



The
SHAMROCK

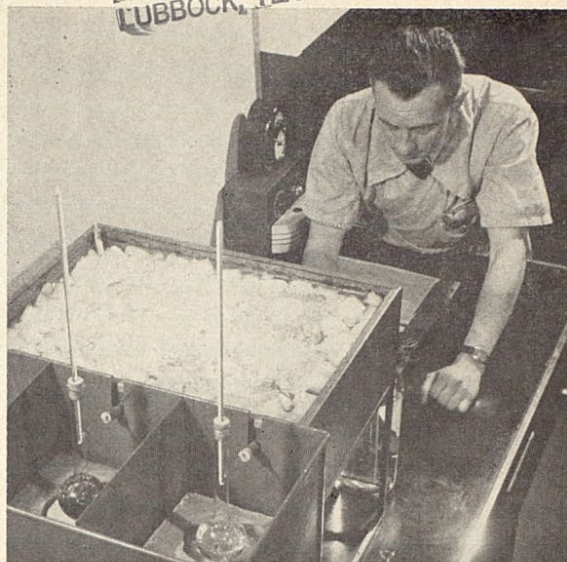
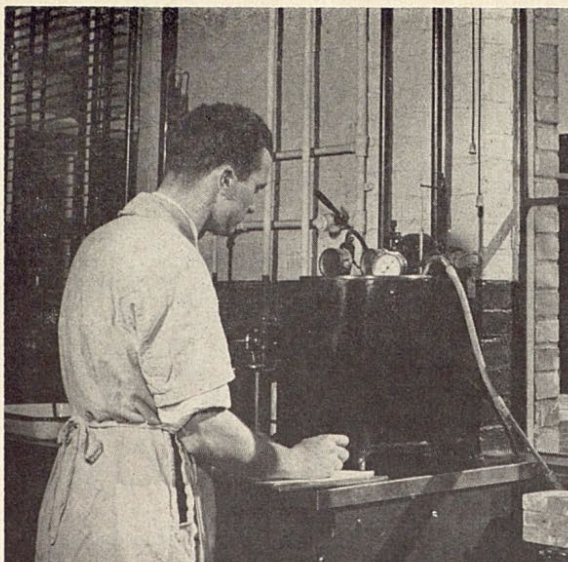
March - April — 1954



After years of research
modern motor fuels
successfully blend
power and economy.
With quality gaso-
line you can be
sure of . . .

COMMAND

PERFORMANCE



Successfully meeting the requirements of the vapor pressure test (left) is one indication of a quality gasoline. Equally important to you is its proven volatility (right).

In 1920, the automotive and petroleum industries—partners in developing the “horseless carriage”—were both battering at uncompromising production problems.

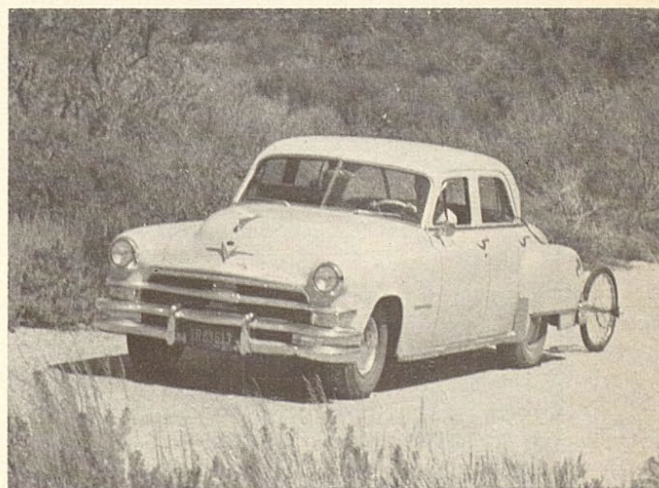
Actually, they had the same problem, but each industry was approaching it from its own standpoint.

Automotive engineers searching for a workable combination of power and economy, knew it was possible to design more powerful internal combustion engines by raising the compression ratio. However, they also knew that for the moment, high compression and engine “knock” were seemingly inseparable.

In their own laboratories, petroleum engineers faced the necessity of improving the unsatisfactory performance of the day’s gasolines. In 1920 the liquid that boiled out of crude oil, once it had been refined and purified, was the only acceptable form of motor fuel. Gasoline was qualified and sold on the merits of its “gravity” which indicated its weight and quick starting properties. However, the best gasoline available in 1920 persistently “knocked” in test model high compression engines.

1921 introduced a revolutionary compound to the harassed engineers of both industries. An anti-knock compound was discovered, which blended with the present gasoline, immediately allowed the automotive industry to boost the compression ratios and economically in-

Is this the gasoline which your automobile engine demands? The fifth wheel says “yes.”



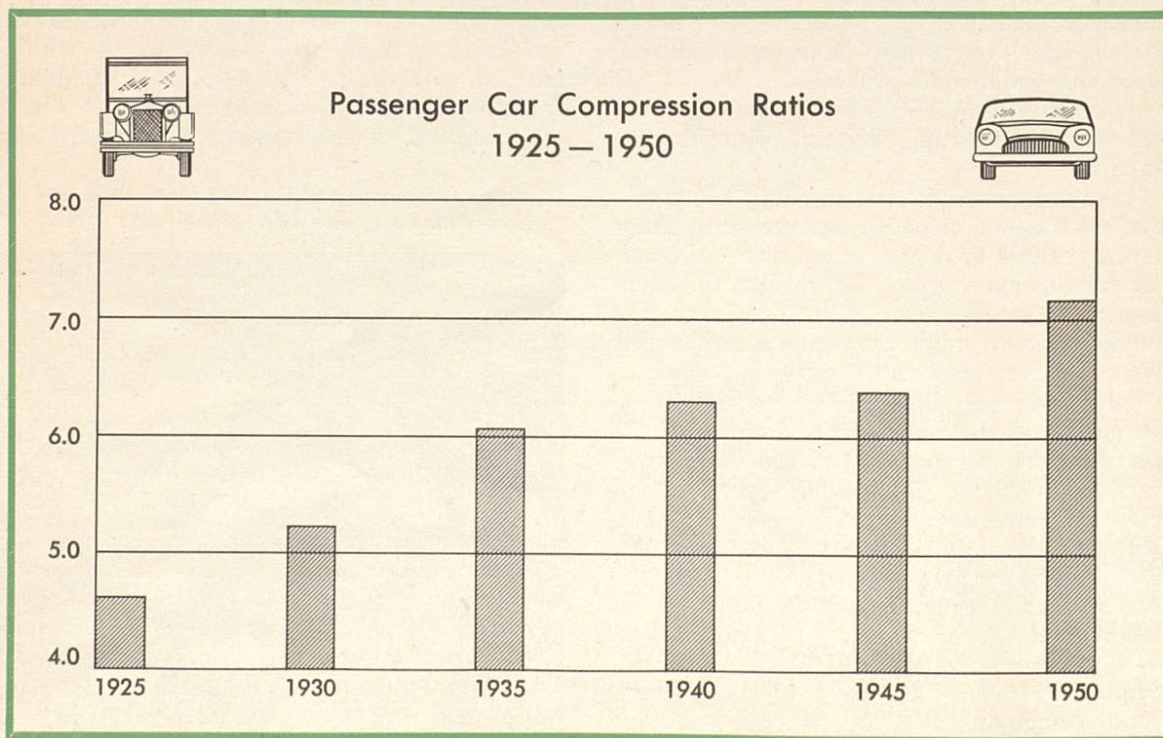
crease engine power. Trade named "Ethyl," this miracle compound was not yet available on a widespread basis when a well known automotive manufacturer marketed the first engine designed to profit from its extra power. Nicknamed the "Red Head," this car accelerated up steep grades in high gear while other cars growled to the top in low gear. The team of high compression and premium gasoline had arrived—rather dramatically—on the American scene.

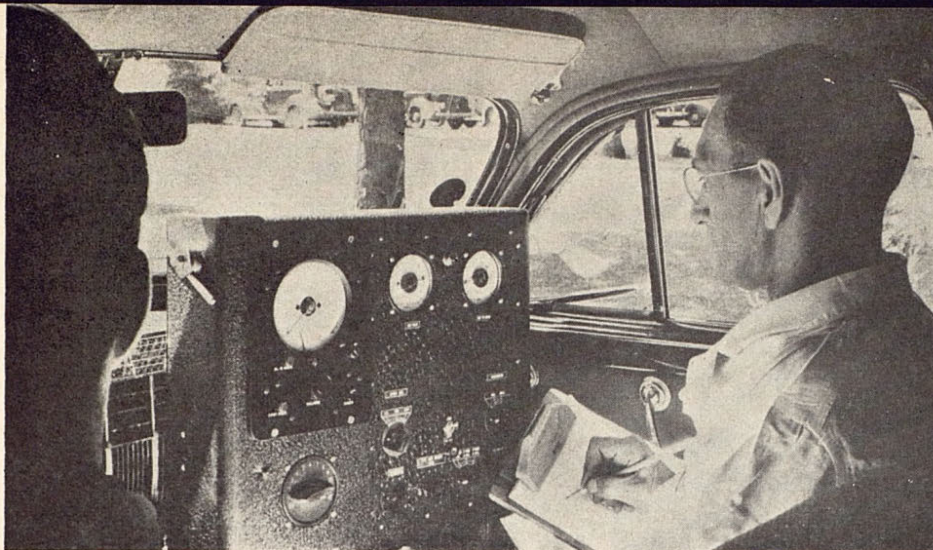
Understanding the many jobs that gasoline must do — to provide quick starts, fast warmup and rapid acceleration for a car—it can be seen that certain characteristics are essential. Actually, the over-all quality of gasoline is determined by such characteristics as its anti-knock properties, volatility, vapor pressure and storage stability, and by the absence of such impurities as gum and sulphur. How good a gasoline is depends on how well it measures up in all of these important qualities.

One of the most important properties of gasoline is its volatility, meaning its readiness to change from liquid to gaseous form, and thus deliver its power readily to the engine at

all speeds. Volatility, which is dependent upon the distillation range and the vapor pressure of the gasoline, is of major importance to engine starting, warmup and acceleration; it also indicates any tendency of the fuel toward crankcase dilution and vapor lock. And yet a fuel must not be excessively volatile, because in that event the gasoline would vaporize too rapidly in the fuel system of a car. That is why the vapor pressure of high quality gasoline is adjusted, depending upon the season of the year. Under extreme conditions of vapor lock, the engine will stall completely. While the vapor pressure must be high enough to permit the use of the required amount of low boiling gasoline fractions, it must not be too high or excessive vaporization will result. Winter driving calls for a high percentage of light gasoline fractions, while summer driving requires a higher percentage of heavy fractions.

Another major characteristic of modern motor fuel is its antiknock quality, measured by its octane number. It is essential that a fuel be sufficiently high in antiknock qualities to develop the maximum power in an engine and to protect it against harmful knock.





Test cars equipped with electronically controlled units note changing engine conditions occurring under deliberately severe tension.

These, then, are some of the characteristics quality gasoline must have: volatility, the required vapor pressure, and antiknock performance. Meanwhile, harmful properties such as sulphur must be removed, and additives used to prevent the formation of gum.

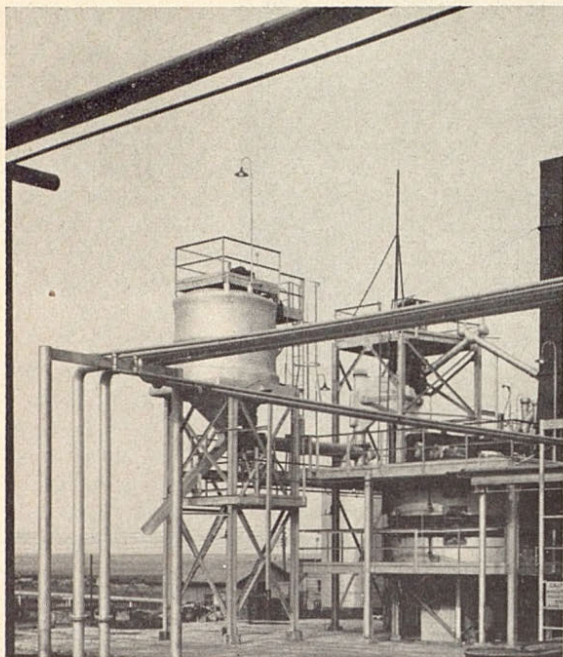
In order to control the over-all fuel quality, all of these gasoline characteristics are measured by a series of laboratory tests. A series of distillation tests indicate the volatility of different percentages of the fuel. Standard tests are used to determine the vapor pressure to insure the removal of sulphur, and the prevention of gum formation. By such tests, the characteristics of the different fuel components are so adjusted and controlled that the motorist is assured of the best gasoline at all times.

The broad wave of automotive progress since 1925 would have been impossible without the advances in refining technology that have been seen over the years. In such modern installations as Shamrock's McKee refinery, fundamental distillation processes have been augmented by thermal cracking and more recently by catalytic cracking. As a result, the public has received progressively better gasoline. Something else has happened, too. The chemical composition of gasoline has undergone a world of change. For, as newer refining processes have been developed, fuel technologists have had completely new kinds of fuel components at hand.



Desert heat and arctic cold are produced indoors in testing a fuel's reactions.

Not content with laboratory tests to insure fuel quality, progressive refiners supplement these tests with extensive road test programs. Road tests are the final proof of the pudding, because it is on the road that gasoline performance pays off. Shamrock, for example, road tested its new 1954 gasoline blends



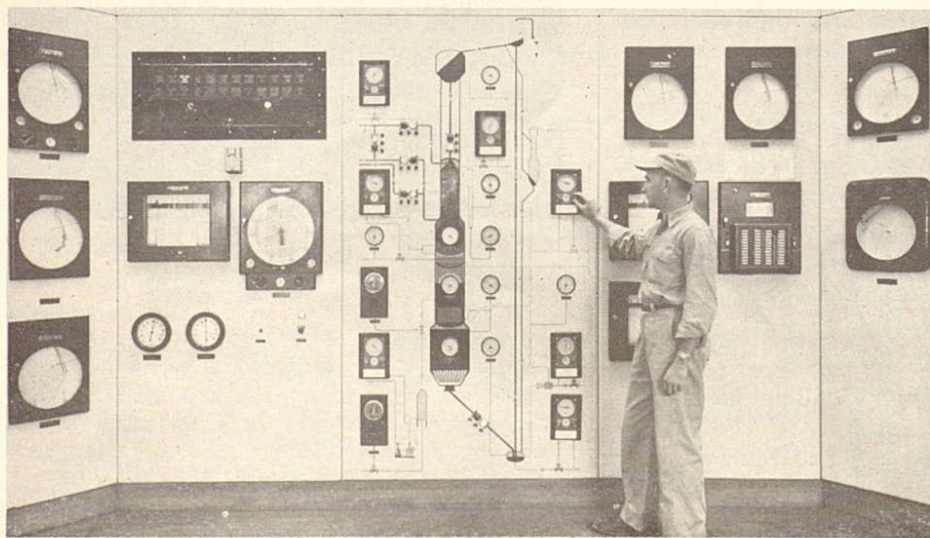
Shamrock's sulphuric acid plant aids in making 100 octane blending stock.

in late model cars, further insuring that its new gasolines meet the most advanced fuel requirements of the automotive industry.

The transportation gains of the past quarter-century have been brought about by the mutual contributions of the oil and automotive industries. To the farmer, the combination of advanced engine design and quality gasoline means more power, more economical performance and longer engine life for his tractor. It also means he is capable of producing more products for the market and doing it cheaper per product than his predecessor. The payload of trucks per gallon of gasoline consumed, has been increased about 50 percent since 1925, and the schedule time for inter-city buses has been shortened about 50 percent because of the higher speeds made possible.

No limit has ever been placed on American ingenuity and initiative. Consequently, it is impossible to forecast all that the petroleum industry may develop in the next 25 years. Antiknock gasoline was a revolutionary development in 1921 and multi-grade motor oils made an equally dramatic appearance on the market this year. To the American motorist, each development represents a milestone in petroleum progress, but to the petroleum industry each discovery represents the fulfillment of a promise made yesterday and a renewed pledge of greater progress tomorrow.

In the control room of Shamrock's 12-story high catalytic cracker, modern refining means quality gasoline.



and now . . . Today . . .

Shamrock Introduces Two Great New, Powerful Gasolines For All Motorists

Utilizing an improved blending formula, Shamrock this month introduced to motorists of the Southwest and Rocky Mountain region two of the most powerful motor fuels they have ever had the opportunity to buy—new Shamrock Cloud Master Premium Gasoline and new Trail Master Regular Gasoline.

In developing these new motor fuels, Shamrock engineers and chemists began with a two-fold aim. One part of that aim was to produce a Premium gasoline that would meet the most exacting requirements of any stock automobile, regardless of make, model or engine compression ratio. In addition, Shamrock petroleum engineers were determined to anticipate future motor fuel requirements and blend into their new Premium gasoline certain plus qualities. These plus qualities mean that Shamrock's new Premium Gasoline offers surplus performance in today's automobiles.

The second part of Shamrock's dual purpose in developing new motor fuels was to produce a regular-grade gasoline with premium qualities. The quality standards of this new regular gasoline must be higher in every respect than the motor fuel requirements of all but the highest compression engines. In short, it must give users of regular gasoline performance they normally would expect only from more expensive premium products.

How well this two-fold aim has been met can best be measured by the results of actual laboratory and road tests of Shamrock's new Cloud Master and Trail Master gasolines.

These tests prove conclusively the superiority of Shamrock motor fuels in anti-knock performance, volatility control, storage stability, and freedom from sulphur and other harmful impurities. In every respect, new Cloud Master and Trail Master motor fuels more than meet the high standards established by the engineers and chemists who developed them.

From the standpoint of performance in

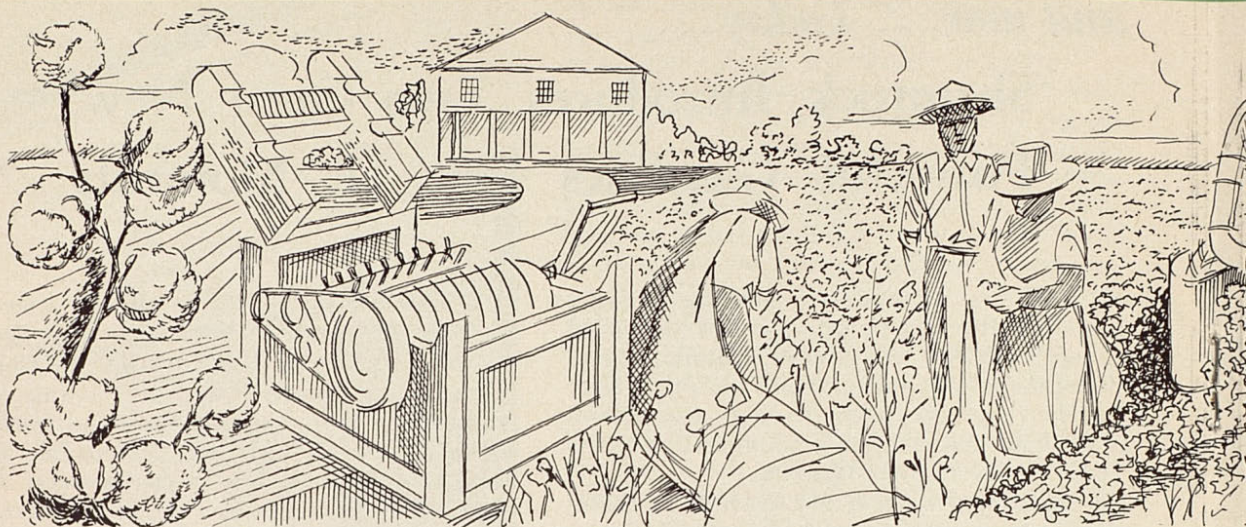
your automobile, here is what the superior qualities of Shamrock's new motor fuels mean:

ANTI-KNOCK PERFORMANCE—Shamrock's Cloud Master Premium Gasoline will burn evenly and smoothly—with no trace of engine knock—in any stock automobile now being manufactured. If your car "knocks" with Shamrock Cloud Master Gasoline, there is something wrong with your engine. The gasoline itself is specifically blended to eliminate knock completely in any stock car now manufactured regardless of engine compression ratio. The anti-knock quality of Shamrock Cloud Master gasoline, measured by octane rating, far exceeds the octane requirements of late model automobiles with compression ratios in excess of 8 to 1. Also improved by the new blending formula are the anti-knock qualities of new Trail Master gasoline. This fine motor fuel, normally a "regular" blend, more than meets the octane requirements of all but the highest compression engines.

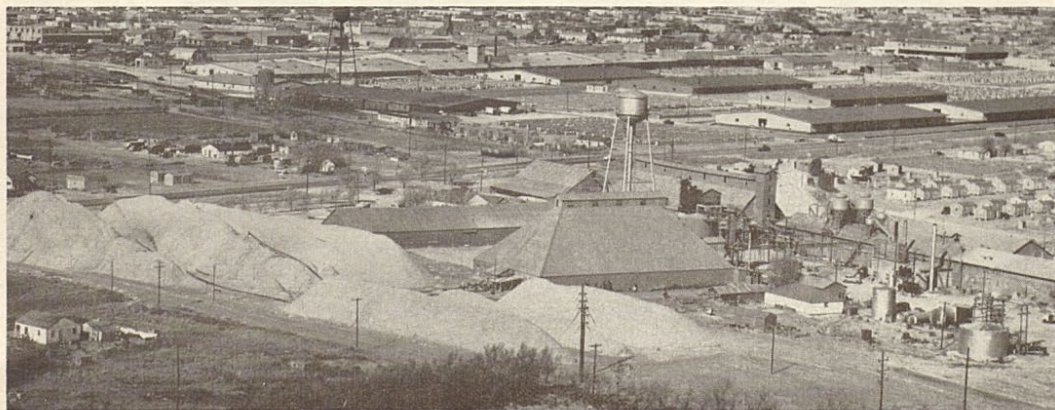
VOLATILITY CONTROL—Important to quick starts, smooth acceleration, fast warm-up and prevention of vapor lock, volatility is the readiness of a motor fuel to change from a liquid to a gas. The volatility must be high enough to provide instantaneous starting, quick warm-up and a smooth, steady flow of completely vaporized fuel to the combustion chamber. Yet volatility of a good motor fuel must not be so high that there is danger of vaporization in the fuel lines, resulting in vapor lock. The volatility of both Shamrock Cloud Master Premium and Trail Master Regular gasolines is carefully controlled by daily laboratory tests to provide for the optimum vaporization characteristics at each season of the year.

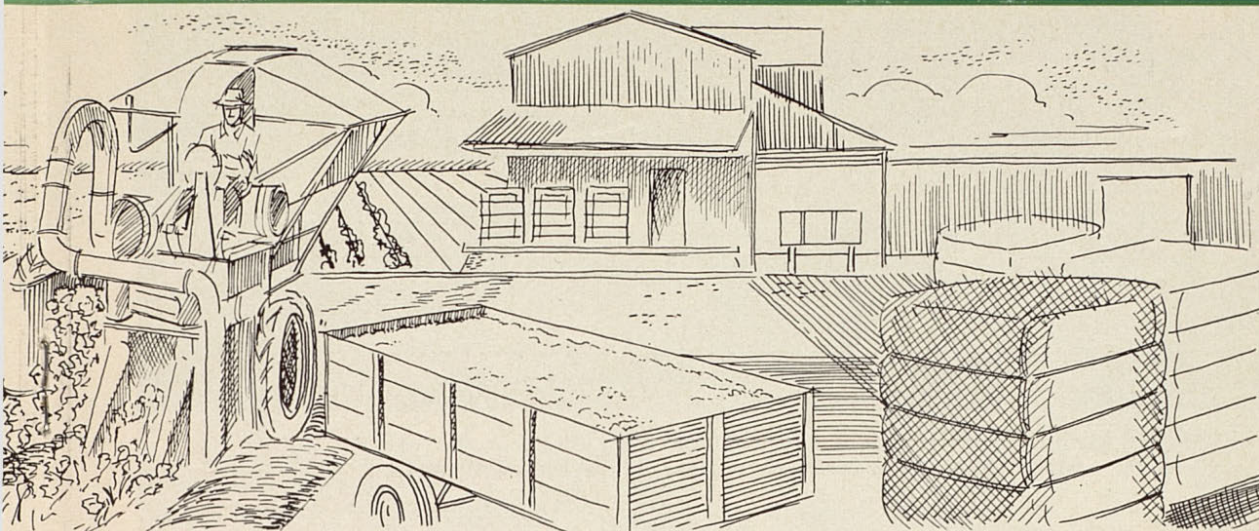
STORAGE STABILITY—Through slow oxidation during prolonged storage periods, troublesome gums sometimes form in gasoline.

Tomorrow's Gasolines, Page 15



Time failed to record the
birthplace and planter of the





the *Webs of Woven Wind*

Today on the High Plains of Texas the cultivation of cotton continues under more progressive circumstances than those prevailing at the coronation of King Cotton on the American Stock Exchange in the 1860's.

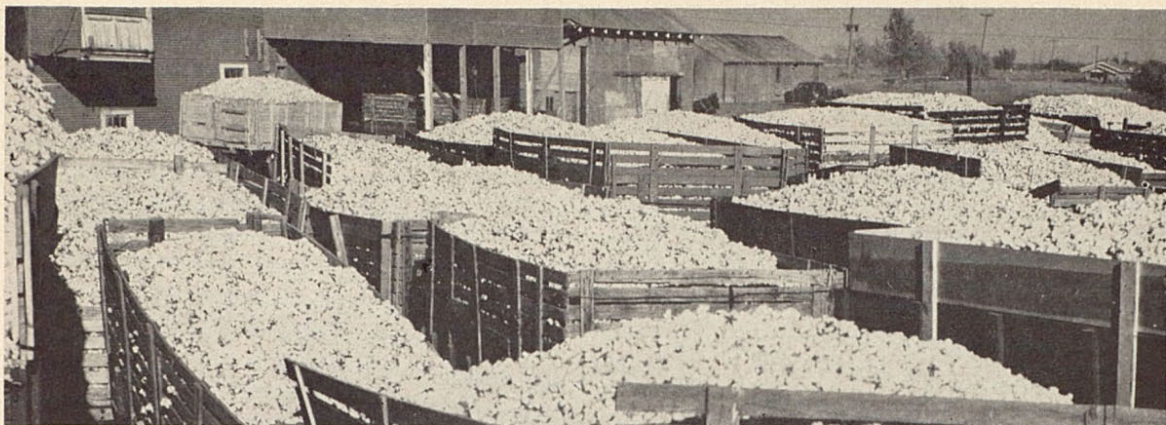
Once described by medieval Arabs as the "webs of woven wind," cotton has witnessed the rise and fall of empires and civilizations from an origin lost in the mystery of unrecorded time. At one time it was shipwrecked but survived to alter the living standard of

the Japanese nation. It has clothed the royalty of ancient Inca dynasties, acted as mediator at the introduction of two worlds in 1492, and been introduced to Europe by the returning grim-faced Crusaders.

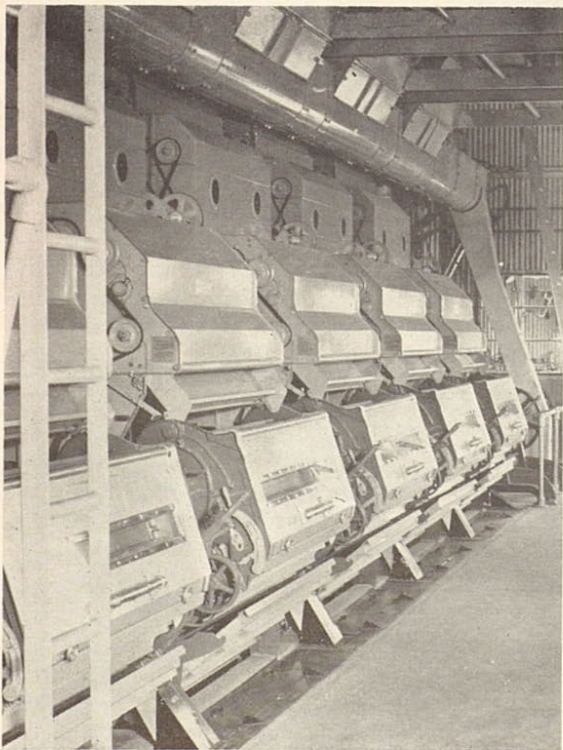
Even the age-worn records of India's Indus Valley reveal the growth and use of cotton as early as 3000 B.C. Beyond that time the thread of written history is broken, but since during the same period natives of the Nile Valley were masters of weaving and spinning, it is logical to assume that cotton was born hundreds—perhaps thousands—of years earlier.

The time of cotton's migration to the western hemisphere is unconfirmed, but there is absolute proof of its presence in Peru in 200 B.C. One of the contributing factors to Colum-

A Texas' High Plains oil mill in Lubbock offers proof of a booming industrial growth.



Some cotton gins on the High Plains had as many as 1,200 bales waiting on the yard at the height of the season. Most of the cotton, as pictured, is mechanically- harvested.



bus' confusion upon landing in the New World in 1492 can be charged to cotton. Believing he had reached India the explorer wrote in his diary, "The natives came swimming toward us . . . (bringing) bales of cotton thread . . . which they exchanged with us."

Today, after winding its way through the southeastern and northeastern United States, cotton has also established itself as a major industry of the southwest. It stretches through 27 states from Maine to Texas, helping the United States play its role as the world's largest consumer and grower of cotton.

Within a 20-county area of Texas' High Plains on the southwestern edge of this giant agricultural belt is a segment of the cotton industry which produces roughly 10 percent of the nation's annual crop. In the normally dry climate of the High Plains—slightly more than 18 inches average rainfall per year—the growth of cotton has been encouraged by the use of irrigation. The first irrigation well in the section was drilled in 1911, but the program made little real progress until 1935 when a drought and the increasing mechanical efficiency of pumps stimulated activity. By 1952, there were 17,360 such wells pumping on the High Plains.

This five-stand gin separates the lint from the seed quickly and efficiently.



The High Plains grower (left) estimated that his crop of newly-developed stormproof variety would produce two bales per acre. Cotton being weighed in the field (right).

In 1953, the total jumped almost 35 percent to 23,393.

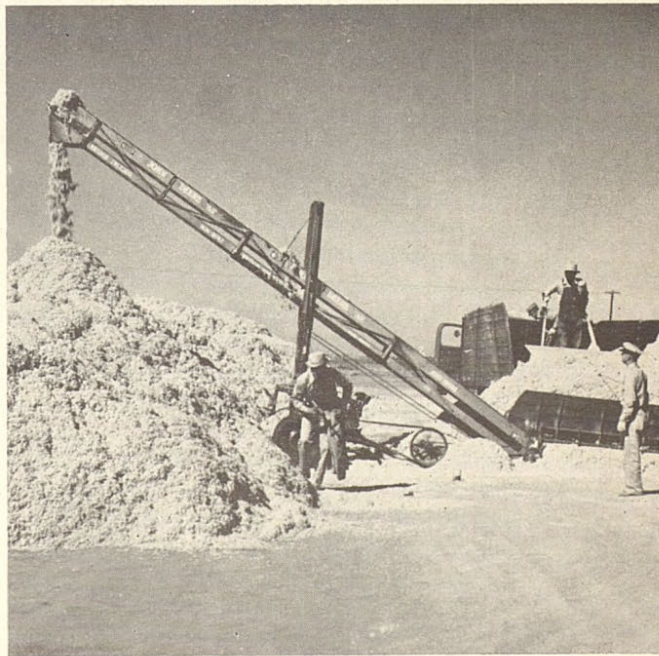
After cotton, once called the "white gold of America," has been picked, it is transported to the gin. Lubbock, Texas, is the hub of the High Plains ginning activities in separating the fiber from the seed, and compressing the cotton into ponderous 500 pound bales.

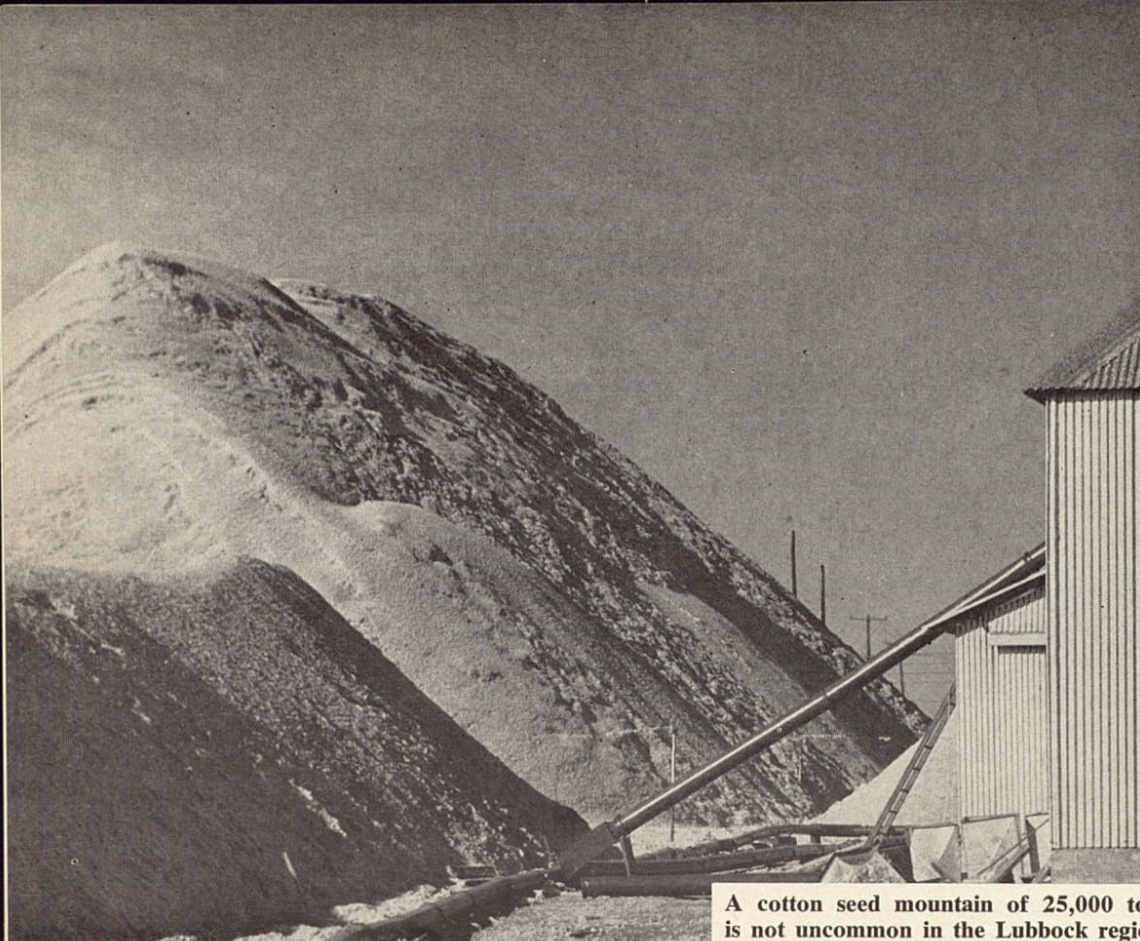
A hustling city of approximately 100,000 Texans, Lubbock claims the title of the world's leading cotton seed oil mill center. The distinction was captured from Memphis, Tenn., during the past two years. Three modern mills in Lubbock employing a chemical process known as "solvent extraction," separate the oil from the cotton seed. After additional processing, the oil reaches the ultimate consumer in a variety of food products requiring either animal or vegetable oil.

The story of irrigated cotton on the High Plains of Texas is a story rarely equalled in cotton producing areas throughout the world.

A survey complete through May of last year testifies to the almost complete mechanization of the area. Information tabulated from 18 of the counties shows that over two out of three irrigation wells depend on butane for power. Gasoline trailed a poor second to bu-

Lack of storage space for huge yields has forced piling of seed in the open.





A cotton seed mountain of 25,000 tons is not uncommon in the Lubbock region.

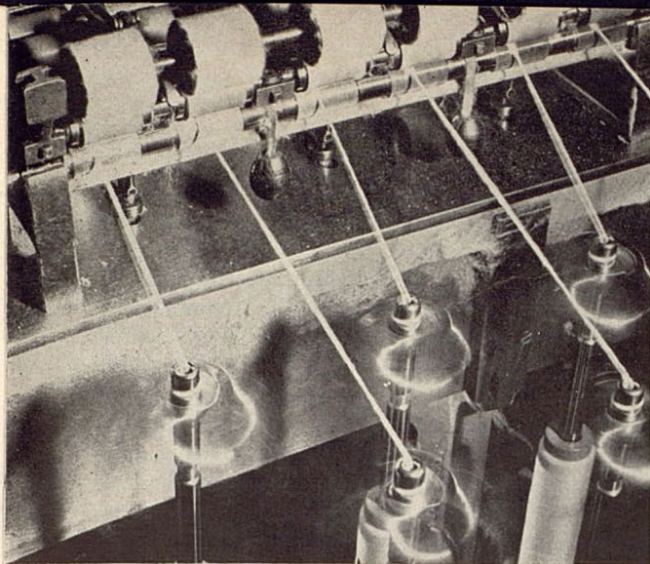


tane by supplying only 2,013 of the 15,681 wells reported. According to analyses of the U. S. Department of Agriculture, the High Plains rank with the nation's leaders in producing cotton economically and efficiently. The same survey estimates that it takes six man-hours to produce one bale of cotton on the High Plains as compared to 50 man-hours in other sections of the country.

Not only has irrigation almost doubled per acre cotton yield, but it has stabilized cotton production and the cotton market. Year-to-year variations are more extreme for dryland crops, but irrigated cotton fed by a reservoir of underground water, produces consistently and steadily. Dryland farming was once

acceptable on the High Plains because 80 percent of the annual precipitation falls between April and October, a period when the majority of crop production is completed. Today, with the increased assurance of high per acre profit and comparatively low operating costs, cotton growers are able to boost their production to meet the demand of steadily expanding market.

The demand on the prosperity-laden Ogallala water formation beneath the High Plains increases annually as more wells are drilled and more powerful industrial engines pump deeper and deeper into the earth. What assurance has the High Plains cotton grower that the water reservoir beneath his land will not



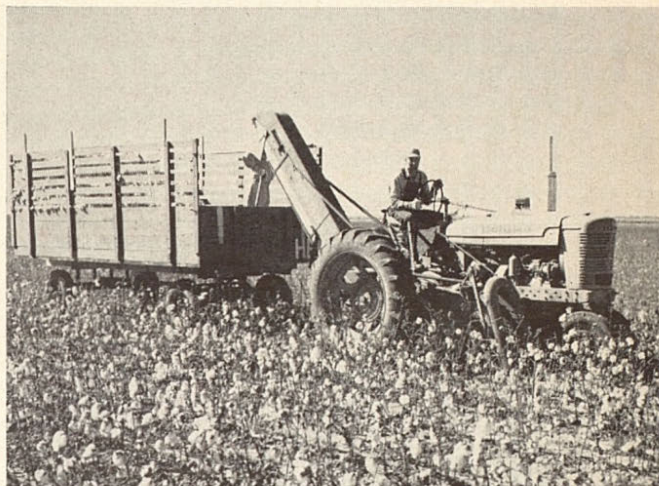
On the "roving frame," cotton is slightly twisted, drawn into smaller strands.

be eventually exhausted?

Since 1936, engineers have been studying the ground waters of the area, balancing the demand for irrigation against the hidden supply, calculating the withdrawal by man against the deposits made by nature. The results of the survey were made public in 1949. First, the report disclosed the average thickness of the water-bearing material as about 210 feet. The available supply of water was calculated as about 150 million acre-feet, two-thirds of it within 200 feet of the surface.

Further, the engineers estimated that since 99 percent of the annual rainfall on the High Plains was lost through evaporation and trans-

Two-row cotton strippers shorten the working time of modern cotton growers.



This Month's Cover



The 1954 Maid of Cotton, Miss Beverly Louise Pack, was chosen as the cotton industry's good will ambassador for the year over 19 other finalists at Memphis, Tenn., January 6.

Miss Pack was selected for the national honor by a seven-member board of judges on the basis of her personality, intelligence, beauty and background. A native of El Paso, Texas, she attends school at Texas Western College where she was recently elected "The Most Beautiful Girl at Texas Western."

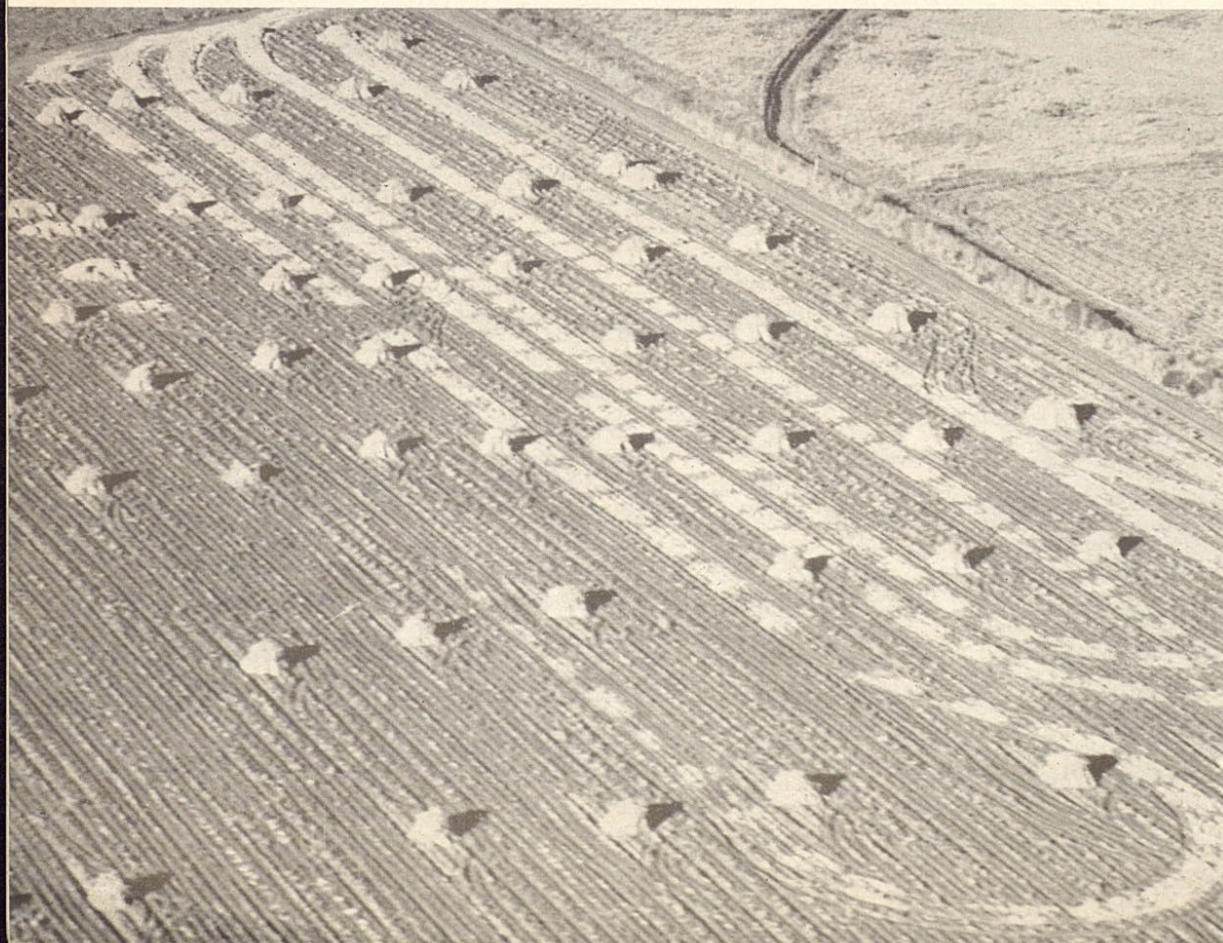
To be eligible for the Maid of Cotton title, each girl must be from one of the 18 cotton belt states, be at least 5 feet 5 inches tall, never been married, and between 19 and 25 years old.

piration, the recharging of the underground reservoir was "hardly more than the annual loss through springs and seeps." On the basis of their findings, the government engineers concluded that the formation could be exhausted in time. However, the natives of Texas' High Plains are equally determined that the wealth of the reservoir will not be wasted or carelessly expended. In the meantime, both the engineers and the growers will erect safeguards as needed to insure continued high production.

From the cotton fields to the gins, through additional processing and eventually to you, the ultimate consumer, the story of cotton testifies to the ingenuity that aided the growth of

a nation. When cotton and its by-products count their customers in 1954, the list will include everything from rocket propellant to frozen desserts, encompassing such seemingly unrelated products as plastics, film, paints, window shades and tennis shoes. The list grows every day. To the High Plains cotton grower surveying his 1954 crop this increased demand for his land and his labor means added capital investment, and greater conservation of his land and the underground water reservoir that nourishes it. The promise of a greater and more properous cotton yield keeping pace with the demands of a world extends endlessly into the future.

This winter scene on the High Plains proves the secondary economy practiced by Texas growers in spreading the gin waste back on their land.



TOMORROW'S GASOLINES—

This gum formation can be inhibited, however, by the use of certain chemical additives. In making Shamrock gasolines, the addition of these gum-preventing chemical agents has long been routine. Laboratory tests of Shamrock motor fuels — both Cloud Master and Trail Master — show that these superior gasolines will be free from gum, even after more than six months of storage. The normal storage period of gasoline is rarely more than a few weeks. The extra long storage stability of Shamrock gasolines is but one more of the many *plus* features of these fine motor fuels.

FREEDOM FROM IMPURITIES—Crude oil sometimes contains sulphur compounds and other harmful impurities. Unless these unwanted products are completely removed in the refining and treating processes, they may result in corrosion, loss of power or other undesirable effects from use of the finished motor fuel. Shamrock's motor fuels are doubly protected against these impurities. First, the nature of Shamrock's catalytic cracking process tends to eliminate all sulphur compounds. Second, Shamrock's advanced treating facilities remove any traces of sulphur remaining after the refining process. Specific treating processes also remove any other harmful impurities inherent in hydrocarbon products.

New Trail Master Regular gasoline is the performance plus gasoline for automobile engines with lower compression ratios. It costs no more than high grade regular gasolines yet gives the anti-knock, extra-power features you normally expect from premium gasoline. New Trail Master Gasoline offers the drivers of cars with lower compression engines all the performance advantages of recent gasoline improvements, without requiring that they pay for a higher octane premium gasoline.

Today's powerful, high compression engines make strong demands on the gasoline they use. But, as a result of Shamrock's new blending formula, Shamrock Cloud Master not only meets those requirements but far exceeds them. Cloud Master Premium motor fuel has an octane rating more than enough to eliminate even trace knock in any stock car. Its superior performance qualities assure maximum power and mileage . . . fast warm-up . . . smoothest possible acceleration.



March - April — 1954

"Dedicated to the Progress of the Great Southwest"

Published Bi-Monthly by
THE SHAMROCK OIL AND GAS CORPORATION
Box 631, Amarillo, Texas

C. R. BOWEN, Editorial Director
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LANCE WISE, Associate Editor

Credits . . .

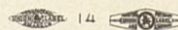
Cover photo, page 13 top, NATIONAL COTTON COUNCIL OF AMERICA; page 3 and page 5, ETHYL CORPORATION; pages 8-12, page 13 middle and page 14, SOUTHWESTERN CROP AND STOCK.



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POWERFUL NEW GASOLINES

Shamrock's NEW Blending Formula:

- 1 Adds Premium Qualities to NEW SHAMROCK TRAIL MASTER Giving Users of Regular Gasoline Extra Performance at No Extra Cost
- 2 Makes NEW SHAMROCK CLOUD MASTER the Finest Premium Gasoline For Superior Performance in High Compression Engines

Regardless of the make or model of your car, one of Shamrock's TWO powerful new gasolines offers you MORE POWER . . . BETTER PERFORMANCE . . . GREATER ECONOMY. If you've been using regular gasoline, try Shamrock's NEW TRAIL MASTER—the motor fuel that offers performance-plus features of a more expensive premium gasoline . . . yet costs no more than regular. Or if you operate a higher compression engine with stronger gasoline demands, fill up with Shamrock's NEW CLOUD MASTER—the gasoline that assures you of the best performance your car was designed to deliver. Fill up with one of the TWO great NEW Shamrock gasolines and know you are using the finest motor fuel your money can buy.



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