr. Lowry, who has been a vice president of Ethyl since November 1962, devoting his attention to special assignments—especially in financial areas—also is executive vice president and treasurer of Albemarle Paper Manufacturing Company, wholly-owned Ethyl subsidiary.

A native of Richmond, Va., Mr. Lowry was assistant treasurer for three Virginia industrial organizations starting in 1935. A certified public accountant, he was a partner in a Richmond accounting firm before joining Albemarle as controller in 1947. He subsequently was named treasurer, and became executive vice president and treasurer at the time of the Ethyl-Albemarle merger. Mr. Lowry is a member of the board of directors of both Ethyl and Albemarle.



KENNETH L. SWARTWOOD *Vice President*

Mr. Swartwood, who had been general manager of Ethyl's Research and Development department, has been elected a vice president. In this capacity, he will continue to direct the Company's far-reaching activities directed toward process improvements, product development and application, and the exploration of new product areas.

A native of Kearney, Neb., Mr. Swartwood earned a B.S. degree in chemical engineering at the University of Nebraska and a doctorate in law (JD) at DePaul University. After the private practice of law and extensive research, technical, legal and patent law experience in the chemical and petroleum fields, he joined Ethyl's research laboratories in Detroit as patent attorney in 1947. He was transferred to Baton Rouge as patent counsel in 1953, and was promoted to general manager of research and development in 1959.

OUTLOOK

SCHOLARSHIP FUND HONORS EDWARD L. SHEA



A scholarship fund in memory of the late Edward L. Shea, former president, board chairman and director of Ethyl, is being established at Princeton University by a group of friends and classmates. Mr. Shea was graduated from Princeton in 1916.

Representatives of "The Edward L. Shea Memorial Scholarship Fund" are arranging with the university to give preference to "capable and deserving" graduates of Phillips Exeter Academy in considering candidates for the annual scholarship. In the absence of qualified Exeter graduates, the scholarship could go to graduates of the Nashua, N. H., High School or to other students who meet high standards of leadership and character.

"Ed Shea loved Princeton and his school Exeter, and worked hard on their behalf," the Fund's co-chairmen point out, "and he never forgot Nashua, the New Hampshire community where he grew up. He demonstrated his deep concern for the needs of worthy students by endowing two scholarships for Princeton undergraduates during his lifetime. It was then that he spoke of the importance of well-rounded ability and achievement ... as well as scholastic and athletic distinction."

NEW USES ANTICIPATED FOR "ETHYL" ANTIOXIDANT 702

More diversified uses are anticipated for "Ethyl" Antioxidant 702, an effective, economical additive now widely used in motor oil. Exhaustive evaluations show that 702 contributes durability and other desirable properties to synthetic rubber, plastics, hydrocarbon resins and adhesives.

The latest and potentially largest new market is in the manufacture of tires made from polybutadiene rubber, where the additive prevents cracking and premature deterioration. It also helps extend the useful

life of polyolefin plastics, such as polyethylene and polypropylene wire coatings, and of asphalt floor tile resins. In hot-melt adhesives, used in industrial applications, 702 prevents the formation of troublesome skin.

One of Ethyl's family of orthoalkylated phenols, antioxidant 702 is well established as the only ashless motor oil antioxidant in general use in the oil industry. Its stability and resistance to high temperatures make it an ideal agent to preserve the properties of premium oils for automobiles and lubricants for such heavy-duty equipment as trucks, bulldozers, cranes, drilling rigs and steam turbines. The additive is especially effective in lubricants for railroad diesel locomotives, since it does not corrode sensitive metal bearings.

In addition to providing maximum protection at minimum cost, 702 is compatible with other commercial additives and is non-toxic.

GASOLINE TESTING LABORATORY MANAGERS NAMED

New managers for two of Ethyl Corporation's gasoline testing laboratories have been named in recent months.

Dean A. Painter, who had been assistant manager of the Long Beach, Calif., laboratory, was appointed manager of the Kansas City, Mo., laboratory, succeeding Edward J. Otto. Mr. Otto has been transferred to the Company's research laboratories in Detroit, where he is in the new position of operations manager for Petroleum Chemicals division activities there, reporting to Richard K. Scales, the division's technical director.

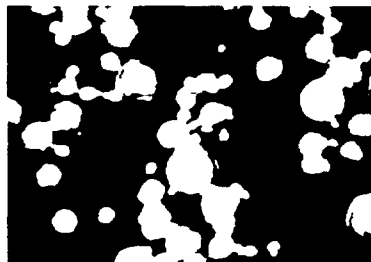
Edward C. Mulligan, formerly supervisor in market research and analysis at Ethyl's executive offices in New York City, is the new manager of the gasoline testing laboratory at Yonkers, N. Y. Mr. Mulligan succeeded Fred W. Ramin, former manager, who is now marketing coordinator in the Ethyl International division in New York.

Ethyl operates gasoline testing laboratories at Houston, Texas, and Tulsa, Okla., in addition to those at Long Beach, Kansas City and Yonkers. The laboratories annually test thousands of samples of gasoline purchased at service stations in 57 marketing areas throughout the country as well as those submitted for analysis by oil refiners.

SODIUM DISPERSIONS AVAILABLE FOR VARIETY OF APPLICATIONS

Highly reactive sodium, for use in a wide variety of experimental applications, is offered by Ethyl in the form of dispersions. In the dispersions, tiny particles of sodium are suspended in hydrocarbon liquids to preserve their properties and to simplify handling and effective utilization.

Liquids containing particles that average from as little as one micron to an average of eight microns are currently available. Billions of fragments can be made from a single pound of sodium.



A microscopical view of tiny particles of sodium in a hydrocarbon liquid.

Dispersions have a number of advantages over bulk sodium in certain processes, including the removal of undesirable amounts of sulfur and other impurities from petroleum products. The suspended particles also have key roles in the manufacture of pharmaceuticals and certain industrial chemical compounds.

Industrial research also points to other uses ranging from the improvement of shortening for bakery products to the improvement of synthetic rubber. Faster and more efficient chemical reactions, greater product yields and more precise controls are provided in many cases by sodium dispersions.

In its efforts to increase the effective use of sodium dispersions, Ethyl has developed a device for continuously weighing and transferring them to petroleum stocks in feed tanks.

R. G. REDMAN APPOINTED MANAGER OF CORRUGATED CONTAINER SALES

R. G. Redman has been appointed general sales manager for all corrugated containers produced by Richmond Container and Albemarle Container, divisions of Albemarle Paper Manufacturing Company, subsidiary of Ethyl Corporation. He has offices

in Richmond, Va., and reports to H. Watkins Ellerson, Jr., Albemarle vice president—converting manager.

Mr. Redman is a graduate of Northwestern University in the class of 1948. He has had extensive experience in sales and sales management with International Paper Company, Packaging Corporation of America, and Western Kraft Company.

COMPANY NOW PRODUCING DNBP, HERBICIDE INGREDIENT

Ethyl has begun commercial production of 4,6-dinitro-2-sec-butylphenol, or DNBP, a chemical compound widely used as the active ingredient in herbicide formulations and to some extent in miticides.

Herbicides containing DNBP are effective in pre-emergence control of annual weeds and in killing top growth of perennial weeds and grasses. Miticides in which DNBP is used are for dormant applications to fruit trees.

DNBP is the latest chemical product of Ethyl's patented orthoalkylation process. Previously, a broad series of highly effective antioxidants for fuels and lubricants and for plastics and synthetic rubber has come from the process.

The herbicide-miticide ingredient is manufactured at Ethyl's special chemicals plant at Orangeburg, S. C., and is available in drum and tank car quantities.

PAPER MILL POWER PLANT NOW UNDER CONSTRUCTION

A new multi-million-dollar electric power generating plant is under construction at the Albemarle Paper Manufacturing Company's pulp and paper mill at Roanoke Rapids, N. C. Albemarle, which produces a wide variety of kraft paper, paper board, blotting, absorbent, saturated, filter and other specialty papers, multiwall shipping sacks, handle shopping bags and corrugated containers, is a wholly-owned Ethyl Corporation subsidiary.

Designed to produce a substantial portion of the mill's requirements for electricity, the generating plant will be housed in a structure about 100 feet high, with steel and aluminum siding. It is scheduled for completion in September 1965. The principal contractor is Rust Engineering Company of Pittsburgh, Pa.

VISQUEEN DEVELOPS NEW POLYETHYLENE FILMS

Ethyl's VisQueen division has developed several new polyethylene films for use in the overwrap and general packaging fields and has made modifications in some of its existing films. Harry C. Byrne, Jr., VisQueen general sales manager, has announced.

One of the new products is "X-47," a multi-layer film which has had exceptional success in overwrapping. Other new products include a specially formulated "IQF" (instant quick freeze) film used for packaging frozen foods, and a shrink film for general packaging.

The new products, which have been introduced on limited scale and found good acceptance, are expected to be generally available in the near future.

ETHYL OF CANADA TO PRODUCE FULL RANGE OF ANTINKNOCKS

Ethyl Corporation of Canada Limited is expanding its manufacturing center at Sarnia, Ontario, in order to provide Canada's petroleum industry with a complete line of newer gasoline antiknock compounds now available only from sources in the United States and overseas.

The Sarnia plant, which went into operation in 1954, is Canada's sole producer of tetraethyl lead (TEL) antiknock compounds. Following the expansion, it will produce the newer, more volatile antiknock, including tetramethyl lead (TML), physical mixtures of tetraethyl lead and tetramethyl lead (TELMEL) and equilibrium mixtures of lead alkyls (MLA), in addition to the TEL compounds.

In announcing the expansion, Alan C. Tully, president of Ethyl of Canada, pointed out that "until recent years, TEL antiknock compounds were adequate for upgrading the antiknock quality of gasolines manufactured anywhere in the world. Today, however, more volatile antiknock agents are needed in many cases, because of great variances in gasoline composition. In fact the compounds should be tailor-made to suit each company's refining, marketing and economic requirements."

The expansion of antiknock compound production is in addition to a \$1 million enlargement of the plant for the manufacture of other petroleum and industrial chemicals.

GEORGE R. MILLS NAMED MANAGER OF ETHYL OF CANADA PLANT

George R. Mills, formerly assistant manager of Ethyl Corporation of Canada's manufacturing plant at Sarnia, Ontario, has been named manager of the plant. He succeeds R. F. Diedrich, who has been transferred to the Ethyl International division of Ethyl Corporation on a special assignment.

Mr. Mills has been with Ethyl of Canada since the subsidiary's formation nine years ago, starting as a technical service engineer. Born and educated in Canada, he is a graduate of the University of British Columbia with a bachelor's degree in chemical engineering. During World War II, Mr. Mills was a flying officer with the Royal Canadian Air Force in Europe.

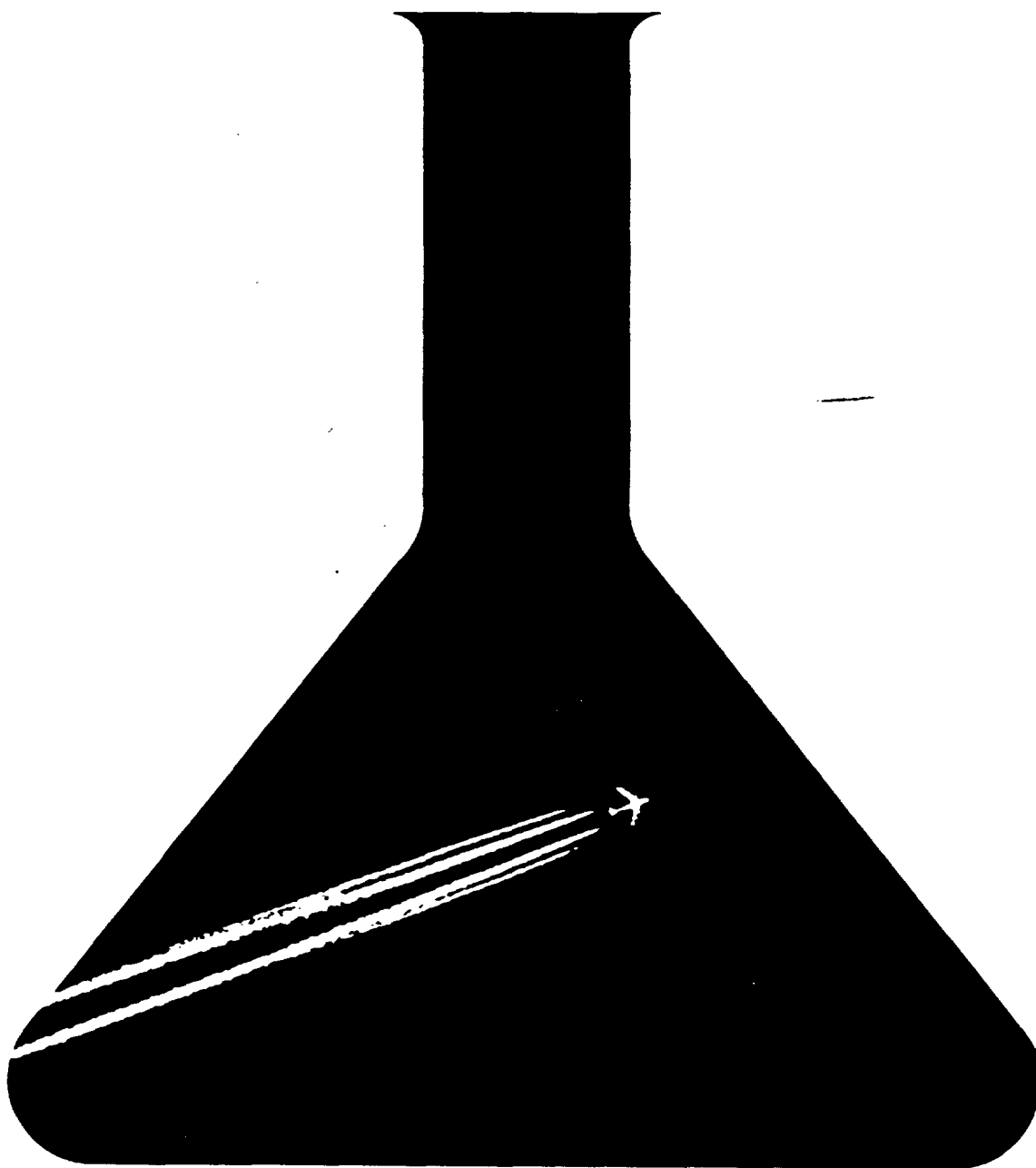
Mr. Diedrich has been associated with the Sarnia plant for some nine years—in design, engineering, construction, operation and management. He was assistant plant manager from 1956 to 1959 and manager until this summer. A native of Louisiana, Mr. Diedrich was an officer with the 87th Infantry division in Europe in World War II and was graduated from Louisiana State University in 1948 with a bachelor's degree in industrial engineering.

BOARD CHAIRMAN NAMED MANAGEMENT MAN OF THE YEAR

Floyd D. Gottwald, Ethyl Corporation board chairman, has been named "Management Man of the Year" by the National Management Association. He has been chosen for this honor on the basis of his executive and administrative leadership with Ethyl and its subsidiary, Albemarle Paper Manufacturing Company, of which he also is board chairman.

The award will be presented during the annual meeting of the National Management Association in St. Louis, Mo., Oct. 21-23.

In previous years, recipients of the "Management Man of the Year" award have included George W. Romney, governor of Michigan, when he was president of American Motors Corporation; the late Charles E. Wilson, former president of General Motors; S. C. Allyn, president of National Cash Register Company; and the late C. R. Hook, former board chairman of Armco Steel Corporation.



blazing new trails

The products of Ethyl's patented orthoalkylation process can blaze new trails in chemistry. As intermediates, our orthoalkylated phenols have made it possible to create interesting new chemical compounds. Some of these compounds have been used to develop new antioxidants for fuels, lubricants, synthetic rubber and plastics. Others are being used effectively in herbicides, insecticides and as antiskinning agents in paints.



Want an instant greenhouse for a corner of your garden? Now they come in clear, flexible sheets. For Ethyl turns polyethylene pellets into the plastic film that makes everything from domestic and commercial greenhouses, to high altitude balloons, to vegetable wraps. We also have

chemicals that clean metals, cut down diesel smoke, stop engines from knocking. Papers that bag, sack, wrap and box a host of things. These are just some of the things we're doing today. Where will Ethyl products turn up next? Wherever research and our imagination take us.

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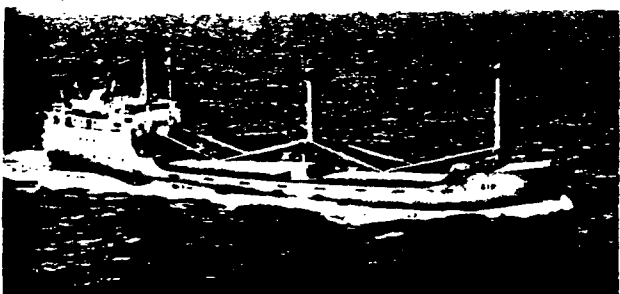
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Ethyl News

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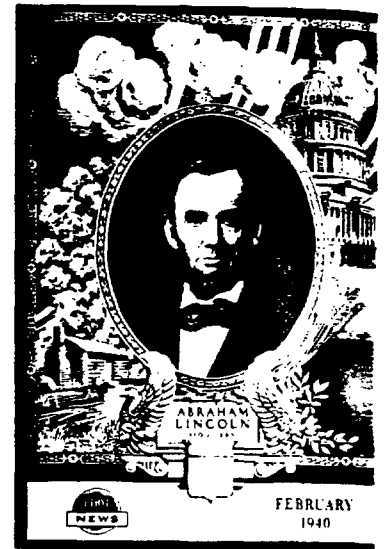
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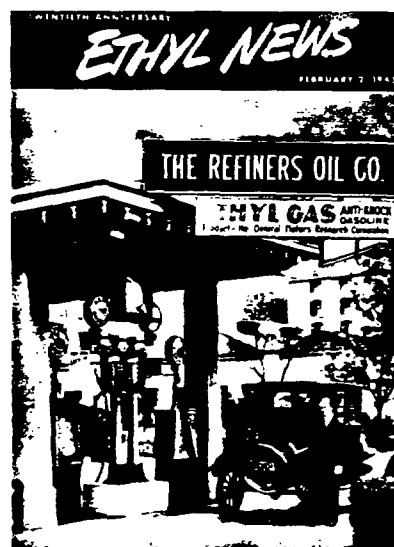
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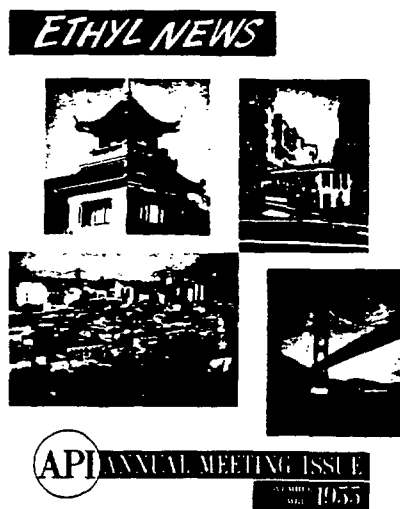
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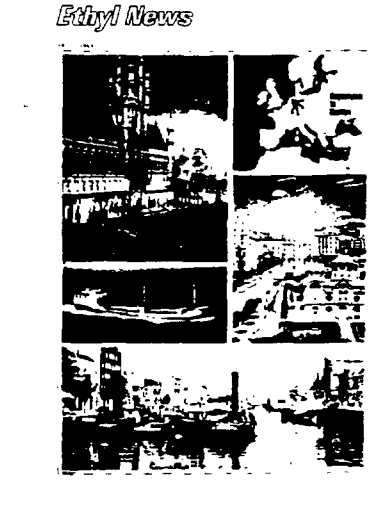
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Ethyl News

VOLUME 31 • NUMBER 4 • FALL/1964

TABLE OF CONTENTS

Expansion in Europe.....	2
Refueling for the Jet Age.....	6
New Wealth from Wood.....	10
Safe Ups and Downs.....	14
A Tank Truck Full of Dyes.....	16
Petroleum's Global Growth.....	18
Reflections on the Crime Problem.....	24
Outlook	27
They're All Part of Additive E.....	29

ON THE COVER

Scenes from Brussels, Belgium, headquarters city of Ethyl S.A., new sales, distribution and service subsidiary; Dordrecht, Holland, site of the Company's new storage and shipping terminal; Salonika, Greece, location of the proposed new "Ethyl" antiknock compound manufacturing plant; and a photo of *EID*, new Ethyl tanker for bulk shipment of antiknocks. For the story of Ethyl's "Expansion in Europe," see pages 2-5.

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*manufacturers of petroleum chemicals,
industrial chemicals, paper and plastics.*

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GEORGE F. KIRBY

President

WILLIAM R. PERDUE, JR.

Executive Vice President and Treasurer

BRUCE C. GOTTWALD

Executive Vice President and Secretary

RICHARD F. COOK

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ETHYL N



The new Ethyl terminal at Dordrecht, Holland, has facilities for handling hundreds of drums of the Company's petroleum additives in addition to bulk shipments of antiknock compounds.

Expansion Europe

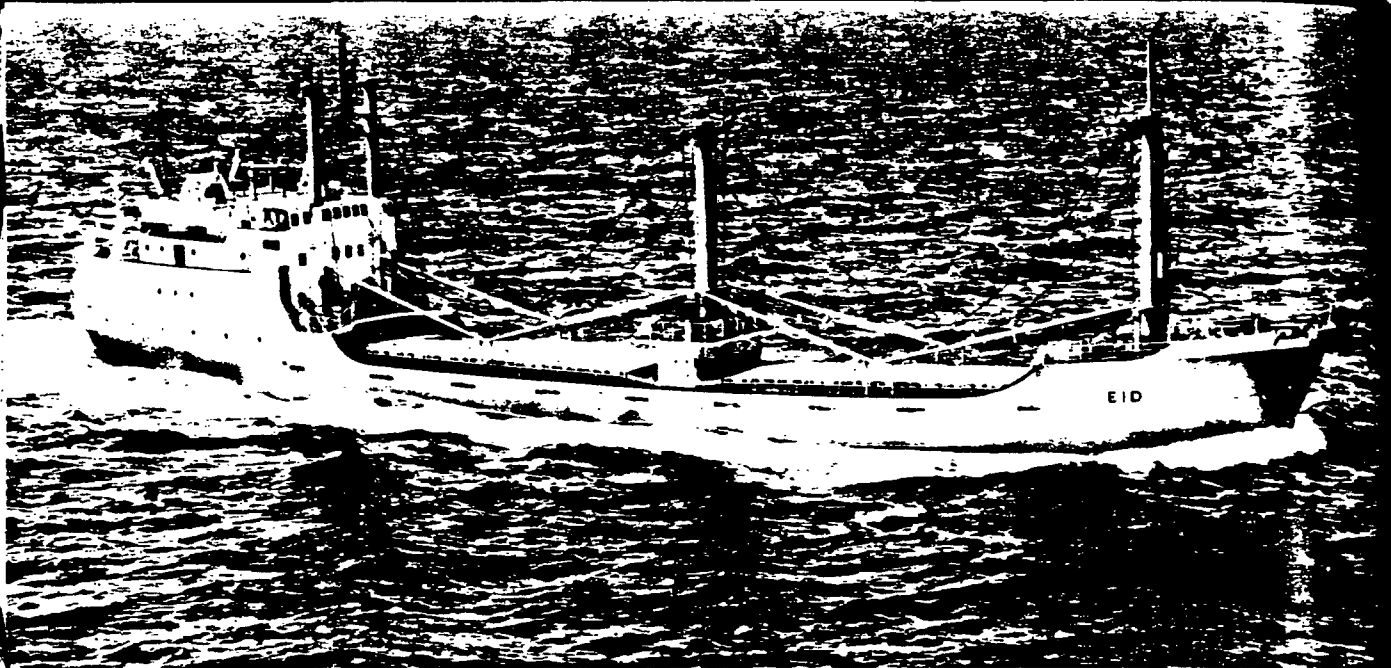
Ethyl International Division forms a new sales, distribution and service subsidiary in Belgium, builds a new terminal in Holland and announces plans for a new manufacturing plant in Greece.

STARTING IN 1966, a new source of supply of antiknock compounds will be available to oil refiners in Greece, the Common Market and other European countries, the Near East and Africa. The essential gasoline additives will be manufactured and shipped from a petrochemical plant the Ethyl International Division of Ethyl Corporation is building in a big new industrial complex at Salonika, in northeastern Greece. Ethyl International was created last year to develop the growing overseas market for Ethyl's expanding line of diversified products.

The new Ethyl plant, the first antiknock compound manufacturing facility in southeastern Europe, is expected to involve an investment of approximately \$11 million and will be the most modern of its type in the world. It will incorporate the latest design and process improvements developed by Ethyl at its plants in the United States and Canada, and will make a full range of antiknocks—including some of the newer lead alkyl compounds. It has been engineered—and will be built and operated—under the direction of experienced Ethyl technical and production executives.

Such other chemicals as ethyl chloride, methyl chloride, ethylene dichloride, hydrogen chloride and related products also will be produced at the plant. Some of these are used in the manufacture of antiknock compounds and others have applications in other chemical processing operations. Ethyl has been an important producer of these chemicals in the United States for a number of years.

Some of the raw materials for the plant, principally ethylene gas, will be obtained from a new 50,000-barrel-a-day refinery under construction in the industrial complex. Others, including metallic lead, will be purchased in world markets.



EID is Ethyl's second tanker for bulk shipments of antiknock compounds overseas.

In commenting on the significance of the new Ethyl plant, A. B. Horn, vice president and general manager of Ethyl International, says:

"Europe and the surrounding areas have experienced a dramatic increase in gasoline consumption in the last decade and the quality of their gasoline has undergone a vigorous improvement. Besides tetraethyl lead, the most widely used antiknock compound, some European gasolines and motor vehicles benefit particularly from the use of some of the newer antiknock compounds containing tetramethyl lead and mixed lead alkyls.

"The Ethyl plant in Greece will provide an important new source of antiknock compounds for the rapidly growing oil industry and will assure refiners that their future needs for antiknocks of all types will be met."

Antiknock compounds manufactured in Ethyl's new Greek plant will be sold by Ethyl S.A., the Company's new sales, distribution and service subsidiary, which was established this summer with headquarters in Brussels, Belgium, the home city of the European Common Market. Ethyl S.A., also

a part of Ethyl International, covers Europe, the Middle East and Africa.

Like all Ethyl organizations, Ethyl S.A. is staffed by experienced personnel. President and managing director is William J. Rusher. Mr. Rusher has almost 20 years' experience in working with major oil companies in their selection and use of antiknock compounds and other additives for petroleum products. J. S. Morton and Glenn W. Babcock, both of whom have similar experience, are account directors—Europe. Hans Wolfe, who has a broad background in laboratory research related to petroleum chemicals and in refinery technology, is manager of technical services.

These men and Ethyl S.A.'s other representatives are working with customers and potential customers throughout the Company's international territory, helping them select the products best suited to their individual needs and assisting them in achieving maximum effective results.

To distribute products from the Greek plant in the European area, the Company has recently completed a modern storage and shipping terminal on the Maas River at Dordrecht, Holland. The terminal has facilities for receiving and storing bulk shipments of antiknocks and for handling hundreds of drums of antiknocks and other products. Shipments are made in specially designed railroad tank cars, highway tank trucks and drums.

The design and construction of the terminal and Ethyl S.A.'s other distribution facilities are based on the know-how Ethyl has acquired over the years in handling antiknock compounds and in making domestic and overseas shipments. Ethyl operates a fleet of more than 1,000 railroad tank cars and a number of tank trucks. The Company pioneered in bulk transoceanic shipments of antiknock com-



William J. Rusher, president and managing director of Ethyl S.A., new sales, distribution and service subsidiary.



Among the points of interest in historic Salonika are (top) an 11th century Byzantine church; (center) the Arch of Galerius, named for a Roman emperor of the 4th century; and (bottom) remains of a Roman wall overlooking the city.

ON THE SCENE IN SALONIKA

Salonika—or Thessaloniki (its official name since 1937)—the site of the new Ethyl plant, is the capital of Macedonia, and, with a population of 375,000, is Greece's second largest city. Situated at the head of the Gulf of Salonika, an arm of the Aegean Sea, it is the principal Aegean seaport of the Balkan peninsula and one of southeastern Europe's most important shipping centers.

Salonika is about 200 air miles north of Athens, Greece's capital and leading city, and about 50 miles from the border of Yugoslavia, to the northwest, and Bulgaria, to the north.

The \$190 million Salonika Industrial Development Plan, of which the Ethyl plant is a part, is planned also to include a major oil refinery, a steel mill and an ammonia plant, and, when completed, to provide jobs for almost 2,000 Greek workers. Ground was broken in May for the oil refinery, the first unit in the complex.

Commenting on the Ethyl plant and the industrial complex, George Papandreou, Greece's premier, says: "... the fact that American firms, such as ... Ethyl ... engage in such investments in Greece ... demonstrates the confidence that the Greek economy inspires."

pounds in sea-land tanks and in tankers and makes thousands of drum shipments annually. Ethyl also operates bulk storage terminals on the Atlantic and Pacific coasts of the United States and five terminals to receive bulk shipments of antiknock compounds in the Caribbean-Latin American area.

Ethyl's *Chemical Trader* was the first tanker for the bulk shipment of antiknock compounds abroad. It supplies the Caribbean-Latin American terminals, reducing refiners' costs and promoting safety in product handling. The *Chemical Trader* will soon be supplemented by a second, larger tanker, the *EID* (Ethyl International Division), which will also transport bulk shipments.

Implementing the Ethyl philosophy that "service is just as important as product" and drawing on more than 40 years of corporate experience, Ethyl S.A. offers research, technical, safety, medical, marketing and training services—all tailored to the requirements of individual customers. The new Company's representatives can provide technical information to refiners on refinery technology, automotive developments, and on vital fuel-engine relationships.

Other services include gasoline testing, marketing and product-handling materials for use in training employees, and qualified personnel to inspect mixing installations. ○



Conveniently located "pits" equipped with both jet and avgas hydrants help speed refueling operations at Los Angeles International Airport.

REFUELING

ETC 29837

AT THE NEW Los Angeles International Airport, you can stick a hose into the ground almost anywhere and come up with jet fuel at a rate of 1,200 gallons a minute.

While even today's biggest super-jets can't take on fuel that fast, high-speed systems make it possible to handle several planes at once at each refueling area, reducing service time. And reductions in service time are important. The big sky giants cost millions of dollars apiece, and every minute they are on the ground is expensive. So it's vital that refueling and all other airport facilities help them get into the air again—fast.

The fueling systems at Los Angeles International were designed by oil companies, who were consulted before the airport was built. The result is systems for jet and piston engine planes that were put in at the lowest possible cost, with no disruption to airport operations, and are among the most modern and efficient in the world.

The Western Airlines refueling system, designed by Union Oil Company of California, is a good example.

To supply Western's system, Union Oil transports jet fuel from its Los Angeles refinery to three 10,000-barrel storage tanks at the airport. From these tanks, the fuel moves by pipeline, as required, to three 50,000-gallon underground tanks in the "day storage" area at Western's airplane loading site. Coming from bulk storage to day storage, the jet fuel passes through the first of the system's three sets of meters and filters which insure product purity.

Another 50,000-gallon underground storage tank—for aviation gasoline—is also located in the day storage area.



Airplanes—jet or piston engine—spotted on circles painted on the loading area pavement can be fueled from these four underground storage tanks. A number of "pits," each flush with the pavement and equipped with both avgas and jet fuel hydrants, which are connected to the tanks, dot the area.

Filtered Second and Third Times

Custom-built, self-propelled fueling carts, manned by experienced airplane fueling specialists and fitted out with specially designed hoses, nozzles, pumps, meters and filters, link fueling "pits" with airplane fuel tanks. The amount of fuel that courses into a plane's tank and the rate of flow are controlled by the specialist at the hose nozzle. Fuel pumped to planes is filtered for the second time as it leaves the underground tanks and a third time as it passes through fueling carts.

No matter how fast fuel is dispensed, the underground jet fuel tanks never run dry. Automatic devices activate pumps to refill them whenever the fuel drops below a predetermined level.

The system Union Oil designed for Western Airlines has many other automatic features. It not only fills the day storage tanks and filters the fuel three times but also signals any mechanical failures or shortages that might occur, meters fuel, and performs a number of calculations. Electronic devices keep all pumps and lines equally busy and tanks equally full by periodically shifting assignments from one set of equipment to another.

Trouble Signalled by Light and Sound

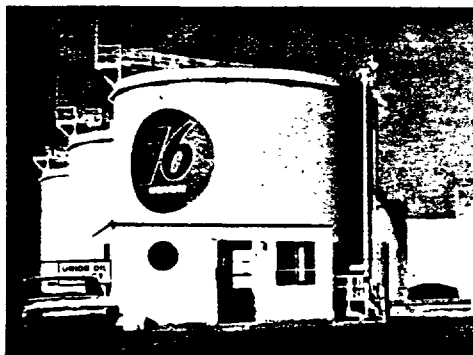
An automated diagram in the office of Western Airlines' maintenance chief reports fuel movements through a series of lights. Trouble is signalled by both light and sound. If, for example, even a trace of water should somehow get into the system, a water alarm would announce the contamination and immediately shut down fueling operations. Nothing is left to chance; the panel even has a push-button to test its own warning lights.

From refinery to airplane fuel tank, the system is as modern and efficient as the fuels it delivers and the fast planes and flight service it makes possible.

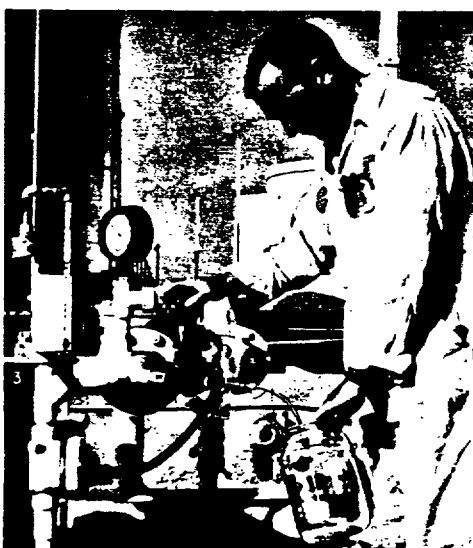
At other locations at the Los Angeles airport and at other modern airports around the world, there are many other efficient fueling systems. Wherever they are, they're another reminder of the big part the oil industry plays in making the miracles of jet-age flying an everyday reality.

JET AGE

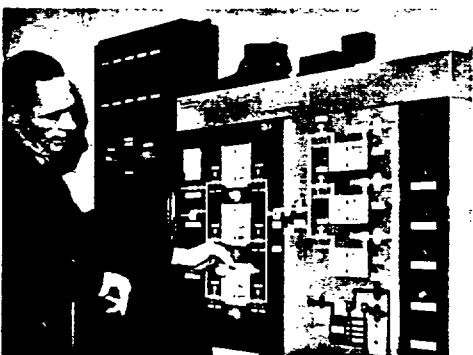
By Jack B. Kemmerer



From Union Oil storage tanks at the airport, jet fuel for Western Airlines planes moves via pipeline to the refueling area.

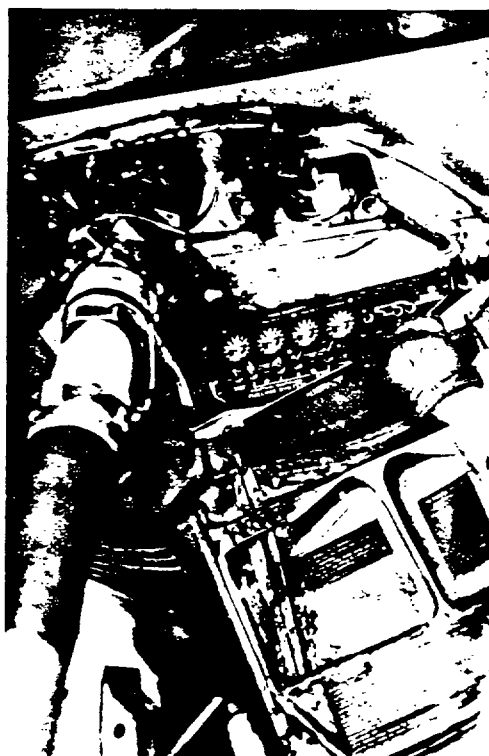


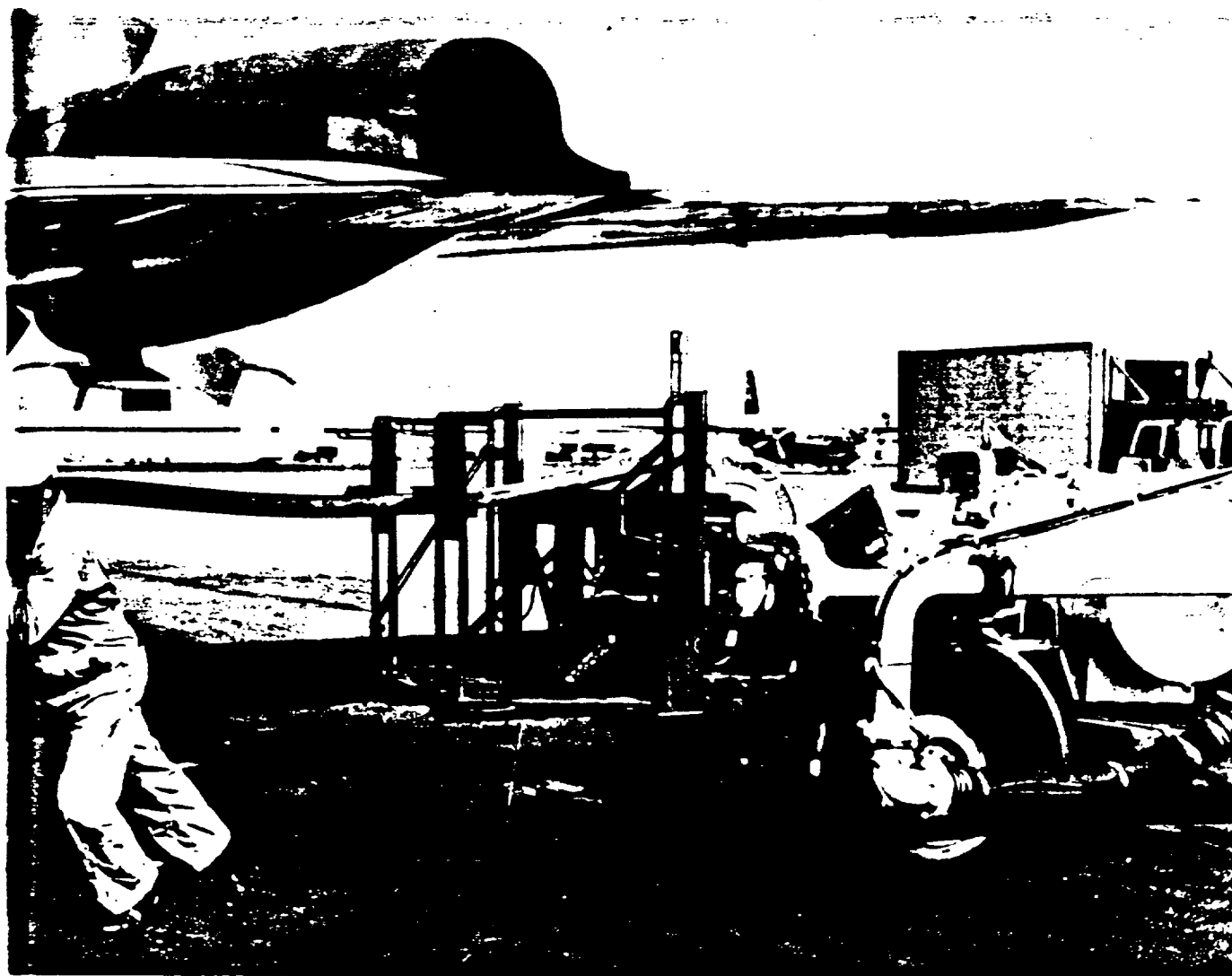
Fuel samples taken daily at several locations on the system are carefully checked for quality.



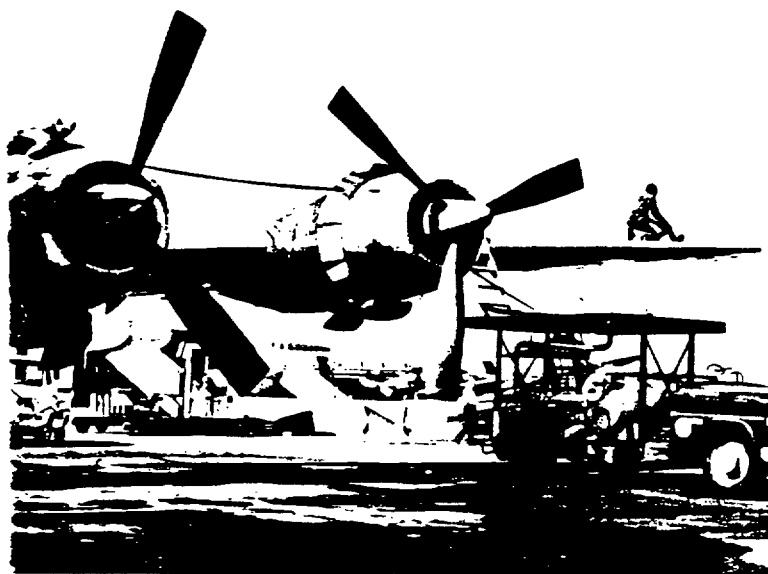
An electronic control panel diagrams the entire system, reports fuel movement by a series of lights and shuts down system if trouble occurs.

Right, watching instruments which record fuel going into an Electra prop-jet's tanks, an operator controls rate and quantity of flow.





Above, custom-built, self-propelled fueling carts, manned by experienced refueling specialists and equipped with specially designed hoses, nozzles, pumps, meters and filters, link the fueling "pits" in the pavement with the planes' fuel tanks.



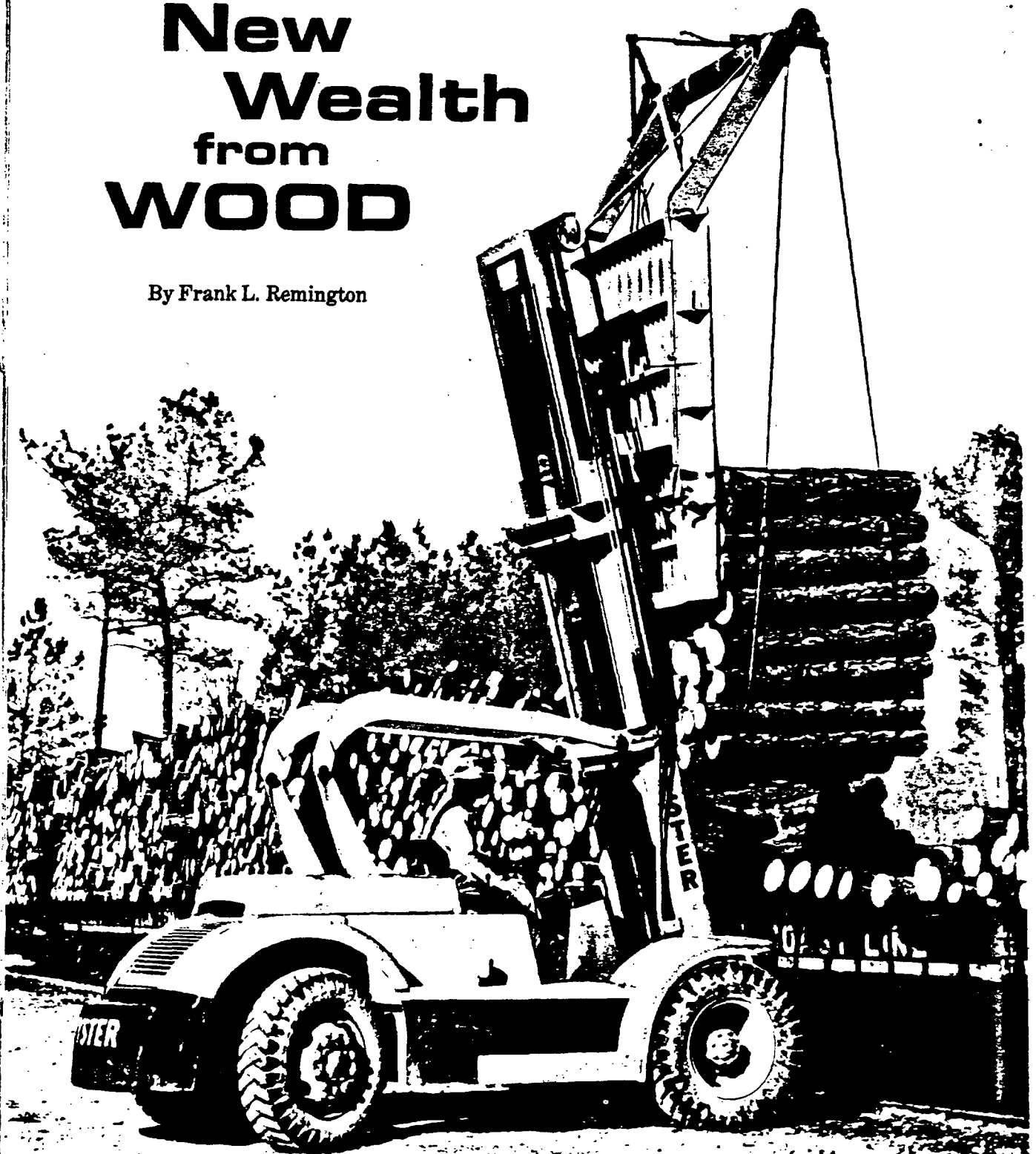
Left, unlike jets and prop-jets, piston-engine planes are refueled from the top of their wings. Fuel carts for such planes are equipped with a superstructure which helps operators mount wings more easily.

Revolutionary new chemicals, medicines, plastics

and other materials of the future may now be concealed in our forests

New Wealth from WOOD

By Frank L. Remington



ETC 29841

FROM ROOT TO LEAF and from bark to core, there's renewed interest in trees these days.

At a time when synthetics seem to be taking over in so many areas, science, industry, agriculture and government are taking a good hard look at one of our greatest natural assets—our forests. They're making every effort to reduce woodlands waste and use trees more efficiently. They're also applying all the know-how of modern scientific research to develop new products and processes from forest-born materials.

From all indications, real progress is being made. Medicine, chemistry, paper, plastics, building materials and farming are all expecting to benefit—and this may be only the beginning. Some leading scientists consider trees one of the great untapped sources of raw materials for all kinds of products of the future.

Historically, man has utilized trees principally to fill two basic needs: houses for shelter and fuel for warmth. These uses continue, of course, but today more than 5,000 products are made from wood.

Paper, one of the principal products, is consumed at an annual per capita rate of about 450 pounds a year in the United States. This figure may zoom as high as 700 pounds in the next couple of decades as paper is used for everything from packaging to oil filters to fabric material.

Wood also goes into such diverse items as dies for automobile bodies, rocket fuels, insulating materials, plastics, paints, film, rayon and cellophane tape.

In early logging days, if 35 percent of a tree trunk was used, it was considered an achievement. Loggers left mountains of wood litter and sawdust lying in forests, creating serious fire hazards and providing breeding grounds for insects that could destroy more timber each year than fire.

Today, the effective utilization of every last chip is a challenge to forest industries—a challenge they are meeting in a number of ways. The waste burner, a long-time hallmark of logging and lumber operations, has completely disappeared at some mills and is being used less and less at others—an encouraging harbinger of things to come.

"Relogging" operations, which salvage broken and defective logs, chunks, chips, and other material and use them for hardboard, pulp, and a variety of other items are big wood savers. As a matter of fact, some pulp mills now use sawmill leftovers exclusively.

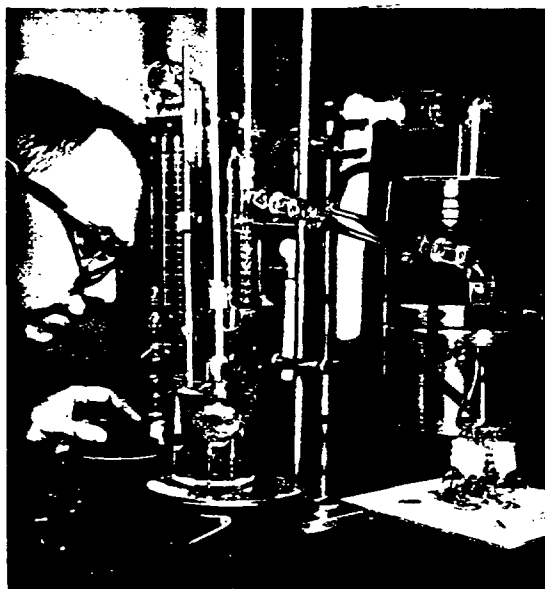
Waste may be further reduced by revolutionary innovations in wood cutting. High-speed water jets, sonic vibrations, and concentrated light (laser) beams are being investigated.

Private industry spends some \$65 million a year on wood research annually and federal and state governments, institutions of learning and various other agencies devote another \$35 million to it. Many officials of forest products industries, a

\$23 billion business in this country, believe these amounts could well be doubled.

One of the active research centers is the Forest Products Laboratory (FPL) at Madison, Wisc., financed by the United States Department of Agriculture in cooperation with the University of Wisconsin. Similarly, the University of California cooperates in such efforts at the FPL in Richmond, Calif.

A fascinating facet of the Forest Products Laboratories' work is the application of chemical research to the wood waste problem. "I believe," says Director Edward G. Locke of the Madison FPL, "that the next 15 years will see the establishment of a thriving wood chemical industry. A number of chemical intermediates have broad application in polymer chemistry for resin and plastic production. From wood we also can obtain various alcohols, industrial acids, solvents, and other types of chemicals extensively used in the manufacture of many products."



Wood researchers have found 2,600 different organic chemical compounds in trees—and they've just started.

Director Locke also predicts that "wood may some day equal petroleum as a source of industrial chemicals." Such predictions are based on the fact that trees are wondrous chemical production plants—literally factories in the forest.

Wood researchers already have identified more than 2,600 different organic chemical compounds found in trees—and they've scarcely started to probe. Some of the compounds, like turpentine and tannin, are well known. Others, like those used in insecticides, cosmetics and explosives, are less familiar.

Trees contain some 60 percent cellulose and between 20 and 30 percent lignin, a cementing



Albemarle's wood research program includes cross-pollination to develop pine trees with higher pulp yield.

substance between the cellulose units. The rest consists of extractives—materials soluble in water or in organic solvents. One extractive, for example, gives redwood its distinctive color.

Lignin is a complex substance, but is thought to have great potential, although researchers have yet to determine its chemical character. It is used for oil well drilling muds and various other purposes, but about 15 million tons go down the drain each year.

In commenting on lignin's potentialities at the annual meeting of the Kraft Paper Association this year, F. D. Gottwald, Ethyl Corporation board chairman, said: "... We need to bring in a fresh look at this opportunity by scientists daring enough in their thinking to attack by methods radically different from the shopworn approaches of the past."

When a practical use for lignin does come out of the laboratory, it may well create a lucrative new business.

Another tremendous opportunity exists in the

fuller utilization of tree bark. Present uses range all the way from a soil conditioner for plants and a medium for raising mushrooms and orchids to a thinner for oil well drilling mud and an emulsion stabilizer for asphalt. But about 200 million tons of bark are scuttled as rubbish each year.

One of the most fascinating fields of wood investigation centers on why certain species of trees are hardier than others and why some decay as they reach maturity. Chemical changes connected with the aging process seem to account for the phenomenon. The possibility that disease operates the same way in humans as it does in trees is under serious consideration.

The marvelous chemical factories in trees may also be useful in chemotherapy. Medical men hope that new organic compounds extracted from wood and bark may lead to some new wonder drugs with an effect on unconquered diseases—cancer, for example.

An indication of the possibilities is seen in dimethyl sulfoxide (DMSO), a byproduct of wood

AT ALBEMARLE...

As a manufacturer of kraft paper, paper board and specialty papers—made primarily from wood pulp—Albemarle Paper Manufacturing Company, Ethyl Corporation subsidiary, is vitally interested in the efficient utilization of forest products.

Planned tree-cutting programs are in effect on the 200,000 acres of woodlands in Virginia and North Carolina which the Company owns or holds under long-term lease. In experimental orchards, Albemarle foresters are using a scientific system of cross-pollination to develop genetically superior pine trees with a higher and better pulp yield. The orchards are expected to produce 25 million seedlings annually in 10 years.

Meanwhile, the Company is obtaining high quality pine seedlings for reforestation of its own woodlands and for distribution to private tree farmers in its wood procurement area. It also is evaluating various hardwood species as a result of a cooperative hardwood program conducted in cooperation with the forestry school at North Carolina State University.

Of the 500,000 cords of pulpwood purchased to supply Albemarle's Roanoke Rapids, N. C., pulp and paper mill last year, some 155,000 cords, or 32 percent, was in the form of chips from more than 50 sawmills and lumber plants. New technology has made it possible to use hardwood chips as well as pine chips in making pulp for kraft paper, thus providing a profitable use for a former waste product.

In another area of waste utilization, the Albemarle mill uses tons of bark removed from cordwood received at the mill as a supplementary fuel for its steam boilers.

In Albemarle's laboratories, continuing research projects are under way, aimed at further capitalizing on the fibers and chemicals in wood to improve existing paper products and to develop new ones.

pulp currently under medical investigation. Applied locally, DMSO penetrates the skin and helps to relieve pain in such maladies as bursitis and arthritis. It also reduces swelling caused by skin inflammation and irritation. However, there's still much to learn about DMSO before its medicinal value can be fully determined.

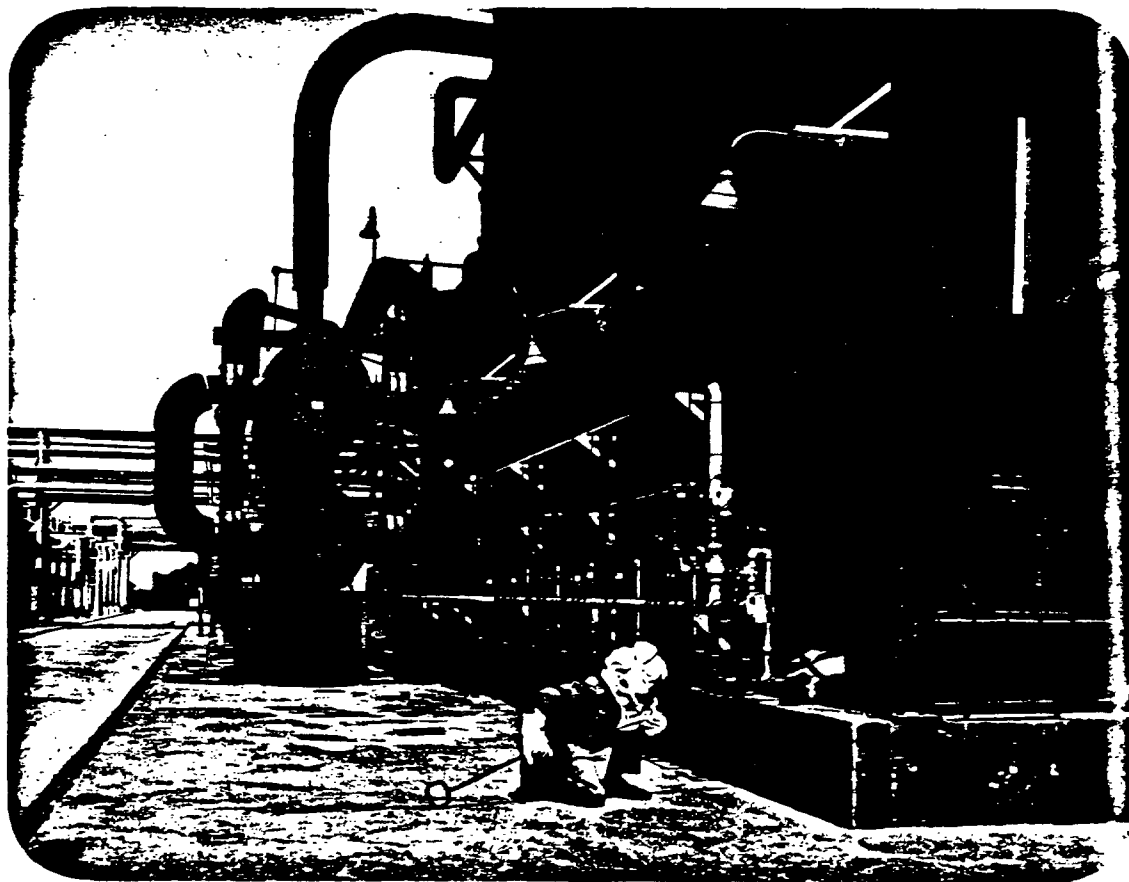
While wood ranks as one of man's oldest natural resources, it has at least one distinct advantage over other natural materials: the supply is constantly renewable. As a matter of fact, the one-time drain on America's forests has not only been halted; it has been reversed. Today, new growth exceeds removal and damage from insects and fire by 25 percent—thanks to the planned cutting and reforestation programs and to waste reduction measures. But there still are many opportunities for expanding efficiency in wood utilization.

Just about every field of endeavor, from the paper, chemical and construction industries to agriculture and medicine may well share in the potential wealth still hidden in trees. ○



Above, annual per capita paper consumption, now about 450 pounds a year in the United States, may reach 700 pounds in the next couple of decades.

Below, supplementing lumber as a building material are ceiling tiles and many other products made from sawdust, chips and other former waste items.



Safe Ups and Downs

New sound and color motion picture produced by Ethyl shows and explains how to avoid hazards in refinery turnarounds

SAFE, EFFICIENT PROCEDURES involved in shutting down and starting up modern oil refineries are dramatically demonstrated and explained in a new sound and color motion picture produced by Ethyl as another service to the petroleum industry.

The 28-minute film, "Safe Ups and Downs for Refinery Units," is an authentic presentation of essential steps in avoiding potential hazards when refinery equipment is shut down for maintenance, repairs or modifications and then put back into operation.

Like predecessor Ethyl movies for refinery audiences—"Danger! Water!" and "Danger! Air!"—the new Company production is designed to help refiners educate, train and motivate employees. The film's sequences dealing with safety are especially effective. There is repeated emphasis on the point that "the thinking man" is alert to what should be done, knows when to do it, and applies his experience to avoid mistakes which could result in fires, explosions and injuries to fellow-employees.

A recently published American Oil Company booklet, "Safe Ups and Downs for Refinery Units," copyright 1963, provided much of the material for the movie. Refinery management, operating, maintenance and safety authorities from a number of oil companies and from several committees of the American Petroleum Institute were consulted in planning and producing the film.

Filmed at Three Refineries

The action was filmed by professional camera crews at refineries of The Pure Oil Company at Heath, Ohio, Signal Oil & Gas Company at Houston, and the Coastal States Petrochemical Company's plant at Corpus Christi, Texas. All "actors" are bona fide employees of these companies who were photographed during key stages of shut-downs, start-ups and turnarounds.

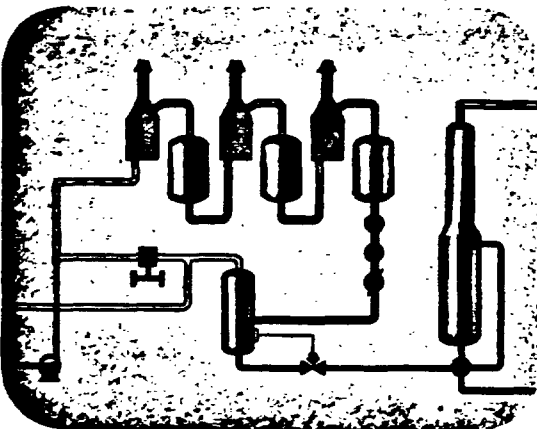
In addition to the refinery shots, the movie includes animated diagrams which show what takes place inside processing systems.

Repeatedly, but in effectively diversified ways, the Ethyl production stresses the critical importance of close, smooth and complete coordination between operators, maintenance men, safety and fire control people, and between shifts. Accenting the positive as well as the negative, the film underscores how such efforts pay dividends and dramatizes the penalties of failure. Refiners who have experienced accidents cooperated in making available film footage which shows the results of oversight, negligence and carelessness.

Thinking Man in Action

In demonstrating how "a thinking man's alertness and know-how in action" can prevent trouble, one sequence shows an alert refinery employee spotting and cutting out a defective pump before it can overheat and start a fire. "Call on all your senses for the warnings that something may be amiss," the sound track reminds listeners, adding that "the excitement that never comes" is the only kind that is ever welcome.

Following a preview by API operating and safety committees at their October sessions in Houston, "Safe Ups and Downs for Refinery Units" had its premiere at the American Petroleum Institute annual meeting in Chicago early in November. Copies of the film are available through Ethyl offices and representatives in the United States, Canada and overseas. ○



The film's sequences include pictures taken during actual shut-downs and start-ups of petroleum processing units at three modern refineries, as well as animated diagrams which show what takes place inside of the units.

ETC 29846

Tank truck delivery reduces handling and unloading time and eliminates spillage.



A Tank Truck Full o

THE FIRST BULK SHIPMENT of liquid dyes to an oil refinery—a 2,000-gallon tank truck full of "Ethyl" Automate Dyes for gasoline—was successfully delivered this summer to Mobil Oil Company's 220,000-barrel-a-day refinery at Beaumont, Texas. The pioneer dye shipment—enough to supply the refinery's needs for six months and provide distinctive color for several million barrels of gasoline—consisted of Automate Red-B for Mobil Premium and Automate Orange for Mobil Regular. The two dyes made the 1,700-mile trip from New Jersey in the truck's compartmented stainless steel tank.

Arrival was timed for the start-up of the Mobil refinery's new facility for the automatic, in-line blending of antiknock compounds, other additives, liquid dyes and gasoline components to produce finished fuels of uniform quality and color. Ethyl representatives who arranged for the dye delivery

had previously worked closely with Mobil on technical aspects of some of the blending system's features, which include the latest designs, mechanical innovations and instrumentation. Ethyl also prepared an instruction manual for operating personnel and provided a scale model of the installation for the refinery to use as a training tool.

As anticipated, the tank truck shipment—equivalent to 70 drums of dye—provided a number of advantages for the refinery. Since the dye was pumped through hoses into storage tanks, handling was cut to a minimum, unloading time and personnel required were sharply reduced and spillage was eliminated.

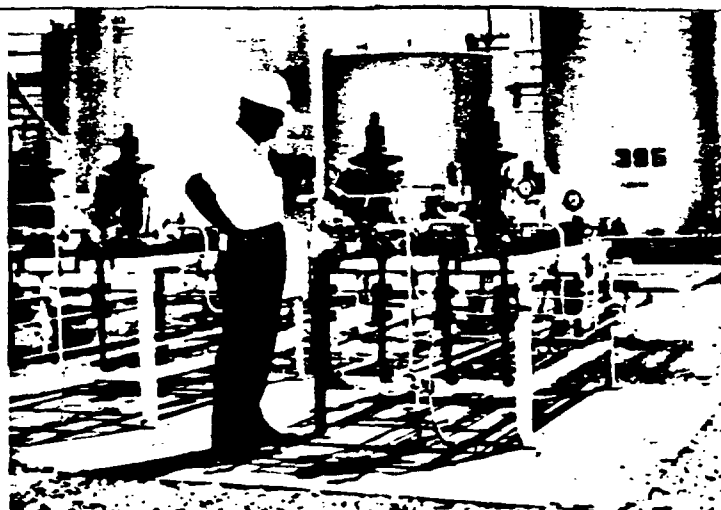
Automate liquid dyes for petroleum products were introduced by Ethyl two years ago and their use has grown substantially, especially with the increase in in-line blending systems.



yes

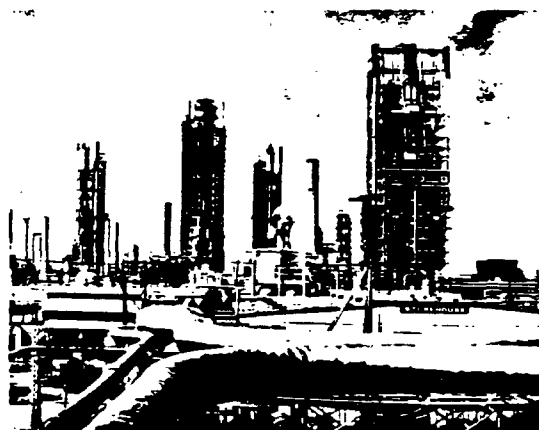
"Ethyl" automate dyes combine readily and uniformly with gasoline, diesel fuels, lubricants, hydraulic oils and transmission fluids, reducing mixing time and eliminating solubility problems. The liquid dyes require less storage space and cut costs for equipment and maintenance, since slurry tanks are not required and there are no clogging problems.

The success of the first bulk dye delivery and subsequent use of the products (Mobil's Beaumont refinery is using the two dyes effectively in the current commercial operation of its in-line blending system) pave the way for Ethyl to evaluate inquiries from other refiners interested in similar service. Ethyl sees the unique shipping service as a logical sequel to its introduction and sale of the dyes and its key role in developing efficient in-line blending systems. ○



Top, "Ethyl" Automate Liquid Dyes for Mobil gasolines are stored in tanks (background) and are added to the in-line blending stream by turbine meters (foreground).

Above, the new in-line blending system for automatically combining gasoline components, antiknock compounds, other additives and the dyes is controlled from this panel.



Reaching high into the Texas sky, process towers mark the location of Mobil's 220,000-barrel-a-day refinery.

PETROLEUM'S (

With Free World consumption slated to double by 1980, Ethyl survey presents supply and demand picture in leading refining nations outside North America.

GROWTH—the pattern of the oil industry throughout its 105-year history—is expected to come at a faster pace than ever in the next few decades, stimulated especially by fast-growing demand overseas.

With the approach of the mid-1960s, authoritative sources are predicting that Free World use of petroleum will double by 1980, and triple by the year 2000. Gearing itself to meet such zooming demand can result only in quickening oil industry growth in the years ahead.

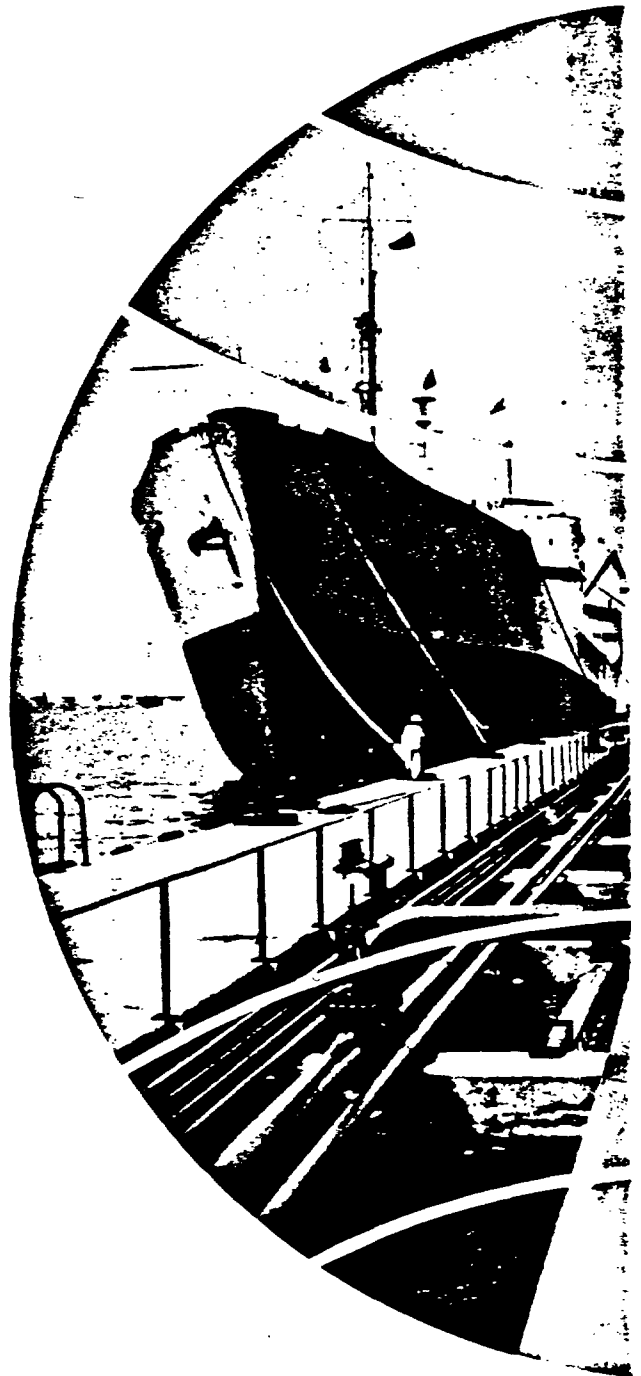
While increasing oil consumption in the United States, Canada and other countries on this side of the Atlantic will contribute significantly to expanded demand, the greatest upsurge is expected to come in some of the more industrialized countries of the Eastern Hemisphere. Now that these countries are well beyond recovery from the ravages of World War II, they are moving along at a new fast clip.

Reasons for Oil's Importance

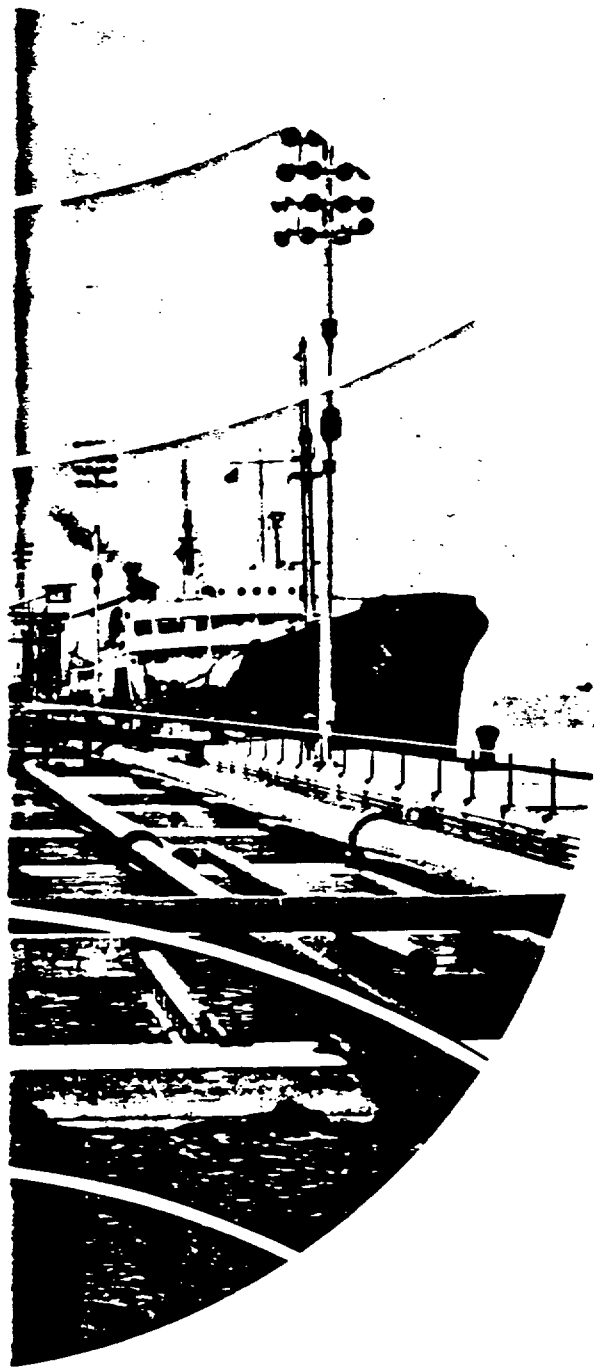
Here are some of the basic reasons for the importance of oil in their expanding economic development:

- Accelerating population growth.
- Greater per capita consumption of energy as industrialization continues and standards of living rise.
- Increasing automobile and truck populations, resulting from widespread prosperity.
- Oil gaining larger shares of the heating and industrial power markets because of its availability, convenience, efficiency, cleanliness and economy.

As a major world supplier of antiknock compounds for gasoline and a growing number of other important additives for petroleum products, Ethyl Corporation naturally is vitally interested in developments in the international oil industry. Accordingly, the Company has recently made a survey of the major crude oil processing countries of the Free World—countries with refinery capacity of a million or more barrels a day — Japan, Italy, West



OIL GROWTH



Germany, the United Kingdom and France in the Eastern Hemisphere, and Venezuela in the Western. The petroleum products demand patterns of the United States and Canada differ from those of other countries—especially in gasoline—so they are not included in the study.

The study covers significant developments in the surveyed countries in recent years, present capabilities, factors expected to affect future demand and anticipated methods of supplying such demand.

Japan is a Leading Refiner

Largest in refining capacity of the Free World's nations, after the United States, is Japan. In that Far Eastern country, domestic demand for petroleum products has shot up at the rate of 25 percent annually for the last decade and crude oil processing capacity has kept pace.

Since 1955, gasoline consumption in Japan has risen at an annual rate of about 15 percent, while demand for such other products as kerosene, heating and diesel oils and heavy residual fuels for industrial and marine use has grown even faster.

There are indications that Japan may also be on the threshold of still more rapid growth in gasoline requirements. Registrations of gasoline-powered passenger cars and trucks have been increasing at a 45 percent annual rate since 1959. If such growth continues, there will be about 10 million gasoline-powered vehicles in the country by the end of 1966, of which about six million will be trucks.

Regular grade gasoline, which now averages about 89 octane number (Research), but which has remarkably low sensitivity, has historically dominated the Japanese motor fuel market. The preponderance of trucks in the Japanese motor vehicle population also has limited premium gasoline sales. However, premium grade fuels of 98 RON and higher are available for premium-minded motorists.

New Antiknocks for Premium Fuels

While demand for regular is expected to continue dominant, the emphasis in premium fuel manufacture will be on antiknock quality, particularly on better distribution of octane number in the lighter fractions. The latter is expected to be accomplished through the use of lighter lead alkyl antiknocks and special refining processes.

Japanese refiners' octane improvement equipment—much of which has been built in the last five



years—is modern and highly efficient. In both processing capabilities and capacity, the industry is well poised for flexible expansion to meet future needs as they develop.

Italy Has 15 Percent Annual Growth

In Italy, which ranks first in Western European refinery capacity, the size and type of facilities, as well as domestic demand for refinery output, have been growing at about a 15 percent annual rate for the last decade. As in Japan, and such other countries as West Germany, tremendous gains in the consumption of residual fuel—heavy industrial oil—have influenced refinery operations, but more recently gasoline consumption has also been on the rise.

The latter trend results in part at least from the Italian government's reduction of taxes on gasoline. The reduction dropped the retail price of gasoline by 20 percent, and subsequently the country's automobile population has been growing at a rate of more than 25 percent annually. At the same time, truck registrations also have been multiplying. If Italy's recent vehicular growth rates continue, there should be 10 million cars and almost a million trucks on Italian highways by the end of 1968.

Although almost one-third of Italy's gasoline is produced by older refining methods, the oil industry has kept pace with growing demands by the addition of new efficient refinery process equipment. It appears that there is an ample reservoir of technological capability for expansion to meet future needs.

Premium Demand Expected to Increase

Premium gasoline in Italy, designed to satisfy sport and luxury cars, currently averages almost 99 octane number (Research). But since most of the automobiles are smaller, lower compression ratio vehicles, regular gasoline, now averaging above 86 RON, satisfies a good share of them and the trucks. As more high compression automobile and truck engines are introduced, however, premium demand is expected to increase.

In West Germany, which has almost matched Japan in oil industry growth during the past decade, petroleum product demand and refinery capacity are expanding at an annual rate of about 23 percent. Pipelines supplying such industrial areas as the Ruhr, and feeding four major refining complexes completed last year, are helping oil continue to eclipse coal as a source of West German heat and energy and to serve as a more widely used raw material for the chemical industry. In addition to a growing need for more residual fuel for industrial power, and for such middle distillates as heating and diesel oils, the country's demand for gasoline has increased about 20 percent annually during the last six or seven years.



A growing automobile population has contributed to Britain's 10 percent annual increase in petroleum usage.

West Germany's gasoline-powered vehicle population has been growing as fast as 25 percent annually since 1955. Gasoline demand is expected to almost double in the next five or six years.

The country started 1964 not only with modern, efficient refineries, but with processing installations capable of achieving high gasoline yields from crude oil. It is therefore expected that West Germany can easily expand gasoline production further to meet its anticipated fast-growing requirements.

Lively competition for the rapidly growing car market, which is promoting higher compression engines in lower priced models, should create a growing demand for premium gasoline unless West German refiners increase the octane quality of regular still further. Since the country's 99 RON premium satisfies all present West German-built autos, a rise in premium's antiknock quality is not anticipated at present.

Across the English Channel, the United Kingdom, long the largest consumer of petroleum products in the Eastern Hemisphere, has experienced a substantial demand increase—though not as fast as some other countries—in recent years. During the last decade, consumption has risen about 10 percent annually, while refinery capacity has expanded about seven percent a year. The UK now

produces about 80 percent of its domestic gasoline demand.

UK to Have 10 Million Vehicles

Britain's car population has been growing at a rate of nine percent annually since 1955 and in more recent years the truck population has been growing even faster. As a result, the UK should have 10 million motor vehicles in the near future.

At present rates, there will be 10 million cars on French highways at the end of this year, and 20 million by 1970.



Premium or superpremium gasolines account for three-quarters or more of all motor gasoline sales in the United Kingdom. Regular grade is used by delivery trucks, motorcycles and pre-1946 cars of low octane requirement. The octane number of Britain's regular grade gasoline spurted to 90 after lingering below 85 for some eight years prior to 1962. At the higher level, it should satisfy most British cars built before 1955.

The UK's capacity for producing gasoline has generally kept pace with demand. The number, size and type of Britain's modern, efficient refining installations lend themselves to expansion as circumstances warrant.

French Gasoline Demand Rising

In France, despite some evidence of excess capacity, refiners are in a sound and enviable position. Unlike other European countries, residual fuel does not dominate the French demand picture. Gasoline requirements, growing at an annual rate of five to six percent since the mid-1950's, are strong, although not growing as rapidly as those for diesel, heating oil and other distillates.

With the automobile population going up at a yearly rate of 12 percent or more, there will be 10 million cars on French highways by the end of this year; 15 million by mid-1968; and 20 million by 1970. Government policies—the reduction of gasoline taxes, for example—may have an important bearing on these estimates and accompanying gasoline demand.

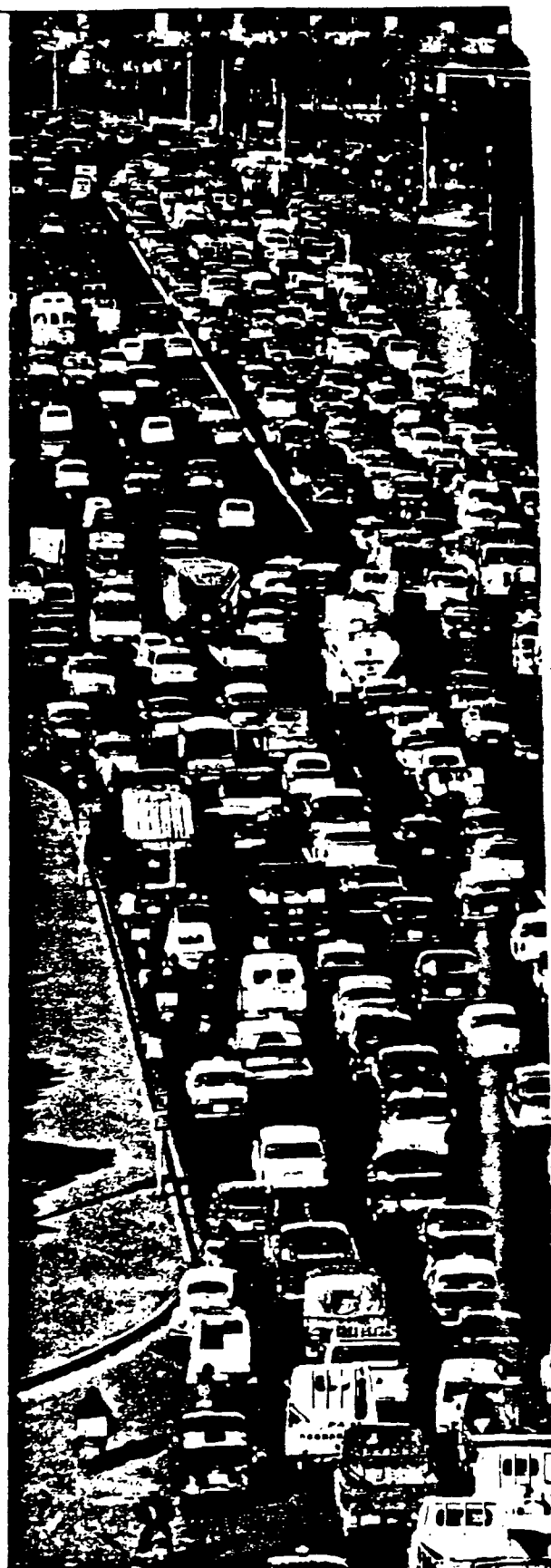
Higher compression engines in French-built cars—and better domestic gasolines to power them—have been introduced since the late 1950s through government-directed oil and automobile industry planning. The coordination has resulted in premium gasoline of 98-99 Research octane number, while the country's regular averages about 91-92 octane number.

Sizeable increases in French gasoline production capacity, aided by the high gasoline yield obtained



Premium gasoline in Italy, designed to satisfy sport and luxury cars, averages close to 99 octane number (Research).

Spurred by fast-growing use of automobiles, as seen in this Tokyo street scene, Japan's demand for oil products is climbing fast and refinery capacity is keeping pace.





In West Germany, gasoline consumption is expected to almost double in the next five or six years.

from the type of crude used, have helped provide enough output from modern refineries to accommodate rising domestic demands.

Venezuela Third in Crude Production

The petroleum situation in Venezuela is noteworthy largely because that nation ranks third in worldwide crude oil production—surpassed only by the United States and Russia. Less than a third of the country's huge production is refined domestically, however—the rest is exported. About 90 percent of the heavy residual and lighter distillate fuels produced in Venezuelan refineries and 65 percent of the gasoline are marketed in other countries. There are few signs of appreciable changes in this pattern in the years immediately ahead.

The country's automotive population—300,000 cars and 120,000 trucks—accounts for the relatively modest domestic consumption of gasoline. Three grades of gasoline are available—premium, with an octane number of 96-97; a second grade of about 83 RON; and a lower quality at the 78 RON level. Judging by present circumstances, no pronounced changes are anticipated.

Looking at the oil and automotive situation world wide, but especially in the leading refining

nations, it is apparent that closer cooperation between the two industries will be advantageous in promoting better matching of fuel and engine requirements. The value of such cooperation is demonstrated clearly in the United States by the work of the Coordinating Research Council and other inter-industry groups. Their achievements prove that cooperative activities do not decrease healthy competition, but promote progress and benefit refiners, automobile manufacturers and everyone involved in automotive transportation. ○

Survey is a Service

The accompanying article is based in part on "Trends in the International Petroleum Refining Industry," a report on the findings of an Ethyl Corporation survey of Free World nations where recent economic growth has been unusually rapid. Prepared and distributed as a customer service, the report has been well received by oil refiners throughout the world. In coming years, Ethyl plans to repeat the survey to supply similar up-to-date information which can help refiners plan future operations to meet anticipated demands.

Reflections on the Crime Problem

BY LEWIS F. POWELL, JR. *

An Ethyl Corporation director, who is a distinguished lawyer, a dedicated civic and educational leader, and now president of the 116,000-member American Bar Association, discusses some of the causes, results and possible cures for crime in America in the mid 1960s.

*The accompanying article is based on a talk given by Mr. Powell earlier this year.

TO EVEN the casual reader of the daily newspaper, it's obvious that the crime problem in the United States has reached alarming proportions. Almost daily, the headlines tell a shocking story of murder, rape, robbery, aggravated assault, burglary, larceny of \$50 and over, and auto theft. In fact, more than two million such serious crimes are now committed in this country every year—and the trend continues upward. One of the most disheartening aspects of the sordid picture, for both its present and future implications, is the accelerated increase in juvenile crime. In 1963, arrests of young people under 18 years old were up 13 percent over 1962—a far higher increase than adult arrests.

It's easy to quote statistics and view the situation with alarm, but it is far more difficult to determine the fundamental causes of the mounting crime problem and suggest ways of combatting it. The subject is vast and complex and involves social and economic conditions as well as the ethical concepts and moral standards of our time. Criminal laws and their enforcement by police and the courts are, of course, involved, too.

Ironically, the fact that we are a western democracy with a constitution and legal system that provide cherished safeguards for the individual is one source of our problem. In the Soviet Union, where the rights of the individual are subordinated to the state, crime is dealt with on a vastly different basis.

A few years ago, I visited the Soviet Union with a delegation representing the American Bar Association. In the course of long discussions with leading judges and lawyers, it was evident that a Soviet citizen charged with a crime has fewer rights and is far more likely to be convicted than his counterpart in this country. Perhaps the most significant aspect of Soviet "justice" is that sentences are swift and severe. Rowdyism, or being a "hooligan" as the Soviets say, is a serious offense, punishable by years at hard labor. So-called economic crimes, involving theft or misappropriation of state property or black market operations, can bring the death sentence.

No one would suggest that we move in the direction of the repressive Soviet system. I cite it merely as an example to accent the fundamental problem, inherent in our system of freedom under law, of preserving both the individual rights of those accused of crime and the broader rights of society. It is the preservation—wisely and fairly—of this delicate balance that is the concern of our responsible lawmakers, our courts and our law enforcement officials. It must also be the concern of every thoughtful citizen.

But the preservation of this balance is extremely difficult and there is a growing body of opinion that we are approaching a state of considerable imbalance; that the pendulum may have swung too far in affording rights which are abused and misused

by criminals, to the serious detriment of the rights of law-abiding citizens and to society as a whole.

In commenting on this point, Orlando W. Wilson, superintendent of police in Chicago and former professor of criminology at the University of California, has said: "Crime is overwhelming our society . . . In the name of protecting individual liberties, we are permitting so many technicalities to creep into our system of criminal justice that we



are no longer convicting a sufficiently high proportion of guilty criminals."

Certainly, the profoundly disquieting facts, recording an alarming increase in crime four times greater than the growth in population, demonstrate that something is seriously wrong.

What can be done to correct the situation?

In improving the administration of criminal justice, several areas are involved: the need to clarify police powers with respect to detention, questioning and arrest of persons suspected of crimes; the wire-tapping dilemma, which has been described by former Attorney General Robert Kennedy as "chaotic;" the desirability of broadening the power of prosecutors to grant immunity and thereby compel a witness to testify; the problem of publicity, through the press and other media, which may prejudice a defendant; the desirability of permitting appellate review of sentences as well as questions of guilt and innocence; the need for far more intensive training and upgrading of police forces; and the problem of providing adequate representation for indigent defendants.

These are some of the pressing problems relating to the administration of criminal justice, and to the responsibilities of public officials, police, judges and lawyers. There is good reason to believe that much can and should be done by all of these. We need stronger laws and stricter enforcement of them; better trained and more efficient police; and certainly we need clearer guidelines for police action, especially in arrests, detention and interrogation. Much remains to be done in the area of sentencing, probation and parole. We also need judges highly qualified to administer the criminal laws, and lawyers—prosecutors and defense counsel—who are sensitive always to their public responsibilities.

But even the best laws administered by the ablest public authorities, and the wisest judges and lawyers, cannot solve these difficult problems alone. The underlying cause of crime is far deeper than faulty law enforcement and faltering administration of criminal justice. Perhaps the most fundamental cause is an intangible one—a public attitude toward morality, ethics and individual responsibility which results in disrespect for law.

At all levels of society we need a sounder sense of values, with a far deeper concern for ethical and moral values.

Unfortunately, we live in an age of excessive tolerance. This is a risky thing to say because tolerance can be a virtue when it means absence of prejudice. But there is another kind of tolerance which accepts, if not affirmatively condones, levels of personal conduct and attitudes which are marginal or clearly bad in terms of the ethics of the individual as well as the welfare of society.

I am not talking about a tolerance or a condoning of serious crimes committed by professional crim-

inals. Few people consciously do this. Rather, I have in mind the cynical and apathetic attitude of our time which tolerates marginal and certain unlawful conduct and which leads to disrespect for law and for the rights of others.

There are many examples, ranging from over-indulgence of children in the home to affirmative participation in lawlessness. They include: juvenile drinking; flagrant violation of traffic laws; flouting of obscenity and pornography laws; illegal gambling; cheating on claims against insurance companies; circumvention of divorce laws; disregard of antitrust laws; condoning labor union violence; and the tendency of government itself—to various levels—to apply double standards and to genuflect to political influence and expediency.

For the most part, these are not the crimes that appear in FBI statistics. Indeed, most of these examples do not necessarily involve persons who are ever charged with crime. But the attitude which condones or tolerates this type of conduct contributes to a general climate of deteriorating respect for law and order.

Although in a different category from the foregoing examples, no one can mention disrespect for law today without thinking apprehensively of our troubled race relations. There have been tragic and frequent instances of lawlessness on both sides—and in various sections of our country. It is especially deplorable that much of this disregard for law and order has related to our schools.

In view of the disobedience of court orders by public officials, sit-ins at school boards, unlawful boycotts and demonstrations, and other racial disorders by adults, it is not surprising that crime and delinquency by children within the schools appear to be increasing sharply.

One of the root causes of lawlessness, then, is excessive tolerance by the public generally—a tolerance or acceptance of sub-standard, marginal or even immoral and unlawful conduct. An inevitable byproduct of this excessive tolerance is the lack of respect—for authority, for law, and for the rights of others. No one has put this point more forcefully than J. Edgar Hoover, who speaks of disrespect of law and order as a "tragic moral sickness."

Moral sickness and the lawlessness that results from disrespect for law and for the rights of others is a deep personal tragedy for the victims and a degradation for our nation.

The problems and situations that are contributing to the upsurge in America's crime rate are, in part at least, a product of the revolutionary age in which we live and the forces of change and unrest that are sweeping the world. It is evident that solutions will not come easily or quickly.

We must nevertheless try to find solutions and apply them on the broadest possible front. How? By revitalizing Judeo-Christian ethical standards;

by insisting on observance of law by citizens and public officials alike; by a stricter enforcement of laws and improvements in the administration of criminal justice; by demanding that the rights of society not be subordinated to the rights of those who prey on society; and by encouraging, in the home, in the schools and at all levels of society a higher sense of individual duty and a genuine respect for law and order.

We must, of course, also strive to eliminate or minimize some of the contributing causes—slums, lack of job opportunities, discrimination and inadequate education.

In all of this, ordinary citizens—and especially leaders of community thought—have a personal and not inconsiderable responsibility. In a democratic society, where the people themselves determine the norms of ethical conduct, we must hope and believe that individual and collective action by thoughtful and patriotic citizens will in the long run be productive. ○

About the Author

Lewis F. Powell, Jr., who is a member of the board of directors of Ethyl Corporation, was installed as the 88th president of the American Bar Association this summer, climaxing a lifetime of service to the organized bar. A lifelong Virginian, Mr. Powell was born in Suffolk in 1907. He was graduated from Washington and Lee University, at Lexington, with an undergraduate (B.S.) degree in 1929 and a law (LL.B.) degree in 1931, and earned a master of laws (LL.M.) degree at Harvard University Law School in 1932. Mr. Powell has been awarded honorary doctor of laws degrees (LL.D.) by Hampden-Sydney College and by Washington and Lee. He was admitted to the Virginia bar in 1931, and has been a member of the Richmond firm of Hunton, Williams, Gay, Powell and Gibson since 1938.

During World War II, Mr. Powell served overseas as a combat and staff intelligence officer with the Army Air Force and was awarded the Legion of Merit, Bronze Star and Croix de Guerre.

Mr. Powell has served as chairman of the Richmond Public School Board, chairman of the commission which wrote the charter introducing the city manager form of government in Richmond, and a member of the Governor's Advisory Council on Virginia Economy.

Currently, Mr. Powell is a trustee and counsel of Richmond Memorial Hospital, trustee of Hollins College and of Washington and Lee University, a member of the Virginia State Board of Education, and a trustee, member of the executive committee and general counsel of Colonial Williamsburg, Inc.

OUTLOOK

S. D. FLEET ELECTED TO NEW POST; WILL COORDINATE MARKETING



S. Douglas Fleet, executive vice president—marketing of Albemarle Paper Manufacturing Company, Ethyl Corporation subsidiary, and a director of Albemarle and Ethyl, has been elected a vice president of Ethyl. In his new position, Mr. Fleet will assume certain marketing coordination functions in the overall Ethyl organization and will continue many of his former duties in marketing management at Albemarle. His headquarters will remain in Richmond. A native of Glen Allen, Va., Mr. Fleet was educated in the Richmond public schools and attended the College of William and Mary. He joined Albemarle as a sales representative in 1925, was named sales manager in 1945 and vice president in 1948. He is elected executive vice president—marketing in February of this year.

S. ROBERTS, VETERAN EMPLOYEE, HEADS ENGINEERING DEPARTMENT



G. Samuel Roberts, a veteran of 23 years' experience, has been promoted to chief engineer of Ethyl in charge of the Company's Engineering Department, with headquarters at Baton Rouge, La. He succeeded A. Clarke Rickard, Jr., who has retired. Mr. Roberts is a native of Missouri, graduate of the University of Missouri with a B.S. degree in mechanical engineering, and a graduate of Advanced Management Program at Harvard University. He joined Ethyl Corporation in 1941 and has been manager of the general engineering section of the Engineering Department for the last 10 years. The Engineering department has worldwide responsibilities for the company. It designs and supervises construction of new production plants and other facilities and provides engineering services.

GOBLE W. BRYANT TO HEAD ALBEMARLE OPERATIONS



Goble W. Bryant, president of Interstate Bag Company, Walden, N.Y., shopping bag division of Albemarle Paper Manufacturing Company, Ethyl Corporation subsidiary, has been named executive vice president and general manager of Albemarle.

In this new position, Mr. Bryant is in charge of all Albemarle operations and makes his office at the Albemarle headquarters in Richmond, Va.

Mr. Bryant is a native of Denton, Texas. He attended Dallas public schools, Texas A & M College, and the United States Military Academy at West Point, N.Y., from which he was graduated in 1949 with a commission as a second lieutenant. He served as an officer in the Army for six years, including combat duty in Korea, and was promoted to the rank of captain. He resigned from the Army in 1954 to join Interstate. Mr. Bryant became plant manager at Interstate in 1955, executive vice president in 1962 and president in 1963.

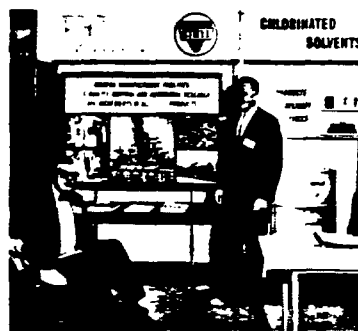
ALUMINUM ALKYLs SHIPPED IN SPECIALLY DESIGNED TANK TRUCKS

Aluminum alkyls and related compounds manufactured by Ethyl are now reaching industrial consumers in new, specially-designed tank trucks, as well as in railroad tank cars, metal cylinders and smaller containers.

The tank trucks—the first of their kind for the transportation of these chemicals—are engineered and built for maximum safety under all types of operating and service conditions. They are equipped with convenient top-loading ports to eliminate potential handling hazards and with heating systems to keep contents at desirable temperatures in transit.



Such highly reactive compounds as ethyl aluminum sesquichloride, triisobutyl aluminum and tri-norpropyl aluminum are shipped to plastics and rubber manufacturers and other users in the new trucks from Ethyl's special chemicals plant at Orangeburg, S.C.



THE STORY OF THE QUALITY and effectiveness of Ethyl's chlorinated solvents was presented pictorially, verbally, in literature and display materials at exhibits at the Laundry and Cleaning Allied Trades Association convention in New York in August and at the American Society for Metals show in Philadelphia in October.

The exhibits were designed to publicize the "Ethyl" name and reputation, in what for the Company is a new field, and to explain what Ethyl's research, manufacturing, quality control, delivery and service facilities and know-how can mean to industrial and commercial chlorinated solvents consumers.

A yellow and blue, 55-gallon drum in which "Ethyl" perchlorethylene—the dry cleaning solvent—is shipped was featured at the Laundry and Cleaning convention presentation. All three "Ethyl" chlorinated solvents—perchlorethylene, trichlorethylene, and 1,1,1-trichloroethane—which are used in industrial degreasing and metal finishing, were included in an expanded display at the Metals show.

"ETHYL" ANTIOXIDANT 703 HIGHLY EFFECTIVE IN NEW BEADED FORM

A new beaded form and a 40 percent reduction in the selling price of "Ethyl" Antioxidant 703—made possible by a major manufacturing breakthrough—and the successful results of recent tests are creating new interest in widespread commercial use of the additive. Beaded 703 is effective in jet fuels, kerosene, diesel fuels, domestic and industrial fuel oils, marine fuels, bunker oils, and in greases, industrial oils, rubber and plastics.

The availability of an effective, economical antioxidant is especially important to refiners who must maintain large inventories of fuel oils and related products for extended periods to meet peak demands in winter months. "Ethyl" Antioxidant 703 beaded is particularly effective in helping maintain stability and in preventing the formation of sludges

or deposits in fuel oils in storage. As a matter of fact, in recent tests in 10 different fuels, 703 consistently provided superior results, outperforming competitive products. Its efficiency, coupled with its new low price, increases the additive's attractiveness from a cost-effectiveness point of view—an important consideration for refiners processing large quantities of product.

Since "Ethyl" Antioxidant 703 beaded is added to fuel oils at refineries, it provides continuing oxidation protection from manufacturing through storage, shipment and right up to the time the products are used.

"VISQUEEN" NETTING USEFUL IN BUILDING AND AGRICULTURE

"VisQueen" netting, a new, strong lightweight polypropylene netting sold by the VisQueen division of Ethyl Corporation, is finding many new uses in building and agriculture.

Fashioned from knitted polypropylene monofilaments for added strength, the black plastic netting is especially useful for tie-downs on farms and construction sites where weight, portability, cost, wear and weather resistance are important considerations. It is ideal for protecting fruit trees and berry bushes from birds, for poultry enclosures, and for snow fencing. It also can be used for such diverse applications as cargo covers, plastic film support, and underwater netting to contain fish or exclude debris from beach areas.

The sizes of the mesh openings of "VisQueen" netting make possible the direct application of insecticides, pesticides and other sprays to crops beneath. And since the netting is non-absorbent, there is no danger of crop damage from the accumulated weight of rainfall as in the case of other cover materials.

Unlike ordinary net materials, "VisQueen" netting does not rust, rot or mildew and is completely resistant to water and common chemicals. These durability factors assure extended product life, reduce replacement costs and eliminate the need for maintenance.

"VisQueen" netting cannot scratch or infect animals, nor cut or bruise hothouse or farm plants.

Available in compact rolls, which weigh less than 20 pounds and can be extended to 23 by 100 foot nets, the netting reduces installation time and labor requirements because of its width, light weight, flexibility and handling ease. Additional segments can be added quickly and easily to increase the size of nets.

JOHN F. KOEHNLE VICE PRESIDENT OF ETHYL CORPORATION OF CANADA



John F. Koehnle was appointed vice president of Ethyl Corporation of Canada Limited and head of the Petroleum Additives department, effective October 1. Mr. Koehnle succeeds H. J. Philp, vice president, who retired on the same date after 15 years' service. Mr. Philp will continue with Ethyl of Canada as a director and consultant.

Mr. Koehnle joined Ethyl of Canada in April of this year after 17 years service with Ethyl Corporation in the United States, most recently as manager of the San Francisco district. Prior to joining Ethyl, he served as an officer in the U. S. Navy during World War II. Mr. Koehnle holds a bachelor of science degree from the University of San Francisco and completed his studies at the Graduate School of Business, Stanford University, Palo Alto, Calif.

FRANK A. HOWARD DIES; WAS FOUNDER AND DIRECTOR OF ETHYL



Frank A. Howard, a founder of Ethyl Corporation (Delaware), a director of that company from its formation in 1924 until 1962, and a director of Ethyl Corporation (Virginia) for the last two years, died on September 25 at the age of 74.

A graduate of George Washington University with B.S. and LL.B. degrees, Mr. Howard was an eminently successful engineer, lawyer and inventor, and held almost 100 patents. At the time of his death, he was an industrial research consultant and chairman of the board of the Sloan-Kettering Institute for Cancer Research, of which he also was a founder.

For more than 25 years with Standard Oil Company (New Jersey) and its affiliates, Mr. Howard was active in the development of methods for manufacturing tetraethyl lead, oil refining processes, and in the production of petroleum alcohol and synthetic rubber. He organized and twice served as president of Standard Oil Development Company (now Esso Research and Engineering Company), and was a vice president of the parent company responsible for research,

patents and chemical developments of Standard Oil and its affiliates.

Mr. Howard was a trustee of George Washington University, the Alfred P. Sloan Foundation, and the Woods Hole Oceanographic Institution and a member of several professional societies. He was a Chevalier of the Legion of Honor of France and held an honorary D.Sc. degree from George Washington University.

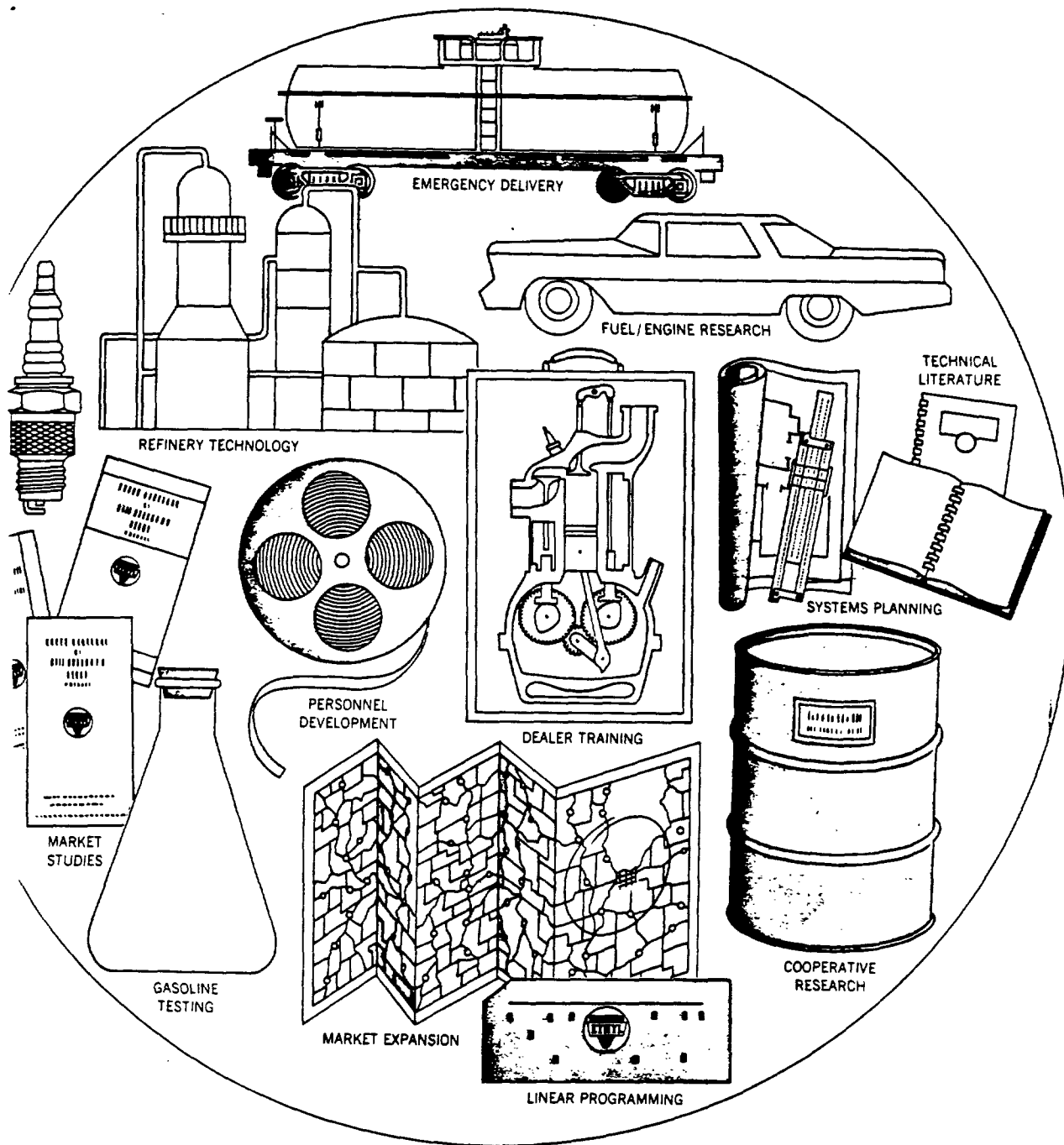
"VISQUEEN" FILM USED TO PACK ONE-TON COTTAGE CHEESE SHIPMENTS

The liner in a huge, new corrugated container, especially designed for a leading dairy products company for shipping one-ton quantities of cottage cheese, is made of "VisQueen" polyethylene film, made by Ethyl's VisQueen division. The "package," which has provided substantial savings for the company since it replaced 40 50-pound-capacity tin containers for ton shipments of cottage cheese, was awarded a silver ribbon at the 1964 fibre box competition sponsored by the Fibre Box Association.

The king-size, leakproof, double-wall polyethylene liner was made from "VisQueen" film by Sto-Cote Products, Inc., Chicago, specialists in large poly bags, shrouds and liners. "VisQueen" film is approved for food packaging by the U. S. Food and Drug Administration and is widely used for such purposes.



ETHYL-DEVELOPED SYSTEMS for automatically monitoring and or controlling the octane quality of gasoline blends at refineries are currently being explained to refiners throughout the country by Company representatives. The systems, discussed in a paper at the National Petroleum Refiners Association meeting in Casper, Wyo., in October, are intended primarily for use with inline blending operations, but some of their features also can be used in batch blending. Ethyl is making designs and procedures of the systems available to refiners as a service to the oil industry.



They're all part of Additive **E**

Additive E is Ethyl's broad service program for oil refiners—essential services delivered as a plus with shipments of "Ethyl" petroleum chemicals.

Additive E has many forms. Some are human: Product Service Engineers, Linear Programming Specialists, Refinery Technologists, Automotive Engineers. Some are paper and ink: Gasoline Sales Reports, Market Expansion Programs, Technical Reports.

Additive E is a built-in Ethyl extra which helps in many ways. It often can reduce refiners' costs, provide them with otherwise unobtainable market and technical data, and help them maintain a strong competitive position.



Kick your tires! Even if they're ready to be replaced they still have plenty of bounce. Tire manufacturers preserve life in rubber by adding antioxidants. Ethyl produces such antioxidants by an exclusive process. Other industries use them to stabilize oils, make asphalt tile

last longer. We also make chemicals that stop engine knock. Papers that wrap, bag, sack or box. Pipe that's made of non-corrosive plastic. These are some of the things we're doing today. Where will Ethyl products turn up next? Wherever research and our imagination take us.

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WINTER 1965



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TABLE OF CONTENTS

In "Ethyl" Chemicals . . . Quality Counts! . . .	2
Caustic Soda, Chemical Workhorse	6
Shortcuts to the Syrup Jug	10
The Ups and Downs of Prices	14
Plastic Bottles by Vypak	18
The 100 Octane Story	22
Bacteria Can Be Beneficial	24
Outlook	27
Shrink Big, Shrink Small	29

ON THE COVER

Samples of a few of the many chemicals in Ethyl's expanding product line awaiting quality control tests and analysis. For a part of the story of the Company's comprehensive quality control program, see "In Ethyl Chemicals . . . Quality Counts!" on pages 2-5.

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*manufacturers of petroleum chemicals,
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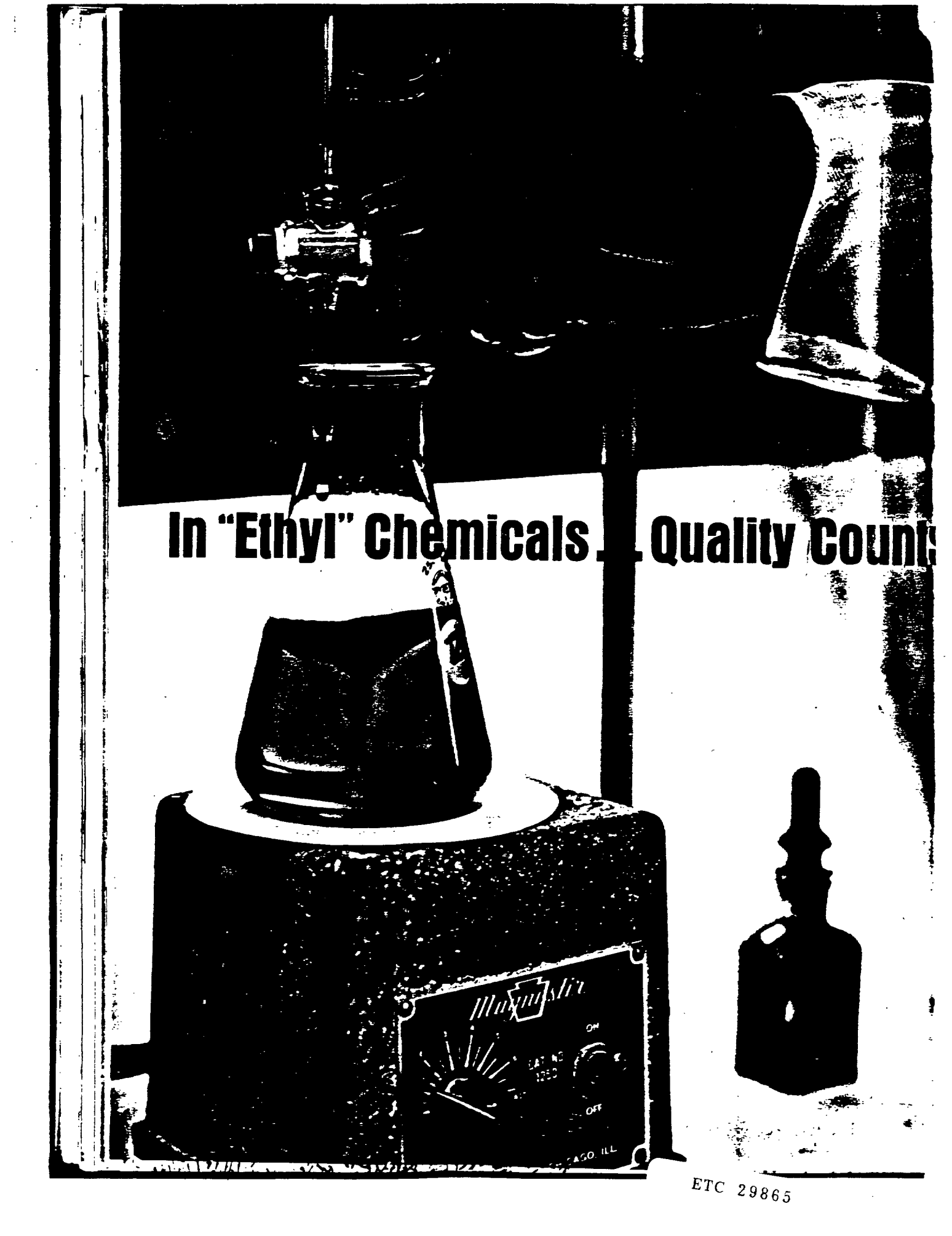
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ARRIVING...

things that precede the
inment of knowledge are an
mind and an eagerness
arn. Seldom is either enough by
f. Ethyl's research laboratories
taffed by men receptive to
ideas who believe they can never
enough. Their thirst for
ledge helps make Ethyl a
ner in its customers' progress.

ETC 29864



In "Ethyl" Chemicals. Quality Counts

ETC 29865



Samples are taken from process streams frequently to be checked in laboratories for fidelity to high standards.

Company's varied products meet rigid specifications

FROM SALT BRINE TO SODIUM; from ethylene to ethyl chloride; from pig lead to tetraethyl lead; from every raw material, through every manufacturing step, to every intermediate and finished product, quality control is an essential ingredient of all "Ethyl" chemical products.

At the Company's chemicals manufacturing plants at Baton Rouge, La.; Houston, Texas; Orangeburg, S.C.; and Sarnia, Ontario, skilled production workers and laboratory technicians, using modern analytical methods and equipment, perform thousands of checks daily to assure purity and consistent high fidelity to rigid product specifications.

Ethyl has long prided itself on its efficient distribution system, which provides customers with dependable, on-time delivery of everything from a pound to a tank car, barge-load or tanker full of "Ethyl" chemicals. But quality control comes first—products must be right before shipment.

Continuing tests made before, during and after the manufacture of antiknock compounds at the Ethyl manufacturing center at Baton Rouge are typical of those made on all products at all plants. Well aware that modern gasoline is a highly developed, complex chemical compound and that modern automobile engines are finely adjusted, precision power plants, Ethyl appreciates the importance of high quality antiknocks to customer oil refiners and ultimately to motorists.

Accordingly, almost 1,000 physical, chemical and instrumental checks—over and above those made by automatic monitoring devices which operate continuously—are made every day at Baton Rouge on the raw materials, intermediates and finished products of antiknocks. Several hundred tests are made by painstaking production personnel and more than 500 tests by the experienced staff of the quality control laboratory.

Just as a silk purse cannot be made from a sow's ear, neither can quality chemical products be made from sub-standard ingredients. So antiknock compound quality control starts with metallic lead, ethylene gas, salt brine and all other raw materials.

Samples from incoming shipments of lead are examined chemically and spectographically to make certain that such impurities as bismuth and antimony do not exceed the minute quantities permitted in specifications.

Samples of crude salt brine, arriving by pipeline from nearby wells, are carefully analyzed. After processing to eliminate undesirable sulfates, carbonates and other contaminants, the brine is sampled again to confirm its purity.

Precisely measured fractions of the ethylene gas stream, incoming also by pipeline, are extracted automatically and analyzed by vapor chromatography to insure specification material. (Modern vapor chromatography used in this and other qual-

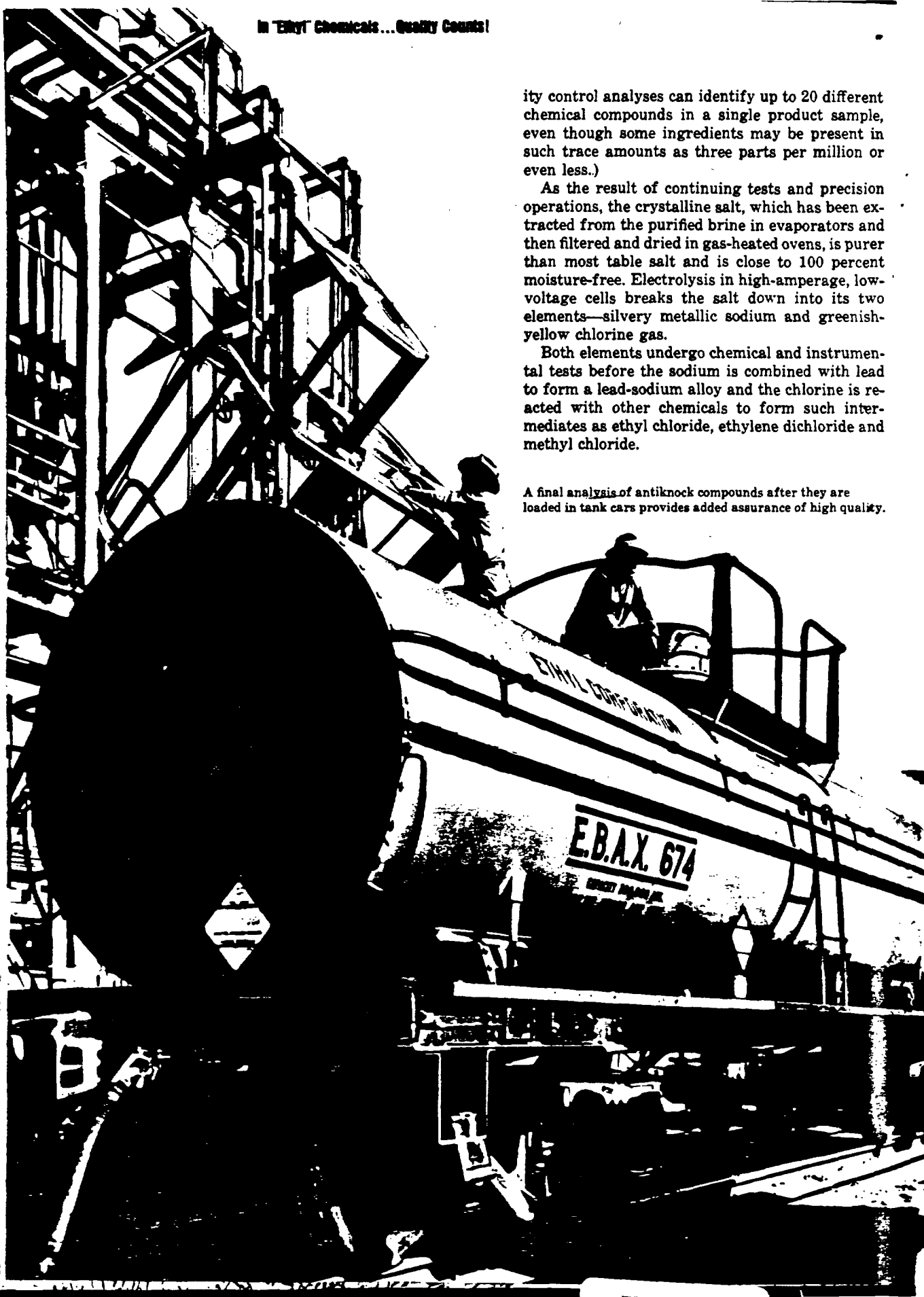
In "Ethyl" Chemicals...Quality Counts!

ity control analyses can identify up to 20 different chemical compounds in a single product sample, even though some ingredients may be present in such trace amounts as three parts per million or even less.)

As the result of continuing tests and precision operations, the crystalline salt, which has been extracted from the purified brine in evaporators and then filtered and dried in gas-heated ovens, is purer than most table salt and is close to 100 percent moisture-free. Electrolysis in high-amperage, low-voltage cells breaks the salt down into its two elements—silvery metallic sodium and greenish-yellow chlorine gas.

Both elements undergo chemical and instrumental tests before the sodium is combined with lead to form a lead-sodium alloy and the chlorine is reacted with other chemicals to form such intermediates as ethyl chloride, ethylene dichloride and methyl chloride.

A final analysis of antiknock compounds after they are loaded in tank cars provides added assurance of high quality.



ETC 29867

The basic process involved in the manufacture of tetraethyl lead and tetramethyl lead, the active ingredients in "Ethyl" antiknock compounds, is a closed vessel reaction between the lead-sodium alloy and ethyl chloride or methyl chloride. Mixed lead alkyls contain specified proportions of both TEL and TML.

Automatic instruments control critical temperatures and pressures during this manufacturing step. After the reaction is completed, the TEL and TML are separated from other reaction products by steam distillation and filtered in wash houses. Then the heavy clear liquids—nearly twice the weight of water—undergo thorough laboratory scrutiny and exact amounts of them are weighed before they are mixed with other antiknock compound components to make 50,000-pound batches.

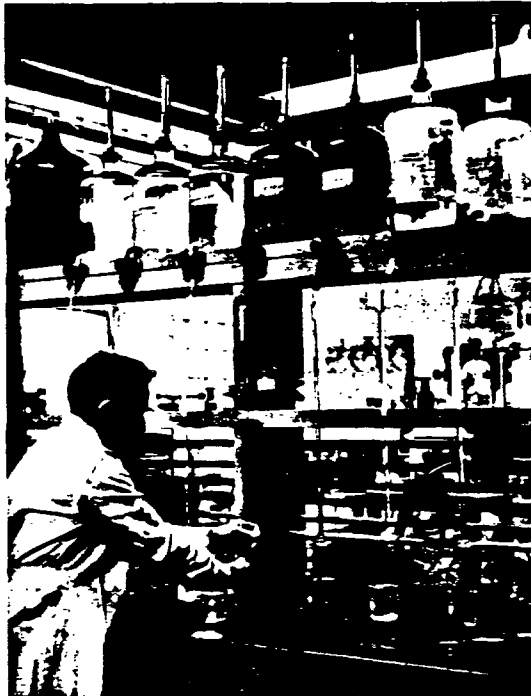
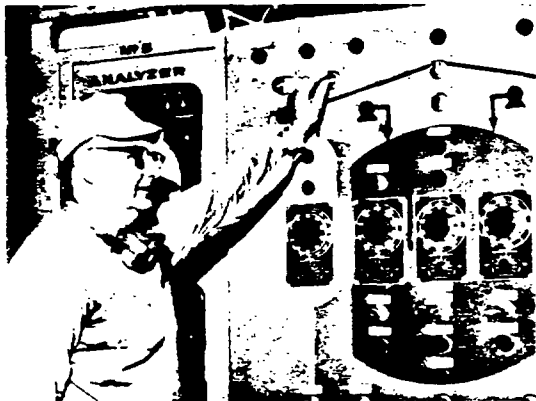
The other components—ethylene dichloride and ethylene dibromide, scavengers to prevent the formation of deposits in automobile engines, and dyes to provide distinctive coloring—also are subjected to precise quality control evaluations at every step from raw material to finished compound.

The purity and proportions of the ingredients

of all finished batches of antiknocks are further evaluated by chemical tests and sophisticated instrumental analysis. When the control laboratories have given their OK—and only then—are antiknock compounds finally filtered and pumped to weigh tanks and later into tank cars and drums for shipment.

But rigid Ethyl quality control still is not completed. A systematic procedure for periodically analyzing samples from loaded tank cars and drums provides still another assurance to customer oil refiners and to motorists that the "Ethyl" antiknock compounds in their gasoline will be everything that top-quality raw materials, modern chemical manufacturing methods, skilled operators and precise controls can make them.

Painstaking procedures and high standards, similar to those applied to antiknock compound manufacturing at Baton Rouge, are employed on all products at all plants. It's these procedures and standards that have earned and retained for "Ethyl" chemicals a worldwide reputation for quality, for purity and for fidelity to rigid specifications. ○



Skilled operators, modern, efficient instrumentation, automatic monitoring devices and well staffed and equipped control laboratories, which test raw materials, analyze process stream samples and make exhaustive evaluations of finished products, assure Ethyl's customers of consistently high quality chemicals. At the Baton Rouge plant alone, some 1,000 scientific checks are made daily.

Caustic Soda, Chemical Workhorse

*Ethyl is important producer
of versatile compound
used in many diversified
industrial applications*



IN THE FAST-MOVING industrial technology of the mid-20th century, familiarity is far more likely to breed respect for a product's potentials than contempt. At least that's the case with caustic soda, one of the oldest, best known, most widely applied and most versatile basic chemicals.

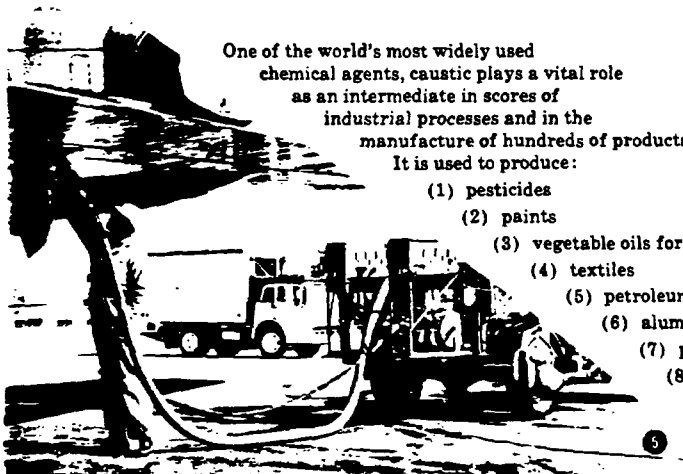
Known and used since ancient times, caustic soda—or, more technically, sodium hydroxide—is now produced in multi-million-pound quantities in some 430 plants around the world. A powerful alkali, it plays a vital part in the manufacture of chemicals, pulp, paper, textiles, soaps, detergents, oil products, rubber, metals, synthetics and other modern materials.

With established applications continuing to grow, and with caustic soda's use anticipated in a variety of new products, it is generally agreed that the chemical compound's market will continue to expand. The United States, currently the world's largest producer and consumer, with an annual output (1964) of 6.3 million tons and a per capita consumption of 59 pounds, is projecting a 30 per-

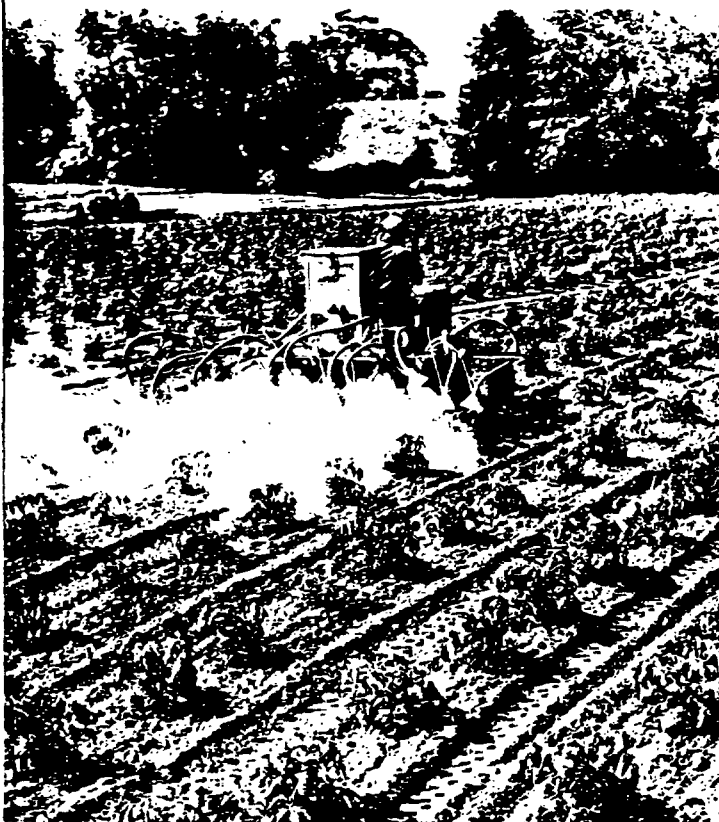
One of the world's most widely used chemical agents, caustic plays a vital role as an intermediate in scores of industrial processes and in the manufacture of hundreds of products.

It is used to produce:

- (1) pesticides
- (2) paints
- (3) vegetable oils for cooking
- (4) textiles
- (5) petroleum products
- (6) aluminum
- (7) plastics
- (8) rayon used in automobile tires



Caustic Soda, Chemical Workhorse



Caustic soda plays an essential part in the production of phenols for weed killers and in purifying metallic lead

cent increase to 7.8 million tons annually by 1970. This represents an annual increase of about five percent.

Most caustic soda is manufactured by the electrolysis of salt brine. This process yields chlorine, also a widely used basic chemical, and a caustic solution. The latter usually is evaporated and purified to meet commercial standards. An older production method of decreasing importance involves the combining of solutions of soda ash and lime. The finished product, available in different concentrations, is shipped as a liquid or as a white, crystalline solid.

For the past two years, Ethyl Corporation has been an important producer of caustic soda at its chemicals manufacturing center at Baton Rouge, La. A modern, multi-million-dollar plant for the production of both caustic and chlorine by the electrolysis of salt brine went into operation there in January 1963. Previously, the Company had had extensive experience in the electrolysis of salt, using the process for a number of years to produce metallic sodium and chlorine.

How Ethyl Plant Works

In the Baton Rouge caustic facilities—designed, engineered and built under the supervision of Ethyl personnel—salt brine is broken down into chlorine gas and a caustic cell liquor in a battery of electrolytic cells. At the time of their construction, these cells were believed to be the largest of their type in commercial use for the electrolysis of brine.

The caustic cell liquor is purified to commercial specifications and marketed to industrial consumers as a 50% sodium hydroxide solution. It is shipped from Baton Rouge in tank car, tank truck and barge quantities. The chlorine is used by the Company to produce ethyl chloride, methyl chloride and ethylene dichloride, ingredients of "Ethyl" antiknock compounds; to make vinyl chloride monomer and vinylidene chloride monomer, plastic intermediates; and as a basic chemical for chlorinated solvents.

Ethyl caustic soda is used by the paper, textile, aluminum, oil refining, chemical and related industries.

Wood pulp processors "cook" wood chips in a watery solution containing the alkali. It frees essential fibers from the wood's lignin, so that finished pulp can be made into paper or other cellulose products. Ethyl expects that the nation's pulp requirements will continue to provide a sizeable market for the Company's caustic production. This trend is typical, in that expansion of established uses for the chemical compound are most likely to represent principal areas of use rather than newly developed or possible potential applications.

Worldwide, more caustic soda is used in chemical processing than for any other commercial purpose.

The compound serves as a chemical intermediate and as an activating, separating, reducing, dissolving, drying, water-softening, recovery or other agent at some point or other along many process roads. It plays an essential part, for example, in the production of phenols used to make plastic resins, synthetic fibers, weed killers and pesticides, paints, varnishes, pharmaceuticals and antioxidants. The alkali also has roles in manufacturing dyes, cellophane, insulating materials, ceramics, disinfectants, adhesives, paint removers, certain acids and some types of rubber.

The manufacture of cleansing agents—soaps, detergents, degreasers and dry cleaning fluids—is another major field for caustic soda consumption. In fact the crude soaps of early times were made by boiling animal fats in caustic solutions, which were prepared by combining such raw materials as seaweed or wood ashes with lime. Yesteryear's rural Americans produced soap at home in much the same way until the 1890's, when caustic soda became more plentiful commercially by the electrolysis of salt brine.

The textile industry is expected to continue requiring a sizeable percentage of the United States' caustic soda production. In this field, it is used for scouring, bleaching, creping, mercerizing, dye conditioning and treating fabrics for flame resistance. In spite of competition from newer synthetics, rayon owes much of its success in the tire cord market to effective and economical processing with the chemical compound.

In petroleum refining, caustic soda treatment is an established procedure for neutralizing acids and eliminating other undesirable impurities from gasoline, jet fuels, heating and diesel oils, some lubricants and certain specialty products. Although new

methods and equipment are cutting down the oil industry's caustic soda requirements in some areas, demand is expected to remain sizeable. Meanwhile, the alkali's position in vegetable oil refining is considered secure.

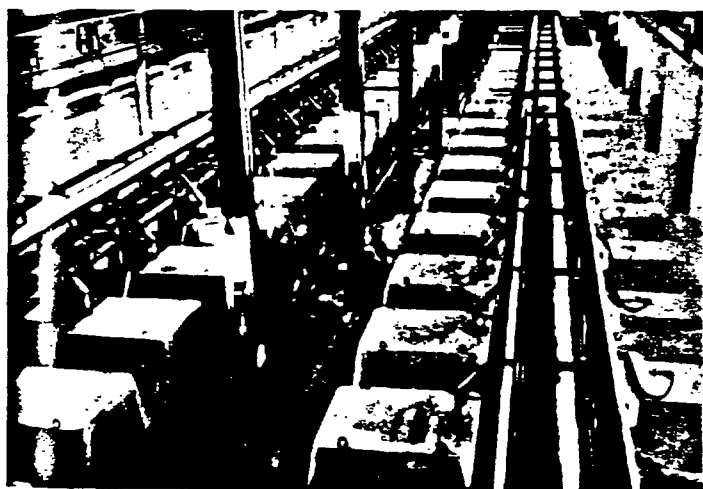
Bulk quantities of caustic soda also have applications in metallurgy, another principal market for Ethyl's production. Leaching bauxite ore with the chemical compound as a preliminary step in aluminum processing is widely practiced with effective economy. This means not only that caustic will continue serving the aluminum industry, but also that its use for this purpose will grow in proportion with the metal's currently burgeoning market. Lead purification is expected to continue utilizing limited quantities of the alkali.

And so it goes. In industry after industry, and product after product, caustic soda effectively performs a variety of significant functions.

Plays Part in Wonder Products

The compound's far-reaching importance is underscored in a recent declaration by the Manufacturing Chemists' Association—that synthetic fibers, rubbers, plastics and resins, agricultural chemicals, detergents, metals and medicines are the seven wonders of modern chemistry. Caustic soda, and its companion product, chlorine, play major roles in making these wonder products possible.

Delegates to the recent International Congress of Industrial Chemistry at Bordeaux, France, heard an even more positive statement: "Chlorine and caustic soda may well be called a yardstick of the world's living standard" because "with untiring activity and wide affinity, these two products are the most widely useful with which the chemist works."



Ethyl manufactures caustic soda by the electrolysis of salt brine in these cells at its chemicals plant at Baton Rouge, La.



Using portable, gasoline-powered drills, farmers can cut tap holes in hard maple tree trunks far faster and with much less effort than hand drilling required.

Shortcuts to the Syrup Jug

Plastics and petroleum increase speed and efficiency in maple production

BY THOMAS A. HOGE

AS THE SAP BEGINS TO RISE in the sugar maple groves, farmers from the Atlantic coast to the Midwest are getting ready to harvest the colorless liquid and turn it into rich amber syrup. But in many areas oldtime drip buckets and wood-fired evaporators are giving way to the efficiency of plastics and petroleum.

Gasoline-powered drills bore into the same trees our forefathers laboriously tapped with brace-and-bit. Sap is collected in plastic bags and buckets or carried through plastic tubes to collection tanks. Evaporators heated by fuel oil boil down the 30-40 gallons of sap needed for each gallon of pure syrup.

Each year, Americans pour nearly three million gallons of maple syrup over pancakes, waffles and ice cream, not to mention the tide of maple cream that flows into puddings, frostings and the little maple candies that children love. And there is the coarse grain sugar used for flavoring venison, fish and wild rice.

Making the maple syrup that is the source of these delicacies has been as traditional in America as the clambake and husking bee — ever since a friendly Indian tribe showed white settlers how to harvest from the sugar bush.

In the days when our economy revolved around the farm, entire families took part in making syrup. The menfolk hauled sap buckets by shoulder yoke, emptied them into ox or horsedrawn sled or wagon and lugged the cargo to the sugarhouse. Inside, the women ladled the bright liquid into cauldrons while youngsters stoked smoky fires with maplewood.

Early sugarmaking seemed romantic when depicted in Currier and Ives prints, but it was grueling toil. Many farmers gave it up because of the grind, increasing labor costs, and an uncertain harvest season that lasted from two to six weeks — depending on the weather. Consequently, maple syrup has almost always been one of America's few farm commodities where demand exceeds supply.

The same factors are also responsible for the big changes that are taking place in many maple states.

Vermont, which milks its lush groves of 450,000 gallons of syrup annually, was for generations the leading producer. New York, which has modern-



Clean, lightweight, durable plastic film bags, easily attached to trees, are replacing rust-prone metal sap buckets in many of the country's modern maple orchards.

Shortcuts to the Syrup Jug



Plastic tubing, gasoline-powered pumps and truck-mounted sap collecting tanks are among the efficient "shortcuts to the syrup jug" that are gaining in popularity.

ized many of its big groves, suddenly swung into first place in 1962, with an output of 526,000 gallons, and has held the lead.

Nine other states, from Maryland to Minnesota, also do a lively business and the Canadian provinces of Quebec and Ontario are major producers. But the United States Department of Agriculture has revealed that most states are tapping only five to ten percent of their trees despite the demand for maple products.

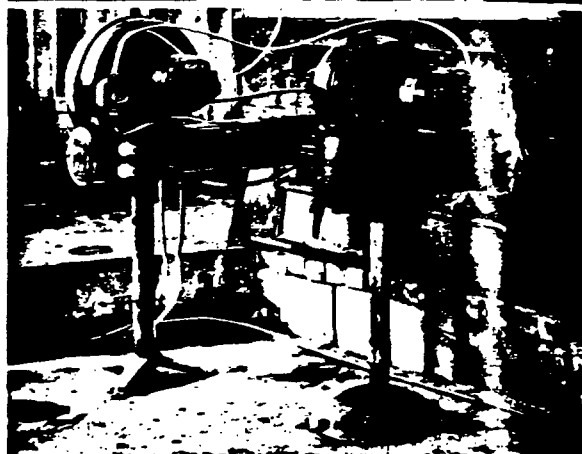
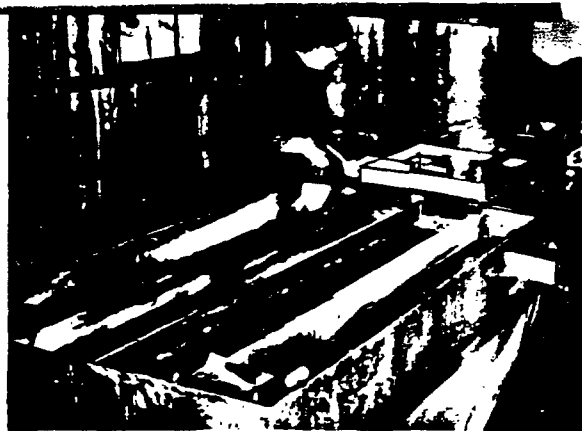
Convinced that consumption would soar if more syrup were available, the USDA has teamed up with industry to develop new production tools and methods, and a more efficient marketing system than the roadside stands that are the only outlets for many farmers.

Leaders in the campaign to modernize the sugar bush include two veteran forestry specialists: Fred W. Winch, Jr., of the New York State Conservation Department, and Raymond T. Foulds, of the University of Vermont Extension Service.

"The maple country is changing," Mr. Winch said recently. "Machines and plastics are invading the forests, and maple producers are searching for new ways to produce a better product at less cost. Ingenuity, plus help from industry, has brought these changes."

Mr. Winch and his aides have hammered away at the theme that modern methods pay off, citing facts, figures and such specifics as:

- Power drills that do the work of a brace-and-bit in one-fourth the time and with far less effort.



Oil burners provide steady, easily-controlled heat for sap evaporators that hand-fed wood fires cannot duplicate.

- Polyethylene film bags and polyethylene buckets that are sanitary and transparent; the latter quality permitting the sun's rays to kill any bacteria that might be lurking in the sap.
- Gravity gathering lines of plastic tubing that do away with the time, toil and cost of laying metal pipe gathering lines or getting the sap from tree to vapor pan by bucket, and also eliminate any danger of contamination.

In addition, plastics manufacturers have produced polyethylene film liners to keep metal or wooden containers clean and rustproof. Concrete storage tanks also are lined and covered with polyethylene film to protect contents from foreign substances.

In some areas, tree trunks are being wrapped in polyethylene film to add warmth and increase sap flow, and plastic sap spouts are replacing wooden and more rustprone metal models.

The biggest stride has been the switch to oil heat. This has eliminated cutting and hauling wood, stoking fires, and the danger of overcooking the syrup. It also has brought a new, cleaner and more comfortable look to sugarhouses, which once reeked of smoke and were cluttered with wood and ashes.

Changes sometimes come slowly in the hills of New England, but syrup makers are becoming convinced that oil not only is cheaper and safer but

that its steady, controlled heat insures a more delicate flavor.

Evidence that modern methods have taken hold in Vermont, for example, is seen in the fact that, while the number of individual syrup producers has declined sharply in the last decade, annual output has held steady. About three dozen big processors have modernized their plants, are buying sap over large areas, and are accounting for a large part of the state's production.

Modern processing also has caught on in Wisconsin—now the third state in maple syrup production. The Four Seasons Maple Camp in Luxemburg was the first U. S. producer to convert to oil, state authorities claim. The huge Reynolds Sugar Bush outside Aniwa taps more than 50,000 trees with gasoline-powered drills. Miles of plastic tubing snake through Reynolds groves, carrying sap to collection tanks where it is fed into big evaporators fired by oil burners that use some 3,000 gallons of fuel oil daily.

Fleets of 4,000-gallon tank trucks haul Wisconsin syrup to Chicago and other Midwestern centers

—a big part of it from Reynolds.

"We now employ one man in the actual syrup-making operations, instead of the six that were needed when we used wood as a fuel, and our place is free of ashes, smoke and chips," a Reynolds spokesman says.

Pure maple syrup now brings up to \$8 a gallon in some areas, prompting mass producers to move into the sugar belt and set up central plants that can handle the sap from a whole region. This enables both the plant owner and farmers whose sap he buys to turn a profit.

In upper New York, two partners established such a plant with less than \$25,000 and built up a year-round business producing syrup and dozens of maple byproducts. Through their evaporators runs sap from scores of farms in the area.

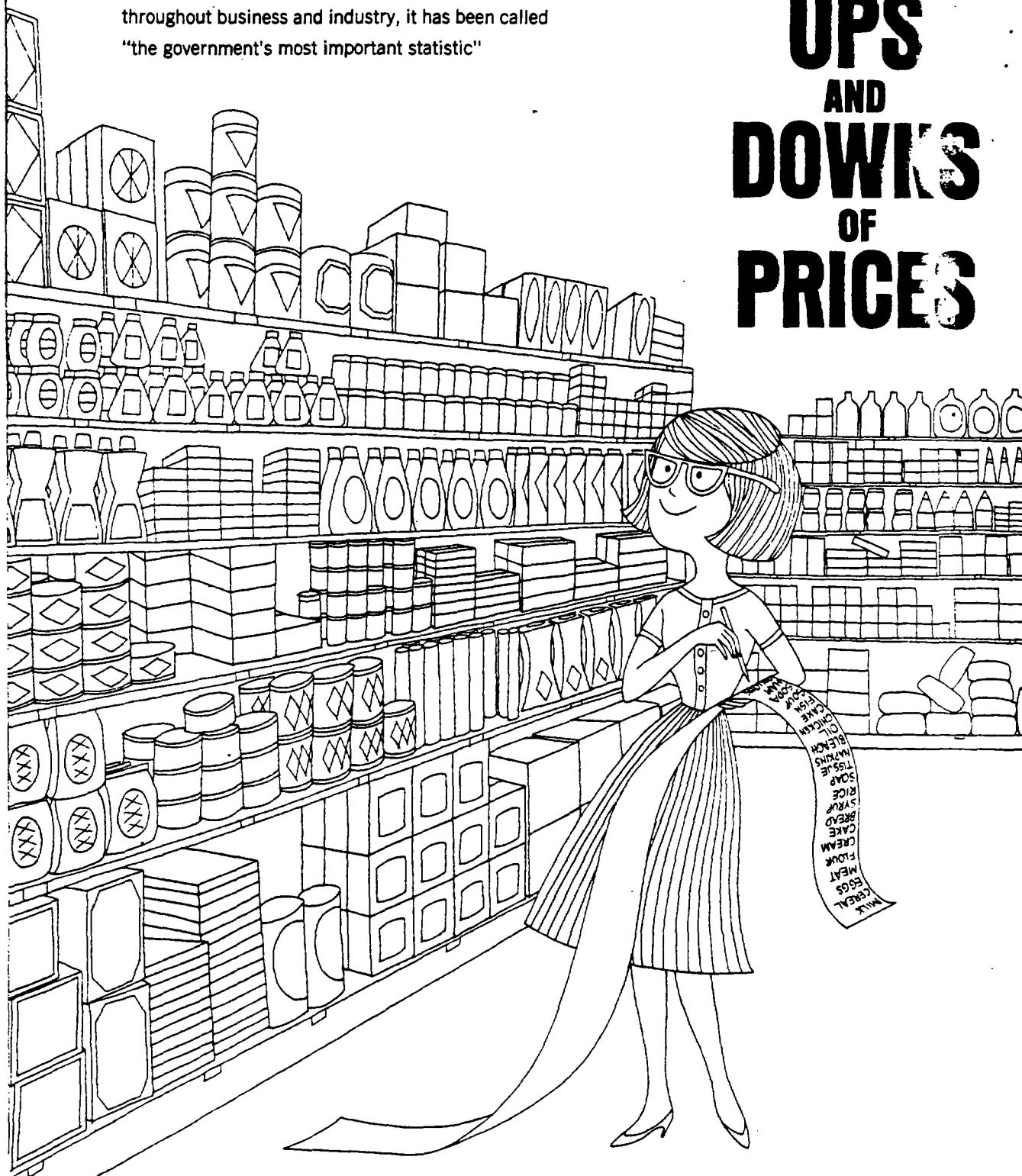
"An enterprising individual with a little capital and a crash course in operating an oil-fired evaporator can set up a good business in a short time," says a Department of Agriculture official. "... thanks to the efficiency of fuel oil and the economy and versatility of plastics," he might have added. ○

Plastics and petroleum are helping make metal sap buckets, stacks of firewood and smoky sugar houses a thing of the past.



The Consumer Price Index, published monthly by the Bureau of Labor Statistics, is so widely used throughout business and industry, it has been called "the government's most important statistic"

THE UPS AND DOWNS OF PRICES

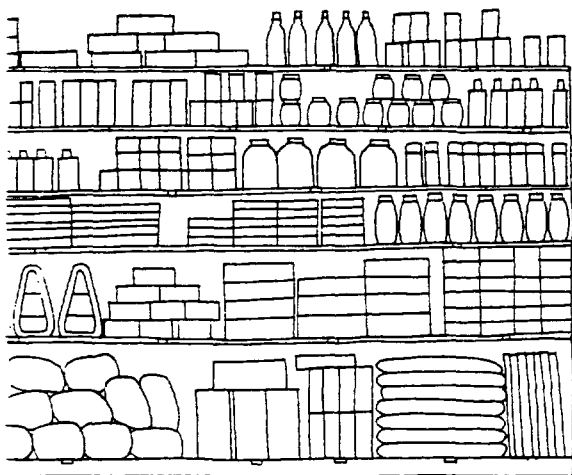


ONCE A MONTH, Mrs. Edward Markey, a trim Chicago housewife, sets out on an unusual shopping trip. Armed with a lengthy list, she makes the rounds of neighborhood food stores and supermarkets, ticking off such things as bread, cornflakes, hamburger, milk, orange juice, canned tomatoes and fresh celery.

Although she visits scores of well-stocked counters and shelves, Mrs. Markey comes home almost empty-handed. All she has to show for her day-long excursion is a "schedule sheet" crammed with prices of all the foods on her shopping list.

What's behind this unusual shopping trip? One of the most important services rendered to consumers by the federal government: Preparation of the monthly Consumer Price Index.

Mrs. Markey is one of the several hundred specially-trained shoppers who work for the U.S. Department of Labor's Bureau of Labor Statistics



in cities all across the country, recording the prices of some 400 goods and services items a typical urban family buys. While Mrs. Markey devotes her attention to foods, other pricing specialists record the costs of clothing, household appliances, furniture, automobiles, rent, transportation, medical care, legal advice and beauty treatments.

The prices are sent to Washington from 50 metropolitan areas and fed into a statistics "mill." The "mill" produces a figure with the cumbersome name of "Index of Change in Prices of Goods and Services Purchased by City Wage-Earner and Clerical-Worker Families to Maintain Their Level of Living." The figure is more commonly known as the Consumer Price Index. It's also popularly—but not accurately—referred to as the "Cost of Living Index."

The monthly index figure is so often quoted and so widely used that a Congressional committee once termed it the government's "most important single statistic."

While one of the most widely publicized uses of the index is in the automatic adjustment of wages under "escalator clauses" in collective bargaining agreements, it also often helps determine the wage rates of workers not covered by automatic escalator agreements. Federal, state and local governments directly or indirectly use the Index to work out pay scales for their employees. Congress and the Executive department of the federal government use it as a guide in determining general economic policy. Businesses often refer to it in setting advertising and marketing programs and as a guide in planning pension and insurance benefits.

Started during World War I

The Index got its start during World War I, when rapid changes in living costs, particularly in ship-building centers, made such a statistic essential. Says a BLS official today: "We consider it a tribute to our reporting and mathematical methods that throughout the past five decades, no one has questioned the accuracy or the unbiased nature of the Consumer Price Index."

Of course, the Index is updated periodically to account for changes in the way Americans spend their money. Early last year, it underwent an extensive facelifting. Among the changes—

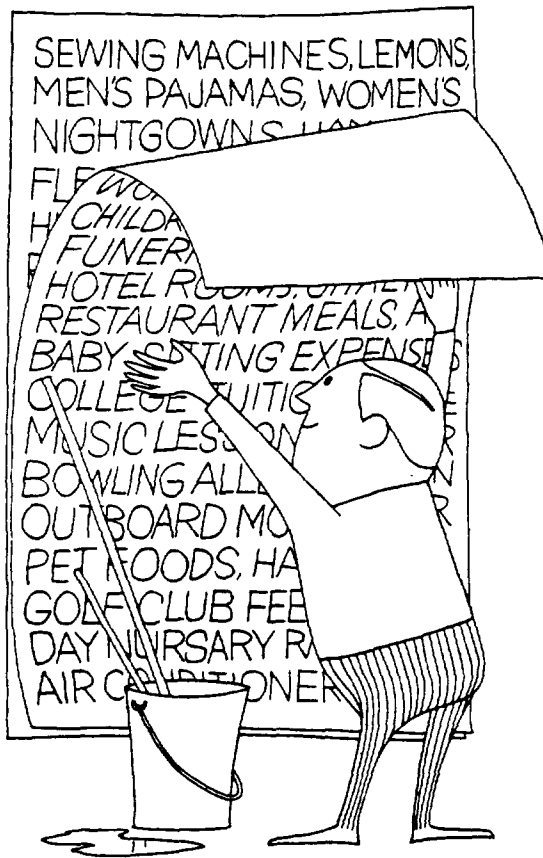
- The number of stores and other outlets in which prices are collected was upped from 37,000 to 50,000 and was broadened to include discount houses and suburban stores.
- Questioning about spending habits was extended to professional people—doctors, dentists, lawyers and accountants—and both office and factory workers, in addition to wage-earners, the only group formerly queried.
- The number of items whose prices are checked monthly was increased from 325 to 400.
- Costs of services were given added weight because it had been found that typical Americans are spending a bit less for food, and more for durable goods and services.
- The Index was revised to reflect price changes for individuals living alone, as well as for urban families.
- Separate city indexes were prepared for metropolitan areas with population of a million or more.

While the Consumer Price Index still applies only to prices paid by city dwellers and does not measure those paid by farm families, the Labor Department has in preparation a separate broad-scale survey of farmers' spending.

A good many signs of the times are mirrored by the revised Index. Prices of air-conditioners and garbage disposal units are in; sewing machines are out. Outboard motors, bowling alley charges, pet foods, day nursery rates and golf club fees have been added. The cost of lemons, men's pajamas and women's nightgowns have been eliminated.

Says a BLS official: "We've cut out nightgowns and pajamas not because people have stopped wearing them, but because their costs are far less important than they used to be in the family budget."

Also added have been the cost of restaurant meals, hotel rooms, music lessons, college tuition, baby-sitting fees, and funerals.



The Index is revised periodically to include new items for which American consumers spend their money and to exclude other items of diminishing importance.

These changes show the relative affluence of today's American family, compared with a few decades ago. They bear out studies by various independent agencies that indicate the high standard of living most of us are enjoying. As wages have steadily increased, the proportion of income spent on food has gone down. People are spending a greater share on buying homes, on travel, on medical care, on personal services like beauty aids, cosmetics and haircuts, and on leisure-time activities and recreation.

Standard of Living up 20%

In the words of BLS Commissioner Ewan Clague: "We have found that the average standard of living has risen by perhaps 20 percent over the past ten years. Average money income, after taxes, went up about 50 percent between the early 1950's and the present. But more than half that rise was cancelled out by price increases, leaving about a 20 percent improvement in the well-being of the average family."

While the CPI has come to be regarded as a tally of what it costs a family to live—a "cost-of-living" measurement—it actually isn't. The Index measures only changes in prices from one month to the next. It tells nothing about the changes in the kinds and amounts of goods and services families buy, or the total amount of money they spend for living, or the differences in living costs in different areas.

Another thing the Index doesn't measure is the extent of quality improvements continually taking place in consumer goods.

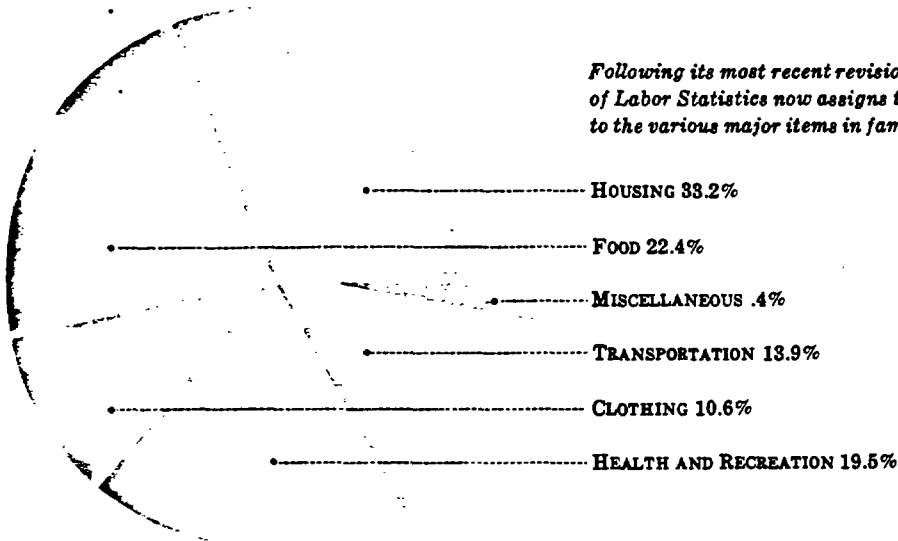
Value of Dollar Declines

A recent calculation by the National Industrial Conference Board showed that a man (married, with two children), making about \$12,700 annually, today has only as much purchasing power as his father, making \$5,000 a year, had in 1939. These figures, by themselves, indicate a decline in the value of the dollar, and a rise in the cost of living.

But some other factors must be taken into account. The father of today's consumer did not have a television set; the mother had no electric clothes dryer, and her washing machine probably was a wringer model. The family car likely had a standard, not an automatic, transmission. The medicine cabinet held no wonder drugs. Frozen foods, cake mixes and other convenience items were just coming into use.

At the annual stockholders' meeting of Ford Motor Company, last spring, Henry Ford II noted that his company is marketing "cars and trucks that are measurably superior to those of just a few

Following its most recent revision, the Bureau of Labor Statistics now assigns these weights to the various major items in family budgets



years ago in quality, durability and performance, for substantially the same prices as in 1959."

"What this means," Mr. Ford added, "is that we have given our customers a large effective price cut over the past few years. Based on Government figures, the value that has been added to autos in this period, compared with the movement of the Consumer Price Index, has meant a relative price cut of \$200 per car to our customers."

Other automobile manufacturers could make much the same comparison.

Or take the gasoline used in today's cars. Regular-grade gasoline now has a higher octane rating than the premium-grade of ten years ago. The retail price of regular-grade gasoline, excluding taxes, is actually less now than it was a decade earlier. So motorists are paying less for a higher quality product.

Such changes as these cannot be measured in the CPI, whose function is only to represent by a single figure the average change in prices experienced by a city worker's family or by an individual worker each month.

Index Now at 108.7

In a recent month, the index stood at 108.7, compared with 107.4 a year earlier. In effect, \$10.87 was needed in that month to buy the same amount of goods that \$10 would have bought in the base years 1957-59.

The latest overhauling of the Consumer Price Index really began as far back as 1960, when the BLS launched a survey of 9,400 households in 66 communities around the United States. Interview-

ers asked hundreds of questions to find out, in as much detail as possible, how people spend their money. Not until this was known could the BLS decide how much "weight" to assign particular items in the revised index, which items not being included should be added, and which items were of such minor importance they could be dropped.

Questions Asked

Sample questions asked by the BLS investigators included:

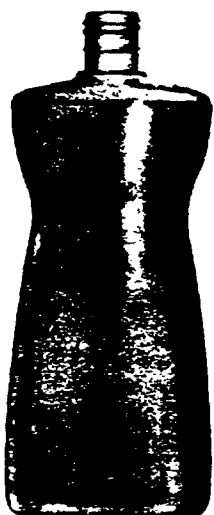
How much did you spend last year for termite protection? For grits and hominy? For steaks? Face powder? Shower curtains? Slippers? Straw hats? Vests? Vitamins? Comic books? Manicures? Drive-in movies? Clutch and transmission repairs? Bridge tolls? Bus travel?

Armed with the answers to these queries, BLS revised the weights attached to various items in the family budget. Food went down from 28.2 percent of total spending to 22.4 percent. Housing rose from 30.7 percent to 33.2 percent. Transportation went up from 11.7 percent to 13.9 percent. Health and recreation rose from 18 percent to 19.5 percent. Clothing was unchanged at 10.6 percent, as were miscellaneous items at 0.4 percent.

All in all, Labor Department experts believe their revised index is a more accurate and a more workable guide to consumer spending than ever before. Yet changes in the daily lives of workers and their families come faster now than in the past.

"It may be necessary for us to run our computers a lot faster in the future just to stay in one place," says one of the custodians of the BLS figures. ○

PLASTIC BOTTLES BY VYPAK



TOUGH, durable plastic containers made of polyvinyl chloride—almost as rigid and clear as glass—are scheduled for widespread commercial availability this year from a new 50-percent-owned subsidiary of Ethyl Corporation. Ethyl is a partner with Solvay & Cie, of Belgium, and Solvay's American subsidiary, Hedwin Corporation, of New York and Baltimore, in Vypak Corporation. Established late in 1964, Vypak takes its name from its product—"vinyl packaging" containers.

The introduction of Vypak bottles, jars and jugs, which have a number of advantages in addition to their durability and clarity, represents the first commercial availability of PVC containers in the United States.

Formation of the new company by Ethyl and Solvay brings together a wealth of corporate know-how in related activities.

Solvay has had extensive experience with polyvinyl chloride in Europe, including the processing of PVC resins and compounds and the development of machines and techniques for blow-molding finished

Polyvinyl chloride containers, made by new, 50-percent-owned Ethyl Corporation subsidiary, come in a number of different sizes, and in a variety of attractive shapes and designs



PLASTIC BOTTLES BY VYPAK

containers. Hedwin is the pioneer in rigid PVC bottle production methods in this country.

Ethyl has a rich background in research, development, manufacturing and marketing. The Company is the largest manufacturer and marketer of polyethylene film, is an important producer of rigid PVC pipe and conduit, and is a leading supplier of vinyl chloride and vinylidene chloride monomer, intermediates in the manufacture of polyvinyl chloride and polyvinylidene chloride. Ethyl is building an \$8 million plant at its Baton Rouge, La. manufacturing center for the production of a full line of PVC resins and compounds.

Polyvinyl chloride is one of the leading plastics. Besides pipe, conduit and bottles, it is used to make floor tile, upholstery material, wire and cable insulation, phonograph records, shower curtains, garden hose, and many other products.

Commenting on the formation of Vypak Corporation, Bruce C. Gottwald, Ethyl Corporation executive vice president and secretary who oversees the activities of the Company's Plastics division, said: "The development of polyvinyl chloride containers on a broad commercial scale in the United States represents a major competitive challenge. However, by enlisting the manufacturing and technical support of Hedwin and Solvay, we feel that

the venture has a good chance of success in competition with other containers."

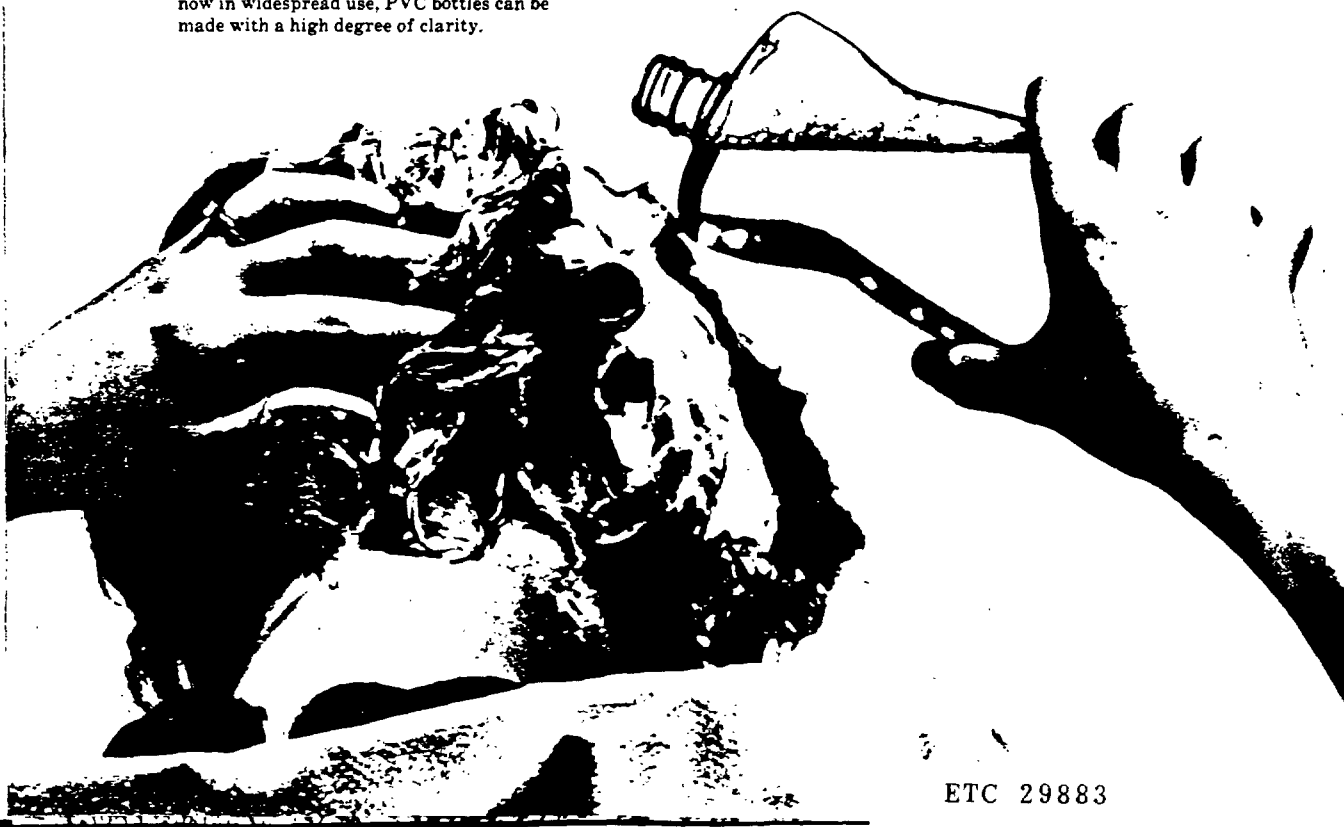
Currently, about 120 billion containers are sold in the United States annually, or about 625 for every man, woman and child in the country. Although metal and glass are by far the most popular, the use of plastic containers is growing, and has passed the 2.5-billion-a-year mark.

While the plastic container field is dominated by polyethylene, polyvinyl chloride containers have a number of advantages. Compared with the plastic containers in common use today, PVC containers will offer:

- Good to excellent transparency.
- Better rigidity and higher tensile strength.
- Greater resistance to chemical attack.
- Resistance to oil and gasoline.
- Lower permeability to such gases as oxygen, nitrogen and carbon dioxide.
- Improved preservation of volatile contents.
- Easier to color and print — no special surface treatment required.
- More attractive surface gloss.

The shatter-resistant properties of polyvinyl chloride containers, coupled with their reduced weight and bulk, are among their most important

In marked contrast to plastic containers now in widespread use, PVC bottles can be made with a high degree of clarity.



qualities. Although PVC containers approach the rigidity of metal and glass, they have the elasticity and strength to resist crushing, chipping, splintering and denting.

Surveys have demonstrated that customer response to liquid products marketed experimentally in clear, translucent or tinted PVC containers is highly favorable because eye appeal is preserved. The plastic permits the same easy identification and examination of bottled contents as glass and will contribute to the merchandizing of foods, toilet articles and a host of other items.

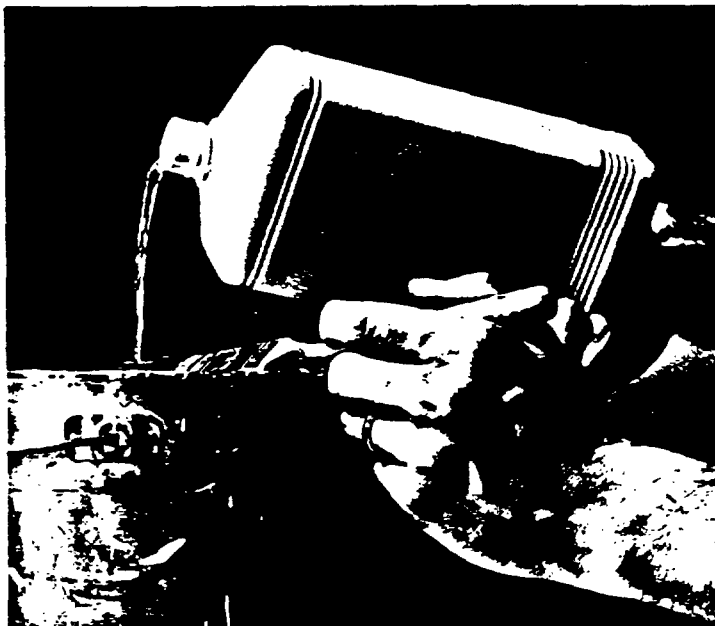
Vypak is producing containers in a number of different sizes, from one fluid ounce to a gallon, and in a variety of designs ranging from utilitarian simplicity to uniquely attractive patterns.

The Company is building its business among manufacturers and marketers of such volatile specialties as naphtha-based household cleaners, solvent-based waxes, lighter fluids, polishes, perfumes, lotions, shampoos, cosmetics and a variety of other toiletries. Vypak containers can also be used for such liquids as turpentine, photographic chemicals, certain petroleum products and some acids. PVC provides full protection and longer shelf-life for these and other products.

An even larger and more diversified market for Vypak containers is expected to result from Food and Drug Administration approval, which the Company anticipates soon. Rigid, clear bottles and jars will be ideal for salad and cooking oils, such condiments as mustard and catsup, drugs, anti-septics, pharmaceuticals, confections and preserved fruits and vegetables.

Currently, Vypak is supplying customers from the modern bottle production section of the Hedwin plant in Baltimore. In producing containers, a blow-molding process is used. Compressed air forces molten PVC into special dies to form containers of various shapes and sizes. Similar equipment will be installed in the production section of the new, expanded Vypak manufacturing plant and headquarters office building now under construction at Rockaway, N. J., about 30 miles west of New York City. The plant is expected to be in production this spring.

The Vypak organization is directed by an experienced executive staff drawn from its parent companies and from the packaging industry. Dr. Anthony J. Srba, president and chairman of Hedwin, is chairman of Vypak. J. Frank Cheely, formerly director of chemical engineering in Ethyl's



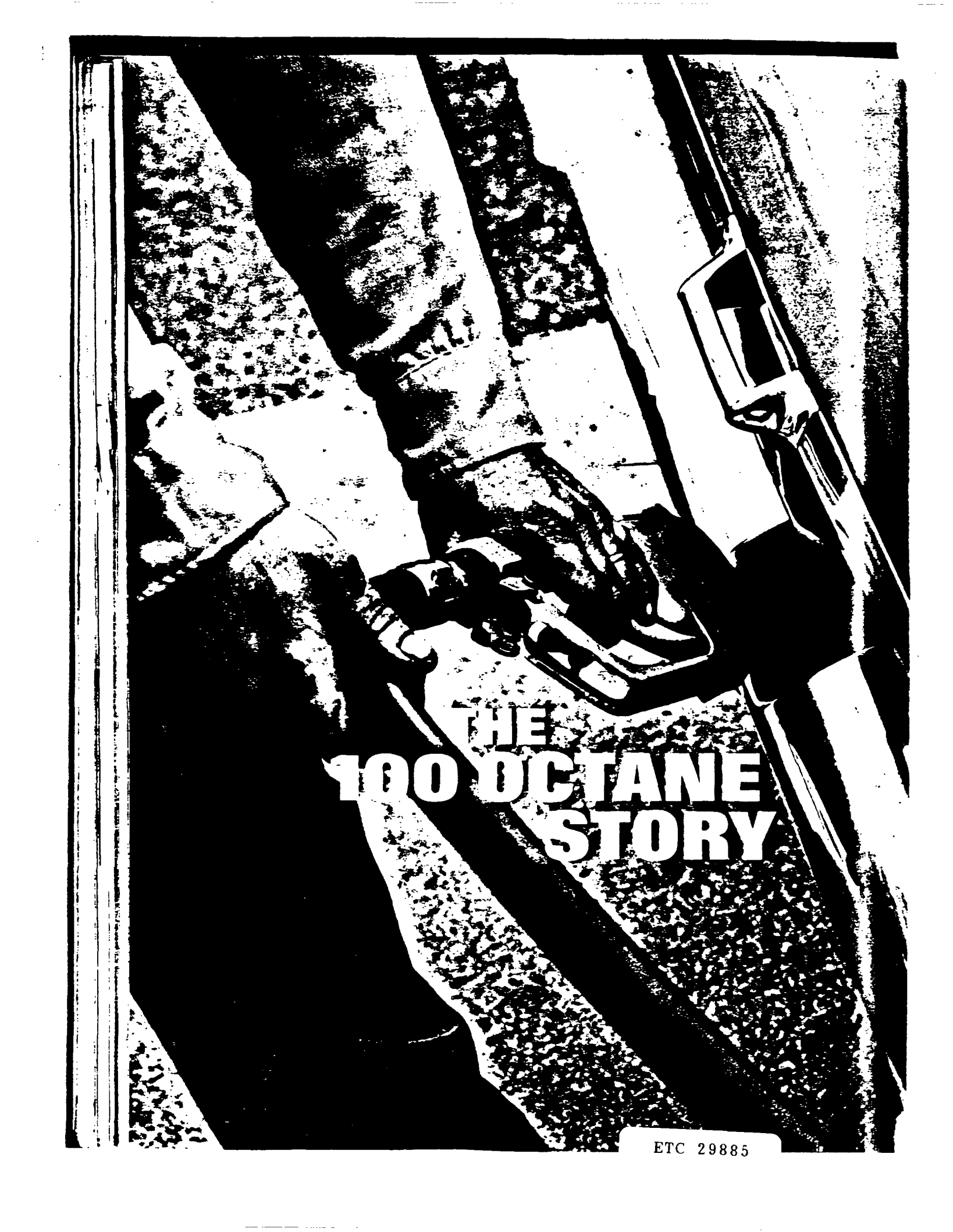
Vypak bottles can be used for a variety of products, including cleaners, chemicals, waxes, polishes and turpentine.

Research and Development department, is president and chief executive officer. Edward F. Miller, a production executive from Hedwin, is general manager of manufacturing. Harry R. Dittmar, who has a varied background of experience in Ethyl Research and Development, directs customer technical service and new product activities. Garland E. Raley, who has a technical background in the manufacture of "VisQueen" polyethylene film, is manager of research and engineering. William R. Bolton, an experienced sales executive in the container field, is general manager of sales and marketing. Joseph Scott, formerly of VisQueen sales, is working with Mr. Bolton.

Vypak's sales offices are located at 100 Park Avenue, New York. ○



J. Frank Cheely, formerly director of chemical engineering in Ethyl's Research and Development department, is president and chief executive officer of Vypak.



THE 100 OCTANE STORY

ETC 29885

FIRST A THEORETICAL POSSIBILITY . . . Then a laboratory curiosity . . . Later a commercial product of limited availability . . . Now the national average of premium gasoline on sale at service stations in the United States.

That, in a nutshell, is the history of today's 100 octane motor fuel.

Pinpointed by Ethyl's evaluation of gasoline quality in 57 key marketing areas during December, the 100-octane milestone—on a national scale—came to light in the final monthly survey for 1964. Every month, the Company's five gasoline testing laboratories test more than 1,000 samples from service stations all over the country for octane number and other important characteristics. Results of these tests provide the oil industry with its most accurate and up-to-the-minute report on U.S. gasoline quality.

Oilmen have been anticipating the 100 octane national average for premium for some time, because Ethyl's monthly surveys have been showing an increasing number of area averages of 100 octane or better. By last fall, more than half of the marketing areas where gasoline samples were obtained had achieved the breakthrough. Today the list ranges (geographically) from Albuquerque, N.M. and Boston, Mass., to Cleveland, Ohio; Little Rock, Ark.; Atlanta, Ga. and Seattle, Wash.

The availability of 100 octane gasoline in most marketing areas—and of premium approaching this magic number throughout the rest of the country—is another reminder of the oil industry's outstanding achievements. Over the last four decades, these achievements have brought more power, greater mileage, better engine performance and lower per-mile transportation costs to motorists.

In fuel, engine and additive research; in refinery technology and other customer services; and in the development and production of new, improved antiknock compounds, Ethyl Corporation has played a significant part in these achievements and in making 100 octane gasoline a practical reality.

Although no one realized it at the time, since the octane scale had not then been developed, the long road to 100 octane gasoline started in the early 1920s when Ethyl introduced the first antiknock compounds. This opened the door to high quality motor fuels and to the development of high compression engines to use them efficiently.

The late Dr. Graham Edgar, then Ethyl's director of research, developed the octane scale in the late 1920s and it was generally adopted in 1930. The scale was a major contribution since it was the first consistent, accurate yardstick for measuring the antiknock quality of gasoline. Its development made it possible to manufacture fuel of uniform antiknock value, provided a basis for the gradual improvement of antiknock quality, and encouraged the automobile industry to design engines to take advantage of higher quality fuels.



Ethyl's gasoline testing laboratories analyze thousands of motor fuel samples to provide oil refiners with up-to-the-minute data on octane number and other characteristics.

In the development of improved fuels, 100 octane gasoline was first used in military aircraft and later as a motor fuel.

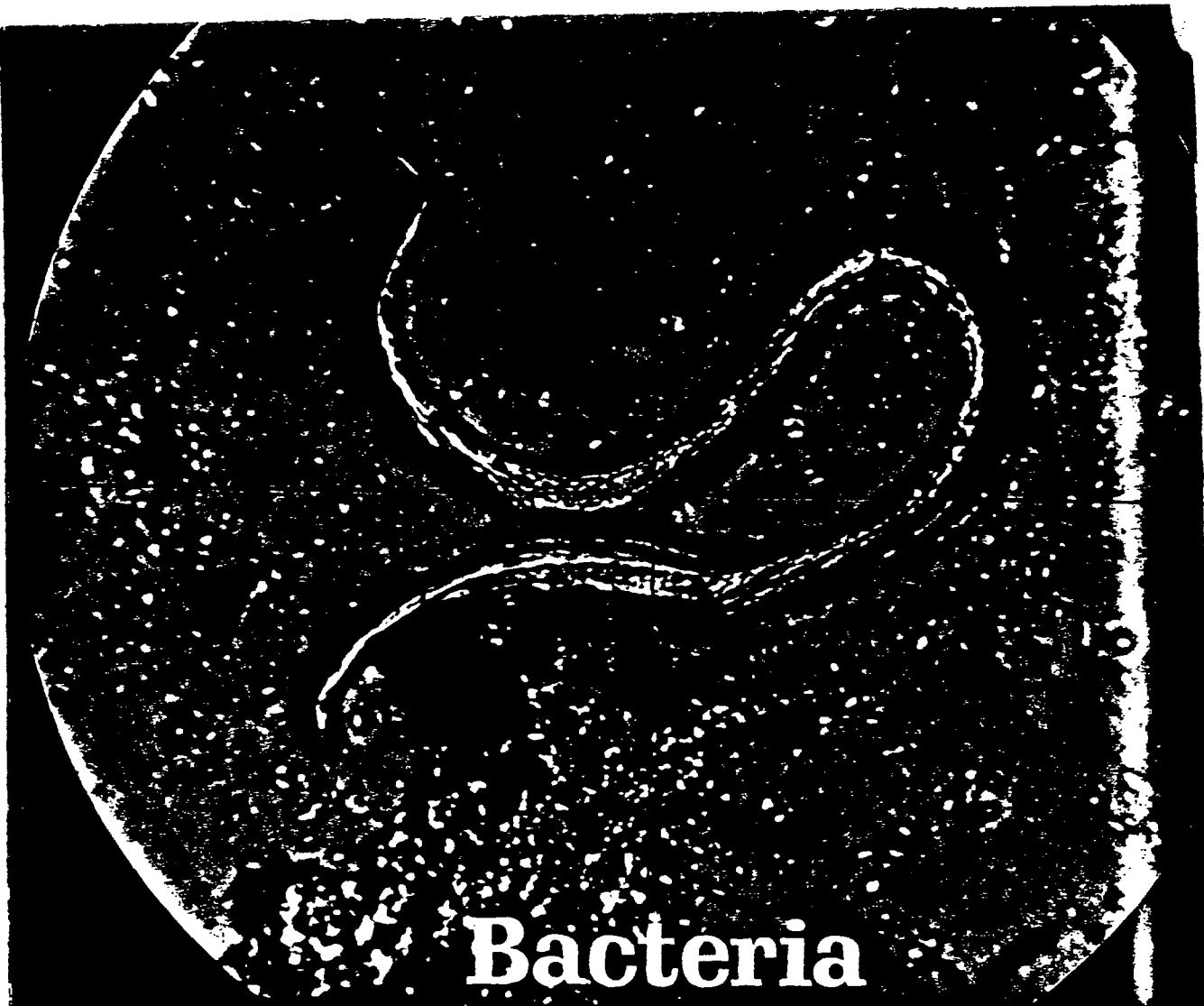
As long ago as the 1920's the Army Air Force was looking for an airplane fuel of higher quality than the 87 octane gasoline that could be made from a combination of the highest quality base stocks of the time and antiknock compounds. In the searching, it was found that the addition of isooctane made 100 octane airplane fuel possible.

By late 1934, oil refining technology had progressed to a point where isooctane was being produced on a commercial scale, and in that year the Army began using 100 octane gasoline. The first 100 octane fuel for civilian aircraft came along the following year.

The full significance of 100 octane gasoline was dramatically demonstrated in World War II, when its high quality and availability played a big part in the superior performance of Allied combat planes in the skies and in ultimate victory.

Meanwhile, starting with a level of about 70 octane number (Research) in 1930, premium gasoline reached a level of 80 octane number in 1937, 90 octane number in 1950, and increasing quality in succeeding years.

As the quality of motor fuel advanced, thanks to an efficient combination of modern antiknock compounds and improved refinery processing and blending techniques, motorists were able to get more and better value from every gallon. Premium grade gasoline played a key role in this drama of steadily increasing value by providing higher octane quality as it was needed by higher performance automobile engines. Premium also set the pace for gasoline quality improvements throughout the industry. In this connection, it is another indication of progress that while premium is now in the 100-octane range, regular grade gasoline, at over 93 octane number (Research), today is equal in quality to the premium of just 10 years ago. ○



Bacteria Can Be Beneficial

BY VICTOR BLOCK

GERMS—or, more scientifically, bacteria or microbes—long-time enemies of man because of their role in spreading disease, are now being put to work constructively. In industry, agriculture and in the home, they are handling a growing number of diverse and difficult jobs. In the oil industry, especially, bacteria are demonstrating their value and versatility.

Much of the credit for successfully harnessing these low forms of life goes to a relatively new breed of scientists, the industrial microbiologists, who study microbes not only for what they do to people but what they can do *for* them. As a result, there now is:

- An insecticide containing bacteria which is effective in destroying certain agricultural pests without harming plants, animals or people.

- A strain of bacteria that revitalizes chemicals used to recover copper from low-grade ore.

- A household product, available in supermarkets, containing millions of microbes which literally chew up grease and refuse clogging drain pipes.

In the oil industry, "good" bacteria help dispose of waste and aid in exploration and production.

Their use in waste disposal is no longer new. The slowly revolving arm of the "trickling filter" pouring water into a sieve of crushed stones that houses billions of impurities-eating bacteria is a familiar sight at refineries.

This purification process is carried a step further at one refinery, where a mass of hardy, non-disease-causing bacteria is injected directly into a tank of bubbling phenol (carbolic acid) waste. The liquid then may be diverted directly into a stream that

eds the city's water system and nearby irrigated farms, because the bacteria produce a chemical action that neutralizes the harmful wastes.

Bacteria also gobble up phenol (carbolic acid) waste at the Ferndale, Wash., refinery of Mobil Oil Company and at refineries operated by Cities Service, Shell, Sun Oil and other petroleum product manufacturers.

In one exploration method, bacteria indicate the presence of oil. While the geochemist searches for chemical evidences of petroleum in surface soils, the geomicrobiologist looks for specific microorganisms which feed on hydrocarbons seeping from petroleum reservoirs.

This method was developed by the late Dr. Raymond J. Strawinski of Louisiana State University. Tramping through bayou rice fields, he carefully gathered soil samples from shallow holes drilled in the muck. Then, back in his laboratory, he fed hydrocarbon gases to the swarming microbes in the soil, looking for strains that live on seepages of gas from underground oil pools.

The seepages of ethane, methane and propane gases are extremely small, but they will support colonies of bacteria which require gases in their diet. Patents on methods of using bacteria to hunt for oil are held by Mobil Oil, Texaco and Sun Oil.

As long ago as 1946, Dr. C. E. ZoBell of the University of California, while director of an American Petroleum Institute research project, was granted a patent on a biological process for promoting the flow of oil from underground formations. The process calls for treating petroleum-bearing formations with a strain of bacteria to bring about chemical and physical changes in the reservoir. The bacteria utilize certain hydrocarbons present in crude oil to produce acids. These acids react with minerals which inhibit oil flow, dissolving them and making oil recovery simpler and more complete.

Furthermore, carbon dioxide, which the bacteria produce, combines with methane to reduce the viscosity of crude, also tending to increase recovery.

Finally, the increased gas pressure created by the carbon dioxide helps speed the flow of oil to the surface.

Another researcher who has sought to use bacteria to recover oil is Mr. Noel M. Melton, a Bureau of Mines scientist. Mr. Melton is looking for an economically feasible method of developing the nation's vast reserves of potential oil-producing shales. The Bureau of Mines' shale oil pilot plant at Rifle, Colo., closed since 1956, was reopened last year. The Colorado School of Mines Research Foundation has leased the plant from the Department of the Interior. The School, in turn, has contracted with Socony Mobil Oil Company to carry out research, together with Humble Oil & Refining Company and other interested parties who join in providing funds.



By putting tiny organisms to work, a comparatively new kind of scientist—the microbiologist—has become the originator of new industrial processes and products.

Mr. Melton's idea is to breed a whole new "race" of bacteria with an appetite for shale in the hope that their hunger will facilitate the recovery of shale oil, as well as chemicals, natural gas and other useful products from the rock. His efforts have led to isolation of several bacteria and mold cultures that live and grow on a strict diet of oil shale. Although the microbes produce small amounts of carbon dioxide and light hydrocarbon gases during the metabolic process, they are not yet hardy enough for commercial use. Mr. Melton hopes that further experimentation will lead to a suitable breed of shale-eating bacteria.

Finally, in order to break down petroleum and its products, scientists are trying to harness the ability of some microbes to utilize hydrocarbons as their sole source of carbon. Results obtained by



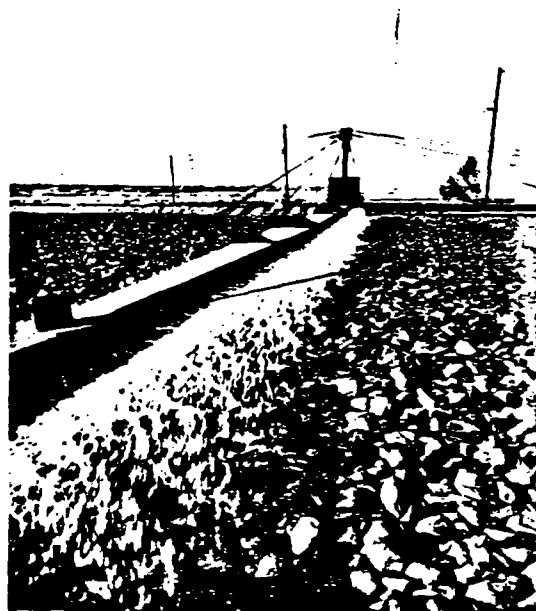
Efficient waste disposal systems utilizing bacterial action are familiar parts of oil refineries everywhere.

R. L. Raymond and J. B. Davis at Socony Mobil's field research laboratory in Dallas several years ago suggest that certain organisms can carry out useful oxidation of some hydrocarbons, including alkanes, paraffins and olefins, to yield stearic and palmitic acids, among other useful products.

While the significance of many such investigations is more apparent to the scientist than to the layman, they are typical of oil industry efforts to speed the flow of petroleum and its products to consumers. If dynamic little bacteria can help, researchers are quick to say "so much the better."

Microbes also offer a solution to the problem of the persistent sudsing of some detergents in waste water, sewers, septic systems, disposal plants and ultimately in underground and surface lakes and rivers. When made with "straight chain" chemicals, such as the synthetic primary alcohols to be manufactured by Ethyl Corporation at a new plant now under construction at Houston, Texas, detergents are biodegradable. That is, they can be broken down and made to disappear by exposure to normal bacteria action occurring in waste waters.

Most detergents made from "branched chain" chemicals are "hard" detergents, which resist bacterial action. But the new "soft" detergents made from "straight chain" chemicals open up another field of important action by beneficial bacteria.



Refinery wastes are distributed over beds of crushed stone in trickling filters. The resulting action is similar to that which takes place in fast-moving mountain streams. Oxygen from the air and bacterial growth on the stone combine to upgrade water quality by removing impurities.

OUTLOOK

ETHYL PRESIDENT ELECTED TO API BOARD OF DIRECTORS



Dr. George F. Kirby, president of Ethyl, is a newly-elected director of the American Petroleum Institute. He is one of 10 key executives of companies in the oil and related industries to be chosen for two-year terms at the 44th annual meeting of the API in Chicago late last fall.

Dr. Kirby was elected president of Ethyl in mid-1964. Previously, he had been vice president—research and engineering, vice president—operations, and executive vice president. He also is a director of the Company, a member of its executive committee, and a director of Ethyl Corporation of Canada Limited and of Ethyl-Dow Chemical Company.

U. S. PICKS ETHYL EXECUTIVE AS KENNEDY ROUND CONSULTANT



Joseph A. Costello, Ethyl vice president, has been appointed a technical representative to assist the federal government as a consultant on foreign trade negotiations.

Mr. Costello represents the entire antiknock compound industry in his services to the office of Christian H. Herter, special United States trade negotiator for the so-called Kennedy Round of tariff adjustments initiated by the General Agreement on Tariffs and Trade at Geneva, Switzerland, during the late president's administration.

The Ethyl executive is on call to provide Mr. Herter and his staff with "additional data or views" about the antiknock compound industry "whenever negotiating developments require... as they may relate to U.S. tariffs, foreign rates of duty, non-tariff barriers, technical product information, industry views on trade expansion possibilities or any other matters relating to the Kennedy Round negotiations."

ETHYL EXHAUST CONTROL DEVICE MEETS STANDARDS

Ethyl expects to apply knowledge gained in the research and testing of its catalytic exhaust device for automobiles to the development of future exhaust control systems. Such devices, the Company points out, may be needed to augment car manufacturers' engine modification systems when California emission standards are tightened in 1970.

This prospect follows recognition by the California Motor Vehicle Pollution Control Board that Ethyl's current device has met successfully California's emission standards.



Ethyl has not requested formal certification of its device because the Company believes there is no immediate market for currently developed catalytic devices on new cars. This is because automobile manufacturers in August announced that their 1966 models to be sold in California will meet California's emission standards through the use of engine modification systems.

Accordingly, instead of a formal certification, the California MYPCEB passed a resolution recognizing Ethyl's device as complying with the exhaust emission standards of the California Department of Public Health.

NEW VISQUEEN PLANT WILL SUPPLY SOUTHEASTERN MARKET

Ethyl is building a new plant at LaGrange, Ga., for the manufacture of a complete line of "VisQueen" polyethylene plastic film for agricultural, industrial, commercial, packaging and household uses. The first Company installation of its kind in the South, the LaGrange plant will be the fourth of Ethyl's VisQueen production facilities.

To be located on a 60-acre plot within the city limits of LaGrange, the new plant is scheduled for completion by fall. It will substantially increase the capacity of Ethyl's VisQueen division, already the nation's largest producer of polyethylene film. The plant also will help provide service advantages to customers within the Southeast's large and growing polyethylene film market.

Other VisQueen manufacturing plants are at Terre Haute, Ind.; Flemington, N. J. and Fremont, Cal.

COMPANY PUBLISHES NEW EDITION OF "THE STORY OF GASOLINE"

Revised, updated and freshly illustrated, a new edition of Ethyl's comprehensive book, "The Story of Gasoline," is available at cost to oil companies, schools and colleges, libraries, reference centers and others.

Like two earlier versions, which readers have described as "highly informative, easy to understand and extremely useful," the new edition of "The Story of Gasoline" is a concise reference source on the fuel's manufacture, characteristics and uses. After an illustrated foreword emphasizing the burgeoning importance of gasoline in today's world, the publication discusses petroleum and its hydrocarbons, refining processes, gasoline testing, performance, and safe handling.

Recent developments in refining processes are included in a completely rewritten section, "The Manufacture of Gasoline." The use of familiar agents such as antiknock compounds, and newer additives including antioxidants, detergents, inhibitors and others are explained. The new edition also recognizes the growing importance of marine gasoline.

Appealing pictures, drawings, diagrams and charts help make the booklet's 80 pages enlightening for new oil company employees, dealers, students and other readers with or without technical knowledge.

Ranging alphabetically from "Acidity" and "Backfiring" to "Xylene" and "Yield," subjects covered in "The Story of Gasoline" are organized and indexed for convenient reference. Produced by Ethyl as an industry service, the book is available through Ethyl offices and representatives in the United States, Canada and overseas.

NEW GENERAL MANAGER FOR ALBEMARLE CONTAINER COMPANY

Albemarle Container Company, the corrugated container division of Albemarle Paper Manufacturing Company, Ethyl subsidiary, has a new general manager. He is John A. Comly, who joined the container division early last year as resident manager of its plant in Richmond, Va.

The new general manager's headquarters are in Richmond. Albemarle Container's other plant is in Baltimore, Md.

A native of Philadelphia, Pa., and a graduate of the University of Pennsylvania's Wharton School of Finance and Commerce, Mr. Comly is a Navy veteran of World War II. He held

various production and administrative positions with the Container Corporation of America in Philadelphia, and was vice president of Connelly Container, Inc., at Bala Cynwyd, Pa., before joining Albemarle.

RAYMOND ADDS NEW PRINTING, BAG-MAKING EQUIPMENT

A new six-color press and related equipment for turning out attractive, color-printed plastic bags and multi-wall paper sacks have been installed at the Middletown, Ohio, plant of Raymond Bag Company, a division of Ethyl's Albemarle Paper Manufacturing Company.

Raymond is an important producer of multiwall paper sacks for foods, feeds, fertilizers, chemicals, building materials and mine and quarry products. The new equipment increases its ability to satisfy markets in which colorful plastic bags and paper sacks are in growing demand. The new press is noteworthy for high quality printing—essential in adding attractiveness to product packages.

COMPANY AWARDS 24 FELLOWSHIPS AND SCHOLARSHIPS

For the twenty-eighth consecutive year, Ethyl Corporation has awarded research fellowships and scholarships to college students seeking advanced and undergraduate degrees in chemistry, chemical engineering, industrial engineering and mechanical engineering.

Collectively, the Company's 24 fellowships and scholarships for the current 1964-65 academic year represent grants of close to \$75,000. There are 18 graduate research fellowships and six undergraduate scholarships for study at leading institutions of higher education in the South, Southwest and Midwest.

Fellowships provide students with stipends for living expenses in addition to allowances for tuition and fees. The awards also include grants to university departments where Ethyl fellows are conducting research. Company scholarships provide recipients with financial assistance in meeting their college or university expenses.

Institutions at which Ethyl fellows are studying this year are the University of Cincinnati, University of Detroit, Florida State University, Georgia Institute of Technology, University of Illinois, State University of Iowa, Louisiana State University, University of Minnesota, University

of North Carolina, Northwestern University, Purdue University, Rice University, Tulane University, University of Texas, Virginia Polytechnic Institute, Wayne State University, Western Reserve University and the University of Wisconsin.

Ethyl scholarship recipients are enrolled at the University of Arkansas, Clemson College, Georgia Institute of Technology, University of Houston, North Carolina State College and Oklahoma State University.

SARNIA PLANT NOW PRODUCING INDUSTRIAL CHEMICALS FOR CANADA

A new industrial chemicals unit at the Ethyl Corporation of Canada Limited manufacturing plant at Sarnia, Ontario, is producing several new products for oil refiners and other industrial customers in Canada.

The unit produces detergent-deicer-anticorrosion additives for gasoline and antioxidants to prevent deterioration, rust and wear, control gum formation and preserve desirable characteristics in a variety of petroleum products. It also manufactures aluminum-alkyls—the first made in Canada—which are used as catalysts in the manufacture of synthetic rubber and plastics.

Antiknock manufacturing facilities at the Ethyl of Canada plant are being expanded to produce tetramethyl lead and mixed lead alkyls, some of the newer compounds that are coming into more widespread use by oil refiners. The new facilities are scheduled to go into operation in June.

HOWARD L. LEVENTHAL NAMED VISQUEEN TECHNICAL DIRECTOR



Howard L. Leventhal, formerly assistant to the operations manager, has been promoted to technical director of Ethyl's VisQueen division, with headquarters at Baton Rouge, La. In this new position, Mr. Leventhal is responsible for development, engineering, industrial engineering and quality evaluation programs.

Mr. Leventhal is a native of New York City and a graduate of the University of Illinois with BS and MS degrees in chemical engineering. He also has studied at the University of Chicago and Northwestern University.

DETROIT CHEMISTS ESTABLISH AWARD HONORING THOMAS MIDGLEY

As a tribute to the late Thomas Midgley, Jr., who discovered the antiknock properties of tetraethyl lead in 1921, and was a founder of Ethyl Corporation and a vice president until his death in 1944, the Detroit Section of the American Chemical Society has established a Thomas Midgley Award for annual presentation to "a chemist outstanding in his contributions to automotive industries."



Thomas Midgley, Jr. Thomas A. Boyd

The award—a medal and a certificate—was conferred for the first time this January on Thomas A. Boyd, Mr. Midgley's principal assistant during his extensive research on knock prevention. Mr. Boyd later became head of the fuel department at General Motors Research Laboratories until his retirement in 1953, and was an internationally recognized authority in his field.

BUILDERS' APPROVAL EXPECTED TO INCREASE PLASTIC PIPE USE

Significant increases in the use of plastic pipe are expected to follow recent approval of the material for drain, waste and vent applications by the Building Officials Conference of America. Subsequent to the approval, the Plastics Pipe Institute predicted that plastic drain, waste and vent pipe will be used in 50 percent or more of one- and two-family residential dwellings built in the next five years.

Ethyl's VisQueen Division is an important supplier of polyvinyl chloride pipe, conduit and fittings. Pipe manufacturing operations were transferred to the VisQueen plant at Terre Haute, Ind., late last fall and they have been substantially expanded.

PVC pipe has a number of weight, durability and handling advantages. Besides its use in residential construction, it is expected also to find widespread application in irrigation systems, gas transmission lines, oilfields, and as electrical conduit.



SHRINK BIG

SHRINK SMALL

Shrink Everything with Ethyl's Newest VISQUEEN® Polyethylene Film

Thanks to a new VISQUEEN development, the use of polyethylene shrink film no longer is limited to packaging a relatively few products. With its new shrink film that has clarity, strength, uniformity, machinability, a shrink factor of up to 50 percent, and a price that's never been lower, Ethyl's VISQUEEN division has brought costs down.

Ethyl's VISQUEEN division also has polyethylene films for every other packaging application—not just shrink packaging, but frozen food packaging, hard goods packaging, soft goods packaging, and all the rest. Just name it—and VISQUEEN will deliver a film that does the best job.

ETC 29892



Who would think that the old-fashioned shopping bag would become a status symbol? Yet it has. Today, stores are set apart by their high-style, smart-looking shopping bags. Ethyl designs, makes and prints more shopping bags than anyone. We also make chemicals used in weather

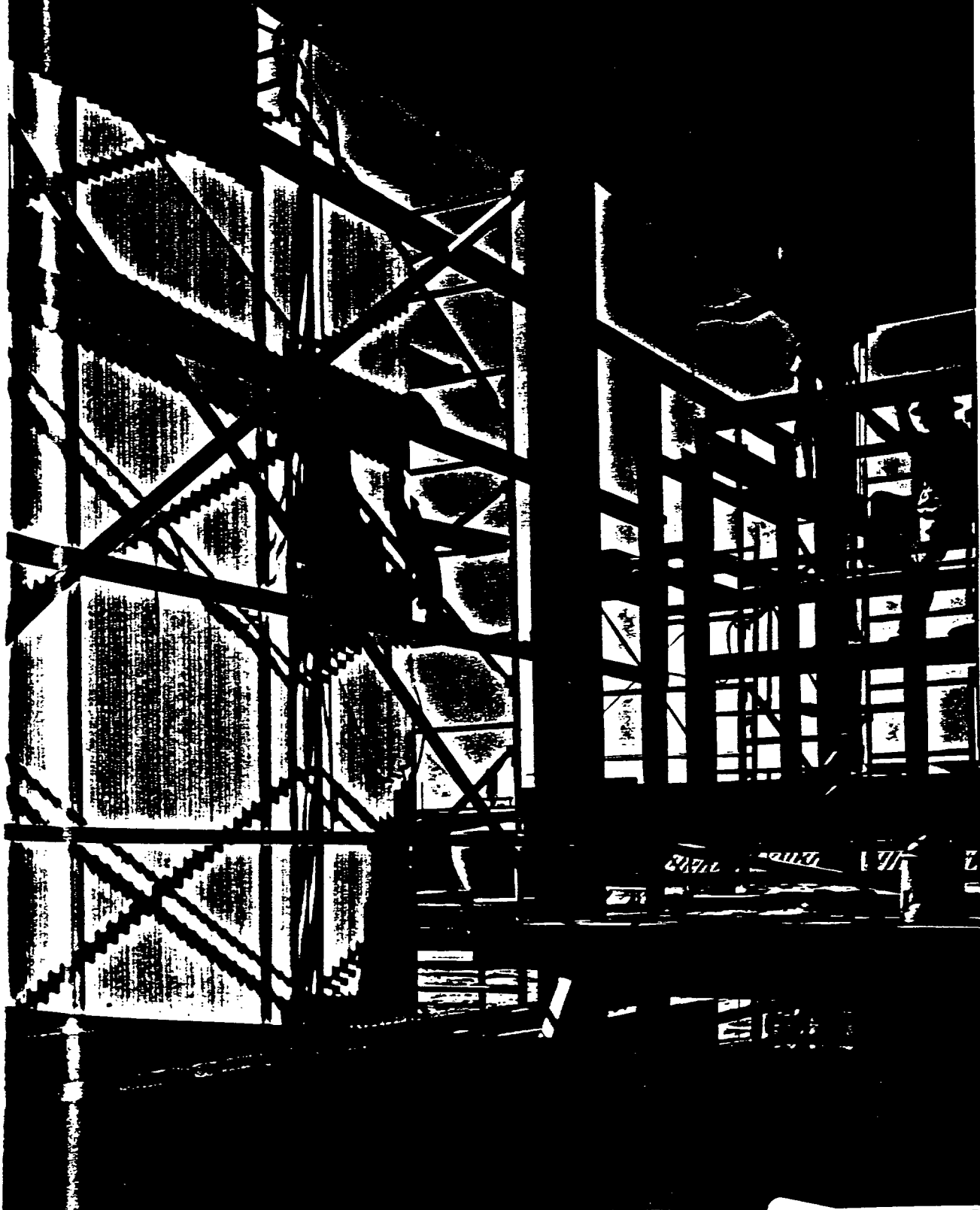
research, others that preserve life in rubber, stop engines from knocking. Plastic films used to wrap phonograph records and socks for tots. These are some of the things we're doing today. Where will Ethyl products turn up next? Wherever research and our imagination take us.

ETHYL CORPORATION

New York, N.Y. Petroleum Chemicals • Industrial Chemicals • Visqueen Plastics • Ethyl of Canada • Ethyl International • Albemarle Paper • Raymond Bag • Interstate Bag

Ethyl News

SPRING 1965



ETC 29894



ETC 29895

Ethyl News

VOLUME 32 • NUMBER 2 • SPRING/1965

TABLE OF CONTENTS

Antiknocks Make a Difference	2
Bags by the Billions!	6
Big Boost for a Popular Plastic	10
There's Mileage in Magic Circles	12
The Wonderful World of Wagons	14
Building with Light and Color	18
Anatomy of a Multibag	20
A New Look at the Fleet Market	24
Outlook	27
We're Specialists	29

ON THE COVER

VisQueen PVC Panels, a new product for Ethyl's Plastic Division (See "Building with Light and Color," pages 6-7), are extensively used in the construction of the Company's new polyvinyl chloride resins plant at the Baton Rouge, La., manufacturing center. Resins produced in the plant, which is slated to go into production later this year, will be another new Plastics Division product.

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*manufacturers of petroleum chemicals,
industrial chemicals, paper and plastics.*

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PLR BAGS

From big, rugged wall sacks like these, to stylish hanging bags and commonplace grocery bags have become such a part of American life they often are taken for granted. The magnitude and scope of the billion-bag business—and the leading Ethyl Corporation divisions and subsidiaries play in it—are discussed in "Bags by the Billions" on pages 6-9. Revolutionary Company development in wall bags is described in "Anatomy of Multibag" on pages 20-23.

ETC 29896

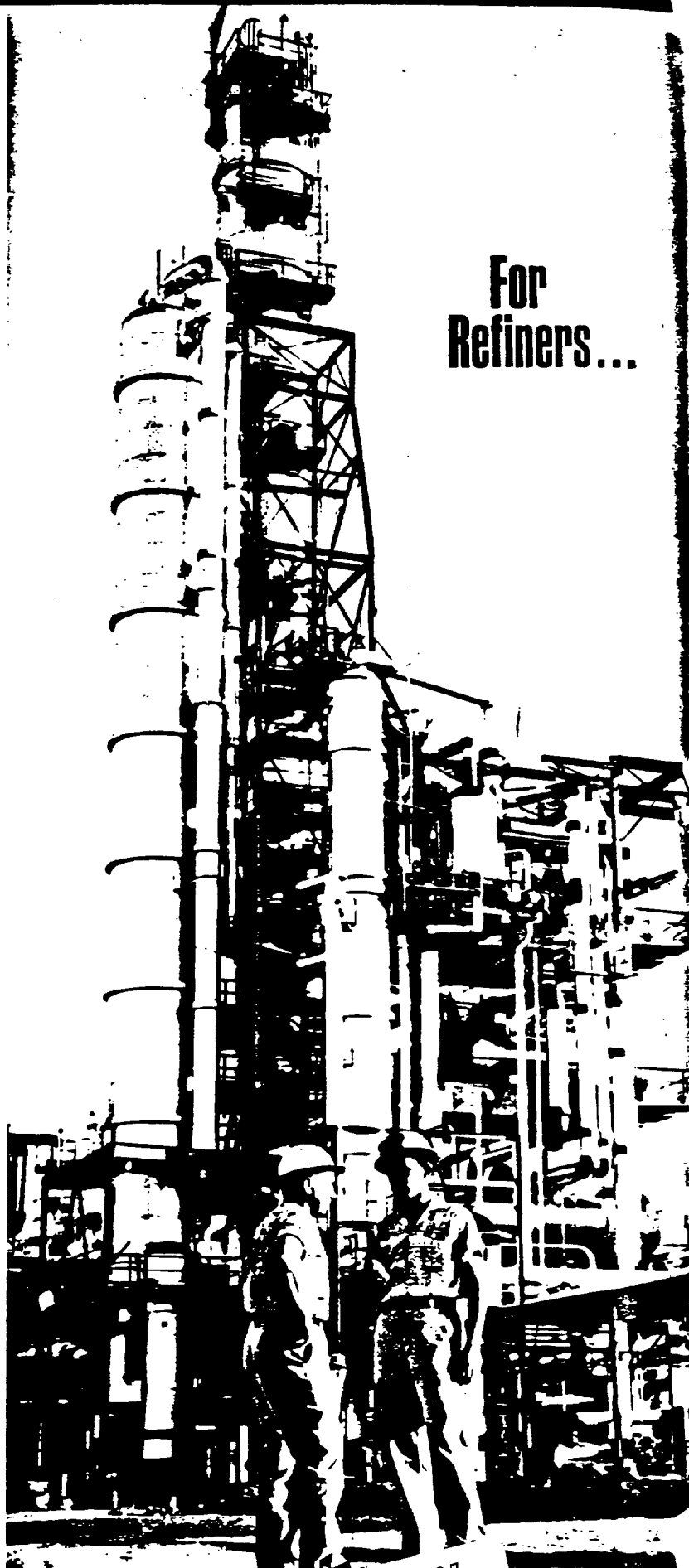
Antiknocks Make a Difference

There's almost no end to the list of people who benefit from the use of antiknock compounds in gasoline... Hundreds of refiners throughout the United States and hundreds more around the world... Millions of motorists and operators of commercial, industrial and agricultural equipment... Just plain citizens everywhere.

- For refiners, antiknock compounds play a vital part in the production of top-quality motor fuel at the lowest possible cost.
- For motorists and other operators of gasoline-powered vehicles, antiknock compounds help provide efficient, economical performance.
- Virtually everyone else benefits from the conservation of millions of barrels of petroleum, an irreplaceable and vitally important natural resource, and from the highly advanced system of automotive transportation which antiknock compounds make possible.

Modern gasolines, of course, must be very versatile. They must be able

**For
Refiners...**



ETC 29897

withstand prolonged storage without deteriorating—and yet go to work at a moment's notice. They just provide fast starts, rapid acceleration, smooth performance and good mileage in all kinds of engines under all sorts of driving conditions in summer and winter, in mountains and deserts.

Refiners build into gasolines the reliability and the qualities that enable them to do all these jobs. Some

of the qualities are provided by refining processes—catalytic cracking, reforming and others—and the blending together of selected base stocks. Others come from the use of chemical additives.

Modern gasolines contain at least three—and sometimes as many as six or seven additives. These additives combat spark plug fouling and preignition, control carburetor icing and the buildup of carburetor

deposits, protect engine parts against corrosion, help overcome operating and maintenance problems. But most important, one group of additives—antiknock compounds—increases octane quality, or gasolines' ability to produce power in engines without knocking.

Antiknock compounds for motor gasoline contain active ingredients (tetraethyl lead, tetramethyl lead, or combinations of the two), ethyl-



ETC 29898

Antiknocks Make a Difference

ene dibromide and ethylene dichloride to help them do their job more efficiently, and distinctive dyes for identification. Manufacture of the compounds involves a series of complex chemical reactions and requires a big investment and lots of know-how.

Refiners have been adding antiknock compounds to motor gasolines for more than 40 years. Today, these additives are used in about 98 out of every 100 gallons made in the United States and in the gasolines of all other countries of the free world.

The amount of antiknock compounds used is very small by volume—about a teaspoonful per gallon or about one part in 1,300—yet their effect in refinery economics, automobile performance and petroleum conservation is tremendous.

At refineries, antiknock compounds are used in combination with processing to achieve the final octane quality of gasoline. If proc-

essing alone were used to achieve comparable gasoline quality, the severity of the processing required would substantially decrease the yield of gasoline from a barrel of petroleum, increasing costs and consuming more of a vital natural resource. With antiknock compounds readily available, refiners can produce both premium and regular grade gasolines of desired octane quality more simply and economically. And these additives help them maintain octane quality day after day, adjusting easily to changes in product demand or gasoline blend composition.

At the same time, by supplying the top octane numbers, antiknock compounds help refiners eliminate or defer large capital expenditures

**For
People
Everywhere...**



expensive processing equipment that would otherwise be needed.

Now what about the motorist? In supplying the most important one numbers in gasoline, antiknock compounds help motorists get better road performance from their cars than would otherwise be possible. The additives protect engines against harmful knock at all driving speeds and enable them to develop maximum power. By promoting efficient combustion, antiknock compounds help engines do more useful work with every gallon of gasoline.

The octane numbers contributed by antiknock compounds in the United States provide the equivalent of many years of gasoline progress. In other words, if these numbers were missing from 1965 gasoline, and no changes were made in refining methods, the quality of present-day gasoline would be down to the quality that prevailed a number of years ago. This, in turn, would hold for automobile engines of the type in use in earlier years, and could result in reduced efficiency and performance in individual vehicles and in our entire system of automotive transportation.

For example, operating on the gasoline quality and automobile engine efficiency of 1954, motorists could use at least 10 percent more gasoline to get the same amount of transportation they get with 1965 fuels and engines. So if motorists today were still using the fuels and engines of 11 years ago, they would suffer a very real economic and performance reversal. Further, it has been estimated that, overall, antiknock compounds save the motoring public about \$2 billion a year on gasoline costs.

In conserving irreplaceable and vitally important crude oil, antiknock compounds benefit everyone. Over the last 25 years, these gasoline additives have saved an estimated five billion barrels of petroleum, worth \$15 billion at current prices. Currently, the use of antiknock compounds by refiners is saving almost 200 million barrels of oil

—worth \$600 million—a year in the United States alone and millions more around the world. Without antiknock compounds, refiners in this country would have to use at least six percent more crude to achieve the same gasoline quality.

Thus, antiknock compounds effect huge savings in money and natural resources while providing vastly improved automobile performance.

Their use by refiners to save billions of dollars, to conserve millions of barrels of crude oil year after year and to increase the efficiency of transportation is another example of how modern chemical technology is helping the oil industry operate for the benefit of people everywhere.



The use of antiknock compounds conserves millions of barrels of crude oil annually.

Antiknock Compounds and Public Health

For the more than 40 years that antiknock compounds have been in use, they have been subjected to continuing thorough research from a public health standpoint. Most of this research has been sponsored by the antiknock compound industry. The research has shown that:

1. Antiknock compounds do not contribute to smog formation.
2. Lead compounds discharged into the atmosphere in automobile exhaust have not created a hazard to the health of the public.
3. Concentrations of lead from all sources (including antiknock compounds) in the air of American cities is low.
4. The amounts of lead to which the general public is exposed—from all sources, including foods and beverages—are far below hazardous limits.
5. During the last 20 or more years, there has been little change, in the intake, output or retained amount of lead in the body of the average adult American.

Just this spring, the U. S. Public Health Service published the results of a comprehensive survey of lead in the atmosphere in three major cities—Los Angeles, Philadelphia and Cincinnati. These results confirmed earlier findings that atmospheric lead levels are low and present no public health hazards.

Bags by the Billions



SEVENTY BILLION bags a year! Stylish shopping bags, sturdy grocery bags, small novelty bags, huge multiwall shipping sacks. Bags of all colors, shapes and sizes — and for every imaginable purpose. Nearly 360 bags for every man, woman and child in the United States.

That's the bountiful bag business in the United States today, and it's a business in which Ethyl Corporation's paper divisions and subsidiaries play a leading role.

- Ethyl's Albemarle Paper Manufacturing Company, a wholly-owned subsidiary, turns out thousands of tons of tough kraft paper that go into the production of millions of grocery bags, multiwall sacks and shopping bags.

- Albemarle's recently-acquired (see page 27) Consumer Bag and Packaging Company division makes a wide range of grocery bags and sacks that are used by merchants ranging from the corner delicatessen to the shopping center supermarket.

- Albemarle's Raymond Bag division is a leading producer of multiwall sacks used to ship millions of tons of food, feed, fertilizer, chemicals, building materials and countless other products.

- The Interstate Bag Company division is the world's leading manufacturer of modish, utilitarian handle shopping bags. Each year Interstate produces over 150 million of these increasingly popular bags in more than 130 types, styles and sizes.

Paper bags are so much a part of our everyday life that it's hard to conceive of a time when they weren't available. But there was — a little over a century ago.

Back in the 1850's there were plenty of wares on store shelves and plenty of customers to buy them. But there was no practical way to

Ethyl Corporation divisions
and subsidiaries play a leading role
in the production of the most
popular of all packaging containers

carry the goods home, until a Pennsylvania schoolmaster developed the paper bag. In those days, storekeepers had no trouble twirling a penny's worth of candy into a paper cornucopia. But to devise a sack that would hold 10 pounds of groceries or perhaps a pair of shoes was something else again.

Handmade Bags Unsuccessful

Merchants set up benches in their backrooms where boys with flour paste and shears tried to glue together sheets of paper made from imported jute, hemp and manila. But the materials and labor made these makeshift bags costly. Besides they were ill-fitting affairs that came apart unexpectedly, especially when a customer got caught in the rain.

Shoppers tried to make do with homemade cloth "tote bags" or market baskets but neither was much help for carrying things like sugar, flour or cornmeal which were sold loose at that time.

The packaging problem intrigued Francis Wolle, 35-year-old Bethlehem, Pa., schoolteacher with an inventive bent, and he spent long evenings musing over ways to turn out durable paper containers and do it in quantity. Finally, Wolle hit on an idea for a machine that would do the job. He quit teaching to put his scheme into effect.

Patent Granted

Wolle's first machine, a crude affair operated by a hand lever and readle that rolled out pasted up square and conical bags, appeared in 1851. A year later, he was granted a patent and went into business.

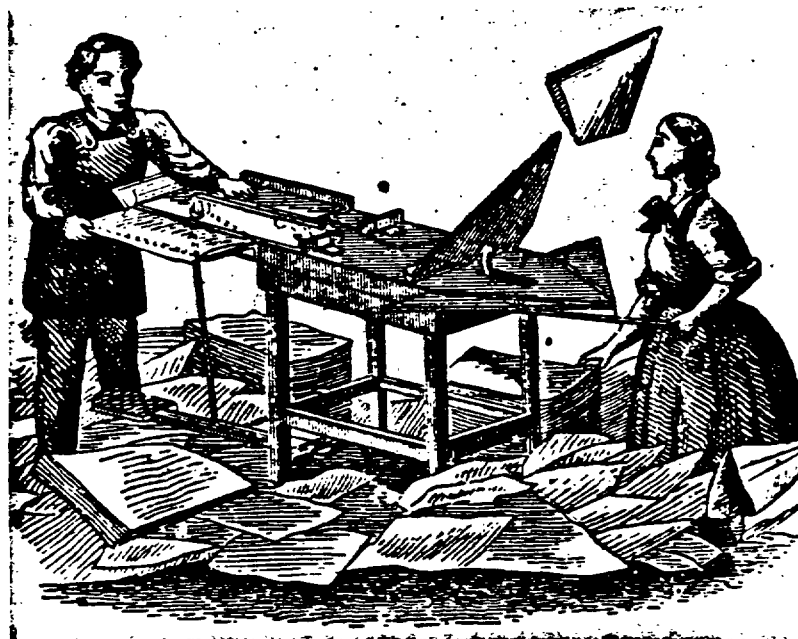
But the machine didn't generate much enthusiasm. Merchants, remembering their own disastrous experiences with handmade bags, doubted Wolle's creation could do any better.



Bags by the Billions

At the end of a production line, multiwall bags—designed and produced according to a customer's requirements—are gathered up for packing and shipping. ▷

Early day bag production was quite unreliable until Francis Wolle, a schoolteacher, developed a successful bag-making machine. ▽



Those who did decide to buy Wolle's early product regretted it. The first batch of bags quickly came apart at the seams and distraught housewives found their groceries spilling into the street before they could reach home. Wolle doubled the quantity of paste thinking that this would strengthen the seams, but he made another grim discovery when a cold wave set in just as he was distributing his revised version.irate merchants reported that in the cold the second batch froze solid.

Wolle finally managed to iron the kinks out of the operation in 1869 after he and a group of backers had purchased the best features of other automatic bag makers which by now had appeared on the market.

Bags from Roll of Paper

The combine's new machine formed bags from a roll of paper in a continuous operation. A long paper tube with a single longitudinal seam was first formed by folding the paper around a cylinder so that one edge of the sheet overlapped the other. Paste was applied and the two paper edges were stuck together. As the tubular paper moved off the cylinder, bag lengths were cut from the advancing end. One extremity of the paper tube was sealed and the complete bag moved onto a dryer.

When merchants realized that here was a bag that did not solidify or fall apart, they poured in their orders. By the early 1870's licensees using the Wolle machine were putting out a million bags a day in New York and New England.

Gradually bag manufacturers evolved ways to cut costs and improve product quality. Paper made from jute, hemp and manila was replaced by sulphite. Later they tried a blend of sulphate (kraft) and sulphite and finally pure kraft, whose principal ingredient is the pulp of the long fiber pine.

The great bag shortage was ended and paper containers became so common that people used them with-

out thinking twice. But it took a herculean feat of production to make this abundance possible.

Today in forests of the South, the West, New England and up into Canada, great plants consume millions of cords of pulpwood each year, chewing and digesting the endless menu into strong-fibered paper. From this paper come bags by the billions — bags for the housewife, the merchant and the shipper.

At Roanoke Rapids, N. C., Ethyl's Albemarle Paper Manufacturing Company transforms some half-million cords of pulpwood a year into kraft paper—much of it for America's multi-billion-bag market.

From the productive manufacturing plant of Albemarle's Interstate division in Walden, N. Y., and Interstate's new plant at Flora, Ind. (see page 28), comes a dazzling array of commodious, colorful shopping bags that have added glamor to the once drab field of packaging. Gemlike they come, in brilliant reds, greens, blues, gold, silver and many other colors imprinted with such prestigious store names as Tiffany and Rosemarie de Paris. Interstate bags, with sturdy handles attached, carry merchandise of every type of store from smart boutiques and jewelry shops to bakeries and hardware emporiums.

Multiwalls by the Millions

In plants at Middletown, Ohio, and Richmond, Va., Albemarle's Raymond Bag Company makes millions of multiwall bags of from two to six layers of rugged kraft paper that can carry up to 100 pounds of materials. Raymond bags go to customers in 37 states and when filled by customers go to every state and to countries on every continent. The sturdy shipping sacks package dozens of agriculture and food products ranging alphabetically from alfalfa meal to yeast and building materials from asphalt to stucco. More than 175 different types of chemicals, drugs, paints, pigments, dyes and

similar products travel in Raymond bags.

Raymond also originated the Multiwall Perfect Seal (MPS), a unique bag with a polyethylene film tube for maximum protection of contents. Just this spring, Raymond has introduced "Multibag", a revolutionary new multiwall bag with a gusseted polyethylene tube liner (See pages 20-23). These sacks not only prevent seepage of the packaged product from the bag but also protect sensitive contents from damage from dampness.



Used at the rate of 70 billion a year in the United States, paper bags have become so much a part of everyday life they are taken for granted.

The volume and variety of grocery bags, sacks and other packaging items produced in the modern Consumer Bag and Packaging Company division plant in Richmond, Va., further diversifies Ethyl Corporation's role in the multi-billion-bag business. For sheer numbers, kraft grocery bags are the most versatile and widely used of all bags. They are used by retail stores of all kinds for easy, economical packag-

ing and Consumer Bag's products for these purposes are shipped throughout the country.

When it comes to sizes, paper bags were originally gauged on how much granulated sugar they would hold. Thus, a five-pound bag, regardless of shape, was supposed to hold five pounds of sugar.

Unfortunately, the system made for many inaccuracies since bag sizes varied from one manufacturer to another. The 20-pound bags made at one plant might hold only as much as the 16-pound bags made somewhere else.

To bring order out of the confusion, the U. S. Bureau of Standards, in 1925, set up minimum capacities for all sizes of grocery bags. The numbers that once indicated pounds of sugar capacity still are used, but they merely designate a bag's minimum cubic capacity. A No. 5 bag has a capacity of 191 cubic inches, a No. 10 has a capacity of 350 cubic inches, etc.

Although paper bags are more than 100 years old, they are continually appearing in new forms for new applications.

Bags for Refuse Collection

A New York restaurateur uses a bag 14 feet long, with a six-foot girth, as a garbage disposal container. He finds it more sanitary than cans and neighbors are not awakened by the banging of metal when the collector pays his early morning call. A number of other commercial and industrial establishments are using multiwall refuse bags for many of the same reasons and several communities across the country are experimenting with bags for improved house-to-house refuse collection service.

The industry also has developed special-purpose bags for such hard-to-package items as fishing poles, beach umbrellas and golf bags.

Almost anywhere you look, it's easy to see that schoolmaster Wolle's creation has come a long way. ○

In expanding the production capacity of its vinyl chloride monomer plants at Baton Rouge and Houston, Ethyl is providing a...

Big Boost for a Popular Plastic

EXPANSION OF Ethyl's vinyl chloride monomer production capacity, now under way at the Company's Baton Rouge, La., and Houston, Texas, manufacturing centers will help plastics producers supply a fast-growing demand. Vinyl chloride monomer is the chemical intermediate for polyvinyl chloride, a widely used and increasingly popular plastic that is growing at an even faster rate than the burgeoning plastics industry.

While overall plastics production totaled 10.2 billion pounds last year—up almost 15 percent over 1963—PVC production shot up at an 18 percent clip, as established uses for the versatile material increased and new applications were developed. In a field crowded with a variety of attractive new plastics, polyvinyl chloride production amounted to 1.6 billion pounds—more than 15 percent of the industry total.

Among the major new PVC products introduced commercially in 1964 were automobile floor mats, foam flooring and bottles. At the same time, production of film and sheet, conventional floor covering materials, wire and cable insulation, phonograph records, rigid pipe, conduit and other building materials grew significantly.

What's responsible for PVC's wide use and fast growth in the competitive plastics field? The answer is found in the ease with which the material

can be handled, its physical properties and its relatively low cost.

PVC can be compounded for a wide range of applications, it is quite easy to process and it is relatively inexpensive. It can be produced in everything from soft, pliable forms, such as packaging film, shower curtains and furniture and wall coverings, to rigid materials, such as pipe and wall and roof panels. PVC has excellent resistance to water, chemicals and abrasion, and is self-extinguishing. It can be made in a wide variety of attractive colors and can be extruded, molded or calendered.

Leading Merchant Supplier

In expanding production capacity, Ethyl is strengthening its position as the leading merchant producer of vinyl chloride monomer, selling it to other companies for conversion into polyvinyl chloride plastics. The Company began producing the intermediate at Baton Rouge in 1958, and added





manufacturing facilities at Houston in 1960.

In making vinyl chloride, Ethyl has drawn extensively on its long experience in the production of such chlorinated hydrocarbons as hydrogen chloride, ethyl chloride and ethylene dichloride. The Company makes the monomer by thermally cracking ethylene dichloride in a highly efficient process. The operation yields both vinyl chloride and hydrogen chloride as a byproduct. The latter is used in other Ethyl intermediate chemical manufacturing operations.

The new, multi-million-dollar expansion of production facilities at Baton Rouge and Houston is expected to be completed next year. It will increase the Company's vinyl chloride capacity by approximately 40 percent to over 400 million pounds a year.

In a related construction project at Baton Rouge, Ethyl also is increasing ethylene dichloride production capacity. Ethylene dichloride is used not only in the production of vinyl chloride, but also in the manufacture of antiknock compounds and in the processing of chlorinated solvents, two other "Ethyl" products.

Further diversifying in the plastics field, Ethyl is going into the manufacture of PVC resins and compounds. A new, \$8 million plant to produce these materials is nearing completion at Baton Rouge. There, vinyl chloride monomer will be poly-

merized, or converted into polyvinyl chloride, which will be sold in the form of pellets or powder to manufacturers of plastics products.

In further extensions of its polyvinyl chloride business, Ethyl has gone into the manufacture of several finished PVC products, which are made from the resins and compounds.

A year ago, the Company acquired a small PVC pipe manufacturing operation as a base for entering the pipe and conduit field. The operation has been expanded and is now a part of Ethyl's Vis-Queen division. PVC pipe has a number of weight, handling and durability advantages and its use is increasing. It has applications for drain, waste and vent pipe in residential construction, in irrigation systems, gas transmission lines, oilfields and as electrical conduit.

Late in 1964, together with Solvay of Belgium and Hedwin Corporation, Solvay's American subsidiary, Ethyl formed Vypak Corporation to manufacture and market polyvinyl chloride bottles. Vypak PVC bottles are made with a high degree of clarity, resist attack from hard-to-package solutions, and provide an effective barrier to the transfer of air and other gases. They are strong and shatter-resistant, are made in a wide range of sizes, shapes and designs, and are used for a growing number of household products. ○

A PPEALING AUTOMOBILE TRIPS in regions ranging from desolate Death Valley to picturesque New England, and from historic Virginia to the wilderness of Washington State, are described in detail in Ethyl's Magic Circle program this year. Following the directions in inviting Magic Circle travel articles, motorists and their families can relive the closing days of the Civil War just 100 years ago this spring, see how Navajo Indians live in 1965, tour some of the country's most elaborate ski resorts, relax in quaint, out-of-the-way villages, enjoy fabulously beautiful scenery, and do the thousand-and-one other things that automobile trips make possible.

Now in its eighth consecutive year, the Magic Circle program is intended to stimulate automobile travel by pointing out the many cultural, scenic, recreational and historical attractions there are to visit—by car—in every section of the country. At the same time, the articles emphasize that visits to these attractions provide automobile travelers with a richer appreciation of their country's heritage.

The Magic Circle program is a keystone of the petroleum industry's market expansion efforts, designed to promote the sale of more gasoline and other service station products through greater use of the family car on vacation, week-end and even day trips. As a public service, the program is even more significant in view of President Johnson's appeal to "See America First."

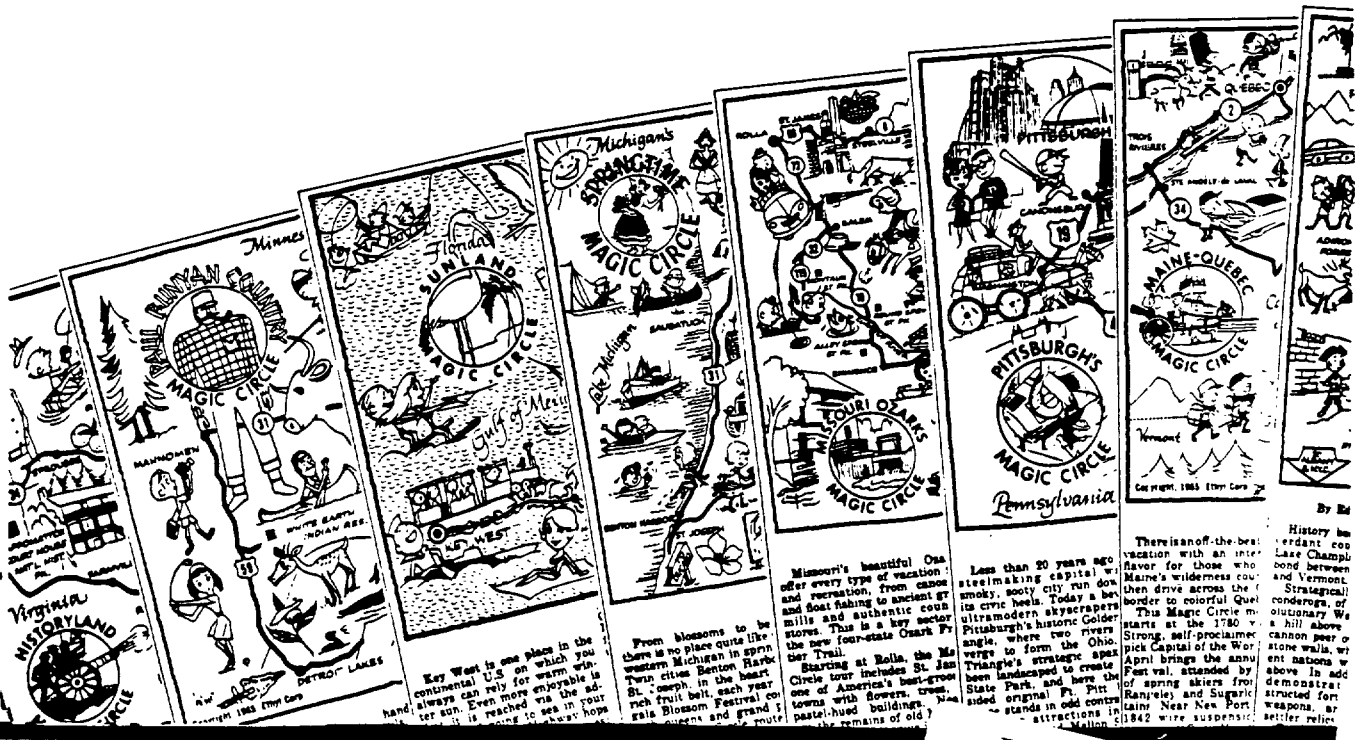
The Magic Circle program consists of a series of feature articles, supplied on a regular basis to more than 900 newspapers from coast to coast for use on travel pages. The articles are not run-of-the-mill tourist accounts or rewrites of travel folders. They are refreshing descriptions of travel opportunities written especially for motorists by an author who has covered the Magic Circle tours by car himself.

Each Magic Circle article is accompanied by an animated map that highlights the major attractions on the tour described. The map delineates the major highways to be traveled and also shows the area's highlights in eye-catching sketches done in a light, entertaining style. In addition, newspaper editors often are supplied with photographs to illustrate the Magic Circle articles.

Even after seven years of reporting the attractions of America, there is something new under the sun this year in the Magic Circle program—and it is just that, the sun. Out-of-the-ordinary jaunts in the winter-time sun of Arizona, California and Florida have been featured in stories and maps already supplied to the newspapers. Following Sol's movement northward, there are fun-in-the-sun features about motor trips in the more northerly states, winding up later in the year with word-and-map tours of the New England, Michigan, Colorado and Utah ski areas.

Another new feature this year is Magic Circle reports on colorful, exciting parts of America that

THERE'S MILEAGE IN MAGIC CIRCLES



rarely have been visited by motorists before but which now can be—thanks to newly-built roads. One of these is the Navajo Trail, the name given to a black-topped highway constructed where no road existed before in the Four Corners area of Arizona, Utah, Colorado and New Mexico.

Many other Magic Circle tour suggestions also are tied in with the American Petroleum Institute's various "Trail" promotions in different parts of the country. The trails, which take in many scenic and historic points of interest, include the New England Heritage Trail, the Dixieland Trail, the Lincoln Heritage Trail, the Ozark Frontier Trail, the Hiawatha Pioneer Trail and the Old West Trail.

Part of the Magic Circle program's continuing success lies in its twofold flexibility, attractive to the motorist and editor alike. In the first place, each tour is presented in such manner that it either may be followed completely at a leisurely pace to form an entire vacation trip or that just segments of it may be visited by those who have fewer days, perhaps a holiday or long weekend, at their disposal. Secondly, while the schedule of Magic Circle releases is established well in advance, there is sufficient flexibility to report on special major events as they are about to occur, in addition to the regular schedule of suggested visits to more permanent cultural, scenic and historical attractions.

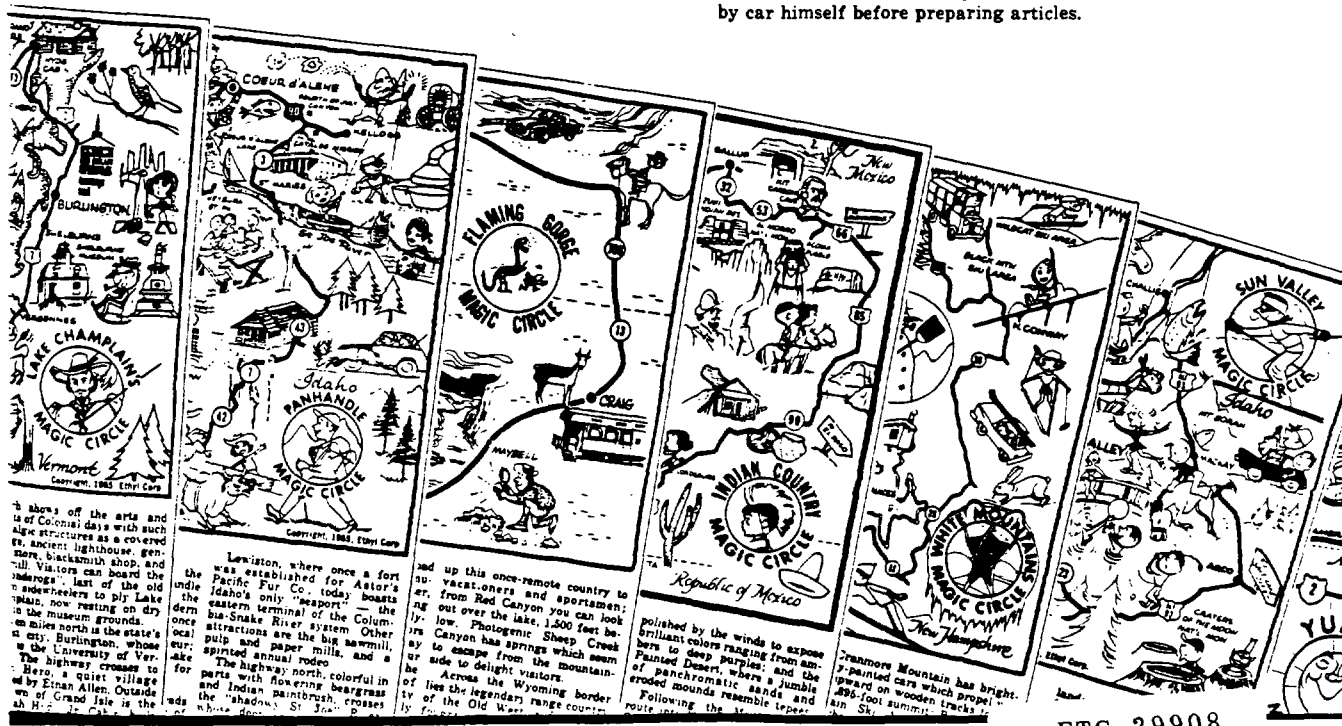
Such was the case recently with a Magic Circle tour entitled "Virginia Historyland." While the capital city of Richmond and the serene Virginia countryside are a delight to tour on any occasion, a visit this spring was especially rewarding since the Civil War concluded just a century ago. Starting with the Richmond-Petersburg area and ending with the scene of General Lee's surrender to Gen-

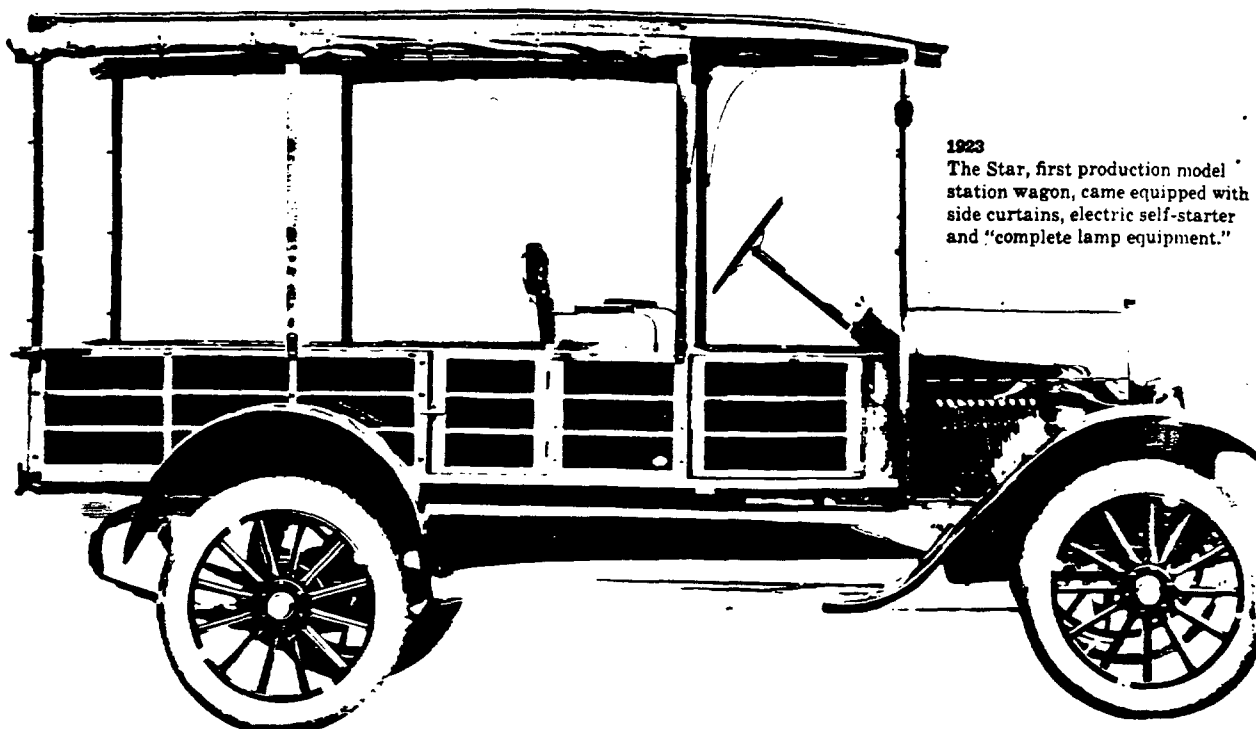
eral Grant at Appomattox, some 100 miles to the west, the "Virginia Historyland" Magic Circle tour takes in much of the territory traversed by the retreating and pursuing armies.

Commenting on the Company's Magic Circle program, James B. Lonergan, director of advertising and sales promotion, says: "Ethyl Corporation is proud of its long role of leadership in encouraging Americans to see more of their country and hence gain a fuller knowledge and appreciation of its history and heritage. We shall be further gratified if our effort contributes to President Johnson's 'See America First' campaign. Too, we are pleased to cooperate with the petroleum industry in its market expansion program through our widely-accepted Magic Circle campaign. To the 'See America First' byword, we join with the oil industry by adding, 'and see it best—by car.'"



Experienced traveler and travel writer Edward A. Collier covers Magic Circle tours by car himself before preparing articles.





1923

The Star, first production model station wagon, came equipped with side curtains, electric self-starter and "complete lamp equipment."

The Wonderful World of Wagons

By Jack B. Kemmerer

THE WIDESPREAD POPULARITY OF STATION WAGONS—those versatile vehicles that carry entire families, plus pets and luggage, on vacation trips; speed breathless commuters to the 7:55; transport teams of Little Leaguers to ball games and patrols of Boy Scouts on camping trips; and haul endless bulging bags of groceries, lawn seed, fertilizer and almost everything else—is a relatively recent automotive phenomenon. But the wagons themselves come from a long line of distinguished ancestors.

Ever since railroads started hauling passengers, there have been station wagons at the depot to meet arrivals. A century ago, highly polished, wood panel wagons, drawn by well groomed horses and driven by liveried coachmen, were fine examples of the carriage maker's art. Today's stylish, roomy, efficient wagons—often with a suburban housewife at the wheel—are still meeting trains, as well as many of the other travel needs of a growing, mobile population. They are another

example of the automobile industry's ability to mass produce vehicles that satisfy modern America's taste in transportation.

Station wagons have come on with a rush since World War II. There are now some seven million of them on the roads and highways of the country and they are rolling off Detroit's assembly lines at the rate of a million a year. They currently account for about 13 percent of annual automobile production.

Going back into highway history, it's not easy to determine definitely

just what vehicle was the patriarch of the big and growing station wagon family. But the Rockaway, with a light exterior wooden frame and panels of mahogany or walnut, built about 1830, is considered the first horsedrawn model.

The Rockaway was followed by many other station wagons over the ensuing decades before harnessed horsepower displaced harnessed horseflesh and the first motorized model chugged onto the automotive scene in 1901. The White steam car is the vehicle usually credited with this significant accomplishment.

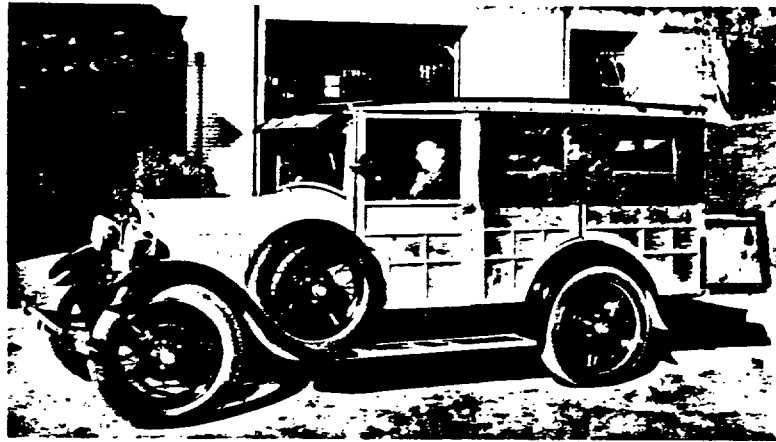
The White was followed several years later, in 1909, by a "six-passenger combination car on a one-ton truck chassis," produced by Rapid Motor Car Company. In later years, custom models offered by various manufacturers went under many names: station wagons, station buses, depot wagons, estate wagons and beach wagons.

During the first years of the horseless carriage age, before engines were neatly concealed beneath

the hood, storage space—one of the big selling points of today's wagons—apparently was sadly lacking in most models.

"One thing seems to have been lost sight of that will be greatly missed, and that is storage space," mourned one reluctant convert to automobiling. "Under the seat in the buggy there was room for a hamper of provisions for a picnic, a traveler's grip, or supplies for the needy.... This space in the automobile is occupied by the driving mechanism, and the baggage is piled upon the carriage in a manner that suggests moving day."

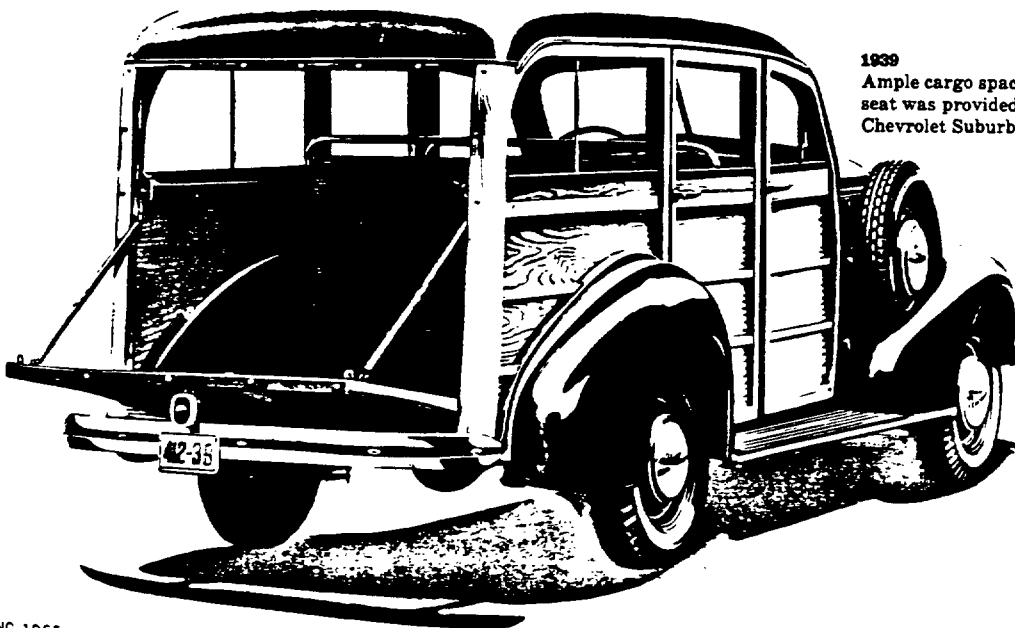
The enterprising industry saw the need and potential market for a vehicle that could haul both passengers and cargo in comfort, and by 1922 was exploring ways to produce one. Durant Motors apparently solved the problem first, for in 1923 they offered the Star station wagon, reputed to be the first production model station wagon. The Star was an open, wooden body, six-poster, "especially suited for general farm use, city delivery, express service and station service for country resorts and estates." The body was mounted on the standard Star automobile chassis. Drop side curtains for bad-weather driving and an electric self-starter were standard equipment.



1929 Model A Ford was described as "mechanically indestructible."

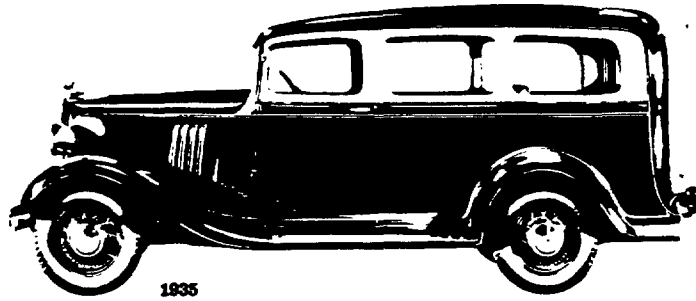


1935 Six years later, Ford wagon had V-8 engine and was "streamlined."

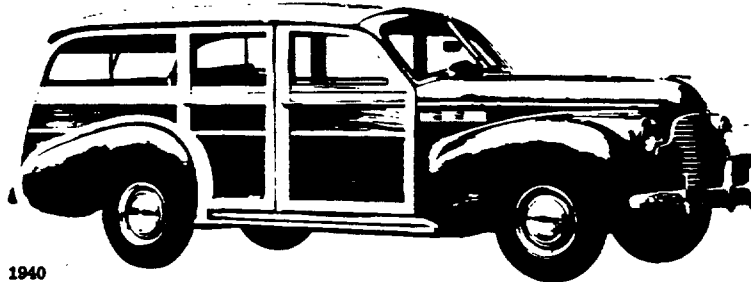


1939
Ample cargo space behind rear seat was provided in Chevrolet Suburban Carryall.

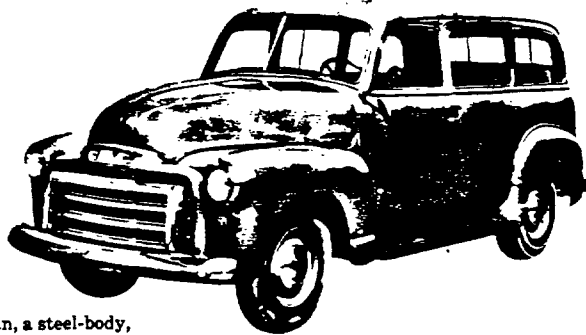
The Wonderful World of Wagons



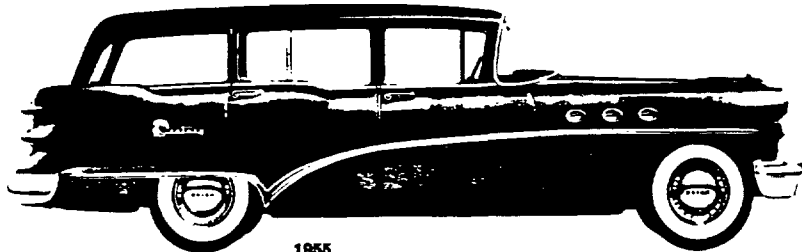
1935
Chevrolet deluxe station wagon, the first all-steel model, was patterned after a panel body truck, with windows added.



1940
Buick's first station wagon, a two-tone, wooden body model.



1948
GMC Suburban, a steel-body, heavy-duty adaptation of lighter wagons.



1955
With the switch to all-steel bodies, wagon sales zoomed. This Buick Century was one of 780,151 units produced by the industry.

Other manufacturers joined the parade. Ford offered a Model-T wagon in the 1920s, and General Motors listed several custom wagons.

Still in the 1920s, Ford began turning out its first production model station wagon. This 1929 Model A was described by an automotive writer of the time as "a wooden-bodied, lurching, backfiring horror that is mechanically indestructible." Only a handful of the "horrors" were sold, however, and they attracted little public notice.

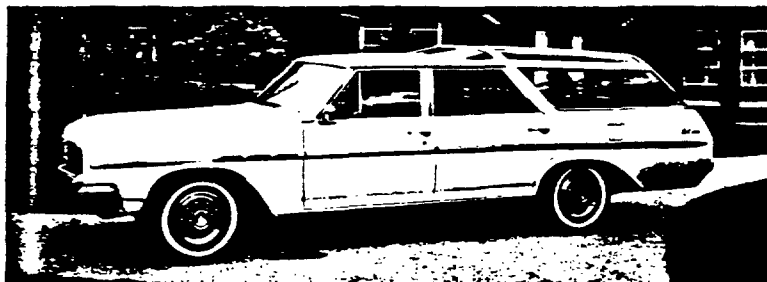
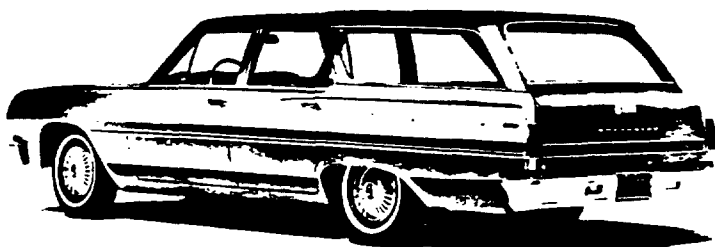
In 1932, Ford manufactured 1,418 station wagons, the automobile industry's entire output. Four years later, three automobile companies and five truck firms were making station wagons, but total production still amounted to only 7,392 units.

All early model station wagons had one big drawback which kept them in the luxury field and therefore limited the demand—wooden bodies. Wood was considered a prestige auto body material, but no matter what preservatives or finishes were used, the beautiful panels simply could not stand the weather for any length of time. Bolts would work loose, rattles develop, and finally the wood itself would turn dark and rot away.

But Detroit was equal to this challenge too. In 1935, Chevrolet pioneered the first all-steel station wagon body — on a delivery truck chassis—eliminating wood maintenance problems and helping to pave the way for the sustained station wagon boom that is now on. Just as the new vehicle form was ready to catch on, World War II put the brakes on car production.

In 1946, with the war over, Willys wrapped its famous military Jeep in a boxy, steel, wagon-like body and sold over 6,000 units to a car-hungry civilian population. Willys sales zoomed to over 33,000 in 1947, almost as many station wagons as the entire industry had sold in 1940.

By 1949, Plymouth and Kaiser-Frazer were out with all-steel models. Ford followed suit in 1952 and soon practically every other manufacturer was in the business.



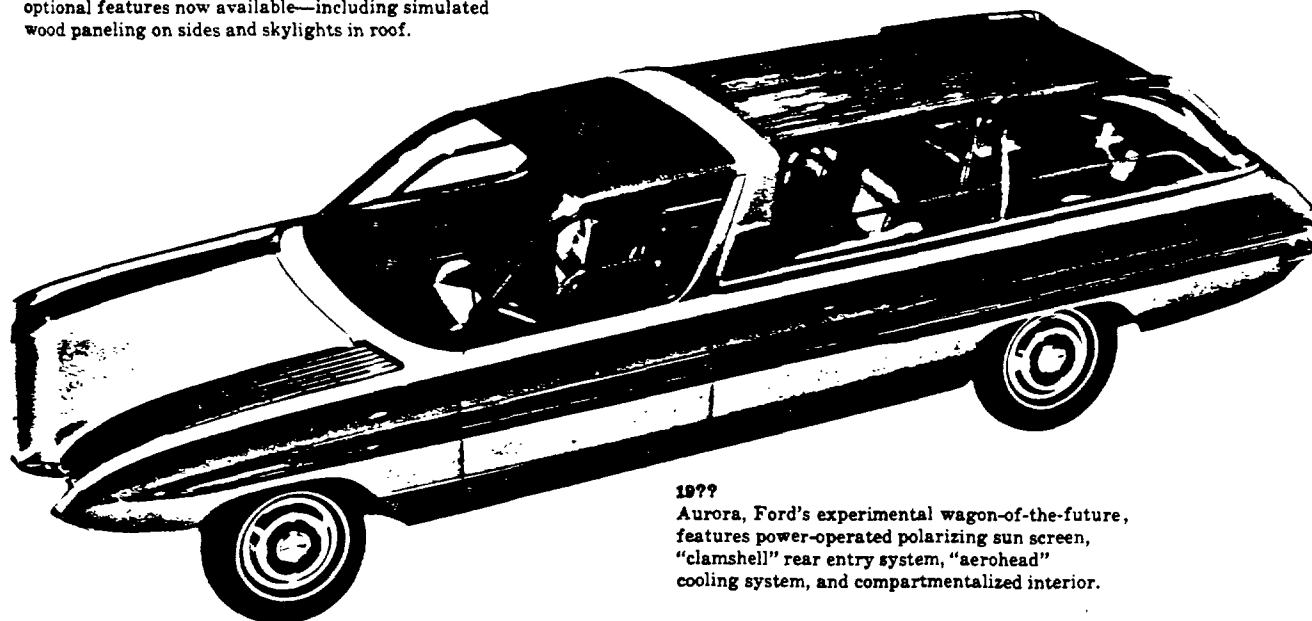
1965
Three current models display the style, size and optional features now available—including simulated wood paneling on sides and skylights in roof.

With the annual sanding and varnishing chore eliminated and with a more affluent, growing population interested in practical, yet comfortable and attractive transportation, station wagons took to the road by leaps and bounds.

On some of the more deluxe models, simulated wood paneling is now available, but the wooden station wagon body is a thing of the past.

A few statistics trace the wagon's rapid climb in popularity. In 1949, manufacturers turned out about 100,000 units—a small percentage of their total automobile production that year. A year later, this figure had risen by more than 50 percent to 160,000, and 10 years later, in 1960, annual production of station wagons topped the million-a-year mark. Every major automobile manufacturing company is now in the station wagon business.

If any one word sums up station wagons' appeal, it's probably "versatility." Ideal for personal or business use, home or vacation travel, station wagons are the cars that most nearly meet all the transportation needs of the American family. There seems to be no doubt that they're here to stay. ○



1977
Aurora, Ford's experimental wagon-of-the-future, features power-operated polarizing sun screen, "clamshell" rear entry system, "aerohead" cooling system, and compartmentalized interior.

Building with Light and Color

Easy to handle and install,
VisQueen PVC Panels, a new Ethyl product, are
just the thing for modern construction

COLORFUL, DURABLE NEW PLASTIC PANELS—designed for daylighting in modern industrial, commercial, residential and agricultural construction applications—are one of the latest additions to Ethyl Corporation's expanding line of diversified products. Known as VisQueen PVC Panels, the rigid sheets of polyvinyl chloride plastic are available in flat and several corrugated styles, and in a variety of colors, lengths and thicknesses.

The panels are attractive as well as utilitarian, providing both color and protection. They are ideally suited for use in roofing, skylights, siding and partitions where varying degrees of light transmission are desired. The nine colors—ranging from opaque white through various shades of neutral, yellow, green and aqua—can be used to admit and diffuse up to 80 percent of available light from natural or artificial sources.

VisQueen PVC Panels are distributed nationally

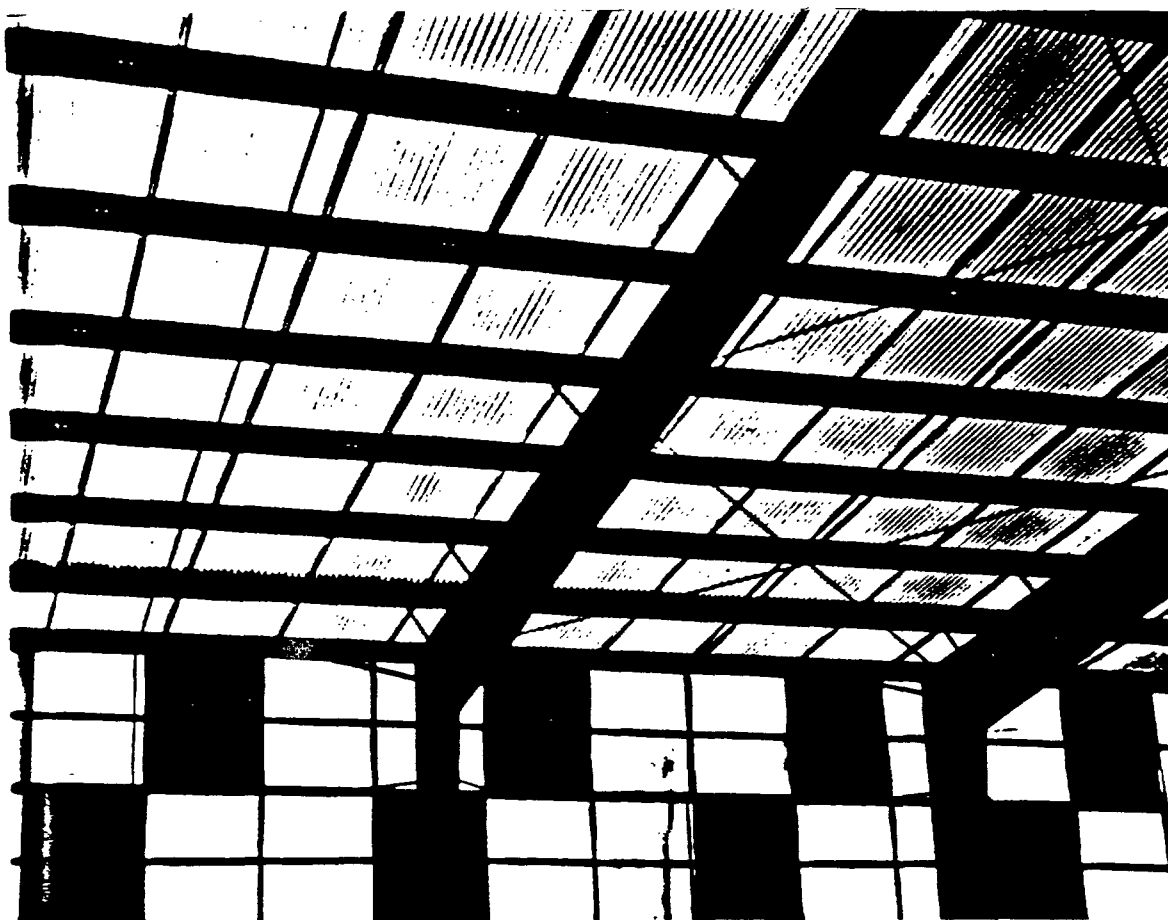
through building material distributors and suppliers. They are less expensive than many traditional building materials, but are exceptionally strong and light weight. They can withstand pressures up to 80 pounds per square foot and winds of 100 miles per hour.

The panels come in lengths of 8, 10 and 12 feet and a standard width of 50½ inches. While they range in thickness from .052 to .068 of an inch, all panels weigh eight ounces per square foot.

Unlike translucent building panels made of other materials, VisQueen PVC Panels are non-combustible and flame-resistant. They require virtually no maintenance, will not splinter, chip, peel or blister, and are immune to common industrial atmospheres and chemicals.

The panels are easily and quickly cut, drilled, fitted and installed and are readily sealed together or joined with other materials. Corrugated styles may be bent around corners or lengthwise to a 10-foot radius.

It is anticipated that the greatest demand for the more translucent VisQueen PVC Panels will be in building and remodeling industrial, commercial and public facilities, especially those where a combina-



Durable and translucent, VisQueen PVC Panels are ideally suited for roofing, skylights, siding and partitions.



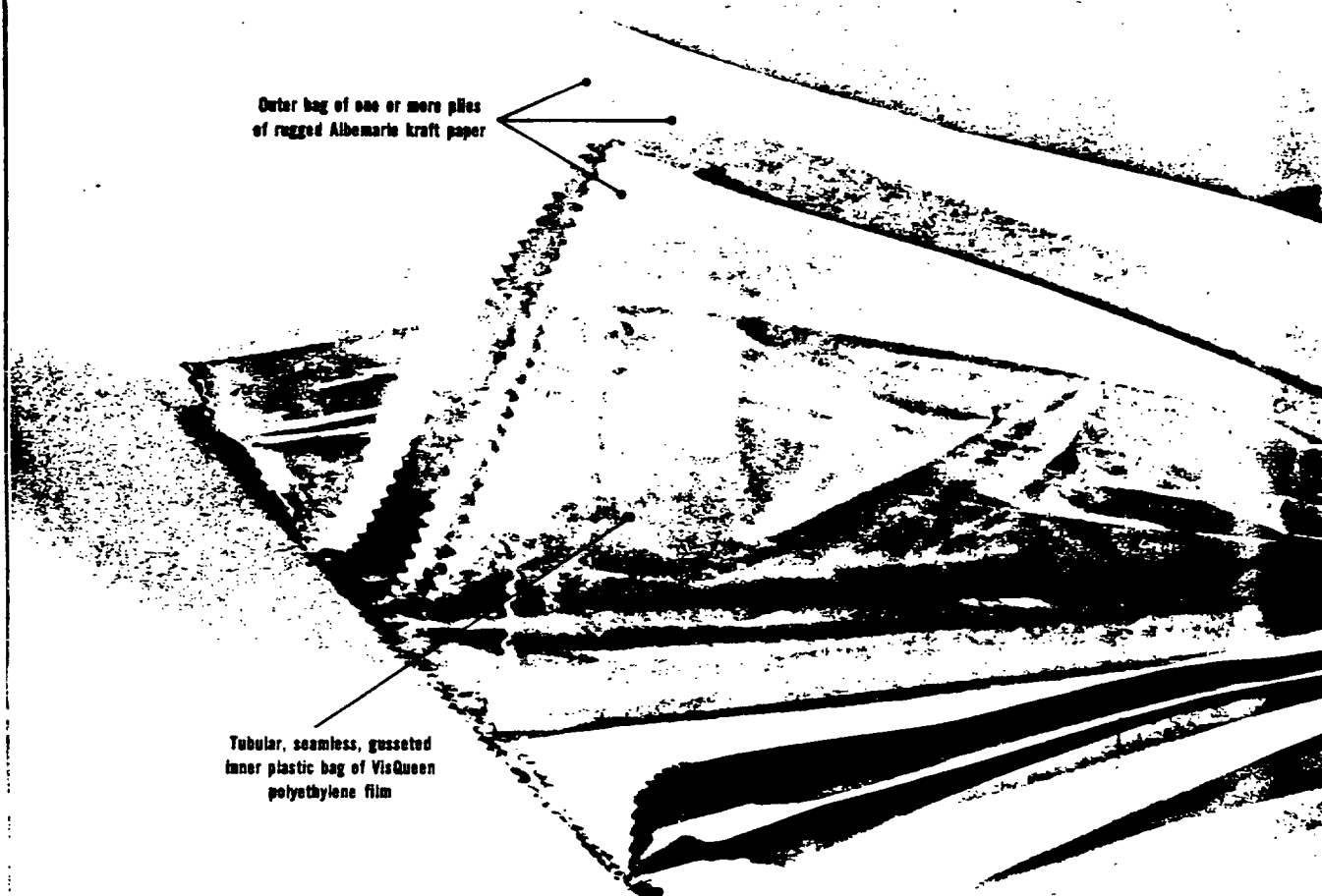
Because of their light weight, even the largest panels present no handling problems on the job.

tion of maximum natural light and protection for interiors is required. Such buildings include manufacturing plants, mills, warehouses, laboratories and terminals and also stores, display rooms, sports arenas, motels, auditoriums and civic centers. Durable greenhouses and similar structures for florist, nursery and agricultural purposes can be built with panels of high light transmission.

More opaque panels have a number of practical applications. Among them are the skins of water cooling towers at refineries and plants, exterior covering for quonset huts and other workaday structures, shelters for commercial vehicles and heavy-duty equipment and fencing around commercial or industrial areas.

For the home and special-purpose markets, panels of various translucence and colors offer interesting applications in roofs, partitions or dividers for patios, game rooms, carports, swimming pools, terraces and recreation areas, and beach pavillions and marinas.

Used in conjunction with natural or artificial light, VisQueen PVC Panels make possible a number of striking effects where eye appeal, distinction and harmonious modernity are desirable. ○



Outer bag of one or more plies
of rugged Albemarle kraft paper

Tubular, seamless, gusseted
inner plastic bag of VisQueen
polyethylene film

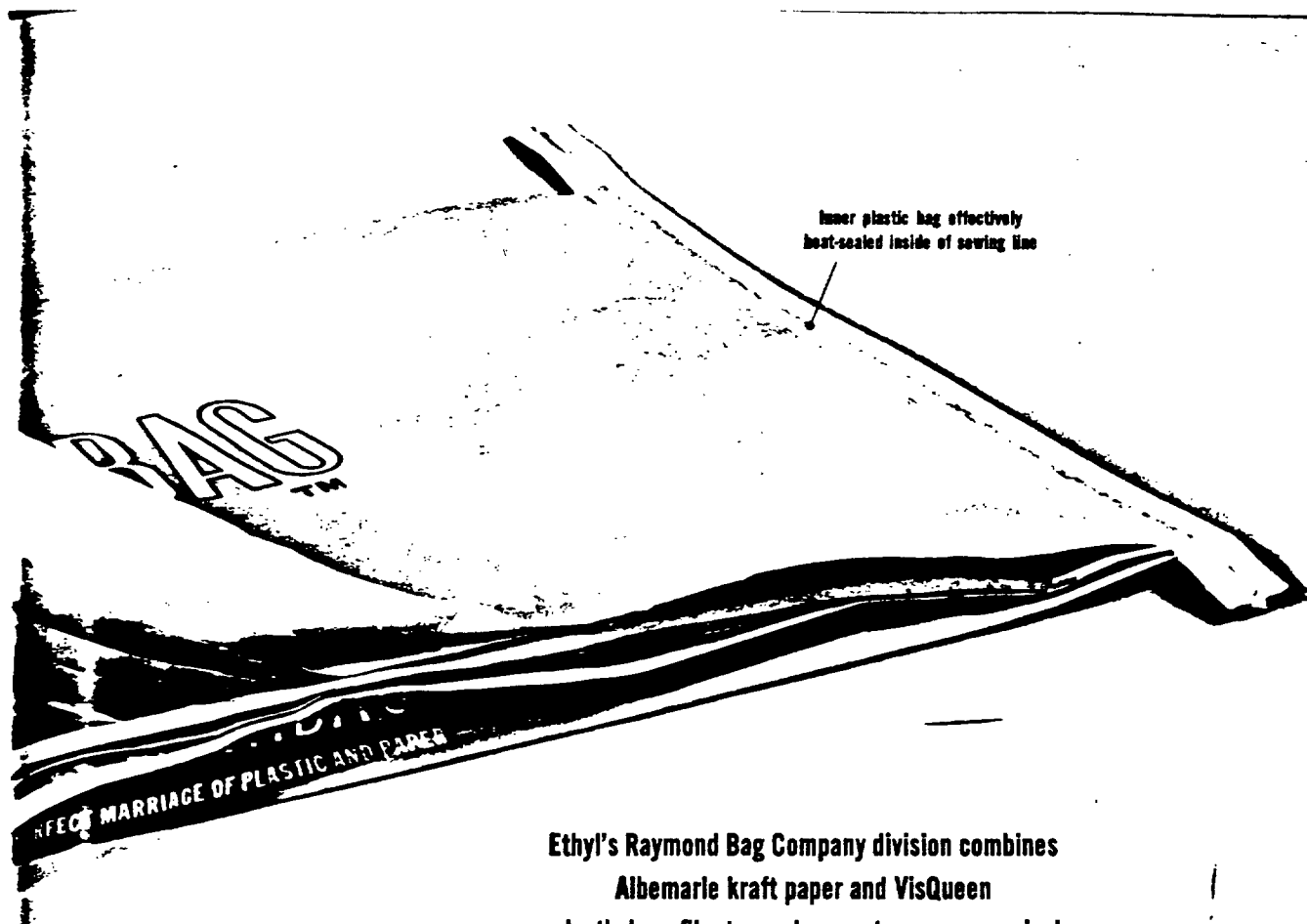
Anatomy of a Multibag

TWO ETHYL PRODUCTS—versatile VisQueen polyethylene film and rugged Albemarle kraft paper—have been effectively combined by Ethyl's Raymond Bag Company division in a "perfect marriage of paper and plastic" to produce an exceptionally strong, economical, new type of multiwall shipping sack. Known as Multibag, the revolutionary Raymond container offers all of the advantages of both plastic bags and paper bags in one packaging unit.

Multibag provides shippers of fertilizers, chemicals, food, feed and other bulk materials with a much stronger, more durable package, with greatly increased resistance to moisture, contamination and chemical action—vital considerations in handling such products. At the same time, Multibag can provide substantial savings in packaging and shipping costs. On a price-performance basis, it can reduce shippers' packaging costs up to 20 percent, depending on the specific construction of the bag.

Developed by Raymond Bag, with the cooperation of the Ethyl plastics research and development staff, the new bag is produced by Raymond's experienced manufacturing department.

Multibag, which is patented and trademarked, consists of an



**Ethyl's Raymond Bag Company division combines
Albemarle kraft paper and VisQueen
polyethylene film to produce a strong, economical,
revolutionary new shipping sack**

inner plastic film bag and an outer kraft paper bag of one or more plies. Its outstanding feature is its tubular, seamless, gusseted inner plastic bag which is slightly smaller than the outer multiwall kraft plies. The size and configuration of the plastic bag enable it to contribute maximum strength to the combined bag and provide maximum protection for the contents.

More Strength and Protection

With American industry and agriculture using some 2½ to 3 billion multiwall bags annually to ship a variety of products, the effective combination of a gusseted inner plastic bag and a multiwall kraft bag

has been a goal of the paper industry for many years. In achieving the goal, Multibag makes it possible for the plastic and paper bags to contribute the independent strength and protection factors which each is designed to provide. Together, the two types of bag assure users of Multibag of a package that offers greater strength and protection and is superior on a cost-performance basis than either a conventional multiwall bag or an all-plastic bag.

The use of the inner bag of gusseted, seamless plastic tubing offers several advantages:

- It eliminates longitudinal seams encountered when plastic sheeting or coated or uncoated paper are

used. Such seams can present adhesion, contamination and barrier problems if they are not firmly, completely and permanently sealed.

Contamination Eliminated

- The inner surface of the tubing is never exposed to the atmosphere or to any other surface or material from the time of its manufacture into film until the bag of which it is a part is filled with the product to be shipped. This eliminates the possibility of product contamination by the fibers of kraft paper or from other materials on the surface of sheets of film or other papers.
- The tubing can be heat sealed with a high degree of efficiency in



**Tubular, seamless, gusseted, plastic inner
bag provides increased resistance to moisture,
contamination and chemical action**

the bag manufacturing process or at the shipper's plant after the bag is filled, and therefore Multibag can be used effectively for practically all products.

- The gusseted, seamless tubing requires no scoring or severe creasing which in other bags weakens the film or inner paper ply and reduces its barrier properties. Multibag's tubing therefore protects contents more effectively.

- The configuration of the plastic tube enables it to provide maximum moisture, grease and acid resistance, since it can be used as the innermost

layer in the multiwall construction and supplies improved protection for the weight and thickness of the film used.

These advantages, plus efficient, high-speed manufacturing methods developed by Raymond Bag, increase packaging effectiveness while reducing costs for many users. The skillful combination of plastic and paper in Multibag provides greater protection at the same cost or the same protection at lower cost.

The unique construction, in which the inner plastic tube is slightly smaller than the outer kraft plies

saves paper and makes it possible to successfully utilize polyethylene film as light as one-half mil for the first time in such an application. Films up to 3 mils in thickness also are available in Multibag. It is because the film is gusseted and available in varying thicknesses that the performance qualities of the plastic inner bag exceed those of all comparable grades of coated papers used in multiwall sacks.

As they do in supplying other Raymond bags, the Company's sales representatives work with Multibag customers to suggest the size and

specific construction best suited to the customer's requirements. Raymond sales representatives also help customers take advantage of available advertising space on the outer surface of bags by cooperating in the preparation of attractive designs. These may include product name, information and instructions for use, company identification and trademark, and any other desired data.

Raymond's art department creates designs for approval by customers or works with supplied artwork, and follows through with the production of printing plates to assure the accuracy and quality of bag printing.

Two Efficient Plants

Raymond has been a leading manufacturer of multiwall bags for many years. In efficient plants in Middletown, Ohio, and Richmond, Va., the Company produces millions of attractively designed, sturdy bags, custom made for the products they package and the markets in which they are sold.

Raymond was the originator several years ago of the first polyethylene-lined bag, the Raymond MPS Multiwall Perfect Seal). More recently, the Company has added a six-color flexographic press to produce fine quality color screen printing on paper and plastic materials and has gone into the production of all plastic bags, in addition to paper bags of 3, 4, 5 and 6 plies.

Design Equipment

Raymond salesmen and packaging engineers work closely with multiwall bag users in recommending, designing and installing modern bag-filling equipment which increases efficiency by filling, weighing and closing bags automatically.

The development of Multibag is Raymond's most recent contribution to the improvement of packing products and services for producers and shippers of chemicals, foods, seeds, fertilizers and other bulk materials. ○



△ Multiwall bags produced by Ethyl's Raymond Bag Company division package tons of food, feed and chemicals.



◁ VisQueen polyethylene film, the plastic material from which Multibag's inner bag is made, is widely used in packaging, building and agricultural applications.

How many miles do heavy-duty, gasoline powered trucks travel in an average month? ... in a year?

What type of oil and grade of gasoline do they use? ... how much do they consume? ... and where and how do they buy it?

Is maintenance done on a regularly scheduled, organized basis and how long-lasting are valves, rings, spark plugs and other vital engine parts?

The answers to these and many other questions about truck operation, fueling, lubrication, maintenance and durability—important to oil refiners and marketers, engine manufacturers, and to Ethyl Corporation's research laboratories—are found in

the results of the current phase of a continuing Ethyl survey.

Conducted by the Company's automotive engineers and technical service group, the current survey covers some 6,000 gasoline-powered, heavy-duty trucks of over 19,500 pounds combined weight in 222 different fleets in various parts of the country. The fleets include major makes of trucks in proportion to their popularity and are divided into three service groups—long haul (over 150 miles one way), short haul (under 150 miles with one or two stops), and local delivery (under 150 miles with multiple stops). As might be expected, local-delivery trucks tend to be lighter than trucks in either long-haul or short-haul service.

A New Look at the Fleet Market



Ethyl survey updates oil marketers, engine manufacturers and the Company's research laboratories on the fueling, lubrication and maintenance practices of heavy-duty, gasoline-powered truck operators

Overall, survey results show, gasoline-powered, heavy-duty trucks are traveling further and are lasting longer.

Long-haul trucks now travel an average of some 7,000 miles a month, or about 84,000 miles a year, compared to slightly more than 6,000 miles a month in 1953, the year that the Ethyl survey assumed its present form. At the same time, short-haul trucks are now covering 4,000 miles a month while those in local delivery service are clocking some 2,000 miles.

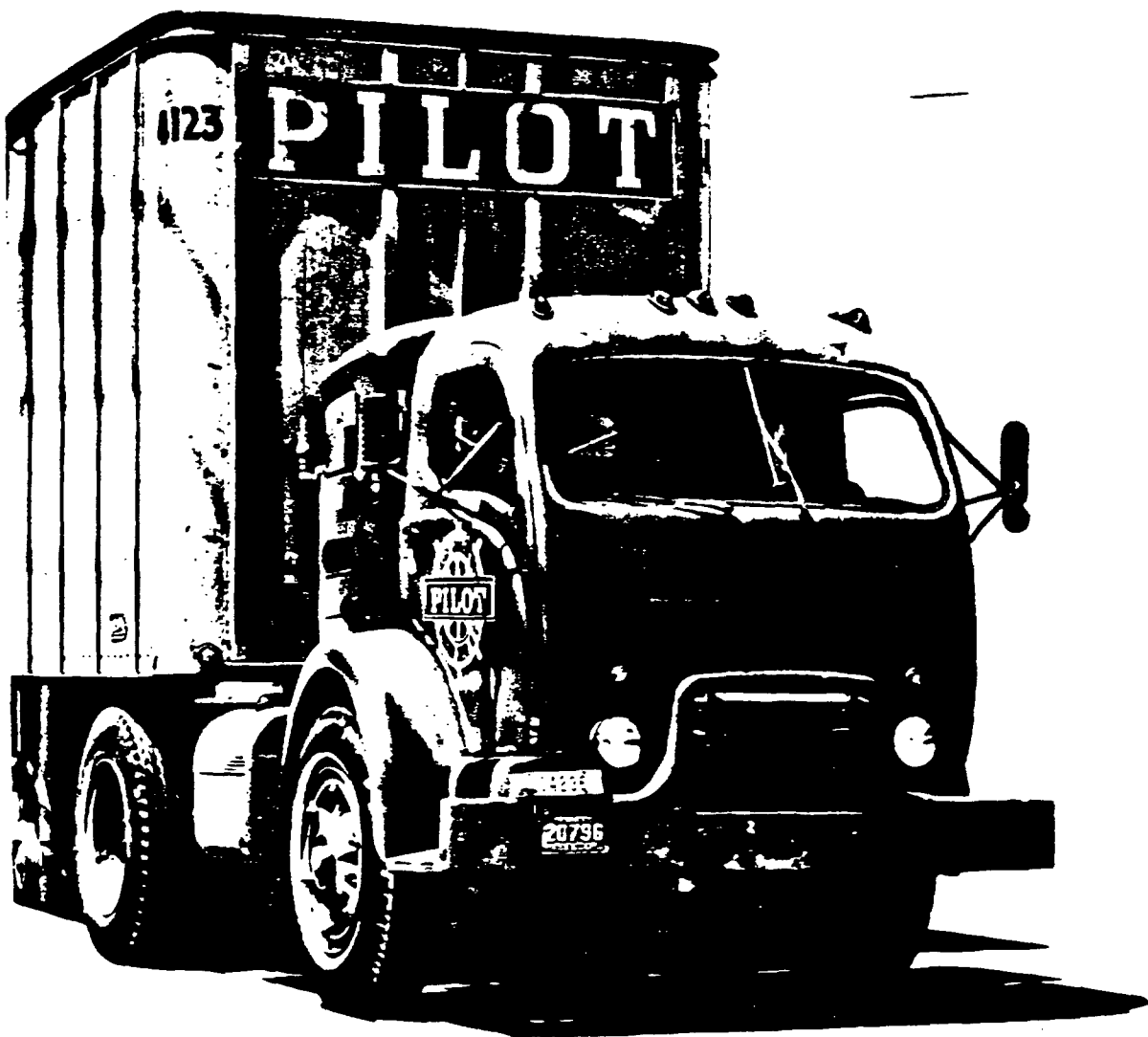
In contrast to the average passenger car, which accounts for about 700 gallons of gasoline a year, trucks are big gasoline consumers and therefore fleets can be substantial volume customers for oil

marketers. The average long haul truck covered in the survey uses about 17,000 gallons of gasoline a year, short haul trucks use 9,000 gallons and local-delivery trucks use about 3,000 gallons.

While the truck fleets by and large use regular grade gasoline, some—especially in the Southwest and West—use premium or special blends.

Contrary to reported practices, fleets are quite loyal to fuel suppliers and usually buy from one source over extended periods. Forty-five percent of the surveyed fleets had purchased their gasoline from the same supplier for seven years or more.

Other significant findings in fuel purchasing habits: larger fleets are more loyal than smaller fleets; only 27 percent of the fleets had changed



A New Look at the Fleet Market

suppliers in the year prior to the time of the survey; there are significant differences in purchasing habits in various parts of the country, with loyalty to the same supplier much stronger in the East and Midwest than in the South and West.

When it comes to engine lubrication, the Ethyl survey shows that more fleets are now using lighter oils—especially in winter—than previously, and that SAE 30 oils are the most popular. Naturally, in cold weather areas many more fleets change oil viscosity from winter to summer than in warmer climates.

The most common oil drain interval for long-haul fleets is 3,000 miles, and 95 percent of trucks in this type service have the oil changed at least every 4,000 miles. For local delivery and short haul fleets, oil is most frequently changed every 2,000 miles, although in short haul service a number of trucks go 3,000 and 4,000 miles between drains, and a few even go as far as 8,000.

Overall, long-haul trucks use about twice as much oil in a year as short-haul or local delivery vehicles and over 10 times as much as the average passenger car.

Most fleets change oil filters every time the oil is changed.

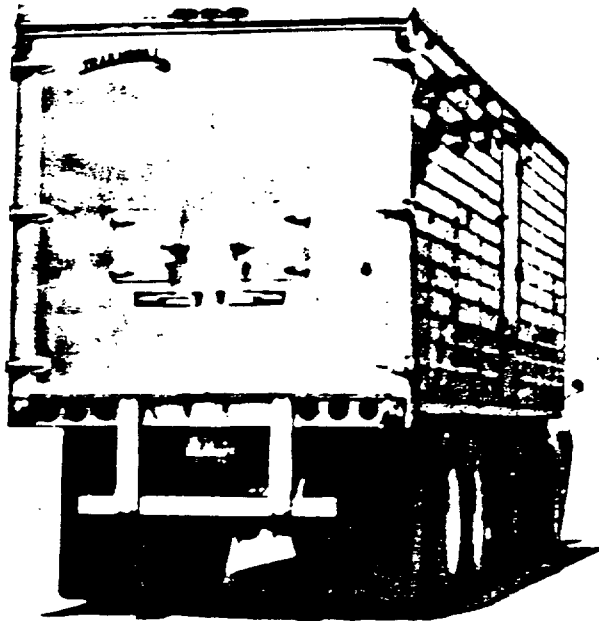
While some fleet trucks go as far as 5,000 miles between chassis lubrications, an interval of 1,500 to 2,500 miles is the most common, and there is very little difference in lubrication intervals for the three types of truck service.

To handle preventive maintenance most effectively, most fleets plan their vehicle overhaul and service for the convenience of the shop rather than on a breakdown or crisis basis. Schedules usually are based on past experience in operating the trucks.

Continuing increases in truck engine durability are seen in the survey's findings. Fleets reporting piston ring life of more than 100,000 miles rose from 20 percent of those surveyed in 1953 to 50 percent in 1964, and the percentage of trucks traveling 100,000 miles or more before valve overhaul rose from six to 35 percent. In the last six years, the service life of spark plugs (the accumulated mileage before removal for cleaning or replacement) has almost doubled from 7,000 miles to 13,000 miles.

Overall, the Ethyl survey makes several important points about the fleet market for petroleum products:

- Gasoline trucks in heavy-duty fleet service represent a substantial market for gasolines and lubricants.
- Most fleets use regular grade gasoline but some are using premium grade or special blends.
- Fleet customers tend to be quite loyal to a given supplier.
- Truckers have not materially changed oil-drain or filter-change practices over the last several years but are changing to oils of different viscosity and API classification to improve performance.
- Continued improvements in fuels and lubricants marketed by the petroleum industry, coupled with improved engines and maintenance practices, are lengthening engine life. O



OUTLOOK

PETROLEUM CHEMICALS PERSONNEL NAMED TO NEW POSTS

Following a series of recent promotions and transfers, a number of Ethyl personnel involved in the sale and use of petroleum chemicals in the United States and abroad have new assignments. Changes include the following:

Western Region—Kenneth A. Freberg, formerly account representative, has been promoted to regional sales manager, succeeding M. F. Weill who died earlier this year. Mr. Freberg's office is in Los Angeles where he reports to L. L. Huxtable, Western region manager.

Paul R. Harris, formerly national account manager in the Central region in Chicago, succeeds Mr. Freberg as account representative.

Southwestern Region—Robert M. Thurston, formerly account representative in the Eastern region in New York, has been appointed regional sales manager to succeed J. O. Balzer who will retire this summer after 35 years' service. Mr. Thurston's office is in Houston where he reports to Ellis K. Locher, Southwestern region manager.

William E. Andreae, formerly account representative in Tulsa, has been promoted to manager of the Dallas district, succeeding Russell Schell who has retired.

F. Dale Buerstetta, formerly supervisor of the Motor Fuel section of the Refinery Technology group at the Company's research laboratories in Detroit, has been appointed chief refinery technologist. He succeeds Donald D. Hornbeck who has been transferred to Ethyl International in Europe.

Eastern Region—Idan E. Flaa, formerly district manager in the Southwestern region at Tulsa, has been appointed district manager at Philadelphia, succeeding Robert W. Richardson who has retired.

C. Alon Cole, formerly chief regional refinery technologist in New York, has been named account representative, succeeding Robert M. Thurston who has been transferred to Houston and promoted to sales man-

ager in the Southwestern region. Replacing Mr. Cole as chief regional refinery technologist is Charles J. Wolf, formerly, a refinery technologist at the Company's research laboratories in Detroit.

Central Region—F. Douglas Baker, formerly marketing services manager, has been assigned account responsibilities previously held by Paul R. Harris who has been transferred to Western region. Herbert J. Andersen, formerly field engineer, has succeeded Mr. Baker as marketing services manager.

New York Staff—Gordon E. Saxon, formerly the Company's assistant advertising manager, has been named assistant manager of marketing services, Petroleum Chemicals division.

Ralph J. Werling, Jr., formerly a refinery technologist at the Company's research laboratories in Detroit, has been promoted to supervisor of marketing research in the Marketing Research and Analysis section.

Ethyl Corporation of Canada—C. A. Parkinson, formerly representative in Montreal, has been promoted to manager of the newly-created Eastern district of the Petroleum Additives department with headquarters in Montreal.

Ethyl International—Donald D. Hornbeck, formerly chief regional refinery technologist in the Southwestern region at Tulsa, has a new assignment in Europe under William J. Rusher, president and managing director of Ethyl S. A., the Company's sales, distribution and service subsidiary headquartered in Brussels.

CASABONNE PLANT MANAGER OF NEW VISQUEEN FACILITY



Grange, Ga., for the VisQueen division of Ethyl Corporation.

Mr. Casabonne, who joined VisQueen earlier this year, has extensive experience in the polyethylene resin and film field. He is a native of Hagerman, N. M., was graduated from the University of New Mexico with a BS degree in chemical engineering.

The new plant—the first VisQueen facility under Ethyl to be operated in the south—will produce a full line of versatile VisQueen plastic films for use in agriculture, construction, and

commercial and household packaging applications. Upon its completion this fall, the plant will become the fourth VisQueen polyethylene film manufacturing operation in the country. Other VisQueen production facilities are located in Flemington, N. J.; Fremont, Calif.; and Terre Haute, Ind.

ALBERMARLE BUYS INTO GROCERY BAG BUSINESS

Albemarle Paper Manufacturing Company, wholly-owned Ethyl Corporation subsidiary, has entered the high volume grocery bag business with the purchase of Consumer Bag and Packaging Corporation, Richmond, Va.

The new acquisition to be known as Consumer Bag and Packaging Company, division of Albemarle, further diversifies operations of the parent company, already the world's largest manufacturer of handle shopping bags, a major producer of multiwall shipping sacks, and an important manufacturer of kraft paper, paper board and specialty papers.

Consumer Bag, which was founded in Richmond just three years ago, manufactures a wide range of grocery bags, sacks and other related paper packaging items. All of its products have nationwide distribution. The firm employs some 150 people.



M. L. Boinest, Jr.

M. Leiby Boinest, Jr., paper mill superintendent at the Roanoke Rapids (N.C.) division of Albemarle, has been named executive vice president and general manager of the new Consumer Bag division. He is a director of Albemarle and has been with the company since 1941.

John W. Edwards will continue as vice president in charge of manufacturing of Consumer Bag. All other management and production personnel will continue in their present capacities.

JAMES B. LONERGAN HEADS ADVERTISING AND SALES PROMOTION



James B. Lonerган was appointed Ethyl's director of advertising and sales promotion, effective May 1. He succeeds Russell B. Weston who retired after 38 years' service with the Company.

Associated with Ethyl since 1943, Mr. Lonergan has been a member of the Advertising and Sales Promotion department for the past 15 years. He has been advertising manager since 1960. Mr. Lonergan is a native of New York City and a graduate of Manhattan College with a bachelor's degree in business administration.

Mr. Weston, a Union College graduate, joined Ethyl in 1927 and spent his entire career in sales and advertising. He has headed the Company's advertising and sales promotion activities since 1946. During Mr. Weston's tenure, Ethyl initiated a series of advertising programs aimed at increasing the gasoline market by encouraging more pleasure driving. The concept of broadening the total gasoline market—through advertising and sales promotion—has since been adopted by the oil industry.

In other appointments in the Ethyl Advertising and Sales Promotion department, Frank A. Howard, Jr., has been named manager of advertising and sales promotion—plastics, and Kerney J. Hurst has been named manager of advertising and sales promotion—chemicals.

PLANS SET FOR NEW ALBEMARLE CORRUGATED CONTAINER PLANT

Albemarle Container Company, the corrugated container division of Albemarle Paper Manufacturing Company, Ethyl Corporation subsidiary, will build a new corrugated container plant on a 20 acre site in Monroe, N. C. The new facility will supplement present production in Richmond, Va. and Odenton, Md.

Located 35 miles southeast of Charlotte, the new plant will enable Albemarle to broaden container sales in the expanding Carolina market. And at the same time, it will mean faster service to customers in that area, now being supplied from the Richmond plant.

NEW SHOPPING BAG PLANT SERVES WESTERN CUSTOMERS

Interstate Bag Company, a division of Albemarle Paper Manufacturing Company, Ethyl subsidiary, began operations April 17 at a second facility for the manufacture of handle shopping bags. Located at Flora, Ind., the new plant provides faster and more economical deliveries to customers in the Midwest and Far West and keeps Interstate abreast of the growing demand for handle bags.

The bulk of Interstate's output—at

the rate of 150 million bags a year—will continue to be produced at the Walden, N. Y., plant. But the new plant will turn out about 50 million handle bags annually, once it is in full production, according to Goble W. Bryant, president of Interstate and executive vice president and general manager of Albemarle. And there's ample room for expansion.

Duane Campbell, who previously was technical staff assistant to Claude V. Allen, operational head of the Walden plant, is the new plant manager. He has long experience in handle shopping bag business.

ETHYL SYSTEMS HELP CONTROL GASOLINE OCTANE QUALITY

A new closed loop system, designed by the Petroleum Chemicals division of Ethyl Corporation, continuously controls in-line blending of antiknock compounds for gasoline at a major Gulf Coast refinery. It gears blending operations to a precise specification, provides a complete and continuous check of blend-run progress in terms of octane number, and automatically detects and corrects any deviations in antiknock quality.

This and other Ethyl systems, the most advanced yet devised for automatic octane control of gasoline blending, were described at the mid-year meeting of the American Petroleum Institute's Division of Refining in Montreal by John Jones and William Ludt of Ethyl's Gasoline Testing Laboratories.

The key to the Ethyl systems are dynamics octane analyzers which automatically measure the slightest deviation in octane quality and adjust in-line antiknock compound additions to instantly compensate for the change. "These analyzers are the most useful instruments available not only for today's blenders, but for both direct digital control and complete computerized refinery operation in the near future," Jones pointed out.

Result: Gasoline can now be produced to within one-tenth of an octane number of the antiknock quality needed. There's no costly octane giveaway. What's more, with the octane analyzer controlling blend operations, not a single reblend was needed in the Gulf Coast refinery even though up to 6,000 barrels of gasoline are produced every hour.

RESEARCH BUILDING NAMED FOR FRANK A. HOWARD

The Howard Laboratory of the Sloan-Kettering Institute for Cancer Re-

search in New York City, named in honor of Frank A. Howard, Ethyl Corporation founder and long-time member of the board of directors, was dedicated in May. Mr. Howard, a founder of the Institute died last fall at the age of 74.

Representing Ethyl at the ceremony were Board Chairman and Mrs. Floyd D. Gottwald; William R. Perdue, Jr., executive vice president and treasurer; William K. McCulloch, manager of marketing services, Petroleum Chemicals division; and Frank A. Howard, Jr., advertising and sales manager—plastics, son of the late Mr. Howard.

ETHYL GARNERS AWARD FOR SHAREHOLDER INFORMATION PROGRAM



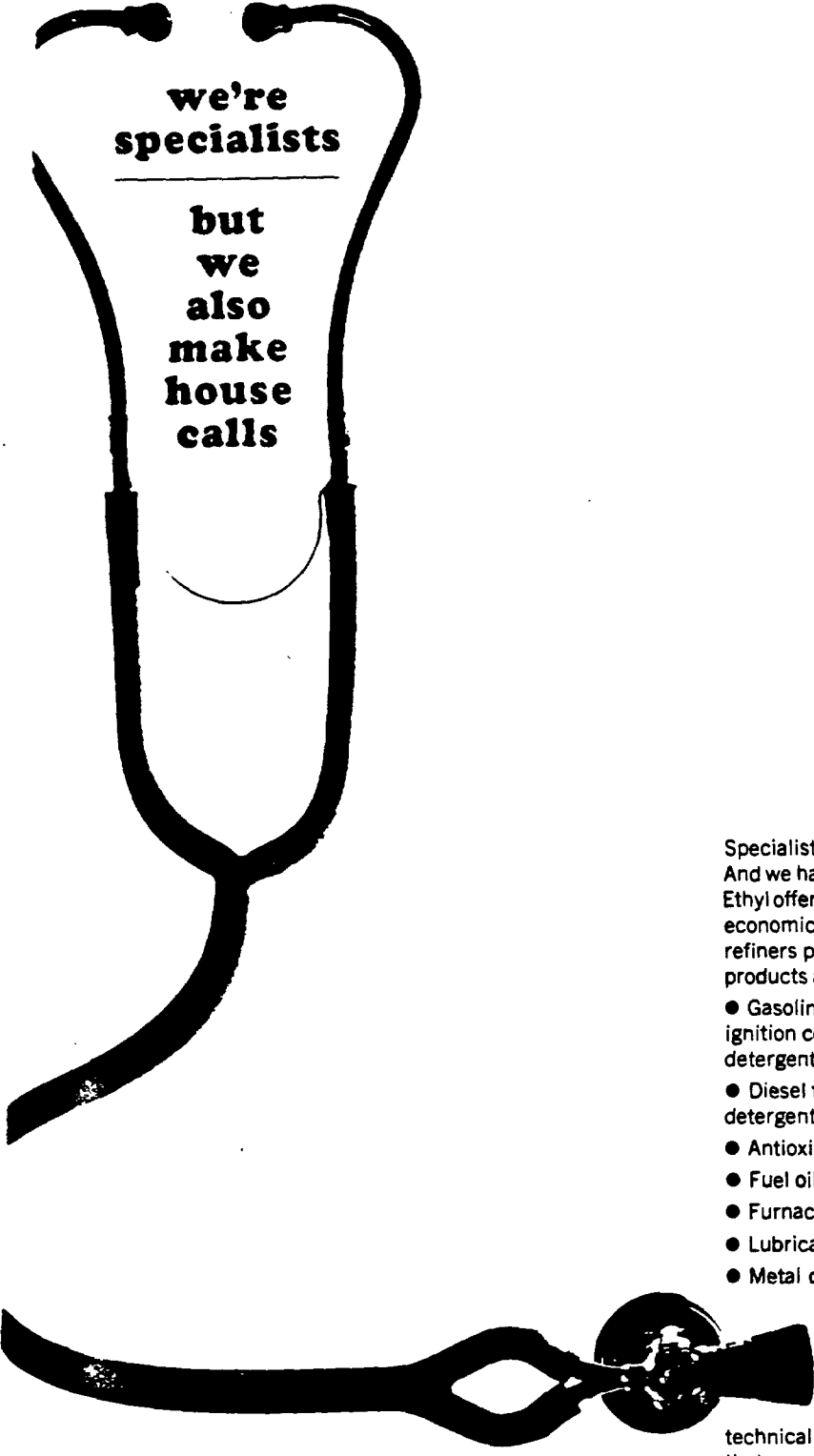
James E. Boudreau, Ethyl's director of public relations, and Floyd D. Gottwald, Jr., board vice chairman, display award.

The National Security Traders Association has presented Ethyl Corporation with an Award of Excellence for its "outstanding" program of shareholder information and education.

Floyd D. Gottwald, Jr., vice chairman of Ethyl's board of directors, accepted the award from Allen L. Oliver, NSTA president, at a dinner in New York attended by more than 2,000 leaders of government, industry, and finance.

The winners were selected from among all companies whose securities are traded in the "over-the-counter" market.

In making the presentation to Ethyl and the other award winners, Mr. Oliver said: "These annual awards were established by the NSTA to give deserved recognition to outstanding shareholder information programs. We feel that these companies are rendering important and constructive public service by creating better informed shareholders and a wider knowledge of the investment process."



**we're
specialists**

**but
we
also
make
house
calls**

Specialists? . . . Yes, additive specialists. And we have been for over 43 years! Ethyl offers a complete line of top-quality, economically-priced additives to help refiners produce better petroleum products at less cost:

- Gasoline antiknock compounds, ignition control compounds and detergent-deicer-corrosion inhibitors
- Diesel fuel ignition improver and detergent-dispersant-corrosion inhibitor
- Antioxidants
- Fuel oil combustion improver
- Furnace oil stabilizer
- Lubricating oil additives
- Metal deactivator

About those house calls? . . . Ethyl representatives are always glad to come to refiners' offices, plants and laboratories to provide any technical assistance and information that may be required.

One of a series of
corporate advertisements
appearing in Newsweek,
U.S. News & World Report
and Business Week



How do you keep a million-dollar electronic computer from quitting on the job? One way is to make sure that each of its brain circuits is scrupulously clean. Ethyl has chlorinated solvents for bathing segments of computers before assembly. We also make papers to wrap coins and

Braille paper for the blind. Chemicals that help make synthetic rubber, stop engine knock. Plastic films to help cure concrete and mulch tomatoes. These are some of the things we're doing today. Where will Ethyl products turn up next? Wherever research and our imagination take us.

ETHYL CORPORATION New York, N.Y. Petroleum Chemicals • Industrial Chemicals • VisQueen Plastics • Ethyl of Canada • Ethyl International • Albemarle Paper • Raymond Bag • Interstate Bag

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TABLE OF CONTENTS

Now Cars Can Get a "Physical" Too	2
Clearly a Better Film	6
Bionics—the Science that Takes Lessons from Animals	8
MLA 500 is Best	12
Look What's Moving by Pipeline	14
The Pipe that Seals Itself	16
There's Something New in Canada	18
Six Magic Dots Bring Light to the Blind	20
Train for Tomorrow	24
Outlook	27
Earle W. Webb, 1883-1965	29

ON THE COVER

The Canadian Rockies provide a breathtakingly beautiful background for motorists traveling the famed Trans-Canada Highway. Ethyl adds to Canadian motorists' travel enjoyment by assuring them of even better car performance with new lead alkyl antiknock compounds now produced at the Ethyl of Canada plant at Sarnia, Ontario. See "There's Something New in Canada," pages 18-19.

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*manufacturers of petroleum chemicals,
industrial chemicals, paper and plastics.*

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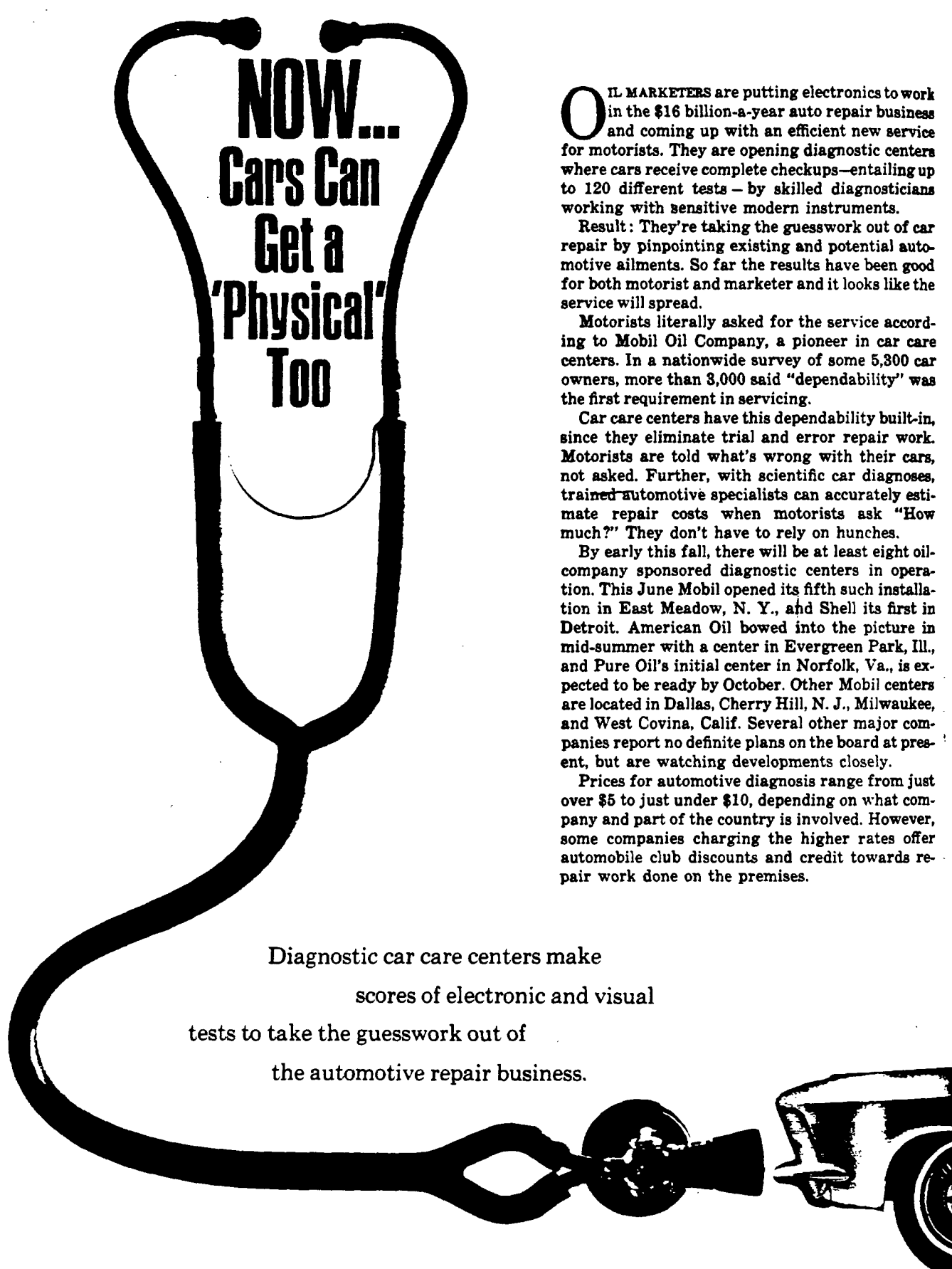
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WATERFRONT LANDMARK

Thessaloniki, Greece, where Ethyl's new chemicals plant is under construction (pages 24-26), is the historic White Tower (Lefkos Pyrgos). The round stone structure was built by Venetians in the 15th century and was used in succeeding years by Turks and then Greeks. It now is Thessaloniki's Boy Scout headquarters.



NOW... Cars Can Get a 'Physical' Too

Diagnostic car care centers make
scores of electronic and visual
tests to take the guesswork out of
the automotive repair business.

OIL MARKETERS are putting electronics to work in the \$16 billion-a-year auto repair business and coming up with an efficient new service for motorists. They are opening diagnostic centers where cars receive complete checkups—entailing up to 120 different tests—by skilled diagnosticians working with sensitive modern instruments.

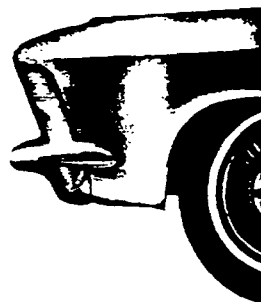
Result: They're taking the guesswork out of car repair by pinpointing existing and potential automotive ailments. So far the results have been good for both motorist and marketer and it looks like the service will spread.

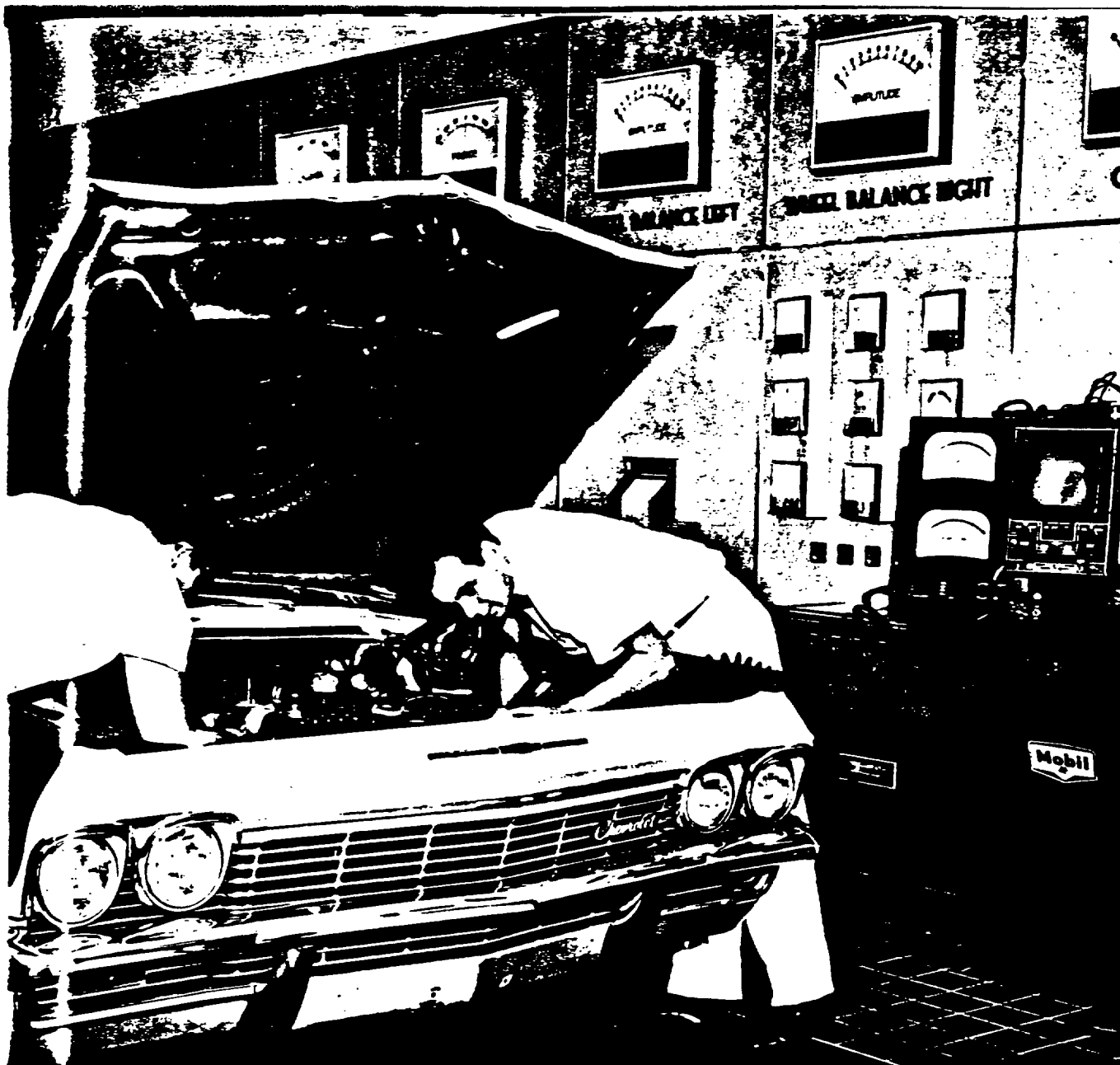
Motorists literally asked for the service according to Mobil Oil Company, a pioneer in car care centers. In a nationwide survey of some 5,300 car owners, more than 3,000 said "dependability" was the first requirement in servicing.

Car care centers have this dependability built-in, since they eliminate trial and error repair work. Motorists are told what's wrong with their cars, not asked. Further, with scientific car diagnoses, trained automotive specialists can accurately estimate repair costs when motorists ask "How much?" They don't have to rely on hunches.

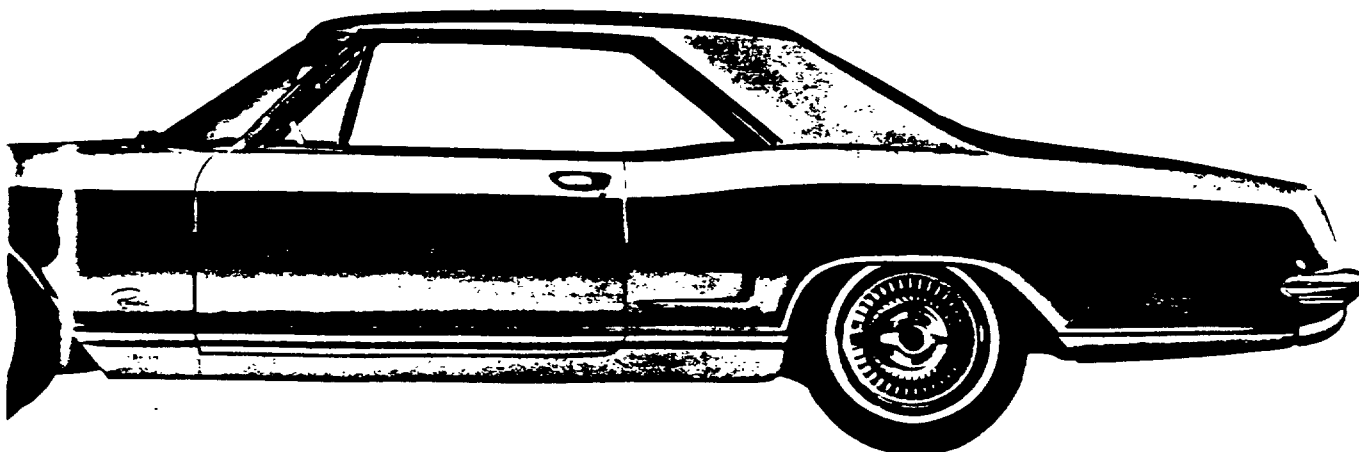
By early this fall, there will be at least eight oil-company sponsored diagnostic centers in operation. This June Mobil opened its fifth such installation in East Meadow, N. Y., and Shell its first in Detroit. American Oil bowed into the picture in mid-summer with a center in Evergreen Park, Ill., and Pure Oil's initial center in Norfolk, Va., is expected to be ready by October. Other Mobil centers are located in Dallas, Cherry Hill, N. J., Milwaukee, and West Covina, Calif. Several other major companies report no definite plans on the board at present, but are watching developments closely.

Prices for automotive diagnosis range from just over \$5 to just under \$10, depending on what company and part of the country is involved. However, some companies charging the higher rates offer automobile club discounts and credit towards repair work done on the premises.





Skilled team of diagnosticians working with sensitive electronic instruments check automobile engine performance. Result of each test is noted on checklist so motorist will know exactly what's the condition of his car.



**NOW...
Cars Can
Get a
'Physical'
Too**



Most marketers don't expect to do better than break even on the diagnostic service. They do expect to make a profit on the increased repair business and auxiliary services. Six of the eight repair centers have car rental service, five have gasoline pumps, four have auto supply stores and three have car wash facilities.

Where does this leave the local brand name service station operator? He benefits too. First, he receives a referral fee for any car care center customer that comes in through his recommendation. Second, most centers have an arrangement whereby motorists living in a specified area can leave their cars at any same-brand service station for pickup and return at a fee. But the biggest benefit, say oil company spokesmen, is the good will and publicity from the car care centers that help the service station sell its principal products — name brand gasoline, oil and TBA items.

Let's take a look at the diagnostic service itself. While the centers now in operation or under construction operate somewhat differently from company to company, the principle is basically the same.

Once a motorist enters the center, he verifies his appointment, registers his car with the receptionist,

and then just relaxes and watches the tests from behind a glass partition. For the next 25 to 50 minutes a team of two diagnosticians make scores of visual, manual and electronic checks and records the results on the standard form initiated by the receptionist.

In all car centers the interested car owner can pick up a wall telephone and listen to a recorded description of tests in progress. The recordings are geared to the technical proficiency of a suburban housewife, but there are also enlarged gauges and oscilloscope screens for the benefit of the more mechanically sophisticated motorist wishing to follow the tests. In Pure's new center the diagnostician will also flash messages on a board in the waiting room to give the car owner a running account of how his car is doing.

The diagnosis itself is a two to five station operation. This is a typical check:

The car is placed on a lift and a visual inspection made for oil leaks. Tire wear is measured and a front wheel removed to examine brake components and wheel bearings.

A complete under-the-hood examination includes all belts, oil and coolant levels, battery, hoses, horn, windshield wipers, parking brakes, lights and exhaust system.

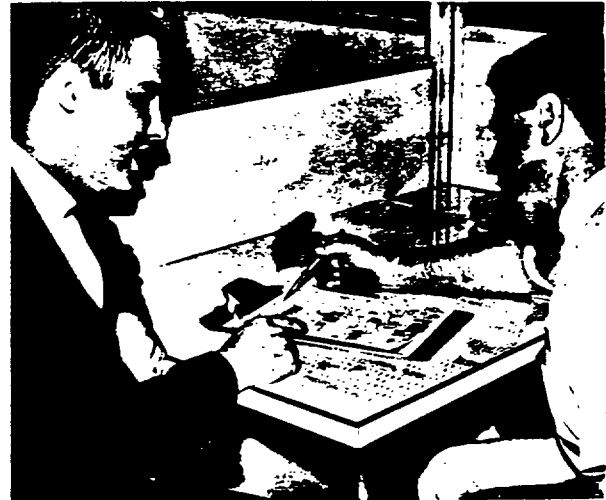
The acid level of automatic transmission fluids is determined by placing a sample into a test tube of bluish chemical reagent. If the solution turns yellow, the fluid should be changed.

Next the combination chassis dynamometer and brake analyzer—the key to the diagnostic concept in all repair centers—takes over.

By placing each of the car's front wheels on a pair of the dynamometer's power-driven rollers, diagnosticians can duplicate high speed driving conditions. They check to see if both front wheel brakes work in unison at turnpike speeds. Sticking brake shoes, cylinders, and faulty return springs can also be detected and studied during this test.

Then the car is moved forward so that the rear wheels move on the rollers and the brake tests are repeated. Afterwards, the brake analyzer becomes a chassis dynamometer as the diagnostician wires the car engine into a large mobile console, housing an ignition analyzer, volt-ampmeter, spark advance unit and flow meter.

The rollers allow the car to run under cranking, idle, and high engine rpm conditions through a battery of transmission, carburetor, ignition and fuel system tests. At



Above, diagnostician goes over completed form with motorist and makes accurate estimate of repair costs.

Left, motorist listens to recorded phone message which explains tests in progress.

the touch of a button the dynamometer can simulate a steep grade and make the engine work as if pulling a load uphill. What's more, the steepness or amount of load can be varied and kept under strict control. Most important, the dynamometer can be held at the speed where trouble occurs long enough to pinpoint the bug.

Each cylinder's ignition pattern is reflected on a large oscilloscope screen. This pattern is studied to determine spark plug performance, and the condition of distributor points, condenser, cam and rotor. For cars with automatic transmission, another oscilloscope test shows the relationship between engine rpm and actual wheel speed in the form of a graph. This is interpreted to pinpoint the accuracy of shift points as well as the shift itself.

The diagnosticians then check for improper wheel alignment and angle of camber and caster via an electronic wheel alignment analyzer. Here again, the front wheels are placed on rollers which duplicate road conditions and speeds.

As soon as the inspection is over the chief diagnostician accompanies the motorist into a conference room, and gives him a complete explanation and evaluation of his findings, all of which are now recorded on the



Cars go through quality control bay for final check after repairs are made.

car's test form. He also makes recommendations as to needed repairs, giving each customer a written estimate of costs. Most important to the customer is the guarantee that costs may be lower, but not higher. One company gives definite repair time commitments as well.

The motorist, of course, can either have the work done at the center or outside, but he's given several inducements to have it done right there:

- Most centers offer a written guarantee against defects both in material and workmanship, good for 90 days or 4,000 miles on all repairs done at the center.

- All centers recheck the car in a quality control bay to make sure that the repairs are done right.

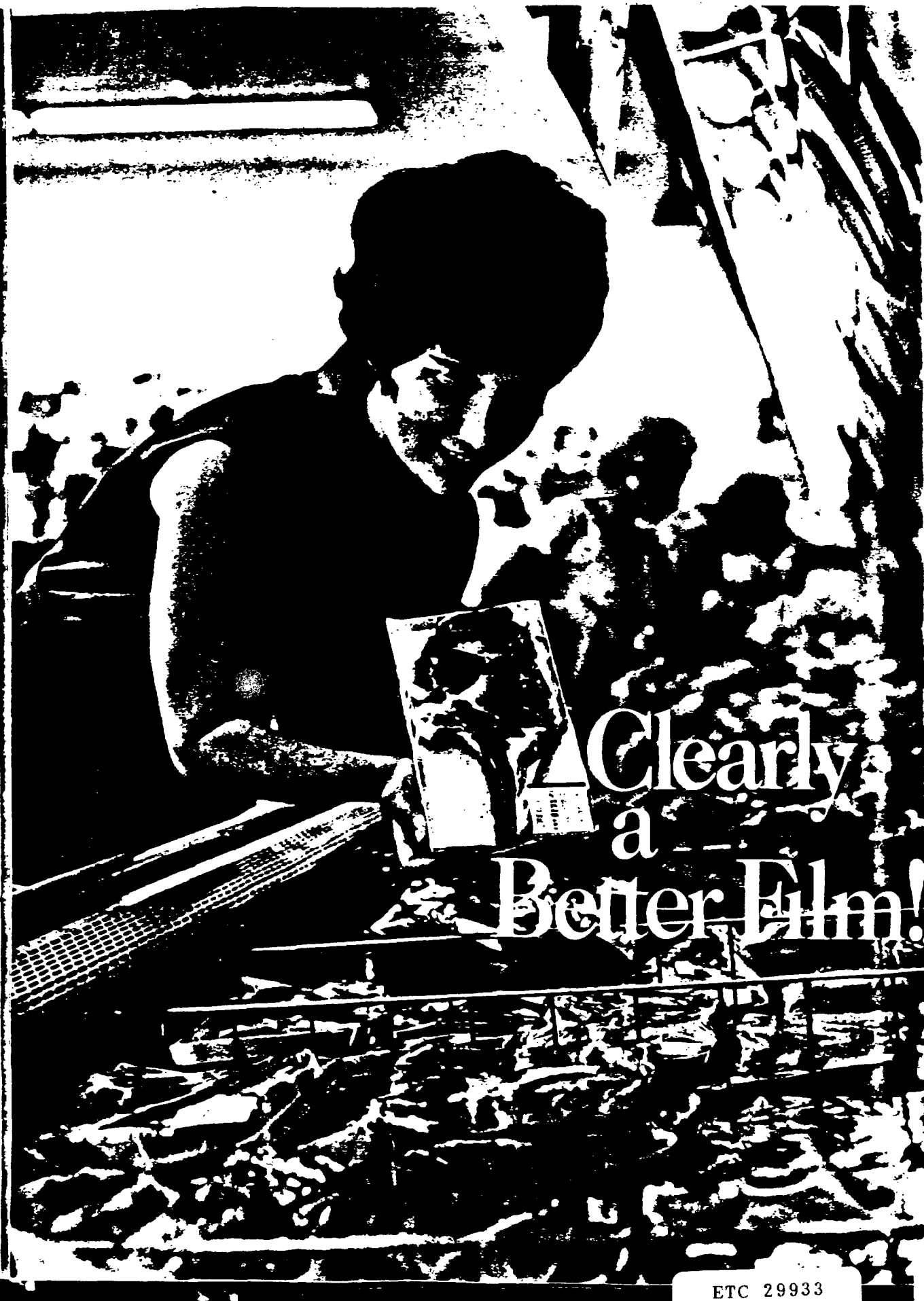
- Some centers offer diagnostic fee credit towards any repair work.

But of course any service is only as good as the men performing it, and the diagnostic concept is no exception. Formal classroom and on-the-job training or prerequisites to becoming a diagnostician.

For example, each man hired by Mobil receives two weeks of intensive training on the dynamometer at Clayton Manufacturing Company, and another week at the oil company's auto research lab at Paulsboro, N. J., where a prototype diagnostic bay is setup. Shell conducts a training program plus instruction on a 132-foot-long diagnostic line at its Wood River, Ill., laboratory.

What's the outlook for oil company diagnostic centers? With a center now in each of its marketing areas across the country, Mobil will base future plans on operating results in the months ahead. Shell has blueprints for dozens of centers on the drawing board, but again is waiting for more complete data from its initial operation before firming up, as are Pure and American.

But it seems that diagnostic car care centers meet the motoring public's prime demand for reliability in repair service. And this could well mean a rosy future for them. ○



Clearly
a
Better Film!

Fresh meat and produce on supermarket shelves don't lose their customer eye appeal between 9 a.m. and closing time when wrapped in new VisQueen PVC film. The high strength polyvinyl chloride material makes an attractive package that won't wrinkle or break under heavy handling by eager shoppers.

Ethyl's VisQueen division is servicing the booming retail food market with the highly efficient PVC packaging film that costs much less than conventional transparent films. Production of the stretchable film is underway at VisQueen's Terre Haute, Ind., facility, where the Ethyl division's full line of polyethylene films and polyvinyl chloride pipe are also made. Development quantities of PVC have been produced since last fall, and test marketed in Eastern supermarkets. Results have led to optimism that VisQueen will get a major share of the \$11 million a year produce and red meat packaging market.

The oxygen transmission rate of VisQueen PVC film means that wrapped meat will keep its appetizing red color — not turn dull brown while on display. Furthermore, PVC film won't fog or lose its clarity, and its stretchability makes it easy to wrap customer-appealing tight packages without unsightly sags, Harry C. Byrne, Jr., general sales manager of Ethyl's VisQueen division, points out.

In the same way, wrapping produce in PVC film results in a strong, yet attractive package, that makes it easy for the shopper to select his purchase. The new film also eases food store headaches due to damaged and unsightly merchandise caused by too much handling. And there's no deterioration of quality as in the case of exposed produce.

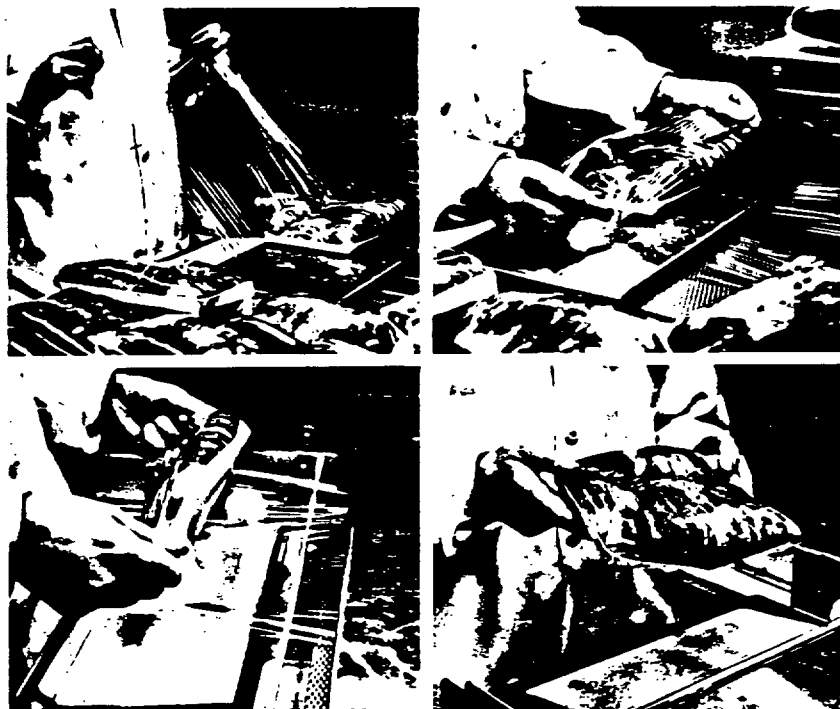
There's no big expense or trouble in store wrapping of meat with PVC film. It's basically a simple hand operation. A hot wire cuts the film to the desired size from the roll, and a hot pad seals it after the pack-

age is formed. No shrink tunnel is needed since the film stretches to form a tight package.

VisQueen PVC film is supplied in thicknesses ranging from $\frac{3}{4}$ to $1\frac{1}{4}$ mils, in widths of 12, 15, and 18 inches. It comes in 4,000-foot rolls about $8\frac{1}{2}$ inches in diameter. This size makes it ideal for easy packaging, especially when women are handling the operation.

Production of PVC film is a major extension of VisQueen's line of flexible packaging materials. VisQueen is already the nation's largest producer of polyethylene film, with plants in Flemington, N. J., and Fremont, Cal., in addition to Terre Haute. A fourth plant will be in production soon at La-Grange, Ga. The new PVC film is fundamentally a special purpose material for food wrap and some industrial applications. Polyethylene film on the other hand, is widely used across the board in packaging, and in a variety of agriculture and construction applications. ○

Bright, Tight
VisQueen PVC
Wrapping
Protects and
Enhances
Eye Appeal



Store wrapping of red meat is basically a simple hand operation with PVC film. The film is pulled to the desired length, then cut with a hot wire. After the package is formed, it is sealed on a heating pad. No shrink tunnel is needed since the film stretches to form a tight package.

HOMO SAPIENS — intelligent man — is taking a good look at so-called lower forms of life among his colleagues in the animal world and is learning plenty from them. He's putting the microscope on living creatures which, lacking the sophisticated reasoning power of humans, have developed fantastically acute senses to cope with their basically hostile environment.

Man has long marveled at a cat's ability to see in the dark, a bloodhound's ability to track his quarry, and a frog's ability to "sense" the presence of food. Now he's asking how — and is finding a whole new area for research. It's "bionics," one of the newest sciences, and it delves into the amazing sensory mechanisms with which animals are endowed. The term "bionics," coined by Air Force Major J. E. Steele, in Greek means "pertaining to life."

Unraveling the mysteries of animal senses may

well open up fantastic advances in industry, national defense and medicine, as well as in pure science. As a result, industrial firms, educational institutions and the military are conducting research in pure and applied bionics on the nerves, muscles, eyes, ears, noses and brains of living creatures.

Let's take a look at this research and see how it could affect our lives:

Bionicists at General Electric are trying to duplicate the visual perception of the ordinary and very ugly horseshoe crab. Scientists at the Rockefeller Institute have already proven that the crab's eye greatly intensifies the contrast between the edges of an object and the background. In other words everything the crab sees stands out as sharply as a line drawing. Apparently his optic nerves are sensitive only to brighter light sources and block out



ETC 29935

signals activated by dimmer light. By matching this ability electronically, industry hopes to perfect an optical system that would scan negatives, aerial photos, and even planets in our solar system with unprecedented clarity.

The frog's eyes as well as the crab's may prove a boon to industry. Since a frog eats only live insects, his discerning eyes are designed to spot instantly any moving tidbit within reach of his prehensile tongue. Yet he is blind to unappetizing dead or motionless morsels. This is because his eyes work on a "need to know" basis. In the same way, the frog's eyes alert him to shapes and motions that spell enemy, while screening out other objects.

A neurophysiological team at Massachusetts Institute of Technology has discovered that a frog's optical nerves won't function unless objects of a certain curvature pass in front of his eyes. The

MIT researchers also found that each tiny bundle of the frog's optical nerves sends back to the brain only one type of information. One transmits data on convexity, another on contrast, etc.

Radio Corporation of America is trying to ape the frog's optical attributes with an electronic machine that can read any typewritten or printed page. One component of the scanner will check the convexity of a letter and another will check the contrast. RCA engineers hope that in this way the machine will be able to recognize letters despite varying sizes and type styles — something no present machine can do.

However, bionics know that seeing is not solely a function of the eye. So they are studying the precise maneuverability of the bat, a mammal with very poor eyesight. The bat "sees" with its brain by means of a radar-like guidance system.

Bionics...

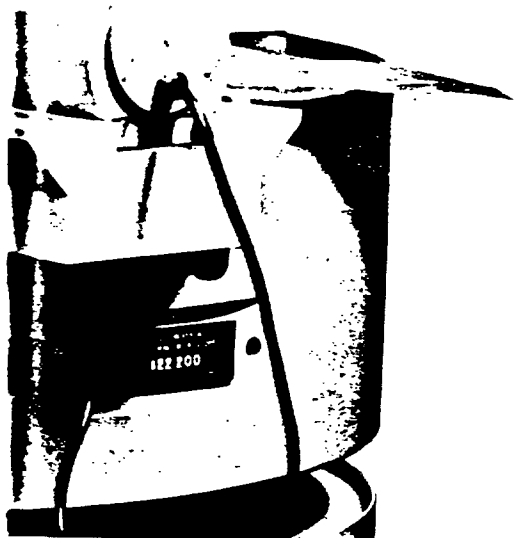
*the science
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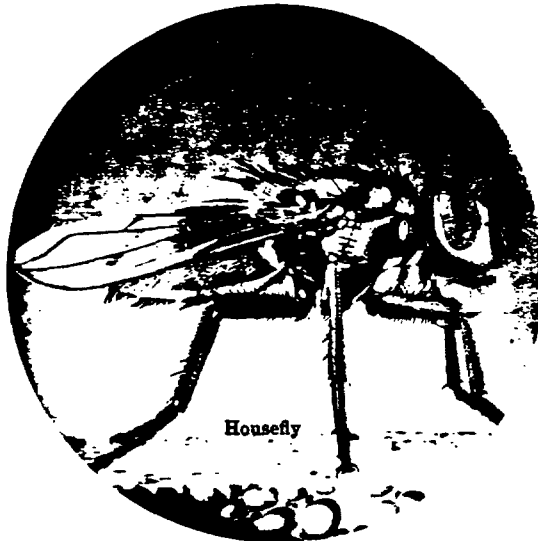
Horseshoe Crab



Frog



Bionics...



Housefly

Relatively new to man, radar is old hat to the bat. In fact, our most sophisticated equipment of today still is far behind the compact and efficient system lodged in the animal's tiny brain. According to Dr. Louis deRosa, vice president of International Telephone and Telegraph Corporation, we might have come up with better radar sooner, if the study of the bat preceded, rather than paralleled the development of radar.

It was not until 1938, when radar was under development, that a graduate student at Harvard University came up with a partial explanation of how this mouselike creature, despite its extremely poor eyesight, could fly and maneuver in total darkness with such incredible ease. He concluded that the bat sends out a supersonic signal and listens for a bounce-back from whatever is in his way. However, present-day knowledge proves that the bat's aerial controls are far more delicate and sophisticated than this explanation indicates, possibly involving some kind of natural electronic computer guidance system stemming from the brain. At any rate, the bat can make foolproof split-second identifications and direction choices.

The sense of smell — generally considered to be the least important of the five human senses — is nevertheless vital to many animals. Propagation of many species is dependent upon the ardor-arousing scent that the female gives off. And, in just one area of research, bionicists have proved salmon could not find their way back home to spawning grounds if their "nostrils" were plugged.

What practical use can man make of this acute sensitivity to odors?

In probing scent perception, the Armour Research Foundation has come up with a synthetic nose able to detect odors at the fantastic ratio of one part per million. This could mean detecting early stages of food spoilage, warning industrial workers and soldiers threatened by hazardous

fumes, gases or chemicals, and helping doctors make diagnoses, since characteristic smells accompany many diseases.

The world of sound is also being thoroughly explored. Merely by hooking an electrode and amplifier to the abdominal ear of the moth bionicists have picked up supersonic noises that even the most sensitive microphones can't catch.

And communication specialists are studying the common mosquito for help in preventing static and man-made jamming devices from disrupting broadcasting systems. A mosquito, simply by vibrating its wings, sets up a hum which cuts through any noise man or nature can create — screaming sirens or thunder claps — and conveys a message to his winged buddies.

Electronic devices, based on the animal ear itself, are the keys to new methods of detecting, jamming and even utilizing enemy radar, radio and other



Rattlesnake



kinds of electronic communications and guidance systems. Government bionic researchers are trying to duplicate the ability of many creatures to reduce all sound to electrical impulse patterns and instantly separate critical sound from other noise.

The sense of touch is far more complicated in many animals — especially in insects and reptiles — than in humans. For example, when Sperry Rand Corporation created its gyroton, the first gyroscope without rotating parts, researchers copied two vibrating rods extending from the body of the ordinary housefly. These rods are so sensitive to the slightest changes in aerodynamic pressure that a fly can maintain a stabilizing flight position throughout any combination of banks and turns.

Other defense industry bionics are intrigued by the rattlesnake's built-in thermostat. In seeking warm-blooded prey at night, a rattler relies on his receptor cells, highly sensitive to infrared heat

from animal bodies. Located in a pit between eyes and nostrils, these cells pick up radiated temperatures as small as a thousandth of a degree, flash their message to the brain and the snake moves in for its kill.

Study of the snake's sensitivity to warmth could improve missile and anti-missile systems, some of which are based on heat-seeking principles.

The ultimate challenge to bionic scientists, perhaps, is the computer that can reason — the bio-computer. The sophisticated computers of today can control inventory, operate giant lathes, guide production schedules, even create poetry if programmed right. But they must be told everything, and can only sift the data. All electronic data processing, no matter how complicated is based entirely on one principle — simple addition. But as far as intellect is concerned, computers can't hold a candle to even an insect's brain.

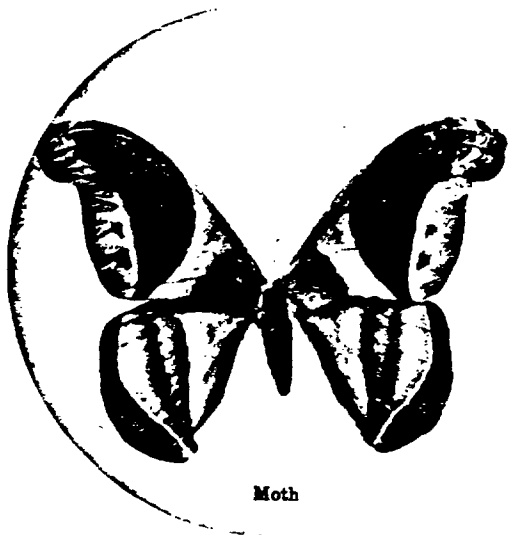


For example, the clumsy looking praying mantis, in just a twentieth of a second, can see a passing fly, compute the fly's speed, course and position, take off and capture its winged victim. No man-made tracking and computer system presently can even approach this performance.

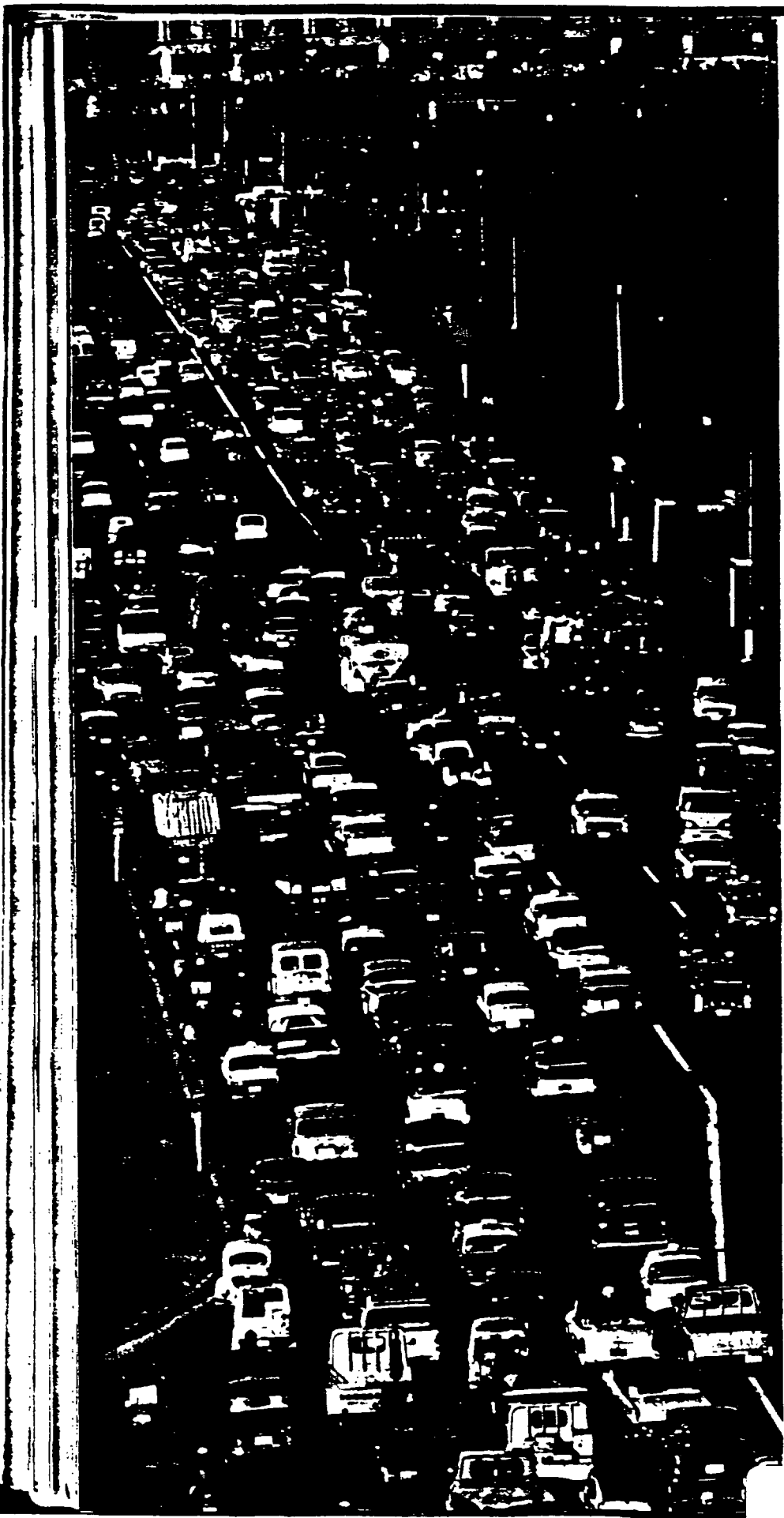
But, the bio-computer, like the brain itself, could be given problems and then left to come up with the means of solving them. Unlike the present generation of electronic hardware, the bio-computer would have basic artificial intelligence.

Can it be done? Prominent researchers and industrialists like John Burns, new Cities Service board chairman, and Stanley W. Davis of GE say yes. Other scientists maintain that so long as such mysteries as the direction-finding ability of a homing pigeon's brain defy solution, it will be impossible to duplicate electronically the 10 billion working parts of the human brain.

One thing is certain, however, man will try. ○



Moth



ETHYL TESTS OF ANTIKNOCK
COMPOUNDS SHOW THAT IN
JAPANESE GASOLINES...

MLA 500 IS BEST



Engine performance of Japanese cars
on gasolines containing different
"Ethyl" antiknock compound formulations
was thoroughly evaluated at the
Company's research laboratories.

◁ Test results help refiners in Japan
satisfy fuel requirements of that
country's booming automobile population.

THE PROOF of the pudding may be in the eating, but the proof of a motor fuel is in the driving. That's why the results of Ethyl International's extensive study of the performance of Japanese gasolines and gasoline antiknock compounds in Japanese cars is all important to the fast growing Far Eastern oil refining industry. Ethyl research proved that in many cases the lighter antiknocks pay off better in cost-effectiveness and that Ethyl MLA 500 is best of all.

Second only to the United States among the Free World's refining nations, Japan's gasoline consumption is increasing by 15% each year — more than three times as fast as in this country. At the same time, registrations of gasoline-powered cars and trucks have been shooting up at the rate of 45 percent a year. Continuation of this automotive population explosion will mean 10 million gasoline-powered vehicles on the streets and highways of Japan by the end of 1966.

What's the best way to satisfy the fuel quality requirements of these vehicles? That's as important to refiners as providing sufficient quanti-

ties of gasoline. And that's why Ethyl International undertook a scientific study of the subject.

Twenty gasolines, representing three-quarters of all gasoline made in Japan, were used in the Ethyl research program. Samples of both premium and regular grades were tested in single and multi-cylinder laboratory engines and in late-model Japanese cars — Toyopet, Nissan Cedric, Datsun and Corvair — on dynamometers. Four different formulations from Ethyl's broad range of antiknock compounds — TEL, MLA 250, TELMEL 50 and MLA 500 — were evaluated at various concentrations in each of the gasolines. TEL (tetraethyl lead), of course, is the best known and most widely used antiknock. The MLAs (mixed lead alkyls) are chemically reacted mixtures of TEL and TML (tetramethyl lead), a lighter, more volatile antiknock, while TELMEL is a physical mixture of TEL and TML.

Result: The Ethyl tests showed that the most effective antiknock performance in Japanese cars is achieved by gasolines containing the lighter lead alkyl antiknock compounds. Of the four fluids tested,

Ethyl MLA 500, a formulation containing equal amounts of TEL and TML before reaction, generally yielded the best results on a cost-effectiveness basis. Overall, lighter antiknocks offer cost advantages in both premium and regular grade fuels — although somewhat more often in premium. The study also showed that they offer greater cost-effectiveness at higher lead levels in both grades.

A key factor in the superior performance of lighter lead alkyls in Japanese fuels in Japanese cars is the preponderance of manual transmissions in these cars. During acceleration in manual transmission cars, when intake manifold velocities are low, the more volatile components of a gasoline usually reach the combustion chambers of the cylinders farthest from the carburetor first. Often lower in octane quality, these components have a tendency to knock until normal fuel distribution is restored at design engine speeds.

On the other hand, the lighter, more volatile antiknocks can prevent knock by traveling to the remote combustion chambers with the lighter gasoline components.

Besides developing road performance data for Japanese gasoline manufacturers, Ethyl also has come up with equations that the Far Eastern refiners can use with laboratory data to predict accurately, promptly and economically the relative road performance of their gasolines. These equations and their application have been created by Ethyl refinery technologists using advanced electronic computer techniques. Their use saves Ethyl's customer oil refiners lots of time and money that would be involved in actually rating fuels in cars on the road or on dynamometers.

Ethyl anticipates that the results of this study will be of great value to Japanese refiners. And the company hopes to make comparable industrywide studies in other parts of the world. ○

C. D. Carter, Ethyl International vice president, and W. S. Dixon, Far East sales director, explain research study's findings.



LOOK WHAT'S MOVING B



EVERYTHING from sardines to wood chips. Pipelines are no longer used just for transporting natural gas, oil and other petroleum products across deserts and mountains. They now haul coffee beans, alcohol, antibiotics, brake fluids, ammonia, antifreeze, perfume, molasses, latex — and even canned tomatoes on their way to the ketchup bottle.

Although gas and oil are still their primary cargoes, pipelines are growing more versatile and sophisticated as their share of America's freight business multiples. As recently as World War II, the United States had only 395,493 miles of pipeline. Now more than 886,719 miles of tubular transportation crisscross the nation. And still the demand grows. Recently pipelines have upped their share of the cargo market threefold, and now haul 18% of the nation's freight. And a key feature of this expansion has been the myriad new uses that are constantly cropping up.

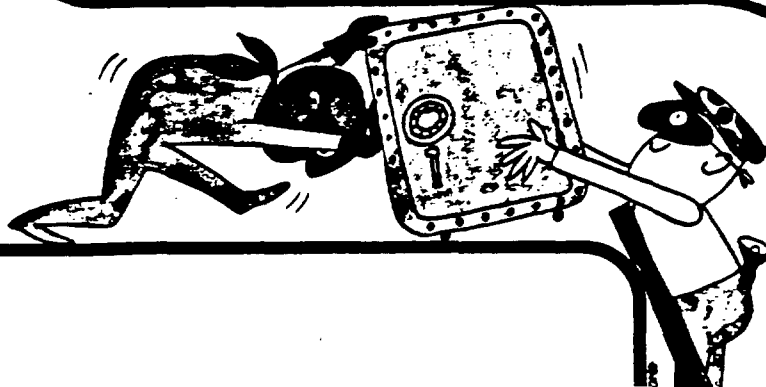
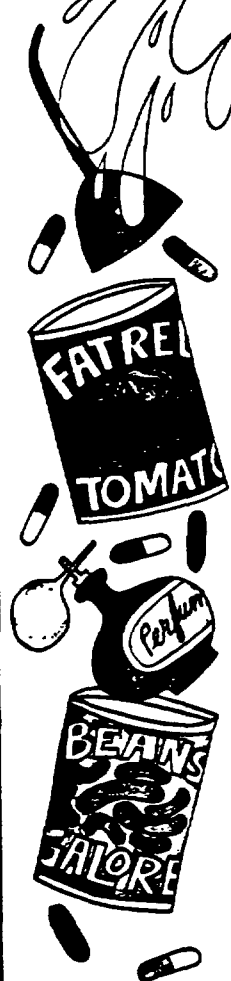
For example, one pipeline in Portland, Ore., transports sardines from fishing dock to cannery. And in

Knoxville, Tenn., coffee beans travel underground from one building to another across town. Such pipelines, of course, can hardly be classed in size and length with the giant tubes carrying petroleum or natural gas. They vary from one to 16 inches in diameter and travel anywhere from a few hundred feet to 50 miles or more. Nevertheless, they are bona fide pipelines in that they transport material over considerable distances on a regular basis.

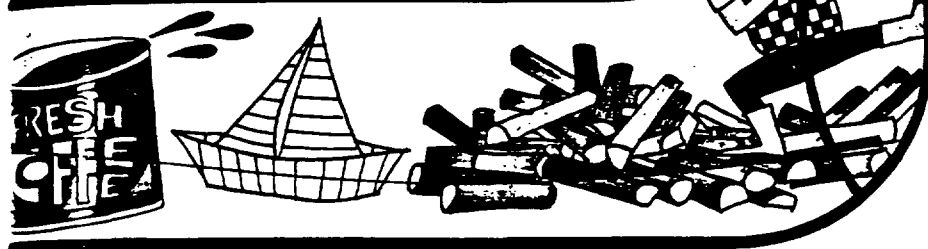
A Look at Other Uses

Let's take a look at other uses: Acids, hydrocarbon-base chemicals, hydroxides and various other chemicals in liquid and gaseous forms are moving via pipelines. And many solid minerals like iron and copper ores, in lump or pulverized form, move through pipelines in liquid suspensions. These slurry pipelines are generally for distances under 100 miles, but longer ones are in the offing.

One of the most successful of these pipelines has moved upward of 800,000 tons of copper concentrates in slurry form 12.8 miles



Y PIPELINE...



across rugged Andes mountain country, from mine to railhead during the past five years, at Anaconda Company's El Salvador, Chile, facility. Company officials pleased with the results are considering long slurry pipelines for all future developments.

A much longer slurry pipeline—72 miles—is paying off equally well for American Gilsonite Company, carrying black lustrous asphalt from Bonanza, Utah, to the refinery at Gilsonite, Col. The eight-year-old system, costing \$2 million, paid for itself in just 24 months in transportation costs. And one project under consideration, proposes a 500-mile pipe route to carry iron ore in slurry form from Minnesota's Mesabi range to steel mills in the Chicago area. Expensive? Perhaps. But it would mean a whopping \$40 million annual savings over present handling costs. The giant pipeline could carry about 10 million tons of ore per year.

In many cases there's actually no need to build additional pipelines to haul extra freight. A whole range of commodities can simply hitch a ride in sealed containers on existing pipelines carrying crude oil and gas. If the container is designed just slightly smaller than the inside diameter of the pipe, it can be propelled just by the pressure of the liquid or gas. If substantially smaller the capsule can simply float along with the stream. In fact, the Research Council of Alberta, Canada, has already floated wheat,

heavy chemicals and minerals in cylindrical and spherical sealed plastic capsules through pipelines carrying crude oil.

The use of pipelines can sometimes bring down manufacturing and processing expenses as well as transportation costs. One company already floats up to 200 tons of sulphite pulp a day through pipelines from its pulp facility to a newsprint mill. If it used overland transportation, it would mean dehydrating the heavy pulp, pressing it into sheets, hauling the sheets by rail, and finally remixing them with water to turn them back into pulp. Savings: a cool half million dollars a year.

And the Pulp and Paper Research Institute of Canada has floated wood chips through a half-mile pipeline, gathering data on the potential construction of a 50 mile wood chip pipeline. To date results have been "most encouraging."

Processing on the Run

Actually the pipelines would be processing equipment as well as conveyors. The chips in a long pipeline would soak up enough of the water in which they float to speed up their conversion into pulp. This could eliminate the soaking ponds which some pulp mills use to prepare wood chips for processing. Furthermore, chemicals can easily be added to a large variety of items carried in water to help process them as they move along.

Homeowners as well as industry

are benefitting from the versatility of pipelines. For years direct underground connections between crude oil producing fields and refinery and from vat to marketing center storage facilities has cut transportation costs while raising the operating efficiency of gas and oil companies. Soon these pipelines may be extended right into the home. A first step has already been made. Recently, some 350 residents of Ledyard, Conn., used fuel oil from pipelines running right into their home. And in Portland, Conn., 650 homes enjoyed the same convenience.

This direct service saved each household an average of \$12 through the winter over the cost of truck delivery to home tank. It also eliminates the need for individual basement storage tanks and—most important—guarantees the consumer 24 hour burner service. He just can't run out of fuel.

Today there are at least five such direct into-the-home pipeline systems operating. As yet, none of them hooks directly into a long-distance pipeline. Rather, the homes draw fuel from a central tank. But the potential is there for pipeline systems that would give a continuous flow of fuel from well to refinery to home burner.

What's the future of pipelines? Says Baxter D. Goodrich, executive vice president of Texas Eastern Transmission Corporation: "We have the technology right now to carry almost anything through a pipeline." ○

A NEW RIGID polyvinyl chloride pipe — that literally seals itself — is now made and marketed by Ethyl Corporation's VisQueen division. It's VisQueen PVC Bell-Ring Pipe and it slashes installation time by one third over conventional solvent-weld plastic pipe. Here's how:

There's an integral heavy walled bell-shaped joint at one end of each 20-foot polyvinyl chloride pipe section. The straight end of a pipe length is simply inserted into the joint, and a perfect connection is made. A natural rubber ring inside the bell joint immediately forms a

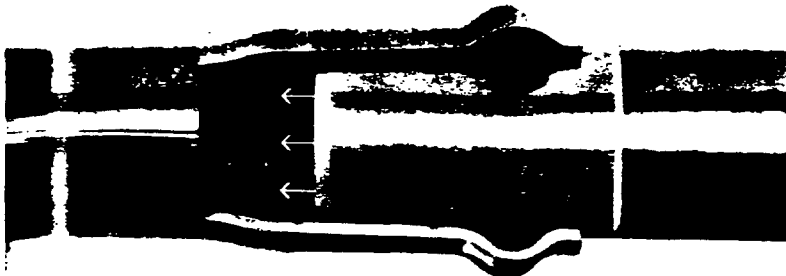
THE PIPE THAT SEALS ITSELF

permanent and leakproof seal. No special tools or skills are needed. Installation is so fast that a two-man crew can lay from 60 to 80 feet of pipe in just one minute.

What's more, VisQueen PVC Bell-Ring Pipe is a perfect solution for contraction and expansion problems that can crop up with solvent-weld pipe. The joints leave room for pipe sections to expand or contract freely, thus alleviating stress and strain on piping systems. Thus a leakproof seal is assured at all time. And this means that the new VisQueen pipe can be laid in a straight line — without the zig-zag pattern



ETC 29943



needed for solvent-weld pipe installation — so a narrower trench can be used. This, of course, brings down trenching costs.

The biggest market for VisQueen PVC Bell-Ring Pipe is potable water systems for municipalities and for irrigation purposes on golf courses and farms. The size of the potable water market was illustrated by Cecil W. Rose, chief engineer, Farmers Home Administration, in a speech before the Plastic Pipe Institute convention earlier this year. "Thirty-nine percent of the farm and rural families in America are not connected to a central water supply," he stated. "From a national standpoint, by the year 1975, an additional 60 million people in these United States must be served with water," Mr. Rose continued.

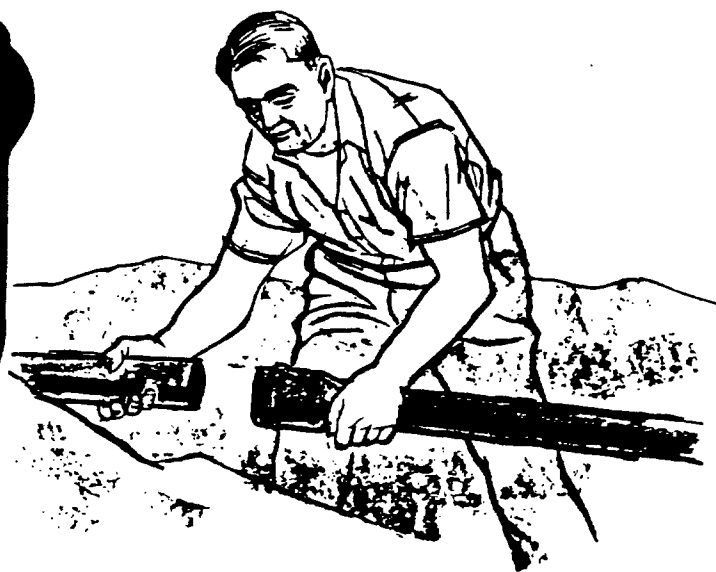
Aside from potable water, VisQueen PVC Bell-Ring Pipe can also be used in chemical, petroleum, plumbing and public utility applications. A neoprene ring is substituted for rubber when the system involves chemical and petroleum products.

The new pipe, together with a complete line of fittings, is sold directly to water system contractors and distributors. And VisQueen engineers provide valuable application and installation knowhow to consulting engineers, municipal engineers, water departments, and contractors.

VisQueen PVC Bell-Ring Pipe comes in 20-foot lengths and in diameter sizes of 1½ through 6 inches. It is pressure-rated 160 psi, and is unaffected by the corroding effect of untreated water, chemicals or highly reactive soils. And the smooth inner surfaces of PVC pipe slash pumping costs by allowing high flow rates with very little head loss through friction.

Besides the new pipe, VisQueen continues to market solvent-weld PVC pipe, conduit and fittings.

Ethyl has for years been a leading merchant-producer of vinyl chloride, the intermediate from which polyvinyl chloride plastic is made. The Company is currently building a polyvinyl chloride resins and compounds plant at its Baton Rouge, La., manufacturing center. ○



There's Something New in Canada

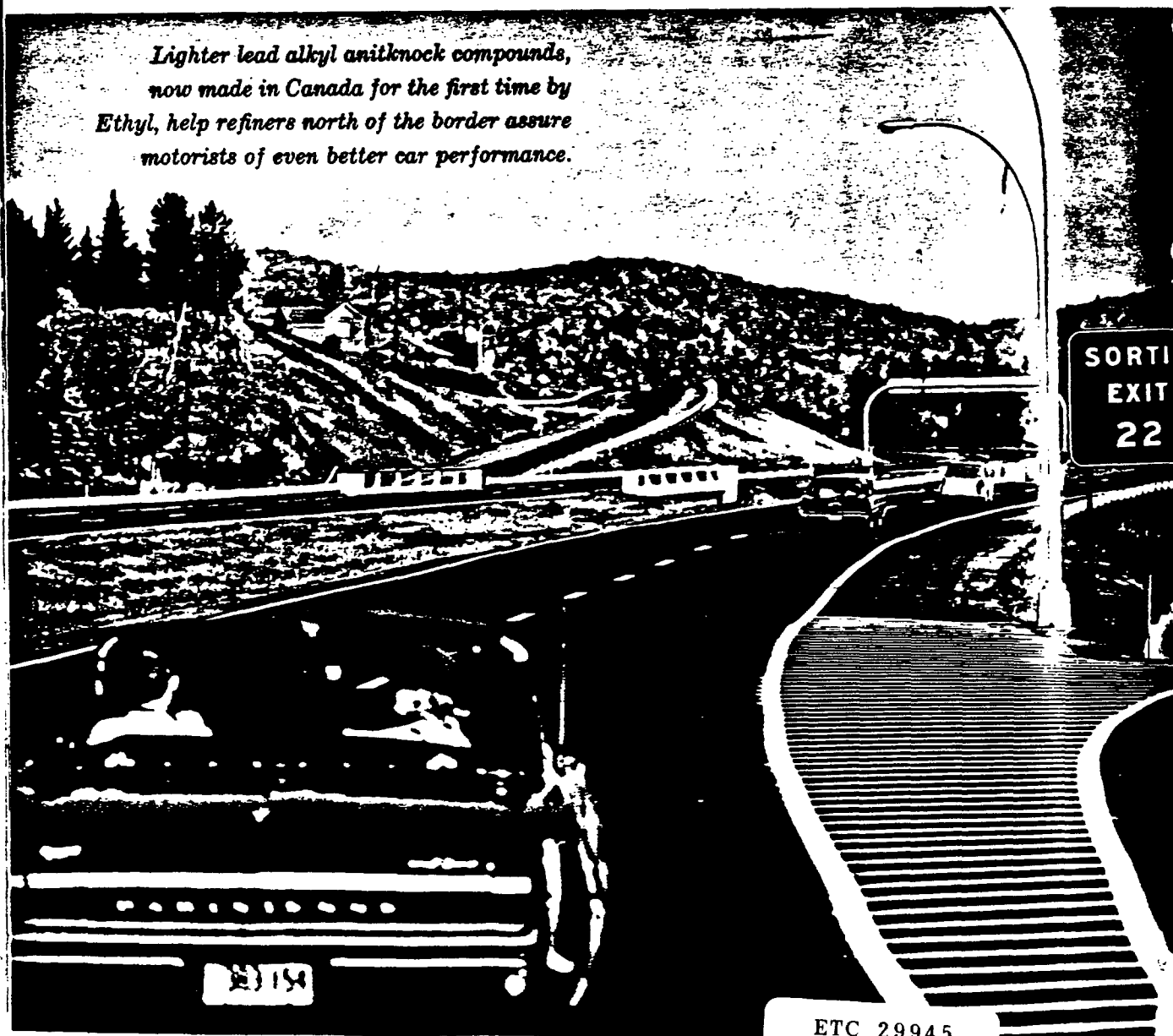
ETHYL has scored another "first" in Canada. Back in 1927, Ethyl was the first to market antiknock compounds for gasoline north of the border.

Then in 1956, Ethyl Corporation of Canada Limited went on stream with the first—and to date still the only antiknock compound manufacturing facility in Canada.

Now, Ethyl of Canada is first with the production of the newer, more volatile, lead alkyl antiknock compounds. These compounds were introduced by Ethyl in the United States and have been used in gasolines here and in other parts of the world for several years.

Shipments of compounds of tetramethyl, as well as tetraethyl lead, and physical and chemical mixtures of the two, have been going to Canadian oil refiners from the Ethyl plant at Sarnia, Ontario, since the first of August. And refiners, motorists and other operators of gasoline powered equipment are all benefitting.

*Lighter lead alkyl antiknock compounds,
now made in Canada for the first time by
Ethyl, help refiners north of the border assure
motorists of even better car performance.*



ETC 29945



With the new "Ethyl" products available, Canadian gasoline manufacturers now have the widest range of antiknocks to help them produce fuels to satisfy the varying requirements of the country's automobile population. For motorists, this means assurance of even better performance from their cars.

While tetraethyl lead (TEL) has been — and still is — the principal antiknock agent in use, the new, lighter, lead alkyl compounds, of which tetramethyl lead (TML) is the lightest, are more effective in certain gasolines and provide better road performance in certain kinds of cars.

The higher volatility of the lighter lead alkyls is one of the keys to their effectiveness.

During the acceleration of some cars — particularly those equipped with manual transmissions — only the more volatile, lower octane parts of the fuel enter the cylinders. This leads to engine knock until normal fuel distribution is restored and normal combustion takes place once again.

But the more volatile antiknock compounds help overcome this problem. They tend to stick with the lighter gasoline components as they enter the combustion chambers during acceleration, thus preventing knock.

The newer antiknocks also are more thermally stable than TEL. Thermal stability is important since it influences the temperature conditions under which a molecule of antiknock compound does its job of preventing knock. Depending on different engines and their combustion conditions, TEL performs better in some and TML does better in others.

In contrast to tetraethyl lead, which is formed by reacting a lead-sodium alloy with ethyl chloride, tetramethyl lead is made by reacting the alloy with methyl chloride.

The chemical mixtures of TEL and TML — known as mixed lead alkyls (MLA) — are made by reacting tetraethyl lead and tetramethyl lead in the presence of a catalyst. The resulting products are different from TEL and TML in physical properties, in metallic lead content, in volatility and in thermal stability.

Physical mixtures of TEL and TML, sold by Ethyl under the name TELMEL, are simply physical combinations of the two antiknocks and are available in a wide range of proportions of the two

active ingredients. The physical mixtures are more volatile than corresponding mixed lead alkyls.

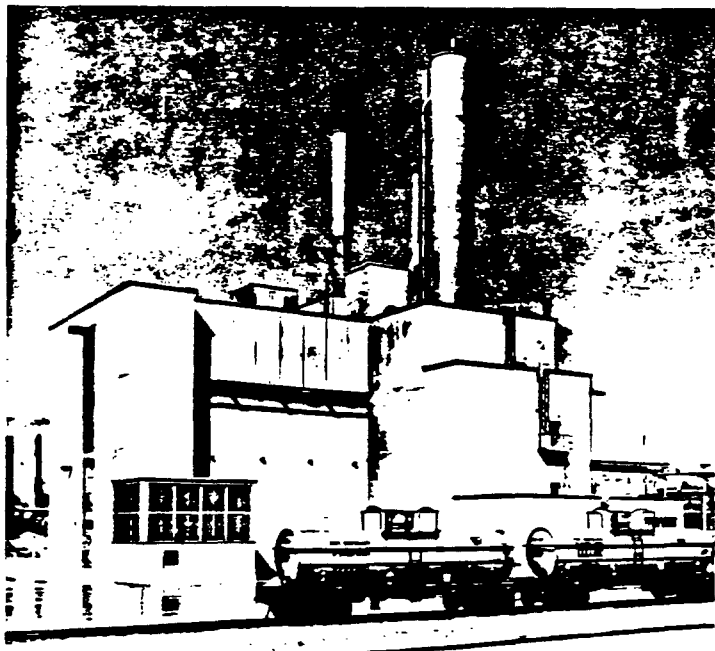
As they do in the United States and in other parts of the world, Ethyl representatives in Canada work closely with oil companies to determine which antiknock compound formulations are best suited to their refinery requirements. These formulations are then tailor-made at the Sarnia, Ontario plant, to refiners' specifications.

Expansion of the Ethyl of Canada plant to produce the new lead alkyl antiknocks was the second enlargement of manufacturing facilities there in the last year. A new industrial chemicals unit was added in 1964 to produce several products for oil refiners and other industrial customers. These include detergent-deicer-anticorrosion additives for gasoline, antioxidants for a variety of petroleum products, and aluminum alkyls which are used as catalysts in the production of plastics and synthetic rubber.

In announcing completion of the new antiknock compound manufacturing facilities, Alan C. Tully, president of Ethyl of Canada, emphasized:

"Not only will Ethyl of Canada, through its expanded production, offer refiners a broader range of domestically-produced antiknocks, but we will continue to back up the products with a complete program of technical service to help each refiner gain the most efficient and economical use of the particular antiknock he requires from us." ○

New lead alkyl compounds are produced at expanded Ethyl of Canada manufacturing plant at Sarnia, Ontario.



SIX MAGIC DOTS

BRING
LIGHT
TO THE
BLIND



*Braille printing on Albemarle
paper literally puts the sightless
in touch with life*



SIX RAISED DOTS, on special high density Albemarle paper, bring the priceless gift of the printed page to thousands of sightless Americans. Albemarle Paper Manufacturing Company, wholly-owned Ethyl subsidiary, supplies tons of Braille paper to printing houses which prepare publications for the blind.

Thanks to the Braille system, the intellectual and spiritual stimulation as well as the pure pleasure and practical benefits that stem from reading are open to the visually handicapped. The sighted read with their eyes, the blind with their hands.

But Braille does more than simply open up the world of literature to the blind. It is their pragmatic guide to everyday living, making

them self-reliant and happy in spite of their visual handicap. A blind man can "tour" the New York World's Fair with a Braille guide book. He can follow the Los Angeles Dodgers via a raised dot boxscore, cook a gourmet meal by following a recipe in Braille, and read the latest issue of the "Reader's Digest" with his fingers.

Bread and Butter Subjects

National and regional organizations for the blind also publish and distribute literature on similar bread and butter subjects. The Lighthouse, The New York Association for the Blind, for example, prints such booklets as "The Weigh of All Flesh" on dieting, "Letter Perfect" on secretary training, and "GuidetoSuccessfulHomemaking."

There are 36 regional libraries for the blind across the country where books can be borrowed in person or by mail, postage-free. And if a blind man needs a book for professional purposes, which has not been translated into Braille, most organizations for the blind will make one up for him with volunteer help.

Of course, not all Braille publications bring pleasure to their blind "readers," but at least they are helpful. The least popular piece of literature by far, is one distributed by the U. S. Government - Form 1040 at income tax time.

Oddly enough, the humanitarian raised dot system originated, not as a device of mercy, but as a weapon of war. During the Napoleonic Wars a French army captain developed a

○ ○
○ ○
○ ○



Braille follows the visually handicapped right into the kitchen with a recipe for a gourmet meal. Everyday uses of touch reading allow a baseball fan to follow his team, a stout matron, her diet, a pianist, his music, a worker, his taxes.

12-dot code system so that his men could read messages in the front lines, at night, without using lights that would attract enemy fire. In 1829, however, Louis Braille, a blind scholar, modified the code and literally put the blind in touch with the world.

Braille in Any Language

Braille found the 12-dot code far too cumbersome for the nerve centers of the fingers to pick up easily. So he devised a system of dots, two wide and three deep within a single "cell," that fit comfortably under the cushion of a finger tip. Each dot or combination of dots forms a letter, contraction, or word sign in the 63-character system. Thus Braille can be transcribed into any language, and almost all nations have at least one organization devoted to touch reading.

Not only words, but the universal language of music can be expressed in Braille. Unlike conventional sheet music, Braille is a symbolic rather than a graphic presentation using regular dots. The 63 symbols just take on different meanings. For example, the notes of the scale are represented by seven basic symbols. Other combination of dots indicate the pitch and rhythmic values of the notes.

Standard English Braille today comes both in a simplified and a more sophisticated form. Grade I uses only letter symbols without abbreviations. Grade II, in addition to the basic 63 symbols, also contains 189 contractions and short word forms. However, most Braille is printed in Grade II, the exceptions being foreign language books and Braille primers. This is because the contractions and abbreviations

BRAILLE INSTITUTE OF AMERICA, INC. BRAILLE ALPHABET

a b c d e f g h i j
· · · · · · · · · · · ·

k l m n o p q r s t
· · · · · · · · · · · ·

u v w x y z
· · · · · · · · · · · ·

Capital
Sign (dot 6)

NUMBERS

Number
Sign 1 2 3 4 5 6 7 8 9 0
· · · · · · · · · · · ·

PUNCTUATION

· · · · · · · · · · · ·

The six dots of the Braille cell are arranged and numbered thus: 1 2 3
4 5 6

With them a total of 256 distinct characters and word signs are possible. These six dots in the Braille system are adaptable to and, therefore, used in any language having an alphabet. From them are formed complete literary, mathematical, chemical and musical codes

This machine reads a Braille page by stamping impressions of dots on the stereotype. Rotary and platen presses capable of printing up to 400 pages per minute on roll or sheet paper speed up the once arduous task of preparing literature by hand.



Sixty-six federal district libraries across the country give the blind free access to books.

make for faster reading and, more important, cut down on the size of a volume. This is quite significant since four thick Braille volumes with giant 11 by 11½-inch pages are required to reproduce a conventional book of average size.

Actually Grade II is easy for children to pick up, and they are taught it from the start. Newly blind adults, on the other hand, learn Grade I first.

Shorthand for the Blind

Braille also has a shorthand form. And blind stenographers can take dictation on a special machine with a key for each dot, plus a space bar. Braille shorthand is a symbolic system with many abbreviations. With it, the blind secretary can take dictation almost as rapidly as her sighted counterpart.

While the Braille system itself has changed but little, the method of printing and the paper used has kept pace with modern technology. In the past every book and pamphlet had to be made by hand. Now rotary and platen presses capable of printing up to 400 pages per minute do the job. Both roll and sheet paper are used. The paper is especially critical since a fractured or smoothed out dot can change the meaning of words and damage the usefulness of painstakingly prepared Braille publications.

That's why Ethyl's Albermarle Paper Manufacturing Company has applied its research and development facilities as well as its manufacturing knowhow to the production of a special high density, smooth finish paper for accurate and permanent Braille printing. ○

AT
BATON ROUGE,
HOUSTON
AND SARNIA,
FLEDGLING
GREEK PLANT
SUPERVISORS...

Ethyl International is bridging the gap between the blueprint and operational stages of its new chemicals plant in Greece. It's giving six Greek engineers a thorough training course in manufacturing operations at company installations in the United States and Canada. These men will fill technical supervisory positions at Ethyl International's \$11 million facility now under construction at Thessaloniki, Greece.

A full range of antiknocks — including some of the newer lead alkyl compounds—and vinyl chloride monomer, the intermediate for polyvinyl chloride plastic, will be produced at the new plant when it goes on stream in 1966. So will ethyl chloride, methyl chloride, ethylene dichloride, hydrogen chloride and related chemicals.

The ultra-modern plant is part of a multi-nation sales, service and manufacturing complex serving Greece, the Common Market, other European countries, the Near East and North Africa. Plant products will be sold by Ethyl S.A., the corporation's new marketing and distribution subsidiary, established last year with headquarters in Brussels, Belgium, the home of the European Common Market. Ethyl S.A.'s key distribution center at present is

a modern terminal on the Maas River in Dordrecht, Holland, which has facilities for receiving, storing and shipping antiknock compounds and other "Ethyl" petroleum additives and chemical products. Other terminals are under construction in Norway and the Canary Islands. And there are plans on the board for additional facilities.

Most of the six Greek trainees are no strangers to North American technology. Four hold degrees from American and Canadian Universities. Meno C. Manopoulo has a master's degree in Chemistry from the

University of Saskatchewan; Ioannis D. Skeparnias is a recent graduate of Auburn (Ala.) University; Emmanuel Vardoulakis holds a B.S. from Indiana Institute of Technology; while Manusos M. Zymbragos has the same degree from Illinois Institute of Technology.

The two other trainees also hold B.S. degrees: Leonidas Georgiadis from the University of Salonika in Thessaloniki, the plant site; and Demetrius J. Vlachos from Alexandria (Egypt) University. Mr. Vlachos holds a master's degree from

Train for Tomorrow





AT HOUSTON: C. H. Gilliland, operations foreman, explains chlorinated hydrocarbons operations to Leonidas Georgiadis and Emmanouel Vardoulakis.

Athens (Greece) Polytechnical University as well.

The trainees, ranging in age from 28 to 36, all have practical engineering experience either in the military or industry. Four were recruited in Greece, one in Canada and the sixth in the United States. When the new plant opens one trainee will be chemist in charge of the operational and quality control laboratories, two will be operating supervisors in the TML and hydrocarbon areas, and the other three will be mechanical, chemical and electrical engineering supervisors. Their training is in



AT BATON ROUGE:

Demetrius J. Vlachos gets a rundown on the power distribution system to the tetraethyl lead manufacturing buildings from John Wilson, foreman.



Manusos Zymbragos, right, gets a first hand look at the king sized job of moving industrial chemicals by rail. He checks an Ethyl outbound tank car with M. L. Kyle, foreman.

Train for Tomorrow



Classroom seminars supplement on-the-job training for the Greek engineers. E. F. Diedrich, (left) who will be resident manager of the European plant, orients the visitors to antiknock compound production.

line with Ethyl's plan to operate the new plant with Greek personnel as far as possible.

Most of the ten-month training activities is conducted at Ethyl's extensive Baton Rouge plant — the largest antiknock compound production facility in the world — but the engineers are also training at the corporation's manufacturing centers in Houston and Sarnia, Ont. One electrical engineer will also tour several of Ethyl's supplier plants for instrument instruction.

During the first several weeks at Baton Rouge, the trainees received identical training — learning the sophisticated operations, safety engineering, process control, maintenance and quality control practices that go into the manufacture of antiknock compounds. Now the men are receiving individual instruction in their respective specialties. In all cases, however, it is the area foremen and first line supervisors who are key instructors.

Under these instructors, trainees gain experience in such key antiknock compound manufacturing processes as the production of ethyl chloride from ethylene gas and chlo-

rine, the formulation of lead-sodium alloy from metallic lead and sodium, and closed vessel reactions between the alloy and ethyl chloride or methyl chloride to make tetraethyl or tetramethyl lead, the active ingredients in finished compounds.

But experience in antiknock compound production is only part of the manufacturing training. The fledgling supervisors also are learning how Ethyl thermally cracks ethylene dichloride to obtain both vinyl chloride and hydrogen chloride. Vinyl chloride is the starting point for polyvinyl chloride plastic. Hydrogen chloride is a byproduct used in other chemical manufacturing operations.

With such complete on-the-job training, the Greek engineers will be fully qualified to step into important production positions when the Ethyl plant begins operations in 1966.

The plant will be operated by Ethyl Hellas Chemical Company, S.A., a newly formed wholly-owned Ethyl subsidiary. Chairman of the board of directors of Ethyl Hellas is William J. Rusher, president and managing director of Ethyl S.A.

Elmo F. Diedrich is vice chairman and James E. Rogers, second vice chairman.

Other members of the Greek subsidiary's board are Dimitrios J. Zepos, an Athens attorney; Albert B. Horn, vice president and general manager of Ethyl International; Floyd D. Gottwald, Jr., vice chairman of Ethyl Corporation; and William R. Perdue, Jr., executive vice president and treasurer of Ethyl.

Mr. Diedrich will direct all activities at the new plant as resident manager. He has extensive experience in directing antiknock compound and other chemicals manufacturing activities, most recently as manager of Ethyl Corporation of Canada's plant at Sarnia, Ontario.

Both Ethyl Hellas and Ethyl S.A. are part of the corporation's expanding International Division, headed by Mr. Horn. The division is responsible for the manufacture, sale, distribution and service of Ethyl's products in the far flung overseas market. And it directs all company activities outside of the United States with the exception of Canada where Ethyl of Canada operates.



A. B. HORN:
Vice president and general manager of Ethyl International.



W. J. RUSHER:
Chairman of the board of Ethyl Hellas Chemical Company S.A., and president and managing director of Ethyl S.A.



E. F. DIEDRICH:
Vice chairman of Ethyl Hellas, and resident manager of Ethyl's new Thessaloniki plant.

OUTLOOK

PRESIDENT TAPS POWELL FOR NATIONAL CRIME COMMISSION



Lewis F. Powell, Jr., a director of Ethyl Corporation and president of the American Bar Association, was named by President Johnson to the recently established National Crime Commission.

The commission, headed by Attorney General Nicholas Katzenbach, is undertaking a systematic, nationwide study of the entire spectrum of crime problems. In his directive, President Johnson said the commission should inquire into the causes of crime and delinquency, measures for their prevention, the adequacy of law enforcement and administration of justice, and the factors encouraging respect or disrespect for law, at national, state and local levels.

The commission will deliver a comprehensive report to the president by the end of next year.

Mr. Powell recently headed a delegation of members of the American legal profession at an international assembly in London to celebrate the 750th anniversary of the Magna Carta. Speaking before the assembly he said: "The Anglo-American legal system has preserved the ideal of individual liberty for perhaps the longest sustained period in all history." Mr. Powell also told the dignitaries that "We enjoy in your country and ours, liberties and opportunities—protected by the rules of law—that are the envy of mankind."

RONALD M. BLAND NEW HEAD OF VISQUEEN'S TERRE HAUTE PLANT

Ronald M. Bland, former plant engineer at VisQueen's Terre Haute, Ind., plant, has been promoted to plant manager. He succeeds F. Lee Hamilton, who has been transferred to Baton Rouge to be general manager of sales service for Ethyl's VisQueen division.

Mr. Bland, has filled several managerial posts at the Terre Haute facility since joining the company in 1952. A graduate of Purdue University with a BS in chemical engineering, he also has an MS degree in business administration from Indiana State College.

Robert E. Newby, who joined VisQueen last year, takes over as plant engineer. Mr. Newby was graduated from Rose Polytechnic Institute with a mechanical engineering degree.

ETHYL'S NOW THE 222nd LARGEST INDUSTRIAL—AND STILL GROWING

Ethyl Corporation's \$277.5 million in sales last year, makes it the 222nd largest U. S. industrial firm. So says *Fortune Magazine* in its annual directory of the 500 largest industrial corporations. This makes a step up of 25 places since 1963, when Ethyl was ranked 247th.

In addition Ethyl rates 151st in assets, 170th in earnings, 326th in number of employees, and 135th in profits as a percentage of sales.

Saleswise, Ethyl ranks just ahead of M. Lowenstein & Sons and P. Lorillard Company, and just behind Flinkote Company and ACF Industries. Ethyl is also ahead of other well known corporations such as Bell & Howell, Pepsi-Cola and Polaroid.

General Motors and Standard Oil of New Jersey finished one, two in sales. Ford Motor Company, General Electric and Socony Mobil round out the first five in the *Fortune* survey.

C. F. NAYLOR NOW GENERAL MANAGER OF PCD ADMINISTRATION



C. Fred Naylor

C. Fred Naylor has been appointed general manager of administration in Ethyl's Petroleum Chemicals division. He succeeds S. T. "Jack" Pruitt, who is retiring for reasons of health.

Mr. Naylor joined Ethyl in 1931. Over the years, he has had extensive experience in the Company's sales operations. He has been administrative assistant to Malcolm P. Murdock, senior vice president in charge of the Petroleum Chemicals division, for the last six years. In his new position, Mr. Naylor oversees the activities of the Product Service & Safety, Order & Shipping, Marketing Research &

Analysis, and Financial Control groups and the Gasoline Testing laboratories.

A native of Belvidere, N. J., Mr. Naylor was graduated from Lehigh University with a degree in chemical engineering.

Mr. Pruitt, who is retiring, spent his entire Ethyl career in sales activities. He was appointed general manager of administration last year. Prior to that time, he was general sales manager.

A native of Benton, Ala., Mr. Pruitt is a graduate of Georgia Institute of Technology.

In other Petroleum Chemicals division changes, Harold U. Landis, Jr., is being promoted and transferred to Pittsburgh, Pa., where he will be responsible for several oil company accounts. A native of Lancaster, Pa., and a graduate of Gettysburg College, Mr. Landis has held several positions in the Petroleum Chemical division's Eastern region since his employment by Ethyl in 1953.

Herbert C. Mosely, account representative in western Pennsylvania, is retiring after 27 years' service with the Company.

Barnard B. Lewis, field engineer in the Eastern region in New York, has been promoted to account representative and will be responsible for accounts formerly handled by Mr. Landis. Mr. Lewis was born in Cardiff, Wales, and is a graduate of St. Lawrence university. He has had many varied positions in different parts of the country since he was employed by Ethyl in 1953.

JOHN T. WALTON NAMED ALBEMARLE VICE PRESIDENT



John T. Walton has been named vice president/converting of Albemarle Paper Manufacturing Company, wholly-owned Ethyl subsidiary, reporting to Goble W. Bryant, executive vice president and general manager. Mr. Walton, who transfers to Richmond, Va., has been vice president and general manager of Albemarle's Raymond Bag division in Middletown, Ohio.

In his new position, Mr. Walton is in charge of all converting divisions of Albemarle. These include: Raymond (multiwall bags), Albemarle Container Company (corrugated boxes), Interstate Bag Company (shopping bags), and Consumer Bag Company (grocery bags). Mr. Wal-

ton also becomes a member of Albemarle's board of directors, executive committee, and research and development committee. A native of Cleveland, Mr. Walton was graduated from Kent State University, and was director of sales for the bag division of St. Regis Paper Company before joining Albemarle.



D. R. Russell



C. K. Watters

Donald R. Russell, formerly vice president and general sales manager of Raymond Bag, has been named president and general manager. Mr. Russell has 12 years of sales and marketing management experience in the multiwall bag business and is a graduate of the University of Kentucky.

In other Raymond division changes: Charles K. Watters has been promoted to vice president and general sales manager, succeeding Mr. Russell. A graduate of Cornell University, Mr. Watters had been marketing manager for Raymond.

Theodore H. Bacon moves into the marketing manager slot. Mr. Bacon formerly was vice president-northeast area sales manager. He is succeeded in that post by Peter B. Shaffer, who has been regional sales manager.

Mr. Watters and Mr. Bacon are based in Middletown, while Mr. Shaffer continues to work out of New York City.

The following changes in the Albemarle sales organization also have been announced:

John G. Rawles has been named sales manager—standard products of Albemarle Paper Manufacturing Company, subsidiary of Ethyl Corporation. Mr. Rawles, who has been with the paper company for 12 years, had been district sales manager in New York since 1960. His new office is in Richmond.

Alexander Hamilton IV is replacing Mr. Rawles as New York district sales manager. Mr. Hamilton has been a sales representative with Albemarle since 1958 and handled the New York district since 1961.

In other changes in Albemarle's sales organization:

James A. De Voe has been appointed sales representative for both New York and New England, working out of New York. Mr. De Voe formerly handled the New England territory.

Daniel L. Williams, Jr., becomes manager of containerboard sales, with headquarters in Richmond.

ETHYL CONSTRUCTING NEW RICHMOND OFFICE BUILDING

Construction has begun on the new Ethyl Corporation office building in the Gamble's Hill area of Richmond. The Great Georgian brick structure, which will house the growing staff of the Ethyl corporate organization, is expected to be completed in about one year.

The new office building will be directly across from Ethyl's present headquarters at 330 South Fourth Street, and will closely resemble that white brick building. It will have two full floors and a partial third story of office space, totaling 56,200 square feet. The building will also have two basement parking levels with 41,300 square feet of space, enough to accommodate 80 cars.

The Richmond building will be the first of two new buildings that Ethyl offices will occupy in the next two years. The Company will also be the principal tenant in a Louisiana National Bank skyscraper now under construction in Baton Rouge, La., and scheduled for completion in mid-1967. The move will consolidate Ethyl's downtown Baton Rouge offices, now housed in two buildings.

GEORGE F. KIRBY HEADS DRIVE FOR LOUISIANA HIGH ENERGY LAB



Dr. George F. Kirby, president of Ethyl Corporation, heads a five-man council seeking to locate the U. S. Atomic Energy Commission's proposed \$280 million National High Energy Physics Laboratory in Louisiana.

The council, made up of members of the Louisiana Board of Nuclear Energy, coordinates the state's intensified and broadened representations and proposals to the A.E.C.

CONSUMER BAG MAKES RECORD GROCERY BAG SHIPMENT

What's believed to be the biggest shipment of grocery bags ever made in the United States went out from the Richmond, Va., plant of Consumer Bag and Packaging Company division of Ethyl's Albemarle Paper Manufacturing Company this summer. In the mammoth load, which filled an 85-foot

"jumbo" railroad boxcar, were more than 76 tons of large, sturdy grocery bags destined for the Jewel Tea Company's retail stores headquarters in Melrose Park, Ill. More specifically, the shipment contained 1,455,500 bags weighing 153,179 pounds.

Previously, record shipments from Consumer Bag to Jewel Tea had included 104,000 pounds of grocery bags in a 60-foot boxcar and a 95,000-pound consignment of bags on a "jumbo" flatcar protected from the elements by waterproof VisQueen polyethylene film produced by Ethyl's Plastics division.

Consumer Bag and Packaging was acquired by Albemarle last spring, further diversifying the paper company's converting operations. It manufactures grocery bags from kraft paper produced by Albemarle at the Company's pulp and paper mill at Roanoke Rapids, N. C.

THREE ETHYL UNITS CITED FOR EXCELLENT SAFETY RECORDS

Officials of three Ethyl Corporation facilities have recently accepted special achievement awards in recognition of outstanding employee safety records.

The Ethyl Research Laboratories in Detroit, and the Roanoke Rapids, N. C., division of Albemarle Paper Manufacturing Company, both were honored with citations for completing more than one million man-hours of work without a disabling injury. And the Baton Rouge manufacturing plant was cited for its improved safety record, which made 1964 the safest year ever in the plant's 27 year history.

The newly instituted achievement awards were presented by the Travelers Insurance Companies, which carry both Ethyl's and Albemarle's workmen's compensation insurance.

Kirkwood F. Adams, Albemarle executive vice president and Roanoke Rapids division manager, accepted the citation for the North Carolina plant. Mr. Adams pointed out that the division's accident frequency rate in 1964 was only 2.60 per million man hours, compared to the Southern pulp and paper industry average of 4.46.

At Detroit, the Travelers award was presented to Harold J. Gibson, manager of the research labs, and Fred J. Schroeter, safety engineer. Wallace F. Armstrong, resident manager of the Baton Rouge plant, accepted the citation for that facility.



Earle W. Webb

1883-1965

Former Ethyl President

Earle W. Webb, former president and chairman of the board of Ethyl Corporation, died while vacationing in Baden Baden, Germany, in July. He was 82 years old.

Mr. Webb became president of Ethyl in 1925, less than one year after the Company had been incorporated as Ethyl Gasoline Corporation. Previously, he had been a director of General Motors Chemical Company, the predecessor company to Ethyl, which manufactured

and sold the first antiknock compounds for gasoline in 1923.

Mr. Webb was president of Ethyl for 22 years, until 1947, and served as the first chairman of the board of directors from 1947 until his retirement in 1948. He was an Ethyl director from 1925 to 1957.

Under Mr. Webb's leadership, the "Ethyl" name and trademark became widely known. The Company became the world's largest producer of antiknock compounds, and introduced them into all grades of motor and aviation gasoline.

Mr. Webb was born in Morehead City, N. C., February 8, 1883. He attended Trinity College, now Duke University, for three years, and took his senior year at the University of Michigan, where he was graduated. Later he attended New York Law School, was admitted to the New York Bar, and was a practicing attorney in New York for 15 years. He was associated with General Motors Corporation from 1921 until 1925.

For many years, Mr. Webb was a trustee of Duke University, a director of the American Petroleum Institute, and was active in the National Assn. of Manufacturers.

Burial was in Morehead City, N. C., site of the Earle Wayne Webb, Jr., Memorial Civic Center. The center, founded and supported by the Webb family, houses the Morehead City library and provides offices and meeting places for civic, philanthropic and youth organizations. It is named in honor of Earle W. Webb, Jr., one of Mr. Webb's sons, who died in the 1930s.

One of a series of
corporate advertisements
appearing in *Newsweek*,
U.S. News & World Report
and *Business Week*



Launder your carburetor? Sure. In fact, you can clean your entire fuel system while you drive if the gasoline you use contains a detergent additive. Ethyl makes such a chemical, as well as many other products for many industries.

Ethyl chemicals clean metals, act as

catalysts and intermediates. Our papers wrap, bag and box. We also make plastic film for packaging. These are just a few of the things we're doing today.

Where will Ethyl products turn up next? Wherever research and our imagination take us.

ETHYL CORPORATION

New York, N. Y. Petroleum Chemicals • Industrial Chemicals • VisQueen Plastics • Ethyl of Canada • Ethyl International • Albemarle Paper • Raymond Bag • Interstate Bag

ETHYL CORPORATION
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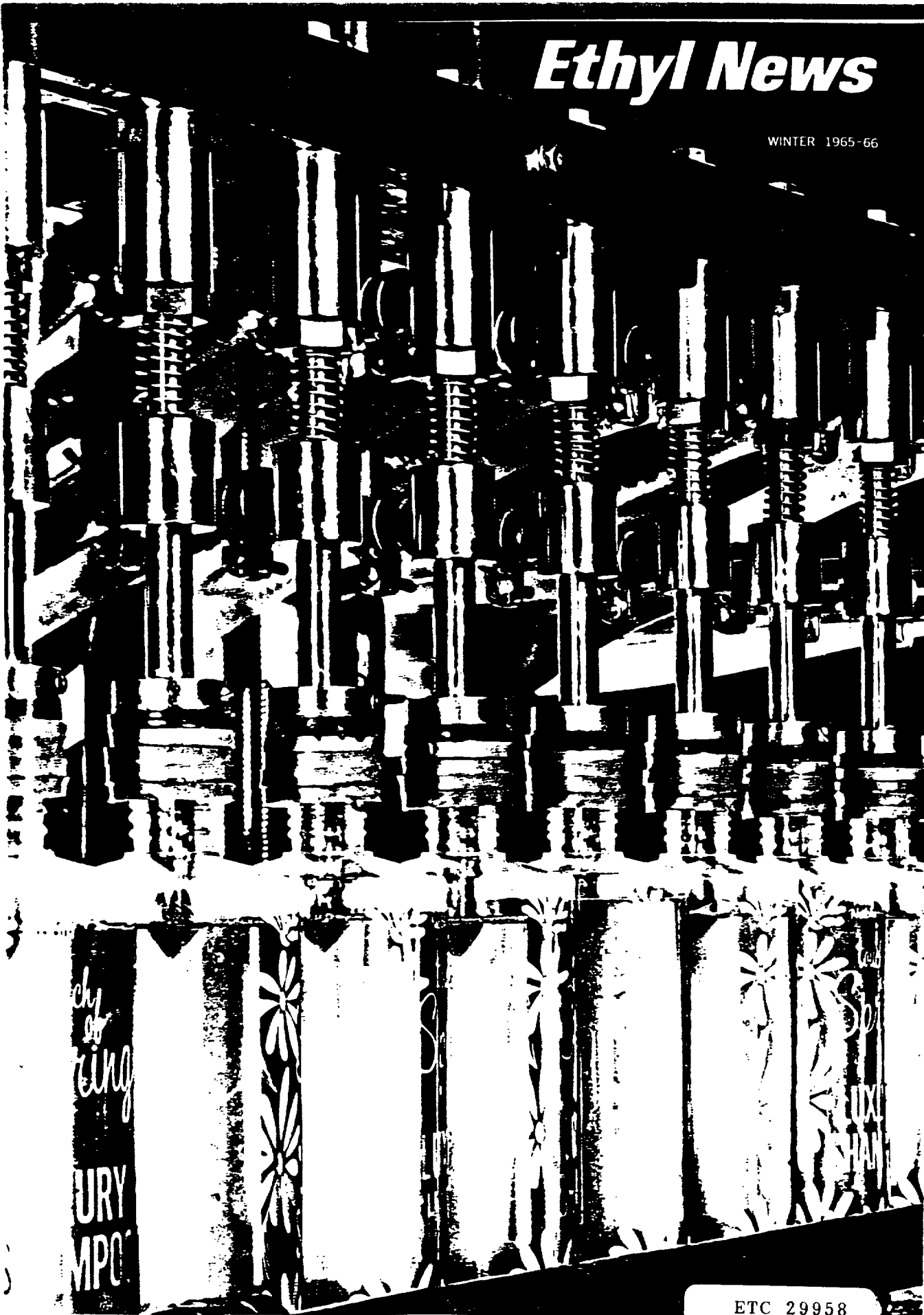
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Ethyl News

WINTER 1965-66



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Ethyl News

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TABLE OF CONTENTS

EY Hits the Big Board	2
Harvest Profits on the Farm	4
Paper Bags Give Garbage Cans the Sack	8
Patents—Fuel for Research	11
Plastic Bottles You Can See Through	14
Promoting Travel-Hollywood Style	16
Eight Saboteurs of Staff Meetings	18
A Look at Both Sides of the Metric Question ..	22
Crime: Our Number One Domestic Problem ..	24
Outlook	27

ON THE COVER

Vypak PVC bottles are on the filling line at Scott Chemical Company in Paterson, N. J. The transparency of the rigid plastic bottles allow the color of the shampoo product to come through clearly and attractively. For a rundown of the market potential of polyvinyl chloride bottles and how Vypak's new Rockaway, N. J. plant is meeting this demand, turn to pages 14-15.

Ethyl News is published quarterly by

ETHYL CORPORATION

100 PARK AVENUE, NEW YORK, N. Y. 10017

*manufacturers of petroleum chemicals,
industrial chemicals, paper and plastics.*

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ETC 29960

Ethyl in Europe

Thousands of gallons of tetraethyl lead are loaded into tankers at Ethyl's ultra-modern distribution center at Dordrecht, Holland. Destination: All of Western Europe.

Right now all antiknock compounds handled at Dordrecht are manufactured at Houston and shipped overseas on the EID, Ethyl's ocean going tanker. Later this year the corporation's \$11 million manufacturing plant in Thessaloniki, Greece will go on stream to supply the vast European, Middle Eastern and African markets. Dordrecht will remain the main distribution center. Next issue ETHYL NEWS will take a look at our overseas distribution operation.



ETC 29961

With the purchase of 100 shares of company common stock by Floyd D. Gottwald, Sr., chairman of the board of directors, on October 14, Ethyl Corporation took another step forward — going on "The Big Board".

Ethyl is now one of some 1,275 publicly owned corporations whose common stock is bought and sold on the New York Stock Exchange. Although there are more than 1,300,000 corporations filing income tax returns in this country, three out of every five American investors hold shares in listed companies. And the listed corporations earn almost two-thirds of the net profits reported by all U. S. companies, pay their stockholders about 60% of all dividends dispersed, and provide jobs for some 14½ million people.

The first purchase of stock by the chief officer of a newly listed corporation is a time-honored tradition at the New York Stock Exchange. Mr. Gottwald's purchase, right at the 10 a.m. start of trading gong, appeared on the ticker tape as the first transaction of the day. And it marked the first time that Ethyl's ticker symbol EY was used. Accompanying Mr. Gottwald at the listing ceremonies were Dr. George F. Kirby, president, William R. Perdue, executive vice president and treasurer, Floyd D. Gottwald, Jr., vice chairman of the board of directors, and Bruce C. Gottwald, executive vice president and secretary.

Ethyl went on the board with 10,424,172 shares of common stock, of which 9,402,600 are outstanding. This stock formerly was traded in the over-the-counter market. Ethyl has approximately 11,300 stockholders, and the current dividend is at an annual rate of 50 cents a share.

The listing of Ethyl stock on the NYSE is providing benefits both for the corporation and for individual shareholders. Here are a few:

- NYSE listing often leads to broadened and diversified ownership of company shares. (Most companies report a heavy increase in

the number of shareholders after listing.) Mutual funds and other institutional investors such as pension plans tend to purchase shares of listed companies. Private investors also find it more convenient to buy listed companies' shares. Some 3,500 offices of exchange member firms are open in almost every city of any size in the United States. About 550 newspapers carry complete or partial listing of up to the minute stock prices every day.

- Listing on the Big Board is keeping the public aware of Ethyl and its products. Thousands of brokerage houses across the country carry information about listed companies.

EY HITS THE BIG BOARD

- The market operates in full public view under tight regulations protecting both management and the individual stockholders. And the cost of transferring listed stock from one person to another is cheaper than trading any other property — averaging just 1% a transaction.

The New York Stock Exchange actually is the world's biggest continuous auction, where nearly 10 billion shares of stock are listed for sale or purchase. But unlike conventional auctions, sellers compete as well as buyers. Brokers vie with each other to purchase stocks for their clients at the lowest possible cost, while others hold out for the best price they can get.

The NYSE stringent criteria for listing and continued listing assures that only the cream of world business can qualify. And for the fourth time in just seven years the exchange has tightened requirements. To be accepted on The Big Board a corporation must:

- Have a market value for its publicly owned stocks of \$12 million.
- Have a minimum of 1,000,000 shares outstanding and at least 700,000 publicly held.
- Have a minimum of 2,000 stockholders and at least 1,700 holders having blocks of 100 or more shares.
- Have a minimum pre-tax income of \$2 million a year, and \$1.2 million after taxes for three years in a row.

In the past ten years about 500 corporations have met these requirements and were listed. On the other hand 118 were dropped for failure to meet the criteria for continued listing. Another 214 businesses were delisted because of mergers and liquidation.

The New York Stock Exchange dates back to 1792 when a group of 24 merchants and auctioneers met under an old buttonwood tree on Wall Street each morning to trade government securities and a smattering of bank and insurance companies stock. A year later the Tontine Coffee House was completed on the corner of Wall and William Streets and the stock exchange moved indoors. In the next century and a quarter the exchange moved more than a dozen times before settling into its present quarters on Broad Street in 1903. And new and even more modern quarters for the NYSE will be ready in about five years.

The ticker tape, symbol of Wall Street to millions of American investors, was first used in 1867, to speed news of each transaction and thus give accurate price information to every section of the nation. Today modern ticker tape machines can print up to 900 characters per minute and handle up to 10 million shares a day without lateness. And these ticker tapes will soon be receiving the trading data via electronic data processing, cutting the elapsed time between trade and reporting on the ticker tape from minutes to seconds.

Ethyl Corporation now adds its heritage of progressive forward looking management to the story of The Big Board. ○

Floyd D. Gottwald, Ethyl chairman of the board, checks ticker tape after buying the first 100 shares of EY at listing ceremony.



Polyethylene films protect fledgeling plants by keeping the weeds down and the moisture in. Here a specially adapted tractor burns evenly spaced holes in the film and plants the seed, all in one pass.

VISQUEEN POLYETHYLENE FILMS

HARVEST PROFITS ON THE FARM

BY MAYHEW CLARK
Agricultural Advisor

Ethyl Corporation
VisQueen Division

Versatile polyethylene film, made and sold by Ethyl Corporation's VisQueen division, is proving the farmer's first line of defense against the weather, soil erosion — even drought and other dangers that threaten his crops.

Roughly one in every 20 rolls of PE film produced in the United States today turns up in agriculture. Strong and lightweight, with excellent resistance to sunlight, chemicals and moisture, polyethylene film has a host of uses in mulching, storage and conservation operations on the farm. It's used for

everything from the temporary glazing of greenhouses and soil fumigation tarpaulins to row crop covers and the winterizing of poultry houses. And inventive farmers are unearthing a wide variety of new uses for VisQueen polyethylene film. Proper selection and use of polyethylene film can make the difference between a melon crop yielding over 200 bushels an acre and one with 70 bushels, or a fully ripened strawberry crop in 47 days instead of 60 days.

VisQueen polyethylene film comes in black, clear and UVR (ultraviolet

resistant), in thicknesses ranging from $\frac{1}{2}$ to 10 mils, and in widths up to 40 feet and lengths of 100 feet. Here are some of the ways that VisQueen films watch out for the farmer's pocketbook:

Black polyethylene mulch film helps promote plant growth and produces an earlier crop of better quality. The film suppresses weed growth, reduces plant nutrient leach-out and helps yield a cleaner crop free from mold damage and other soilborne diseases. This is done by holding lifegiving moisture in the soil while at the same time



VisQueen's Mulch film can make the difference between a fully ripened strawberry crop in 47 days, and one in 60 days.

HARVEST PROFITS ON THE FARM

raising the soil temperature from five to eight degrees. Plants also are buffered from sharp temperature changes because of more even soil warmth. The black film coloring blots out sunlight to curb weed growth and prevents ultraviolet light breakdown of the film itself.

In arid sections of the United States, such as parts of Arizona, California and New Mexico, polyethylene film has proved to be a valuable aid in conserving water when used to line reservoirs and irrigation ditches. In these areas, almost one-third of the water diverted to irrigation ditches ordinarily is lost through seepage before reaching the fields. Black VisQueen polyethylene film is an economical method of reducing irrigation costs and conserving water by reducing seepage, drainage problems and labor and maintenance costs. It also prevents bank erosion and washouts in the irrigation ditches.

Black polyethylene film is also a practical answer to the problem of low cost storage of quality silage in stack, trench or tower silos. Film silo covers are inexpensive and enable the farmer to increase the amount of feed available for livestock. Forage crops can be turned into high quality silage by fermenting under the airtight, waterproof cover. The film minimizes temperature rises and inhibits caramelization which robs silage of feed value. Spoilage can be held to less than 5%.



Heavy guage VisQueen film—delivered in large rolls—can easily be laid over the prepared sides and bottoms of irrigation ditches and canals. Without the film almost one-third of the water can be lost through seepage before reaching the fields.

The Black film also serves as a quick economical way to protect valuable hay supplies from foul weather.

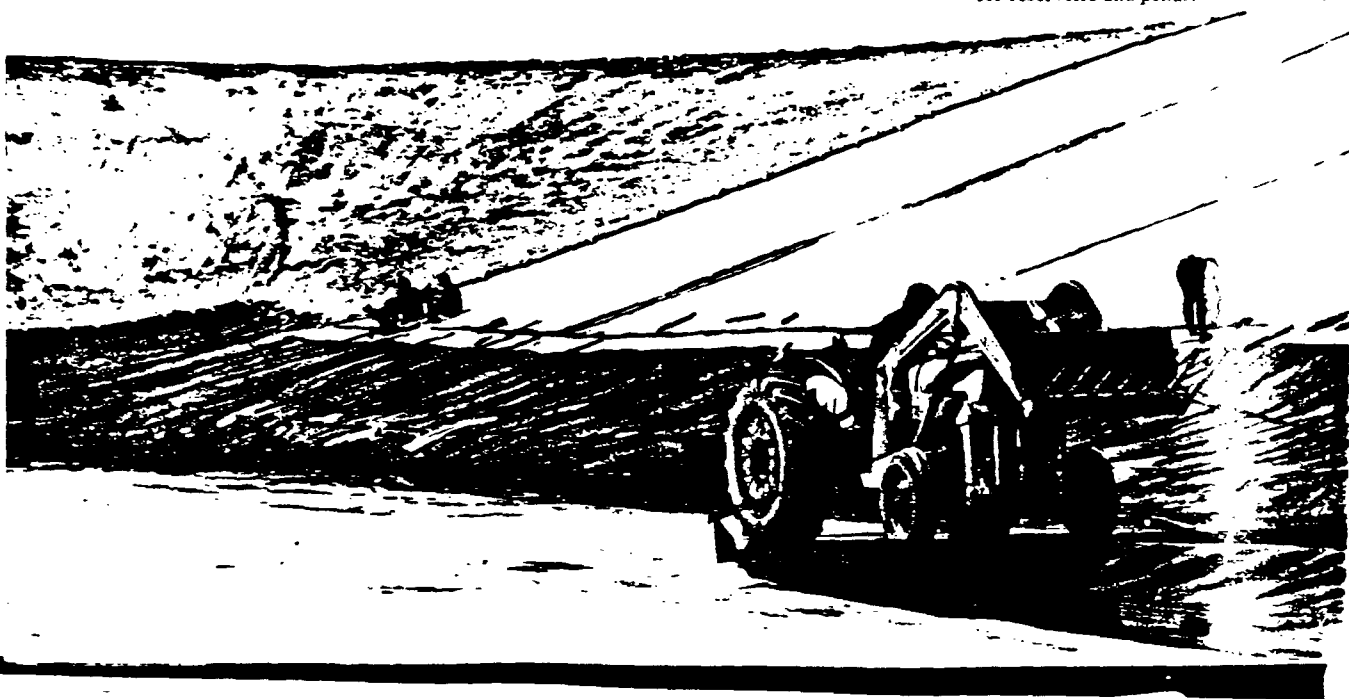
Black polyethylene film 1.5 mil thick, spread over sweet potato beds, suppresses weed growth while speeding slip formation. The cost of this film covering is less than for building felt and other commonly used materials. It is also easier to handle, is lightweight and comes in longer lengths than the other materials.

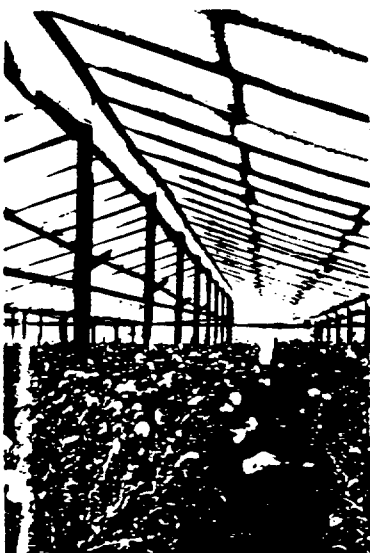
As a ground covering, black polyethylene film prevents weed growth under and around container (potted) grown stock and prevents ground contamination of seedlings started on unsterilized soil beds in greenhouses.

VisQueen film provides low-cost protection of crops in temporary storage. A black film covering at least 6 mil thick safeguards beets and grain stored in open areas until processing facilities are ready to handle them.

Clear polyethylene film provides a low-cost, easy to apply temporary glazing for greenhouses for vegetable and foliage plant production and bedding plant and floral production. The tough, clear material permits free passage of light and is strong enough to withstand most hail and high winds. The covering can be replaced every year for less

Many types of farm equipment can be used to unroll black VisQueen film to provide a watertight lining for reservoirs and ponds.





Polyethylene film can do double duty in the green house. It makes a low cost, easy to apply glazing, and also serves as a liner to provide dead-air insulation.

than maintenance costs for most conventionally glazed greenhouses.

Clear film can also be used for insulating purposes in permanent type glazed greenhouses by providing a dead air space between the two surfaces. A 2 mil thick, clear film secured under the permanent glazing material forms a dead air

space which can reduce heating costs as much as 30%.

Polyethylene film is a highly successful substitute for hot caps used with cold susceptible off-season plants started early in the field. Plastic row covers give seedlings an early healthy start secure from frost and cold winds. They extend the growing season in both spring and fall by keeping the soil moist and temperatures substantially higher. Crops are ready for market sooner.

Similarly, clear polyethylene film is an ideal low-cost temporary glazing material on plant bed frames for growing tobacco, vegetable and flower plants and seedlings. Replacement costs are less than the upkeep of glass frames. Clear film is used for this operation because it allows sunlight through to warm the soil.

Properly installed clear polyethylene film is a valuable aid in controlling chronic respiratory diseases (CRD) in poultry kept in open houses. A house with wet or damp litter, cold draft conditions or subject to sudden temperature changes is a likely target for CRD. Poly-

ethylene film reduces environmental stress when used in winterizing poultry houses. It keeps the cold winds, snow and rain out while allowing sunlight to pass through these structures. Poultry houses of frame construction with poultry netting sides and ends, are normally left open in the summer and closed in the winter. A sheet of clear film covers the sides and ends from the eave to the ground with allowance for ventilation at eaves or ridge.

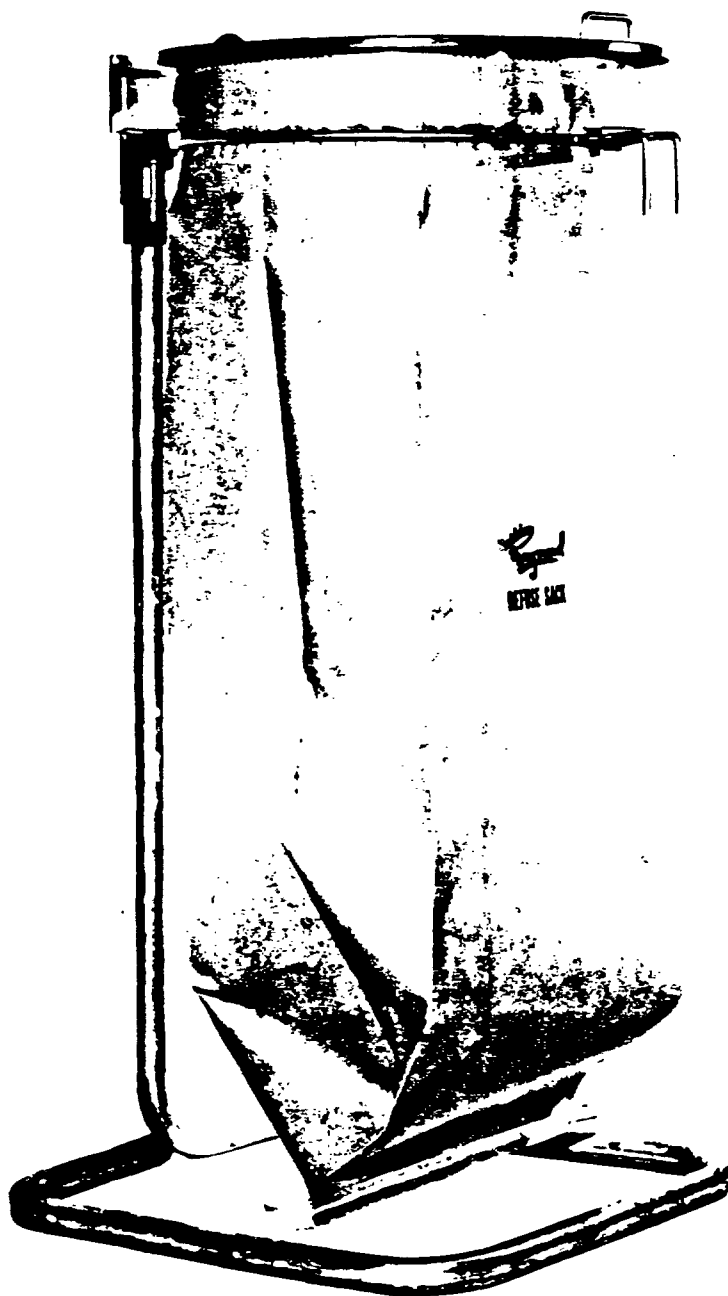
In addition, polyethylene film is an excellent vapor barrier which makes it ideal for eliminating moisture damage to grain and fertilizer in farm structures. Roughly 80% of all moisture found in farm structures comes from the soil.

When a longer lasting film is needed, specially formulated ultraviolet resistant (UVR) film is ideal—lasting twice as long as the other polyethylene films used under similar conditions.

The only limitations to the use of VisQueen polyethylene film on the farm is the inventiveness and ingenuity of the farmer. ○



Paper Bags Give Garbage Cans the Sack!



If the results of a pilot test in Middletown, Ohio last summer are any indication, the soft rustle of paper refuse bags may replace the noisy clatter of metal garbage cans in many municipalities across the country.

A top heavy 82% of the participants in a ten week study conducted jointly by the city of Middletown, the local chamber of commerce and Raymond Bag division of Albemarle Paper Manufacturing Company, gave their approval to paper.

Under the test setup, huge disposable kraft paper sacks, easily attached to special holders placed at the side or rear of each house, took the place of conventional garbage cans. Each householder simply filled the bag in the same way he would a metal container. Then the bags were picked up at regular intervals by city collectors and tossed as packages into refuse trucks—no need to empty and then return each container. Then each participant hung up another bag from a supply delivered in advance, and the process began again.

One hundred and twenty-seven households, in an area comprised of lower-middle to upper-middle class homes, took part in the summer long test. And early last fall each participant was interviewed to determine his reaction. The chart on page ten tells the story.

Key to the revolutionary system is the wet-strength single ply kraft paper sack manufactured by Raymond Bag. Special resins are added to the basic kraft paper formula to produce these sturdy sacks that keep their strength even in rain, sleet and snow. A special metal guard can be placed along the bottom section of the bag in neighborhoods where dogs and cats are too friendly.

There are inherent advantages to the paper sack that should make it attractive both to the homeowner and city officials. They are:

- It eliminates the unpleasant and time consuming job of scrubbing out the garbage can.
- The simple fold over design of the bag forms a neat seal when full. There's no spillage problem caused by trying to push down a bent can top.
- There's less problems with insects. A state of California study indicates that once a week pickup with paper bags equals twice a week with metal cans as far as eliminating flies is concerned.

*Four out of five
Middletown, Ohio residents say
OK to the new Raymond Bag
refuse system after
a summer long test*

- They're noiseless. Even the most enthusiastic refuse collector can't make them clatter and bang.

- They can lower collection costs. Collectors can service more units in less time, because the lightweight sacks are easier to handle and there is no return of containers to the storage side.

- It's impractical to store extra garbage cans for emergencies such as storms that can interrupt collections. On the other hand empty sacks take little space and a huge supply of new containers is always on hand.

Middletown city officials as well as participants were enthusiastic about the results. Rober V. Moschel, Director of Public Works for the city put it this way: "The results

have proved favorable. My family and myself are using the bags ourselves."

If the paper refuse bag concept catches on in the United States like it has in cities in Sweden, Great Britain and other nations the market potential would be fantastic. In fact the entire production capacity of all American paper companies presently would not be able to take care of more than a fraction of the demand. The cleanup tab for both public and private sanitation services has been conservatively estimated at more than \$1.3 billion annually. In fact if all municipalities within a 50 mile radius of Cincinnati adopted the paper bag system, all the current production at Raymond

Bag's Middletown plant would not be able to meet the needs of this one metropolis.

Practically speaking however, a realistic figure of the paper refuse sack potential comes to a whopping 1 and 1/2 million tons of kraft paper annually. Even this is about 45% of the entire output of the kraft paper industry. To get their share of the market, the nation's major paper manufacturers have launched an educational program to inform municipal authorities, public health officials and the general public about the new system of refuse collection. Pilot studies, such as the Middletown test, is a key part of the campaign. The information program is directed by the National Refuse

Featherweight paper sacks are easier for the collector to handle than bulky metal cans. And they're easier on the eardrums —won't rattle or bang.



**PAPER BAGS GIVE
GARBAGE CANS THE SACK!**

Sack Council, made up of seven top companies including Raymond Bag.

Similar tests to the Middletown study have already been made in several U.S. cities and the results have been overwhelmingly favorable. For example, College Park, Md., adopted the paper bag refuse system exclusively in 1962, after a summer long test. Even though the city is paying for both the metal stand and paper bags, it is still saving money. Collection now requires only four days a week instead of five, and truck crews reduced from five men to four.

The American Public Works Association tested the system in four cities of widely varying climates—Sarasota, Fla., Buffalo, N. Y., Fort Worth, Texas, and Dubuque, Iowa—with very satisfactory results.

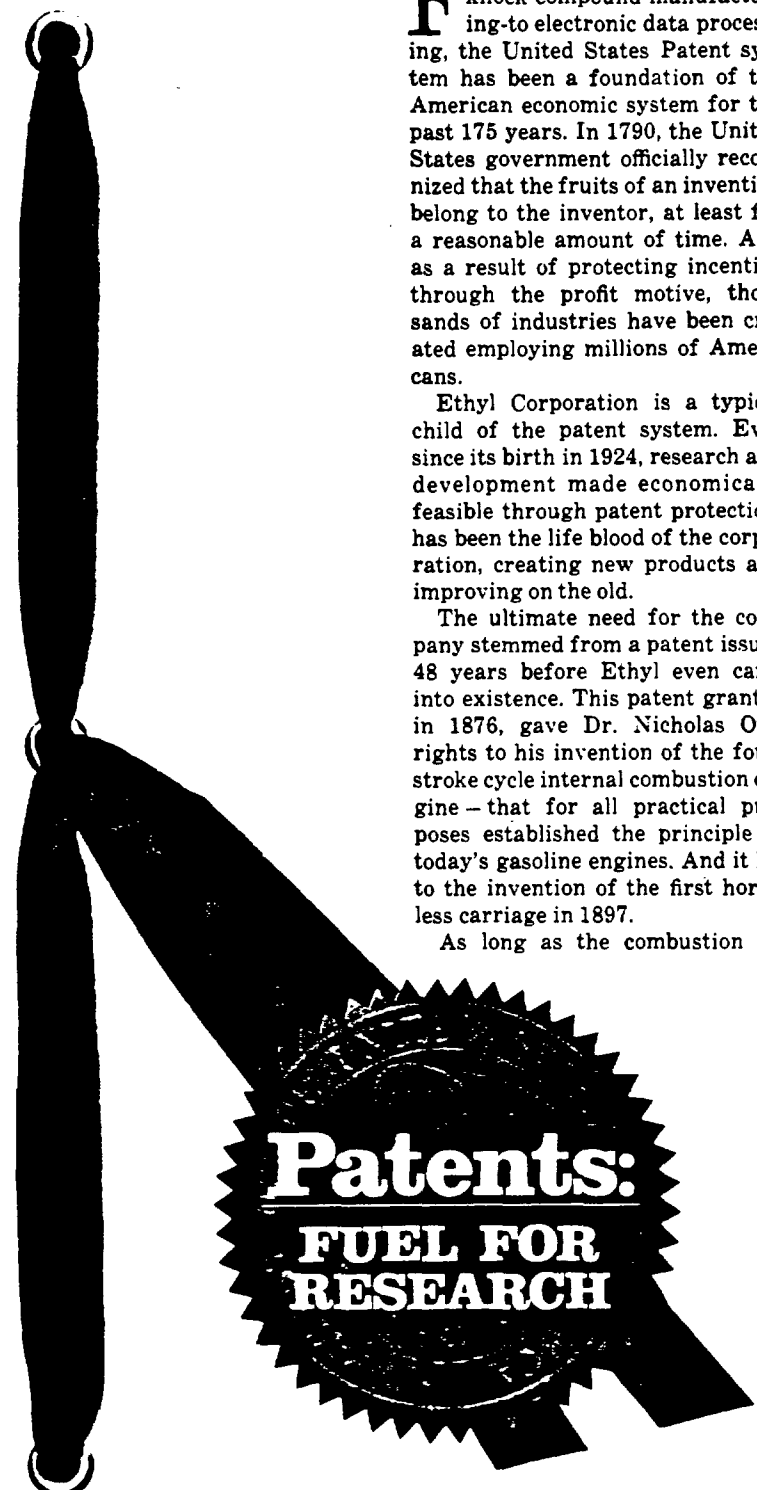
Although only a handful of communities have adapted the refuse bag system in this country to date, more than 1,000 municipalities in Europe are using it. But the potential is there, and Raymond Bag is a leader in the fledgling industry.

Bags are a housewife's delight. They can be changed in a flash, and there's no spillage worry.



**HERE'S HOW THE PARTICIPANTS
IN THE MIDDLETOWN TEST FEEL ABOUT
THE PAPER REFUSE SACK SYSTEM**

	YES	NO	UN- DECIDED
All things considered do you like the system	82%	11%	7%
Are refuse bags more sanitary than garbage cans	81	13	6
Are they less noisy	68	19	13
Are the bags and holders more attractive than garbage cans	73	20	7
Were the bags durable enough to withstand the weather	89	4	7
Were the bags durable enough to withstand the refuse	90	9	1
Generally did you find paper bags superior to garbage cans	78	14	8
Did you notice a reduction in standard litter in the neighborhood during the test	43	36	21
Did you notice an increase in speed and efficiency of the refuse collector	43	16	41
Did you have any trouble with the holder or in attaching the bag	12	82	6
Do you prefer the paper refuse bag system over metal collection cans	72	13	15
Would you like to see the city adopt this system if it pays for the holder and bags	65	24	11



From potash production to antiknock compound manufacturing to electronic data processing, the United States Patent system has been a foundation of the American economic system for the past 175 years. In 1790, the United States government officially recognized that the fruits of an invention belong to the inventor, at least for a reasonable amount of time. And as a result of protecting incentive through the profit motive, thousands of industries have been created employing millions of Americans.

Ethyl Corporation is a typical child of the patent system. Ever since its birth in 1924, research and development made economically feasible through patent protection, has been the life blood of the corporation, creating new products and improving on the old.

The ultimate need for the company stemmed from a patent issued 48 years before Ethyl even came into existence. This patent granted in 1876, gave Dr. Nicholas Otto rights to his invention of the four-stroke cycle internal combustion engine — that for all practical purposes established the principle of today's gasoline engines. And it led to the invention of the first horseless carriage in 1897.

As long as the combustion re-

quirements of the early gasoline engines remained low they worked fine, but in 1912, the Cadillac's stepped up engine compression ratio brought the start of the familiar ping of engine knock. Auto genius, Charles F. Kettering, who was later to become Ethyl's first president, and his laboratory assistant Thomas Midgley, tackled the knock problem in 1916. Research and experiments with 30,000 different compounds were to continue for more than five years before tetraethyl lead was discovered as the optimum knock suppressor. Only the assurance that any discoveries would be protected by patents made this research possible. As a result of their discoveries, the famous Midgley patent was issued and the antiknock compound industry was born.

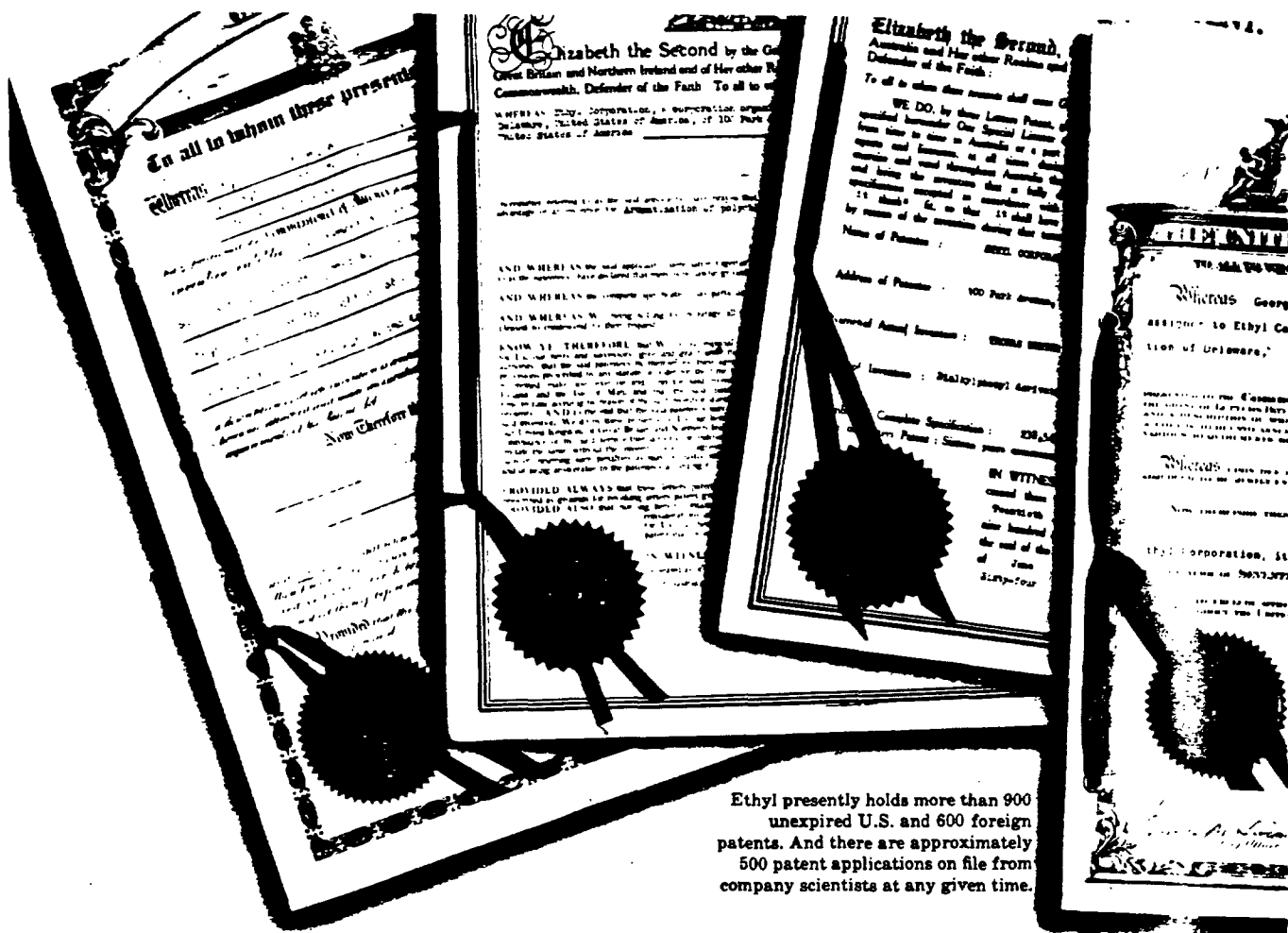
But realizing that tetraethyl lead is a knock suppressor and producing it in profitable production quantities are two different matters. The Kraus-Callis manufacturing patents, which were transferred to the corporation, made high production rates possible, and the company grew while at the same time gasoline manufacturers and the motorist public benefitted greatly.

Though the Midgley and Kraus patents — both of which have expired — remain basic to the manufacture of most antiknock compounds, Ethyl has dozens of research scientists and inventors seeking new and better chemical compounds and manufacturing processes. This is especially important since Ethyl has diversified into industrial and petroleum chemicals, paper, paper products and plastics.

Here's a small sampling of Ethyl products and processes now protected by U. S. patents:

- Process for producing TML (tetraemethyl lead), a light volatile antiknock compound especially effective in automobiles with manual transmissions.
- Process for manufacturing MLA (mixed lead alkyls), the newest antiknock compounds, combining the best features of tetraethyl and tetramethyl lead.

Patents:
FUEL FOR
RESEARCH



Ethyl presently holds more than 900 unexpired U.S. and 600 foreign patents. And there are approximately 500 patent applications on file from company scientists at any given time.

- Process for producing Motor 33 Mix (manganese formulation), that provides spectacular octane improvement for certain types of gasoline.
- Product coverage for ICC-1 and ICC-4 (phosphorus compounds), used to control surface ignition and spark plug fouling in gasoline engines.
- Product coverage on "Ethyl" Antioxidant 702, 703 and 733 (phenolic oxidation inhibitors), used to stop rust and slow down wear in numerous industrial and aviation applications.
- Process coverage for producing trialkyl aluminum (aluminum alkyls), used as a catalyst in the manufacture of plastics and synthetic rubber. It also is used as a chemical intermediate in the production of alcohol.
- Process patent for "Ethyl" Diesel Ignition Improver (mixed primary amyl nitrates), used as additives for

diesel fuel to improve cetane rating.

- Process patent for the manufacture of the heat sealed Multi-Bag (multi-wall shipping bag), which provides the shipper with a durable package, with greatly increased resistance to moisture, contamination and chemical action.
- Process patent on Ethyl's method of producing polyethylene film.

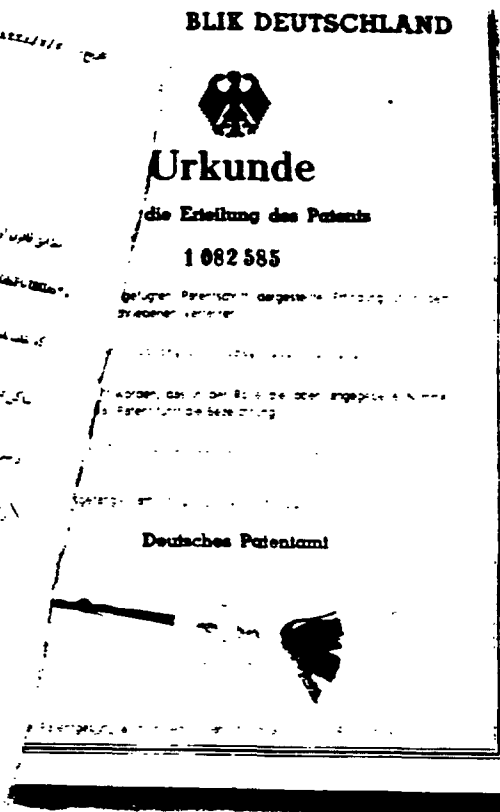
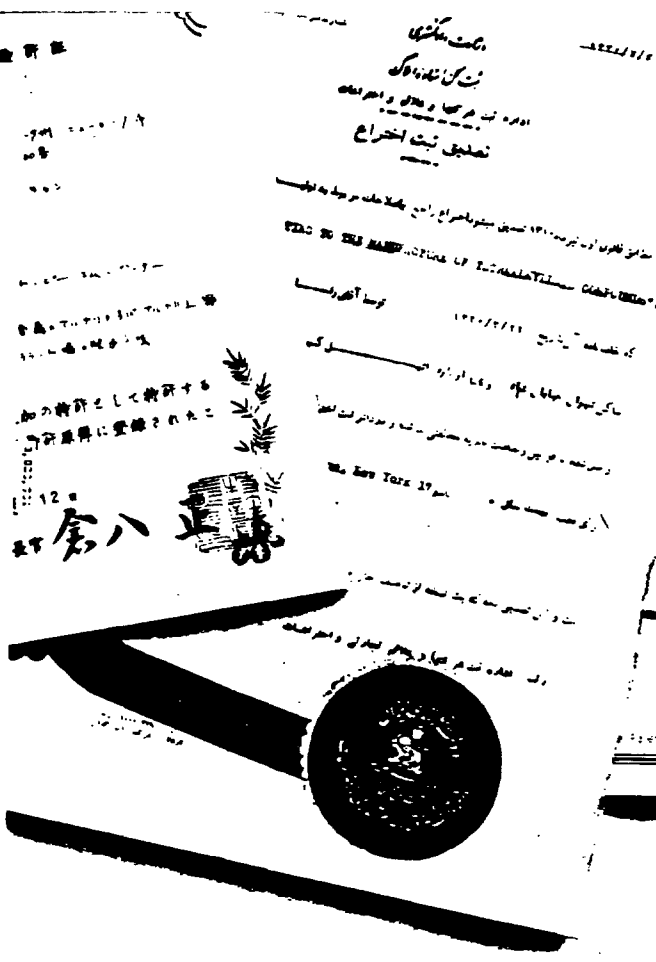
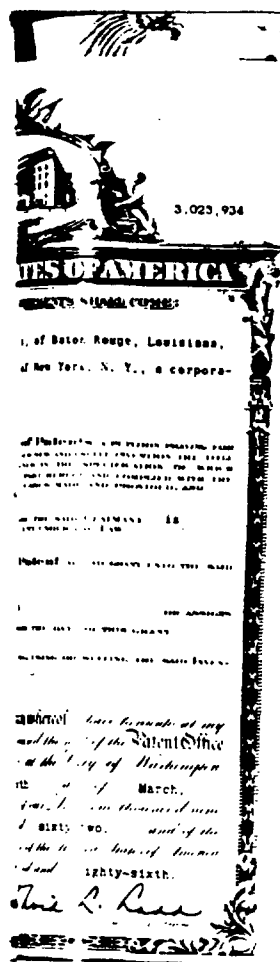
In 1964 alone, 90 new U. S. patents were assigned to the company plus 75 patents from foreign nations. Presently, Ethyl holds more than 900 unexpired American patents while maintaining over 600 abroad. And there are approximately 500 patent applications on file from company scientists at any given time.

What actually is a patent? It is a contract between the government and the inventor under which, in exchange for the inventor making the knowledge of his invention available to the public, the govern-

ment grants to the inventor the right to exclude others from making, using or selling his invention for a period of 17 years. However, design patents relating only to the ornamental aspects of a manufactured article have a shorter life span. Patents can only be renewed or extended by an act of Congress. The policing of a patent lies strictly with the inventor, through the courts, and it is up to him to protect his rights. In fact, he runs the risk of losing his right to exclude others if he does not take action against violators.

Patents can only be given for devices, processes and uses that are truly new, non-obvious and really work. In other words ideas and dreams no matter how promising can't be patented.

From application to patent presently takes about three years, although the government is attempting to speed up the process. Once the application is filed, the inventor



has some degree of protection under patent pending status, but his right to exclude others from using his invention does not come into being until the patent is granted.

Ethyl has a staff of patent attorneys and agents who work directly with company inventors and their supervisors to speed laboratory discoveries into patent protected products. Headed by Donald L. Johnson, patent counsel, most of these experts are graduate engineers or chemists, as well as lawyers, and thus can speak the language of both the laboratory and the courts. Each man is a specialist in a certain phase of company operations, assigned to various company locations. The Ethyl corporate patent division is part of the Research and Development department headed by Kenneth L. Swartwood, vice president.

Since Samuel Hopkins was granted the first U.S. patent for an improvement in the making of potash and peat ash in 1790, patent sys-

tems have been adopted by almost every industrialized nation in the world. In fact, even the Confederate States of America issued 266 patents. The first, issued in 1861, was for a breech loading gun.

The first U. S. patent commissioner, Henry L. Ellsworth might have been a good administrator, but something less than a satisfactory prophet when it came to the future of his department. In one annual report he stated, "the advancements of the arts from year to year, taxes our credulity and seems to presage the arrival of that period when human improvement must end." However, there has been 3 million patents issued since that statement and not one patent official has yet to resign because everything has been invented. Not even when an automatic hat tipping machine was patented last century.

Rather invention has been built upon invention which in turn stimulates still more research. The in-

ventiveness of the human mind has been continuously expanding with each new advance instead of drying up. And as such has created a never-ending research, invention, research cycle which has made the U. S. economy the most dynamic that the world has ever seen. And the nation's patent system, that protects the profit motive is the catalyst in this growth.

Today the patent system is more important to the nation's standard of living than ever. For example, the fields of plastics, drugs, electronics, and chemistry, have been revolutionized by products brought out only in the last decade. And the demand for new products is accelerating, not diminishing. Research, made possible by patent protection, is the means towards the new products end.

Abraham Lincoln put it this way: "the nation's patent system adds the fuel of interest to the fire of genius." ○

VYPAK PVC:

Plastic Bottles You Can See Through

Clear, tough, rigid polyvinyl chloride plastic bottles—for a multitude of purposes—are being produced in commercial quantities at Vypak Corporation's new Rockaway, N. J. plant. Vypak is jointly owned by Ethyl Corporation and Solvay & Cie of Belgium.

The ultra modern production facility can now turn out from 50 to 100 million bottles per year depending on size and shape of the product. However, Vypak officials, expecting the new—almost clear as glass—PVC containers to make huge inroads in the plastic container field now dominated by polyethylene, have made provisions for 400% future expansion. Vypak also has consolidated its research and engineering, customer service laboratories and corporate headquarters at the central New Jersey site.

There is good reason for optimism for the future of PVC bottles. Several large companies have successfully test-marketed products bottled in PVC containers at various locations across the country. And last fall the first clear rigid PVC bottles were used nationwide for the packaging of shampoo. Now several large and small cosmetic firms are using PVC bottles on a regional basis. However, shampoos are only one of some 25 to 50 consumer products that are being considered for packaging in these rigid plastic containers. Some industry estimates see PVC container sales reaching 125 million units or about 5% of the projected 2.5 billion plastic container market in the near future. And as more toiletries, cosmetics, and household chemical products are bottled in PVC containers, the sales figure should zoom to one billion units by 1970.

The growth potential of Vypak bottles stem from the very nature of the product. PVC containers offer the best properties of glass and traditional plastics at competitive prices. Here are a few specifics:

- Vypak bottles have a high level clarity, almost equaling that of glass. And the transparency qual-





ities of the plastic bottles have been improved tremendously during the past year. Earlier bottles sometimes had detracting striations. Today's bottle is virtually clear as glass. This allows the retailer to take advantage of the natural color of a product for point of sale display purposes.

- Vypak bottles have a high level of impact strength. They're literally housewife and child-proof—can withstand a five to ten foot drop without breaking, denting, or chipping.

- Vypak bottles are much more resistant to oxygen and other atmospheric gases that can cause product deterioration than their polyethylene counterparts. What's more, they seal in essential flavors and are also a good barrier to water permeation. A typical product bottled in a PVC container will lose no more than 1.5 to 2 percent of its water in a year.

- Vypak bottles give the customer a wide range of packaging design possibilities. The polyvinyl chloride material is marketed in clear, tinted, and opaque forms in a wide variety of colors. And there are no size limitations with rigid PVC containers. Currently they are blow molded in sizes ranging from an ounce up to a gallon, but there are no technical difficulties in producing them larger or smaller. As far as decorations are concerned, the bottles can be labeled, silk-screened or hot stamp printed.

- Vypak bottles are more economical in the long run for most customers. The lighter weight of the PVC bottles make the operation cheaper than with glass when the overall costs—bottle price which includes carton filling, and shipping—are considered. On a straight unit basis PVC is competitive, to slightly higher than glass, depending on the shape.

Realistically speaking, Vypak bottles will supplement rather than replace the use of glass or other polyolefins. But PVC has a ready made market when breakage, chipping and denting is a problem, yet clarity to view the product is needed.

As a result Vypak is building its business among manufacturers and marketers of shampoos, lotions, perfumes, solvent based waxes, household cleaners, cosmetics and a variety of other toiletries. Vypak containers can also be used for such liquids as turpentine, photographic chemicals, certain petroleum chemicals and even some acids. PVC provides full protection and longer shelf life for these and other products.

Another area of potential for Vypak bottles in the food market. Certain types of PVC bottles are perfect for packaging vinegar, edible oil, salad dressings and mustards.

J. Frank Cheely, president of Vypak, discussed the future of his organization in these words. "PVC bottles represent a major new packaging material, and because of their distinctive properties, they will play a leading role in the over-all growth of plastic containers." ○



PROMOTING TRAVEL HOLLYWOOD STYLE

Ethyl Corporation's Magic Circle campaign to encourage travel by car moves into local motion picture houses across the country in February. As part of its 11 year old automobile travel promotion program, Ethyl has produced a two reel shorts subject, "Road to Adventure, U.S.A." It brings the wonders of Canyonlands (Utah), America's newest national park, to the movie going public.

Ethyl pioneered the concept of expanding the market for gasoline by promoting automobile travel in 1955, as a service to the petroleum industry. Ethyl geared its campaign directly at the American motorist, pointing out the scenic wonders of this country that can easily be reached by automobile. Since that time, the American Petroleum Institute and individual oil companies have also instituted successful travel promotion programs. And the U.S. government has just launched "Discover America," to encourage domestic travel.

Canyonlands National Park was picked as the subject for the new Ethyl production for its breathtaking scenery and because it is only accessible by automobile. Located in Eastern Utah at the junction of the Green and Colorado Rivers, the 53 square mile park has two entrances — upper and lower — connected by black-topped U.S. 160.



"Road to Adventure, U.S.A." emphasizes that any motorist can visit a myriad of scenic and historic attractions within easy driving of his home. The film is part of Ethyl's Magic Circle automobile travel campaign designed to expand the market for gasoline.

"Road to Adventure, U.S.A." was shot in 35mm. Eastmancolor so that the full visual impact of this rugged wonderland could be felt by the audience. Dramatic stone formations such as: Six-shooter Peak, grinning dragons, a mammoth penguin, and a 200-foot cliff top opening known as Angel Arch



are seen from the canyon floors. And reverse views were filmed from the rims of gorges that plunge down for 2,000 feet. The time lapse camera has caught the ever-changing hues from sunup to sunset — crimson, purple, and rich chocolate set off by the green of juniper and pinion.

The 18 minute movie is family oriented. It shows how an American motorist with his wife and children can plan a trip to a scenic wonderland with maximum enjoyment and minimum bother using his automobile. The story line follows a young married couple who explore this fantasy-land park by car. Enroute they meet and share the hospitality and camaraderie of the other vacationing motorists and their families. Although Canyonlands is the scene, the film stresses that it is but one example of America's treasures that can be reached by any motorist within a short drive of home. And as such ties-in with President Johnson's "Discover America" theme as well as the American Petroleum Institute's P.S. "Discover America . . . Best by Car".

The film was made under the supervision of William K. McCulloch, marketing service manager or Ethyl's Petroleum Chemical division, who spent two weeks on location with the professional Hollywood film crews.

In addition to the film, Ethyl's Magic Circle program consists of a series of feature articles, supplied on a regular basis to more than 900 newspapers from coast to coast, for use on travel pages. The Magic Circle refers to an area of interest around any central point such as New York or Pittsburgh, or an area such as Lake Champlain or the Missouri Ozark Mountains. These articles emphasize auto trips that a motorist can take to reach some or all of the points of interest within the Magic Circle.

Written by veteran travel writer Edward A. Collier, each article is supplemented by an animated map that highlights the major attractions on the trip. Photos and cartoons are often used.

Does the Ethyl travel campaign in behalf of the petroleum industry really pay off?

"Definitely," says Mr. McCulloch. "Studies conducted on several scenic and historic attractions, after they received national publicity and attention through Ethyl campaigns showed a dramatic increase in tourists. And it doesn't take too many extra car-miles to make a big difference in gas and oil consumption. For example, if every American car owner would drive just eight city blocks a day more, it would ring up additional gasoline sales to the tune of a billion gallons a year." ○

THE EIGHT SABOTEURS OF STAFF MEETINGS

The staff meeting is a double-edged management sword. With the right kind of planning and a dynamic chairman, it's the best way to organize and use executive brainpower for the optimum good of the organization. It provides a sounding board for ideas and a marketplace for creativity.

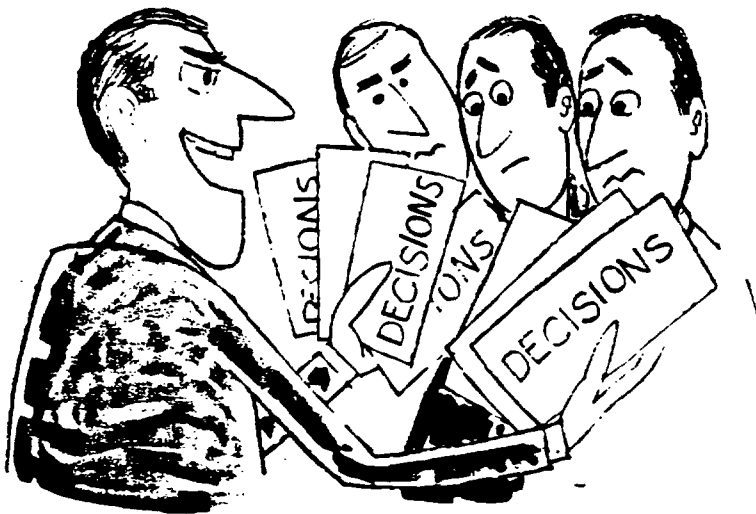
On the other hand, a meeting that runs itself is at best a waste of time. At worst, it is a disruptive force

creating morale problems, loss of initiative through group thinking, and a false status symbol.

One top industrial executive recently took a good long look at staff meetings at his plants and found the sword was cutting the wrong way. One third of the parleys were held too often or simply were unnecessary in the first place, others failed to achieve the purposes for which they were called. In addition,

20% of the conferrees arrived late, 15% just twiddled their thumbs, and another 15% sat in for prestige purposes only. About five minutes out of every hour went down the drain through lateness, and in 15% of the cases, the chairman himself was unprepared. And the average meeting lasted a long one hour.

Let's see who are responsible for warping the purposes of staff meetings? Here are some of the culprits:



MR. I. PASTOR BUCK

This executive is allergic to decisions so he "passes the buck." Anytime action is called for he uses the staff conference to thrash out the pros and cons and finally come up with a group decision. Spread the responsibility and you always have an alibi for failure is his philosophy. It's easy to shift decisions that should be made by one man onto the group when the agenda of a parley

is never nailed down in advance or adhered to at the meeting. Real trouble starts when this type of thinking spreads. Fledgling managers who would mature if forced to make decisions, never reach their potential and continue to lean on the security of group actions.

One noted psychologist put it this way. "Several men of proven business judgment when brought together as a committee do not neces-

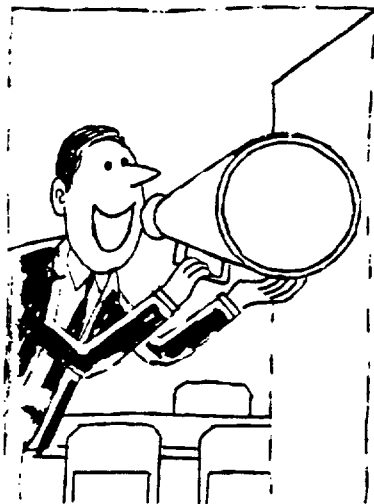
sarily perform at a higher level. They frequently will rely on the opinions of others. And as a result, they sometimes make mistakes collectively that none would commit alone," he concluded.

The conference chairman can foil Mr. Buck by only allowing decision making on subjects that cut across the jurisdiction of everybody at the meeting.

MR. CAL A. MEEDIN

Everytime there's a slight change in a manufacturing process or company policy, he figures it's time to "call a meeting." But he figures wrong. If a parley is always needed to coordinate a manufacturing change, chances are there is something basically wrong with the organizational structure of the company.

Ideas many times can be made just as clear on a memo as in a smoke filled conference room. Mr. Meedin also forgets a simple law of economics. To call a meeting of 10 top plant men earning, say an average of \$15,000 a year, costs about \$144 an hour including payroll



taxes, fringe benefits, and time going to and from the conference. A detailed memo to each of these men might total ten dollars.

When do you call a meeting? Bert Y. Auger, group manager of Minnesota Mining and Manufacturing Company, sets up these criteria in his book, "How to Run More Effective Business Meetings".

- To receive reports from participants
- To reach group judgment as the basis for a decision
- To discover, analyze or solve a problem
- To gain acceptability for an idea, program or decision
- To achieve a training objective
- To provide essential data for work guidance or to clear up major morale problems
- To assure understanding by all present
- To have an excuse for taking up a matter which has gotten pigeon-holed



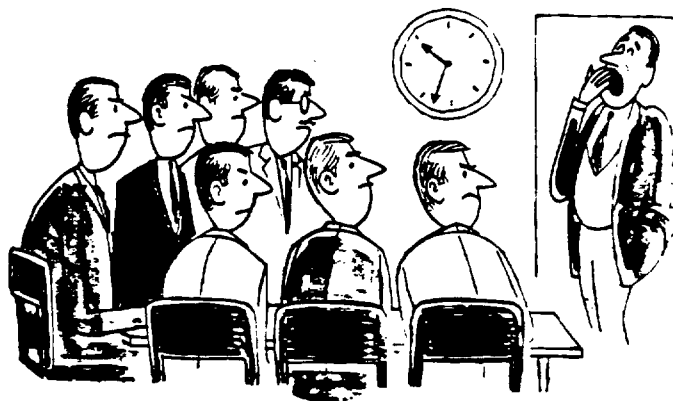
MR. HUGH ALLCOM

"The sales manager, production manager, ... , third floor sweeper, in fact 'you all come' to today's meeting," says this conference chairman. He's like the mother of the bride, simply can't arrive at a cutoff point as to who should attend the ceremony. As a result staff parleys become corporate status symbols. A manager attends because of his title, instead of what he can contribute or learn. And this concept spreads fast at all

levels of the organization.

A man should be invited to a staff meeting only if:

- He or his department is expected to carry out a decision reached at the meeting
- He can contribute important information
- His approval may be needed
- He has official responsibility for the matter under discussion
- He is a knowledgeable idea man



MR. TY M. WAISTER

This "time waster" lets 9 a.m. mean 10 after, 20 after, or even half past. All participants are executives and it's good form to be late. But 30 minutes of wasted time in a top

level meeting can cost \$75 or more in direct costs, and even more in lost business or production if an executive misses a later appointment. Besides lateness other time wasters are live telephones, hot cross table

discussions that obviously can't be ironed out on the spot, and too comfortable participants who are just as happy to sit back and relax. One mid-western steel company general manager put an end to the easy chair syndrome by having the thermostats in his conference rooms set several degrees lower than the rest of the building.

An effective chairman can set Mr. Waister straight. If Ty is late the first time, he might let it pass for the moment, but at the end of the meeting make a general remark about being sorry the meeting was five minutes late in starting. If he's late again, a terse, "sit down Mr. Waister, we've been waiting for you," will get the point across sharply.

Any meeting should also have a definite cut off time except for unusual circumstances — no more than one hour. If everyone knows the meeting will be over by ten, they'll be less apt to discuss the stock market and football scores while there's work to be done. More important a manager can plan the rest of his day better.

MR. NOEL E. DOOR

He's a chairman in name but definitely "no leader". Here are some of his more common mistakes:

- He's ill prepared, shuffles through papers seeking catchwords and



clues to the subject. He may try to bluff by impressive sounding cliches, but he comes through transparent as glass to the impatient conferees.

- He hogs the meeting, figures his job is just to deliver a message so he rambles on. Something may get through by osmosis, but there's no purpose to a business meeting if each participant doesn't benefit from the presence of others. It's the chairman's main job to draw out each one present. This does not mean simply asking the sales manager whether the new project presents problems in his area. It's too easy just to answer no. "What kind of sales promotion will be needed in the Pacific Coast area," is a better query. Once drawn into the discussion, individuals will usually continue to participate. A good rule of

thumb is that the chairman should take no more than 20 per cent of the conference time.

- He overuses funny stories and off color jokes to a point where the meeting loses its tone of serious business. Sure, an occasional gag can break tension or emphasize a key point, but watch out for too much of a good thing.

- He lets the meeting digress. He lacks force to pick up the discussion from the speaker who is spouting verbal nonsense and guiding it back to the point. This can be done by breaking in at a pause, raising a point and calling on someone else to respond. If this doesn't work, then the chairman simply must interrupt, restate the issue and meeting purpose and insist that discussion remain on the track.



MR. DON TELL

He lets his associates sweat it out. "Don't tell the conference purpose until they file into the room, then spring it on them," he says. "It'll keep them on their toes and make an impression." Sure it will make an impression all right, but his unprepared associates will contribute nothing. If Mr. Don Tell simply wants to make an announcement, a memo will do fine and won't take

an hour of everyone's time.

Any meeting will have better results if an agenda is circulated well in advance to all participants. Ideally, a brief resume of the problems, alternatives and areas for decisions should be included. In this way the conferees have a chance to organize and clarify their thoughts. It won't hurt to assign research to participants before the parley convenes.



MR. BARD MANN ORRS

His personality, "bad manners," lack of preparedness and open-mindedness, and interest help sabotage any meeting he attends. Here's his strategy:

- He prides himself on off-the-cuff thinking so he pooh poohs pre-planning. He reads work sheets only after entering the conference room, and as a result too often is unfamiliar with the problems, issues and various points of view.
- His self confidence is only exceeded by his ignorance. He won't budge from his position and takes opposing statements as a personal slap in the face. He forgets that the best defense against error is to approach the meeting with a mixture of confidence based on knowledge, cautious reservations, and a willingness to consider valid points made by others.
- He just loves the sound of his voice. He overstates his position and then takes personal digs at anyone having opposing views.
- He likes to surprise his boss with new proposals at parleys. This automatically puts the chief on the defensive, forcing him to ignore or shrug the proposal off, or disavow it completely. It's a far safer course to discuss these proposals with him privately before the meeting. Then he might say to drop — which is his

prerogative — or to present them, even though he is not in agreement.

- He loves to promote controversy. He'll divert the parley from the main order of business by refusing to retreat from any position or even letting the matter drop.

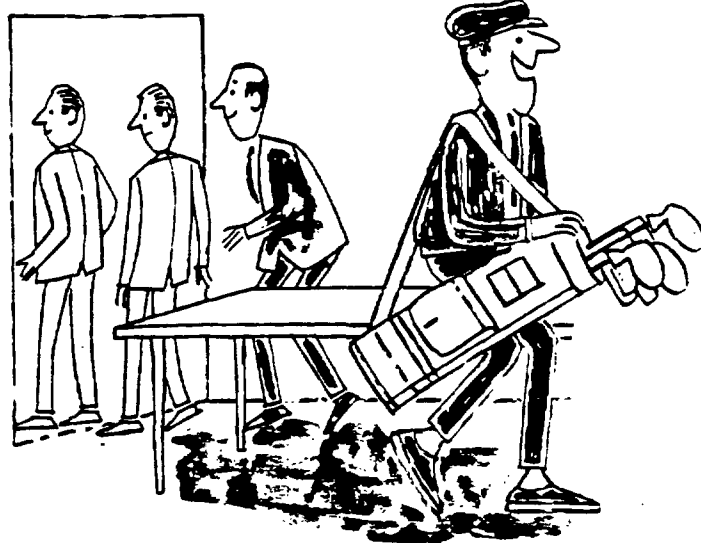
MR. JOB S. DUNN

He figures his "job's done" once the meeting has been held. He forgets, that like an iceberg, only a small part of the business takes

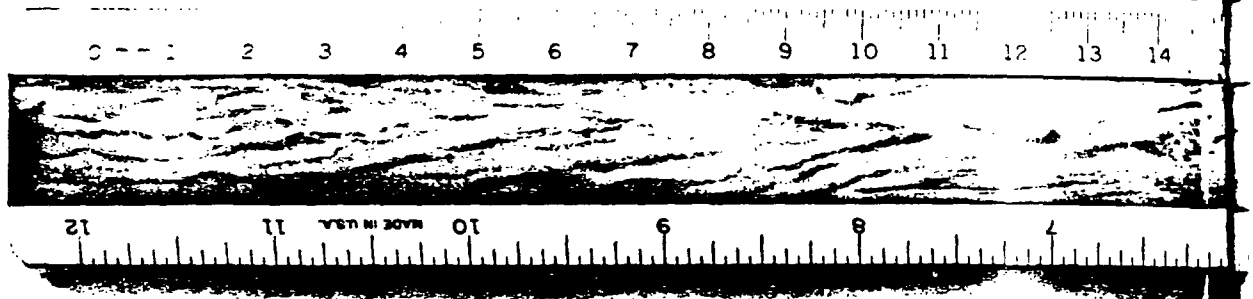
place on the surface, in the meeting room.

A good meeting should always be followed up. The first step is adequate minutes. Those who say that some of their meetings are too short or unimportant to prepare minutes, might question if such parleys should be held at all. Minutes should be concise, but complete enough to document the full results of the confab. They must include the names of members who have been assigned projects and these special assignments should be followed up by the chairman. It's good practice to have his secretary jot down the due date, then notify him and the assignee two days prior. Frequently it will be necessary to report on the results at a subsequent staff meeting.

Staff meetings, when conducted right, can not only expedite company production and sales, they can provide a podium from which organizations have been able to gain broad and wide-scale support for new policies and programs. One chemical company executive puts it this way. "No dubious manager has ever been convinced of the advisability of company policy via an impersonal inter-office memo. You can't reason with a routing slip. You need staff meetings." ○



A LOOK AT BOTH SIDES OF



It's a matter of inches—or is it meters? Advocates of the metric system are expected to make another strong pitch for the adoption of decimal measurements on the grounds of efficiency at the next session of congress. And proponents of the traditional American system of inches and feet will cite the tremendous cost of conversion.

This is perhaps the oldest continuing argument in American history. George Washington asked congress to adopt the decimal system for both currency and measurement. He got 100 cents to the dollar, but the United States stayed with the English inch. Andrew Johnson won the metric battle in 1866 when congress passed a law permitting the system to be used on a voluntary basis, but lost the war when industry successfully resisted the encroachment of the meter. Now even Great Britain is planning a switch to meters. The change will take more than a decade but both industry and government are committed to it. Their basic reason is simply to stimulate exports in a metric world. When the switch is completed the United States will be the only major industrialized nation using quarts and yards. And many economists insist that we will have to convert or lose our position in world trade.

The pragmatic argument between pro and anti metric enthusiasts in this country remains cost versus efficiency, but there is another factor—tradition. Something may seem wrong to millions of Americans to see Gina Lollobrigida with a perfect 91-71-89 figure centimeter-wise, the four minute mile relegated to limbo, and no compact car owner boasting about 30 miles to the gallon.

In fact the origin of the inch-foot-yard system stems from tradition. The inch originated from the width of some long forgotten English king's fat thumb, while the original yardstick was the length of his arm. The metric system dates back to the

French Revolution and its basic unit of weight was thought to be the mass of one cubic centimeter of water. Modern science proved that calculation wrong, but the metric system still has its fundamental advantage. As a decimal system, every unit is arrived at by multiplying or dividing by ten or combinations of ten.

Far Less Complicated

Let's look at some of the arguments in favor of conversion to meters:

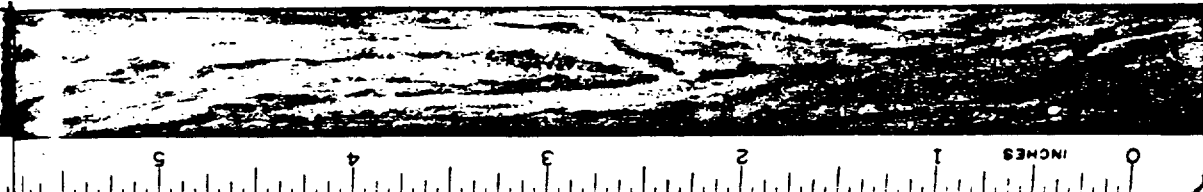
- The metric system is far less complicated. The present system of weights and measures has mills, chains and furlongs. How many people even know what they are? And it takes the most complicated arithmetic to convert one unit into another. The nautical mile for example is an incomprehensible 6,076.1 feet. In the metric system every unit of measurement is related to every other in multiples of ten. Because of this fact meters are used by just about all U.S. scientists for pure research work, but when it comes to working with commercial products they are still strapped with hard to convert mills, inches and pounds.

- It's worth the extra costs. A top manufacturing executive of Stewart-Warner Corporation put it this way. "I'll agree that it would cost a lot of money to change, especially with American standardization. And nobody could actually say OK in 1966 we go metric all the way. But it would be possible to say that from now on all new designs will be made to the metric measurements. Of course, for some time we would have two sets of tooling and this would be expensive, but it would more than be made up for in efficiency in the long run."

"Engineers don't have to worry about switching to the metric system as it will actually simplify

THE METRIC QUESTION

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30



their jobs almost right from the beginning. Production men who operate the machines would not be affected either. What do they care whether the dial they set is in inches or millimeters. Too many of our industries fought the metric system a century ago when it was authorized by congress, on the grounds that it would be too expensive. It will always be too expensive unless we decide that the long-range benefits will be more than enough to justify the expense," he concluded.

- World trade requires that the United States change. America is literally standing alone with inches and pints. The developing nations of Africa as well as industrial Europe have adopted meters. And they are now developing universal standards. Adoption of fastener standards for example would certainly hamper American industry's ability to sell abroad.

Economically Unfeasible

Now let's take a look at the other side of the coin. Here are the major arguments in favor of sticking to our present system of weights and measures.

- It's economically unfeasible. If American industry switched overnight to the metric system on all new products, it would still mean living with a dual measurement system for more than a decade. And industry would still have to manufacture spare parts under the inch system for many years after that. Certainly industry would have to pass a good part of this tremendous expense to the consumer—enough to send the U.S. economy into spiralling inflation that could wreck its present prosperity.

- America would be sacrificing its very important and sophisticated industrial standards. Not until 1832 were U.S. weights and measures standardized. It has taken decades of hard work and cooperation

to get industry united behind some common standards. The thought of going through it all over again with metrics is enough to discourage anybody. And remember, standardization is not that easy. Sure all European countries agree on the metric system. But even though they trade heavily with one another they have not agreed on such simple standards as screw threads. One vice president of Portable Electric Tools Company put it like this: "Do you know that you can't buy standard bricks or standard lumber in Europe? In America, no matter where you are, a two by four is a two by four."

- The metric system could disrupt the U.S. defense effort. A switchover would conflict with the established NATO goal of interchangeability of military equipment based on the inch system. At best it would make much of our present weapons obsolete.

There is a third side of the metric-inch debate calling for the retention and modernization of our present system. A committee on measurement, made up of pro-metric scientists and pro-inch industrialists, recently reported to the Department of Commerce. They suggested decimalizing the inch and eliminating duplicate units, but ruled out any governmental compulsion for the adoption of the metric system.

But many industry and government officials are extremely dubious whether the metric system could be adapted by voluntary methods. "No country has yet switched to the metric system on a voluntary basis," said Lawrence J. Chisholm, weights and measures coordinator for the National Bureau of Standards. "It has to be enforced."

Will America change? Probably not for decades. But a proposed federal study of the subject has passed the House of Representatives last session. And the Senate may approve it this year. Maybe the 91-71-89 Gina is closer than we think. ○

"CRIME: Our Number One Domestic Problem"

Says Lewis F. Powell, Jr., in this frank interview with ETHYL NEWS.

He discusses the twin dangers of rapid increase in crime and growing disrespect for law and due process.

Lewis F. Powell, Jr., member of the Board of Directors of Ethyl Corporation, and immediate past president of the American Bar Association, is concerned by the rapid rise in crime and the growing disrespect for law and due process.

In his annual address to the American Bar Association recently, he spoke of the seriousness of our "national confrontation with crime and violence" expressing the opinion that crime may be America's number one domestic problem.

But, Mr. Powell noted, the public now seems to understand the urgency of this problem and is demanding action. He pointed out that lawyers are also concerned about a different aspect of deteriorating law and order. This relates not to ordinary crime as such, but to the growing lack of respect for law and for due process and the unwillingness of many to resolve differences by established legal means.

Mr. Powell has recently been named by President Johnson to the newly formed Commission on Law Enforcement and Administration of Justice. The Commission has been broadly authorized to study and report on the crime situation and to submit recommendations to the President.

Mr. Powell, in discussing his annual address to the ABA with the editor of this magazine, emphasized that he was speaking individually and not on behalf of the President's Commission.



EDITOR: You called crime America's number one domestic problem. Why?

MR. POWELL: More than 2,600,000 serious crimes were reported during 1964, a 13% rise over 1963. Yet the increase in population was only 1.5%. And the FBI reports that since 1958 the increase in crime has been almost six times greater than

the population growth. During my terms as president-elect and president of the bar association, I have spoken repeatedly of this disturbing crime situation. It is not too much to say that crime is our country's number one domestic problem. Indeed, President Johnson has recently re-emphasized the seriousness of the situation. In announcing the creation of a national commission to study all aspects of crime and the administration of justice he said: "The present wave of violence and the staggering property losses inflicted upon the nation by crime must be arrested."

EDITOR: How about the criminal himself? Are we going overboard in attempting to guarantee each accused criminal his constitutional rights to the detriment of society at large?

MR. POWELL: The bar and the courts have shown a commendable interest in safe-guarding fair trial. There must be no lessening of this concern for the constitutional right of persons accused of crime but the first priority today must be a like concern for the right of citizens to be free from criminal molestation of their persons and property. Indeed, this is perhaps our most basic individual right. Unless this is adequately protected, society itself may become so disordered that in the end all rights are endangered.

EDITOR: You have spoken many times of the growing lack of respect for law and order in contemporary life. Aside from the professional

criminal, how does this trend show itself?

MR. POWELL: There are many contemporary symptoms. First, the willful violation of laws and court decisions, sometimes by officials sworn to observe them. Second, the doctrine that only "just" laws need be obeyed and that every man is free to determine for himself the question of "justness". And third, the growing use of coercion — in forms ranging from demonstrations to sit-ins and mobs in the streets — as a means of enforcing rights or asserting political views.



Although there are wide variations in the employment of these methods, and many who use them do so sincerely and often in the name of morality and justice, there is one basic common denominator. There is a disregard of orderly means of exercising rights, attaining goals or influencing decisions. The public appears to be largely unaware of the scope and implications of this dangerous trend.

EDITOR: Negro leaders say that it's sometimes necessary to flaunt "unjust" laws such as in the areas of civil rights in order to gain redress. Civil rights leaders claim that this is part of our American heritage.

MR. POWELL: Every lawyer recognizes that the right of dissent is a vital part of our American heritage. So also are the rights to assemble, to protest, to petition and to test the validity of challenged laws or regulations. But our constitution and tradition contemplates the orderly assertion of these rights pursuant to the rule of law.

This is not, contrary to popular misconception, a question of civil rights. The issue is the fundamental one of law and order and due process.

EDITOR: There's a widespread belief that civil disobedience in some cases brings out an issue before the public — helps to make it a "cause celebre" and gain public support.

MR. POWELL: The frightening aspect of this attitude and technique is that it tends to escalate. Civil disobedience spreads geographically and numerically. The worthiness of causes becomes increasingly marginal — sometimes wholly indefensible. For example, the objective of the student disorders at the University of California in January apparently degenerated into a demand for the "right" to be obscene. It also becomes increasingly difficult to maintain the distinction between genuine protest and legitimate demonstrations, on the one hand, and disorderly conduct and mob violence, on the other. Moreover, these techniques are made to order for adop-



tion or infiltration by subversives or lawless extremists. James Reston, Associate Editor of the N. Y. Times, commented last spring that some of the student and teacher demonstrations against this country's foreign policy have been "backed by anti-American propaganda of the most vicious type."

EDITOR: Proponents of sit-in demonstrations and other forms of civil disobedience aside from their "moral" reasons, claim pragmatically, that it "works."





*"... an orderly
society cannot
exist if every man
may determine
which laws
he will obey"*

MR. POWELL: However successful the techniques of disobedience and coercion may be in the short run, and whatever the justification, they are self-defeating and imperil individual freedom in the long run. An orderly society cannot exist if every man may determine which laws he will obey, and if techniques of coercion supplant due process.

EDITOR: What will the effect of the recent surge of sit-ins, demonstrations and riots be on public opinion?

MR. POWELL: Public opinion is capable of abrupt swings. Particular groups can never be certain that they will always be strong enough to force others to respect their rights. Indeed, those most concerned with the civil rights movement may in the end suffer the most. They can be assured of the very rights now sought to be vindicated only so long as laws are observed and due process followed. The courts and legislative halls, rather than the streets,

must be the places where differences are reconciled and individual rights ultimately protected.

Mr. Justice Black has spoken eloquently on this subject: "Minority groups . . . are the ones who always have suffered and always will suffer the most when street multitudes are allowed to substitute their pressures for the less glamorous but more dependable and temperate process of the law".

Individual freedom has been preserved under the Anglo-American system of law for perhaps the longest sustained period in human history. We can continue to preserve this freedom, and strengthen it, only by acceptance of the rule of law and strict adherence to lawful means. As Mr. Justice Douglas has said: "We reject the philosophy that the end justifies the means."

* Mr. Powell's speech before the American Bar Association appears in its entirety in the September 20 issue of the ABA Journal. ○

OUTLOOK

\$2½ MILLION POLYETHYLENE FILM PLANT OPENS IN LAGRANGE, GA.



VisQueen division's new 2.5 million polyethylene film manufacturing plant is in full production at LaGrange, Ga. It's part of the Ethyl division's three

year, \$90 million capital expansion program that was started in 1963.

The new plant will mean even better service to VisQueen customers in the South, while adding appreciably to the production capacity of the division. And the new facility is designed for easy expansion to meet any increase in market demand. The polyethylene film market reached 755 million pounds in the United States in 1964, a 25% boost over the previous year. And industry production figures are expected to top the 900 million pound mark within the next few years.

William R. Perdue, Ethyl Corporation executive vice president and treasurer, spoke at a dinner meeting of the LaGrange Chamber of Commerce that coincided with the opening of the plant. He told the group that, "if the polyethylene film business and Ethyl's overall fortunes go the way we believe they will, it is almost certain that expansion and enlargement of our LaGrange operation will take place."

VisQueen also has plants in Flemington, N. J., Fremont, Calif., and Terre Haute, Ind.

ETHYL GRANTS 24 NEW FELLOWSHIPS AND SCHOLARSHIPS

Ethyl Corporation's aid to education program will provide 18 graduate research fellowships and six undergraduate scholarships, valued together at more than \$75,000, during the current 1965-1966 academic year. Ethyl has sponsored this academic aid program continuously since 1936.

The fellowships furnish an allowance for living expenses as well as payment towards tuition and fees. The university as well as the fellow benefits from the program. Ethyl provides funds towards the research project that the Ethyl fellow is involved.

Each scholarship provides the student with financial aid, the amount being based on individual need. These scholarship awards are separate from the Ethyl Merit Scholarship, which is only opened to qualified children of Ethyl employees.

The 18 institutions which hold the current Ethyl fellowships are: University of Arizona, University of Cincinnati, University of Detroit, Florida State University, Georgia Institute of Technology, and State University of Iowa.

Also Louisiana State University, University of Minnesota, University of North Carolina, Northwestern University, Purdue University, Rice University, University of Texas, Tulane University, Virginia Polytechnic Institute, Wayne State University, Western Reserve University and University of Wisconsin.

Scholarships are held at the University of Arkansas, Clemson University, Georgia Institute of Technology, University of Houston, North Carolina State University and Oklahoma State University.

The program is administered by the Ethyl Fellowship Committee, headed by Theodore Carron, of Ethyl's Detroit Research Laboratories.

S. DOUGLAS FLEET RETIRES AS ETHYL VICE PRESIDENT



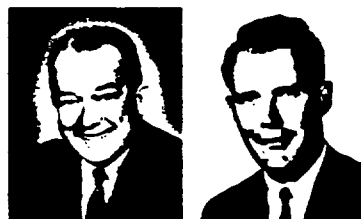
S. Douglas Fleet has retired as vice president of Ethyl Corporation and executive vice president of Ethyl's Albemarle Paper Manufacturing Company Division.

A veteran of 40 years service with the company, Mr. Fleet continues as a member of Ethyl Board of directors.

A native of Glen Allen, Va., Mr. Fleet attended the college of William and Mary. He joined Albemarle as a sales representative in 1925 and was named sales manager in 1945. He was promoted to vice president three years later. Mr. Fleet was named to the Ethyl corporate post following the merger of Ethyl and Albemarle in 1962.

MILLIRON, PERRY NAMED VISQUEEN SALES MANAGER

James K. Milliron, and Arthur W. Perry have been appointed to top sales posts with the VisQueen division of Ethyl Corporation.



James K. Milliron Arthur W. Perry

Mr. Milliron who has been named sales manager plastic films, will direct the nationwide marketing of VisQueen vinyl and polyethylene films to the packaging industry. He joined VisQueen in 1954 as a sales representative and later became regional sales manager. Mr. Milliron, who attended the University of Kansas, was most recently assistant general sales manager.

Mr. Perry, as pipe products sales manager, is responsible for the sales activities of the company's polyvinyl chloride pipe. He previously has been a sales representative for VisQueen in California. A graduate of Boston University, Mr. Perry joined VisQueen in 1959 with extensive sales experience in the plastics industry.

Both Mr. Perry and Mr. Milliron are headquartered in Baton Rouge.

RIGID VINYL BUILDING PANELS STOPPED BETSY'S WINDS COLD

One hundred and twenty-five mile an hour winds ripped through the Baton Rouge area last fall, but VisQueen polyvinyl chloride panels bore the full brunt of Hurricane Betsy's might without damage.

The rigid PVC panels were installed on a new plastic resins production building at Ethyl's manufacturing center. The high tensile strength and flexibility of the plastic material safeguarded the panels from the fury of the winds, according to Tom R. Clark, sales manager for building & agriculture products of Ethyl Corporation's VisQueen division.

Panel failures under storm conditions usually occur at the point where material is attached to the building frame. Stress built up by the buffeting wind causes the surrounding area

to give way and the panel is torn loose. However, VisQueen PVC Panels are not affected by stress. Nail pull through tests have shown that these versatile building panels will sustain forces of more than 220 pounds.

NEW CHLORINATED SOLVENT FACILITIES UNDER CONSTRUCTION

Construction of new facilities for the production of chlorinated solvents is underway at Ethyl Corporation's Baton Rouge manufacturing center. Both trichlorethylene and perchlorethylene will be produced at the new facilities, costing more than \$3 million. Completion is scheduled for late 1966.

Ethyl entered the chlorinated solvents market in 1964, and went on stream with a \$1.2 million 1,1,1-trichloroethane plant last year. When the new facilities are completed they will become part of one of the largest chlorinated hydrocarbon production complexes in the country.

Related chemicals made by Ethyl include: ethyl chloride, methyl chloride, ethylene dichloride, vinyl chloride and vinylidene chloride. The company is currently expanding its capacity for vinyl chloride and ethylene dichloride, and is building a polyvinyl chloride resin and compounds manufacturing plant in Baton Rouge.

Marketwise, the demand for trichlorethylene and perchlorethylene exceeds 500 million pounds a year. Trichlorethylene is an industrial cleaning and degreasing solvent used in a broad range of production and maintenance applications. Perchlorethylene also is used in industrial cleaning applications, but is primarily a solvent for dry cleaning.

ETHYL CUSTOMER SERVICE GOES SOUTH OF THE BORDER



A two week course, designed to help the Brazilian oil industry achieve uniform knock test ratings and develop a mutual exchange program of samples, was given in Rio de Janeiro by Ethyl Corporation.

Charles Rankin, manager of Ethyl's Tulsa Laboratories, conducted the course at the request of Brazilian Petroleum Institute as part of Ethyl's customer service program. The meetings held at Petrobras, the Brazilian

government oil company, were attended by top laboratory people from refineries from all parts of the country. Mr. Rankin's instruction emphasized the operation and maintenance of CFR (knock testing) engines.

Mr. Rankin, accompanied by Miguel Espinosa, of Ethyl International division, also gave instruction at Manginhos, a privately owned refinery in Rio. Mr. Espinosa served as interpreter and technical assistant.

Jose Marquez, secretary of the Brazilian Petroleum Institute, praised the Ethyl course, calling it "eminently useful". The institute plans to publish a translation of the course for future reference.

VISQUEEN NETTING FIGHTS HIGHWAY SOIL EROSION

Knitted polypropylene netting from Ethyl's VisQueen division stops soil erosion before it starts on embankments along the nation's highways.

The plastic netting holds down the straw mulch placed on freshly seeded areas beside roadways. It is particularly effective on steep embankments, where the grass seed can be washed or blown away without protection. The netting and mulch combine to keep the seed firmly in place until it sprouts.

Since some of the seed takes as long as a year to sprout, the long-life polypropylene netting is very effective. It lasts as long as five years as compared to its paper counterpart, which disintegrates inside of six months.

It's quick and easy to install the VisQueen netting. It's simply unrolled, pulled taut and then anchored.

The Illinois State Highway Department is the latest state agency to approve use of plastic netting for erosion control.

POLYMER DIVISION NAMES FOUR NEW SALES MANAGERS

The Polymer division of Ethyl Corporation broadened its sales coverage of the polyvinyl chloride resins and compounds market with the appointment of four district sales managers. They are: Charles W. Benjamin, west central district; Michael Glagola, east central district; Arthur A. Smith, southern district; and William R. Whitaker, eastern district.

Mr. Benjamin, who has more than 12 years of experience in the plastics industry is headquartered in Chicago. He was graduated from Oberlin Col-

lege. Mr. Glagola has a BS degree from the University of Florida and works out of Detroit.

Mr. Smith joins Ethyl with some 12 years of experience in plastics and has his office in Baton Rouge. He attended Sam Houston State College and received his BS degree from Stephen F. Austin College. Mr. Whitaker is headquartered in New York and holds a BS degree in Chemical Engineering from Cornell University. He has 15 years' background in plastics.

The polymer division also named Harwick Standard Chemical Company of California as sales representative. Harwick, with principal offices in Pico Rivera, Cal., will promote and sell Polymer products in Arizona, California, Colorado, Idaho, Nevada, Utah and Washington.

AUGUSTUS W. BACHMAN TO HEAD INTERSTATE'S WALDEN PLANT

Augustus W. Bachman has been named plant manager of the Walden, N. Y. plant of Interstate Bag Company division of Albemarle Paper Manufacturing Company, a wholly owned Ethyl Corporation subsidiary.

Mr. Bachman, a native of Henderson, N. C. joined Albemarle in 1959 as an industrial engineer following two years Army service in Korea. He was made superintendent of the Richmond Waterproof Papers Plant in 1963 and later promoted to assistant chief industrial engineer.

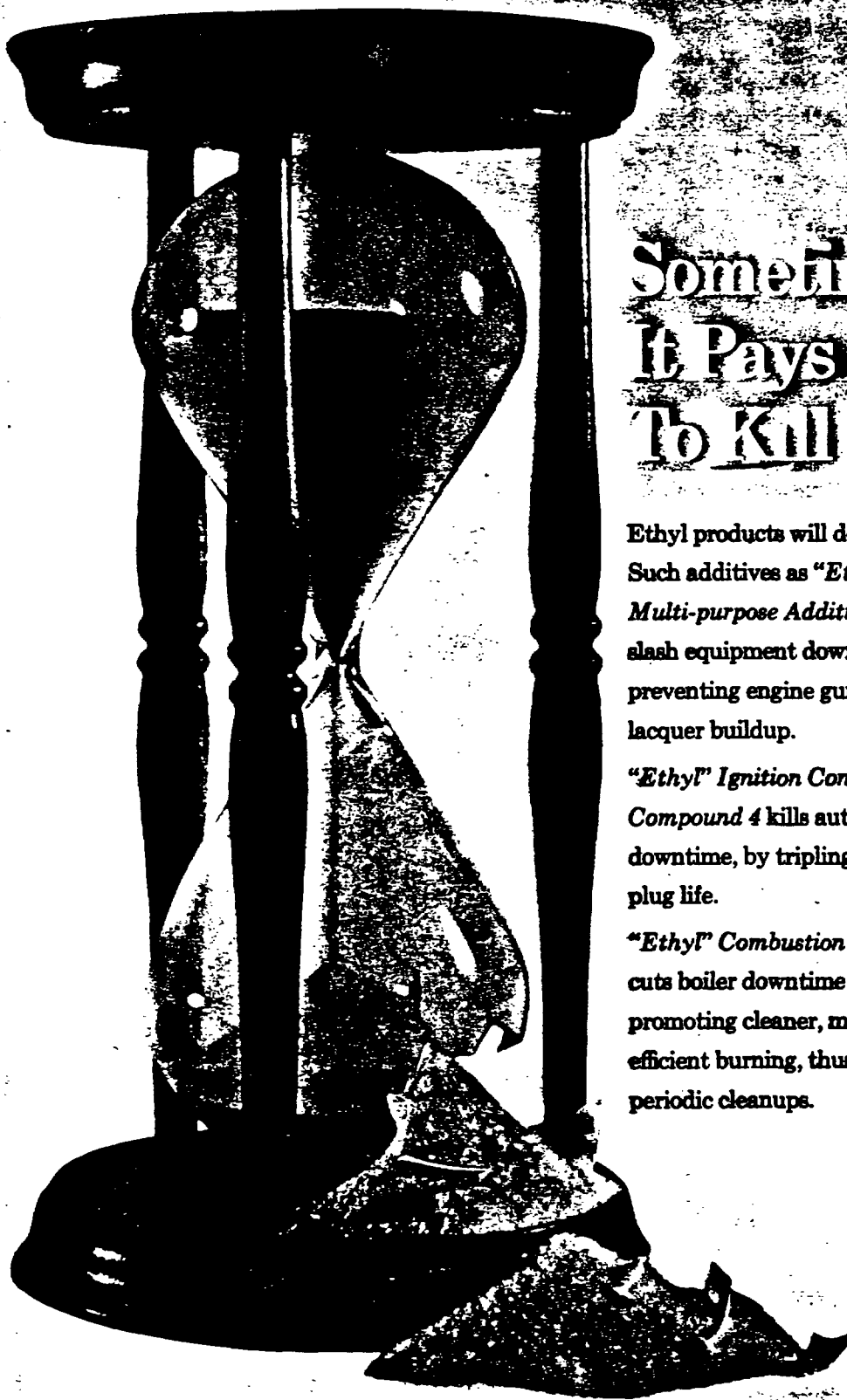
Mr. Bachman has a degree in industrial engineering from North Carolina State College.

INTERSTATE SHOPPING BAG WATCHES OUT FOR THE KIDS

Youngsters, trick or treating, were a little safer last Halloween thanks to a special Reflecto Bag made by Interstate Bag Company, Inc., an Ethyl Corporation paper converting division.

The Reflecto Bag has an aluminized outer ply printed with bright orange decorations that are clearly visible at night, especially by motorists. The shiny bags pick up the headlights of the car, reflect the light, and thus warn drivers to be careful.

Developed by Interstate at its Walden, N. Y., the Reflecto Bag has been marketed nationally through three large retail chains—G. C. Murphy, S. S. Kresge, and F. W. Woolworth.



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(DOWNTIME)

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