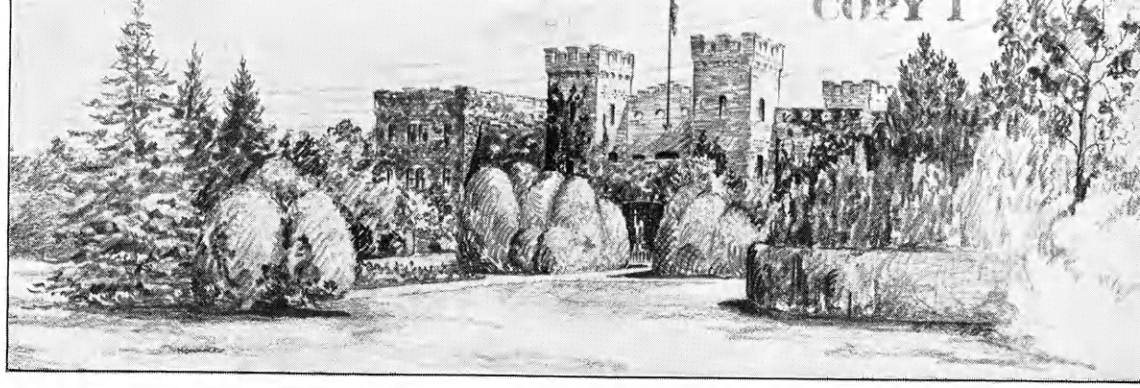

THE KANSAS AGRICULTURAL STUDENT

MANHATTAN, KANSAS

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EAST ENTRANCE TO THE CAMPUS AFTER A LIGHT SNOWFALL

CONTENTS

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The Plains Shelterbelt Project

Charles A. Scott, State Director

No farm-development undertaking in this country within recent years has caught the popular imagination as has the President's proposal to create shelterbelts in the Great Plains region. This is an undertaking full of difficult and complex problems. It will tax the ingenuity and knowledge of trained tree planters, soil physicists, forest meteorologists, forester-practitioners, and biologists. It is only natural that an undertaking of such magnitude, involving so many phases of biological science, should provoke discussion.

The Plains Shelterbelt Project, which has been assigned to the Forest Service of the United States Department of Agriculture, is of public interest primarily as a social enterprise. The purpose of the project is to establish a large number of shelterbelts in a zone about 100 miles wide along the eastern margin of the Great Plains region. The shelterbelts are expected to reduce the destructive effects of wind; thus conserving moisture, stabilizing the productiveness of the land, developing game and recreational resources, and transforming the countryside into a better place in which to live. In addition to these permanent benefits a very considerable part of every dollar spent will go to local residents in the form of cash wages.

The zone chosen for the undertaking extends through an area stretching from the Canadian border to northern Texas. The length, north and south, is about 1,000 miles; the width, east and west, about 100 miles. A shelterbelt, as considered in connection with this project, is a dense belt of trees about 130 feet in width and of undetermined length, so located as to provide the greatest possible protection from wind. In general, the shelterbelts will be planted at intervals about one mile apart and will consist of from 10 to 15 rows of trees and shrubs. There will be frequent interruptions—usually at least one every mile—and every conceivable variation in form, direction, and arrangement. All of these variations will be determined in accordance with topography, soil, direction of the prevailing winds, and the local conditions encountered, to which the plan must conform if the project is to accomplish its purpose.

Organization

Although the project, following a short interruption because of fiscal uncertainties, has been temporarily authorized on only a very limited scale, pending action by the 74th Congress, it is here being discussed in its larger scope and as it is hoped it will be carried out. The project is so large that it will require a great number of trees and these trees have yet to be grown in the nurseries. It will require the acquisition of a large number of tracts of land by lease or purchase. It will require the establishment of a proper organization that can oversee its development. The planted trees must be protected from abuse by livestock, and the Biological Survey is expected to aid in the control of other enemies of trees in this region, such as rabbits, gophers, ground squirrels, and even mice. Cooperation is expected from the Bureau of Plant Industry in the control of tree diseases, and from the Bureau of Entomology in the control of insects. It will require several years for the completion of the project as outlined.

There is a research branch and an administrative branch in the organization assigned to the project. The former, under the director of the Lake States Forest Experiment Station at St. Paul, Minn., is making, and has for some time been making, a thorough study of climate, soils, plant species, and cultural methods for the purpose of guiding the administrative branch safely within the scope of natural limitations. This is being done through a review of past experience and available data, of which there is a considerable

accumulation, as well as through original research.

Administration

The administrative branch is located at Lincoln, Nebr., and is concerned with the acquisition of land (for the present through lease); the collection of seed for the production of some two billion trees; the establishment and operation of nursery contracts; the planting, fencing, and care of the shelterbelts; and supplementary water-conservation and erosion control work. Headquarters for the Kansas project is located at Manhattan and all the work done in Kansas will be directed from this office.

Location of Trees

The actual planting of trees will be done on agricultural land of high productive value; on land that is supporting a fairly dense population, rather than on ranch lands of questionable agricultural value. It will be the purpose of those in charge to counsel with each land owner from whom a right of way for tree planting is leased; to make a survey of the condition of his farm and locate the shelterbelt where it will be of the greatest value in checking soil erosion by the wind, or where it will provide growing crops the greatest amount of protection from desicating winds, or where it will collect and hold the greatest amount of snow during the winter months, or where it will afford the greatest amount of protection to the farmstead during crucial periods of the year.

There will be locations in which the scheme of tree planting will be modified to fit the highway program. A shelterbelt will not be forced upon any individual, yet it is hoped that the benefits will be available to every farmer who desires them.

Criticisms and Suggestions

Criticisms, suggestions, and honest differences of opinion are most essential to the success of this undertaking. Literally, hundreds of unsolicited letters have been received at Lincoln from people in all walks of life, offering criticisms or advice. All these have received due consideration. A rough estimate of the sentiment as expressed in these letters received, and the editorial comment of the press, show that about 50 per cent are in favor of such a government undertaking; 30 per cent have honest skepticism and doubts of the practical possibility of such a project, but are in favor of trying it out, and 20 per cent are opposed to it.

CHARLES A. SCOTT

Two questions stand out preponderantly in many minds:

1. Can trees be made to grow in the shelterbelt region?

Trees can be grown successfully in many portions of our Plains region where the average annual precipitation does not fall below 18 inches; and in

some sandy soils even with a precipitation as low as 15 inches.

The best answer to this question, however, is: Trees are growing successfully throughout the zone traversed by this proposed shelterbelt. These trees were planted by farmers who are only partially acquainted with varieties suitable for such locations and who are only partially familiar with the cultural requirements of trees to insure their successful growth. Yet under these handicaps, thousands of plantings have proved successful.

On the other hand, it must be admitted that thousands upon thousands of trees have been planted in the shelterbelt zone since the days of the Timber Culture Act of 1873, that have perished from the face of the earth. It is not a difficult matter to explain the cause of many of the failures. Species unsuited to withstand the climate were planted and in many instances left to fight for their own existence. Many other plantings were abused and trampled under foot by livestock, while still others perished in the ravages of prairie fires. Trees of the earlier planting in Kansas were looked upon as being capable of taking care of themselves after they were once planted, rather than as a crop that required cultivation and protection until they became definitely established.

It is believed that a belt of trees 130 feet in width will make it possible for them to protect each other against adverse weather conditions. In dense plantings the trees will soon shade the ground and reduce the velocity and the sweep of wind over the surface of the ground, thus conserving the soil moisture for the use of the trees instead of allowing it to be dissipated by the sun and wind. As the years go by, an accumulation of litter will cover the ground, protect the soil from erosion, and check excessive run-off in periods of heavy rainfall.

The drought of the last few years is not believed to be a permanent change in the climate. If it is a permanent change, agriculture is hopeless whether the purpose be to grow trees or field crops. However, evidence indicates that the drought of the last few years is only a passing climatic stage. Droughts of this kind have occurred before and probably will come again in the future, but with long, wet cycles interspersed between them. Climatic records going back for some hundred years clearly indicate the occurrence of such dry and wet cycles. From available records it would seem that last year was the bottom of the dry trough, and within the next few years normal precipitation will return in this region, followed by a period of perhaps 15 tor 20 years of plentiful rainfall.

2. What are some of the benefits of shelterbelt planting?

The benefits are confined largely to improving the physical conditions for living and working in the vicinity of the shelterbelts. A great share of the soil erosion in the Plains is due to wind action, which the shelterbelts are specifically designed to reduce. The shelterbelts will not change the general climate of the entire region. Climate is the result of cosmic or solar forces, beyond the control of man. It is believed, however, that shelterbelt planting will modify temperature, humidity, and wind velocity on portions of the adjoining farms. Shelterbelts will not prevent the occurrence of drought, but will lessen the effect of drought. Shelterbelts may not increase the total amount of rainfall, but they will help to conserve the moisture that falls.

The application of such benefits to field crops, and to livestock, is obvious. Exposure for a half-day to a hot, dry wind will ruin growing crops in a crucial stage. One night of unprotected exposure to a blizzard may reduce a herd of cattle to a pile of carcasses. Against both losses shelterbelts offer a safeguard.

Moisture is conserved by shelterbelts throughout the seasons in a variety of

(Continued on page 58)

Fertilizers for Potatoes in the Kaw Valley

Melvin P. Rogers, '35

Cooperative fertilizer tests have been made in plots on Kaw Valley potato growers' fields for the past four years. The test plots were four rows wide and of varying length. The seed was planted with an Aspinwall planter at the rate of approximately 17 bushels per acre. The fertilizer was applied at the same time in a band 2 inches on each side of the row and slightly below the level of the seed piece by means of a fertilizer attachment. The test plots were cultivated and handled throughout the season in the same manner as the general field. All plots were harvested by the growers in the regular manner under the supervision of a member of the staff of the Agricultural Experiment Station. The weight of U. S. No. 1 potatoes was secured by grading wtih commercial graders.

Plots which received 150 pounds per acre of fertilizer analyzing 15 per cent nitrogen and 30 per cent phosphoric acid (P_2O_5), which is equivalent to 22 pounds of nitrogen and 45 pounds of phosphoric acid per acre, produced an average annual increase of 1,812 pounds per acre over check areas unfertilized. If the cost of handling the increased yield at 17½ cents per hundred plus the cost of the fertilizer in ton lots. f. o. b. Kansas City, is subtracted from the value of the increased yield at 75 cents per hundred, this fertilizer produced an average annual net profit of $6.31 per acre.

A plot which received the same amount of nitrogen as above but twice as much phosphoric acid, produced a larger increase in the years of high yields but not in years of low yields. The average annual net profit for this treatment was $4.79 per acre.

Heavier applications of nitrogen and phosphoric acid did not produce so large profits in any year. The increase from nitrogen alone and phosphoric acid alone was not enough to pay for the fertilizer in any year. Potash used in combination with nitrogen and phosphoric acid produced lower profit than the same combination of nitrogen and phosphoric acid without the potash.

These results were obtained for the four-year period, 1931 to 1934, inclusive. During this period there was an opportunity to study the results secured in a year of high yield, 1932; one of medium yield, 1931; and two years of low yields, 1933 and 1934. The results of these tests indicate a tendency for larger increases to result from the use of fertilizers in years of high yields. It is possible, therefore, that larger increases in yield than those reported may be secured over a period of years, as the average production of this area for the four years tested was 21.5 bushels below the average for the 15-year period, 1919 to 1933.

The response to fertilizer treatments used was similar on all soil types studied from the sandy to the heavier types. It appears, therefore, that the results discussed will apply to all soil types now used for producing potatoes in the Kaw Valley.

The majority of the test plots were planted following a green manure crop. It is suggested that the fertilizers should not be expected to replace green manure crops but to supplement them. Experimental investigations to determine the value of various crop sequences and the use of green manures are now being conducted at the Newman potato experiment field.

The quantity of fertilizer that must be applied to supply the needed nitrogen and phosphoric acid per acre can be easily calculated from the analysis given on the label, which will be expressed as percentage of nitrogen (N) or ammonia (NH_3), percentage phosphoric acid (P_2O_5), and percentage potash (K_2O). (Fourteen pounds of nitrogen are equivalent to seventeen

(Continued on page 46)

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THE PLAINS SHELTERBELT PROJECT

A clear and accurate statement of the plans for the Federal Shelterbelt Project and the status of the work to date in Kansas, is contained in this issue, having been prepared by Mr. Charles A. Scott, state director. Whether the reader is skeptical, apathetic, interested, or enthusiastic over this project, he will certainly be interested in these fair and frank facts.

The direction of the work in Kansas could not be placed in safer hands. Mr. Scott is a specialist in all horticultural lines but especially in forestry. He is a native Kansan and knows the shortcomings and possibilities of the diversified areas of Kansas. He is well and favorably known in professional and commercial lines of horticulture. He is the author of a number of publications on various phases of Kansas forestry problems, the most recent of which is "Kansas Trees and Their Uses," pages 15 to 147 of "Trees in Kansas," published by the Kansas State Board of Agriculture in 1928.

The project is a big one but Mr. Scott is a man who will undertake it deliberately and conservatively with a knowledge of the practical and scientific facts involved.

PROUD OF OUR JUDGING TEAMS

Seven judging teams represented K. S. C. in intercollegiate judging during the past season. As usual they made a creditable record. They can't all win or always win but they brought back good portions of the "bacon." Every team showed character, ability, and the results of capable training. The members of the teams have profited by the contests and K. S. C. has profited by their favorable publicity.

The poultry judging team were snowbound and reached the contest almost four hours late. Even then they placed first in one of the four sections of the contest and made several individual placings in the upper third of the contest or some section thereof. Our hat's off to their pluck, speed, and skill. No doubt their placings and winnings surprised their competitors and while their total score in the entire contest placed them last, they won.

College Notes

AG STUDENT STAFF, 1934-'35

Left to right: Front row—Murphey, Noland, Phillips, Ljungdahl, Wyckoff. Middle row—Ausherman, Rousseau, Murphy, Evans. Back Row—Campbell, Rogler, Shoemaker, Grass, Reid.

OFFICERS OF AGRICULTURAL ASSOCIATION, 1934-'35

Left to right: Eugene E. Sundgren, secretary; Albert A. Thornbrough, president; Robert E. Phillips, Jr., treasurer; and Walter M. Lewis, vice president.

THE CHICAGO LIVESTOCK JUDGING CONTEST

The Kansas State College senior intercollegiate livestock judging team competing at the International Livestock Exposition in Chicago, December 1, 1934, placed 10th with 23 teams competing. Texas Technological College won the contest with a score of 4,385 points. Kansas was 171 points behind the top team but only 34 points below the team placing fifth. Albert A.

Thornbrough was high man in the entire contest with a score of 915 points out of a possible 1,000. This is the first time a Kansas man has ever been high man at Chicago.

The team was composed of Clifford L. Harding, Wakefield; Walter M. Lewis, Larned; Charles E. Murphey, Leoti; Charlie B. Team, Wichita; Albert A. Thornbrough, Lakin; and Maurice I. Wyckoff, Luray (alternate).

Thornbrough was third in judging sheep and seventh in judging hogs.

Texas Technological College	9,071
Texas A. and M. College	9,043
Iowa State College	8,813
Kansas State College	8,803
University of Missouri	8,733
Oklahoma A. and M. College	8,724
Colorado Agricultural College	8,700
Michigan State College	8,646
University of Nebraska	8,563
University of Minnesota	8,505
Ohio State University	8,457
University of Wisconsin	8,112

There was keen competition among the 10 men trying out for the senior livestock team this year. All were young men with practical livestock experience and well acquainted with the

SENIOR LIVESTOCK JUDGING TEAM

Left to right: Front row—Clifford L. Harding, Charlie B. Team. Middle row—Maurice I. Wyckoff, Albert A. Thornbrough, Charles E. Murphey, Walter M. Lewis. Back row—Prof. F. W. Bell, coach, Lee J. Brewer.

Lewis was second, and Team was fourth in judging horses. The Kansas team was first in horses and tied with Purdue University for the Belgian trophy for being high in judging Belgians. In other classes of livestock Kansas placed 13th in cattle; 11th in sheep; and 12th in hogs.

The combined scores of the American Royal and International contests rank the 12 teams which competed in both contests as follows:

livestock industry. Each member of the team, although he recognizes it is essential to win contests, feels the benefits received from livestock judging can be measured more adequately in the training received and the deeper appreciation one attains of good livestock. The value of personal contacts with men who are leading the livestock industry and the opportunity of visiting some of the greatest livestock farms of America, cannot be overesti-

mated and will be an inspiration to each man as he enters his chosen field. The leadership and instruction of Prof. F. W. Bell, coach, is also an important factor in making the experience of the team an inspiration for a lifetime.—Maurice I. Wyckoff, '35.

Walter E. Wilson, '34, is engaged in greenhouse work in Blackfoot, Idaho.

J. Wheeler Barger, '22, is acting head of the Department of Agricultural Economics, Texas A. and M. College, College Station, Tex.

G. T. Klein, M. S. '26, who was extension poultryman at K. S. C. until September 1, 1934, has accepted a position as extension poultryman at Massachusetts State College, Amherst.

DAIRY PRODUCTS (ABOVE) AND DAIRY CATTLE JUDGING TEAMS

Above: Left to right—Dean D. Scott, Prof. W. H. Martin, coach, J. Sherman Todd, Marion B. Noland, Everett L. Byers. Below: Forrest R. Fansher, Prof. H. W. Cave, coach, Howard A. Moreen, Philip W. Ljungdahl, Lester A. Zerbe.

CROPS CONTEST IN CHICAGO

In the international crops contest held in connection with the International Hay and Grain Show at Chicago, December 1, 1934, the Kansas team placed third with Oklahoma and North Carolina ranking first and second, respectively. The contest was marked by keen competition, the scores of the seven competing teams being close together. The Kansas team made 66 points fewer than the winning team, their total score being 3,681. The score of the North Carolina team was 3,730 and that of the Oklahoma team, 3,747. The possible team score was 4,320—on grading, 1,530, on judging, 1,350, and on identification, 1,440.

The Kansas team was composed of J. Raymond Dicken, Winfield; Lewis S. Evans, Washington; George A. Rogler, Matfield Green; and Frank G. Parsons, Manhattan (alternate).

The Kansas team placed first in the identification section of the contest, second in the judging section, and sixth in the commercial grading section. Evans placed first in identification, making 478 points out of a possible 480. Dicken placed second in judging and third in identification. Rogler placed fourth in identification. Prof. C. D. Davis assisted in coaching the team. Prof. J. W. Zahnley, chief coach, accompanied the team on the trip.—Frank G. Parsons, '35.

MEAT JUDGING TEAM WINS

The Aggie men's meat judging team placed first in the intercollegiate meat judging contest held at the International Livestock Exposition, Tuesday, December 4, 1934. The team's score was 2,414, the highest score ever recorded in this contest. The nine teams in the contest made scores as follows: Kansas, 2,414; Nebraska, 2,410; South Dakota, 2,388; Ontario (Canada), 2,367; Pennsylvania, 2,328; Minnesota, 2,321; Iowa, 2,280; Ohio, 2,262; and Massachusetts, 2,217.

CROPS JUDGING TEAM

Left to right: Front row—George A. Rogler, J. Raymond Dicken, Frank G. Parsons, Lewis S. Evans. Back row—Prof. J. W. Zahnley, coach, Prof. C. D. Davis, assistant coach.

The Kansas team was composed of:

Philip W. Ljungdahl.....Menlo
J. Edward McColm.....Emporia
Howard A. Moreen.....Salina
Robert R. Teagarden (alt.).....La Cygne

The contest was divided into three sections—the judging of pork, the judging of lamb, and the judging of beef. The Kansas team placed third on pork, seventh on lamb, and first on beef. Ljungdahl placed sixth and

Moreen, ninth on pork; Moreen, sixth on lamb; and Moreen, fourth, McColm, fifth, and Ljungdahl, seventh on beef. The individual placings and scores for the members of the Kansas team were Moreen, third, 817 points; McColm, sixth, 807 points; and Ljungdahl, tenth, 790 points. Reasons were given on every placing and as many points allowed for reasons as for placings. Moreen was high man on reasons.

By winning the contest the boys brought home the beautiful silver trophy offered by the National Livestock and Meat Board in 1926. This trophy becomes the permanent possession of the first team that wins it three times. Kansas won it in 1931 and, therefore, won the second leg this year. Nebraska is the only competitor that has won twice, having won in 1926 and in 1928. To a large extent, therefore, the 1935 contest will be a Nebraska-Kansas contest.

Prof. D. L. Mackintosh, who has made some excellent showings coaching meat teams during recent years, coached the team and accompanied them on the trip.—Howard A. Moreen, '36.

POULTRY JUDGING TEAM

Left to right: Front row—John R. Patton, Ned O. Thompson, Lloyd J. Sconce, Leonard F. Miller. Back row—Prof. H. M. Scott, coach, Irving B. Hawk.

POULTRY JUDGING CONTEST

In the annual mid-west intercollegiate poultry judging contest held in Chicago, Saturday, December 1, 1934, the Kansas team placed sixth in a field of six competing teams. In one section of the contest, however, exhibition judging, the Kansas team placed first and won the silver trophy shown in the accompanying picture.

The contest was divided into two distinct divisions and each division was divided into two sections. One division —the production-exhibition division— consisted of judging five production and five exhibition classes. The other division—that of judging market products —consisted of judging five market poultry classes, made up of both live and dressed poultry, and three egg classes. Really Kansas had a team for each di-

vision of the contest or was represented by two distinct teams as follows: In production-exhibition judging, Leonard F. Miller, Agra; Ned O. Thompson, Manhattan; Irving B. Hawk, Effingham. In judging market poultry and market eggs, Lloyd J. Sconce, Halstead; John R. Patton, Columbus; Leonard F. Miller, Agra.

In the entire contest Iowa placed first; Texas, second; Oklahoma, third; Arizona, fourth; Missouri, fifth; and Kansas, sixth.

Thompson was sixth high man in the entire contest and fourth in exhibition judging. Miller placed second in judging the market poultry classes, sixth in judging the exhibition classes, and sixth in the market products division.

Prof. H. M. Scott, the coach, assisted Dr. L. E. Card in the preparation of the contest.

Saturday night after the contest the competing teams and their coaches were guests at a banquet given at the Hotel Auditorium by Dr. O. B. Kent. The winners were announced and prizes awarded at the banquet.—Robert E. Phillips, Jr., '35.

FERTILIZERS FOR POTATOES

(Continued from page 39)

pounds of ammonia.) A material carrying 16 per cent P_2O_5 will contain 16 pounds of P_2O_5 per hundred pounds, and in order to apply 44 pounds of P_2O_5 per acre it will be necessary to apply 44/16 x 100 or 275 pounds of the fertilizer per acre. The same principle is involved in the calculation of the amount of nitrogen to apply. Thus when it is desired to apply 22 pounds of nitrogen and 44 pounds of phosphoric acid per acre, using ammonium sulfate (20.57 per cent nitrogen) and superphosphate (44 per cent P_2O_5), it is necessary to apply 107 pounds of ammonium sulfate and 100 pounds of 44 per cent superphosphate.

W. E. Tomson, '12, is city milk inspector in Palo Alto, Calif.

Grain That Is Becoming Unfamiliar to British Millers

This heading was used by "Milling," the most widely read British milling journal, in presenting extracts from a talk made by Prof. A. L. Clapp, associate agronomist, before the Association of Operative Millers at Kansas City in September, 1934. The editor's note continues: "Kansas wheat with which the British miller used to be quite familiar is not now to be seen on these markets. It may, however, reappear, and in any case students should be acquainted with the characteristics of the different types of Kansas wheat, as well as with the climate and soil factors that determine wheat quality."

Some of the sections of the talk which interested the British millers most contained information on the varieties of wheat grown and soil conditions as they affect the quality of the wheat produced. The principal varieties of wheat grown in Kansas are Turkey, Kanred, Blackhull, Tenmarq, Kawvale, Harvest Queen, Fulcaster, and Currell. A few others, as Superhard Blackhull, Early Blackhull, Clarkan, and Iobred, are grown to a limited extent.

The Turkey variety, in 1929, was grown on 48 per cent of the Kansas wheat acreage. It is a hard winter wheat and makes a high-quality flour. It is winter hardy but quite susceptible to Hessian fly, stinking smut, and is only medium early in maturity. Kanred makes up 12 per cent of the Kansas wheat acreage and is very similar to Turkey.

The acreage of Blackhull increased 22.2 per cent, or 2,929,585 acres, from 1924 to 1929. It is a hard wheat and generally high in test weight. The percentage of flour produced is not so high as would be expected from the test weight. This variety is not so winter hardy as Turkey or Kanred, but is resistant to Hessian fly, which prob-

ably aids in its high yields especially in "fly years."

Tenmarq, a new variety selected by Dr. John H. Parker of Kansas State College, gives a high yield of flour of excellent baking qualities. Tenmarq is not so winter hardy as Kanred or Turkey, is susceptible to Hessian fly, is inclined to yellowberry, and does not weigh so much per bushel as Blackhull under the same conditions. It does have a very stiff straw and is a higher yielder than any other standard variety in south central Kansas.

Rainfall is very frequently the limiting factor in wheat production in western Kansas. Experiments at Manhattan show that a shortage of available nitrates in the soil at seeding time will greatly reduce the yield of wheat. Climatic conditions during filling time determine to some extent the protein content of the wheat. If a high temperature and shortage of soil moisture prevail at filling time the kernels will be shriveled, low in test weight, and high in protein. The reverse is also true.

For the production of high-protein wheat, it is extremely important that there be plenty of available nitrogen in the soil as this is the characteristic ingredient in protein. Most of the heavy-type soils of western Kansas are well supplied with nitrogen and produce high-protein wheats. The sandy soils of central and eastern Kansas and many of the heavy-type soils of eastern Kansas produce wheat of a satisfactory protein content for bread flour, only when a legume is used in the rotation.—Leon E. Wenger, '36.

The Comparative Palatability of Grain Sorghums for Hogs[1]

A very interesting and enlightening test for the comparative palatability of grain sorghums has been completed in which some valuable facts have been learned. Two tests were conducted. For the first test, four pigs were individually fed, each having access to nine varieties of grain sorghums. No other feed except a daily allowance of tankage was given. Each pig had his own lot and in the lot were nine self feeders each provided with 25 pounds of one of the grain sorghums being tested. As soon as a pig ate the first allowance in any self feeder a second allowance of 15 pounds was given him. When this was all eaten the feeder was moved to a new location and 15 more pounds added. When the total of 55 pounds had been eaten no more of that particular grain was given. This made it necessary for the pig to make a second choice. This plan was followed with all of the grains and thus the ranking of the grains was obtained.

The summary of the first test shows the following rank of the grain sorghums in order of their palatability: Red kafir, wheatland, pink kafir, atlas, kalo, blackhull kafir, grohoma, club, sumac.

The method of feeding in the second test was identical with that of the first trial. Three new varieties—dwarf milo, feterita, and early sumac replaced the varieties of grohoma, club, and sumac in the first trial.

The summary of the second trial was very similar to that of the first. The following is the rank of the grain sorghums used in this test: Red kafir, wheatland, dwarf milo, atlas, feterita, pink kafir, blackhull kafir, kalo, early sumac.

An average of the six varieties used in both tests gives the following rank: Red kafir, wheatland, atlas, pink kafir, kalo, blackhull kafir.—Charles E. Murphey, '35.

1. For the data used in this article credit is due Prof. C. E. Aubel of the Department of Animal Husbandry and Prof. A. L. Clapp of the Department of Agronomy.

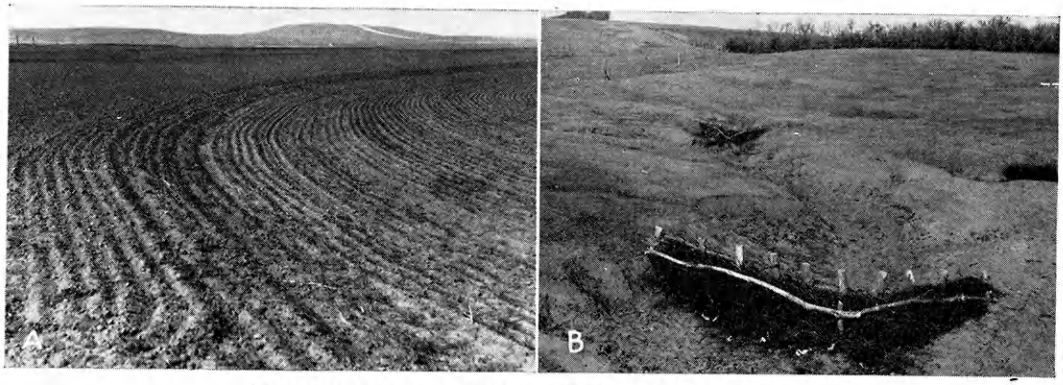
Austin G. Goth, M. S., '30, is in the Department of Agricultural Economics, Montana State College, Bozeman. He has charge of the educational phases of the state corn-hog program and is also supervising the development of an AAA farm record book program.

The Soil Erosion Service

F. L. Duley, Regional Director

The Soil Erosion Service (S.E.S.) was authorized September 29, 1933, as a branch of the Department of the Interior with an allotment of $10,000,000 from the Public Works Administration. H. H. Bennett, formerly in charge of soil erosion investigations of the Bureau of Chemistry and Soils, United States Department of Agriculture, was placed in charge of the work. Its purpose was to demonstrate the possibility of controlling soil erosion. For these demonstrations, complete water sheds representing important geographic and agricultural regions in various sections of the United States were selected. At the present time there are 31 of these areas located in 30 states. The size of the individual water sheds varies from 25,000 to 200,000 acres. In addition to these relatively small units there are two of much greater extent. The Navajo Indian Reservation project comprises 16,000,000 acres, while the Gila River project involves over 8,000,000 acres. Altogether the Soil Erosion Service is working with approximately 28,000,000 acres of land.

Within any one water shed the individual farm is the basic unit for the erosion control program. All work is cooperative between the land owners and the service. The program includes the use of all known methods of erosion control and these are applied by a technical staff who understand the problems involved. The application of the program to an individual farm practically always includes a revision of farm management practices. Before any erosion control work is done the farm is surveyed by one or more of the technical staff. Then a soil management program, including methods of erosion control, is worked out with the farmer. This plan is made to fit the individual farm and farmer. After the plan is approved by both the farmer and the Soil Erosion Service, the farm is ready to be worked.



SCENES ON LIMESTONE CREEK PROJECT, S. E. S.
(A) Wheat drilled on contour parallel with terraces. (B) Brush dams.

The cooperative agreement between the farmer and the federal government is that the farmer is to put into operation a five-year cropping plan and follow the plan of farm management agreed upon by himself and the S. E. S. He also agrees to maintain in good order any structure built on his farm. In addition to working out the soil management program for the farm, the S. E. S. builds all structures deemed desirable for the control of erosion on that farm.

The Kansas project is known as the

Limestone Creek project and is located in Jewell, Mitchell, and Smith counties. On November 30, 1934, the first year of work on the project was completed. The extent of the work is indicated by the following figures:

Total farms in area	629
Total farms cooperating	356
Percentage cooperation	56
Acres under cooperative agreement	78,060
Trees to be planted in 1935 for erosion control	250,000
Acres to be seeded to alfalfa, sweet clover, and grass	7,734
Acres of small grain planted on the contour in 1934	3,000
Acres of row crops planted on the contour in 1934	3,500
Acres of land terraced	15,348
Brush dams built	1,454
Rock dams built	118
Ponds constructed	12

Funds are now allotted for the work of the S. E. S. until July 1, 1935. The status of the work after that date depends on the action of the 74th Congress.

KEEPING THE SOIL ON KANSAS FARMS

The control of soil erosion to a point where the fertility of our upland soils will not be rapidly washed away is one of the biggest soil problems confronting Kansas farmers. There is now sufficient scientific information on this subject to show that it is not only possible but practical to control erosion in such a way that it will not be a serious factor in the loss of soil fertility. There are approximately 10,000,000 acres of land in Kansas that are suffering from erosion to a point where erosion control measures are needed.

The control of erosion is not so difficult if proper measures are adopted. The first thing to remember is to keep land covered with a crop as much of the time as possible. This can be done most satisfactorily by adopting a crop rotation that will include cultivated row crops along with small grain and sod-forming crops. The relative amounts of each will depend upon the locality. Sod crops and small grain are far more effective than cultivated crops such as corn or sorghum. Forest is also effective and should be planted on some areas.

Planting the crops across the slope, particularly the row crops, will greatly reduce erosion. This contour cropping and cultivation are most easily accomplished on land that has been terraced. The terraces also greatly reduce the formation of ditches and are effective in filling gullies across cultivated slopes.

Where gullies occur in pasture land they can be stabilized most effectively by the construction of brush or rock dams and by planting the bank to grass, sweet clover, and trees.

If these various measures are properly used, the amount of erosion taking place on any farm will not be serious and much more of the rainfall will be conserved in the soil, thus reducing the amount of run-off.

W. S. Morrow, '15, is sales manager for the Harbison Manufacturing Company, makers of farm implements. He is located in Kansas City, Mo.

M. M. Williamson, '24, who, since his graduation has been distributor in Oklahoma for Fruehauf trailers for the Fruehauf Trailer Co., of Detroit, Mich., is moving to his old home in Clay Center to go into the milling business with his father.

Dr. W. E. Grimes, '13, acting dean of the Division of Agriculture, was elected president of the American Farm Economic Association at the recent annual meeting of that association. He succeeds W. I. Myers, governor of the Farm Credit Administration.

Dr. John H. Parker, professor of crop improvement, was recently elected a fellow of the American Society of Agronomy. This honor is conferred annually upon only three agronomists in the country. Fellows are chosen on the basis of research and activity in agronomic work after they have devoted at least 10 years of work to the society.

A Few Pointers on Lamb Feeding

J. Howard Watson, '35

The Kansas feeder is faced with unusual feeding conditions this fall which in many instances make feeding a questionable venture. Adverse conditions last summer reduced the corn yield to the smallest ever recorded, and grain sorghums, along with most other farm crops, also produced a very limited amount of feed. This factor has caused such a rise in grain and hay prices that the buying of these feeds inject quite an element of risk in the lamb-feeding venture. However, in those sections where there is an abundance of wheat pasture plus what grain and roughage the feeder may have on hand, it is possible to feed lambs economically and profitably with the present good prospects for a strong spring market. Wheat pasture can be utilized to better advantage where the lambs are penned at night.

One of the most important considerations which should be stressed is for the prospective lamb feeder to be sure he has enough feed to finish his lambs. If it becomes necessary to buy more feed after feeding has progressed some time there is always the chance of not being able to get the same kind that has been used, and a change is likely to prove costly unless made very slowly and carefully. In estimating the feed requirements it is well to figure for a 60-pound range lamb that is to be fed 90 days, approximately 2 bushels of corn and 225 pounds of alfalfa or their equivalent. If feeding grain sorghums, about the following amounts or their equivalent should be provided to fatten one average range lamb: 1¼ bushels of grain, 25 pounds of cottonseed meal, and 250 to 300 pounds of ground fodder (grain left on). If silage, alfalfa hay, or other roughage is fed in the ration the amount of fodder required will be correspondingly less. Approximately 3 pounds of silage should be used to replace 1 pound of dry roughage.

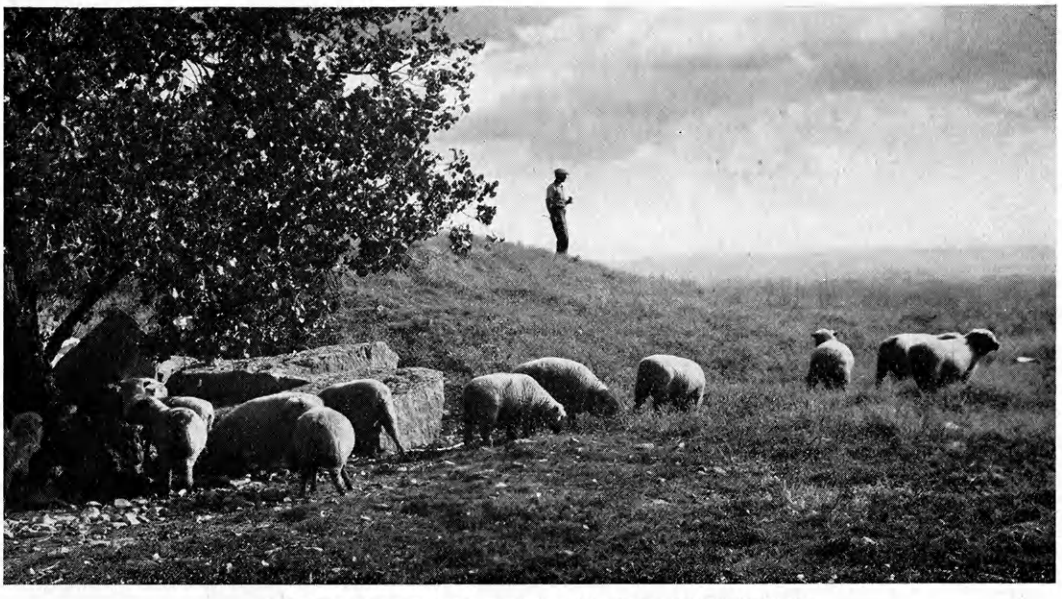
One factor determining the success of the feeding operation is the proper arrangement and location of yards and equipment. There is no better location for lamb-feeding lots than a south sandy slope. Good drainage is very important. Lambs do not do well when they are wading in mud and have to bed down in wet or muddy places. For this reason a slope should be used as a location for the lot and arrangements made to carry out any water that falls in the lots as soon as possible so that the ground does not become soaked. South slopes are preferable because they dry more quickly and afford some protection from cold north winds, but any kind of a slope is better than a level poorly-drained feedlot. It is well to remember that some kind of shelter for lambs and feed should be provided for eastern Kansas. For the drier parts of western Kansas, shelter other than windbreaks is not necessary.

Feeders for grain and hay should be placed in the higher part of the feedlot, not only because it is cleaner there but lambs like to stay on higher places and probably will eat more if they are induced to spend more time near the feeders. Many good types of feeders are in use. However, it is well to remember that whether a combination grain and hay feeder is used or whether the grain pen and hay panel method is used, approximately one foot of feeder space should be provided for each lamb. Less than this will not allow all the lambs to get their part of the feed. More than this amount is unnecessary and may induce some greedy lambs to overeat and die. Crowding at the feeders is good insurance against overeating. Where self feeders are used, 1 foot of feeder space is sufficient for three lambs.

Watering devices should be located some distance from the feeders if practical so that lambs will not leave the feeder with a mouthful of feed to be dropped into the water trough. Many good watering devices are used but probably the best is one through which

water flows continuously. This is not necessary, though fresh water supplied constantly is necessary to success.

There can be too many lambs in one feedlot, even though it be a large roomy lot. Generally, 500 is considered the maximum number that should be fed together. It is a good practice to sort the lambs at the beginning of the feeding period into two or three pens according to size and weight. This makes for uniformity and the feeder will find it easier to observe the results being obtained. Sort out the lambs as they are ready for market and send them in. It is usually a poor practice to try to hold lambs after they are ready for market or make the heavier lambs wait for the lighter, thinner ones.



A GROUP OF SHEEP FROM THE COLLEGE FLOCK
This picture was taken in the college pastures north of Manhattan.

Observance of a few simple rules should help to minimize death losses and make for more efficient gains.

1. Get lambs on feed gradually. Take 8 to 12 days for it and much trouble will be avoided later.

2. Avoid sudden changes in the feeding schedule. Feed at regular times and in regular amounts.

3. Use a maximum of cheap, home-grown feeds in the ration and a minimum of expensive feeds.

4. Don't overcrowd lambs on feed and don't feed too heavy grain and too light roughage ration. The saving of a few days time is not so important as the saving of a few per cent on losses.

5. Furnish plenty, but not too much, feeder space. Too much is as bad as not enough.

6. Feed light and heavy lambs separately where possible. Sort out the fat ones and market them when they are ready.

7. Don't stuff lambs before loading them on cars and don't overload the cars.

Marketing prospects now point to a higher spring market. A great reduction in the number of lambs on feed, due primarily to a poor lamb crop on the western ranges and adverse conditions this last summer, has created a shortage. This, coupled with the high price of feeds and a shortage of home-grown feeds in the feeding sections, indicates that there will be a consider-

able shortage of fat lambs next spring. A shortage coming at a time when prices are normally high will have a tendency to greatly increase the demand for well-fattened lambs. For the man who has feed to market, who can keep death losses down below 3 per cent, there is little chance of his realizing less through lamb feeding than by placing his feed on the market, especially considering the probable high spring market.

The Ewe Flock as a Farm Enterprise[1]

The chief object in keeping a farm ewe flock is the production of lambs of good quality, uniform in weight, condition, size, and type. To make the enterprise a success attention must be given to the kind and care of breeding stock used. One has the choice of using either good native ewes or western ewes either of which should be crossed on good mutton-type rams. Without rams of the proper type the production of good market lambs is impossible.

Uniformity of size and type in lambs is an important factor in the determination of the market price. This is more easily obtained through uniformity of ewes which is usually more easily and economically obtained in western ewes when selected from large numbers. Only active and vigorous sound ewes should be bought as they make the best mothers and are the most economical to keep. In the selection it is important that the mouth of each ewe be examined for a full set of unbroken teeth. An unsound-mouthed ewe very often becomes a liability which decreases the return on the investment in her and in the other ewes as well. Soundness of udder is just as important as soundness of teeth. An udder may be unsound by being spoiled on either one or both sides. Oftentimes a shearer will carelessly clip off a teat while shearing ewes. A ewe which cannot suckle her lamb or lambs, obviously, becomes a liability.

A factor often disregarded in the selection of ewes is the wool covering. This is important in two ways: (1) A good fleece pays a good share of the expense of keeping the ewe through the year. (2) The "type of fleece is a good index to feeding response." A tight densely fleeced lamb will feed out into a better finished, higher dressing lamb than one with a loose long stringy fleece.

In good management of a flock one must have lambs dropped early enough that they can be finished out in time for the market before the heavy runs of western lambs. which begin about June 15. Ewes must be bred early enough so that lambing occurs before March 1 to 10. An important consideration at the breeding season, around October 1. is flushing which can be done on most farms by turning the ewes on an extra good green pasture, saved back for them, about 10 days previous to breeding. If green pasture is unavailable extra feed as grain or hay will serve the purpose just as well, but extra feed should be given in the most economical way possible. The purpose of flushing is to get the ewes started to gaining in flesh which should be continued during pregnancy, but not so much that they get fat.

Good management of the ewe flock, to make it a successful farm enterprise, requires the ability to select ewes of such a type that when mated to a good mutton-type ram they will produce lambs uniform in type and size. Such lambs should constitute almost 100 per cent of the lamb crop if proper attention and care have been given to flushing, breeding, and exercising the ewes during pregnancy.—Robert J. Danford, '35.

1. For the data used in this article the author is indebted to Prof. R. F. Cox of the Department of Animal Husbandry.

Max M. Hoover, '24, M. S. '25, is regional director of Soil Erosion Service in West Virginia. He is located at Spencer, W. Va.

A New Era for the American Farmer

Nathan B. Shapiro, '36

Taking its place among the chapters of United States history is the so-called rugged individualism of the American farmer. A spirit of cooperation and collective endeavor opens a new chapter as far as this American farmer is concerned.

Cooperative endeavors are not new to the people of the United States. The tobacco growers of Kentucky, the citrus men of California, the apple raisers of Oregon, and in some places even wheat growers have banded together for the purpose of insuring for themselves a fair return for their labor. In all these cases, however, the principal emphasis was placed on marketing and little attention was given to the problem of adjusting supply to demand. Furthermore, these cooperatives were widely scattered, limited in number, and effective in improving the lot of only a small fraction of the nation's farmers.

It was not until 1933, with the advent of the Agricultural Ajustment Administration, that all agriculturists were enabled to gain the benefits of cooperative action. The AAA was an emergency measure created for the purpose of lightening the burden of the American farmer. Burdensome surpluses, which were the proximate cause of the fall in prices of agricultural commodities, have been reduced. The outlook for the future indicates that in most cases prices are likely to work higher during the next few months. Furthermore, the AAA acted as insurance for thousands of drought-stricken contract signers and enabled them to carry on.

However, the improvement in existing conditions and the optimistic outlook for the immediate future in no way indicate that the fundamental causes of surpluses and low prices in agricultural commodities have been permanently removed.

Twenty-five years ago the United States was primarily an agricultural nation. Large surpluses were produced which were sent to Europe. This situation was made possible because the United States was a debtor nation and each year the countries of Europe took our agricultural products in exchange for the 200 million dollars we owed them annually in interest. During the last fifteen years, however, this condition has been entirely changed. The United States is now a creditor nation and it is no longer easy to sell abroad. In fact, agricultural exports have dwindled away to a negligible figure. In 1919, for example, the value of agricultural exports aggregated nearly four billion dollars, whereas in 1933 it had shrunk to 588 million dollars. Since the United States will not or cannot accept European goods in payment of debts and since European countries have not the money with which to make direct payment, these countries find it necessary to import required goods from countries with whom they still hold a favorable balance of trade.

This loss of markets was severely felt by the American farmers. Domestic acreage of wheat had been increased from 44 million acres in 1909 to 73 million acres in 1919, while during the same time the per capita consumption decreased from 5.6 bushels to 4.6 bushels annually. Acreage had likewise increased in other countries. When this increase in acreage took place, it was needed to replace what had formerly been produced on 55 million acres which had dropped out of production in Europe during the war. Following the war, European nations became more and more nationalistic in their policies and outlook. Each strove to be self-sufficient. Today they are subsidizing their wheat growers, restricting imports, boosting tariffs, and compelling their millers to mix with any imported wheat a large percentage of native grain. Thus with production vastly

increased, consumption decreased, and foreign markets practically destroyed, surpluses kept piling up until by 1933 the world carryover of wheat exceeded one billion bushels.

This is the condition in which the American farmer found himself in 1933. On the one hand, he had his increased acreage and his obligations which were, to a great extent, contracted during the so-called good times, while, on the other hand, he viewed lost markets abroad and diminished consumption at home. He could no longer follow the general practice of former depressions where the man who owed passed the land to the man who owned and then started west for another start. There is no new West to which the bankrupt farmer can go. Citizens must live together—something American farmers have never done. There was but one thing left to do—use controlled production. At this point the AAA stepped in and endeavored to balance supply and demand.

Since the AAA has been in operation, the burden of the farmer has been lightened, the farm income has increased over 65 per cent, and the relation between prices farmers pay and prices farmers receive has become more equitable. However, the factors which make for low prices still exist and render the continuation of a restrictive program essential. The United States is still a creditor nation and though the European nations continue to default on their debt payments, and though war debts are cancelled, private debts will still remain. Foreign trade barriers still exist and the nationalistic policies of the nations of the world are more manifest now than ever before.

It is hoped that these trade barriers will be cut down and efforts are being made to remove them by means of reciprocal tariff agreements. The degree of success of these efforts is, however, debatable and, at the best, it will take some time before the benefits will be apparent. The increased wheat acreage of other agricultural countries, notably Canada, Argentina, and Australia, is a factor which is important and the struggle for self-sufficiency among European nations, such as Italy, Germany, and France, has not shown the slightest sign of abating. Finally, efforts are being made to stimulate consumption but much time must be allowed before any great degree of success can be expected.

Thus the forces that bring about reduced prices are still at work. Under normal conditions in the case of wheat, the United States can produce on unincreased acreage, from 20 to 50 per cent more wheat than is required for domestic consumption and for export. It thus appears inevitable that without a policy of restriction the farmer would again soon find himself in his 1932 condition. The farmers of the United States appreciate these facts and, furthermore, have learned the benefits of cooperative action. They have, therefore, signified overwhelmingly their wish to have the AAA continued.

In formulating the program for 1935, efforts have been made to improve on the original contracts and attention has been directed especially in the case of corn and hogs, where the greatest opposition was encountered. The question of whether some crop control policy should be adopted as a permanent means of keeping farm production in line with market requirements is a matter of interest to all American farmers. If the cooperation received in the present programs can be used as an indicator of the trend, the American farmer is willing to have his individualism curtailed for the benefit of the farming industry as a whole.

The AAA has the disadvantage that it takes out of production both the efficient and the inefficient areas. Moreover, it carries no insurance against the expansion of production through bringing new lands into cultivation under the stimulation of the better prices achieved by curtailing production in areas now cultivated. With separate programs of control for different prod-

ucts, it is difficult to avoid the shifting from one controlled product to other products. The need for annual campaigns for acreage reductions and for the various measures to prevent evasion involves complicated and expensive administration.

A temporary and varying reduction in the productive acreage seriously disturbs the farm economy; it requires readjustments in the relationships of landlords and tenants, which may be disadvantageous to the tenants; and it necessitates the disuse or less effective use of labor, machinery, work stock, and equipment acquired to farm larger acreage. Overhead in production frequently cannot be curtailed with the reduction in farm operations.

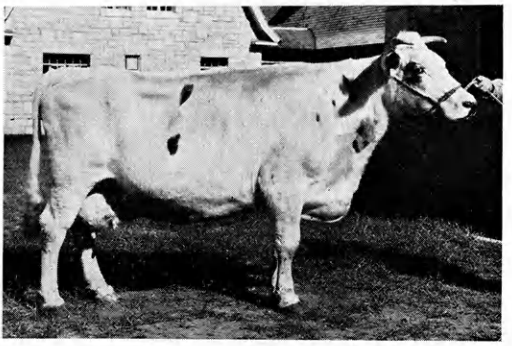
These factors do not make the matter hopeless. The disadvantages can be turned into advantages and since the American farmers have expressed their willingness to cooperate, the greatest difficulty has already been overcome.

A program for gradually removing poor farming areas from cultivation appears desirable to correct many economic and social maladjustments of both local and national significance, as well as for bringing the farm plant to manageable proportions. In this way the disadvantage of taking the efficient areas out of production would be lessened.

Furthermore, by gathering the separate programs of the AAA into one single contract, the cost of administration would be appreciably reduced and the problem of evasion and shifting from one controlled product to other products would be lessened. Compulsory control, if the farmers would signify their willingness to have it, would not only protect the contract signer against unscrupulous and selfish neighbors but would also simplify the reorganization of the farm business to a sounder and more efficient basis. It remains now for the farmer to voice his opinion and to select the future course.

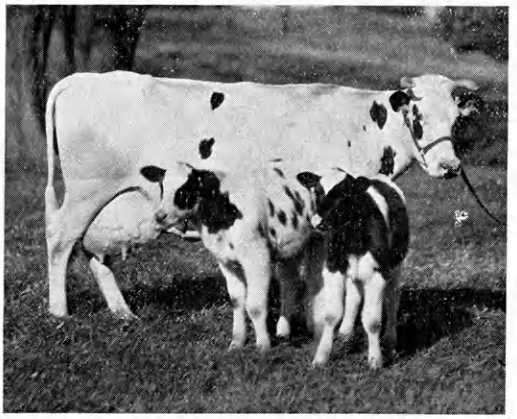
Inka Hijlaard Walker

Inka Hijlaard Walker, commonly known during the last few years by workers in the Department of Dairy Husbandry as "old Inka," is gone. Having rendered unusual service and attained the reputation of being the most famous Holstein cow in Kansas, she reached the end of her usefulness. She was slaughtered a few weeks ago but was not useless in death, as her body was used in the cause of science. The Department of Dairy Husbandry, the college meats laboratory, and the dairy herd research department of the United



OLD INKA

This picture was taken October 30, 1934, the day before she was slaughtered. She had an outstanding record of production.



INKA AND HER TWINS

This picture was taken in November, 1922. Inka was past 6 years of age at that time and at her best.

States Department of Agriculture made a most careful study and analysis of various parts of her body, especially glands and reproductive organs.

Inka was calved March 2, 1916. She produced in her lifetime 12 calves, three of which were bulls and became herd sires in outstanding Kansas herds. Two of her daughters were in the college dairy herd for several years each.

July 29, 1922, Inka gave birth to a pair of twin heifers and she and her twins are shown in the accompanying picture. In the lactation period following the birth of the twins she produced 20,530.8 pounds of milk and 798.3 pounds of butter fat. In 1926 she produced 21,446 pounds of milk and 791.2 pounds of butter fat. During her last lactation period of 196 days in 1933 she produced 4,069.4 pounds of milk which tested 3.94, giving a total of 160.2 pounds of butter fat. In a 7-day test as a 5-year-old, she produced 449.8 pounds of milk and 22.526 pounds of butter fat, or a little more than 3.2 pounds of butter fat per day. During her lifetime, or for 11 lactation periods, she produced 155,319.8 pounds of milk and 5,641.01 pounds of butter fat.

One of the twin daughters of Inka produced as a 4-year-old, 22,699 pounds of milk and 849.9 pounds of butter fat. In female offspring Inka has contributed to the K. S. C. dairy herd, nine daughters, five granddaughters, four great-granddaughters, four great-great-granddaughters, and three great-great-great-granddaughters.

One of the sons of Inka in service at the State Sanatorium at Norton, has made an outstanding record as a sire of production. Seven daughters of this bull at an average age of 2 years and 6 months, had an average production of 15,857 pounds of milk and 535 pounds of butter fat.

Inka was an outstanding producer of soft-curd milk, the curd tension of her milk averaging below 30 grams.—Marion B. Noland, '35.

Tularemia—Rabbit Fever

Tularemia is an infectious disease caused by *Pasteurella Tularense,* occurring in nature as a plague-like disease of rodents, especially rabbits and hares. In man it is a disabling disease and in some cases has proved fatal. It has been placed in the same genus as the organism causing bubonic plague. It is one of the first all-American diseases completely worked up by Americans.

The disease was discovered by McCoy in Tulare county, Calif., in 1910, taking its name from the tule-a-bulrush growing there.

In 1919, Doctor Francis proved that the organism of the disease was transmitted from animal to animal by means of insect bites, such as woodticks, lice, fleas, horseflies, and deer flies. Since that time the disease has been found in the snowshoe rabbit, the cottontail rabbit, the jack rabbit, the red and gray fox, coyotes, and in skunks, woodchucks, opossums, muskrats, rats, mice, ruffed and sharp-tailed grouse, sage hens, and quail in their wild state in many sections of the United States.

Just recently an outbreak of tularemia in sheep with a loss of 200 head was traced to a pasture known to have sick and dying jack rabbits in it at the time the sheep were turned in. The disease-carrying ticks from the sick rabbits spread the malady to the sheep.

The greatest difficulty in diagnosis is that tularemia is not well known. Doubtless many cases have been wrongly diagnosed as the flu, septic infection, or other kindred disease because of superficial resemblance at some stages of the disease. The principal clinical signs upon which to base a diagnosis are: Sudden onset accompanied by headaches, chills, aches, bodily pains, nausea, vomiting, sweating, prostration, and irregular fever. There is often a brief remission to about normal on the third or fourth day, after which the temperature rises again and does not fall to normal for two or three weeks.

(Continued on page 58)

Soil Survey

J. R. Latta, '34

Differences and variations in soils have been recognized for many centuries, but only during the past five decades has there been any effort to familiarize the public with these variations. The soil survey reports which have been published for the past 40 years by the Bureau of Chemistry and Soils of the United States Department of Agriculture are the result of such an attempt.

The soil survey report, for which the county serves as a unit, gives a classification of soils in the area on the basis of soil characteristics. The information contained in the report is obtained after the soils have been carefully studied and mapped in the field. The soil surveyor maps the soils of an area, using the soil type as the unit of classification, which includes those soils that are essentially alike in all characteristics. The boundaries of the soil type are established after the soils have been examined and studied in the field. The examination includes a study of both surface soil and subsoil. The types mapped in one area are then correlated with other soils having the same characteristics in areas previously mapped.

A map showing the location of the soil types is then published as a part of the soil survey report. Each soil type is represented on the map by a particular color which is shown in the legend. The map also includes the location of roads, towns, railroads, country churches, cemeteries, streams, and rivers. These are located on the base map by the surveyor along with the soil boundaries. The field work which is necessary for making the soil map and writing the report is done by representatives of the Bureau of Chemistry and Soils in cooperation with men of the soils staff of the agricultural experiment station in the state in which the survey is being made.

In addition to the soil map the soil survey report includes various items which are linked very closely with the utilization of the soils of a particular county. A general description of the agricultural environment of the county is given. The part dealing with climatic environment includes data and discussion of the annual precipitation, occurrence of storms, date of frosts, and variations in temperature throughout the year. A detailed description is given of each of the soil types mapped in the county. The characteristics of different horizons and sub-horizons, drainage of surface soil and subsoil, occurrence of clay-pans, importance of erosion, crop adaptation, fertility, fertilizer needs, and relative extent in the area are given for each type of soil. A discussion of the type of agriculture practiced in the county and the effect the soil types present have upon methods used by farmers of the county is also given in a report.

A large amount of information can be obtained from soil survey reports which would be helpful to farmers, county agricultural agents, extension workers, real estate men, land planning groups, and many others interested in the utilization of the soil. The farmer may use the soil survey reports to help him in planning a crop rotation or to get suggestions for increasing the fertility of his farm. The real estate men may use the report to show a prospective buyer of land the agricultural possibilities of the soils on a given farm. A prospective buyer of land, by examining a soil survey report, would usually be able to get a much better idea of the value of the land that he is considering. County agricultural agents and extension workers may use the reports as an aid in planning cropping systems and in suggesting better soil practices for farmers. In a few localities the soil map has been used as a basis for establishing land value. The report may be used to locate areas suitable for home-

steading as well as locations for reclamation projects. It is being used more each year for various items in connection with soils and their uses.

TULAREMIA—RABBIT FEVER

(Continued from page 56)

The final diagnosis in tularemia rests on an agglutination of *Pasteurella tularense* by blood serum collected after the first week of the disease. Diagnosis in animals consists in finding necrosis (which sometimes may be in the form of minute spots) in the spleen, liver, and lymph glands.

The disease may be avoided by most people by wearing rubber gloves when dressing rabbits. Inasmuch as the germ is killed by heat, thorough cooking of rabbits destroys the infection in the meat. No one should remove woodticks or horseflies from domestic animals with his bare hands but should always wear gloves. Hunters, ranchmen, and farmers are particularly warned concerning the handling of wild rodents found dead in the field. Wild rabbits which are easily caught by a dog or easily shot because of sluggish movement are very apt to have the disease.

Statistics show that the number of cases of tularemia is increasing at an alarming rate. It is essential that immediate attention should be given this disease.

Tularemia is a new disease and much is yet to be learned about it. It may cause serious disease in animals and man. It has caused serious disease to wild rabbits and ground squirrels. There is no reason why it may not infect the tame rabbit and later become a problem for those who breed these rabbits. It is giving trouble to the stockmen in the west by causing sickness and death in sheep. It may even affect other domestic animals. It is very important that preventive measures be taken without delay.—Claude C. Cheney, '35.

A New Market for Kansas Flours

Considerable interest is being manifested by Kansas millers in the removal of tariff barriers from Cuban wheat imports. Until recently, mills in the United States were unable to compete in Cuba with South American mills. The opening up of this territory is a distinct benefit to American flour mills. The next six months should be characterized by feverish activity on the part of Kansas mills to get a good share of the Cuban trade which amounts to about 800,000 barrels annually.—A. H. Rousseau, '35.

C. R. Enlow, '20, M. S., '27, is with the Division of Forage Crops and Diseases, United States Department of Agriculture. He is in charge of pasture investigations in the northern states and recently made a plant-exploring trip to Russia for the United States Department of Agriculture.

Chester A. Wismer, '31, M. S., '33, who was working toward his doctor's degree in the University of Minnesota last year, is now employed by the Firestone Rubber Company and has sailed for Liberia. He will do bud propagation work with rubber trees for an indefinite time.

THE PLAINS SHELTERBELT PROJECT

(Continued from page 38)

ways. Drifting snows are caught and held until spring thaws release them in the form of water to saturate land on which they were deposited. Snows are prevented from being swept by the wind into gullies or draws, there to melt in the spring and run off as flood waters without enriching the fields with moisture. As the season progresses, loss of moisture by evaporation is reduced in proportion to the reduction in wind velocity.

The shelterbelts will be flanked by low shrubs and undergrowth as a

means of making them most effective, and such shrubs will have a high value in furnishing food as well as protection to game and song birds. The alternation of strips of trees with cultviated fields will provide ideal conditions for the propagation and conservation of upland game, which if properly handled may bring the farmer some cash return. The shelterbelts will beautify the landscape and provide a haven for men, beasts, and birds.

Last among the benefits of the shelterbelt project—but by no means correspondingly unimportant—is the relief that is to be offered by it to an agricultural population through cash wages. This benefit will not be underestimated by anyone familiar with the Middle West in its present condition. Relief in this region, whether it be a part of the shelterbelt project or some other worth-while undertaking, is not a charity; it is an investment. A region of such size and importance cannot suffer as the Middle West has suffered without affecting the far corners of the country. It is planned to hire the farmer to do the fencing, to prepare the land for planting, and to cultivate the trees after they are planted, together with such other work as the project may offer, paying him cash wages for such work. It is hoped that the leases can be executed for a ten-year period and that the lease rental or purchase price can be paid in one payment. It is planned that the equipment needed in the performance of the foregoing operations be rented from the farmer and that he be paid in cash for its use. These direct monetary benefits will come to the farmers in the shelterbelt project if the project is made permanent by the 74th Congress.

The entire project is based upon the provision that the government shall own, or control by lease, the land on which the trees are planted, the lessor in the latter case having no vested interest in the trees as long as the lease is in effect. This provision is well justified by the fact that under private control trees are seldom given the protection necessary to insure long life, even though they may be given much care and cultivation while young. The other reason is that the entire undertaking should be a public improvement and not a subsidy to a certain proportion of farm residents.

The method of obtaining leases in each case will be by negotiation between owners and representatives of the Forest Service. The government representatives will consider every factor which will affect the value of the shelterbelt to adjacent farms. As far as possible the belts will be located so as to return the greatest possible service.

The Planting Plan

Within the protective zone, the plan is to grow trees on approximately one-fortieth of the entire area. It is evident, therefore, that agriculture is not to be crowded out. In the main, this planting is to take the form of strips 10 rods wide through the central portion of each section of land, taking about 20 acres out of each 640 acres, which will be devoted to tree planting.

The strips cannot be located the same in every section, nor under any mathematically precise scheme. In Kansas the east-west belts will predominate although under certain conditions belts will extend north-south. In any given section or group of sections the direction of the axis of the windbreak may be varied to fit the use of the land, the location of farmsteads, and to some extent the topography, without changing the essential basis of fairness and equality that the acreage shall be about the same in each section and that one farmer shall be given this benefit as much as another if possible. The fact that this region and its farms were originally laid out by sections and the sections further divided into "halves" and "quarters" means that in most cases the shelterbelts will follow the property division lines.

Narrower belts placed much less than a mile apart have been suggested. There are two reasons for not consid-

ering this feasible, at least in the initial stage of the project; namely, the expense of protecting such belts from livestock, and the belief of foresters that the only way in which trees may conquer the prairie and persist for long periods is by a mass effort which promotes the accumulation of litter and underbrush that will protect the soil from the drying effects of the sun and wind and will allow the ready percolation of water into the soil. All these are features which distinguish the "forest" from the prairie, or even from "open woods." This general theory also dictates the policy that the trees should be planted close together if they are to crowd out grasses and other sun-loving plants, and keep them out when cultivation ceases after a few years, but at the same time not so close as to make cultivation in the early stages difficult and to create an excessive drain on available soil moisture.

Various departures from this general plan may be considered, such as additional small clumps of trees that will furnish much needed shade for stock in pastures, larger groves or blocks where human social requirements for picnic grounds or parks are especially urgent, and trees on suitable rough land needing protection from soil erosion. These items are mentioned merely to show that such special modifications are being given consideration, but the primary purpose is to furnish protection from wind, and that agricultural land will be the first considered and the first on which trees will be planted.

For protective purposes the three essentials of a shelterbelt are height, length, and density. The greatest height is to be obtained by putting the tallest growing trees in the center of the belt and to some extent forcing them to shoot upward. These are to be flanked by shorter trees, and at the extreme edges of the belt by shrubs, so that the outside conformation of a good belt is somewhat the shape of a gable roof. This shape tends to divert surface wind currents upward. This effect will be at work both winter and summer.

It is thus by a mass effect of tall trees, short trees, and shrubs that a dense and really effective barrier against the wind must be created. No individual shelterbelt will be continuous for more than about a mile because of the need for providing protection from different directions and because openings must be left for roads and for other purposes.

Preparation of the Ground

Before planting, the ground to be used will be plowed or listed and if possible fallowed land will be selected. After the first season practically all of the strips on which planting is to be done will be secured early enough to allow for fallowing one season before planting.

Care and Cultivation

After planting is done, weed growth must be kept down by cultivation until the trees shade the soil sufficiently to suppress such growth. It is hoped that after a few years the mulch formed by the litter will cover the ground and eliminate the need of cultivation. The details of the cultural work will be left to the Forest Service, which will hire local men, teams, and farming implements to do this work.

Species To Be Planted

The whole question of which species of trees and shrubs to use and which not to use has been settled very largely by the current drought. Those that have withstood the present unfavorable conditions are the ones that will be used. These species will be planted, not because they are fast-growing, not because they are the easiest to handle in the nursery or to get started in the shelterbelts, but because they can be expected to survive during extreme conditions which may come in the next big drought 20 to 40 years hence. They will be the native trees of the western region that have become adapted to the climate and the soils through many generations. Trees found growing successfully in any region at the present

time will be the guide in selection for that locality.

The selection of trees and shrubs for the shelterbelts in Kansas will be made from the following species: Russian olive, Chinese elm, American elm, hackberry, green ash, honey locust, black locust, bur oak, black walnut, Osage orange, cottonwood, Kentucky coffee tree, red cedar, Austrian and western yellow pines, and such other varieties as may be found to be desirable. It is evident that some of these species will not be of any value on certain sites. It is also true that certain types of land will never support tree growth of any kind. Such land will not be planted.

Special attention has been given to securing seeds from within the zone of the shelterbelt from which to grow the trees for the future plantings. The surviving trees now growing within the shelterbelt zone have proved their superior ability to withstand drought and hardships that proved fatal to those that have failed in recent years. Securing seeds from such trees is an attempt to follow up-to-date scientific practices in the propagation of superhardy strains of recognized hardy species that have proved their adaptation to local environment.

Location of Kansas Shelterbelt

In Kansas the strip of shelterbelts will extend from the Nebraska line to the Oklahoma line. The eastern boundary will be determined by the soil formation, the average annual rainfall, and crop production records. It is contemplated that the eastern boundary will fall approximately on the 25-inch rainfall line but this will be modified somewhat in the southern part of Kansas to include some of the more sandy regions east of the 25-inch rainfall line. The shelterbelt will be extended west as far as possible. In this region, natural tree growth is, with only a few exceptions, restricted to water courses and lowlands adjacent to them. The general absence of trees is explained in a variety of ways. Such explanations have been plentiful, varying from the detrimental effects of wind and sun, summer heat, and droughts, to prairie fires or even to the presence in the soil of substances and organisms which are toxic to tree growth. Alkali soils, for example, will not permit the successful growth of trees.

Any explanation that in any degree explains the absence of native tree growth must give a large measure of importance to the effects of fire. The Indians of central and western Kansas attempted to discourage winter visits of northern tribes by burning the prairies north of the Arkansas river. The deer and buffalo would desert the burned-over tracts and the roving Indian would find no pasture for his war horse or pack pony. In favorable seasons the northern tribes reached the Arkansas and the southern tribes would burn the area from the Arkansas to the Cimarron watershed. All of this time the fire was the factor that kept the timber growth from encroaching upon the domain of the prairie. Older settlers of northeastern Kansas tell that in the early days even that section of Kansas that now has abundant natural tree growth had scarcely a tree except in those areas so protected that fire did not get a chance to do damage. Practically all of the trees of Kansas have come since the white man began controlling the prairie fires. The actual number of trees in Kansas is greater now than it ever has been before and is increasing each year. Most of the trees of the state are not old, they represent in most cases the first generation of trees on these prairies. There is no cut-over timber land in Kansas excepting small tracts in the extreme eastern part of the state.

Plans for the Kansas Shelterbelt Project call for a planting of from 25 to 40 linear miles of shelterbelts in Kansas in the spring of 1935. Unless substantial rains fall in northern Kansas within the shelterbelt zone between now and March 1, or suitable fallowed

sites can be obtained in this region, planting will have to be limited to the southern part of the shelterbelt zone in 1935, where moisture conditions are adequate and trees will have a good chance to grow. Leases of the shelterbelt strips are being made at the present time and wherever possible the land is being made ready for planting the trees. Lists of available planting stock have been secured and there is an adequate supply to make this initial planting. If congress approves the project, operations will be increased and several hundred miles of shelterbelts per year for the next several years will be planted. The present efficiency of the Forest Service will insure the greatest number of growing trees possible per dollar expended.

The Plains Shelterbelt Project is a beginning for more extensive tree planting in the Plains region. It will stimulate further planting by land owners. The accumulation of knowledge and experience will prove of great value and future planting will prove more and more successful under conditions which may seem to be very hazardous at this time.

The shelterbelt project implies more than the mere planting of strips of trees. It means an attempt to raise the living conditions in the Plains region for thousands of people to a higher level of permanence and stability; it means building up of communities provided with the comforts of a higher cultural life; it means development of all the potentialities of the region; it means added protection, safety, and happiness to the inhabitants of more than one-fourth of the agricultural area of Kansas.

Farming in the Land of the Pyramids

M. H. Radi, M. S., '35

Member of the Egyptian Educational Mission in America

The discovery of King Tut's tomb brought to light a true picture of the ancient Egyptian culture and revealed that the early Egyptian civilization and progress were the direct outcome of prosperous farming in the great valley of the Nile. The Biblical story of Joseph, who forecasted the approaching famine and stored as much Egyptian grain as the sand of the sea, proves that Egypt has been blessed in its unequalled farming prosperity.

Egypt is an ancient agricultural country and farming has been the occupation of the majority of its people since the early days of history. Farming in Egypt is quite different from farming in America; in fact, Egyptian farm life, farm operations, and farm customs and habits have no similarity, in most cases, to those of America. Farmers in Egypt live in small communities or villages, around which, to as far as five miles or more, the tillers of the soil go out daily to work.

The southern valley and the northern delta, the two main agricultural sections of Egypt, each has a different farming scheme. In the South, the valley is composed of a long but narrow strip of land. It ranges from two to ten miles in width while its length is several hundreds of miles. Throughout the length of the valley, runs the Nile river from south to north, and on both of its sides stand little sandy hills marking the border line between the cultivated area and the great sandy deserts which cover more than nine-tenths of the total area of Egypt.

On a large portion of this narrow, long valley the water of the Nile overflows every year. From August to November the land is covered with water to a depth of 6 feet or more. This period of flood lends to that part of south-

ern Egypt the most picturesque scenes of the year. Everywhere the land is covered with water so that it looks as if it were a great lake. Here and there the villages, built on high platforms, are rising above the water; stately groves of high palm trees are scattered throughout the valley; and little boats loaded with men, animals, products, and merchandise are sailing from one village to another. The marvelous beauty of the flooded area surpasses that of Venice and its picturesque gondolas on the shores of the Adriatic.

Late in October and early in November the water recedes. Within a few days after the flood is over, the farmers sow their fields with different kinds of crops and the soil is slightly scratched by drawing a wooden board over its surface to cover the seeds with mud. Then the fields are left to nature until the harvest time comes.

Wheat, beans, barley, onions, lentils, clover, and sorghum are abundantly produced by this crude method of farming that has been in use since the old days of the Pharaohs. The well-soaked land of the valley, upon which the water had stayed more than three months, is damp enough to grow these crops without any additional water.

Usually these crops reach a perfect degree of growth and maturity without using a fertilizer or any other growth-promoting material. The brown-colored water of the flood season is heavily loaded with sediments and valuable plant food elements washed away from the Abyssinian mountains and the central African plains through which the Nile passes on its way to Egypt. These substances settle when the water flows over the land, and form a layer of rich soil year after year. Curiously enough, in these substances lies the secret of the inexhaustible fertility of the old Nile valley over which once ruled Khufu, the first pyramid builder, and Rameses, the Jew slaver.

Several thousands of years before the advent of the Christian Era, the ancient Egyptians worshipped the Nile as if it were a god. They believed in its divinity because it brought the fertility into their grain fields and pomegranate orchards and realized that their lands without the Nile could not have been any better than the surrounding lifeless, barren deserts. For this miraculous god which brought them prosperity and happiness they built magnificent temples, which are still standing on its banks today, and offered human gifts to signify their devotion. In these bygone days the human offerings to the great Nile were chosen from among the daughters of the nobles who joyously and devoutly watched their young girls thrown into the stream of the holy god amidst the most elaborate ceremonies.

In the delta lands of the north farmers follow methods more civilized than the primitive ones of the south in cultivating their fields.

At the beginning of the last century both northern and southern sections were using the same methods of farming. At this time all the country, from the Mediterranean coast to the Sudanese borders, was subject to the annual overflow of the Nile. Since then the north has departed widely from the south by adopting a new farming scheme based on irrigation. This extensive development of the irrigation system in the delta allows the farmer to raise a variety of crops on his farm every year.

The rise of the fame of Egypt among cotton-producing centers of the world is the direct consequence of the establishment of the irrigation system in the delta which was begun over a century ago by Mohammed Ali, the founder of the present royal family of Egypt.

FLOOD WATERS IN THE NILE VALLEY

The waters of the Nile covering an agricultural area in southern Egypt. Note the high palm trees. A portion of a village may be seen in the background.

The northern farmer is now able to grow three crops, one after the other, on the same piece of land within a 12-month period. This system, however, has deprived the delta lands of the most important source of fertility that was naturally supplied by the overflowing of the Nile, a problem which has been solved through the use of manures and fertilizers.

The sunny and frostless climate of Egypt, the rapid increase in population, and the abundance of water supply for irrigation have been the most important factors in the development of the intensive farming scheme in the delta. The average family farm in the delta is little less than three acres. From the products raised on such a limited area the farmer pays his rent and supports an average family of five persons.

The delta land is well adapted to the cultivation of many crops. Practically all kinds of farm products of both tropical and temperate zones are economically raised in this section. Long-staple cotton, a superior variety of the most desirable cottons of the world, all kinds of grains and legumes, sugar cane, citrus fruits, mango, palm trees, and a wide variety of vegetable crops constitute the main products of this great triangle of northern Egypt.

During all seasons of the year green feeds and grasses are raised for the use of dairy cattle and other farm animals. Under ordinary conditions it is possible for the farmer to maintain a pasture for his animals the year round.

Modern farming methods have been introduced into the delta section since the close of the World war. Today the high-powered modern tractor works side by side with the old wooden plough slowly drawn by oxen and buffalo. Transportation by trucks is rapidly increasing where once the heavy-stepping, curved-backed, long-necked camel had monopolized the traffic movements of the country. Once more, in the birthplace of ancient civilization, a struggle between old and new is under way.