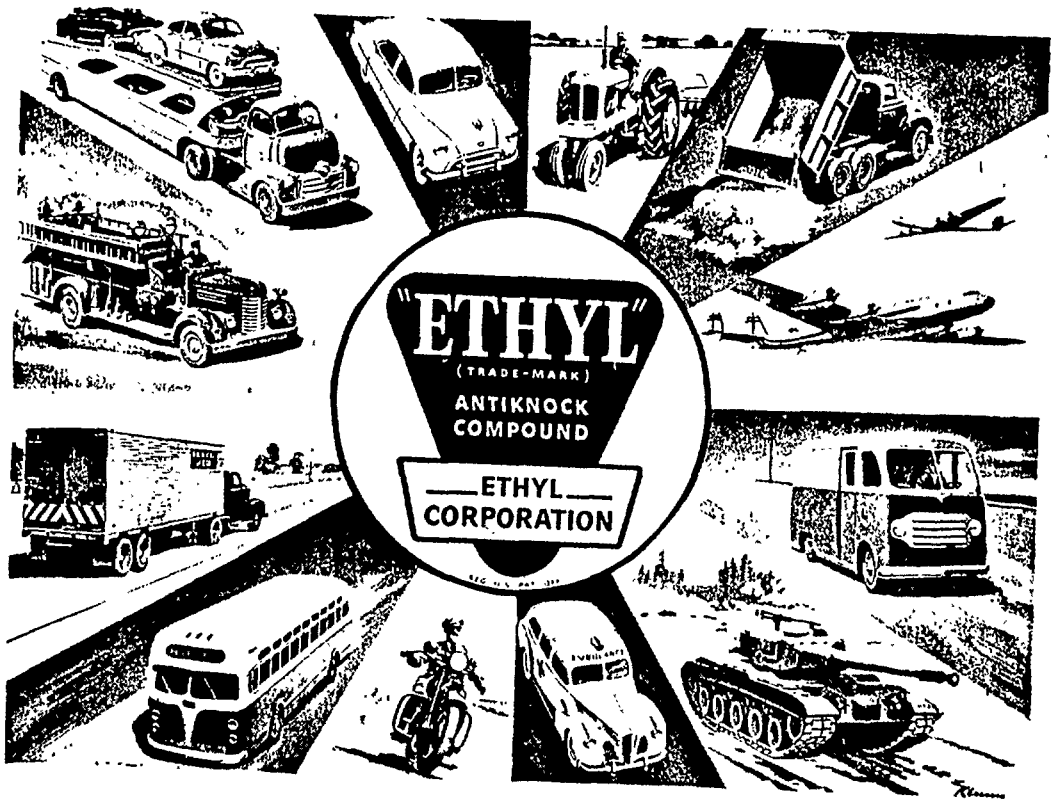
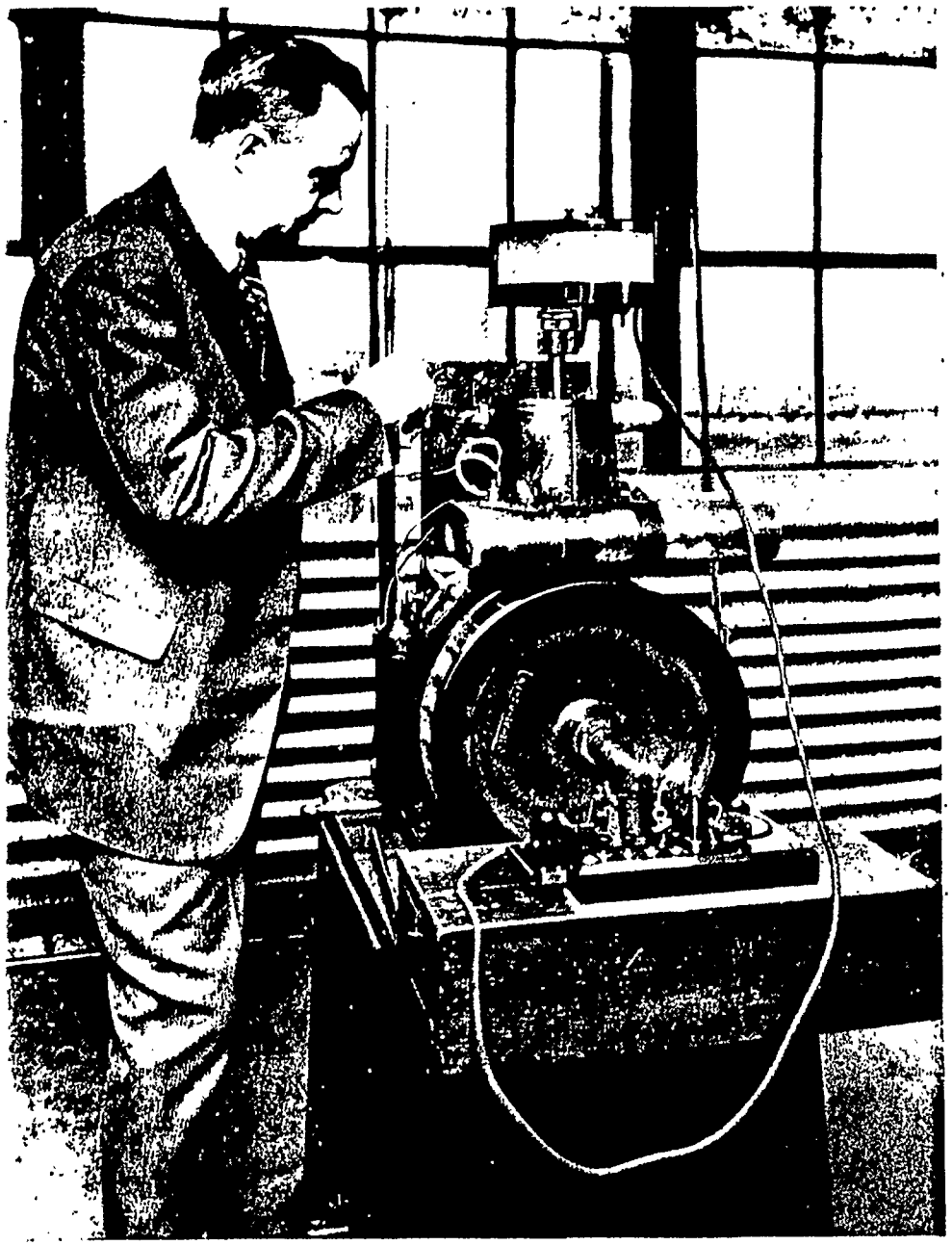
the ETHYL STORY



ETHYL CORPORATION, NEW YORK 17, N. Y.



The late Thomas Midgley, Jr., at the age of 35, at the laboratory engine in which tetraethyl lead was first tested

The Ethyl Story

BACK in 1923, a milestone was reached in gasoline progress. In that year, an ingredient was added which somehow changed the gasoline and changed the way it performed inside an engine.

That magic ingredient was so small it accounted for less than 1/10th of 1 percent of a gallon of gasoline. But it was so powerful that it set in motion a brand new way of life for the American family, changed the entire concept and pattern of automotive transportation, and in no small way helped to win a worldwide war.

What was it? A chemical compound called tetraethyl lead, a chemical compound that has become so important as to be found in over 95 out of every 100 gallons of automotive and aviation gasolines produced today.

Ethyl Corporation is the world's leading manufacturer of tetraethyl lead, which is the principal ingredient of "Ethyl" antiknock compound. And looking back at the first sale of "Ethyl" gasoline in 1923—which represented the first use of "Ethyl" fluid in gasoline—it would seem that it marked the beginning of Ethyl's success story. Actually, that first sale was just a midway point in a long struggle that began in a small research laboratory and wound up in completely uncharted scientific fields. The entire struggle was a years-long effort to stop automobile engines from knocking.

It was Charles F. Kettering, the automotive genius, who first sensed the problem of knock in internal combustion engines, and early work by his assistants, Thomas Midgley, Jr., and T. A. Boyd, proved that the knock was a fuel problem and not a mechanical one. With that established, Midgley and Boyd set out to find something—anything!—which would take the knock out of gasoline.

In one of those freak twists of scientific research, they discovered an antiknock agent almost at the very start. But it wasn't tetraethyl lead—it was iodine, chosen by chance to dye the gasoline a dark color. Iodine was a good antiknock except for two drawbacks: It was expensive. And it produced undesirable chemical reactions in an automobile engine.

That likewise was the trouble with tens... then hundreds... then thousands of other compounds. Weeks slid into months and then into years. Thousands upon thousands of dollars were poured into expensive experiments, the cost of the laboratory,

Successful shipboard recovery of bromine from sea water led to the establishment of shore-based bromine extraction plants

the salaries of the research staff. There were several times when the costly effort to stop a noise would have been given up as hopeless, except for the unswerving faith of "Boss Ket." But in the end, Midgley and Boyd fully justified that faith, when they discovered the antiknock properties of tetraethyl lead. Mr. Kettering served for a short time as the first president of the newly-formed Ethyl Corporation, and is today the senior member of its board of directors. Dr. Midgley served as a vice president of Ethyl until his death in 1944.

With discovery of tetraethyl lead as an antiknock agent, the problem of knock was solved. Now the whole road ahead of automobile progress —of more efficient engines able to deliver more power and more miles to the gallon—suddenly became clear. Small wonder that tetraethyl lead came to be hailed as one of the greatest automotive discoveries of modern times.

These things are taken for granted in the 1950's, because we've seen them happen. But back in the mid-1920's, they were little more than a faint hope. The new-born Ethyl Corporation knew that tetraethyl lead was economically sound. But it meanwhile had more problems than customers. Problems of manufacturing a compound that had never before been made. Problems of handling a new product. Problems of finding adequate supplies of a key raw material which was vital to its commercial success. And not the least, problems of educating the public to the whole idea of antiknock quality in gasoline.

To take just one of these problems, bromine had to be combined with the tetraethyl lead in the final antiknock compound in order to carry off the lead from the engine after it had done its job. But the amount of bromine Ethyl needed was far greater than all existing commercial supplies. Emissaries scoured the United States, Mexico, the Middle East—looking for a stockpile of bromine. Finally, it was suggested, why not mine the sea?

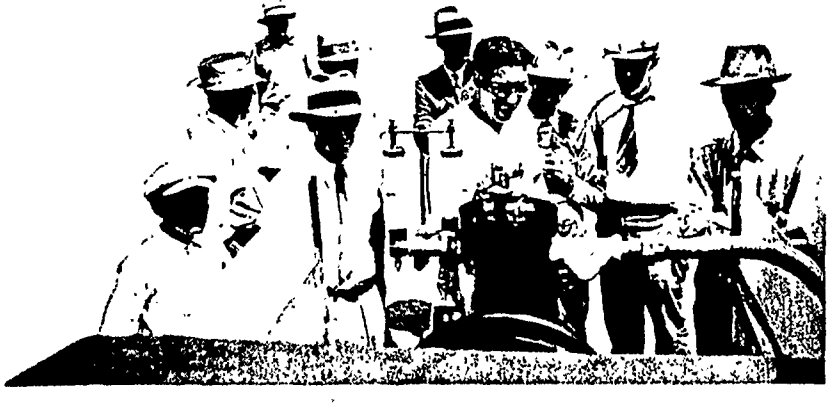
Mining the sea was a long shot. There are only about 67 parts of bromine to every million parts of sea water. But taking the gamble, Ethyl proved that such bromine could be recovered from sea water commercially and economically.

The same kind of pioneering helped Ethyl to solve its other problems—with clear-cut benefits for everyone.

Determined that tetraethyl lead would be used wisely and well, Ethyl developed safe and efficient methods for its handling and use. That pioneering made it possible to use tetraethyl lead in gasoline with complete safety. That pioneering also made it possible for U. S. industry at large to introduce scores of other useful products, and to handle them safely.

It was one thing to find the raw materials for its product, to work out the best manufacturing methods, to assure its safe handling and use. But it was something very different to sell the public on an idea: the idea

One of the big jobs of Ethyl's field representatives in the 1920's was to teach the public the meaning of antiknock quality



of antiknock quality. Cars ran before without tetraethyl lead, right? How could they run any better, the non-scientific car owner asked himself, on a product you couldn't even see?

Blandly assuming that all motorists came from Missouri, Ethyl set out to show them. Racing cars ran on gasoline containing tetraethyl lead—and ran off with the prizes. Ethyl "mystery cars" were entered in hill-climbing contests—and led all the way. Ethyl field engineers staged street corner meetings like old-time medicine men—and showed the public, with single-cylinder "demo" engines, that tetraethyl lead was good medicine for their cars.

By now, things were beginning to roll. By now, Ethyl's "shirt-losing" era was finally over, even though its sponsors were nearly three million dollars in the red.

"Ethyl" gasoline, introduced in 1923, marked the real beginnings of the premium gasoline market. Regular gasoline came to be improved with "Ethyl" antiknock compound ten years later, setting new standards for that grade of motor fuel, too. Farmers learned from Ethyl field trials of the superiority of high-compression, gasoline-burning farm tractors. U. S. airlines and truckers and bus operators and business men all shared in the improved fuels—and engines—that were becoming available.

Today, in ordinary everyday use, tetraethyl lead does more than take the knock out of gasoline. Each drop of TEL sets in motion a chain reaction of progress in which our modern automotive economy operates efficiently, the consumption of petroleum and other natural resources is conserved, and substantial economic benefits accrue to the motoring public.

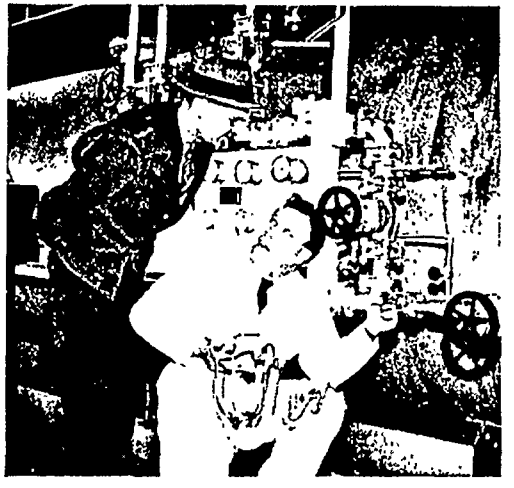
In a recent year, the use of tetraethyl lead saved an estimated 10% in gasoline consumption—or four billion gallons. That meant a cash saving to the motoring public of over a billion dollars on its annual gasoline bill. At the same time, it helped the oil industry to conserve petroleum, to refine less gasoline than would otherwise be needed, and to reduce its expenditures on new refining capacity.

As tetraethyl lead found wider usefulness over the years, Ethyl met the challenge of its potential further growth with major increases in manufacturing capacity.

In 1936, Ethyl built its Baton Rouge, La. manufacturing plant. Today, that plant is the largest in the world for the production of antiknock compounds. In 1952, Ethyl put into operation its Houston manufacturing center—giving it two completely integrated and completely independent plants. Besides drawing upon nearby sources of raw materials, each center can manufacture all of the specialized chemical intermediates needed for tetraethyl lead.

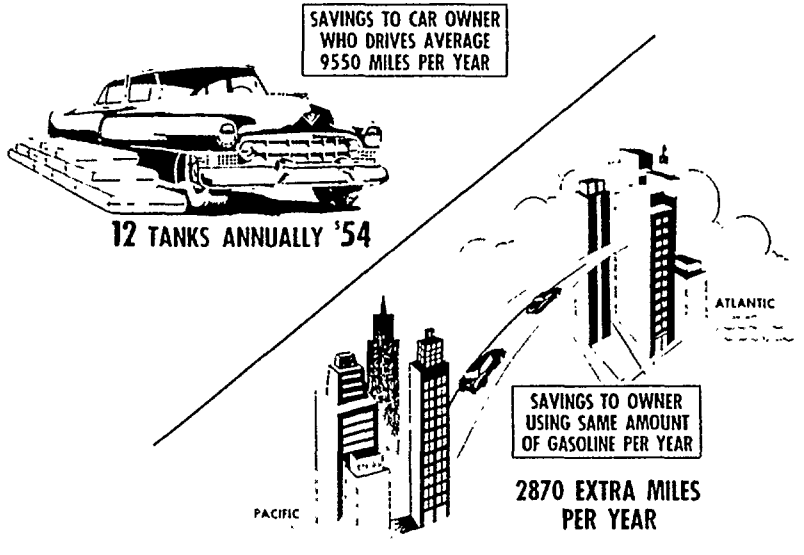
So great are the manufacturing requirements of "Ethyl" fluid that, in order to supply them, Ethyl is a leading producer of numerous other chemicals. It is, for example, the world's largest producer of metallic sodium, obtained from the electrolysis of salt. It is also a major producer of chlorine, ethyl chloride, ethylene dichloride and other useful chemicals. In fact, the manufacture of a single product—tetraethyl lead—has brought Ethyl into three major chemical fields: electro-chemistry, petrochemistry, and organo-metallic synthesis.

From the very start of its business, Ethyl has not been content simply to sell its product. Instead it has developed a full-fledged program of services with which it follows through on the use of tetraethyl lead —from the time it is first put into gasoline until it is finally consumed in an engine.



Safe handling of "Ethyl" fluid from beginning to end is one of the many services to the oil industry Ethyl developed

SAVINGS TO CAR OWNER
THROUGH INCREASED ENGINE EFFICIENCY—1930-1950



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Two important gasoline-consuming fields—power farming and commercial fleets—are served by Ethyl's field service programs, carried on cooperatively with oil refiners

Ethyl works directly with refiners on the safe handling and efficient use of tetraethyl lead. It assists refiners in such specialized fields as fuel technology, on the one hand, and power farming and commercial fleets, on the other. It provides training and educational materials for refining and marketing personnel. Its comprehensive research programs have a threefold objective of contributing new knowledge in the broad fields of fuels and engines, of working cooperatively with refiners on research projects of mutual interest, and of serving as a liaison between the oil and automotive industries.

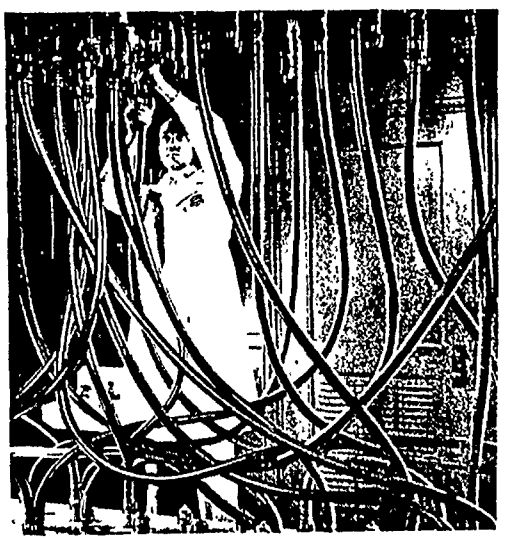
These things, in a real sense, are evidence of Ethyl's philosophy of sales based on service.

• Ethyl designed the tetraethyl lead mixing plants which are standard throughout the oil industry—and established the dependable safety procedures which are an integral part of the industry's operations. Today, Ethyl's field safety service embraces everything from the mixing of antiknock fluid with gasoline to technical advice on the best methods for cleaning storage tanks that have contained leaded gasoline.

• Ethyl's gasoline testing service is another product of its many years' experience—and is a service upon which scores of oil refiners rely. Since Ethyl first pioneered in gasoline testing in the 1920's, it has established five laboratories—in Tulsa, Oklahoma; Kansas City, Missouri; San Bernardino, California; Baton Rouge, Louisiana; and Yonkers, New York—as a service to its customer companies. These laboratories not only test individual samples for individual refiners. They also provide the oil industry at large with current authoritative reports on antiknock quality, and trends in antiknock quality.

• Ethyl's pioneering work in the farm tractor field laid the basis for today's four million-plus gasoline tractors. And today its farm tractor service, carried on by trained engineers, is helping farmers to utilize the benefits of gasoline, is helping the oil industry to broaden the farm market for gasoline.

• Ethyl's work with fleet operators—with the operators of bus and truck fleets—has contributed steadily to the



An elaborate fuel distribution system is required for the many test programs constantly in progress at Ethyl's research laboratories.

Year-round road test programs, conducted over mountain and desert bordering San Bernardino, Cal., provide data on final fuel-and-engine performance

great growth of this important gasoline consuming market. Today as always, Ethyl works with its customer oil companies and their fleet accounts —solving field problems, correcting operating difficulties, promoting efficient utilization of gasoline in commercial vehicles.

• Ethyl's fuel technology service, an outgrowth of its unmatched experience in gasoline antiknock quality, assists refiners in utilizing every drop of "Ethyl" fluid to the fullest, helps them in special fuel blending problems, helps them to meet the fuel requirements of their customers.

• Ethyl's research activities—which are carried on in its central research laboratories in Detroit Michigan and in its road research laboratory in San Bernardino, California—are, in a real sense, another service of the Corporation. Ethyl's research has not only contributed new knowledge about antiknock compounds and antiknock quality. It has also uncovered new information about combustion, about the chemical composition of gasoline as related to its performance in engines, and about the kind of fuels and lubricants, engines and engine parts, that will be needed tomorrow. More, because of their close technical relationships with both the oil and automotive industries, Ethyl's research laboratories enable each industry to benefit from trends and developments in the other, and thus to further transportation progress.

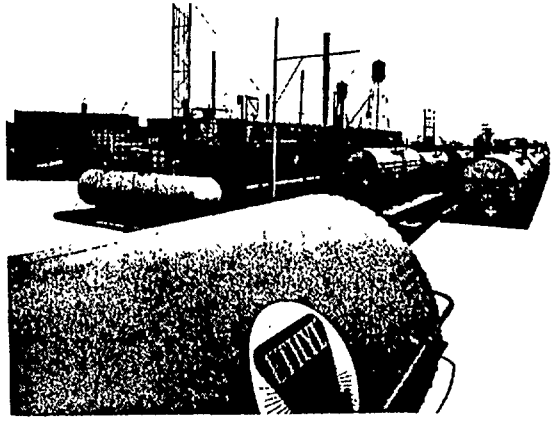
• Ethyl's educational programs have long since become famous in the oil industry. Training talks and demonstrations by fuel and engine specialists, technical reports and group conferences with customer companies on important developments, full-dress presentations on safety, marketing, or developing technological trends—all these are constantly made available to the oil industry.

• Ethyl's steadfast support of the premium gasoline market has benefited the oil industry, the auto industry, the public. For the public, premium gasoline has been a pacemaker of progress, with yesterday's premium becoming today's regular grade of motor fuel. For the automobile industry, the availability of premium gasoline has made it possible to introduce improved engines of higher compression ratio. For the oil industry, premium gasoline has enabled it to meet the advancing octane requirements of the motoring public in an orderly and economic manner.

• Ethyl's industrywide public relations activities have benefited the oil industry by increasing public knowledge of the oil industry. For example, its "Two Equals Three" program told the public why and how gasoline is one of the biggest bargains on earth, with two gallons of present-day gasoline equal in value to three gallons of motor fuel of the 1920's.

Today, besides its two self-contained manufacturing centers in Baton Rouge and Houston, Ethyl also has two huge storage and distribution terminals for "Ethyl" antiknock compound, located in Delaware and California. This means four principal locations in all from which to serve refiners. In the event of a national emergency, loss or damage to any one of them would still leave three major sources of "Ethyl" fluid from which refiners could draw their supplies. And as part of its nationwide distribution system, Ethyl has hundreds of railroad tank cars constantly in service for the shipment of "Ethyl" fluid. Twenty-four hours a day, seven days a week, a shipment of "Ethyl" fluid is no further away than a telephone call.

This is what has come out of all of these years of experience in the antiknock field. This is what has come out of the test tube in which Ethyl Corporation was born. As much as anything, Ethyl's success has been built on its record of service to the oil industry, on its policy of matching every pound of product with a full measure of service. The Ethyl Corporation is proud to be a member of the oil industry and to have worked with it in providing the modern transportation we enjoy today. With the industry, Ethyl looks forward to the even greater progress which will be realized tomorrow.



Four storage and shipping points—and over 400 specially-designed railroad tank-cars—speed shipments of "Ethyl" antiknock compounds all over the United States

"ETHYL"
(TRADE-MARK)
ANTIKNOCK
COMPOUND

ETHYL
CORPORATION

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