THE

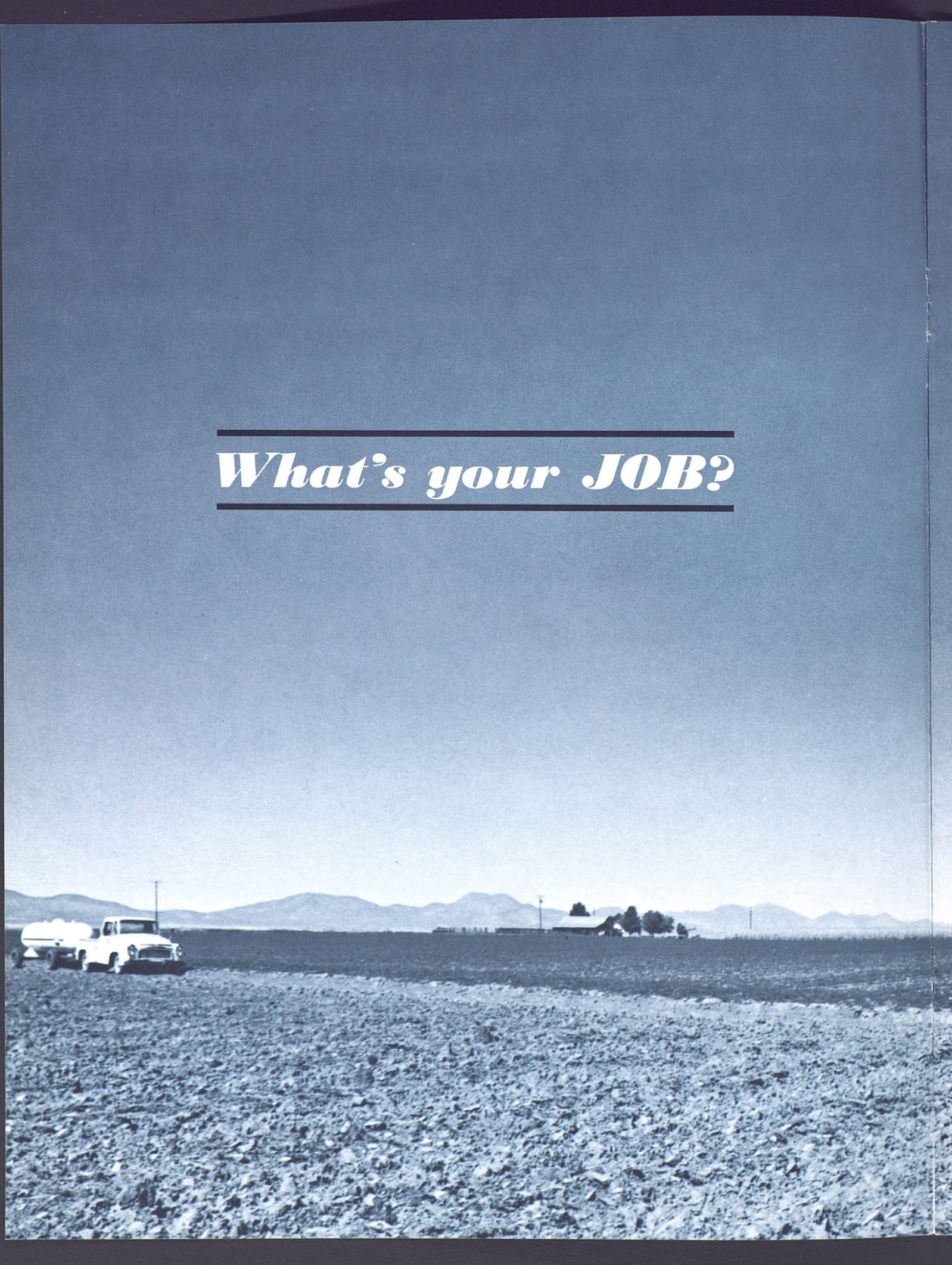
SHAMROCK

SPRING 1967

AGRICULTURE ISSUE

FROM THIS SOIL . . . Hope for a hungry world

What's your JOB?



That's a question that strikes at the heart of a man's pride . . . There are answers to that question men give with pride — I heal the sick . . . I fly the airplanes . . . I build mighty bridges . . . I minister to souls. My answer I, too, give with pride . . . I'm a farmer . . . not the first, the best, the only, but one of the many the nation needs as nations have always needed farmers . . . like the doctor, I work with life. From the heart of the earth I must bring forth life that is in turn the food of living men. From my soil must come the power to make my countrymen keen of brain, sturdy of body, sure of hand. Farming is old . . . as old as man. But farming is as new as plastics, paint, fabrics, all the myriad product miracles of a modern age which still must come out of the rich earth as raw materials for man's dreams. It's a comfort to know you are needed and your skills are necessary. So, when I meet a stranger, and he asks me what's my job, I say . . . like Cato once said in the Senate of Rome . . . I'm a farmer . . . and I look out at the land.

NAC News and Pesticide Review

It is to the American farmer and his unheralded efforts that we dedicate this issue of THE SHAMROCK.

A great variety of crops are grown to meet the food needs of the world population and the American farmer is engaged in raising many of them. Corn, left, one of the nation's basic crops, is used primarily as feed for cattle and hogs. • Corn also is used in its green stage, second from left, to make ensilage as food for beef and dairy herds. • While great strides have been made in the perfection of synthetic materials, cotton, third from left, remains one of the nation's most important crops for fiber. • Cotton harvest, third from

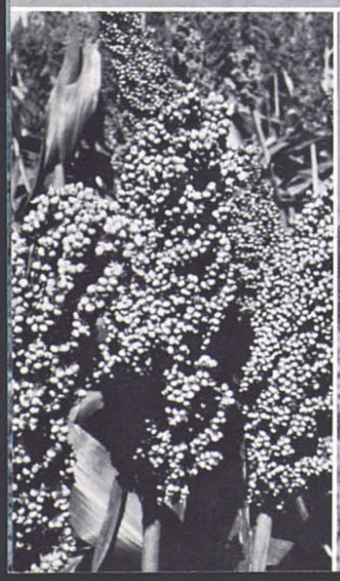
FOOD, FIBER and the FARMER

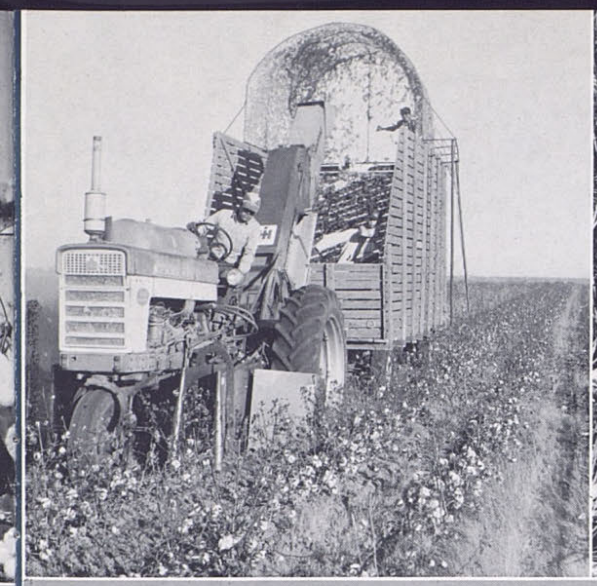
The American farmer and his genius for performing near-miracles in food production stands as the world's greatest hope against future mass starvation. His ability to produce life's essential foods and fibers never has faced a more demanding challenge.

A food shortage that threatens to become acute in a few years actually is being spawned now by an explosion in the world's population. Currently, the food supply is more or less keeping pace with the demand, but experts see signs of trouble ahead.

As the world population continues to mushroom and the demand for food grows proportionately, the farmer must produce steadily-increased yields. Ironically, he must produce those greater yields on a land mass that remains practically unchanged.

Grain sorghum, left, is similar to corn in nutritional value. • It is harvested with combines, second from left, much as wheat is harvested. • Soybeans, third from left, is a relatively new crop on the American farm scene and is becoming one of the principal producers of food oils. Many farmers are raising soybeans as substitutes for other crops. • Sugar beets is another important crop for the Ameri-





right, has changed drastically in recent years as mechanical harvesters have all but replaced the manual labor of hand-picking. • Wheat, second from right, is probably the most important single crop grown in the world and millions of tons are raised each year on American farms. • Agricultural research goes on in wheat varieties in an effort to increase production. At right, a test plot is harvested at High Plains Research Foundation near Halfway, Texas. Caution is taken to prevent mixture of grains of various strains.

Therein lies his challenge: to produce more food on each acre of land he tills.

Just how ponderous the farmer's problem may eventually become may be seen in a glance at the projected population picture. The U. S. alone is expected to pick up 32 million more persons in the next 10 years. Over the same period, the world population is forecast to jump 700 million – most, ironically enough, in already food-short countries.

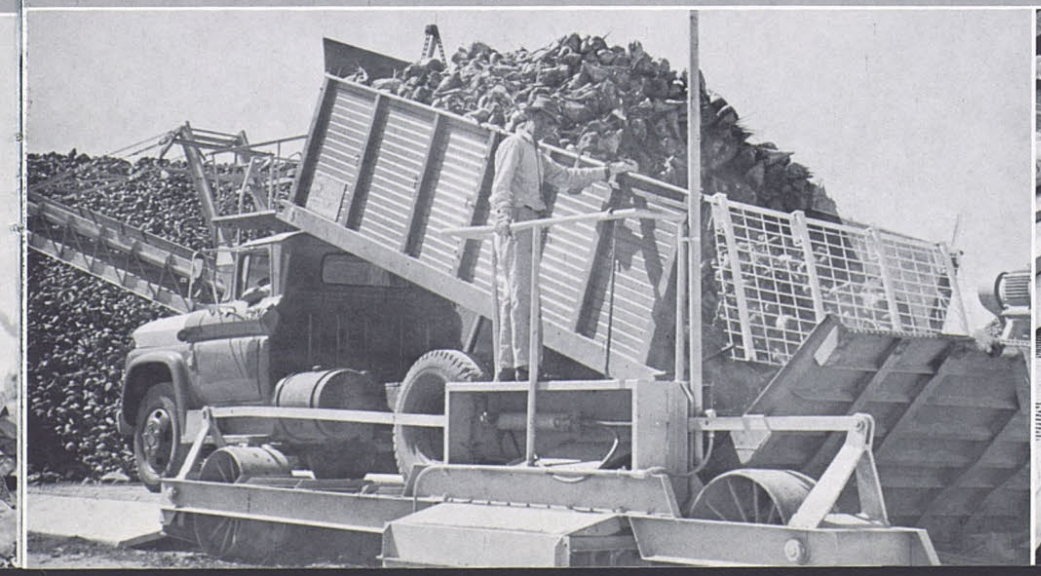
The food picture in the United States has recently undergone drastic change, offering further indication of conditions to come. Where only a few months ago surplus grain and other foodstuffs bulged warehouses practically to the bursting point, almost-empty bins now stand. Increased exports to foreign countries and heavy domestic consumption of grain through livestock feeding combined to deplete the country's surplus food much sooner than had been anticipated.

Yesterday's surplus thus may have become tomorrow's shortage.

While none can predict with certainty the extent of future U. S. food exportations, estimates hint that foreign markets, now taking food from one of four U. S. acres, will take the production of one-third more 10 years from now. It also has been estimated that the United States will be exporting as much wheat 10 years hence as it now produces in a single year.

Fortunately, the farmer in America hasn't been asleep to the problem he faces. He has, over the past several years, adopted new and improved methods of

can farmer. This truckload of beets, second from right, is being dumped at a sugar refinery in the Texas Panhandle. • Poultry farming also has gone mechanized and "gathering the eggs" has taken on a new twist recently. At right, a poultry farmer gathers the day's produce from caged layers while seated comfortably on a mechanized cart as he drives down a central aisle in the building.



Sheep, left, are one of the few farm crops that provide both food and fiber for the farmer's income. • America has become known as a nation of beef eaters and scenes like this, second from left, are becoming more prevalent throughout the nation. This feed lot in which thousands of cattle are fed annually is in the Texas Panhandle. • The sale of feeder stock has become extremely important in cattle country and this scene, center, is typical at Amarillo, Texas, home of the world's largest livestock auction. • Dairying long has

operation. From the days of "10 acres and a mule" when he fed himself and six others, he has progressed to more streamlined mechanical farming methods that now allow him to feed himself and 35 others.

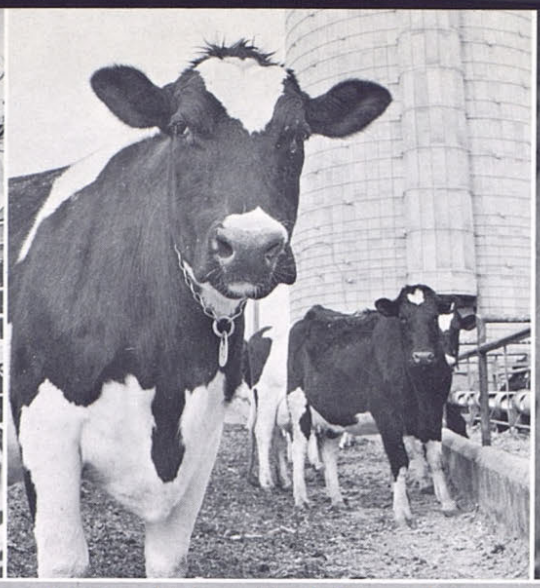
Still greater heights of efficiency in farm operations are forecast for the future. The use of push-buttons and computers will foreseeably boost the farmer's individual output and allow even more foodstuffs to be produced by fewer workers. The need for such change is apparent in light of the steady decrease in the number of farmers – 3,280,000 today compared to 5,871,000 only 20 years ago.

Much of this reduction has come about through the elimination of small inefficient farms, either forced out of business or consolidated into larger and more profitable units. These larger farms, comprising four percent of the U. S. total, produced 40 percent of the country's agricultural output in 1964.

But the size of the farm, in reality, is of little concern in the overall problem of feeding the world's masses. The big challenge facing the farmer is to devise means of producing more food on the same amount of land.

To meet this challenge, the farmer has turned to more extensive utilization of agricultural research and technology. Years of careful study and planning have resulted in vastly improved breeds of livestock that reach marketing weight faster and more economically. Careful crossbreeding of plants has produced higher-yielding crop varieties, often doubling the per-acre out-

Many farms, especially in those areas where irrigation is available, are used exclusively for the production of vegetables such as are seen in these photos taken near Hereford, Texas. At left, a truckload of potatoes is dumped at a processing plant where they will be washed, sacked and shipped to markets throughout the nation. • This field hand, second from left, snips the tops from turnips as the



been one of the important phases of food production and herds like this, second from right, near Canyon, Texas, produce millions of gallons of milk and dairy products annually. • Though only three days old, this litter of piglets hovered under a heat lamp, right, will be ready for market in something like six months or less at weights of around 200 pounds each. The production of pork has become an important economic factor to farmers in the nation's Corn Belt who market a high percentage of the pork raised in the U. S.

put for the same crop a few years earlier.

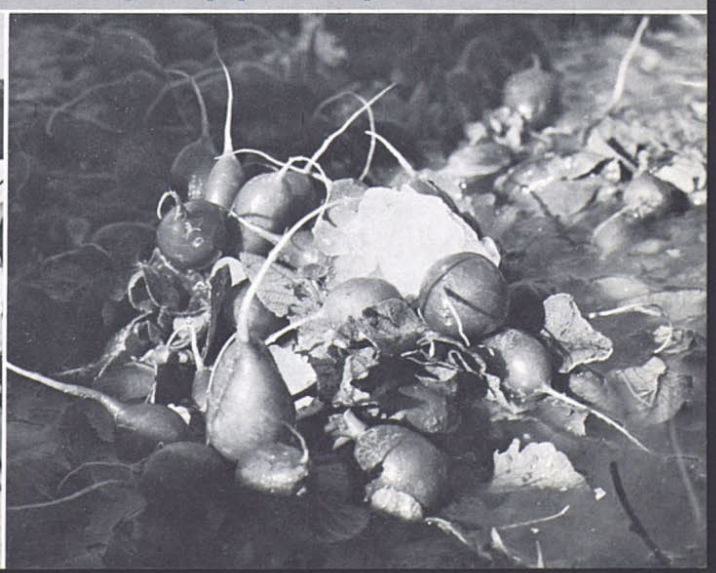
The use of chemical fertilizers, perfected by research and study, has doubled in the past eight years and is expected to double again in the next decade. And more effective chemicals to control weeds and pests have added considerably to crop yields.

Research also has played an important part in the development of more efficient farm equipment. Mechanical horsepower has all but replaced animated horse power on the American farm scene, and new tools are being developed constantly to make the farmer's task easier and his efforts more productive.

It often has been said that the farmer is the world's biggest gambler. He must contend with weather problems, price variations, unsteady product demands, and other whims of the market. But despite the odds against him, the American farmer has managed to provide a heaping bread basket for this nation and much of the world. At the same time, he has kept pace with progress and geared his operations to meet the challenge of feeding a great many more.

Farmers in the United States cannot, of course, feed the entire world. But if the past is used as a criterion for the future, he will carry a major portion of that burden.

crop is gathered for market. • Another important vegetable crop is cabbage, shown third from left. • A head of cauliflower, third from right, gets careful scrutiny before it is gathered for marketing. • Mechanization plays a vital role in harvesting many vegetable crops such as this sorting machine for tomatoes, second from right. • Radishes, packed in ice at right, are prepared for shipment.



RESEARCH ON THE

FARM

Until a relatively few years ago, the only hybrid found on most American farms was a long-eared, stubborn-but-sturdy critter known as a mule. Now, thanks to agricultural research and the progress it has fostered, "hybrids" have wrought a vast change to the entire farm picture.

Hybrids have been developed through careful crossbreeding in crops and livestock, resulting in far greater yields of edible foodstocks and a substantial upgrading of the farmer's economic standard.

Progress was slow in the early days of the mule, but with this cross between a horse and a donkey, man could cultivate a small tract of land and comfortably feed himself and six other people. But as the country grew and its population increased, the need for more food grew accordingly. The farmer soon was forced to feed more than the "six others."

Obviously, a change was needed in his mode of operations. Mechanized power was introduced and more land was put to the plow, enabling the farmer to temporarily keep pace with the increased demand for his products.

Eventually, the amount of available land for cultivation became constant while the population continued its steady increase, creating an even greater demand on the country's food supply. With this situation, a need for greater per-acre production became apparent.

The farmer turned to the scientist and farm research was born.

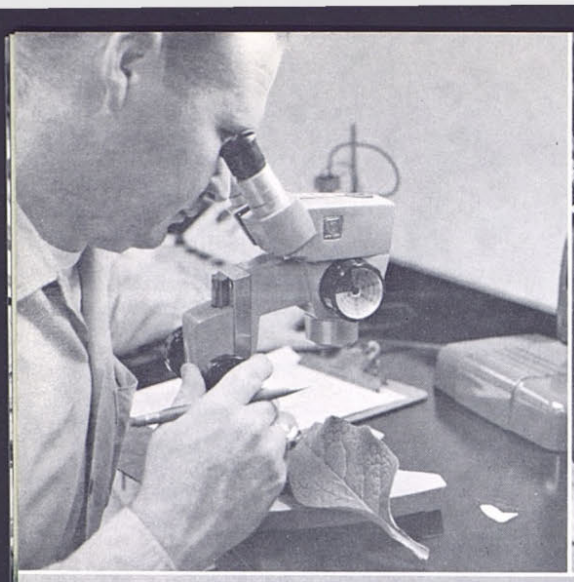
In the past several years, farm research has resulted in a tremendous increase in food production. By careful crossbreeding, new strains of crops and livestock have been developed. Hybrid crops have become as much an integral part of the American farm scene as the hybrid mule once had been.

Farm research has not stopped with the development of new crop varieties. It constantly is being pursued and is being carried into practically every phase of agricultural operations.

State land grant colleges have permitted an extensive pursuit of agricultural knowledge for both student and research technician. Thousands of private research organizations have been endowed to study farm problems throughout the nation, and help to increase the yield of farm commodities.

A typical example of such private organization is High Plains Research Foundation at Halfway, Texas, on the great South Plains. Born in late 1956, it has matured into an established institution serving the needs of farmers in a vast area of the Southwest.

High Plains Research Foundation maintains a complete independence from federal or state agricultural organizations and is governed and financed by the individuals it serves. It is mentioned here strictly as an example of the thousands of similar research organiza-



Much of the research work at High Plains Research Foundation near Halfway, Texas, is performed in the laboratory. Above at left, Lloyd Langford, associate agronomist, studies a leaf from a forage plant. • By the use of automatic thermisters (measuring and recording equipment for air and soil temperature), second from left, research was conducted at HPRF to determine the influence of planting and watering practices on cotton in respect to width of rows and its proximity to other crops. • Recharge of irrigation wells from playa

tions operating in the nation today.

"We're here to supplement and complement other basic research organizations," said Dr. Tom Longnecker, director of the Foundation. "We're not in competition with Texas A&M, Texas Tech or any other school or research group."

Actually, High Plains Research Foundation was formed by a group of farmers and businessmen who sought more information on crops, soil and water conservation, fertilizer use, and cultural practices. Toward those goals, it lists four specific purposes:

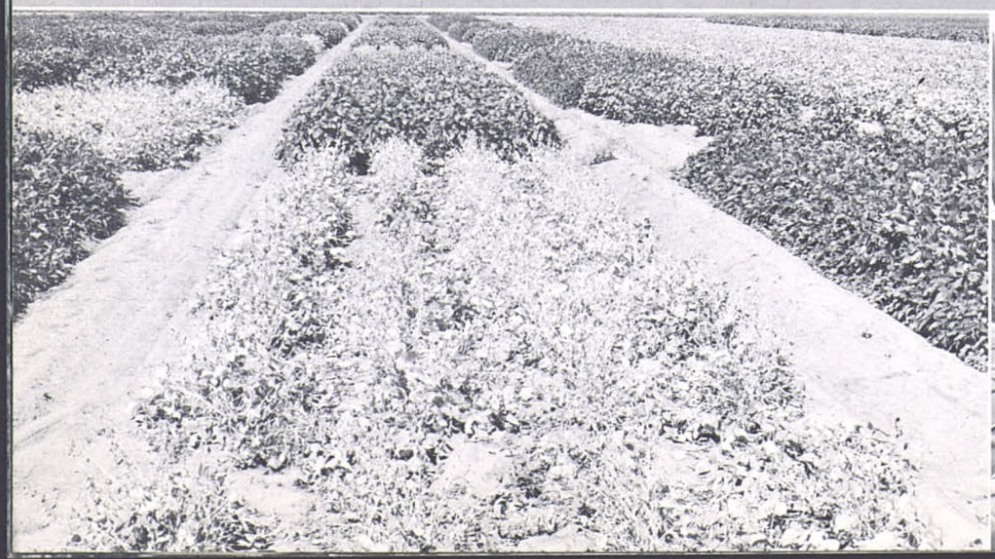
- To increase the efficiency of production of existing crops through variety and strain testing, fertilizer use, and cultural practices.
- To evaluate and develop new crops that can be used to strengthen the agricultural and industrial economy of the High Plains and West Texas.
- To conserve soil and water through the recharging of surface water and development of sound conservation practices.
- To determine more efficient methods of soil and water management.

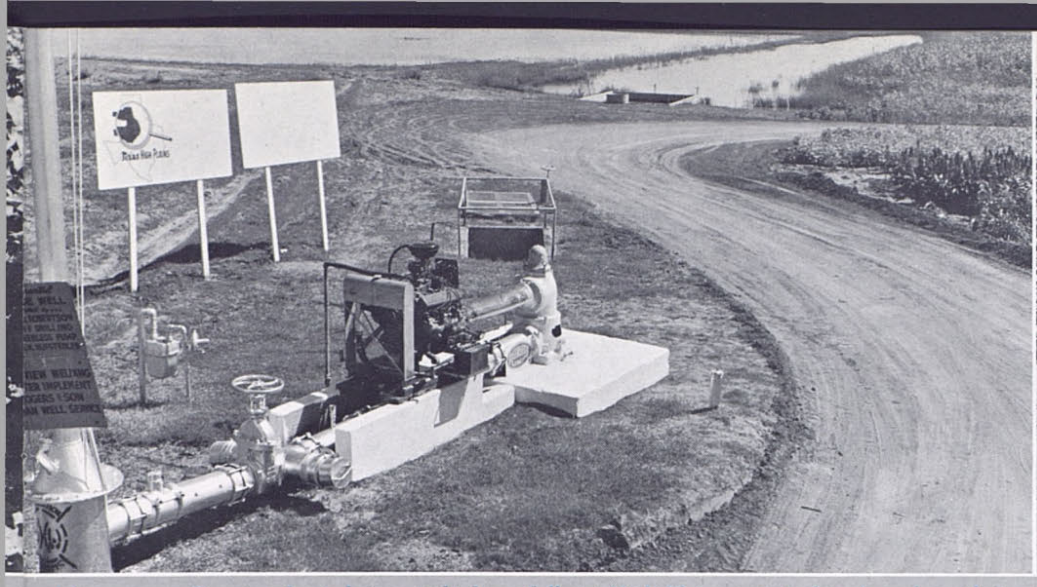
In the 10 years of its existence, the High Plains Research Foundation has made gigantic strides toward upgrading the agricultural economy of the South Plains area of Texas and a great many Southwest farmers have seen their production – and thus their income – increase immeasurably as a result of research conducted by the Foundation.

One of its most outstanding accomplishments has been the development of new strains of soybeans, believed by many to be the coming crop for the High Plains. Two of these new varieties have been released by the Foundation and are being raised by numerous area farmers.

The soybean breeding program was initiated at the Foundation in 1957 for the purpose of developing higher-yielding beans adaptable to local soil and climate conditions. Seven years later – in 1964 – the first new variety was released, known as the Hinn bean. This

This soybean test plot, left, reveals the different stages of maturity for the several varieties. The beans in the foreground are near harvest stage while others remain green and several weeks from harvest. • Trace elements of fertilizer ingredients are observed in





lakes or run-off water also is being studied carefully at High Plains Research Foundation, as shown in second photo from right. • Extensive tests also are conducted on forage sorghums from which ensilage is made for feeding beef and dairy cattle. At far right is a test plot of sorghums being tested at High Plains Research Foundation, showing the varied heights and growth of the crop. Study is also conducted on sunflowers, sesame, castor beans, various grasses and numerous other plants at the research center's farm in Texas.

new variety was bred as a full-season crop, requiring about 155 days from planting to maturity.

In contrast, the second variety, released in 1966 and known as the Patterson bean, has been bred to mature in 105 days from planting, nearly two months quicker than the Hinn. This feature makes the Patterson soybean particularly beneficial to the farmer whose grain sorghum or cotton crop has been damaged or ruined by hail. Because of its early maturing characteristic, it may be planted behind these damaged crops and still allow the farmer to realize an income from the land.

The Patterson also affords the farmer an opportunity to follow up his wheat harvest with a quick-maturing crop, thus increasing his per-acre income even more.

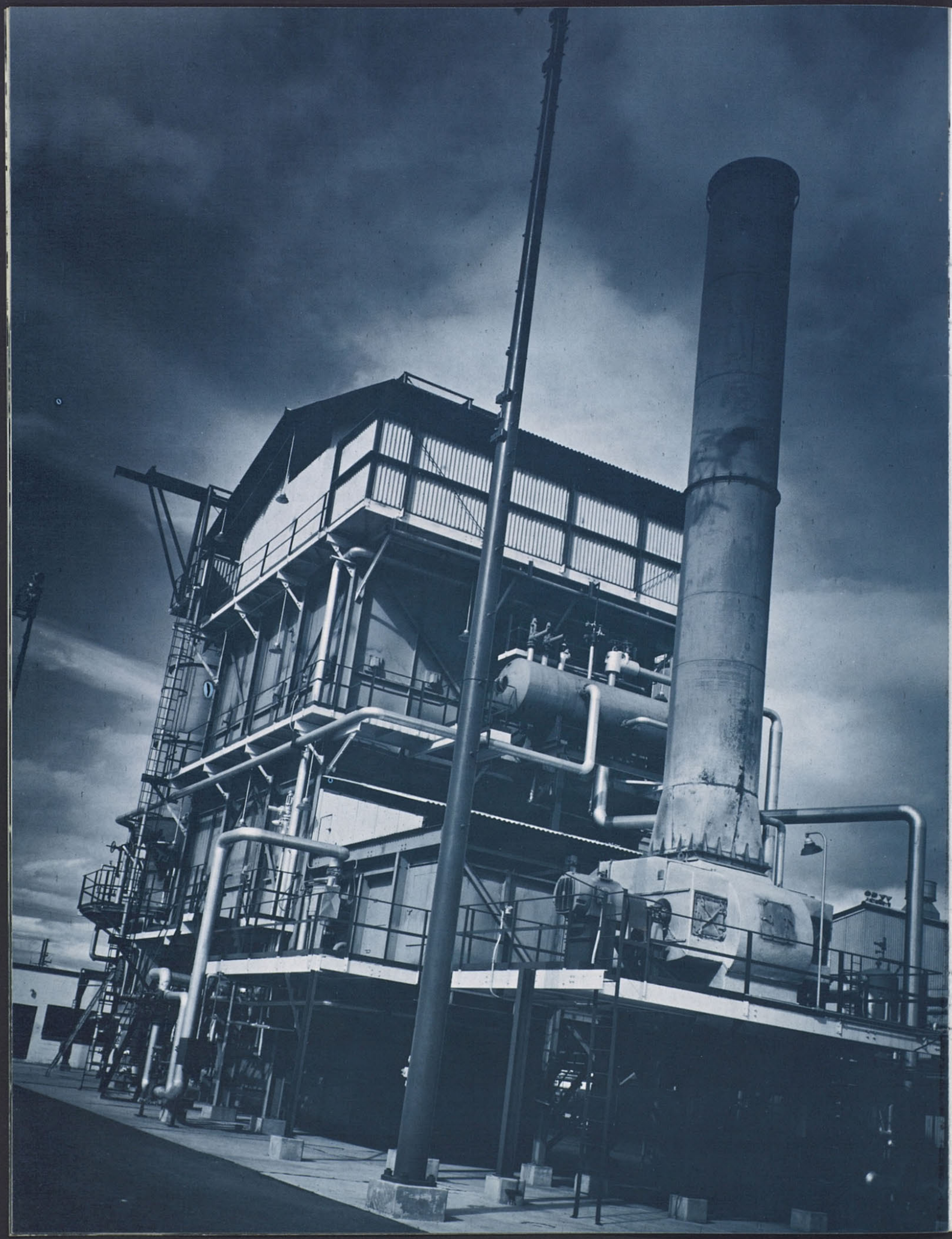
The soybean study is but a small example of the overall research program at the Foundation. Studies are going on constantly on various other crops such as wheat, grain sorghums, castorbeans, barley, sesame, cotton and sunflowers. Water and its proper application to all crops is studied carefully and data disseminated to irrigation farmers throughout the area.

Study also is being conducted on the effects of fertilizers on various crops, spacing and inter-planting of various crops, and the conservation of water and soil through bench levelling and contouring. Information garnered from these studies has proven invaluable in boosting the economic level of both farmers and agribusinessmen in the surrounding area.

The role played by the High Plains Research Foundation in the nation's agricultural drama may seem relatively insignificant. Yet the Foundation and its thousands of counterparts throughout the nation helps to point up the tremendous importance research plays in the farmer's bid to successfully feed a ballooning world population.

Considerable progress has been realized toward that goal since the day of the lowly mule. The farmer now feeds himself and 35 others. Tomorrow he will be feeding a great many more.

different plants seeded in jars. Langford carefully notes the progress of soybeans, cotton and sorghum plants, center. • Water usage and yield are closely observed in test plots involving contour and bench-level farming for cotton and sorghum as seen at right.



FERTILIZER

...Key to FOOD PRODUCTION

Fertilizer, probably more than any other single commodity, holds the key to man's problem of producing greater quantities of food for a hungry world. In its use lies much of the answer to the "more per acre" food production so vital to man's survival.

Fertilizer cannot in itself solve all the problems of increased production. Research toward the improvement of crop varieties remains of premier importance. But when properly applied as a supplement to the existing food qualities in the soil, fertilizer becomes a profitable substitute for more land.

Proof of the profitability of fertilizer use is clearly mirrored in U. S. Department of Agriculture figures which show an average return of $3 for each $1 spent for plant food. Even this impressive figure, agricultural authorities claim, can be increased measurably through the practice of better application methods.

Research has revealed that the urgent need for food has created an equally urgent need for nitrogen, phosphate, and potash – the principal ingredients of agricultural fertilizers – as a substitute for land on which to grow crops. Of these ingredients, nitrogen has been in greatest demand, its consumption rising from 398,000 tons in 1940 to an almost-unbelievable 3,847,000 tons by 1963. By 1975, the national consumption of nitrogen is projected at 7,404,000 tons.

To meet this demand, more than 100 ammonia plants for the production of nitrogen have been constructed throughout the nation by various commercial firms. Numerous other plants are in the planning stage. Among these firms with production facilities is The Shamrock Oil and Gas Corporation of Amarillo, Texas.

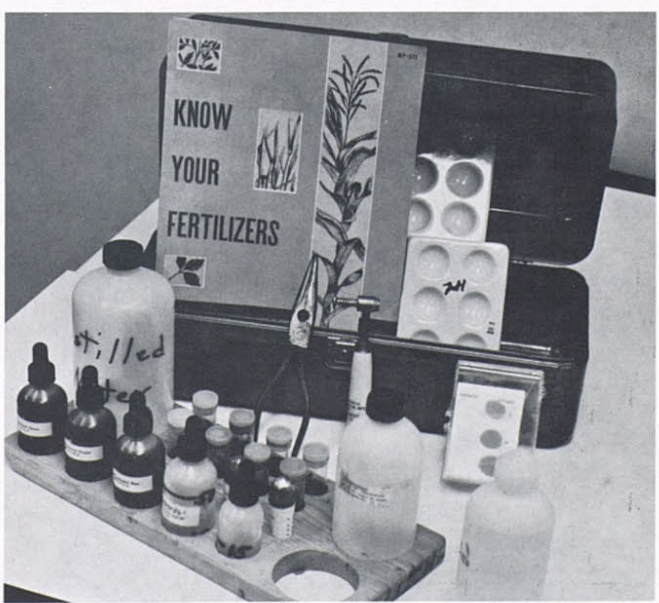
Shamrock, a wholly integrated firm engaged in the production, manufacturing, and marketing of refined petroleum products since 1929, entered the fertilizer production business in the spring of 1962 when it marketed its first anhydrous ammonia under the tradename Nitromite. In the fall of 1963, Shamrock's anhydrous ammonia plant went "on stream," was later enlarged, then doubled in capacity in late 1966 as the demand for its product continued to mount.

The company's entry into the fertilizer business was decided upon for several reasons. Primarily, the company's manufacturing facilities in the Texas Panhandle rest atop one of the free world's largest known natural gas fields, assuring easy accessibility to an abundant supply of the basic material for ammonia.

Secondly, the rich farmlands of Texas' North Plains provided a ready market for fertilizer after Shamrock first opened the gates to extensive irrigation by supplying inexpensive natural gas as fuel to power irrigation pumps. In natural gas and anhydrous ammonia, Shamrock saw ideal companion products to boost the stock of agriculture in the area.

As an integrated petroleum firm, Shamrock also is in a position to furnish farmers in its marketing area with other farm supplies including gasoline, diesel fuels, LP gas and lubricants.

Emerald Gas Corporation was formed early in 1962 as a subsidiary of Shamrock to administer the natural-gas-for-irrigation program. In the five years since Shamrock introduced the inexpensive fuel, irrigation wells on the North Plains have increased from 1,000 to nearly 3,800. Real estate values have soared in the area and farmers are realizing greatly increased yields.



Shamrock's field representatives use kits such as this in analyzing soils and helping farmers to make decisions as to the proper fertilizer to use.

Shamrock's anhydrous ammonia plant near Dumas, Texas, produces liquid fertilizer for farm use.

It was known by the farmers that sufficient quantities of water to provide ample irrigation existed beneath the surface. But because of its extreme depths, the cost of pumping with other fuels tended to make irrigation on a large scale somewhat prohibitive.

Shamrock's fertilizer marketing operations have in no way been limited to the North Plains area of the Texas Panhandle. Outlets for anhydrous ammonia have been established in various other areas of Texas and in rich agricultural sections of New Mexico, Oklahoma, Colorado, Kansas, Nebraska, South Dakota, Iowa, Missouri and Illinois.

Shamrock recently expanded its fertilizer marketing operations to include dry nutrients as companion products for anhydrous ammonia. Varied analyses of phosphate and potash fertilizers are being made available in bulk form through dry storage outlet facilities in the company's marketing territory.

Equally as important to the farmer as a ready and dependable supply of fertilizer is an effective educational program for assuring its proper application. Soil fertility tests must be made and the proper fertilizer analysis determined. Also, the correct rate of application must be decided as well as the proper time and method of application.

Shamrock has included these services in its fertilizer

marketing program and provides farmers with authoritative information concerning research discoveries and recommendations. Its field men spend countless hours counselling with fertilizer customers and helping to solve their various farm problems.

Shamrock realizes the necessity of a continued program of research and study as a solution to the food shortage problem. More and better fertilizer must be produced if the farmer is to produce more food.

Right now, it's the farmer's ace-in-the-hole.

The farmer above fills a field applicator with anhydrous ammonia from a nurse tank in the background. Nitromite is Shamrock's tradename for its anhydrous ammonia.

the SHAMROCK

"Dedicated to the Progress of the Great Southwest and Rocky Mountain Area."

COVER STORY

In the rich soils of the world – and the dedicated men who cultivate them – lie the hopes for human survival from eventual starvation. Man with his ingenious technical knowledge can plant the seed and work the soil, but only the land can give forth the substance to feed a growing world population. An example of man's genius is shown on the cover in a two-way moldboard plow being used to turn the soil of a Texas Panhandle field.

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Cover by THE SHAMROCK staff. Photos top left page 4, top left and top center, page 5, Bill Weaks; photos bottom center page 4, bottom left page 5, top right and bottom page 6, and page 7, Hereford Brand; photo bottom left page 5, Extension Service; photos bottom right page 5, top left page 6, Potter County Agriculture Agent; photo page 12, Jack Laws. All others staff photos.

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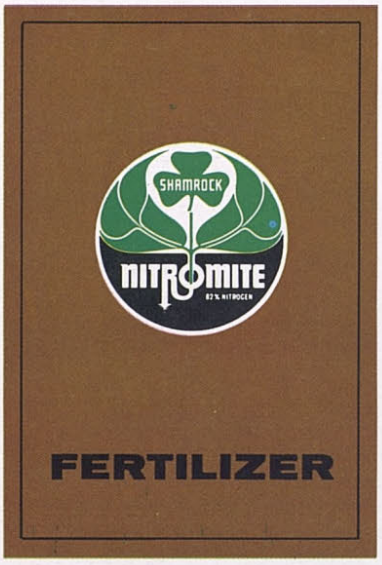
SHAMROCK

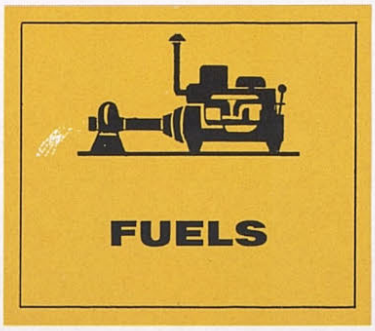
with an eye on the future

PRODUCTS FOR AGRICULTURE

Shamrock quality is now at work on more farms, doing more jobs than ever before. Here are just a few of the Shamrock products helping to make the farmer's job easier and more profitable.



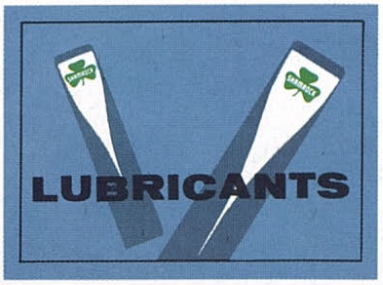
Nitrogen is the nutrient plants must have in the largest volume. Nitromite, Shamrock's fine brand of anhydrous ammonia, is 82% nitrogen. Anhydrous ammonia has by far the most favorable cost per unit of nitrogen and furnishes the nitrogen in the form most easily converted to crop use. It is applied directly into the root zone and will remain there until used by a plant. These characteristics allow great latitude in application. It is ideally suited for pre-plant, side-dress and plowdown application. Distribution of Shamrock's Nitromite is from Iowa and South Dakota south through Texas and New Mexico. Expanding rapidly through Nitromite dealers, is Shamrock's Dry Fertilizer Program. Shamrock Dry Fertilizer is adapted to suit a wide variety of crops and soil conditions.



In addition to our fine gasolines, CLOUD MASTER and TRAIL MASTER, Shamrock manufacturers, processes and distributes through dealers a variety of fuels enabling us to supply the farmers' total fuel requirement.

EMERALD GAS CORPORATION, a Shamrock subsidiary, provides natural gas for irrigation engines to Texas farmers in Moore, Sherman, Northwest Hutchinson, Ochiltree and Lipscomb counties. Since natural gas is by far the most economical fuel, and since an unlimited supply is always available right at the engine, Emerald gas is the ideal fuel for irrigation. Another important fuel is Shamrock DIESEL used in trucks, tractors and other heavy engines.

Our highly rated HD-5 PROPANE liquified petroleum gas assures consistent 110 octane to deliver smooth, knock-free power in all LP gas tractors. It provides a premium fuel at regular fuel prices. Shamrock LP-Gas is, of course, well known as an economical, clean burning fuel for home heating and cooking away from the gas mains.



The oils and lubricants used on farm machinery are, of course, just as important as fuel. Here too, Shamrock can supply the farmer's total requirement. Shamrock's family of fine motor oils, from ECO-LUBE to EQUA-FLOW have many farm applications. Some of the special products for farm use are: TURBINE OIL—developed primarily for drip oil in irrigation wells, this light bodied, straight mineral product will lubricate to the bottom of the well, summer and winter, leaving no oily film on the water being pumped; GEAR HEAD OIL — especially refined and processed for irrigation well gear heads, it resists oxidation and corrosion without foaming . . . its -30°F pour works well year round. A number of SHAMROCK GREASES for farm use are now packaged in cartridges called Load-A-Matic Tubes which are the most modern, clean and economical method of hand application. These include: SHAMROCK MULTI-LUBE LITHIUM LUBRICANT — a 1½ grade, all-purpose, all season product for general farm use . . . low temperature pumpability, yet has a minimum dropping point of 350°F; SHAMROCK PIXIE GREASE — a heavy duty, calcium base, multi-purpose lubricant for trucks, tractors and machinery . . . especially adapted for lubrication of tail bearings and universal joints on stationary engines; SHAMROCK VALLEY LUBE — for working parts subjected to excessive amounts of water, like the bearings of Valley sprinkler irrigation systems . . . unaffected by hot or cold weather.

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