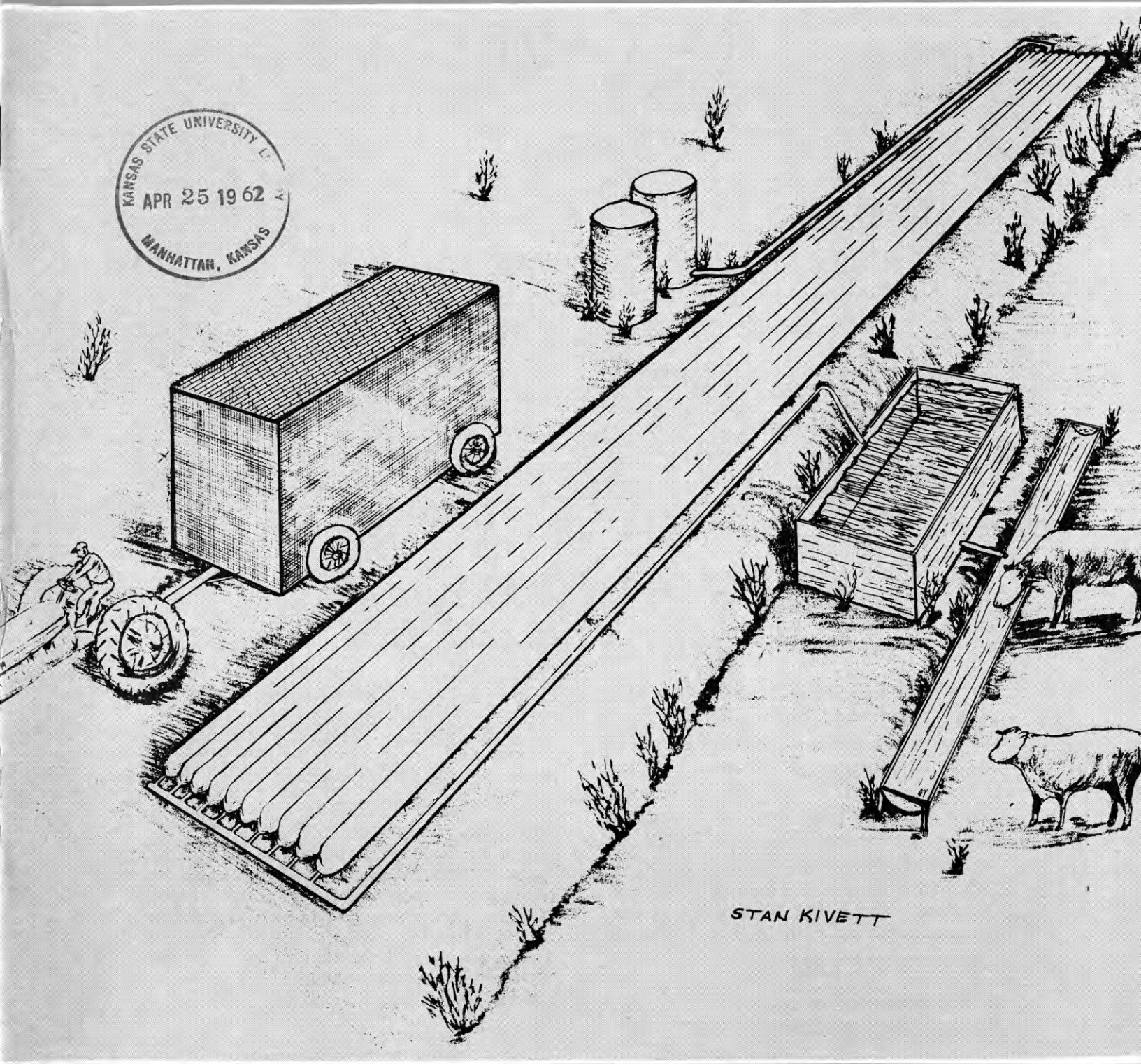
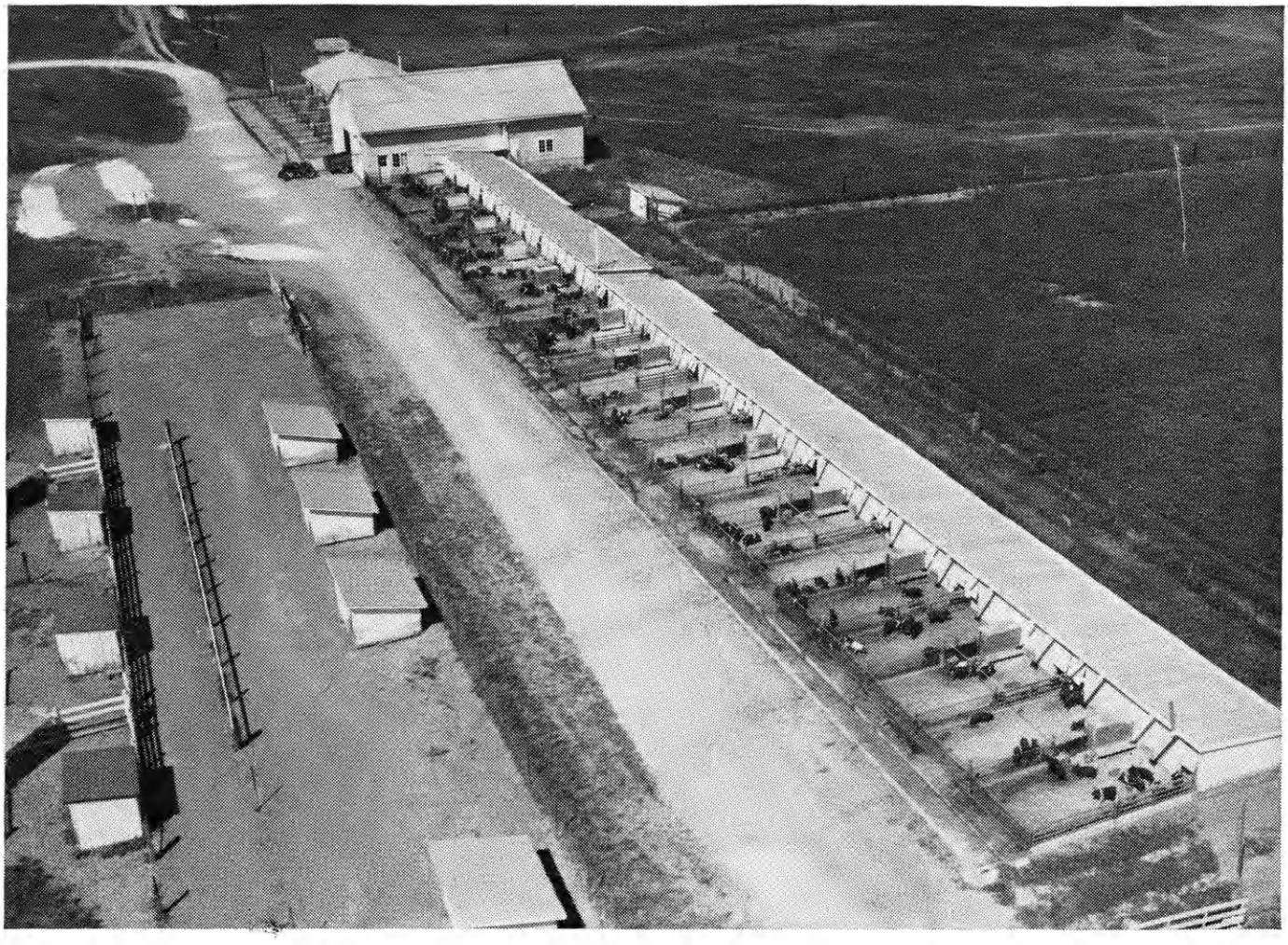
KANSAS STATE UNIVERSITY

AG STUDENT

APRIL 1962



Water From Air . . . page 10



A two-block-long yardstick for measuring cost of production

Only $5.50 to $6.00 worth of MoorMan's Mintrates* and about 9 bushels of corn will make a 200-pound hog. This low-cost pork production is no accident. It's a result of MoorMan's continuous Swine Research Program. Last year alone, tests with over 2,000 hogs were conducted on MoorMan's three Research Farms totaling 1280 acres. Here, effects of ingredients from vitamin A to tranquilizers were measured for effectiveness in producing faster, lower cost gains.

The result—better use of home-grown feeds

The low cost of production with MoorMan's Mintrates has been made possible through research and testing such as this. Mintrates are super-concentrates of vitamins, minerals and proteins. MoorMan's belief is that a farmer need buy only what he cannot raise or process on his farm. Mintrates, when fed with home-grown grains and forages, supply the nutrients needed to help livestock get more of the meat, bone and milk-producing energy out of that feed.

MoorMan's sponsors University research

MoorMan research is aimed at the profitable *feeding* of livestock and poultry. But, the *breeding* of better animals cannot be overlooked. Realizing this—MoorMan's makes grants to a number of colleges and universities for needed research on specialized problems of animal breeding as well as feeding. The results will, of course, be made public, for the benefit of all livestock breeders and feeders.

MoorMan's*

Since 1885

Good Results Through Research and Service

MOORMAN MFG. CO., QUINCY, ILL.

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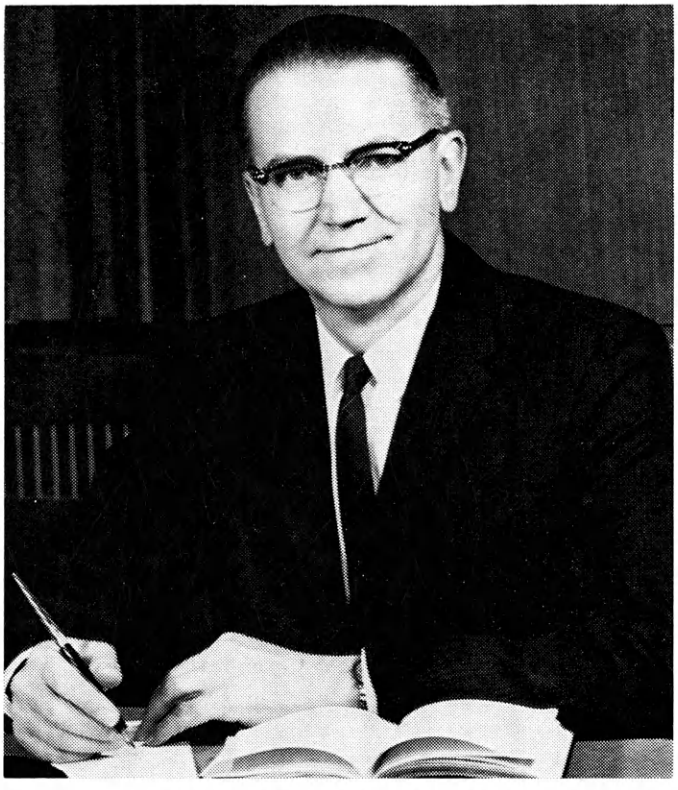

Dr. Glenn H. Beck, Dean of Agriculture

From the Dean's Office

RECENTLY I returned from a trip to India where I reviewed the Kansas State University educational assistance program. This program is designed primarily to increase food production in India and improve rural living. It is supported almost entirely by foreign currency made available through Public Law 480.

One of the important features is a graduate training program for Indian students. Each year a carefully selected group is brought over for a year's training period at Kansas State University. We have now trained 72 under this program, and have 15 more on the campus this year. Visiting with these returned students in India, I observed a great deal of enthusiasm for K-State. As these scientists and teachers assume positions of leadership in India, I am sure there will be substantial benefits to Indian agriculture.

In addition to this phase of the program, we send some of our own staff members to India for periods of two years. They are providing technical assistance to Indian universities and governmental agencies working in the fields of agriculture, home economics and veterinary medicine. Also, we have sent farm equipment, scientific equipment and library books to India.

The program has been under way about five years and is beginning to show effects. Much remains to be done, however, because India is faced with many complex problems. Her 450,000,000 population, which is still increasing rapidly, creates a tremendous demand for food. More than half of the Indian population is on a sub-nutritional level. They are particularly deficient in protein. This problem is made worse by dietary habits that exclude meat and most animal products.

Potentially, India has the climate, enough good land, and irrigation water available to produce most of her food if the right farming methods are adopted. Her greatest need is a mass education program for a population that is 80 to 90 per cent illiterate. I came away from India feeling that our educational effort is urgently needed, and there are many indications that it is beginning to produce favorable results.

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Vol. XXXVIII April 1962 No. 5

In This Issue

COVER: This month's cover picture is an artist's conception of a mobile water absorption unit located on a pasture site. Stan Kivett, landscape architecture student at Kansas State, made the original drawing.

PHOTO CREDITS: Rick Solberg, 6, 12, 14; Owen Brewer, 8, 9; Marcellus Gilmer, 13.

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Editorial . . .

FOREIGN trade agreements with European Common Market countries are important to United States agriculture, and especially important to Kansas farmers.

Six European countries—France, West Germany, Italy, Holland, Belgium and Luxemburg—make up the Common Market. Last year these countries bought about 25 per cent of all U.S. agricultural exports.

These countries, known as the European Economic Community, have joined together to promote economic development in their own countries. They have agreed to set tariffs at the same level in each country, and to gradually remove all tariffs and other trade restrictions among them.

The Common Market is an important agricultural producing area. Member countries are also among the world's largest importers. Agricultural production in France, for example, meets her domestic needs; consequently France uses a high tariff to protect her domestic agriculture. Holland, on the other hand, has a lower tariff on agricultural commodities to stimulate imports of these products. By joining together, Common Market countries expect to have a common agricultural program and similar tariff policies. Their goal in wheat production, for example, is to be 99 per cent self-sufficient by 1965. This will mean less importation of wheat and a high protective tariff on agricultural products.

The six Common Market countries represent the world's largest market for agricultural goods. The United States alone ships two billion dollars worth of farm goods to Common Market countries every year.

Loss of these countries as importers of agricultural products would have serious effects on our domestic agriculture. But we do have bargaining power with the Common Market countries. They need outside markets for their rapidly expanding industrial producers, and we could supply part of that market by lowering our tariffs on industrial goods. They, in turn, would need to lower tariffs on agricultural commodities.

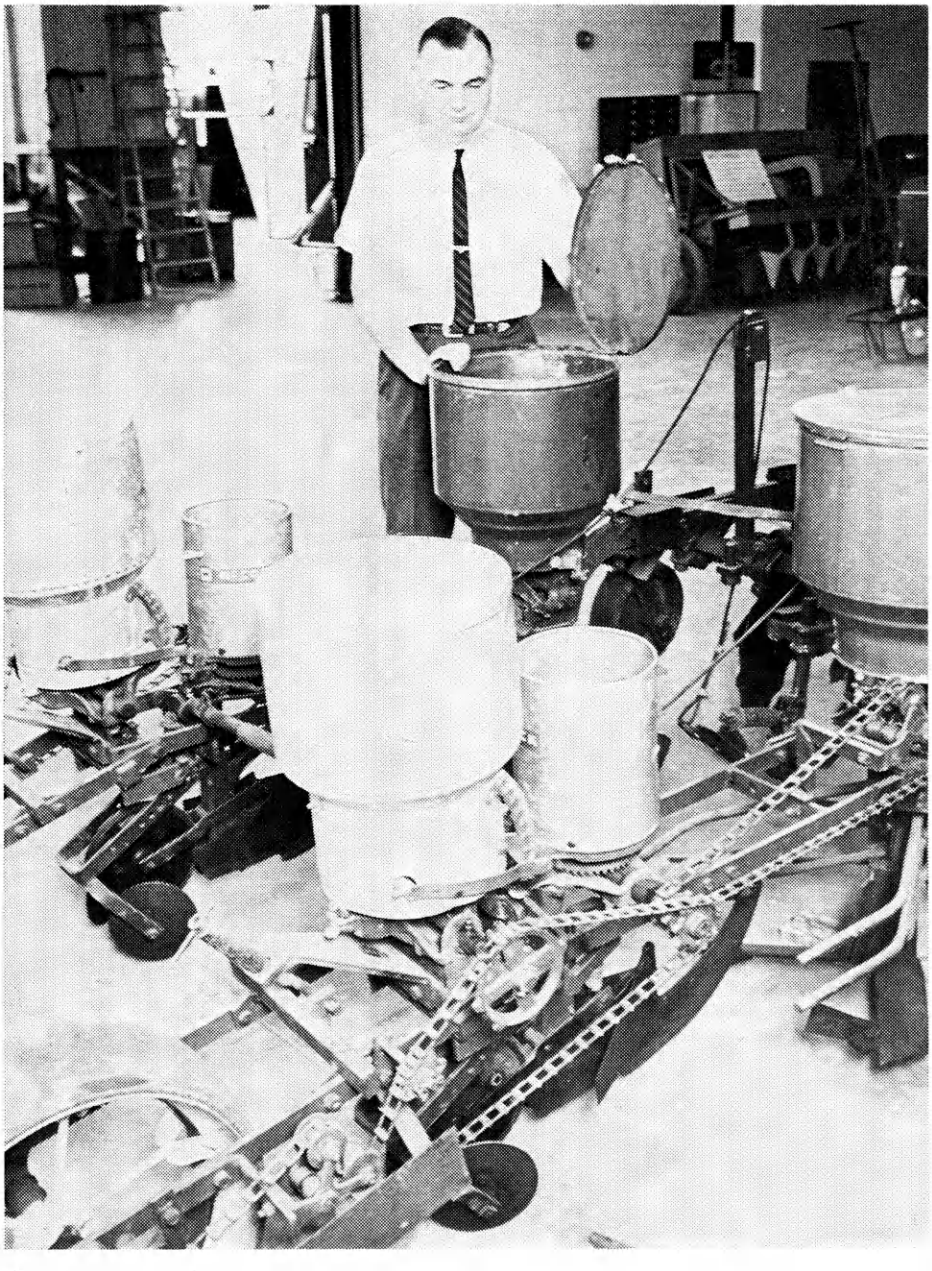
Opposition to such a trade agreement may come from U.S. business and industry. U.S. industries receive 8 per cent of their marketing income from foreign trade while 13 per cent of farm marketing income is derived from foreign trade. Foreign trade is more important to agriculture than to industry. Industry would also be challenged from competition due to increased imports of foreign industrial products if favorable agricultural trade agreements can be reached.

Kansas farmers have a stake in foreign trade agreements. A total of $204.2 million worth of wheat, grain sorghums, soybeans, and livestock products were sold on the export market by Kansas farmers in the 1960-61 fiscal year. As a producer of exportable farm products, you can well afford to keep an open ear to trade negotiation developments!

Ken Hofmeyer

New Implement

Combines Planting Operations



by Gordon Bieberle

THE TILL planter, a new corn and sorghum tillage implement, has been developed at Kansas State University. It is designed to reduce field operations from four or five to two or possibly one operation.

The till planter, a two-row, mounted implement, is capable of performing the preparation, fertilization, and planting operations in one operation. It is designed to leave most of the weed and crop residue from the previous crop on or near the surface of the ground. This helps prevent wind and water erosion and increases the intake and retention of rainfall on your land.

G. E. Fairbanks, professor of agricultural engineering, describes the implement like this: "The tillage unit of the till planter consists of two V-shaped sweeps and four spider sec-

G. E. Fairbanks, professor of agricultural engineering and designer of the till planter, explains that ground is worked with V-shaped sweeps and rotary hoe spider sections. Fertilizer attachments are located on tiller and above planting units.

tions of a rotary hoe per row. The top sweep is a yard wide and operates from two to four inches below the ground surface, just low enough to cut roots of weeds which have started. The bottom sweep is 18 inches wide and is mounted 14 inches to the rear and about six inches below the top sweep.

"The bottom sweep thoroughly works the root zone soil. The rotary hoe section is mounted immediately behind the sweeps. The rotary hoe spiders rotate in reverse direction. This treads and firms the soil loosened by the sweeps. Two of the rotary hoe spiders in each unit of four also drive a chain sprocket which provides power to operate a fertilizer unit for each row. Fertilizer from this unit is deposited at the depth of the lower sweep which will normally be six to eight inches below ground surface."

The planting unit, which is mounted to the rear of the till planter, is made up of a runner-type opener with a split boot for placing starter fertilizer. Two small disks mounted behind each furrow opener help cover the seed. Two wheels, which support the rear of the planting unit, pack the soil around the seed and drive the seed and starter fertilizer metering devices.

When research at K-State was first started on this project in 1957, the sweeps and fertilizer units of the implement were mounted ahead of the rear wheels of the tractor. The redesigned version of the till planter, which was made in 1959, is in general, better than the original version under Kansas conditions. The sweeps and fertilizer units, originally mounted under the tractor, have been placed on the implement itself.

Professor Fairbanks points out that the present implement is simpler to attach and remove from the tractor. It weighs approximately 700 pounds less than the original planter. The tillage units penetrate better, and the wheels slip less because of better weight distribution and weight transfer. Easier handling of the new machine was accomplished by reducing the weight on the tractor's front wheels.

Controls Weeds Effectively

The till planter was originally designed to do all planting and cultiva-

Continued on page 18

Agribusiness – Opportunities for Farm Youth

by Earl W. Hole

TO A VAST majority of the general public, the word agriculture is synonymous with farming. While farming is an important part of agriculture, it is by no means the only phase of agriculture.

When this nation was born, 170 years ago, agriculture was more or less self-sufficient. More than 80 per cent of the total labor force was engaged in agriculture. The farm family produced most of its own necessities, with only a few items purchased or bartered for. The significant fact is that the farm family performed all the operations of production, storage, and processing of products and family supplies.

New machines were the biggest single thing that led to several changes in the basic patterns.

First, complicated tools and machines could no longer be made or repaired by the farmer in his blacksmith shop.

Second, workers in the non-farm sector of agricultural industry no longer obtained their food and clothing from the farm, but through the markets.

Third, farmers sold an increasing proportion of their farm production to obtain purchasing power to buy new tools and machines, which was the beginning of commercial agriculture as opposed to subsistence farming.

Fourth, as larger and larger quantities of farm products moved into market channels, specialized marketing, processing, and distributing agencies developed. This made it possible for the farmer to become more specialized and have more time to care for livestock and crops.

Increased productivity has led to economic progress, which is a frequently used, but little understood term. Economic progress is the evolutionary process through which mankind learns to produce the necessities of life with less and less labor. This frees manhours for the production of the comforts and luxuries of life and for leisure.

A recent study released by the K.S.U. Department of Economics stated that if the recent trends continue there will be a reduction of 20 per cent in the number of farms from 1955 to 1965. Assuming average mortality among those farming in 1955, retirement at the age of 65, and none leaving the farm for other reasons, there will be room for only 7,000 new openings on farms in Kansas by 1965. There will be 41,000 farm boys reaching the age of 21 between 1955 and 1965. This means that for every 100 boys who start farming, 500 will need to find employment elsewhere. There are some assumptions in this statement; however, it is accurate enough to point out the limited opportunities in farming.

What about these 500 boys who cannot return to the farm? Are they aware of the limited opportunities to enter farming? Do they know of the opportunities in other fields? The processing and storing of farm products and producing farm and family supplies have been largely taken away from the farmer. What are the opportunities in these off-farm agricultural businesses?

In terms of the labor force for the United States, farming employs eight million people. This makes twice as many job opportunities in agribusiness as in farming.

The businesses that make up the sector of agribusiness are the food and fiber processing, and farm supply industries. According to "Fortune" magazine, the inventory of farm machinery alone was more than the total assets of the American steel industry and five times that of the automobile industry on January 1, 1960.

Agribusiness is suggested as a field for farm boys who cannot find farms to operate, because in agribusiness they will be dealing with farm people and farm products and will have the background and experiences that their city cousins cannot possibly duplicate.

Wheat undergoes selective breeding in a greenhouse laboratory. Bags on grain heads allow scientists to control cross-pollination.

Selective Breeding Improves Crops

by Darrell Garner

"KANSAS WHEAT CROP DOOMED!" "Million Bushel Wheat Loss Expected from New Disease!"

These headlines, of course, aren't authentic, but as a wheat producer, you have no doubt experienced losses similar to the ones predicted in the headlines.

In an effort to prevent such headlines, plant scientists have made tremendous strides in recent years by developing higher yielding varieties that are resistant to disease. Ottawa wheat, for example, has been developed as a strong-strawed wheat that is resistant to leaf rust, stem rust, Hessian fly, and soil-borne mosaic.

It took 15 years of experimenting with different crosses and strains to develop Ottawa wheat. Six different wheat types were used, and if all the parent strains are counted individually there are 19. Three strains were used twice, leaving the parentage of Ottawa to 16 different types of wheat which came from seven regions of the earth. Ottawa inherited some features of each parent and scientists hope it represents a combination of the most desirable features in one variety.

The ancestry of Ottawa dates back to about 1870 when Turkey wheat was introduced into this country. Various crosses were made which resulted in two unnamed types. These types were known only by a number. While they were not good enough to be varieties, their desirable features led researchers to believe a variety could be developed from them.

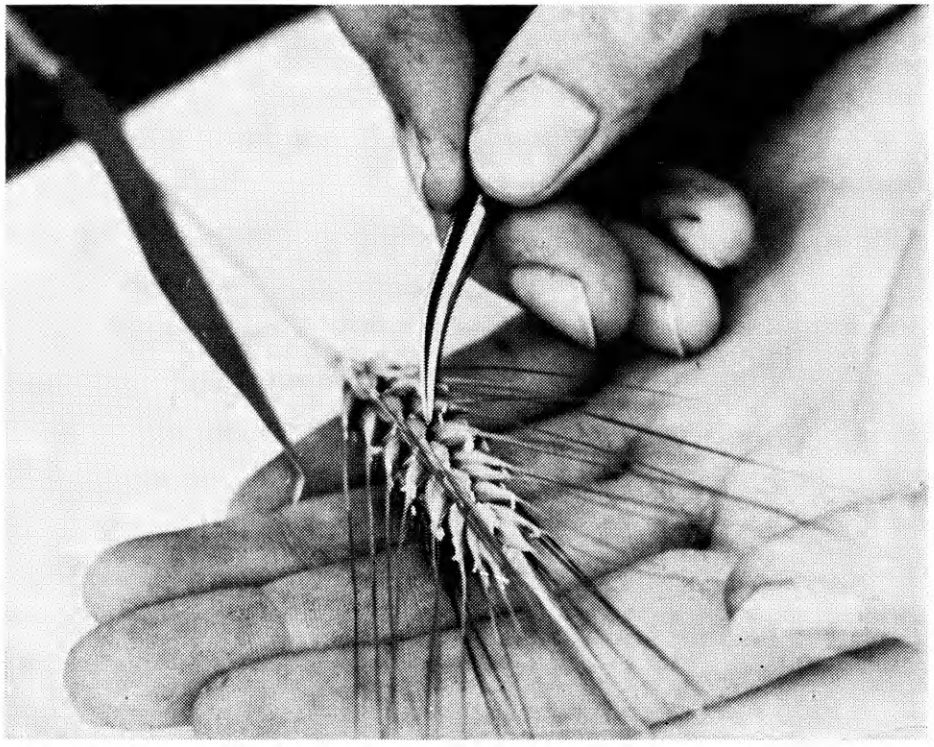
The actual development of Ottawa began in 1943 when these two unnamed types were crossed. However, the first or F_1 generation cannot be called Ottawa. The variety, Ottawa, was only one of many seeds which were planted to obtain the F_2 or second generation. The progeny or offspring of this generation were planted, and by continuing this process for four more generations, about 200 pure lines or types were developed. This six-year period up to 1949 was a selection time in which these lines were tested for disease resistance and quality factors. The best line was selected to increase as a

variety. In this case the line selected was called Ottawa; this was the first time Ottawa was recognized as a variety.

Testing Requires Several Years

After the selection period came a test period. During this time Ottawa was tested for adaptability, yield, disease resistance, and quality. While the testing time is usually three years, it was lengthened to six for Ottawa to see if its quality was acceptable.

Three years were used for increasing the amount of seed. Only then, after 15 years of development, was Ottawa first released. Seed is generally sold first to certified seed producers for increase and then other farmers buy seed from them. From a start in 1943 it is estimated that 30,000 acres are seeded for 1962 production of Ottawa in Kansas. This scheme of development is an example of the length of time and the procedures used before you receive a new variety.

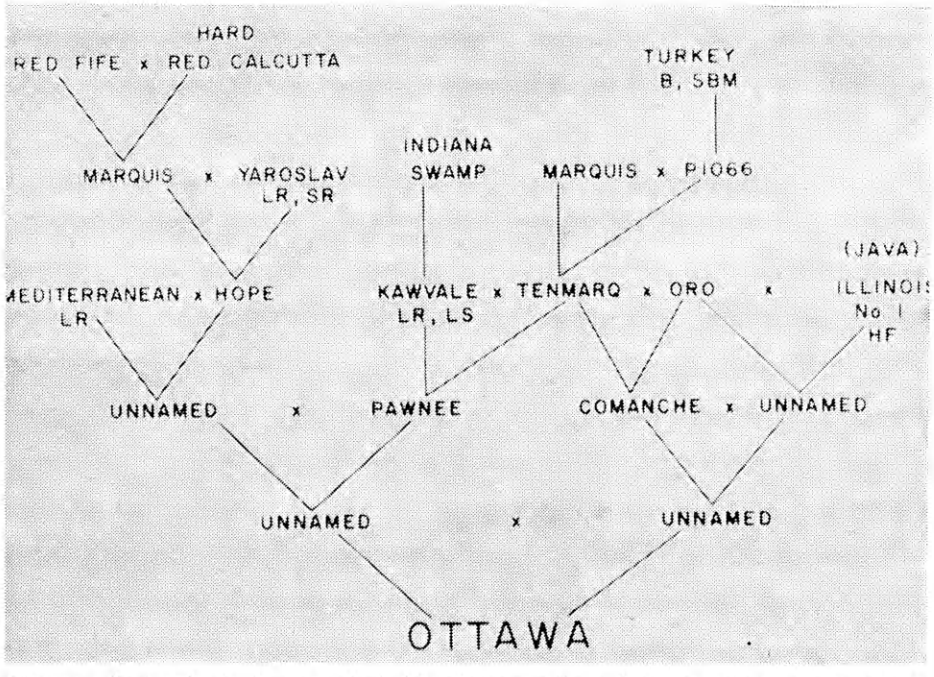


Cross-breeding requires using hand methods to transfer pollen grains from one plant to another. Pollination of this barley head occurred approximately 15 days ago. Remnants of the stamen, the male reproductive flower, are visible at the tips of the kernels.

Plant Breeding Must Continue

You may ask, "With all this surplus, why not stop breeding work for several years until demand catches up with the supply?" The answer is that since work started in 1960 will not produce results until 1975 or 1980, a serious production problem could occur which couldn't be solved in time to prevent serious difficulties.

"Actually, the plant breeder has a difficult job to keep even. As agriculture in an area becomes older, production problems become more numerous and part of these problems can be solved only by breeding." This is a statement by Elmer Heyne, who is in charge of breeding small grains at the Kansas agricultural experiment station. He went on to say, "Nature does not allow a vacuum to form. When a disease-resistant variety is released, it is not long before another form of the disease occurs naturally which can attack this variety. Thus, the breeding program for resistance appears to be a continuous one."



Ottawa wheat inherited many desirable characteristics of its ancestors: resistance to Hessian fly (HF), leaf rust (LR), soil-borne mosaic (SBM), bunt (B), and loose smut (LS).

Producers Realize Benefits

Among the important advances of plant breeders was the development of a sugar beet with enough sugar to be used profitably in a commercial extraction process. The increased production from hybrid corn during W.W. II alone has been valued at two billion dollars, or enough to pay for the development of the atomic bomb. If it were not for advances in wheat breeding throughout the world we would now be suffering from a serious wheat shortage. Flax, sugar cane and cabbage producers in the U.S. have been saved by the development of disease-resistant varieties.

Even with our present surpluses it appears that a longer-living, increasing population will require increased plant production for food and clothing. Plant breeders, in their fight to control disease and produce better varieties, will play a large part in increasing the food supply through development of better varieties.

Mobile Unit Will Tap Atmospheric Moisture

by Paul Vincent

K-State scientists are developing a new process which may reduce dry-land water problems.

THIS country's fresh water supplies are gradually becoming inadequate for the increasing demands of growing populations, expanding industries, and modern agricultural practices.

Government action has stimulated water conservation practices and pollution reforms, and science is seeking new methods to meet our future water needs.

Many scientists are devising methods to recover fresh water from vast ocean reserves. But Prof. Raymond Hall, of the Kansas State Department of Chemical Engineering, is attacking the problem from another angle. In research studies at K-State, Hall and his graduate student assistant, Jack Lonsinger, are removing water from the air.

Professor Hall's first thoughts on this idea resulted from an exchange of letters in 1955 with Frank Edlin of Du Pont. Edlin pointed out that the air around us holds a far greater amount of water than people realize. Under average Kansas conditions a 100-foot cube contains approximately 100 gallons of water; that is, one million cubic feet of air, or a space of air 2½ feet deep over an acre of ground. This doesn't change much, whether the humidity is 30 per cent or 100 per cent.

The problem is how to remove this water from the air with a system that is functional on a large scale and is economical to build and operate. To achieve this goal, Professor Hall is utilizing the physical property of compounds known as deliquescents. These compounds absorb water from the air.

Calcium chloride, one of these compounds, is commonly used on roads and race tracks to keep the dust down. Ethylene glycol, another deliquescent compound, is a liquid known to most of us as modern antifreeze. If you cut the top out of a can of this antifreeze and let it stand in the open, it would begin to dilute itself by absorbing water from the air. In time it would fill the can and run over. This is the principle that Hall and Lonsinger are working with.

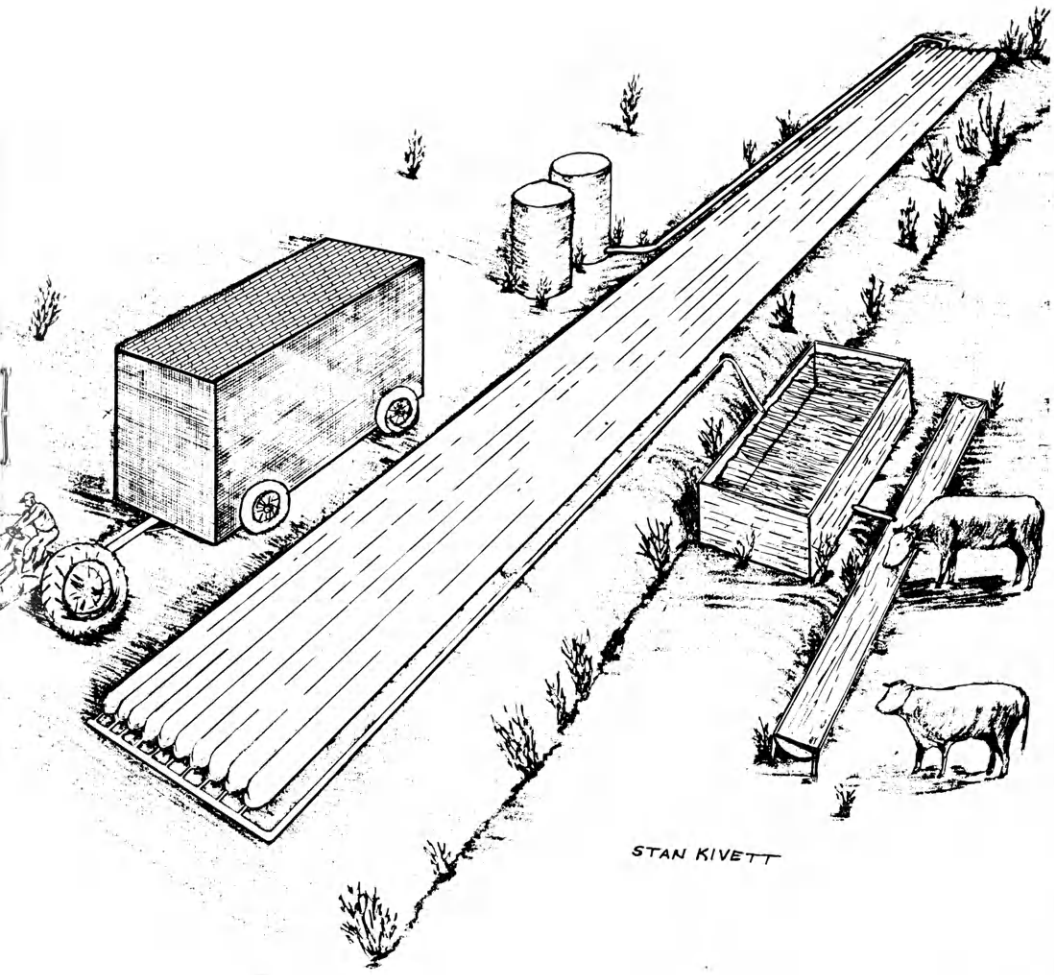
Basically, the problem is to construct a system which, in a continuous motion, will expose large surface areas of glycol to the air and then recover the water from the glycol.

Recovery of the water from the glycol is a major factor in this problem. The system is designed to utilize a series of solar stills in which the water is evaporated from the glycol by using the sun's energy, and then condensed to pure water. Solar stills are in operation and scientists are developing them to a high degree of efficiency.

Professor Hall's first concern is to develop a means of exposing the glycol to the air. The system being considered consists of a series of vertical sheets. The glycol flows down both surfaces of these sheets, moves through the solar stills where the water is removed, and is then pumped through tubes up to the top of the sheets.

Projected figures on the capacity of such a unit indicate that a series of 120 sheets 3 inches apart, measuring 10 feet by 15 feet, would absorb enough water each day for 100 head of cattle. Hall thinks such a unit could be constructed on a wagon to use as a mobile unit. The stills could be stationary units at individual watering sites.

With one or more of these absorption units you could meet the water needs of your livestock in times of



An artist's conception of a proposed water recovery station shows the mobile water absorption unit behind the tractor. The tanks would contain dilute and concentrated glycol. The long tubes on the ground are plastic solar stills. These tubes would evaporate the water from the glycol. After the water and glycol are separated, the glycol would be pumped back to one of the tanks and pure water would flow into the supply tank. Research at Kansas State University is directed toward developing the absorption unit. Raymond Hall, professor of chemical engineering, is in charge of the research. Hall hopes to build a mobile test unit within two years. More research is needed before a practical absorption unit is available for consumer use.

drought and your herds would not have to be thinned, provided it is economically feasible.

You would be able to have water not only *when* you need it, but *where* you need it. Distribution of cattle over the range has long been a problem of pasture management. Cattle tend to stay within a definite distance of water. Thus, areas can be overgrazed if water sources are not spread throughout the range. By placing watering facilities with storage tanks at various locations over the range you could achieve a more favorable distribution of cattle.

Unit Operates Free of Maintenance

The foremost attractiveness of the proposed unit is that it is completely self-contained and operates free of maintenance. It would use the forces of nature to supply energy needed for operation. The flow of glycol from the solar stills to the top of the sheets will require a small pump. Such a pump could be wind driven or use electricity from solar batteries such as those used on satellites to power radios. Less than a quarter horse motor could supply the needed power.

The flow of air between the sheets will depend on air currents that occur when the air becomes lighter as it loses its moisture. The dry air will rise between the vertical sheets and wet air will move in from the sides. About 250 gallons of glycol will be used in the proposed unit. Approximately one quart of water will be absorbed for every gallon of glycol circulated.

The solar stills produce one quart of water per day for every two square feet of still. Solar energy is relatively constant during the day regardless of clear or cloudy skies. A series of stills covering an area 40 by 40 feet will produce about 200 gallons of chemically pure water each day.

Experiments show that water absorption is greater at night when temperatures are lower. However, distillation requires initial energy acquired from the sun during the day. This combination of factors indicates that a storage system would be needed to hold the dilute solution acquired during the night for distillation during the day. These storage tanks could be stationary features at watering sites.

Efficiency May Reach 80 Per Cent

The efficiency of the system is of greatest concern, and is receiving the most attention in the research. The efficiency is dependent upon the amount of water absorbed by a given amount of glycol. And this factor depends on the method used to expose the glycol to the air. Figures mentioned are based on operations ranging from 10 to 20 per cent efficiency. Professor Hall thinks his system is capable of reaching an efficiency above 80 per cent.

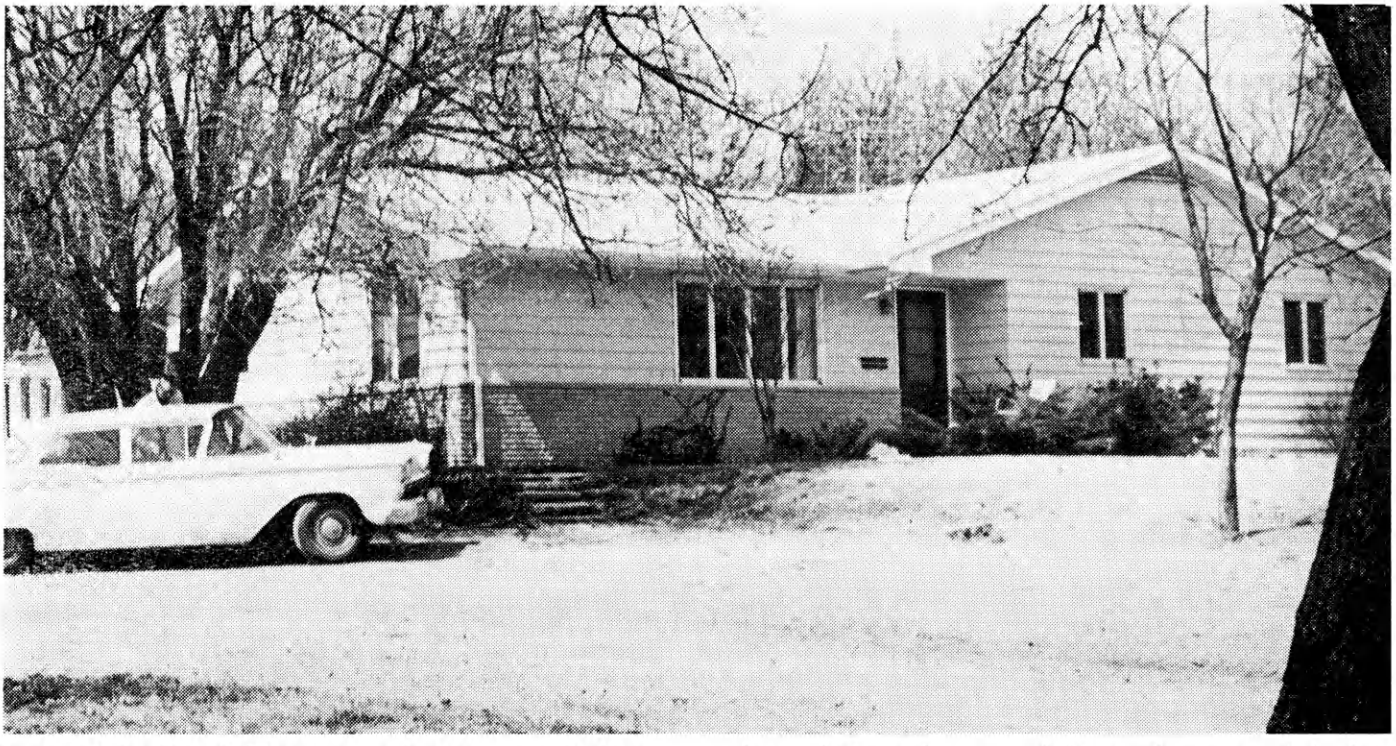
Economical for Private Use

Hall plans to build a complete unit within the next two years. The initial cost of the experimental absorption unit is estimated at $5000. Units produced on a commercial basis should be a great deal less.

Hall thinks these units may find an economical application in private homes or small businesses where other water sources are not available.

Only through research of this kind will we be able to solve our water supply problems. Fresh water is not a problem in this country alone. There are some areas of the earth which have very little or no fresh water supplies. The problem in these areas is not how to use the water wisely, but how to obtain it. And these areas will need to be developed to support the world's expanding population.

Professor Hall's absorption unit may provide some of the answers.



Successful planning of driveways, parking area, and shrubs can be used to guide visitors to the appropriate door. Position of plants, shrubs and trees, orderliness of areas, and simplicity of design must be considered for an attractive rural home area.

For Your Home

Modern Rural Landscaping Defines Yard Areas

by Sharon Stauffer

WHILE driving through the country, you may have noticed some unusually attractive farmsteads. The favorable impression you received was probably due to the orderliness of areas, position of plants, and the simplicity of layout—all achieved through the organized planning known as landscape architecture.

Charles E. Parks, extension landscape architect, defines the term as "the art of developing land and the objects on it for the greatest human use and enjoyment."

Planning Is Important

Just as an engineer uses blueprints for building bridges, a housewife uses recipes as guides in cooking, a teacher uses textbooks in teaching, you, in landscaping your farmstead, should use a plan for successful and pleasing results.

Drawing a scale model on paper enables you to see the improvements, and makes it easier to plot details. You can cross out a fence on paper but it's rather difficult to move a dozen posts once they are in the ground. Preparing a sketch of what you want your farm to be like will save time, trouble, and effort.

The landscaping of the farm up the road may be the perfect example in your eyes, but the same shrubs and trees may detract from your place. The shape of buildings, the placement of driveways, and existing plant life will be deciding factors in what you will change and add.

In determining *where* to plant *what*, you'll find it necessary to designate yard space for specific uses. Three definite areas are found around most homes.

The first area greets the public. This includes the public entrance, drives, turn-arounds, parking, and front lawn. If construction of a new

When planting shrubs near the house, avoid a crowded appearance by allowing for growth of shrubs. A low-growing variety should be planted in front of windows.

driveway is provided in your plan, a loop or horseshoe shape is practical and attractive. If you want visitors to use the front door, make parking space and a place to turn around near the front entrance to the house.

Outdoor activities of your family call for a second area. Family recreation, cooking, and eating may be done in a more private area including patio and pool. This area is connected to the kitchen and utility rooms of the house to eliminate unnecessary walking. This is especially handy when cooking outdoors and numerous trips to the kitchen are necessary.

Because of their appearance, place your clothesline, vegetable garden, garage, fuel tank, trash burner, and compost pile in a third area. These service items may be hidden from the public when they are grouped together.

Use Shrubs Effectively

If you select shrubs and trees, allow for full growth of the plant and consider its mature size. Then decide if it will fit your needs. Many a do-it-yourself landscaper's mistake has shown up ten years later as the little bush that grew and now covers the picture window. Because landscaping a farm is usually a once-in-a-lifetime job, these errors in judgment of plant sizes can't be corrected easily or inexpensively.

Placement of trees greatly influences the landscape appearance. Trees should be planted in spots where shade is desirable. They may form a frame or be used as a backdrop for viewing the house. Windbreaks of cedar cut the cold, north wind on some farmsteads.

Dividing and screening the three yard areas is often accomplished by shrub borders. Available in heights of one foot to 10 or 12 feet, they can outline a flowerbed or isolate an area with equal success.

Shrub plantings should be used at the edges of the areas. Not only will lawn mowing be simpler when groups of shrubs are not scattered about, but the grounds will have an organized, pleasing look.

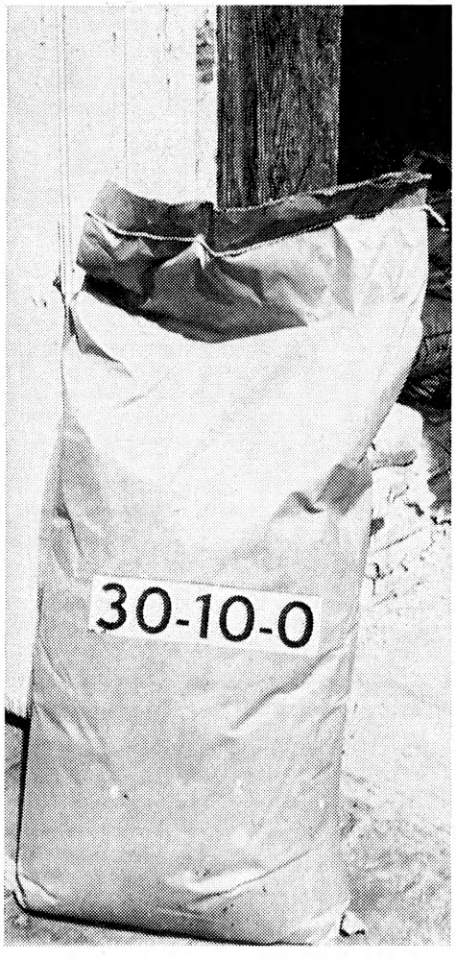
Check Architect's Qualifications

If you seek the advice of a professional architect, check his qualifications. Most states do not require a license or a college degree to qualify for the title landscape architect.

Because there is a constant demand for professional service on larger projects, it may be difficult for you to find an architect that will design a landscape for your home. Since the designer you might choose would follow a procedure similar to that described, you can use the same approach, even without a drawing. Valuable, specific information is available from the Kansas Extension Service.

Emphasizing the need of a plan, regardless of whether it is a professional or a do-it-yourself job, Parks says, "Beautiful landscapes are planned in detail. They don't develop by chance."

A back yard can be planned to include both recreation and utility areas. Larger varieties such as Lilac, Dogwood, and Mockorange are best along the back of the yard. Shorter varieties such as Barberry or Spirea can be used to divide smaller areas.



Research Shows

Multi-purpose Fertilizer Meets Your Crop Needs

by Merle Jones

A NEW nitrogen-phosphate fertilizer (30-10-0) is now available to Kansas farmers. It is an all-purpose fertilizer especially well suited to Kansas soils.

The new fertilizer is an "inverted ratio" type. It has three times as much nitrogen as available phosphate (P_2O_5). A hundred pounds of 30-10-0 will supply 30 pounds of nitrogen and 10 pounds of P_2O_5. Most fertilizers have the opposite relationship, with three times as much phosphate as nitrogen. The high nitrogen content is what makes 30-10-0 a suitable fertilizer for the usually low-nitrogen Kansas soils.

About 80 per cent of the nitrogen is supplied while in the ammonium nitrate form. The remaining 20 per cent is supplied as ammonium phosphate. The P_2O_5 is soluble in water; thus the fertilizer's phosphate and nitrogen are readily available for plant use soon after application.

30-10-0 Suited to Kansas

The fertilizer's ratio of nitrogen to phosphate is comparable to the ratio used by many plants in assimilation. Assimilation is the process of converting plant food into new cells or rebuilding old cells. Since 30-10-0's nitrogen-phosphate ratio is ideally suited to most plants' growth requirements, it is well suited for Kansas croplands.

Extensive tests conducted at K-State have shown that fertilizer will promote high yields in wheat, corn, grain sorghum, a variety of cereal grains, and many other crops. 30-10-0 will do an excellent job as a general-purpose fertilizer under most soil conditions. If you are doubtful as to which fertilizer to use, a safe bet would be to use 30-10-0.

Application Recommendations

It can be used most advantageously as drill-down with wheat. It will supply sufficient amounts of nitrogen as well as phosphate for wheat, and has a marked starter effect when applied this way.

When banded along the sides of a row of corn or grain sorghum, it acts as an excellent source of both nitrogen and phosphate. By placing fertilizer near the terminal root of the corn or sorghum plant, 30-10-0 gives a good starter effect on these crops.

If broadcast or plowed-down before planting, it will also supply sufficient amounts of nitrogen for most crops. This method of applying the fertilizer won't give you the high

starter effect that drilling-down will, but even broadcast, some phosphate will leach down and be available to the plant.

Test Results Are Favorable

K-State test results have not been conclusive as to whether 30-10-0 can be used effectively as a topdress on cereal crops. Test plots of wheat fertilized with 30-10-0 were just planted last fall, so no test results are available. Since it contains a high percentage of nitrogen, and some phosphate is sure to get down to the plants, it seems possible that 30-10-0 should be more beneficial as a topdress than fertilizers containing only nitrogen.

Old stands of bromegrass and similar grasses would benefit from a topdressing of 30-10-0. It provides an almost perfect combination of nitrogen and phosphate for topdressing.

Suited to Topdressing

Test results compiled by the Department of Agronomy at K-State show that in 1961, in Brown County, corn yields in an unfertilized check plot were 120.4 bushels per acre. Nitrogen only fertilization (120-0-0) produced a yield of 118.0 bushels per acre, while 30-10-0, supplying 80 pounds of nitrogen plus 27 pounds of available P_2O_5, produced a yield of 134.8 bushels per acre. The top yield was 137.0 bushels per acre and was obtained by adding ammonium nitrate to 11-48-0 so that it furnished 120 pounds of nitrogen plus 40 pounds of available phosphate, the equivalent of 400 pounds of 30-10-0. In one of the other three corn grain tests, yield results were similar for the fertilized and unfertilized plots. The Ashland Agronomy Farm had a great response to fertilization, and the yield from 30-10-0 was comparable to any other nutrient combination.

The John Fuller Farm, Russell County, ran a test in 1961 on sorghum grain yields. Response to fertilization was good, with 30-10-0 showing a yield of 81.2 and 81.9 bushels per acre for the application in the ratio of 80-27-0 and 120-40-0 pounds per acre, respectively. The unfertilized check plot yielded 62.2 bushels per acre. Yield responses to other fertilizers were similar to those received from the 3:1 ratio fertilizers.

Several observations were made by K.S.U. researchers about 30-10-0 in the 1961 trials. The Kansas State Fertilizer Handbook prepared by the Department of Agronomy at K.S.U. states:

- *Commercial 30-10-0 fertilizer has excellent handling qualities. It can be drilled as easily as any pelleted or drilled fertilizer.*
- *Commercial 30-10-0 fertilizer can be applied safely to cereal and row crops. When drilled with wheat or banded along the row when corn or sorghum is planted, it does not constitute a major germination hazard.*
- *Starter effect from the relatively small amount of phosphate furnished when using the proper nitrogen application has been excellent.*
- *Visual plant growth response has been at least as good with 30-10-0 as with conventional phosphate treatments.*
- *There has not been indication of agronomic inferiority with 30-10-0 fertilizer.*

EGGS—

Building Blocks of Cooking

by Linda Kernohan

THE EGG comes in one of the neatest food packages ever designed! Inside the shell can be found all the proteins needed for growth and body maintenance, essential fats, vitamins A, B_1 or thiamine, B_2 or riboflavin, niacin, D, E, and K, and the minerals—iron, phosphorus and calcium. Eggs are a natural food recommended by nutritionists to be included in the diet in some form every day.

"The egg is the cement that holds the castles of cookery together," a famous chef once said. Eggs may be used to thicken, as in custards and puddings, or to leaven, by beating to incorporate air as in cakes. They may add color, richness and flavor to individual dishes. They may be used to coat, as in breaded meats, or to bind, as in meat loaves and croquettes. Eggs may be used to emulsify, as in salad dressings and cream puffs, or to clarify, as in the preparation of consomme or in "boiled" coffee. They may be used to retard crystallization, as in candy making, or to garnish, as in canapes, salads and soups.

Eggs may be served in hundreds of ways. They are easily and quickly prepared by cooking in the shell, frying, broiling, baking, poaching, scrambling and in omelets.

Store Eggs Properly

Eggs with clean shells keep best. Wipe off soiled spots with a damp cloth, but don't wash them until just before you use them. When eggs are first laid, the shells have a film known as the "bloom" which seals the pores and helps keep out bacteria and odors. You will remove this protective film if you wash the eggs.

Store eggs in a covered carton, bowl or pan, away from strong-smelling foods. Without a cover, eggs lose moisture faster and are more likely to absorb odors.

Keep eggs in the refrigerator or other cold place. Eggs stored at room temperature may lose as much in quality in three days as those kept two weeks in a refrigerator.

Use any eggs with cracked shells first.

To keep left-over egg yolks or separated whites until they can be used, place yolks in a dish or cup and add just enough cold water to cover. Put egg whites in a jar or dish and cover tightly. Be sure to keep them cold. Left-over yolks may be kept two or three days, and whites a week to ten days.

Cook at Moderate Heat

When you cook eggs, whether in water, frying pan or oven, the rule to remember is to cook them with low to moderate, even heat. Like all protein foods, eggs cooked at too high a temperature get tough and leathery. This is why eggs should never be boiled.

To prevent curdling when making custards, mix sugar with the egg and not with the hot milk. Adding hot liquids or mixtures to the beaten egg a little at a time will also prevent curdling. Don't overcook.

To beat egg whites, let the whites stand a while. They whip up best when they're at room temperature. For a larger foam, add a pinch of salt before beating.

When you want to combine beaten egg whites with other mixtures, fold —don't stir—using a light under-and-over motion. For omelets and souffles, fold the heavy mixture into the beaten egg white—not the whites into the other mixture. Don't overmix or you'll lose some of the air you've beaten into the egg whites.

To measure eggs, remember that four to six whole eggs, eight to 10 egg whites or 12 to 14 egg yolks are the equivalent of one standard measuring cup.

Check Egg Quality

Egg quality is easily determined. The position of the yolk, the condition of the thick and thin white, and the size of the air cell determine interior quality. A high-quality egg when broken out on a plate has a high curved yolk, well-centered in a thick white.

As the egg loses quality, the air cell becomes larger because of moisture loss. Thick white becomes thin. The yolk floats to the side or top of the egg. When broken out on a plate, the lower quality egg has a flattened yolk and the white is watery and thin.

Because we cannot candle the eggs we buy to determine the interior quality, we must depend on grading. Though eggs may be graded according to federal, state or private standards, most eggs are graded according to standards set up by the U.S. Department of Agriculture. U.S. Grade AA, or Fresh Fancy, are the best eggs you can buy for frying, poaching, or cooking in the shell; U.S. Grade A are also excellent as table eggs; U.S. Grade B eggs are satisfactory for most other uses, such as baking and general cooking; and U.S. Grade C eggs are suitable for baking and other cooked dishes.

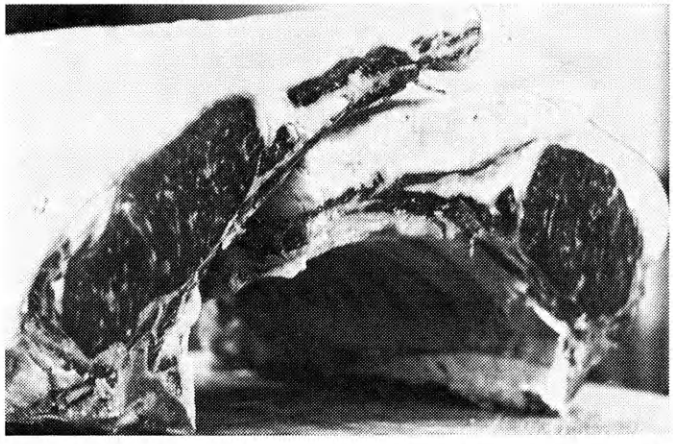
There are eggs of every size in every grade. For example, a carton of U.S. Grade A eggs may contain either small, medium, large, or extra large eggs. Quality, not size, determines the grade of the egg.

People sometimes wonder about dark specks that quite infrequently appear in eggs. These are blood spots, formed when the egg is produced. They may be lifted out of the egg before cooking. They do not alter the nutritive value or the cooking performance.

Shell color may vary from white to deep brown. Color is a breed characteristic and does not affect the flavor, the nutritive value or the cooking performance. There is no advantage in paying more for brown or white eggs of the same size and quality.

The high nutritional value . . . the versatility in cooking . . . the mild, delicate flavor . . . and the availability are some of the reasons the egg is a unique food.

New Approach To Carcass Grading



Using dual grading, beef carcasses which yield a large rib eye area with a minimum of fat covering will bring more profits.

by Tom Kay

"DUAL" grading is a new system of grading livestock carcasses that provides two separate measures of value—a quality grade and a yield grade. If such a system were adopted, you would be paid for exactly what you have, not a close approximation of it. In many cases, this would mean an additional premium for your cattle.

Meat grades have been based on quality only for several years. Within each grade there is a great variation in the area of the eye muscle, cutout value, and the distribution of fat. The two primary factors which influence the value of a beef carcass are:

1. the quality of its lean meat, and
2. how much of its weight can be sold as trimmed retail cuts.

U.S.D.A. beef grades are designed to measure these two factors. Quality —that is, juiciness, tenderness, and flavor—is judged on the basis of marbling, firmness, color, and texture of the lean, all in relation to the maturity of the animal from which the carcass was derived.

Yield of retail cuts, under the present beef grading system, is judged only on the basis of conformation. Conformation is the thickness of the muscle and the proportionate development of the various parts of the carcass. Although several other factors have an effect on yield, they are not included in the grade standards at the present time.

Dual grading would give you a more accurate estimate of the value of your animal by combining these elements, quality and yield. To do this, the carcasses would be graded as to the conformation just as they have been in the past and assigned a grade like Prime, Choice, Good, Standard, Commercial, Utility, Cutter, or Canner. In addition, they would be given a cuttability score which would rate the carcass from 1 to 10. A No. 1 carcass would yield the highest percentage of high-priced cuts, going down to a No. 10, which would yield the lowest.

"Cuttability" can be estimated with a high degree of accuracy by rating four factors:

1. Area of the rib eye
2. Fat thickness over the rib eye
3. Weight of the kidney fat
4. Carcass weight

An example of how this system could mean more money in your pocket can be shown with the use of two steers, A and B, that graded Choice, weighed the same, and brought their producers the same price. Yet there was a considerable difference in their yield. Steer A produced a carcass with 13 square inches of rib eye muscle, three-tenths inch of fat thickness over the rib eye, 16 pounds of kidney fat, and a weight of 700 pounds. These factors would give the carcass a dual grade of Choice No. 2 and a value of $517.72.

The carcass of steer B yielded nine square inches of rib eye, one inch of fat thickness, 28 pounds of kidney fat, and a dressed weight of 700 pounds. This carcass would grade a Choice No. 6, and would have a value of only $444.07.

Looking back, we see that the producer, which might have been you, was paid the same for these two steers, yet they had a difference in value of $73.65. This demonstrates the inefficiency of our present grading system, and shows how you, as a producer, could profit if this system of dual grading were adopted.

David Pettus, who is responsible for all grading work in the U.S.D.A., says, "The only way to get cattle with high cuttability to be produced is for the producer to be paid for them. We believe that dual grading will do this."

This means that you will have to breed for cattle with a high yield and a minimum of waste fat. There will be less need for the low-set, blocky, straight-lined steer and more for the large, lean, muscular, meat-type steer.

Till Planter

Continued from page 7

tion up to harvest. However, researchers discovered that under Kansas conditions some weed control operation prior to planting time seems to be necessary, especially when planting is delayed by a wet spring. If the till planter is used on fields that do not have a thick mulch, the field will need to be cultivated at least once during the growing season to keep weeds down.

"One of the promising uses of the till planter in Kansas is for double-cropping," remarked Professor Fairbanks. Recent research results show that both sorghums and soybeans were successfully planted in heavy wheat stubble immediately after harvest. The till planter controlled the weeds effectively at planting time. Only one cultivation of these crops was necessary later for control of the weeds.

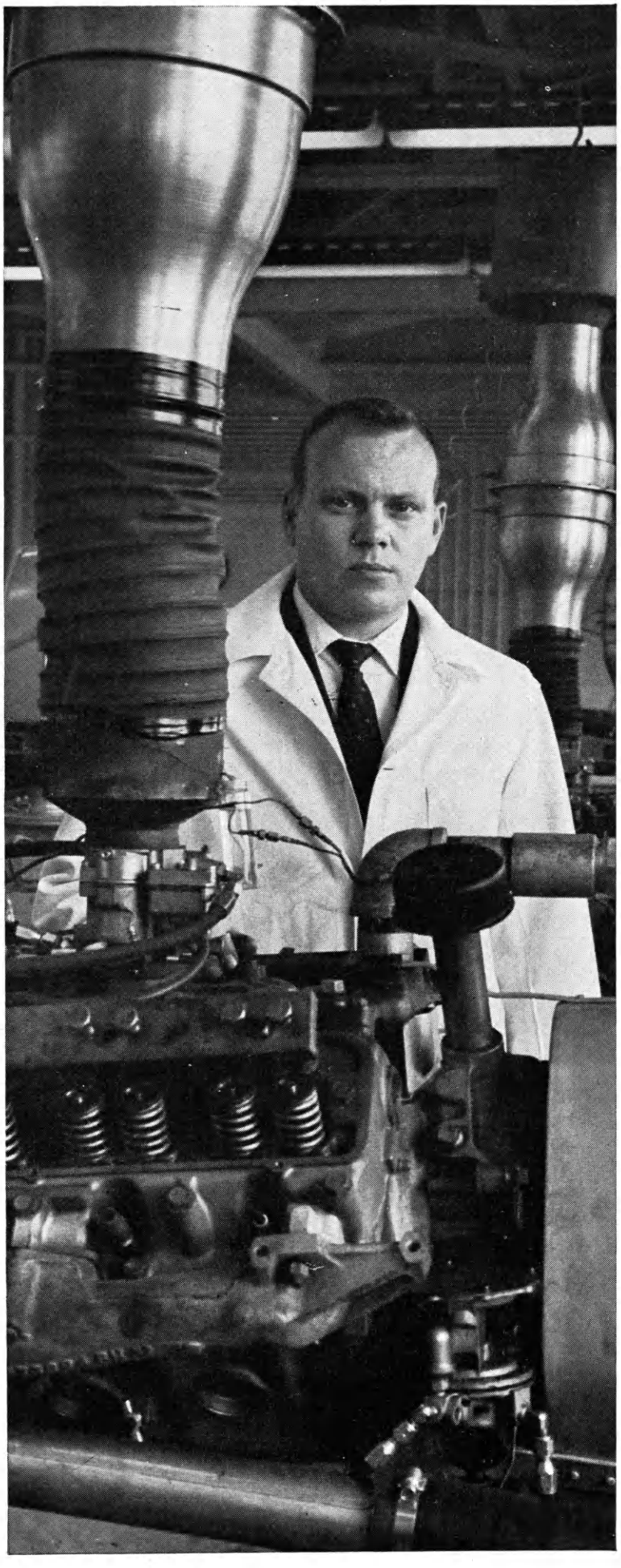
What does such a machine cost? According to Professor Fairbanks, a mass-produced, two-row till planter, which would sell by weight, would probably cost between $450 and $550. He said the cost could be reduced by using lighter weight metals in its construction.

Research on the till planter at K-State is completed. Fairbanks said he doesn't think such a machine will ever replace the present methods of planting sorghums. However, he pointed out that farmers in Nebraska are using a machine similar to the till planter.

Advantages To Consider

In comparing this machine and its methods with those that you are using now, keep in mind the following points:

1. The till planter can save you from one to three field operations.
2. By letting the crop residue remain on the surface of your land, the till planter method will increase the rate of water intake.
3. Reduction of runoff will consequently tend to prevent water erosion. The heavy mulch will also stop wind erosion.
4. The till planter is a good planting machine if you want to practice a double-cropping system, where you want to plant such crops as sorghum or soybeans in wheat stubble immediately after harvest.



Good reasons why I chose American Oil

by Don Anderson

"Here you're treated as an individual. The Company respects and recognizes individual achievement. The work is challenging and affords the chance to use your own ingenuity."

That's Don Anderson talking, 31-year-old mechanical engineer engaged in testing lubricants at American Oil Company. Don spent six years in the military service prior to earning his Bachelor of Science degree at the University of Illinois. Don, the father of two children, explains, "The routes to the top are many and varied. There's plenty of opportunity for advancement —and that's the best kind of job security I can think of."

The fact that American Oil attracts talented college graduates like Don Anderson may have special meaning to you as you plan your career. Don is one of many young scientists and engineers at American Oil who are growing professionally in a wide range of research projects. There are challenging opportunities in many areas. Chemists, chemical engineers, mechanical engineers, physicists, mathematicians and metallurgists can find interesting and important work in their own fields.

For further details about the rewarding career opportunities at American Oil Research and Development Department, write to: D. G. Schroeter, American Oil Company, P. O. Box 431, Whiting, Indiana.

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