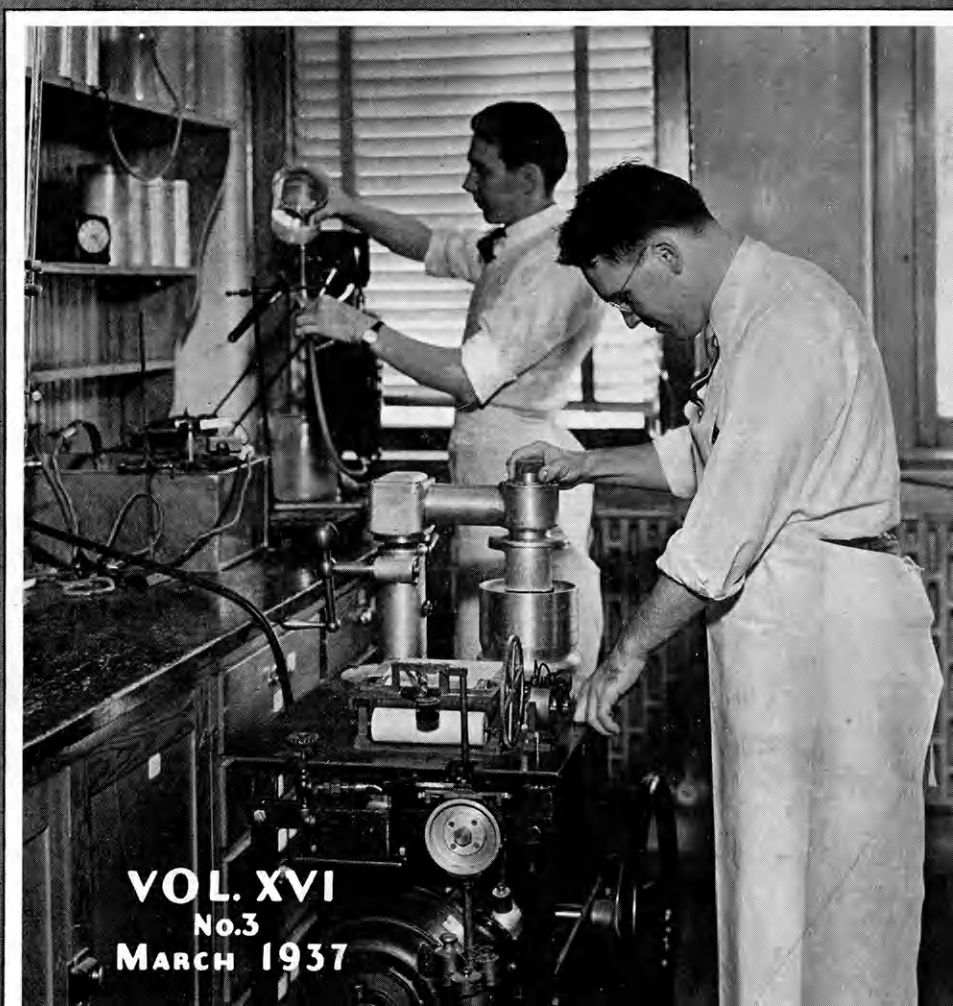
THE KANSAS AGRICULTURAL STUDENT

MANHATTAN, KANSAS



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AN EASTERN KANSAS ALFALFA FIELD. A VIEW OF THE AGRONOMY FARM, KANSAS STATE COLLEGE.

CONTENTS

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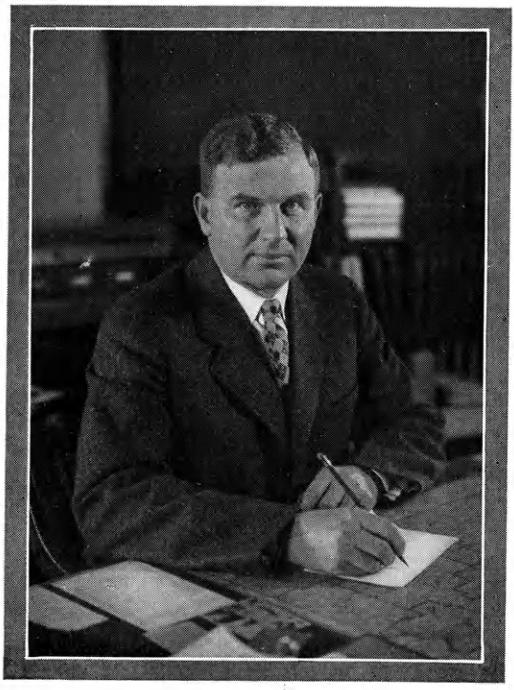
The Experiment Station Has Served Farmers Fifty Years

Alfred G. Schroeder, '37

Fifty years ago, Kansas was an infant among the states, sparkling with brand-newness, a part of the undeveloped frontier. Indeed, it was not then certain just what the new state would be good for. Some believed that the land would remain a vast area of buffalo grass, fit only for the use of the cattle kings. Others saw possibilities in minerals. Some held that the new state would become agriculturally important, and others were equally emphatic in their belief that nothing of economic importance would grow in the dry, thin air of Kansas.

Today, in less than the span of a lifetime, Kansas has become one of the most important of the agricultural states, second to none in the production of wheat, important in the production of cattle, sheep, and hogs, and dairy and poultry products. Kansas has come to personify leadership in modern, progressive agriculture.



DEAN L. E. CALL
Director of the Kansas Agricultural Experiment Station

The rapid and sound development of farming in Kansas is in no small part due to the fact that Kansas was one of the first states to establish an agricultural experiment station. For the past fifty years science and research have aided Kansas farmers in the solution of their problems, and an examination of the record of the experiment station discloses numerous outstanding accomplishments by Kansas experimenters which have contributed not only to the wealth and happiness of the state, but to the nation and world as well.

The Kansas Agricultural Experiment Station was organized under the provision of an act of congress approved March 2, 1887, commonly known as the Hatch Act. The Kansas legislature passed a resolution accepting the conditions of the act and vesting the responsibility for carrying out its provisions in the Board of Regents of Kansas State College, on the day following the approval of the act by the president March 3, 1887. The original federal funds provided have been supplemented by the Adams Act, 1906; the Purnell Act, 1925; and the Bankhead-Jones Act, 1935.

Has Many Projects

Today more than one hundred subjects, covering practically all phases of agricultural research, are being studied by members of the Agricultural Experiment Station staff at Manhattan, the central station, and at the branch stations at Fort Hays, Garden City, Colby,

and Tribune. There are four groups of experimental fields located in northeastern, southeastern, south central, and southwestern Kansas.

An experiment station is known by the results it produces. The Kansas Experiment Station has to its credit a long list of accomplishments. Some are well known because they contain elements that are easily dramatized by the press—spectacular. Some are little known except to persons in special lines of work. Yet all of the research of the station is woven into the farming pattern of Kansas to make it a stronger,

(Continued on page 85)

AN IMPROVED SORGHUM SELECTED AT THE EXPERIMENT STATION

Upper picture shows Atlas, a forage sorgo with a strong, sweet, juicy stalk and palatable white seed. This sorgo was selected at the Kansas station from hybrid material sent in by a farmer. It was released to farmers in 1928 and today has largely replaced Kansas Orange, a sorgo with a brown seed and comparatively weak stalk, shown in the lower photo.

"Men of Science" Are an Important Kansas State Crop

Clarence L. Bell, '37

Through the bleak Steppes of Russia a young man pushes his way in quest of new grasses. . . In a neat office in western Kansas a middle-aged man conceives an idea for a new machine that will be a great aid in soil conservation work. . . In southern Oklahoma a burly young man gazes proudly at some of his new sorghum plants that resist chinch bugs. . . In India lie buried the remains of a man who brought new wheats from the Steppes of Russia to the Plains.

All of these men, diverse as their occupations in the service of American agriculture, have something in common. That common factor is the B. S. degree they obtained from Kansas State College.

Kansas State College has done its full share in furnishing leaders for the all-important and world-wide field of agricultural research. A survey of the men whose names have become prominent in such fields as plant breeding, plant exploration, agronomy, animal husbandry, genetics, horticulture, and other experimental work reveals a high percentage of men who have received their training on this campus.

At present the field of genetics occupies the center of attraction in the realm of agriculture. In this field one of the very best is a 1911 graduate of Kansas State. **Donald Jones** served as editor of the Journal of Genetics for ten years. At present he is geneticist at the Connecticut Experiment Station, and is doing top-notch work as a plant breeder.

The experiment station at College Station, Texas, is fortunate in having **Dr. Paul C. Mangelsdorf** as a plant breeder. He was graduated from Kansas State College in 1921, and since that time has made tremendous contributions to the knowledge of genetics of maize and its relatives. His older brother, **Dr. Albert J. Mangelsdorf,** is with the Hawaiian Sugar Planters' Association in Honolulu. His work with sugar beets is widely and favorably known.

In the Kansas station is a 1910 graduate, **Louis C. Aicher,** who has made ex-

LOUIS C. AICHER
Superintendent, Fort Hays Experiment Station

cellent contributions to the fields of livestock production, grain sorghum investigations, and has been directly responsible for the basin lister and several other soil conserving devices. Since 1921 Mr. Aicher has been superintendent of the Fort Hays branch of the Kansas Experiment Station.

C. R. Enlow, a native Kansan and graduate of Kansas State College, has been a plant detective in Russia, Turkestan, Turkey, and other foreign countries in quest of new grasses, legumes, and trees which can be introduced into the United States to replant areas which may be permanently retired from grain crop production.

Another man who has aided in making the United States a better place in which to live is **Dr. David Fairchild,** a graduate of Kansas State College in 1888. He organized the Office of Foreign Seed and Plant Introduction into an active functioning service that has imported more than 100,000 specimens into the United States. A few of the plants imported by this great Kansan are the tung-oil tree from China; mango trees, the seeds and cuttings of which were brought from British India; bamboos from Japan; and the dates and nectarines.

A volume could not do justice to Kansas plant hunters. When one thinks of these adventurous souls who scour the far corners of the world searching for plants to improve agriculture, these names come into mind: **Dr. Charles F. Swingle,** who is largely responsible for improvement of the dates in this country; **Harry V. Harlan,** barley authority, who brought Kansas such varieties as Trebi and Club Mariout; and **Mark A. Carleton,** who brought Kharkov and Kubanka wheat to this country.

The livestock industry of this country has been greatly influenced by Kansas State graduates. **W. L. Blizzard,** who took his bachelor's degree in 1910, heads the animal husbandry department of Oklahoma A. and M. College. His major contribution has been the utilizing of cottonseed meal to fatten cattle. Incidentally he is recognized as one of the outstanding livestock judges of America.

John Lantow, who was graduated with the class of 1916, until recently was in the animal husbandry department of New Mexico Agricultural College, and served as head of that department for some time. At present he is in the Range Conservation Service, and is responsible for much of our knowledge concerning mineral deficiencies of our range grasses, and the supplements required to offset these deficiencies.

Another man, who has worked on the nutrition of range cattle, is **Harold Guilbert,** with the agricultural college, University of California. He has done special work in nutrition as associated with reproduction. Since his graduation in 1920 he has added to knowledge of vitamins in nutrition, and has helped

PROF. W. F. PICKETT
Professor of Horticulture, Kansas State College

to establish a definite correlation between carotin and Vitamin A.

Earl Hostetler, '14, is now head of the animal husbandry department of North Carolina Agricultural College. The swine husbandmen of America are in-

debted to him for much of their knowledge concerning the causes of soft pork, and feeding methods to avoid it.

It would be impossible to list the prominent geneticists of contemporary times without including **Dr. Jay Lush** well up at the head of the list. He has contributed much to our present-day knowledge of problems in livestock breeding and heredity.

Dr. Fred Griffee received his bachelor's degree from Kansas State in 1919. As a student he did the pioneer work in Kansas on hybrid vigor of corn. While working with "spot blotch" of barley he contributed to the field of genetics as related to disease resistance in plants. He has worked out the chromosome number in several of our barley species. Doctor Griffee became biologist at Maine University in 1928, and has been director of their experiment station since 1931.

Kansas ranks about tenth in apple production, but in the production of apple authorities she goes much higher. **John R. Cooper,** head of the department of horticulture, University of Arkansas, has done some outstanding research on the apples. He received his degree from Kansas State in 1912.

The fact that the tomato industry of the northern great plains did not develop rapidly in the early history of that section was largely due to the absence of adapted varieties with which to carry on economical production. **Dr. Albert Yeager,** a 1912 graduate, has been especially successful in developing varieties to overcome this obstacle. At present he heads the horticultural department of North Dakota State College.

It is only fitting that Kansas should retain some of these good "horticultural minds." The head of our own "hort" department, **Robert Barnett,** was graduated here in 1895; and **Dr. William F. Pickett,** an authority on physiology of fruit plants, is a 1917 graduate.

This list could be extended far beyond the space available for printing, to include such men as **Karl Quisenberry,** in charge of wheat investigations for the great plains; **E. G. Schafer,** professor of farm crops, Washington State College, **Roy R. Graves,** in charge of breeding investigations, Bureau of Dairy Industry, United States Department of Agriculture; **R. P. Karper,** vice director of the Texas Experiment Station, and numerous others.

The list is far from complete. Certain it is that some of our outstanding alumni have been omitted, but let it suffice to say that Kansas State is proud of her "Men of Science."

Eggs with Windows

Floyd Maynard, '38

An observation incubator, one in which the development of chick embryos can be watched, has been built and was demonstrated at the Engineers' Open House by the Kansas State College department of poultry husbandry in cooperation with the electrical engineering department.

The incubator has a glass top. Eggs in various stages of incubation, with their tops removed, are placed in the machine, revealing development of the embryo chick.

The display attracted much attention at Open House. In eggs of two days' incubation, the heart could be seen plainly beating on top of the yolk.

Maurice Wyckoff, '35, is county agent of Labette county.

W. N. Page, '33, is teaching vocational agriculture at Sabetha.

Russell Reitz, '27, is helping finish the shelterbelt work here at Manhattan.

F. E. Davidson, '33, is superintendent of the southeast Kansas experimental fields at Parsons.

Judging Team Third at Denver

A. Eugene Harris, '38

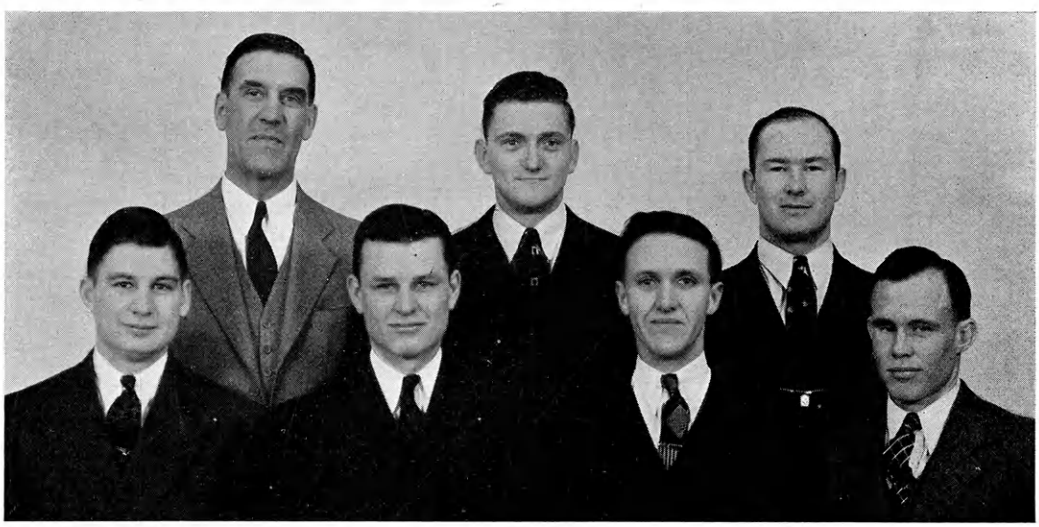
The Kansas State College junior livestock judging team placed third in the intercollegiate livestock judging contest, held in connection with the national western livestock show at Denver January 16. Six teams competed in the contest, with the Colorado Agricultural College winning first and the Texas Technological College placing second. The Kansas team was composed of Kenneth A. Fisher, Newton; A. Eugene Harris, Grinnell; Waldo W. Poovey, Oxford; Elmore G. Stout, Cottonwood Falls; C. Peairs Wilson, Anness; and F. Louis Brooks, Scott City.

Two Kansas State men ranked in the upper 10 contestants. Waldo Poovey placed ninth with a score of 707, which was only 30 points behind the high man of the contest, and Peairs Wilson was tenth with a score of 706 out of a possible 800 points. The Kansas students showed unusual consistency as a team by having only 22 points difference in the total score of any two men. The teams and their scores are as follows: Colorado, 3,565; Texas, 3,547; Kansas, 3,470; Utah, 3,457; Wyoming, 3,426; and New Mexico, 3,293.

The show, which is recognized as the world's greatest exhibit of carload lots of bulls, was judged by Prof. W. L. Blizzard, a former graduate of Kansas State College and now head of the animal husbandry department at the Oklahoma A. and M. College, Stillwater. Prof. H. B. Osland of the Colorado Agricultural College was superintendent of the judging contest. Each year the Kansans attend the annual banquet for Kansas State College alumni living in Colorado, which is held in Denver at the time of the stock show. This year members of the Kansas team gave short talks, telling of current campus activities. Graduates were present from classes as far back as 1888.

Edwin Sample, '36, is vocational agriculture teacher at Fairview.

Gerald Winters, '31, has a farm which he manages near Oswego.



DENVER JUNIOR LIVESTOCK JUDGING TEAM

Back row, left to right—Prof. F. W. Bell, coach; Waldo Poovey, Louis Brooks. Front row—Kenneth A. Fisher, C. Peairs Wilson, Elmore Stout, A. Eugene Harris.

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CONGRATULATIONS!

Comments from the ringside and opinions of old veterans of the show acclaim this year's Little American Royal the best in history. A word of praise is due to the committees in charge, to the showmen, and to all others who cooperated in such a wholehearted way to help present this year's show.

We are proud of the fact that our Agricultural Division could entertain our Farm and Home Week visitors with such a fine exhibition of livestock and showmanship. We are even more proud of the display of leadership and loyalty, and of the spirit of cooperation that characterized the planning and execution of the event.

We are told that the ability to cooperate and work with others is one of the most valuable assets a man can possess to help him attain success. We develop this ability by actual participation in cooperative endeavor with other people in events such as the Little American Royal. The effective organization of this year's Royal demonstrated that the students in our division are acquiring this ability at a rapid rate.

Kansas State College agricultural students do not consider this divisional activity as a task to be performed, but rather as an opportunity to acquire actual experience in leadership, cooperation, and showmanship, and at the same time to provide a program for our visitors that is educational as well as entertaining. This spirit accounts for the success of our 1937 Little American Royal. CONGRATULATIONS!

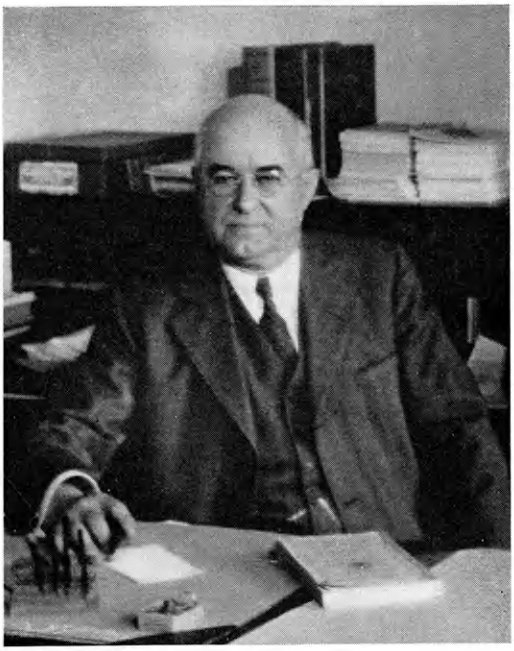
WE ARE GRATEFUL

When Governor Huxman signed the bill giving Kansas State College a new chemistry building, future students of our college were rescued from crowded classes, midnight laboratories, and inadequate equipment.

Of even greater significance than classroom improvement is the promise of facilities for carrying on research and experimental work of a chemical nature, which are necessary to any agricultural department. Mr. Governor and Mr. Legislators, we are indeed grateful to you.

HUGH DURHAM RECOVERING

Friends of Prof. Hugh Durham, Assistant Dean of the Division of Agriculture, will be gratified to learn that he is recovering rapidly from his recent illness. He has recovered sufficiently to



PROF. HUGH DURHAM
Assistant Dean of the Division of Agriculture

be up and around the house and to take an occasional automobile ride.

Professor Durham is greatly missed at his desk in the dean's office. No faculty member has devoted more time and painstaking attention to the needs of the students of the college than Professor Durham. He was always at hand to lend assistance to students in time of need and to offer words of encouragement in times of discouragement and disappointment. All join in the hope that he will be back soon to his accustomed post fully recovered in health.

FOUNDATION FOR FARMING

It is economically impossible for the individual farmer to carry on experimental work to any great extent, yet the whole of his operations depends to a large degree on knowledge that has been accumulated through research and experimentation. It is one of the advantages of our highly specialized society that this type of work has been delegated to men especially trained for it who belong to such organizations as the state experiment stations.

Research is the biggest job of the agricultural experiment station; indeed, research forms the foundation of everything that it does. Through the agency of the experiment station new knowledge unearthed by scientific detective work is translated to new crops for farmers, improved plans for production, and valuable aids in combating insects and pests that attack plants and animals. Today's farmer finds that the service provided by the experiment stations lays the foundation for his farming.

Agriculture is dynamic. There always will be new problems to be solved. Consequently the demand for trained men to carry on this work will be continuous. Plant breeding, one of the most fertile fields of research, still has much ahead of it. Soil survey work of this state is shamefully behind neighfers many opportunities in Kansas, for boring states in this work. There always will be insects and diseases to control. Much remains to be done in erosion control, irrigation improvement, and designing of better farm buildings and machinery. Studies in rehabilitation, land utilization studies, and farm planning have as yet only scratched the surface.

The story of the Kansas State Experiment Station during its fifty years is one that should reveal to the student the great opportunities for service that exist in this field. Let us, the future research workers, prepare ourselves so that we may continue in a creditable manner such excellent work as that which has been done and is being done at the Kansas Agricultural Experiment Station.

Legumes Are Important in the Kansas Farming System

Gilbert L. Terman, '38

There are five good reasons which indicate that the value of legumes under conditions where they may be grown cannot be overemphasized as far as Kansas farmers are concerned.

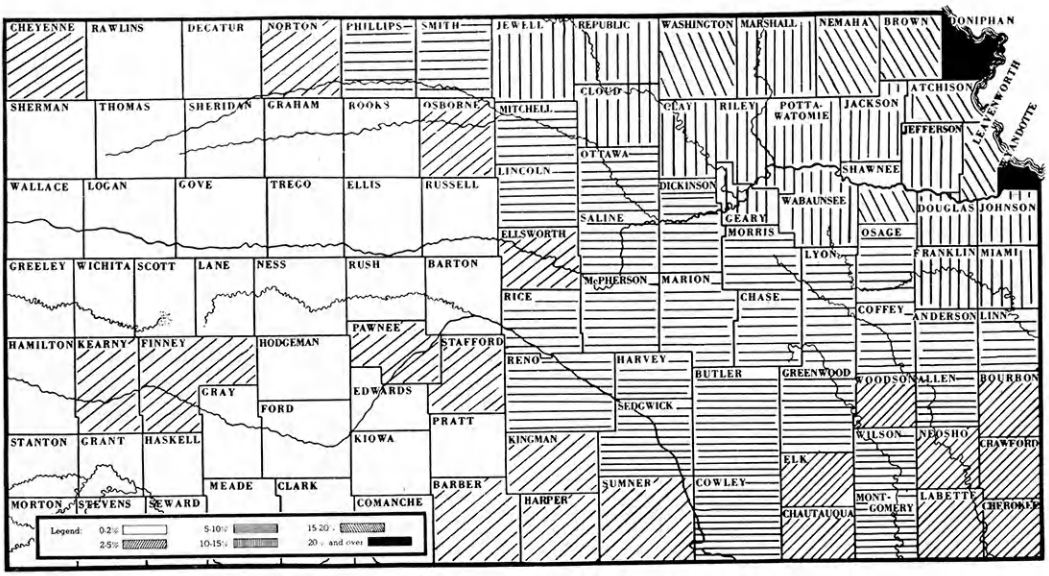
In the first place, legumes may be used to maintain soil nitrogen and organic matter in the soil by their use in rotations with other crops. Secondly, they are valuable as a high protein feed for livestock. Add to this the fact that they cover the ground a maximum period of time during the season and thus lessen soil erosion, that they are a source of cash income, that they tend to reduce risks in farming by adding diversity to grain production, and the main evidence of the case for legumes is in.

Legumes vary greatly in efficiency as soil building and nitrogen maintaining crops. Experiments carried on at the Kansas Agricultural Experiment Station and at other places have all resulted in the same conclusion—that alfalfa is the best legume for this purpose. Even though all of the top growth is removed as hay or by pasturing, still there is a continuous process of building up the soil nitrogen while the alfalfa stand is left on the land. The reason is that approximately one-third of the nitrogen of the plant is in the roots. Biennial legumes such as sweet clover and red clover are second in value to alfalfa as soil building crops. In these 25 to 30 per cent of the nitrogen is fixed in the roots.

Annual legumes have been found to be the least efficient as to their residual effect on the land. In these legumes, including soybeans, cowpeas, vetch, and field peas, less than 15 per cent of the nitrogen is in the roots. The residual effect of annual legumes seldom lasts more than one or two years, while alfalfa has been found to affect the yields following it for five years or more.

Legume production in Kansas, as shown on the accompanying map, is limited for the most part to the eastern half of the state. The amount of rainfall is the principal factor limiting the distribution of legumes in this state. No high efficiency legumes have been found which are adapted to dry land farming conditions. Also, in areas in which dry farming is practical and moisture is a limiting factor and where recommended farming practices are used, the maintenance of soil nitrogen and organic matter is not a serious problem. Only in the eastern half of the state is the problem of maintaining nitrogen and organic matter considered serious. Most of this region receives 30 or more inches of rainfall annually.

Summer and winter temperatures limit the growing of many legumes in Kansas. Certain of these such as peanuts and cowpeas are strictly warm weather crops and are adapted for the most part to southern states. Vetches and velvet beans, winter annuals, require mild winters and the warmer climate of southern states. Other summer annuals such as field beans and field peas are adapted only to regions having cool growing seasons and can-



WHERE LEGUMES ARE GROWN IN KANSAS

The map above indicates, by counties, the percentage of crop acres devoted to the production of legumes.

not stand the extreme heat of Kansas summers.

In southeastern Kansas, especially, and to some extent in all of the eastern part of the state, soil acidity limits the growing of good legumes. Alfalfa, sweet clover, and most other clovers are not tolerant to strongly acid soils. Due to the cost of liming these soils, many farmers have neglected the growing of these good legumes, and decreases in soil productivity have resulted. Lespedeza, primarily a poor soil crop, will do well on many low fertility and acid soils where alfalfa and sweet clover will not grow.

Low fertility soils also cause a limited acreage of legumes in some sections. The difficulty of establishing a stand on these soils often discourages farmers from the attempt. Of these soils, some require applications of phosphorus fertilizers, which some farmers feel they cannot afford.

Several recommendations, which apply mostly to eastern Kansas, may be suggested concerning the growing of legumes as an aid to the maintenance of soil nitrogen and organic matter, and the reduction of erosion and leaching of nutrients from the soil.

Keep a liberal proportion of good legumes in the rotation. Most agronomists agree that in order to have an adequate system by which soil productivity may be maintained, at least 25 per cent of the cropped land should be in legumes—that is, legumes should occupy any particular field a fourth of the time. By this one may easily see that almost the entire state is greatly deficient in the growing of this type of crop.

Maintain a soil reaction which is favorable for the growth of good legumes and for the maximum free fixation of nitrogen in the soil. The weight of evidence of experiments which have been carried on favors the liming of the soil and the growing of the better legumes instead of growing the poorer acid tolerant legumes such as lespedeza and soybeans.

Maintain the phosphorus content of the soil needed by legumes for a good growth. Not only does this increase the

yield of legumes but also of many other crops.

See that all legume seed is inoculated when planted unless it is known that the soil contains nitrogen fixing bacteria.

Leguminous or mixed pastures are usually superior to grass alone as pasture for dairy cows and other livestock. Also, results of experiments show that both wild and tame legumes are a valuable aid in the building up of the nitrogen of pasture soils. For these reasons it is well to include legumes in the pasture mixture.

Red clover is recommended only for the corn producing area of northeastern Kansas. This legume is not nearly as drought resistant as alfalfa and sweet clover.

The soybean is adapted to the eastern three or four tiers of counties. It will grow on soils too acid for alfalfa and sweet clover and will produce a fair crop on land too poor to produce a good crop of corn. Drought conditions and destruction of the crop by rabbits limit the growing of soybeans farther west. It is well to note that no other grain crop in Kansas will produce as much protein per acre as soybeans.

Pinto beans, a legume which will stand a great amount of drought, are being recommended for those sections where other legumes are not adapted. This is the principal legume of Cheyenne and Sherman counties.

Lime and phosphorus are needed to establish stands of sweet clover and alfalfa in eastern Kansas. It has been estimated that the counties in this area would like to plant an additional 238,000 acres of alfalfa and 203,000 acres of sweet clover. Money is being made available through the Agricultural Conservation Program and it seems advisable that farmers should take this opportunity to seed these legumes, which are badly needed in this part of Kansas.

In summary, alfalfa, red clover, and sweet clover are recommended for northeast Kansas; sweet clover and alfalfa where they may be grown, and lespedeza and soybeans on sour soil in southeastern Kansas; and sweet clover and alfalfa for central Kansas.

Junior Livestock Judging Team Makes Good Showing at Fort Worth

Vernal Roth, '38

The Kansas State College Junior Livestock Judging Team won four of the ten first place awards offered in the Collegiate Livestock Judging Contest which was held in connection with the Southwest Exposition and Fat Stock Show at Fort Worth, Texas, on Saturday, March 13, 1937.

Winning first as a team in the judging of both sheep and hogs, and with Charles Pence placing first in the judging of sheep, and Elmer Dawdy first in judging hogs, the Kansas State team won more first place cups and medals than any team in the contest. In addition to these four firsts, the Kansas team was third in judging cattle. Roland Elling was second and Waldo Poovey fourth in judging all classes of livestock. Elling was also second in cattle judging. The failure to place higher than sixth in judging horses and mules prevented the team from placing higher than third in the field of eight competing college teams.

The rating of the eight colleges in judging horses, cattle, sheep, and hogs, with the total score of each team follows: First, Oklahoma A. and M., 4,452; second, Texas A. and M., 4,391; third, Kansas State College, 4,386; fourth, University of Nebraska, 4,293; fifth, University of Missouri, 4,262; sixth, Texas Technological College, 4,255; seventh, University of New Mexico,

4,067; eighth, Mississippi State College, 3,897.

The members of the team were Elmer Dawdy, Washington; Charles Pence, Elmont; Roland Elling, Manhattan; Waldo Poovey, Oxford; Vernal Roth, Emporia; and Donald Andrews, Bloom, alternate. F. W. Bell, professor of animal husbandry at Kansas State College, was in charge of the team.

The team had many interesting and educational experiences during the trip. On the way to Fort Worth they judged Hereford cattle at Hazford Place, El Dorado, the farm of the late Robert H. Hazlett. Hazford Place is one of the outstanding Hereford breeding establishments in the world. Mules were judged at the C. B. Team Mule Company in Wichita, and at Stillwater, Oklahoma, the boys spent two days of practice judging, using the livestock of the animal husbandry department of Oklahoma A. and M. College.

ALUMNI NOTES

W. H. Houston, '30, is farming near Potwin.

Leland Sloan, '31, has work in the Soil Conservation Service, Winner, South Dakota.

William Thompson, '35, has a veterinary practice established at Okmulgee, Oklahoma.

H. H. Brown, '28, is teaching vocational agriculture at Manhattan High School, Manhattan.

Miner Salmon, '30, is working in the department of agricultural chemistry at the University of Wisconsin, Madison.

James R. Mason, '16, has recently been appointed manager of the Great Western Sugar Company's plant located at Billings, Mont. This is not only the largest unit of the Great Western Sugar Company but the largest factory in the country. Except for a period of military service in the world war, Mason has been in the employ of the Great Western Sugar Company since graduation. In this time he has had several promotions and gone from apprentice fieldman to near the top in the positions the company has to fill.

THE JUDGING TEAM WHICH COMPETED AT FORT WORTH
Back row, left to right—Prof. F. W. Bell, coach; Charles Pence, Vernal Roth, Roland Elling.
Front row—Waldo Poovey, J. Donald Andrews, Elmer Dawdy.

Colorful 1937 Little Ameri from Large

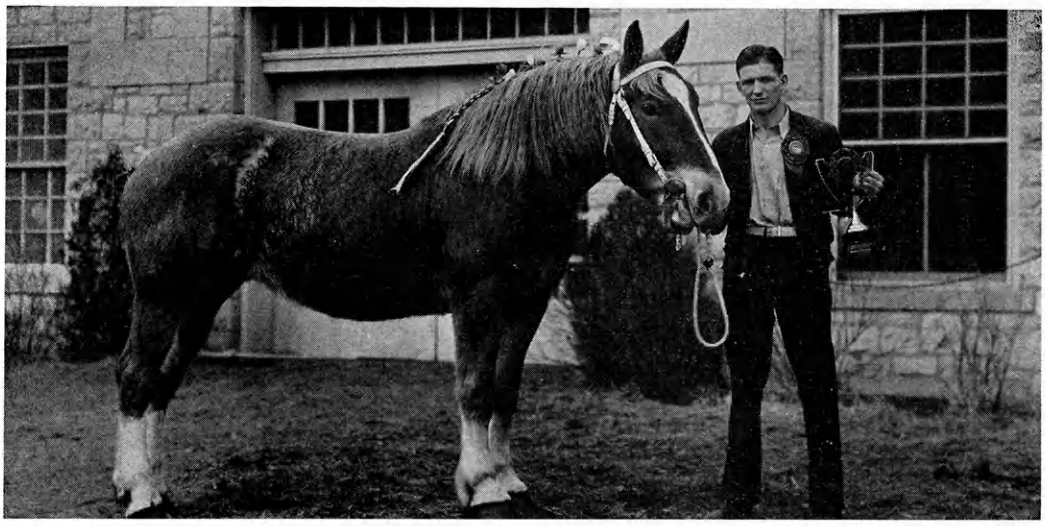
Roy Fre

With the clear, staccato notes of a bugle call at 7:30 sharp on the evening of February 11, more than 1200 people came to attention in the Kansas State College judging pavilion. The two buglers, dressed in the high top hats, long tailed coats, and striped trousers of Uncle Sam, stalked to their chairs as the fourteenth annual Little American Royal swung into progress. Excitement and anticipation filled the crowd as they sensed the lure and glamor of a genuine livestock show.

Before them they saw the large oval arena, sparkling with fresh, yellow sawdust and carefully enclosed with green drapery. The design of a savage, purple wildcat about eight feet long faced them from the center of the south arena. Encircling the wildcat, in letters nine inches high, was the inscription "1937 LITTLE AMERICAN ROYAL." The spectators saw the sweep of colorful flags in long rows about their heads.

During the evening, 16 classes of livestock, including more than 100 animals, carefully groomed and trained by students, paraded beneath these flags. The judges, G. E. Mahoney and J. W. Linn, Kansas State College dairy extension specialists, and B. M. Anderson, assistant secretary of the American Hereford Association, Kansas City, made awards on the basis of skill exhibited by the students in fitting and showing their animals. The number of entries exceeded any previous Little American Royal, and according to a great many who saw the show, the fitting and showmanship displayed was the best yet.

The show was a two-ring affair. It was presented in both the north and south divisions of the pavilion in an attempt to accommodate all of our Farm and Home Week guests, and at the same time have room for a large number of local people. Interest and attendance at the show have steadily increased since 1924, when the first Little American Royal was staged for Farm and Home Week visitors by the Dairy and Block and Bridle Clubs. In 1927 it was made a fitting and showing contest for students, and in 1935 the Agricultural



BLOCK AND BRIDLE DIVISION WINNERS

D. Dean Dicken, Winfield, who was grand champion showman of the Block and Bridle Division of the 1937 Little American Royal, showing the Belgian mare, Farceur's Heiress I.

can Royal Wins Applause Audience

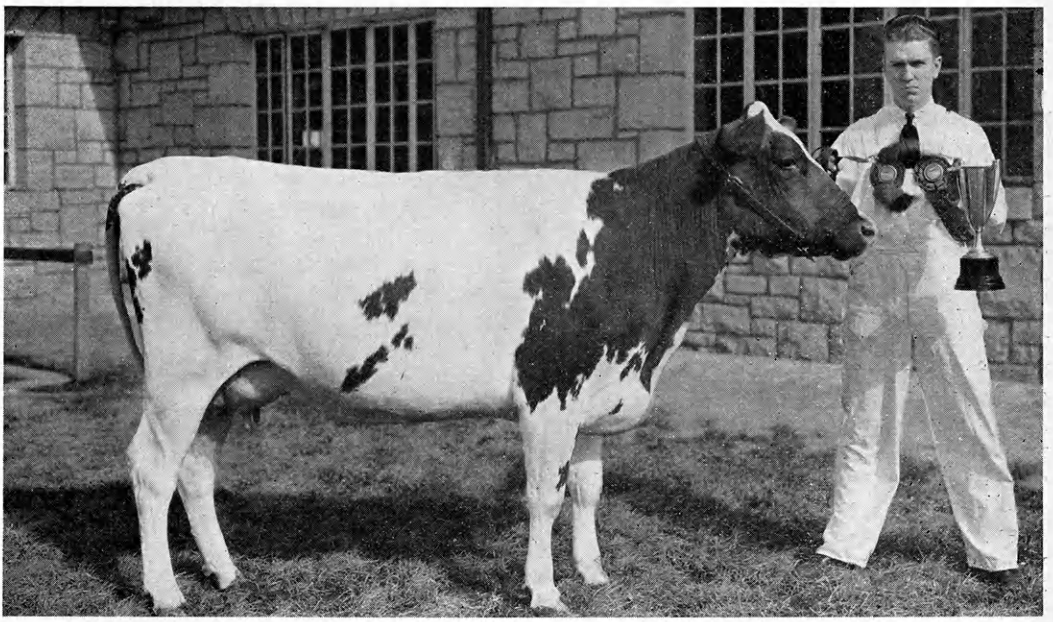
and, '37

Association joined with the two departmental clubs in helping to stage this annual event. Now, in 1937, the Little American Royal has made another major advance by providing a show for nearly twice the number of people who could see it under the one-ring plan.

On the south side, the jovial good humor of Charles Beer, Larned, president of the Dairy Club and announcer for the dairy division of the show, spiced up that part of the program. Fred Fair, Alden, president of the Block and Bridle Club, handled his part of the show with an air of ease and assurance. President F. D. Farrell presented this year's judging teams to the audience. L. E. Call, Dean of Agriculture, introduced F. H. Servatius, secretary of the American Royal Livestock Show, Kansas City, who presented trophies to W. S. Robinson, Nashville, and Dean Dicken, Winfield, championship winners of the Dairy and Block and Bridle divisions. The trophies were offered by the American Royal Livestock Show and the Kansas City Stockyards Company.

On the north side, Edwin Schuetz, Mercier, and Carl Elling, Manhattan, announced the two divisions of the show, and heads of the respective departments presented the judging teams. Roy Freeland and Wilton Thomas acted as ringmasters of the south and north sides respectively, while Herbie Ford and Bill Saubion were the two buglers.

Some unsung heroes of the show are Prof. David L. Mackintosh, of the animal husbandry department, Prof. W. H. Riddell, of the dairy department, Dr. W. E. Grimes, of the economics department, and more than ten score of hard working students, who gave freely of their time to help present our 1937 Farm and Home Week visitors with one of the most successful Little American Royals in the history of the show.



1937 DAIRY DIVISION CHAMPION

Walter S. Robinson, Nashville, who won the trophy awarded for the champion showman of the Dairy Division of the 1937 Little American Royal, showing Princess Gertrude Lass.

Block and Bridle Division

Fred Fair, '37

A record breaking Block and Bridle Show passed in review before 1200 visitors attending the fourteenth annual Little American Royal Livestock Show held at the college judging pavilion Thursday evening, February 11. Comprising 69 entries, the Block and Bridle division overshadowed the 62 entries last year and far exceeded the entry list of previous years. Animals shown this year were also in better condition than last year, in spite of the severe weather preceding the week of the show.

Grand champion showman of the Block and Bridle division was D. Dean Dicken of Winfield, showing the Belgian mare Farceur's Heiress I. F. H. Servatius, secretary of the American Royal Livestock Show, presented Mr. Dicken with the championship trophy donated by the American Royal Livestock Show and the Kansas City Stockyards Company.

Other winners in the Block and Bridle Show were:

Young mare class—Dean Dicken, Winfield, first; Kenneth Johnson, Norton, second; R. W. Kiser, Manhattan, third. Aged mares—W. H. Dieterich, Minneola, first; Don Andrews, Bloom, second; Don Kinkaid, Medicine Lodge, third. Champion horse showman was Dean Dicken.

Southdown sheep class—Carrol Wahl, Wheaton, first; Clifton Dawson, Norcatur, second; Waldo Poovey, Oxford, third. Shropshire sheep—Clarence Bell, McDonald, first; Vernon Martin, Kingsdown, second; Walter Campbell, Wilsey, third. Dorset sheep—Harold Fox, Rozel, first; Milan Smerchek, Topeka, second; J. L. Foster Jr., Emmett, third. Champion sheep showman was Clarence Bell.

Cattle classes, Hereford bulls—Arthur Leonhard, Lawrence, first; Earl Trapp, Waldo, second; E. G. Stout, Cottonwood Falls, third. Shorthorn heifers—Evans Banbury, Pratt, first; James Tomson Jr., Wakarusa, second; Paul Danielson, Lindsborg, third. Hereford calves—Dale Mustoe Jr., Rexford, first; R. L. Hendershot, Hutchinson, second; Dale Engler, Topeka, third. Aberdeen-Angus heifers—James Clark, Effingham, first; Vern Martin, Kingsdown, second; William Ljundahl, Menlo, third. Champion cattle showman was Arthur Leonhard.

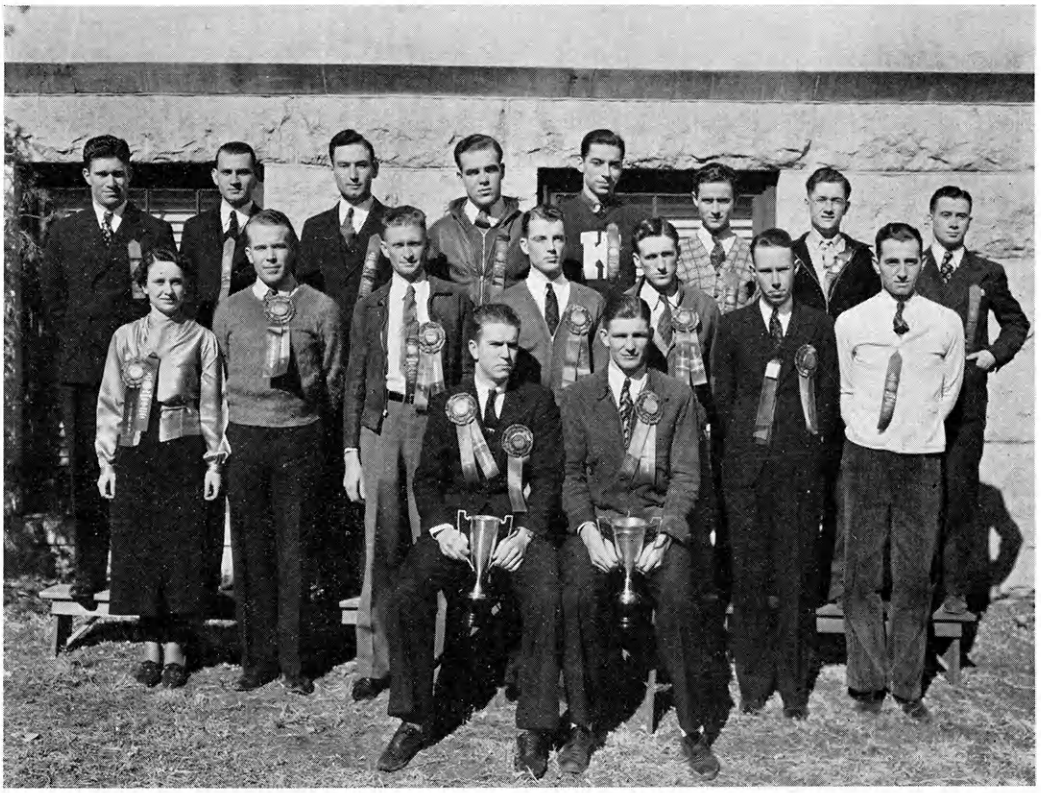
Swine classes, yearling Poland China gilts—Carrol Wahl, Wheaton, first; J. W. Kirkbride, Medicine Lodge, second; Louis Cooper, Peabody, third. Poland China sows—Dean Dicken, first; Charles Sanford, Milford, second; Bruce Barker, Burns, third. Champion swine showman was Carrol Wahl.

These winners were awarded ribbons for class placings and rosettes for championships of each kind of livestock. B. M. Anderson, assistant secretary American Hereford Breeders' Association, Kansas City, Missouri, was official judge of the Block and Bridle division.

1937 Dairy Show

The Dairy Show held in connection with the 1937 Little American Royal was conceded the best of its kind in recent years. There was a bigger entry list and more enthusiasm among the students than any time in the past. Nearly 30 per cent more students drew animals for this year's event as compared with previous years.

An excellent feature of the 1937 show was the way in which the students in dairy manufacturing supported the show. Some of these, who have had little or no experience with dairy cattle before, handled their animals like professionals and stood well in the final placings. A further interesting fact brought out was that more than 50 per cent of the students showing animals in the dairy classes this year were former 4-H Club members. These veterans



CLASS WINNERS IN THE LITTLE AMERICAN ROYAL

Left to right, front row—Walter S. Robinson, D. Dean Dicken. Second row—Mabel Baird, Clarence Bell, Clyde C. Reed, Arthur F. Leonhard, Elmer Dawdy, Carrol Wahl, Robert J. Steele. Third row—Fred G. Warren, Evans E. Banbury, Willard C. Davis, William M. Beezley, William H. Dieterich, Harold R. Fox, Dale E. Mustoe, James E. Clark.

of the show ring garnered a lion's share of the prizes, including three breed championships and the grand championship over all breeds.

This year the show was presented in duplicate on both sides of the pavilion and met with much favor. The classes were placed on the south side by Gordon Mahoney, extension dairyman, and C. O. Bigford, Kansas State College dairy herdsman. The show was then repeated on the north side where the placings were made by J. W. Linn. Thanks to Judge Linn's clever handling of the classes, few realized that they were seeing a mock show in which the final placings had already been made before the animals entered the ring.

This year the champion showman over all dairy breeds was Walter S. Robinson, Nashville, showing Princess Gertrude Lass. Walter is a former 4-H Club member and has shown Ayrshires for several years at state and national shows. He showed grand championship over all breeds in 4-H competition in two successive years at the Kansas State Fairs as well as placing second at the National Dairy Show in 1931. As grand champion showman in the dairy cattle classes, Walter was awarded a trophy presented by the American Royal Livestock Show and the Kansas City Stockyards Company, Kansas City, Missouri.

Elmer A. Dawdy, Washington, was adjudged champion Guernsey showman. He was showing Monarch's Mag-

nolia. Elmer, a junior in dairy husbandry, learned to show in 4-H Club work and spent one season on the show circuit with the successful Washington County herd. He was also a member of the 1936 Kansas State Dairy Cattle Judging Team which placed second at the National Dairy Show.

Clyde C. Reed, Kanopolis, won the Holstein breed championship by showing Dean Inka Elizabeth. Clyde is a former 4-H Club leader and has been in the Holstein business since 1928.

Mabel Baird, Arkansas City, Kansas, was declared champion Jersey show woman. She was showing Lunar Light's Duckling. Mabel has for seven years been a member of the 4-H Club, where she developed her skill in showmanship. She likes to work with cattle, taking an active interest at home and helping her father with the livestock and livestock records.

Placings in the dairy classes were as follows: Ayrshire cows—first, Walter S. Robinson, Nashville; second, Cecil R. Robinson, Nashville; third, Harold E. Jones, Concordia. Ayrshire heifers—first, Fred G. Warren, Beverly; second, Noel N. Robb, Niotaze; third, Robert E. Kitch, Winfield. Guernsey cows—first, Robert J. Steele, Barnes, second, John R. Brainard, Carlyle; third, Rex E. Watts, Havensville. Guernsey heifers—first, Elmer A. Dawdy, Washington; second, M. Max Dickerson, Parsons; third, Harvey E. Goertz, Hillsboro.

Holstein cows—first, William M. Beezley, Girard; second, Merle J. Parsons, Emporia; third, Fred A. York, Manhattan. Holstein heifers—first, Clyde C. Reed, Kanopolis; second, Russell H. Arensdorf, Ensign; third, Harold J. Scanlan, Abilene. Jersey cows—first, C. Willard Davis, Halstead; second, Arthur G. Jones, Reading; third, Marvin K. Stein, Sedgwick. Jersey heifers—first, Mabel Baird, Arkansas City; second, Jim F. Cavanaugh, Dodge City; third, F. Monroe Coleman, Sylvia.

Alvin Ploger, '36, is farming near Kinsley.

Merle G. Mundhenke, '29, is farming near Lewis.

Carl Rupp, '35, is farming near Moundridge.

Clarence Keith, '34, lives on his farm near Ottawa.

John Hamon, '33, is county agent of Wilson county.

Lewis King, '32, is 4-H Club agent in Shawnee county.

Ronald Curtis, '31, is in soil conservation work at Salina.

Clarence Bayles, '27, is county agent at Clay Center, Nebraska.

Ernest Chilcott, '27, is teaching vocational agriculture at Carbondale.

M. M. Taylor, '30, is now county agent of Thomas county. He is located at Colby.

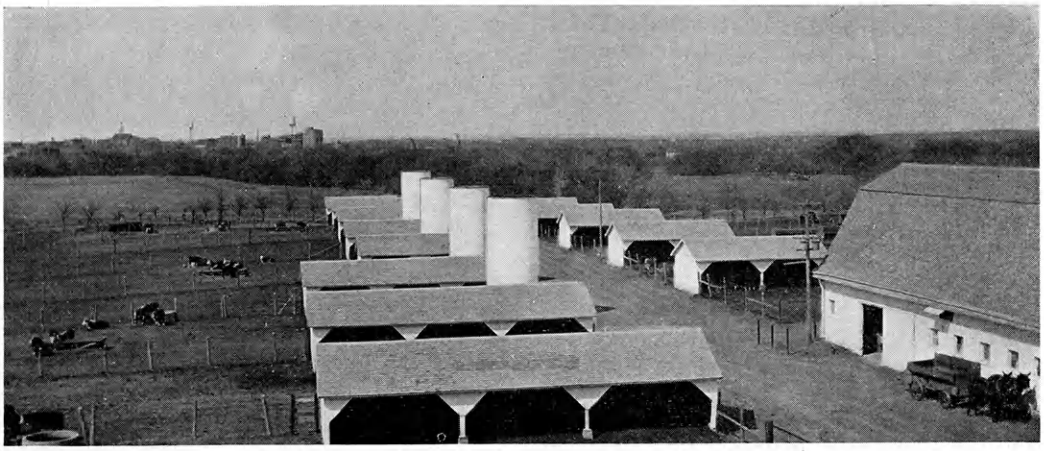
Lester George, '31, has a veterinary practice established at Chester, Nebraska.

Raymond Stover, '24, is county agent of Brown county. He headquarters at Hiawatha.

Harry F. Moxley, '25, is a specialist in animal husbandry at Michigan State College, Lansing.

Theunis Kleinenberg, '27, is now working near Petersburg-Transvaal, South Africa, his native birthplace.

S. G. Kelly, '29, is located at Uvalde, Texas, where he is working on insects for cocklebur control for the Australian government. This is the same work he had been doing here at Kansas State.



FEED LOTS AT THE FORT HAYS EXPERIMENT STATION
Here a number of experiments in testing the efficiency of livestock rations are carried out.

THE EXPERIMENT STATION HAS SERVED FARMERS FIFTY YEARS

(Continued from page 69)

more efficient, more productive system.

In the following paragraphs an attempt has been made to give the pertinent details of a few representative samples of the work of the Experiment Station, that the reader might judge for himself the manner in which it has influenced Kansas agriculture:

Protection Against "Blackleg"

The infection responsible for blackleg of cattle occurs in all parts of the world. Early methods of preventive vaccination reduced the annual loss to one per cent or even less but such a loss to the livestock wealth is a serious economic burden. With these facts in mind the Veterinary Department of the Kansas Agricultural Experiment Station began investigation in 1912. A commercial vaccine was developed and in 1916 the Department of Agriculture issued a license to the Veterinary Department at the Kansas Agricultural Experiment Station for the manufacture and interstate sale of blackleg aggressin—an almost perfect immunizing agent against "blackleg."

In 1911 the Agricultural Experiment Station realized not only that grasshoppers were increasing in numbers, but would also do enormous damage to crops. Recommended preparations of poison baits were not effective or practical, so the station worked out and perfected its own poison bran bait, together with the method of application. The original Kansas bait is made of 20 pounds of bran, 1 pound of white arsenic or Paris green, 2 quarts of syrup or molasses, 3 oranges or lemons, and 3½ gallons of water.

Prof. G. A. Dean, head of the department of entomology, conducted an extensive control campaign in 1913 over a large infested area in western Kansas to prove that it could be used in a practical manner to control the grasshoppers. The extensive campaign resulted in a saving of crops valued at more than 25 million dollars.

Balking the Hessian Fly

Since 1871 nine outbreaks of Hessian fly have occurred in Kansas, each attack occupying from two to six years and becoming increasingly severe. The Hessian fly destroyed at least 55 million dollars' worth of wheat in the five-year period 1912-17. Yet these losses have been drastically curtailed in recent years as the result of a program of fly prevention developed by the experi-

ment station. When practiced by all farmers in a community this program has proven to be practical and effective. It involves early, deep plowing of stubble, proper preparation of the seed bed, thorough destruction of all volunteer wheat, and planting at the time recommended by the station as the "safe-seeding" date for that community.

About 1910 a form of roup among chickens which was accompanied by sore eyes was causing such heavy losses to poultry raisers of Kansas that a bacteriologist was employed at this station to devote a portion of his time to the study of the disease. Little progress was made until 1916 when it was discovered that the lack of a certain dietary factor now known as Vitamin A produced a disease in rats characterized by sore eyes. This also proved to be the case in chickens. The reasons for the losses in Kansas were that very little yellow corn was fed and green feeds dried up because of the hot summer winds. Subsequent experiments by the departments of chemistry and poultry showed that "nutritional roup" may be entirely eliminated by feeding yellow corn or by adding alfalfa leaves or green vegetation when white corn is fed.

While studying the nutritional requirements it was found that chicks in nutritional rooms did not develop normally and that hens laid thin-shelled eggs. Investigations completed in 1923 showed that lack of direct sunlight in the nutrition laboratory caused the rickets in growing chicks and thin-shelled eggs from the laying hens. By opening the front of the poultry house to admit direct sunlight or by including in the diet cod liver oil which contained Vitamin D, both of these difficulties were eliminated. The real value of the discovery is that the poultryman can now safely grow his young chicks in confinement and off of the ground and thus eliminate certain serious diseases and parasites.

Revising Land Taxes

Taxes on farm real estate in Kansas increased 132 per cent and selling value only 28 per cent from 1913 to 1923. These with similar facts and a complete and well worked out plan of tax revision were presented by the Agricultural Experiment Station during the years 1923, 1924, and 1925. Discovery of concrete facts pertaining to assessment and equalization, trend in taxation relative to selling value, and comparative tax burdens resulted from extensive research. The most important provisions of the plan presented were as follows:

1. Classification of property for taxation purposes.
2. A low rate tax for intangible property.
3. A gasoline tax.
4. A tax on cigarettes.
5. An income tax.
6. A gross production tax.
7. A sales tax on certain non-essentials.
8. County unit plan of assessment.

The first five of the provisions have been adopted to date, the first one in a limited form of classification, however.

In the spring of 1907 it was observed that the wheat in many fields in eastern Kansas was quite yellow in color, while wheat in adjoining fields was a dark green color. The difference resulted largely from the time at which the land was plowed. When the experiments were started most wheat land was plowed relatively late. It was revealed that acreage production was decreased one bushel per acre for each week the seed bed preparation was delayed after the middle of July. Today at least eight million acres of wheat land are prepared at more nearly an optimum date.

New Wheats for New Land

Early work in the Kansas Experiment Station demonstrated the value of the hard red winter wheat varieties for most of the state as contrasted with

the soft winter wheats which were being extensively grown. Selection in other states illustrated marked improvement in wheat. Accordingly, in 1906, about 600 heads were selected at the Kansas station and grown in head rows. The best were propagated from year to year. One was named Kanred and released for distribution. It spread rapidly, not only over all the state of Kansas, but found its way into every important wheat state and into foreign countries. In 1924, when an investigation of wheat varieties was conducted by the United States Department of Agriculture, Kanred comprised 21 per cent of the acreage of hard red winter wheat and ranked second only to Turkey in that class. It has averaged two bushels an acre more than Turkey, the variety it has replaced.

Tenmarq wheat was selected at this station from a cross made in 1917, and for the years in which it was tested has outyielded Kanred on an average of 4.8 bushels and Blackhull 3.7 bushels an acre.

Kanota oats, an outstanding contribution of this station, in 116 tests outyielded Red Texas oats 103 times. The higher test weight in favor of Kanota is an outstanding factor in favor of this variety over Red Texas. It averages approximately 10 bushels more an acre than Red Texas.

New $10,000,000 Crops

In addition, in the past twenty years other new varieties, as Pride of Saline corn, Pink kafir, Blackhull kafir, and Kansas Orange and Atlas sorgo, have been developed at this station. The new varieties are conservatively estimated to be adding 10 million dollars annually to the wealth of the state in increased crop yields.

In the control of plant diseases the service by the Agricultural Experiment Station has been valuable. Such plant diseases as the kernel smut of wheat, oats, and sorghum may now be completely controlled by proper seed treatment. The formaldehyde vapor method of treating seed oats and the copper carbonate method of treating wheat and sorghum seed are not only simple and inexpensive, but highly effective.

The cause and control of "milo disease" has been worked out at this station in cooperation with the Division of Cereal Crops and Diseases, Bureau of Plant Industry, United States Department of Agriculture. The disease which has been shown to be caused by a fungus, *Pythium arrhenomanes*, which lives over in the soil for several years, may be practically and economically controlled by growing resistant selections of Dwarf Yellow Milo, Day Milo, Wheatland, and Beaver. The feteritas, kafirs, durras, and sorgos are highly resistant. Most milo hybrids are highly susceptible.

Detailed studies have been made at this station of the biology of the large round-worm of chickens and of several of the parasite worms of pigs. Flock and herd management have been devised for the control of these pests.

The average yield of wheat on bindweed-infested land was found to be 24 per cent less than the average yield obtained from bindweed-free areas. The average yield of oats was 39 per cent less. Perhaps the most outstanding contribution in the last few years has been the discovery of an effective chemical spray for the destruction of bindweed. Two applications of this spray have completely destroyed small areas of the weed.

Determinations made for the change in the nitrogen and organic matter content of the soil between 1915 and 1925 showed (a) that corn production is probably three times as destructive as wheat production, (b) that despite the removal of all the alfalfa in a rotation occupying the land, four years out of sixteen years the nitrogen and organic carbon content were increased, (c) that green manure crops occurring not oftener than one out of four years did not produce a measurable increase, and

(d) that manure applied at the rate of five tons in sixteen years gave no measurable increase.

It has been shown by both laboratory and commercial bakings that the Swanson-Working recording dough mixer, developed at this station, accurately forecasts the mechanical treatment required by a flour. Under certain procedure it appears that the machine can also be used to forecast the fermentation period.

Aiding Livestock Industry

The Kansas Agricultural Experiment Station has contributed much to the development of the livestock industry of this country. A few of the facts developed that have been of value to the livestock industry are given here.

1. Feed has a very definite effect upon the quality of meat. The Kansas station pioneered in this field of study. In the early 90's a comprehensive series of tests was made which showed the effect of different feeds upon the firmness of pork. Around 1900 tests were conducted that showed the effects of feed upon the quality of beef. Still later a project was inaugurated which is still in progress that has developed much fundamental information relative to the factors that influence the quality and palatability of meat.

2. The Kansas station pioneered in the production of baby beef. In fact, a test conducted by this station during the winter of 1900-1901 in which seven lots of calves were fed different rations was the first baby beef experiment conducted by any experiment station in this country and showed the way to a more profitable plan of fattening cattle for market.

3. A practical and profitable method of utilizing grass in fattening young cattle for market has been developed through several years of study at this station. Good quality calves are purchased in the fall, wintered well, grazed to August, and then full fed in a dry lot 100 days. This has proved to be a satisfactory and profitable way to utilize roughage in the winter, grass in the summer, and produce a maximum of gain from a minimum amount of grain.

4. The Kansas station discovered the fact that silage plus a small amount of powdered limestone is satisfactory as the roughage portion of a cattle fattening ration and may replace alfalfa hay for this purpose. The significance of this discovery lies in the fact that cattle producers in those sections that can produce sorghum crops but no alfalfa now know that they can fatten cattle for market as satisfactorily and often more cheaply than the corn belt feeder.

5. Experimentation at this station from 1920 to 1934 has shown that feeding sorghum grains to dairy cattle is just as good when fed in silage as when fed separately. Pound for pound the sorghum grains are not quite as good as corn, however.

6. Investigations at this station from 1914 to 1932 show sorghum silage can take the place of corn silage in feeding dairy cattle. The significance of this statement lies in the fact that under Kansas conditions there is an increased amount of feed nutrients per acre from sorghums. The high yields are due to the adaptability of the sorghums to drought conditions.

Due to the fact that the Agricultural Experiment Station is supported cooperatively by all of the people of this country, the cost to any one person for its service is ridiculously small. The average Kansas farmer on a single acre of Kanota oats in an average season derives a sufficient increase in yield to pay at current market prices three times the cost of the Agricultural Experiment Station to him. Is there a more profitable investment to Kansas farmers?

Shelby Neelly, '33, is a teacher in the high school at Byers.

William Chapman, '30, is in rehabilitation work at Phillipsburg.

Milk As a Food

Harold Scanlan, '37

"There is no single change in the diet of the American people that will be of such benefit to them as the general use of one quart of milk a day for every man, woman, and child." This statement was made by the American Public Health Association.

Milk like certain other foods has at times been overemphasized by some people. As the sole food of the diet, it has a few shortcomings. It lacks bulkiness, it lacks copper, iron, iodine, and manganese. Milk, however, is not recognized as a source of these things.

A man could live healthfully and do a moderate day's work on a daily consumption of four or five quarts of milk alone, but the appetites of most people crave more variety. The real value of milk lies in the fact that it is a protective food and a supplementary food necessary for the welfare of the entire family. Dietitians say milk and its products should make up about 44 per cent of the American diet. Why? Because evidence shows that one quart of milk buys more protection than is possible with any other one food, and as far as comparative costs are concerned, it is the cheapest item on the grocery list.

The public and the medical profession have accepted milk as our most nearly complete food, having the best combination of nutrients found in any food. It contains these nutrients in the same proportion as they are found in the body.

Milk is the finest food source of lime and phosphorus, the bone and teeth building elements. According to Dr. W. A. Phipps, head of the National Institute of Dairy Inspection, it is difficult to meet calcium requirements of the human body unless milk is included in the diet.

Doctor Phipps states that milk in any form is a superior source of protein which is more completely digested and absorbed than any other food protein. Milk protein is just the kind the body needs for building muscle and other body tissue.

Also one of the most easily digestible fats we eat is the butterfat of milk which, because of its finely divided state, is most readily accessible to digestive juices.

Milk is unique as a source of vitamins. Few other foods contain even small quantities of all these body regulators. Vitamins as a group promote health and vigor and are necessary for proper body functions. Milk is low in Vitamin D which nature evidently intends us to get from sunshine, but fortunately Vitamin D can be incorporated into milk by radiation of the milk or by incorporating Vitamin D units into the feed given to the cow.

Research shows that from the standpoint of vitamin content alone milk ranks as an outstanding protective food. When to this is added its contribution in minerals and protein, its value in the diet should never be ignored.

Doctor Phipps also states that if all the milk consumed in the United States in one year were put in quart bottles and the bottles were stacked one on top of the other, they would reach to the moon thirty-five times. That would be quite a milky way. Yet, according to him, twice that amount should be consumed for the most complete welfare of this nation.

THE COVER THIS MONTH

The cover page of this issue illustrates the use of the K. S. C. recording dough mixer. This mixer was designed by Dr. C. O. Swanson, head of the department of milling industry. Karl Finney, operator, is watching for the physical properties to appear as they are recorded by the machine.

Harold Lindahl, in the background, is pouring a flour and water solution into a supercentrifuge to determine the absorption of flour.

The Waxing Process of Poultry Packing

David W. Gregory, '36

The poultry packing industry has passed through a great number of changes in the last score of years. Several different methods of killing, picking, dressing, and cooling have been used, but the industry is still in a transition stage. Bleeding, which consists in severing the arteries of the neck, either through the mouth or by cutting just under the throat, is a common method of killing chickens. The brain either may or may not be pierced in order to loosen the feathers. Dry picking, scalding, and semi or slack scalding are all used in dressing. The slack scald involves immersing a bird in water heated to 128 degrees F. for 30 seconds.

Recently a new method has been introduced in the picking of poultry which has been tried and accepted by many poultry packers. This is the wax method. In using the wax method the birds are killed and rough picked in the usual manner, but following the rough picking they are dipped in vats of liquid wax; the coat of wax when dry and hard is removed together with the remainder of feathers. Many advantages are claimed for this method, such as: (1) The birds are cleaner and more attractive, because of the removal of all pinfeathers, dirt, scruff, etc.; (2) tears and blemishes are practically eliminated; (3) waxing imparts a velvet finish to dressed poultry; (4) the waxing method is more economical; (5) working conditions are more sanitary.

There is quite a story involved in the steps taken in preparing dressed poultry in a typical packing plant, using the wax method. The birds are picked up at central points by trucks and taken to the packing plant. Chickens, including broilers, springs, hens, and cocks are usually taken to the fattening room upon arrival at the plant, and fed a wet fattening mash for several days. After the feeding period they are taken to the killing room, where killing and picking take place. The birds are fastened by their feet to shackles suspended from an overhead steel belt conveyor and killed by sticking. The conveyor then passes above a scalding vat immersing the chickens in the hot water as the belt revolves. After scalding, the belt passes above an open space where the birds are roughed. Roughing involves pulling the long tail and wing feathers and most of the body feathers, thus giving the birds the appearance of being about three fourths picked. The head is then fastened to the shackle so that the bird is then hanging by three points, the head and two feet. The conveyor then passes into the drying chamber where the suspended birds are dried. Heated air is forced into the chamber and kept in circulation by means of fans. The birds pass back and forth in the chamber until dry and finally emerge ready for the waxing operation.

The birds now are conveyed to the waxing machine. When the bird is directly over the machine the trolley from which a bird is suspended engages a trip which throws the clutch in the waxing machine into gear, and the vat of warm liquid wax (124° F.) rises and submerges the bird with the exception of the head and feet. The conveyor then changes direction and as the bird again passes over the waxing machine it is submerged a second time. After receiving this second dip in the wax the bird enters a spray tunnel where cold water is sprayed on it to harden the wax. After the wax hardens the bird is ready for the dewaxing operation.

As the bird leaves the spray tunnel its head is disengaged from the shackle and the bird is pulled down into a vertical position, thus causing the wax to crack at places of tension. As the bird is conveyed along the line the wax is removed and dropped onto tables be-

neath the conveyor. These tables have large openings every few feet and beneath these holes are receptacles into which the hard wax taken from the birds is dropped.

The wax along with the feathers is then dumped into a reclaiming tank, where the wax is melted, all of the wax boiled off, and feathers removed. The reclaimed wax is then taken to a tempering tank where it is heated to the temperature required for dipping. Next it is piped to the dipping machine. The loss of wax in dipping amounts to about 2 percent, the rest being reclaimed. After dewaxing, any feathers not removed with the wax are then removed with a pinning knife. The birds are then taken from the conveyor and hung on metal racks by their feet and taken to the cooling room where they are kept for 24 hours at a temperature of about 32 degrees F. At the end of this period of time they are packed in boxes, twelve to a box, and taken to the freezing room, where they are frozen at a temperature of about 15 degrees F. below zero for one week after which they are held in a room at zero temperature until ready for consumption.

Gas Given Off by Apples Inhibits the Growth of Potatoes

When the potato tuber is confined with ripe apples its sprout growth becomes very abnormal. Instead of producing long normal sprouts, such potatoes produce short stubby tuber-like growths. After potatoes are removed from the influence of the gas from apples, normal growth of the sprouts is resumed. This gas, it has been demonstrated, is ethylene.

The discovery of the effect of the gas from apples on the potato was purely accidental. Dr. O. H. Elmer of the Department of Botany and Plant Pathology was working on another problem when he noticed this effect on the potato. Work on this new, interesting problem was started immediately and the results obtained are now being published in the Journal of Agricultural Research.

These potatoes confined with ripe apples ceased normal growth; the leaf blades, leaf petioles, and stems became abnormally rigid; and the older leaves bent down as though wilted. The gas caused not only a dwarfed sprout growth, but caused the sugar content of such potatoes to be increased five times that of normal and caused the rate of respiration to be doubled. The gas from apples evidently has an anaesthetic effect on the potatoes as is indicated by the sharp reduction in growth activities and in the greatly increased rate of respiration.

Inhibited growth of potatoes results only when the pulp of ripe apple fruits is used. Normal growth continues when potatoes are confined with the seeds, skin, and cider of ripe apples. Green apples have no effect. The inhibited sprout growth is also produced by pear and hawthorn fruits, but normal growth results when the potato is subjected to the gases produced by bananas, onions, oranges, or sweet potatoes.

The most difficult problem encountered was that of identifying the growth-inhibitory gas. This was done by passing a stream of air containing the gas from apples through fuming sulphuric acid. Potatoes treated with such air grew normally, indicating that the growth inhibitory substance had been removed by the acid. Chemical analyses of the fuming sulphuric acid showed the presence of ethylene. As confirmation of these results, potatoes treated with ethylene gas gave the same response as did potatoes that were confined with ripe apples.—A. S. H., '37.

Experiments with Concord Grapes Under Drought Conditions

Theodore C. Stebbins, '36

The unusual weather conditions of the last three summers have caused considerable disturbance among the fruit plants in both yields of fruit and severe injury to the plants themselves.

The Concord grape, the most extensively grown American variety, is able to withstand considerable adversity and is therefore the important variety for Kansas. Under conditions of extreme drought and heat, however, the fruit fails to mature properly, and remains green, except for scattered berries in a few bunches, long after the middle of August when the fruit would normally ripen. The vines stop growing soon after the drought begins and the injury to the leaves during the season results in a great reduction in leaf area.

Such abnormalities may be the result of low soil moisture content, extreme heat, low relative humidity, high transpiration rate, or a combination of these conditions. In an effort to determine which of these conditions is the most influential and to seek a method of control, some experimental work was conducted on Concord vines during July and August of last season.

The month of July was characterized by an average maximum temperature of 101.8 degrees, an average minimum of 69.4, and an average mean of 87.4. The average maximum for August was 94.3, the average minimum, 70.2, and the average mean, 85.5. The total amount of rainfall for the two months was 3.87 inches.

Water equivalent to a 3-inch rain was applied to some vines at 10-day intervals. Lath shades were constructed above other vines so that they received only half of the direct sunlight during the hottest period of the day. Other vines were both shaded and watered while a fourth group received no treatment.

The results found by this experiment may be summarized as follows: The fruit on the shaded and untreated vines failed to mature even after the appearance of a few scattered ripe berries during the first week in August. No difference was found in the fruit of these two plots except that on the untreated vines it was badly sunburned. The watered and shaded vines produced scattered ripe berries two weeks later but made no further change until October 10 when the fruit showed definite signs of ripening. Thus the fruit may be ripened by the application of water but this ripening occurs about two months later.

Considerable leaf injury was found on all vines at the beginning of this experiment. It continued to increase on the untreated vines until they were practically devoid of leaves by the latter part of the season. Shading the vines resulted in greatly decreased injury to the leaves. Watering alone did not prevent much leaf injury but offset the loss by stimulating considerable new growth. Shading and watering resulted in the least injury to leaves and also an abundant new growth from which to select next year's canes. Watering also prevented the vines from entering a dormant period which breaks in the fall and results in injury to them.

Apparently, considerable leaf injury is caused directly by the sun's rays alone but of course low relative humidity and a high rate of transpiration are inseparable from extremely high temperature. It is reasonable to suppose that the injury from low soil moisture content was made more serious by the high transpiration rate which accom-

panies the extreme heat and low relative humidity. To satisfy this transpiration demand, water must be delivered from the soil through the roots and to the leaves much faster than is possible from such dry soil. Leaf injury results if such conditions continue.

It is impossible to make any definite conclusions from the results of one season's studies but it appears that the benefits from shading alone would not warrant its practice in a commercial way. Irrigation during such a summer, though not a complete solution, would probably be of principal value in producing vigorous cane growth for the following year's crop. Shading and watering, except for a few "pet" vines, could not be recommended on the basis of the 1936 results.

Eat Kansas Apples

The old saying, "An apple a day keeps the doctor away," has considerable truth in it. Apples are a good source of vitamin C, so necessary in bone and teeth formation and also supply many minerals needed by the human bodies to maintain the proper alkalinity. The aromatic crisp juicy texture of apples stimulates the flow of digestive juices and the insoluble solids in the fruit serve as very necessary roughage.

Apples are eaten either raw or cooked. Their attractive color, pleasing aroma, crisp texture, and tasty flavor make them very desirable as a dessert fruit and a high percentage of the apple crop is eaten raw. A large number of varieties have been designated as good "eating" apples. Not all dessert apples are good cooking apples. By selecting varieties suitable for cooking, apples can be served for every meal and as frequently as our common vegetables. Apples may appear on our daily menu as baked apples, as apple sauce with pork or fowl, in various combination dishes with vegetables, in pies, fritters, dumplings, tarts, turnovers, scalloped apples, etc., and in various jellies. Apple cider makes an excellent appetizer.

Not only is it important to select proper varieties for the different uses but the varieties should be used at the proper season. Apple varieties vary considerably in their keeping and storing qualities. Eating an apple after it is over-ripe is almost as bad as eating one that is green or immature.

The accompanying table lists some of the common Kansas apples and gives their best use and proper season:

Use	Variety	Season
Sauce, pie, jelly		
	Yellow Transparent	July
	Early Cooper	July to Aug.
	Oldenburg (Duchess)	July to Aug.
	Wealthy	July to Sept.
Dessert, pie, sauce, jelly		
	Jonathan	Sept. to Jan.
Dessert, pie, sauce		
	Grimes Golden	Sept. to Feb.
Dessert		
	Delicious	Oct. to Jan.
	Golden Delicious	Oct. to Jan.
Dessert, baking, pie, sauce		
	Rome Beauty	Nov. to April
	Stayman Winesap	Nov. to April
	Winesap	Nov. to May
Baking, sauce, pie		
	Blacktwig	Nov. to April
	York	Nov. to April
	Ben Davis and Gano	Nov. to May

After selecting the proper variety for the season and use, it is a good plan to inquire where the apples were grown. There are reasons why Kansans should prefer Kansas-grown apples. First, the apple varieties listed in the table above, can be, and during normal seasons are, grown to perfection under Kansas conditions. Secondly, Kansas apples are shipped only a short distance, hence, reach the consumer in better condition than apples shipped from a long distance. The price usually is a little lower, too, because of the lower transportation expense. Lastly, helping Kansas growers helps the consumers. By supporting this phase of agriculture the entire state is helped either directly or indirectly.—G. A. Filinger, '24.

Blackhead in Turkeys[1]

R. E. Phillips, Jr., '35

Of the diseases that attack turkeys, blackhead (infectious Entero-hepatitis) is by far the most important or devastating. Unfortunately this term has been used to describe several diseases of fowls that sometimes cause a dark discoloration of the comb and wattles. However, the true organism, Histomonas meleagridis, occurs in all parts of the world where turkeys are grown and has assumed such serious proportions that this disease has been primarily responsible for turkey raising being abandoned in certain localities.

Studies have shown that this disease is predominantly a disease of turkeys, but may occur in chickens, pheasants, quail, and guinea fowl. The domestic chicken is very resistant to the disease and usually suffers only a mild attack. On recovering from blackhead, however, chickens remain as carriers of the disease for an indefinite period, discharging millions of organisms in the droppings. This makes the recovered chicken the most serious carrier of the disease.

The discoloration of the bird's head is due to a disturbance in the circulatory system, but not all the affected birds show this characteristic. The diseased bird shows little body activity and does not feed so readily although consuming large amounts of water. The bird's head is drawn in, eyes closed, with the tail and wings drooping.

Although science has failed to find a cure for this disease, it has enlightened us as to the modes of transmission. It can be passed directly from diseased to healthy turkeys, natural infection probably taking place through food and water contaminated with the droppings from the affected birds. While it is possible that a practical method will be developed to vaccinate turkeys against blackhead, there are at the present time serious practical difficulties that prevent the adoption of the procedure for commercial purposes.

As in other animals, mortality is highest in young birds. Adults are more likely to recover, although this takes considerable time.

Range conditions for growing turkeys are far from being ideal at the Kansas State College poultry farm. From five to eight thousand chicks and several hundred turkeys must share the same ranges. The chickens are moved off one range and turkeys are grown on the ground vacated. This has occurred yearly since 1926 and yet under these poor conditions, 80 to 85 per cent of the poults hatched have been raised to marketing size.

It is important that sick birds be killed and burned, the range should be as dry as possible, and the droppings should be promptly removed so as not to be a source of reinfection. The success in holding blackhead losses to a minimum is closely correlated with the cleanliness of the intestinal tract and in particular with reference to the cecal worm. Sometimes the ulcers formed in the cecum perforate the wall and cause peritonitis.

High summer temperatures and winter freezing will kill the protozoon causing blackhead, but the egg of the cecal worm affords the necessary protection for this organism during adverse weather conditions, because blackhead lesions can be produced by feeding these embryonated worm eggs per os.

With the bulk of the evidence proving the cecal worm is the principal cause of the trouble, the best plan of attack is to take steps to control this internal parasite. To do this the Department of Poultry Husbandry recommends 4 pounds of tobacco powder in each 100 pounds of mash. Then each week a mild laxative (Epsom salts)

1. The author is indebted to Prof. H. M. Scott for assistance on this article.

should be given, using about one-eighth of a pound per hundred head for the young birds and one-fourth of a pound for older birds.

Recently a careful examination of the intestinal tracts of 24 turkeys raised by the above described method yielded no round worms or any of the common forms of intestinal parasites. This shows the good results that can be obtained.

It is quite unlikely that the blackhead organism could live over from year to year in the Kansas soil without some protection, so the big problem is to keep the intestinal tract of the birds free of the cecal worms and this can be accomplished by the continuous feeding of nicotine.

Selecting Pullets for the Laying House

Gilbert C. Moore, '33

The culling of poultry is generally thought of as the culling of hens on their past production and the possibility of their future production. This is a very important factor in having a profitable poultry flock. Culling, however, should begin with pullets.

The most successful poultrymen begin culling their pullets when they are about twelve weeks of age. Due to the fact that there are so many chickens over the state which are late this year, early-maturing pullets should be picked to be placed in the laying house this fall. Early maturity can be determined on the basis of feathering at the age of twelve weeks, in general purpose breeds. The most desirable pullets are those that are well feathered at this age. The early-maturing pullets of the light breeds can be selected when they are about eight weeks old. The early-maturing pullets should be marked by toe punching or banding so others may be sold when they are large enough to market.

The health and vigor of the chicks are other important factors in the selection of pullets which are later to make up the laying flock. Pullets which show signs of weakness or disease should be segregated from the remainder of the flock and marketed as soon as they are large enough, provided the birds are in good enough condition to use for meat purposes, otherwise they should be killed. The small pullets should be disposed of because they will never make desirable layers.

There are a number of advantages in this system of culling the pullets. Some of them are: (1) Early-maturing pullets begin laying early and produce eggs when egg prices are highest. (2) There is a direct correlation between early maturity and high production. (3) Most of the undesirable birds can be picked out at this early age thus giving the desirable pullets the advantage of more room. (4) More eggs can be produced per unit of feed cost and the percentage of profit thus increased.

R. W. Stumbo, '32, is extension dairyman at Oklahoma A. and M. College, Stillwater.

F. L. Timmons, '28, M. S. '32, is in charge of the weed control project for Kansas under the direction of the Bureau of Plant Industry of the United States Department of Agriculture and the Kansas Agricultural Experiment Station. Most of the experimental work on the projects will be done at Hays.

Prof. H. M. Scott of the Department of Poultry Husbandry has been recommended by the local chapter of Sigma Xi as the candidate from Kansas State College for the research prize of $1,000 being awarded this year by the National Society of Sigma Xi as a part of its semi-centennial celebration. Each of the 69 chapters of Sigma Xi in the United States has been asked to name a candidate for the award.

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