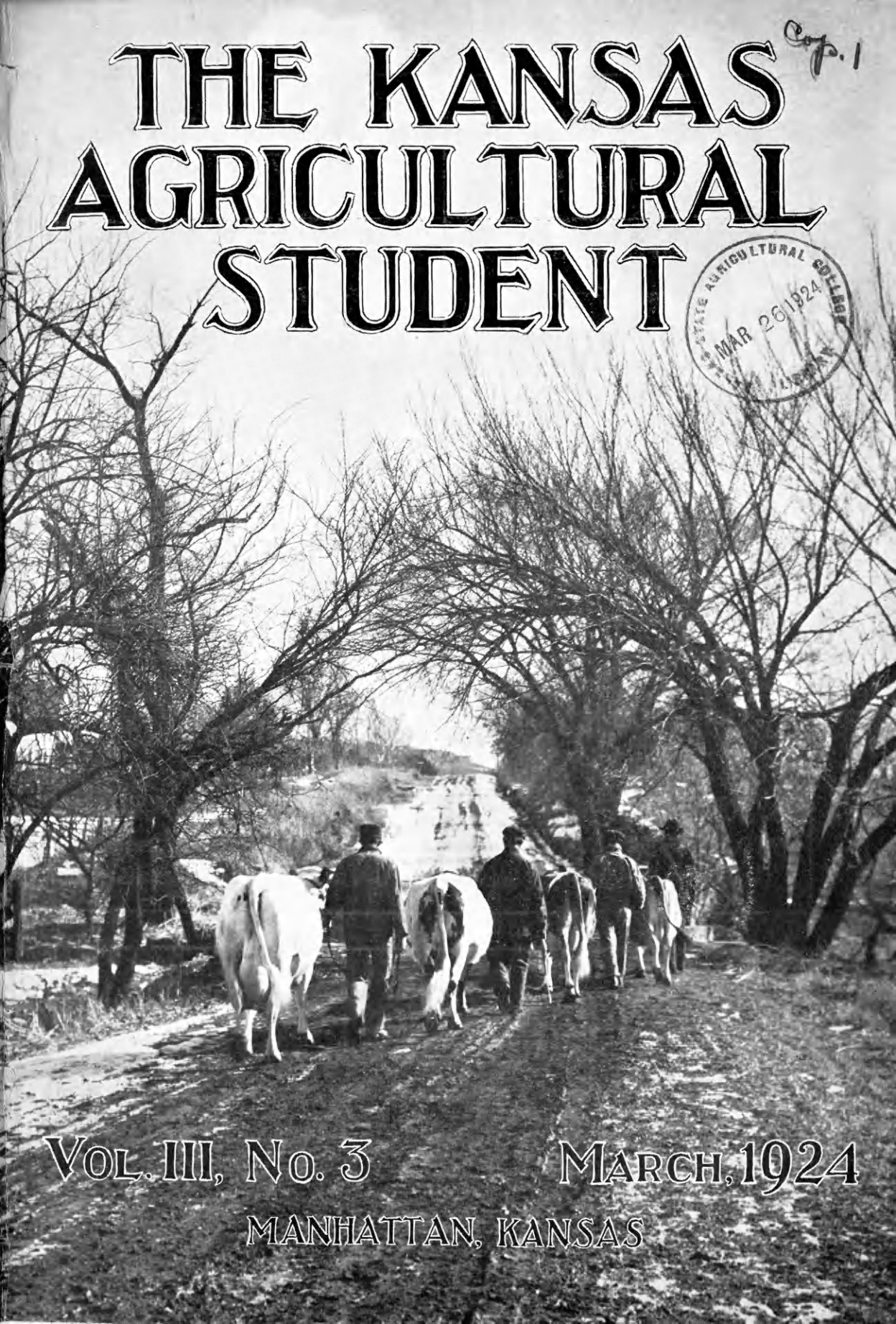
THE KANSAS AGRICULTURAL STUDENT



VOL. III, NO. 3 MARCH, 1924

MANHATTAN, KANSAS

COLLEGE DAIRY COWS ON SWEET CLOVER PASTURE

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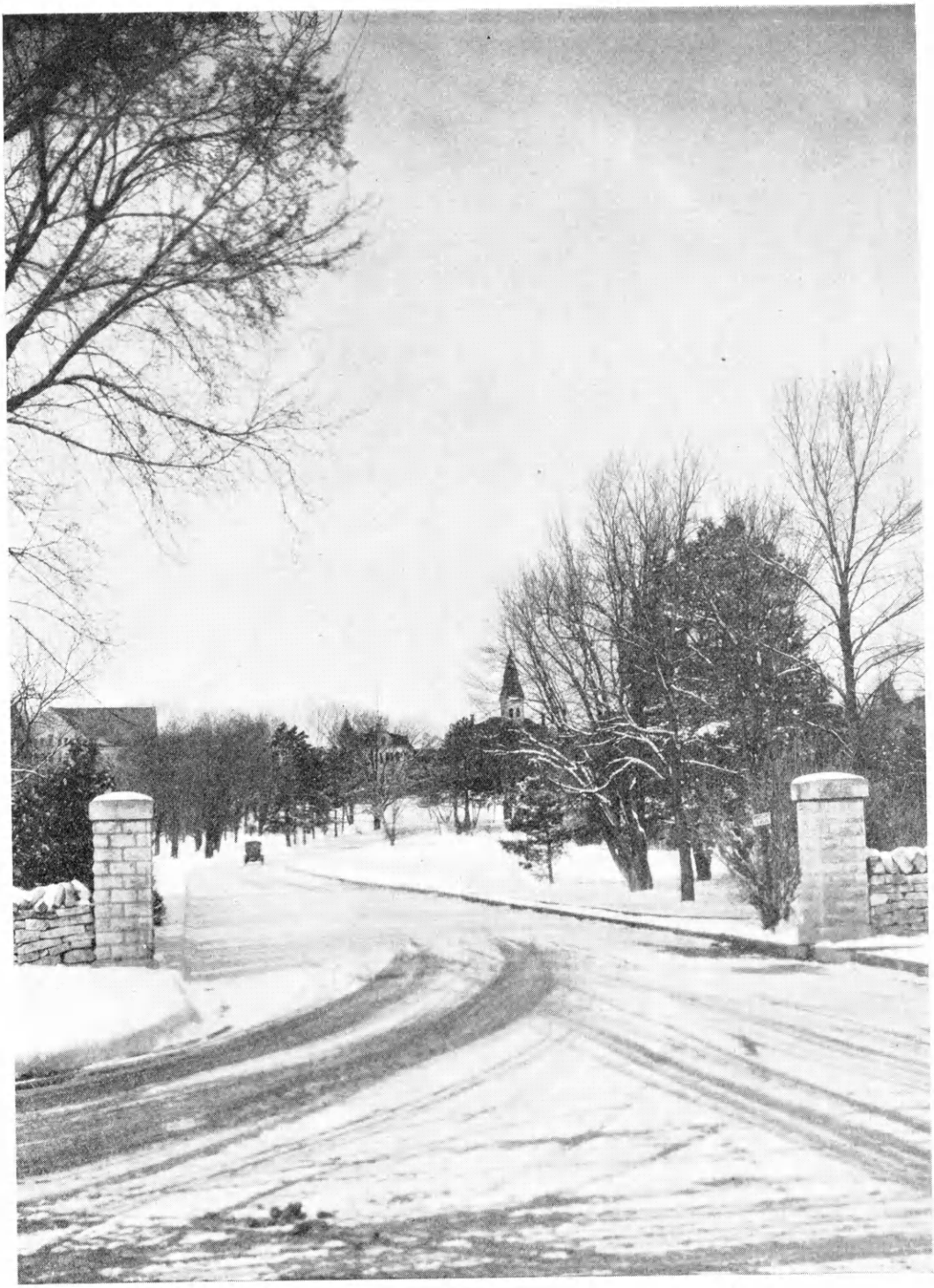

SCENE ON THE EAST DRIVE, MARCH 9, 1924

The Kansas Agricultural Student

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Some South African Impressions of Kansas Farming

Dudley B. Moses, '24

Probably the first question occurring to the American student on being told that there are students from South Africa on the campus is, "Why do these men come such a distance to study?" Then, when he finds that the majority of them are studying some phase of agriculture, he naturally wants to know how the agriculture of this state compares with that of South Africa. The scope of this article is to give some of the impressions of farming in this state as they are gained by the average South African, and to give some idea of agriculture in South Africa as compared with that of Kansas. It must be kept in mind, however, that there are as many different types of farming in South Africa as there are in Kansas, and the term average is used in its widest sense in both cases.

One of the first impressions is made by the relative intensity of the agriculture for where the Kansas farmer farms his hundreds of acres, the South African farms his thousands of acres. With the exception of some fruit farms and some small farms in the citrus growing areas and irrigation projects, the average size of the South African farm is at least five times that of the average Kansas farm. The conclusions to be drawn from this are that farming is more intensive in Kansas, the per cent of land under cultivation per farm is greater, and the yields per acre higher. The Kansas farmer thus grows feed for his livestock, whereas the South African farmer grazes his livestock on large areas of land which is of such a nature that much of it will never be cultivated on account of its roughness.

The extensive use of machinery and the high efficiency of the Kansas farm also make a deep impression on the student accustomed to slow-moving oxen and other farm methods and sights almost distinctively South African. It is better economy to graze oxen on the large South African farms and use them for draft purposes than to use horses or power machinery, but at the same time, it requires more man labor and takes more time, both of which are available on the South African farm. Notwithstanding the trend of the times, the ox, on account of the little attention it needs as regards care and feed, will hold its own in South Africa for some years to come against the horse and power machinery, because horses are more susceptible to disease and cannot so well be left to the care of the Kaffirs, and power machinery is too expensive as both it and the liquid fuels have to be imported.

The network of railroads and graded roads of Kansas also impresses the student from South Africa. In America, one hears much of Kansas roads, especially during periods of wet weather, but it is to be hoped that the road-building program now being urged in South Africa will result in as many roads and as good roads as there are in Kansas. With regard to the railroads, which in South Africa are controlled and operated by the state under the immediate supervision of the Minister of Railways and Harbors, the country is well supplied considering the fact that it is still a young country. However, a distance of 100 miles or more from a railroad, which is still fairly common in South Africa,

would perhaps dismay most Kansas farmers of this generation.

Another thing that the South African notices is what appears to him to be a great scarcity of labor in Kansas. To one accustomed to the South African farm with its large supply of native labor, the amount of work performed on the Kansas farm by the farmer and, say one or two hired men, is almost incredible. The average South African farm has one or more Kaffir families living upon it, sometimes even whole clans or tribes. In return for living upon the farm, the men of the family or clan must work for a certain number of months each year, while, as in the cotton belt of this country, in peak periods, the native women may also be called upon to meet labor demands. There is thus on the South Africa farm a large supply of relatively inefficient hand labor, which, although receiving low wages, is nevertheless fairly costly on account of its inefficiency. Thus the comparison between these conditions and the efficiency and labor saving devices of the American farm is very striking. Then, from the personal point of view, the South African wonders how the Kansas farmer gets along without the ministrations of the "house boy," "garden boy," "cook boy," and other servants considered so essential to the domestic well-being of most South African farmers.

Any account of impressions of Kansas would be incomplete if there were no mention made of Kansas climate. To the surprise of many Americans, who, from high school days retain hazy ideas of South Africa as an intensely hot country peopled mainly by negroes and missionaries, South Africans are surprised at the extremes of heat and cold met with in Kansas. As a result of these extremes, well-built barns, feedlots, and stables are essential to the progressive Kansas farmer, while the South African, thanks to his mild cilmate, manages very well with plain stone-wall corrals, not very elaborate feedlots, barns or stables, and, in addition, rarely has to worry about a supply of coal for the winter.

But brief mention can be made of only a few other impressions gained of Kansas farming. Among these are the tremendous volume and value of the agricultural products of Kansas; the number of silos and elevators; the importance of the sorghums in Kansas agriculture; the rural telephone service; the fuller community life; and last, but not least, the number of trucks and flivvers in rural districts. Mention might be made of the fact that nearly every South African farm has its orchard of apples, peaches, pears, plums, apricots, and often one or more other fruits; of the free and easy life of the South African farmer, with more of sport and less of hard work than seems to fall to the lot of the Kansas farmer; and of the nearness of most South African farms to the seaboard and to the water borne trade of the Empire. Finally, it should be mentioned that even in Africa the humble flivver is gradually but surely displacing the buggy and ox wagon as it has in America.

These impressions can give only a very incomplete picture of South African farming and are but a few of the many impressions gained of Kansas farming. It is to be hoped though that they will have pointed out the value of travel and the benefit that has been derived from a study of Kansas agriculture by the men who hail from "Sunny South Africa."

President W. M. Jardine, of the college, is chairman of a special committee appointed by Governor Davis to develop experimental projects at the state educational institutions looking toward the economic use of electricity on the farm, and the construction of an experimental rural power line in Kansas to supply electricity to cooperating farms. The organization meeting of the committee was held at the college during the recent Farm and Home week. Details of the work will be developed by the committee which will meet at the call of President Jardine.

Dudley B. Moses, M. S., '24, University of Illinois, '22, completed his graduate work for the master's degree at the end of the first semester and has returned to his home in Johannesburg, Union of South Africa, where he will take charge of agricultural investigational work for his government.

Farm Manure

Paul Schopflin, '26

It is the purpose of this article to discuss briefly two phases of the farm manure problem; namely, (1) handling and storage of manure and (2) application of manure.

Care of fresh manure is very important because as much as 50 percent of the total value of manure may be lost by decomposition and leaching if the manure is left in the open for a period of six months. Under ordinary conditions only about 25 percent of the nutrients secured from the soil in the production of feed crops are returned in the manure. This makes it necessary to use the best possible methods in storing manure to avoid crop loss due to low fertility and to make unnecessary the use of expensive commercial fertilizers.

The ideal method, when seasonable conditions are favorable, is to feed livestock on the cultivated fields, thus eliminating any handling, transportation,, and storage of the manure. As weather conditions permit this practice only at limited times, the next best plan is to haul the manure directly to the fields from the stable. However, storage must be resorted to many times and if the amount of manure handled is large, a concrete manure pit with a shed roof can be made a profitable investment. A concrete floor is very important as leaching losses will be considerable when manure is stored on even the best constructed dirt floors. Also the liquid part of the manure, which contains almost all of the potash, in addition to a high percent of other nutrients, will seep away. Nutrient losses are also much less when the manure heap is kept compact and very wet. A modified form of pit can be constructed above the ground having a concrete floor and a shed roof as stated above.

There are many advantages in a covered barnyard with a practically impervious floor. The manure can be stored right there and kept damp by the animals. Also trampling the manure and keeping it packed reduces the loss to a minimum.

When manure is piled out in the open, large losses are inevitable. However, certain precautions will curtail much of the loss. The piles should be high and well packed to prevent leaching. If the sides are steep they will shed water readily and the piles should not be located near enough to a building to receive any of the water draining from its roof. If the pile is situated in a slight depression which could profitably be lined with cement, loss of excess nutrients will be prevented.

Regardless of how the manure is handled, proper choice of bedding and tight floors in the stalls should be attended to in order to minimize the initial loss. Bedding should be chosen for its absorptive power, its cost, and its cleanliness. Tight floors in the stalls are important for the same reason as in manure sheds and pits.

The problem of application of manure is usually influenced by the fact that most farmers have only a limited supply. The principle to be followed is this: The object is not to get the largest possible increased yield per acre but to get the maximum increase per ton of manure. The total increase will be greater the larger the area covered so that twenty tons of manure are more profitably used if five tons are put on each of four acres than if the whole twenty tons were put on one acre.

In distributing manure fineness and evenness are greatly to be desired and can best be obtained through the use of a manure spreader. This is especially true if small amounts are to be distributed over large acres. Also a spreader lessens the labor cost by about one-half.

Manure may be plowed under if considerable time elapses between the time of application and the seeding of the crop. Under Kansas conditions manure should not be plowed under just before seeding as much moisture is required to decay the manure and it tends to give rise to a loose seed bed. Manure may be used most profitably as a surface application for alfalfa and other hay

crops and also for wheat. For corn or sorghum the application should be made during the winter and early spring on fall-plowed or fall-listed land. Even when plowed under manure should remain near enough the surface so that it will decay readily.

The reinforcement of farm manure by the addition of a commercial fertilizer is often advocated as a means of checking losses. Figures from agricultural experiment stations all over the country have shown that this advantage from such a combination treatment is very doubtful but the addition of a commercial fertilizer undoubtedly is valuable because it balances the nutrient content of the manure. Acid phosphate should be added at the rate of about 40 to 80 pounds to the ton of manure while 75 to 100 pounds to the ton will give the best results in the case of rock phosphate.

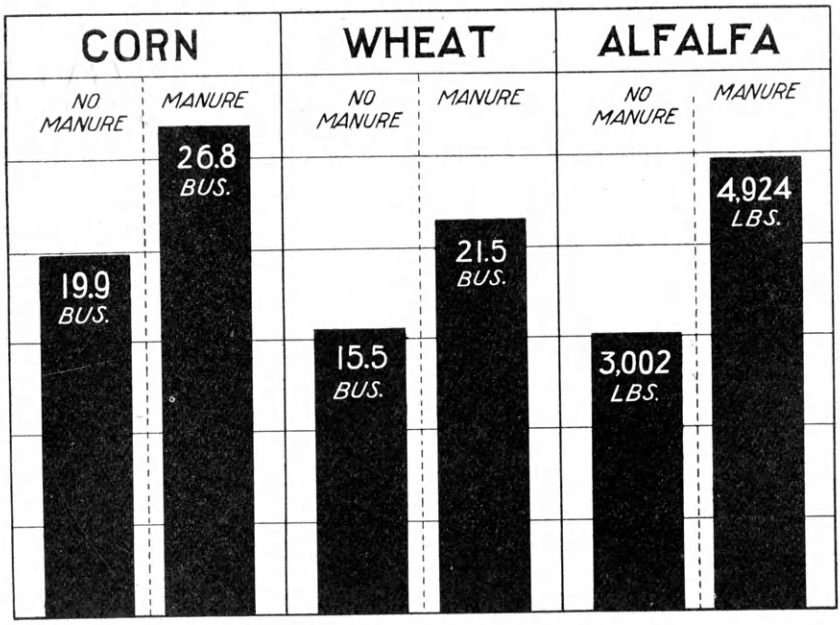
The rate of application of manure is determined largely by the supply but a basis should be adopted to calculate from. In eastern Kansas the most profitable application is about ten tons to the acre. In central Kansas five tons is sufficient, while in the western part of the state three or four tons is usually recommended.

Experiments have shown that manure produces marked results on alfalfa but as commercial fertilizers are almost equally efficient on alfalfa, manure should, as a rule, be saved for some other crop. A series of experiments conducted by the Kansas Agricultural Experiment Station show that corn grown continuously from 1911 to 1923 produced an average yield of 19.9 bushels per acre without manure and 26.8 bushels when 2.5 tons of manure per acre were applied annually. In a rotation with alfalfa and wheat the average increase from the use of manure was much less.

In continuous wheat production for 13 years the average yield without manure was 15.5 bushels per acre while the average yield from land receiving 2.5 tons of manure per acre annually was 21.5 bushels. When wheat was grown in a rotation with a legume and corn the average increase was 4.5 bushels per acre.

Alfalfa grown continuously for 13 years

(Continued on page 96)



FARM MANURE AND CROP PRODUCTION

The above graphs show the average annual yields of corn, wheat, and alfalfa when grown continuously for 13 years, first, without manure, and second, with the addition of 2.5 tons of manure per acre annually.

How to Prevent Brooder Vices

Martin Henrichs, '25

The most critical period of a chick's life is the first four weeks. If the chick survives this period it usually can be expected to reach maturity. One of the principal causes of mortality among chicks is the development of vices during the first few days in the brooder or while yet in the incubator. Vices, as a rule, seldom if ever develop under natural conditions for instinctively the hen cares for her brood and keeps it interested and contented. One of the problems of artificial brooding is to approach as nearly as possible these conditions.

One of the more common vices developed among young chicks kept under artificial conditions is the vice of toe-picking which results in the loss of blood and may lead to the far more serious vice of cannibalism. Losses may run to 5 or 10 per cent. Toe-picking may be prevented at the start by keeping the incubator darkened and feeding the chicks as soon as they are placed in the brooder. Chicks with bloody feet should be immediately removed from the rest. It is well to throw in green feed and a box of bran should be available at all times.

A second brooder vice and one of a very serious nature is that of crowding. Losses as high as 70 or 80 per cent have been reported in a single day or night. It is a natural instinct for a chick, when it gets chilled, to crawl under something to get its back warm and this leads to the chicks piling upon one another. As a result those at the bottom are suffocated. During the first few days chicks are often attracted by sun spots on the floor. They gather together on these spots and sun themselves, then when the spots move on or disappear, the chicks remain, become chilled, crowd together, and finally some are smothered.

Young chicks should never be frightened at night for they will naturally dodge under anything to get out of sight. This results in crowding and serious losses may follow. Crowding can be prevented by giving the chicks roomy quarters, making the brooder warm, and keeping direct sunlight out of the brooder pen for the first few days. It is essential that correct habits be taught at the start. A chick does the things it is taught the first night.

Chicks often become cannibalistic in nature, feathers are pulled out, and some may be found with the rump half eaten off. This vice may appear at any time and frequently it does not begin until the chicks are two or even three weeks old. Causes may be attributed to an improper diet which results in a depraved appetite, to lack of exercise, or to the absence of something to keep them busy. Often 50 per cent of the chicks are lost in this way. Cannibalism may be controlled by feeding a complete balanced ration. The following is recommended by the Department of Poultry Husbandry:

SCRATCH GRAIN

Cracked corn	60 pounds
Cracked wheat	20 pounds
Cracked kafir	20 pounds

DRY MASH

Bran	30 pounds
Shorts	30 pounds
Fine corn chop	25 pounds
Meat scrap	10 pounds
Bone meal	5 pounds

Sour or sweet skimmed or some form of buttermilk should be kept before the chicks at all times during the first month. For the first week it is best to feed the scratch grain five times a day or every three hours. During the second week the scratch grain should be fed three times a day and the dry mash hoppers opened from 9 a. m. to 3 p. m. Finely cut up green feed should be given once a day. Exercise should be induced to prevent cannibalism and to keep the chicks from becoming listless and dumpish. As soon as possible it is desirable to put chicks out on the ground. The skilled caretaker is one who has his flock busy and full of vigor at all times.

R. H. van Scoik, '14, is with the Dairymen's League Cooperative Association, Inc. His address is 3 Kenyon Court, Utica, N. Y.

Methods of Controlling Pocket Gopher and Possibilities of Eradication

Frederick E. Emery, '23

In the preceding number of The Kansas Agricultural Student the pocket gopher was discussed as an alfalfa pest with special emphasis on the tunnels and mounds. This information is very important in gopher control work since a knowledge of the runway enables the operator to place the poison or traps where they are most likely to get the gopher.

In earlier times gophers were kept thinned out by their natural enemies. Hawks, owls, civet cats, house cats, and snakes, all enjoy a feed of gopher meat. At the present time hawks and owls are needlessly shot, the civet cats are hunted out of season, and harmless snakes are notoriously abused. Thus pocket gophers will no longer be reduced in numbers by their natural enemies and trapping and poisoning must be resorted to as methods of control.

TRAPPING

The trapping method is very old. The first traps used were snares made by a slip noose in a string. The operator laid and waited for the gopher to come out with dirt and then pulled the string, catching the gopher around the neck with the noose. From time to time a new trap has been put on the market. First, steel traps were advocated in gopher trapping. Later wooden frame traps, such as the California box trap, came into use. These traps were quite efficient, the chief objection being their large size. In order to set the wooden frame traps it was necessary to dig a large hole into the runway. This not only required considerable work, but disturbed the runaway resulting in the gopher's plugging the trap with dirt.

A few years ago the small Mac Bee trap, due to its small size and the ease with which it is placed in the runway, found a ready sale on the market. About two years ago the death clutch trap came into use and is holding its own with the Mac Bee. Within the last few months the Pat gopher trap has appeared on the market. This trap, due to its long jaws and strong body, will no doubt prove a very efficient one.

The method of trapping is similar for all traps and consists first in locating the runway. This is done by inserting a gopher probe or small rod into the ground between the mounds. A sudden drop of the probe indicates it has broken into the runway. The probe is withdrawn and with the aid of a hand towel a hole large enough to admit the hand is dug into the runway. The loose dirt is removed and the runway is inspected for lateral runways. Traps are now set and one inserted well back into each of the open runways. It is advisable to press the traps firmly into the dirt so as to conceal them as much as possible; also to darken the tunnel by covering the open hole.

The trapping method as a whole is slow and usually when the gophers get scarce the trapper moves on. Enough gophers are left behind to reinfest the field heavily the next year.

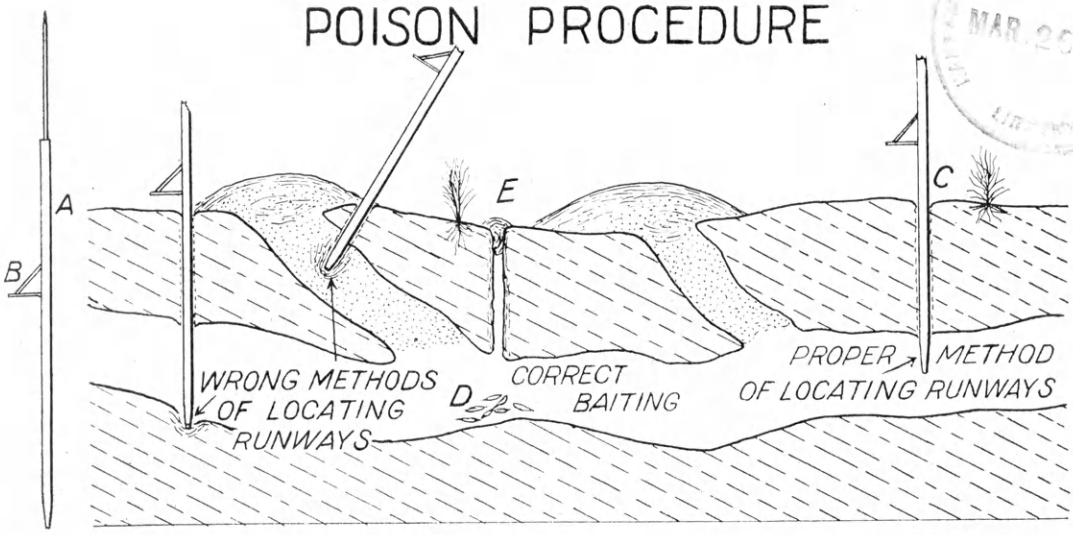
POISONING

Strychnine is the usual poison used in gopher work. It is usually applied on tubers or oats. Carrots or sweet potatoes cut into about one-inch cubes, dampened and poisoned with one-tenth ounce of strychnine alkaloid to one-eightieth ounce of saccharin per quart of bait are very effective if distributed while fresh. The poison is simply sifted on the damp cut bait.

The locating of the runway for poison work does not differ from the method described for locating the runway in trapping. A satisfactory instrument for use in poisoning is shown in the accompanying illustration (A). One end of a half inch gas pipe approximately three feet in length has been filed and hammered into a blunt point; into the other end a small rod has been fastened; a hand hold (B) has been welded on and is very desirable if large use is to be made of

the instrument or probe. Having located the runway with the small end of the probe, the operator inserts the large end of the probe and by a rotary motion makes a hole (C) large enough to admit the bait (D). Care should be taken not to enter a side tunnel or make a hole in the bottom of the runway as either of these methods would conceal the bait. Both correct and incorrect methods of placing bait are shown in the illustration.

state eradication. Through cooperation a local community may become gopher free. Later a township may become gopher free, then a county, adjacent counties, and so on, until the entire state is gopher free. This is the dream and hope of the men in the United States Biological Survey. To do this would require time, money, and cooperation on the part of all concerned; but in the end it would mean a financial saving to the farmers of



CROSS SECTION OF POCKET GOPHER RUNWAY SHOWING BOTH RIGHT AND WRONG METHODS OF POISONING GOPHERS

Having properly placed a small portion of poisoned bait the operator should close the hole with his heel, possibly by the aid of a clod (E). Bait should be inserted every third or fourth mound or every 15 or 20 feet.

Poisoned oats are the most efficient bait. They are easy to handle, will keep several years, and when properly applied are 90 to 100 per cent efficient. The poison laboratory of the Agricultural Experiment Station of K. S. A. C. sends out over the state many thousands of quarts of this bait annually.

The control of the pocket gopher, because of the economic loss to the farmer, is a serious question. It is a conservative estimate that the damage done to alfalfa alone in Kansas is one and a half million dollars annually. This annual loss has caused men not only to think of local control but also of Kansas of one and a half million dollars annually.

FORT HAYS ROUND-UP

The annual round-up of the Fort Hays branch of the Kansas Agricultural Experiment Station (Hays, Kan.) will take place Friday and Saturday, April 24 and 25, 1924. Friday will be devoted to boys' and girls' livestock judging contests, six classes of livestock being judged. Saturday will be stockmen's day, the program centering about the announcement of the results of the year's livestock feeding experiments. L. C. Aicher, superintendent of the Fort Hays station, is in charge of the round-up.

G. E. Thompson, '11, is living at Santa Anna, Ariz.

Fifth Grade Children Receive Valuable Health Lessons

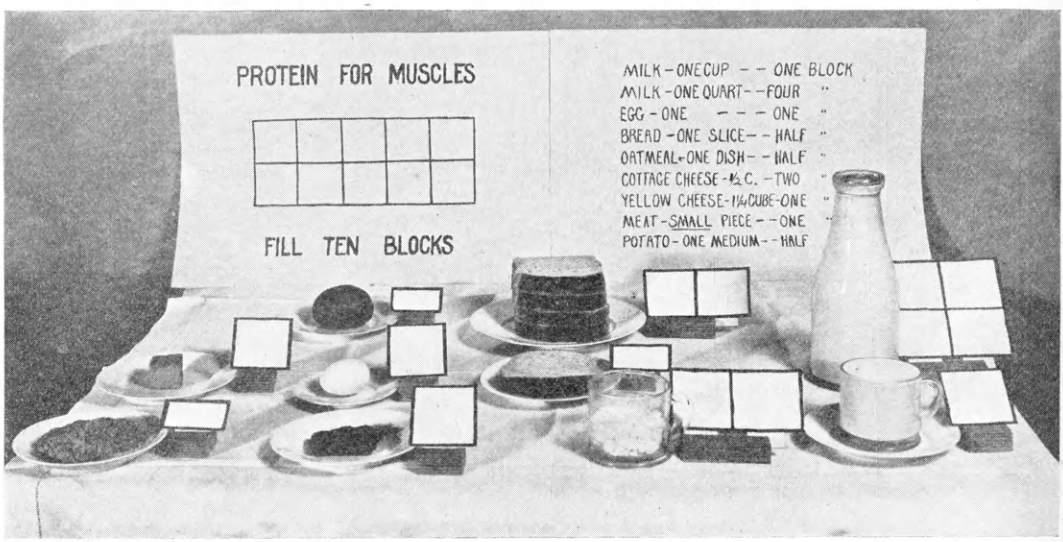
Pearle E. Ruby

Thirty-five fifth grade boys and girls of the Roosevelt school in Manhattan are studying health and doing "health problems" along with arithmetic problems, reading lessons, geography lessons, and the like. This "health class" is under the supervision of the students and instructors in the field course in nutrition given by the Department of Food Economics and Nutrition of K. S. A. C.

Every Thursday each boy and girl is weighed. Then his weight is plotted in a chart which shows from week to week whether he is gaining or losing. Then the charts are hung up around the classroom and a part of each health class lesson consists in the discussion of these charts as to which are good, which are poor, and why.

About half of the children are below normal weight. They are encouraged to make gains as fast as possible. Some are at normal weight or above. All of them learn that to have a few pounds of "reserve" is the ideal condition. They learn very quickly that ordinary colds and illnesses drag the weight down.

Besides the discussion of the weight charts, every health lesson includes a discussion of foods or of health habits such as proper amount of sleep, good posture, cleanliness, and fresh air. The children learn that



COMMON SOURCES OF PROTEIN

Each child 10 or 12 years of age needs 2.5 ounces (10 blocks) of protein per day. Possible and desirable ways of obtaining this essential food requirement may be figured out easily from this illustration.

growing boys and girls need milk, cereals, fruit, and vegetables every day. Some of these foods will furnish protein to build muscles, some lime to build bones and teeth, and some vitamins to speed up or "oil" the whole growth process.

An illustrated protein lesson is shown in the accompanying illustration. Each "block" means a definite amount of protein, about one-fourth ounce. A child of 10 to 12 years needs about 2.5 ounces or 10 of these blocks

of protein every day, so he learns to count up his own protein. Every cup of milk counts one block, a quart would therefore be worth four blocks. An egg will supply one block, a slice of bread one-half block, and so on.

To illustrate the value of milk as a "growth" food, a very simple experiment has been carried out using white rats, weighing about 30 grams each at the start. Two rats were put on a bread and milk diet, two on bread and coffee, one on white bread and water, and one on whole wheat bread and water. The children watched the effect of these diets on these rats for a period of eight weeks. At the end of this time the bread and milk rats weighed more than 150 grams each, while none of the others weighed over 70 grams. The accompanying illustration shows the size and appearance of a bread and milk rat as contrasted with the one receiving white bread and water. The

MILK IS THE GREAT "GROWTH" FOOD

These young rats weighed 30 grams each at the beginning of the experiment. After eight weeks on white bread and water the small one weighed 46 grams. After feeding for the same eight weeks on white bread and milk the large one weighed 176 grams.

diet for one bread and coffee rat and for one bread and water rat was changed to bread and milk and they began to grow satisfactorily immediately.

A similar experiment with rats last year showed these figures: A young rat (A) on a diet of bread and milk for six weeks gained 174 grams. A similar young rat (B) on a diet of bread and coffee for six weeks gained 2 grams. Rat A continued on bread and milk for four weeks gained 78 grams more, while rat B changed from a diet of bread and coffee to one of bread and milk gained 98 grams in the same four weeks.

Other lessons in the series provided for this fifth grade "health class," include "count of calories" and learning how to judge meals as good or bad for children.

The children keep daily records on the amount of milk they drink, whether they have cereals, vegetables, and fruit daily. They also check the number of hours of sleep, whether they sleep with windows open, have brushed their teeth, and have followed other rules of cleanliness, such as washing of hands, baths and so on.

Every child in the class has had an examination by the school nurse. These examinations help to show why some children who have bad tonsils or adenoids, defective teeth, or other defects are not "free to gain." Parents are urged by the school authorities to have these defects corrected.

The class is divided into small groups of five or six each. Each group is supervised by a college student teacher. The student teacher tries to find out all that she can about each child in her group so that she will have an intelligent idea of how to go about improving his general nutrition. This work gives the student teacher a chance to apply some of her theory and principles of nutrition and dietetics in a practical way to a group of real children.

Lewis W. Taylor (University of Wisconsin, '22) of Milwaukee, Wis., is graduate assistant in the Department of Poultry Husbandry. During the college year 1922-23 he was instructor in poultry husbandry in the Massachusetts Agricultural College, Amherst.

Development of Dairy Heifers

John C Keas, '25

Some factors that influence the value of a dairy cow are: The inherent tendency to produce milk, feed, age at freshening, size of animal, and the care given the animal. The first of these factors can be controlled only by breeding, while the rest of them may be influenced in a number of ways.

The effect of these influencing factors is so varied as to leave many unsettled questions especially as regards methods of handling dairy heifers. The breed of animal also tends to determine the method of handling. Therefore it is hard to set any definite rule as to what methods should be used. However, reliable experimental evidence on certain points is available.

The Kansas Agricultural Experiment Station in 1914 started an experiment with grade Holstein heifers to determine certain points regarding the relation of feeding and age of calving to dairy heifer development. The heifers to be used were obtained from the college herd of grade Holstein cows, and from the herd at Fort Hays Branch Experiment Station, Hays, Kan. They were divided into four lots. They were first fed their mothers' milk. Later this was replaced by herd milk, which was finally replaced by skimmed milk.

The heifers in lot 1 were given alfalfa hay at two weeks of age, the amount depending upon what they would eat. At six months of age they were fed nothing but alfalfa hay, the skimmed milk being removed from the ration.

The heifers in lot 2 were fed alfalfa hay and silage. The alfalfa hay was fed at two weeks of age, and the silage as soon as they would eat it. After six months of age they were fed only alfalfa hay and silage.

The heifers in lots 3 and 4 were fed alfalfa hay, silage, and grain. They were started on alfalfa and grain at two weeks of age and on silage as soon as they would eat it. The skimmed milk was removed from the ration at six months.

Lots 1, 2, and 3 were bred to calve at 30 months of age and lot 4 was bred to calve at 24 months of age.

A record was kept of all the feed consumed. Measurements, as height of withers, heart girth, barrel girth, and width of hip and pin bones were taken each month. Weights were also taken at these periods.

The animals fed alfalfa hay, silage, and grain made the best growth and the best production records, while those fed alfalfa hay and silage, and those fed alfalfa hay alone did not make a satisfactory development nor did they produce milk economically.

The animals bred to calve at 24 months of age did not develop as well as the animals on the same feed bred to calve at 30 months of age. However, their milk-producing ability was not affected by early calving.

No injurious effects were noticed due to feeding alfalfa hay exclusively from six months of age through two lactation periods.

The under development and low production in animals fed no grain is perhaps due to their inability to consume sufficient roughage to supply the necessary energy.

The third annual potato train, run by the college in cooperation with the Union Pacific railroad, completed a successful week's trip over the Kaw Valley potato growing section on February 23, 1924. Eleven stops were included in the itinerary. Demonstrations and lectures, covering both Irish and sweet potatoes, were given on plant diseases, insects, seed treatment and selection, spraying, soil management, grading, and marketing. The following specialists of the college accompanied the train: L. E. Melchers, Albert Dickens, E. G. Kelly, E. B. Wells, E. A. Stokdyk, and F. O. Belcha.

Miss Pearle E. Ruby, who contributes an article on nutrition in this issue, has since September, 1921, been assistant professor of food economics and nutrition in the Division of Home Economics. She received her master's degree from the University of Chicago in 1920 and for the year, 1920-21, was a nutrition worker in the Red Cross stationed in Wichita.

An Outstanding College Belgian And Some of Her Progeny

A. P. Atkins, '24

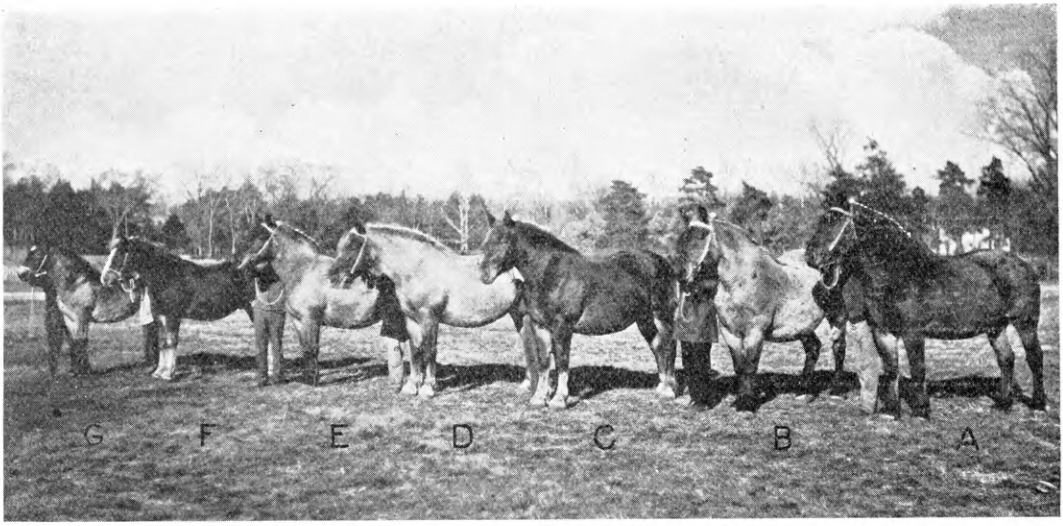
That it is possible to develop a high-class stud of horses from a very small beginning, has been demonstrated by the Department of Animal Husbandry of K. S. A. C. In 1916, the department founded its Belgian stud by the purchase of an eight-year-old mare and her daughter. There are now on the College Farm three daughters, two granddaughters, and a grandson of the mare, besides the mare herself and a gelding from her. It is a matter of record that the state has never made a special appropriation for the purchase of purebred livestock by the college; the college herds have been built up almost entirely from occasional gifts of public-spirited breeders, augmented by natural increase, prize money, and proceeds from the sale of the animals.

The Belgian mare, Mirza de Bou 1229 (A), was foaled June 2, 1908, and imported by George W. Souers & Sons. She was purchased, together with her daughter Bernadine, from Joseph Ade of Brook, Ind., in 1916, with the intention of founding a Belgian stud from her. Breeders throughout the country were attempting to modify the old Belgian type horse, in order to produce growthier, stretchier individuals, more suited to American conditions and demands. This mare was recognized as representing the desired type, having been a champion at various local fairs in Indiana, although never shown at a state or national show.

Bernadine 3909 (B), by Garcon 6233, was foaled April 14, 1913. She was once grand champion at the Kansas Free Fair at Topeka, and the year following, at the same show, stood second in class to a mare that was later made grand champion of the International Livestock Exposition at Chicago.

Mirzelle 8023 (C), out of Mirza de Bou and by Imported Collart 8706, was bred by K. S. A. C. and was foaled August 2, 1919. As a yearling, she was grand champion at both the Kansas Free Fair at Topeka and the Kansas State Fair at Hutchinson.

(Continued on page 96)



MIRZA DE BOU (A) AND SOME OF HER PROGENY

Septic Tanks for Country Homes

F. M. Alexander, '24

A modern sewage disposal system including septic tank and subirrigation absorption system has been installed on the Agronomy Farm. Experiments are being made with this plant to determine the best and most economical methods for the disposition of wastes from farm homes.

The house is of eight rooms and in many respects does not differ from other Kansas farm homes of the better type. The plumbing appliances consist of a toilet, bath tub and lavatory, shower bath in the basement, and a kitchen sink. A cistern and a well furnish water, which is pumped from the former by hand. A gasoline engine pumps the well water into a hydro-pneumatic tank providing pressure. The number of persons living in the house is variable, from seven to eleven being there depending on the amount of work to be done on the farm.

The septic tank used on this farm for sewage disposal is located on ground sloping from the water supply and is about 500 feet distant from the well. The septic chamber has a capacity of approximately 550 gallons and the dosing chamber, 210 gallons. In a 16-week period the average flow per person per day was 18.9 gallons, the minimum flow per day being 8.9 gallons and the maximum, 27.9 gallons.

The essential requirements of a sewerage system are twofold: (1) To remove all the sewage to the place of disposal as soon as possible. (2) To dispose of it in such a way as to rob it permanently of its power for evil.

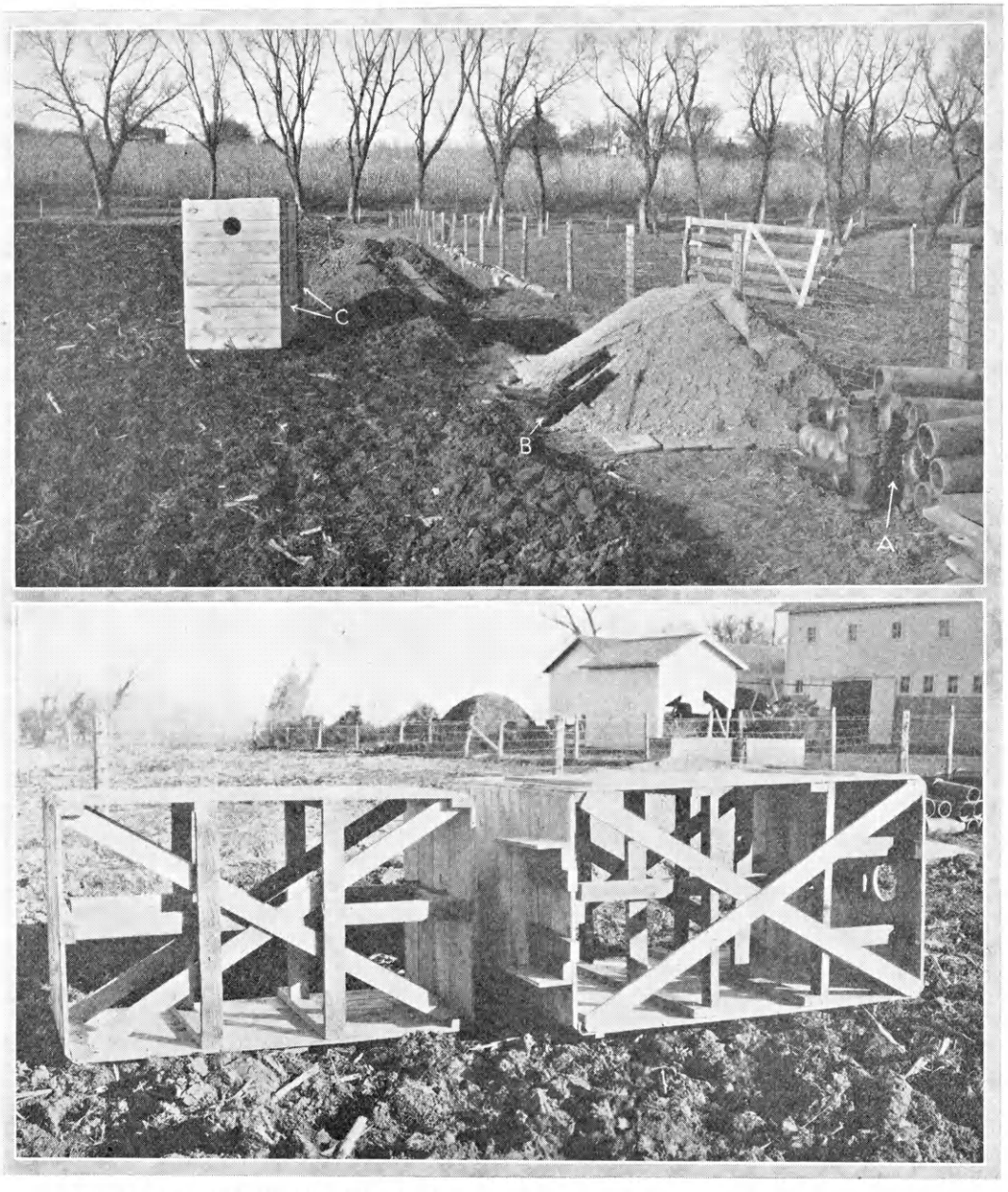
Sewage is a complex product containing bacteria and mineral, vegetable, and animal refuse, partly in solution and partly in suspension. If household sewage is conducted from the house into a water-tight compartment without direct exposure to light or air, and allowed to settle, it will be attached by anaerobic bacteria which thrive under these conditions and which will liquify much of the solid matter. This is the process accomplished by the septic tank.

Septic tanks are almost invariably built rectangular both in plan and in cross-section. Brick or concrete may be used and the tanks should be water tight when completed. For disposal of the effluent other than by dilution the septic tank should consist preferably of two chambers. The first compartment should be large enough to hold from one to three days' flow of sewage. This will amount to about 25 to 75 gallons or four to eight cubic feet of sewage for each member of the family. The sewage should be 40 inches deep in the tank and to prevent disturbance of the surface scum the sewage should enter beneath the surface.

By means of a weir or a pipe extending beneath the surface, the sewage passes over into the second compartment or dosing chamber. This chamber has a capacity of not more than one day's flow and is filled as fresh sewage flows into the septic chamber. When the dosing chamber becomes full it is emptied by mechanically opening a gate or by the operation of an automatic siphon, and the contents are carried into the absorption system.

In order to purify the effluent from the dosing chamber it must be oxidized by the action of aerobic bacteria. This may be done by dilution, by broad irrigation, by aeration and intermittent filtration, or by any combination of these methods. The aerobic bacteria of the soil are powerful in changing nitrogenous materials into nitrates and the process of subsurface irrigation affords a means for purification of the liquid from the septic tank. The sewage is distributed over the land by a system of open-joint drain tile which allows the sewage to seep out and come in contact with the air of the soil. About 50 feet of four-inch absorption tile line should be provided for each person served.

The accompanying illustrations show stages in the construction of the septic tank on the Agronomy Farm. In the upper illustration the six-inch tile (A) which are to carry the sewage from the house to the



SCENES IN THE CONSTRUCTION OF A FARM SEWAGE DISPOSAL SYSTEM

tank are shown at the right of the picture. The automatic siphon (B) is installed in the dosing chamber at the time the concrete is poured. This siphon periodically empties the effluent from the dosing chamber into the irrigation system. The forms for the tank (C) and the pit to receive them are in the center of the picture.

The lower illustration shows the forms

(Continued on page 94)

THE KANSAS AGRICULTURAL STUDENT

KANSAS STATE AGRICULTURAL COLLEGE

MANHATTAN, KANSAS

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OPPORTUNITIES IN FARMING

In spite of the fact that the number of boys and girls enrolled in colleges and universities from rural districts is increasing, the enrollment in agriculture at nearly all the state agricultural colleges is decreasing. This means that the students coming from small towns or the country are specializing in subjects that will lead them into other activities than farming. Some of this is to be expected, however, because of the present condition of agriculture.

The enrollment in the College of Agriculture of the University of Illinois shows that less than half the students come from the farm and that more than one-third come from towns of more than 5,000 population. The farmer boy acquainted with the hardships and disadvantages of the farm looks to other lines wherein he knows nothing of the troubles. At the same time the city boy familiar with the drawbacks of the city thinks he sees something better on the farm. Perhaps both are looking for the easy road to success and are willing to sacrifice their knowledge of the past.

Farming is not and never will be a bed of roses. But to the young man who has had the fundamental training and likes the farm it offers great opportunities for leadership. Great achievement comes to no one without difficulties and sacrifice, and as surely as civilization must advance, agriculture will rise again and offer greater opportunities than in the past.

Running a farm is a man's job and the better the man the better the farm. It requires as much ability and tact to start in at the bottom and work up until you own and successfully operate a farm as it does to start at the bottom for a big company and become one of its leaders. The young man with early farm training who has farming opportunities should consider them well before giving up the agricultural field to go into one of which he has little knowledge.

When men are leaving one industry, competition in that industry is slacking up. When men rush into an industry competition in that industry is becoming keener. Beware of temporary periods of depression. They may throw you off your guard and lead you to do that which in later years you will regret. The long-time pull counts.

OUR COVER PAGE

The action picture presented on our cover page, by F. E. Colburn, College Photographer, illustrates purebred high-producing individuals of the correct type from the four leading dairy breeds. These four animals are owned by the Department of Dairy Husbandry at K. S. A. C. and each has rendered distinguished service in the production of

milk and butterfat.

The Holstein, Inka Hijlaard Walker, is not satisfied with a yearly production record of 19250 pounds of milk and 770 pounds of butterfat. She is at present on a new test which is very promising as is indicated by her December and January records in which she produced 82 and 79 pounds of butterfat, respectively. Melrose Canary Bell 2nd, represents the Ayrshire breed. She holds the distinction of being a former world's record two-year-old in the Honor Division. She produced as a two-year-old, 14,408 pounds of milk and 404 pounds of butterfat. Imp. Pallas, the Guernsey, is also a former state record cow. She produced in her record year 12,240 pounds of milk and 625 pounds of butterfat. The Jersey, Khio, is a former state record cow, producing 12,452 pounds of milk and 615 pounds of butterfat as a four-year-old.

SPRINGTIME AGRICULTURE AND THE HIGH SCHOOL SENIOR

As the first warm days of spring drive the winter snow from Kansas hillside and valley, tiny rivulets form streams which pour into rivers as they wend their way in a tortuous pilgrimage through the Southland to the sea. The snows gone, a glowing sun warms a plastic water-soaked soil, the ever changing residue of countless centuries, teeming with plant food and biological activity.

The robin returns followed by legions of black birds and other members of the feathered aristocracy. These will soon prey upon the larva forms of lower animal life which awaken and emerge from a winter's entombment. As if by magic a pale green verdure spreads over meadow and pasture land. Long dormant buds swell and burst, hurling into the pure atmosphere, nature's sweetest perfumery.

But see in man the greatest transformation. He is thrilled by that intangible something which pulls at the soul of every man in the spring time and beckons him to the great out of doors where all nature seems in tune with the Diety. As he assumes the mastery of his environment he visualizes the advent of a new and bountiful season. He sees the seed at planting time germinate into luxuriant plant life and then yield a golden harvest. Fat pigs bask lazily in the sunshine. Calves race madly through the pasture with tails pointed skyward. A lamb roughly appeases his hunger and tells the world of his satisfaction by the erratic contortions of his tail. Fluffy chicks pick greedily at a spot of sunlight.

Is it any wonder that the observant farm boy of high school age fairly gapes with astonishment and wonder as nature's panoramic plan unfolds before him in the spring. "How and why are nature's phenomena accomplished? queries the boy.

"It was never intended for me to know these things," one boy may answer and with this pessimistic outlook on life he surrenders his rights to leadership and scientific research.

"Surely science has found an answer to the how and why of these manifold mysteries of nature," reasons the boy with the optimistic outlook. "If I am to be master of my environment I must study science," he concludes. Unconsciously he has taken his first step toward K. S. A. C. to study scientific agriculture.

Jesus said, "Ye shall know the truth and the truth shall make you free." It is only by painstaking experimentation and research that the great truths of the universe are being fathomed. No intelligent high school student will accept his neighbor's assertion that "it is better to plant potatoes in the dark of the moon," until he shows that this assertion is a true one.

Our curriculum in agriculture at K. S. A. C. is designed primarily to teach the student how to determine the basic truths in the different phases of agriculture. It may be seen readily that the man who begins any agricultural enterprise guided by a true premise will reap a much greater reward than the man who begins a venture guided by a false premise which is likely to end in disillusionment and failure.

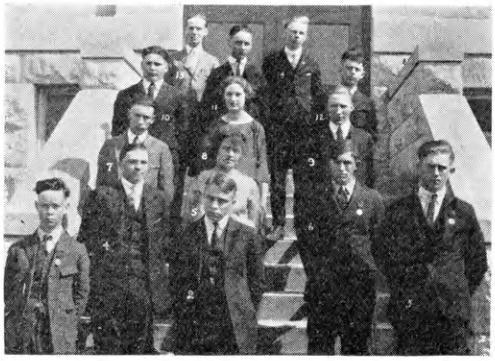
The Kansas Agricultural Student, speaking for every Ag at K. S. A. C., extends hearty congratulations to every Kansas High School Senior upon his achievement in passing the first milestone in search of the fundamental truths of science. We hope many will continue their studies at K. S. A. C.

College Notes

FOURTH ANNUAL STATE HIGH SCHOOL JUDGING CONTEST

The high schools of the state have been invited by President Jardine to enter judging teams in the Fourth Annual High School Contest in the judging of farm products to be held under the auspices of K. S. A. C., Thursday and Friday, May 1 and 2, 1924. Each team shall consist of three students but a high school that does not send a team may send one or two contestants to compete for individual honors.

Forty-nine high school teams competed in the Third Annual Contest and one additional high school was represented by a single individual. The Fourth Annual Contest will present 22 classes of crops, livestock, and poultry to be judged. Practically all the high schools entered in the 1923 contest are planning to enter the coming contest and many new entrants are expected. The contest is one of the big spring events at K. S. A. C. (See The Kansas Agricultural Student, Volume III, No. 1, pages 16 and 17 for further information regarding the 1923 contest.—Editor.)



WINNERS IN THE THIRD ANNUAL STATE HIGH SCHOOL JUDGING CONTEST

Details regarding the third annual high school judging contest may be found in Vol. III, No. 1 of The Kansas Agricultural Student. The picture of the winners, together with their names and the schools they represent, is also given in that magazine, page 18.

KANSAS RADIOCULTURE COLLEGE IN OPERATION

The first "college of the air" in the United States was instituted on February 11, 1924, when K. S. A. C. began its radio agricultural course, broadcast from station KFKB, Brinkley-Jones Hospital, Milford, Kan., 30 miles distant from Manhattan. This station has a 286 meter wave length, and reports received indicate a range as far north as Ontario and as far south as Mississpipi and Texas. Students have enrolled from practically every state in the union and from Canada.

Timely subjects of interest primarily to farmers are discussed briefly each evening from 7 to 8 o'clock by college professors, the lectures being interspersed with musical numbers contributed by the Department of Music. The hour on Saturday evenings is given over to music, entertainment, and "college pep" programs. The extension radio curriculum consists of five courses, each being presented one evening each week for 10 weeks. The schedule is as follows:

Monday evenings—Crops and Livestock.
Tuesday evenings—Dairy and Poultry
Wednesday evenings—Agricultural Economics.
Thursday evenings—Home Economics.
Friday evenings—Engineering.

Enrollment blanks are furnished the extension students upon application. A written examination at the completion of the college air program will entitle radio students to a certificate of graduation from the first school of its kind ever conducted.

ALPHA ZETA INITIATES ELEVEN AGS

Alpha Zeta, student honorary agricultural fraternity, held formal initiation on February 11 for F. M. Alexander, W. J. Daly, G. A. Filinger, K. L. Ford, M. M. Hoover, H. F. Moxley, George Montgomery, G. B. Railsback, G. A. Read, R. L. Stover, G. E. Truby, and G. R. Warthen. An informal dinner was held at the college cafeteria following the initiation service.

JUDGING CONTEST OF THE NATIONAL WESTERN LIVESTOCK SHOW

The K. S. A. C. Junior Stock Judging Team finished third in the intercollegiate judging contest held at the National Western Livestock Show in Denver, January 19, 1924. Nebraska was first with 3,490 points out of a possible 4,000. Colorado, second with 3,470, Kansas coming third with 3,437. Wyoming placed fourth. The Kansas team was composed of G. F. Ellis of Las Vegas, New Mex., R. E. Sears of Eureka, R. W. Russell of Jewell, C. C. Huntington of Eureka, and E. C. Smith of Pratt, who ranked in the order named. G. E. Truby of Anthony was the alternate. G. F. Ellis, with a score of 719 points out of a possible 800, was fourth high individual in the entire contest. He also won the trophy cup awarded for high man on judging breeding livestock.

VOCATIONAL SCHOOL TO BE DISCONTINUED

Upon recommendation of Pres. W. M. Jardine, the Board of Administration, at its regular January meeting, voted to abandon the Vocational School of K. S. A. C. at the close of the present college year. The Vocational School, formerly known as the School of Agriculture, has been in existence since 1913 as a secondary department or high school of the college offering both regular vocational high school curricula and an opportunity for students to make part or all of their college entrance requirements. The development of high schools in Kansas, together with the vocational work carried on under the Smith-Hughes program, has materially decreased the demand for a high school on the college campus. No more enrollments will be accepted, but students now in attendance will be allowed to finish their work in the school.

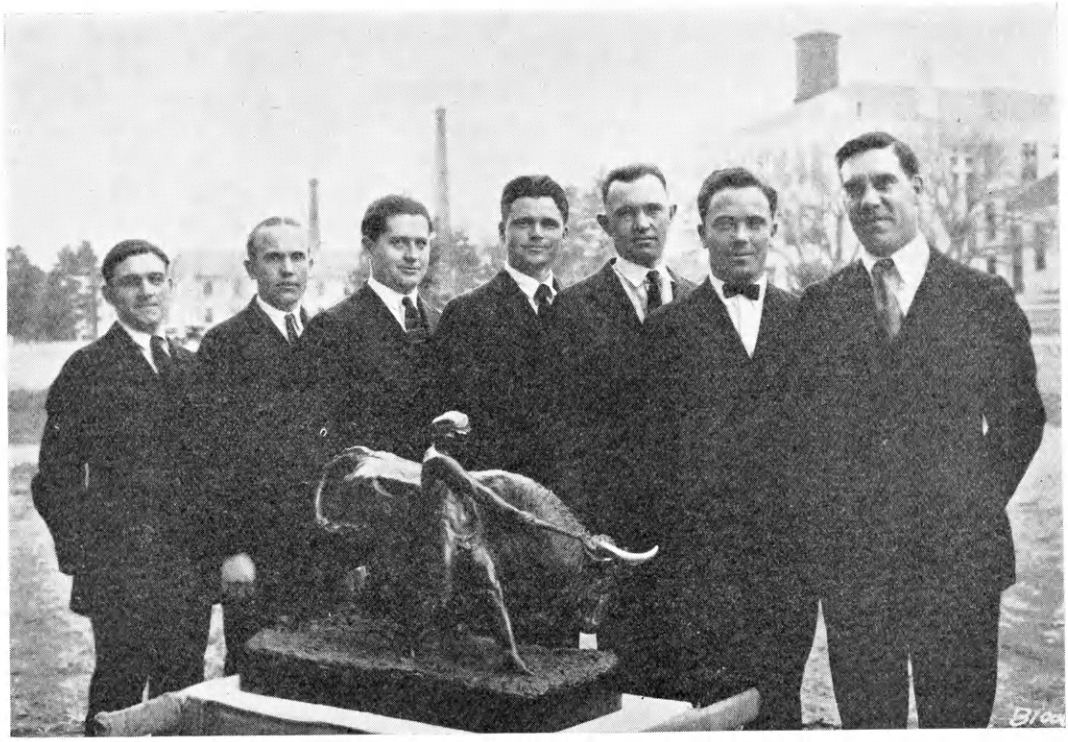
AGRICULTURAL ECONOMICS CLUB AFFILIATES WITH AMERICAN FARM ECONOMICS ASSOCIATION

The Agricultural Economics Club, composed at the present time of 30 students who are majoring in the Department of Agricultural Economics, recently voted to affiliate with the American Farm Economics Association. The affiliation of the local club with the national organization was made possible by an amendment to the constitution of the national association adopted at their recent annual meeting held in Washington, D. C. Prof. W. E. Grimes and Prof. Eric Englund were in attendance at this meeting, and through their efforts membership of the local club in the American Farm Economics Association was effected. This membership places the local association in contact with the leaders in agricultural economics throughout the United Satets and Canada.

Kansas State Agricultural College placed five students in the first twenty rankings of the 1923 Saddle and Sirloin Club essay contest. Mrs. Dorothy Lush Nelson placed third and was awarded a bronze medal and a trip to Chicago at the time of the International Livestock Exposition. Other Kansas placings were as follows: C. O. Dirks, sixth; R. W. Sherman, seventh; M. M. Hoover, tenth; and A. W. Stover, twelfth. The subject was, "Have our county, district, state and national fairs and expositions, reached the limit of their educational value?"

The livestock show winnings of the Department of Animal Husbandry for the five-year period, 1918 to 1922, compared with those of the previous five-year period show the splendid recent development in the livestock work of the Department of Animal Husbandry. During the show season of the years 1918 to 1922, inclusive, the department won 162 championships and 586 first prizes on cattle, horses, hogs, and sheep at the Kansas fairs, the American Royal, and the International as compared to 27 championships and 99 first prizes for the five-year period, 1913 to 1917 inclusive.

The following excerpts are taken from a Christmas letter from Lucy Stallings Mostert: "As yet it is all so very strange for me here. I can't think of Christmas when it is so hot. I felt like a fool for a week when I first discovered the sun shining in the north.



CHAMPION JUDGING TEAM IN THE 1923 INTERNATIONAL CONTEST AND THE BRONZE BULL TROPHY

From left to right the men in the picture are: A. C. Magee, Edwin Hedstrom (alternate), G. R. Warthen, M. L. Baker, H. F. Moxley, J. L. Farrand, and Prof. F. W. Bell, coach. The trophy is offered by the Union Stock Yards Company of Chicago. The college placing first in an International Stock Judging Contest becomes possessor of the trophy until the ne..t contest. Ownership of the trophy is gained by the college first winning three international contests. Further details regarding the 1923 contest may be found in The Kansas Agricultural Student, Volume III, No. 2, page 53.

COLLEGE LIVESTOCK EXHIBIT WINS AT WICHITA

Seven head of Shorthorn cattle, from the college animal husbandry herd, won more prizes in the recent livestock show at Wichita than any other group of animals shown by a single exhibitor. This exhibit defeated prize winners of the American Royal and National Western livestock shows and established a record never before equaled by an agricultural college. Six of the entries placed, winning $300 in prizes.

The following prizes were won: The three yearling Shorthorns composing the yearling Shorthorn herd presented on the cover page and discussed editorially on page 48 of Volume III, No. 2 of The Kansas Agricultural Student won first prize for yearling herd. The bull of the herd, Royal Crown, won first prize as senior yearling and Narcissus Gem 6th was placed junior champion female and reserve grand champion Shorthorn female. Other prizes won by the exhibit were: First prize get of sire, third prize senior heifer calf, first prize junior bull calf, and second prize two-year-old Hereford bull.

These winning individuals were exhibited at the special livestock show of animal husbandry prize winners held on the evening of February 7, 1924, during Farm and Home week.

KANSAS WINS APPLE JUDGING CONTEST

A horticultural products judging team, composed of three students from the Department of Horticulture of the college, won first

place in an apple judging contest held December 18, 1923, in connection with the first biennial Central States Horticultural Conference and Exposition held in Kansas City, Mo. Teams from Kansas, Oklahoma, Iowa, and Missouri were entered. Arkansas and Nebraska are both members of the conference, but neither state was represented with a team this year.

George A. Filinger of Cuba was high man in the individual scoring, making 975 out of a possible 1,000 points. Charles O. Dirks of Augusta was third high individual. The third member of the Kansas team was Dan M. Braum of Denison. The team was accompanied by W. J. Douglas of Piper, alternate, and Prof. R. J. Barnett, of the Department of Horticulture, coach. The Kansas team scored a total of 2,851½ points out of a possible 3,000, the Missouri team placing second with 2,832½ points.

FOURTH ANNUAL AG FAIR

Not necessarily bigger than ever but at least better than ever is the slogan of the manager of the Fourth Annual Ag Fair to be held on the north campus, just south of the two Ag buildings, Saturday, May 3, 1924.

The parade is to start for the business section of the city at 12 o'clock; the Pike will open at 3 p. m. and the fair will be in full swing from then on till midnight. The two biggest entertaining attractions of the Fair will be "The Farm Hand Follies" and "The Rodeo." The performances of the former will be given in the north half of the stock judging pavilion and of the latter in an open air corral on the south side of the fair grounds. The next three entertaining features of outstanding interest will be "The Minstrel Show," to be housed in a large tent on the pike; "The Hickville Music Box Review," to be housed in the Veterinary Amphitheatre; and "The Hindu Magician Show" to be housed in an open air arena on the pike. Other entertaining features of interest include the Ferris wheel, the crazy house, the dime museum, and other side shows and features too numerous to mention. Farm Machinery Hall will be fitted up for the evening dance.

As usual the educational features will be full of interest. More departments than ever will place exhibits which will occupy the entire south half of the stock judging pavilion.

A. C. "Tex" Magee of Canadian, Tex., is manager of the big fair. He has his workers well organized and the indications are the slogan will be realized.

Eradication of Tuberculosis in Farm Animals

C. J. Coon, '24

The most insidious disease occurring among man, cattle, swine, and chickens is tuberculosis. It is a menace that no progressive dairyman or livestock raiser can afford to ignore. Tuberculosis is a slow developing contagious disease destroying life by a chronic and long continued systematic poisoning and by the destruction of tissues of organs necessary to life. The cause of the disease is the deadly rod-shaped germ, *Mycobacterium tuberculosis*. Every year it causes the needless sacrifice of hundreds of human lives and thousands of animals. At the Federal abattoirs in 1921 over 21 per cent of all the cattle and 12 per cent of the swine slaughtered were affected with this disease. To fail to make a strenuous effort to decrease the annual toll of this disease, would be an offense to posterity.

Before it is possible to take any satisfactory steps in the direction of controlling tuberculosis it is first necessary to find the affected animals. The most practical method that has been devised to detect tuberculous animals is the tuberculin test. This test consists in using a highly reliable diagnostic agent which is a product of the growth of tubercle baccilli properly mixed with a substance upon which the organisms have grown. This agent, or tuberculin as it is properly called, contains no living organisms, thus it is clearly seen that no harm can befall the animal as a result of being tested with tuberculin. The tuberculin should be applied only by a trained veterinarian for if it is not properly applied the animal may fail to respond to its application at another time. This important fact is often taken advantage of by unscrupulous dealers. The tuberculin is applied by means of the subcutaneous, intradermal, or ophthalmic method.

The subcutaneous test, or what is commonly called the temperature test, is very reliable in the cow. The test requires taking the temperatures of the animals at two-hour or reasonably longer intervals three times before the tuberculin is injected, to determine if the animal is in condition to receive the test. The tuberculin is then injected beneath the skin. In the typical reactor when temperatures are taken at two-hour intervals up to 24 hours after the injection, a rise of over 2 degrees in temperature and a typical fever curve are noticed. The healthy animal fails to respond to the injection and consequently no rise in temperature is detected.

The intradermal test is easier to apply and its use is desirable particularly when cattle are hard to control. In this test a small amount of tuberculin is injected in one of the folds of skin at the base of the tail. The reaction occurring in affected animals consists in an enlargement at the point of injection observed from 48 to 108 hours after the injection. It requires considerable experience and technic in applying and interpreting the test for the enlargement often varies in size and character. The intradermal test may also be used in detecting tuberculosis in swine and fowls, the tuberculin being injected in the skin of the ear of the hog and the wattle of the fowl.

The ophthalmic or eye test is still another test that is used to quite an extent. Its main importance lies in its value as a check test upon the others. It is applied by first instilling in one eye a sensitizing dose of tuberculin and later following up with a diagnostic dose. From three to ten hours after its application a characteristic discharge from the eye occurs in the reactor. An inflammation of the eye may be associated with the discharge.

After the detection of the tuberculous animals, the next step is to establish a uniform systemized campaign that will successfully eradicate the disease. In 1917 a group of stockmen, livestock sanitary officials, and the Bureau of Animal Industry held a meeting. They adopted a definite plan of procedure

in the eradication of tuberculosis from livestock. In order that their campaign would be successful three main projects were decided upon: (1) The accredited herd plan, (2) free area plan, and (3) swine eradication plan.

The accredited herd plan aims to keep purebred herds free from tuberculosis. The reason is obvious, for due to the extensive shipping of purebred cattle throughout the country for breeding purposes, it is quite possible that the disease may be introduced easily into a healthy herd. Under this plan where no tuberculous animals are encountered when two successive annual or three semiannual tests and physical examinations are applied, the herd is placed upon the honor roll. The State and Federal governments then issue a certificate to the owner which grants him certain privileges not held by a nonaccredited herd owner. The certificate carries with it the right to ship cattle interstate for a period of one year. Any time the owner introduces cattle into his herd that have not been tuberculin tested, or fails to live up to his agreement with the proper officials, he loses his certificate. The accredited herd is retested at such times as are considered necessary by the State or Federal authorities.

In the State of Kansas the township has more or less been used as the unit of territory in the area eradication of tuberculosis. Under this project all the dairy cattle, purebred cattle, and the registered cattle used for breeding purposes are tuberculin tested according to the rules formulated by the Livestock Sanitary Commissioner.

When any organization or agency wishes to free a certain area from tuberculosis, it makes its plans known to the Livestock Sanitary Commissioner, who immediately furnishes the organization with a printed form of petition and also a definite plan to follow. The commissioner also advises the State Agricultural College and Bureau of Animal In-

(Continued on page 94)

Alumni Notes

E. J. Bird, '14, is farming near Great Bend.

O. J. Olsen, '07, is farming near Horton, Brown County.

Wallace McIlrath, '15, is farming near Kingman, Kan.

W. L. Hoover, '13, is principal of the Goodhue School, Goodhue, Minn.

J. R. Mingle, '20, is working for the Prather Creamery Company at Oakley.

J. L. Pancake, '00, is a stockman and farmer in Rawlins County. His post office is Gem.

Fred W. Wilson, '05 is professor of animal husbandry in the University of Nevada, Reno.

L. R. Brooks, '17, is in the land classification work of the United States Geological Survey.

M. J. Bahl, '23, is in the employ of the Great Western Milling Company of Los Angeles, Cal.

S. J. Gilbert, '21, is special assistant to Sec. J. C. Mohler of the State Board of Agriculture, Topeka.

H. H. Sherrard, '14, is located at Sonara, Cal. He is horticultural commissioner for Tuolumne County.

Preston O. Hale, '16, is county agricultural agent of Goodhue County, Minn., with headquarters at Zumbrota.

Rudolph G. Rodewald, '16, is assistant district superintendent of The Great Western Sugar Company with headquarters at Greeley, Colo.

J. M. McArthur, '15, is director of nature study and gardening in the New Orleans Public Schools and New Orleans Normal School. He resides at 2819 Aubry Street.

H. C. Lint, '11, is in charge of the Agricultural Research Department of the Texas Gulf Sulphur Company. His address is 41 East 42nd Street, New York City.

F. B. Lawton, '12, is farming near Newton.

J. A. Clark, '19, is farming near Winfield.

C. R. Enlow, '20, is coach of athletics in the Abilene High School.

E. F. Whedon, '19, is teaching in the Gardena High School, Los Angeles.

George E. Denman, '16, is Superintendent of the Public Schools, Filer, Idaho.

Harold S. Woodard, '20, of Glen Elder is moving on a farm near Lawrence, Kan.

Lee H. Gould, '12, is county agricultural agent of Santa Cruz County, Nogales, Ariz.

Reid Weimer, '17, is with the Armour Fertilizer Works, Chicago. His address is 209 West Jackson Avenue.

P. E. Neale, '20, is in the Department of Animal Husbandry of New Mexico State College, State College, N. Mex.

R. R. Hinde, '20, farm foreman at the Fort Hays Experiment Station (Hays, Kan.) was married during the holidays.

Stanley P. Clark, '12, is assistant agronomist, University of Arizona. His address is 905 East Fifth Street, Tucson.

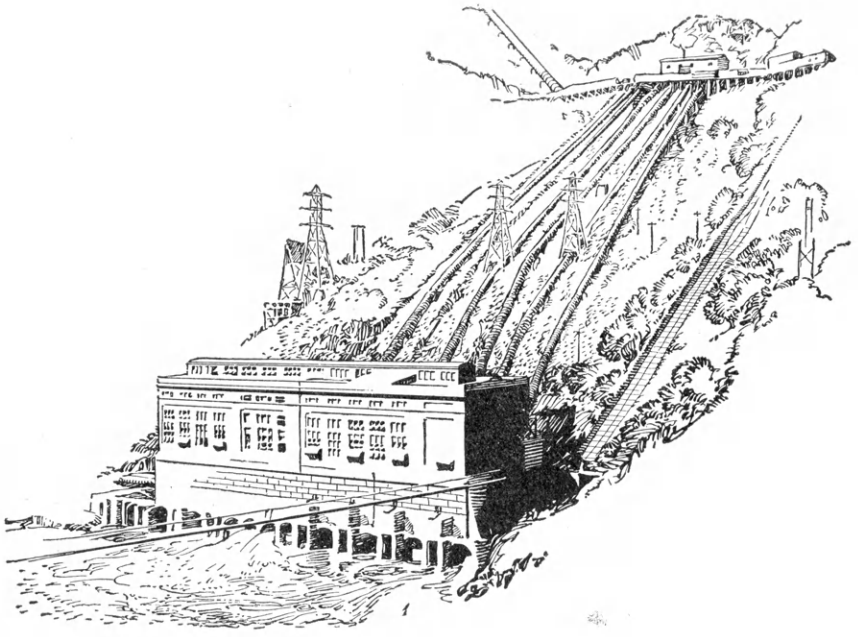
C. R. Jaccard, '14, now county agricultural agent of Coffey County, will be transferred to Clay County, April 1, 1924.

I. L. Plank, '18, instructor in vocational agriculture at Winfield, has just closed a very successful four weeks short course.

A. E. Anderson, '14, is crop reporter for the United States Department of Agriculture with headquarters at Lincoln, Nebr.

Roscoe I. MacMillan, '17, Captain of Infantry in the United tSates Army, has recently been transferred to Fort Davis, Canal Zone, Panama.

H. A. Ames, '23, is with the Farmers' Union Livestock Commission Company, Kansas City, Mo. His address is 410 Livestock Exchange Building.



Harnessing gravity to do our work

California farmers are making mountain waterfalls do much of their hard work. On many thousands of farms a turn of a switch gives light, heat and power — energy brought sometimes hundreds of miles on high-tension transmission lines.

When the whole country is served by a network of electric lines, and all available water-power is utilized, American life will be in a new and happier era.

The familiar mark of the General Electric Company is to be found on the equipment of hydro-electric power stations and high-voltage transmission stations throughout California, where four out of five people live in electrically lighted homes.

GENERAL ELECTRIC

Growing Alfalfa in Southeastern Kansas

G. M. Reed, '25

An outstanding experiment in alfalfa growing in southeastern Kansas is that known as the Dunlap experiment located in Allen county. It was started in 1915 under the direction of the Kansas State Agricultural College and is still in progress. The results now show very clearly some of the general soil needs in that part of the state.

The soils of southeastern Kansas have been formed largely by the weathering of shale, and in addition contain a mixture of limestone and sandstone. Occasionally there are small areas of soil derived almost entirely from limestone or sandstone, but by far the greater part of the soils are those formed from shale. As a consequence they are usually shallow with a hard impervious subsoil that does not absorb water readily. As might be expected from their origin these soils are low in lime. Chemical analysis shows that they are also quite deficient in phosphorus. In addition continuous cropping has depleted the organic matter; erosion has taken away considerable of the top soil; and the fertility, none too high at first, has been greatly reduced.

The farm on which the experiment is being conducted is located near Carlisle, and until recently was farmed by Mr. Dunlap. It is representative of the upland soils of southeastern Kansas, being dark gray in color, with a heavy compact drab impervious subsoil, popularly known as "Gumbo."

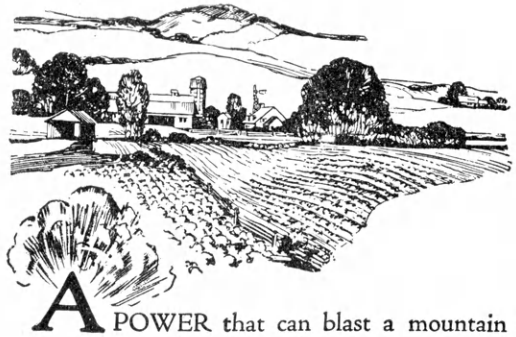
The size of each plot is one-tenth acre, and plots are run in duplicate, one being tiled and the other untiled. Seven different fertilizing treatments were used; namely, (1) no treatment, used as a check, (2) lime only, (3) lime and acid phosphate, (4) lime, acid phosphate, and potash, (5) manure only, (6) manure and lime, and (7) manure, rock phosphate, and lime.

Briefly, the results secured from 1915 to 1923 inclusive are as follows: In every case the yield of alfalfa hay from the tiled plots has been greater than that from the untiled plots. The highest average yield was made by the plots treated with manure, rock phosphate, and lime; while those receving manure and lime were a close second. The lime alone treatment returned the lowest yield of any in the experiment where the stand has been retained until the present time. In the untreated plots and those treated with manure alone the stand of alfalfa lasted only until 1920 and 1921.

From the above facts several conclusions seem quite evident: (1) Alfalfa can be grown successfully on the upland soils of southeastern Kansas if the proper methods are employed. (2) The addition of lime, phosphorous, or organic matter increases the yield. (3) The addition of all three gives the greatest yields. (4) The addition of manure alone is not sufficient; for while manure will increase the yield temporarily, it will not maintain the stand for a period of years.

The fourth Kansas ice cream scoring contest was conducted by the department of Dairy Husbandry, February 26 and 27, 1924. Fifty-three samples of ice cream were submitted by forty-five ice cream companies, four of whose plants are located in Nebraska and seven in Missouri. Seventy-five company representatives attended the meetings. The ice cream submitted averaged decidedly better than that entered in the third annual contest. For example the average bacterial count last year was approximately 2,000,000 per c. c. This year the average bacterial count was about 150,000 per c. c.

Four students of the Division of Agriculture attended the international convention of the Student Volunteer Movement held at Indianapolis, Ind., December 28, 1923, to January 1, 1924. The students of the division attending as representatives of various college and religious organizations were: H. C. Lantis, D. B. Moses, R. D. Patton, and R. W. Sherman. Thirty-four students and members of the college faculty composed the delegation from K. S. A. C.



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A POWER that can blast a mountain or crack a boulder—dig an isthmian canal or drain a swamp on the farm—has been created by the chemical engineer.

Today, explosives power is employed both in the heaviest and in the most delicate operations. The scientific control of this resistless energy has enabled explosives engineers to utilize it in a thousand ways undreamed of a generation ago.

Recently at the Frazier Quarries of the Chesapeake & Ohio Railroad in West Virginia, 60,000 pounds of du Pont dynamite were exploded at one time to bring down *five hundred million* pounds of stone for ballast. Literally a whole hillside was blasted out.

But in a power house in Baltimore, du Pont explosives were used to perform a different and delicate operation. This work involved blasting out five concrete bases in the basement of the building without damage to a switchboard that governed the distribution of power over a large section of the city. And in making these blasts a glass of water and some wire nails placed on their heads in an upright position were set near the blast and were not disturbed by the explosion.

So, in dynamite, we have a servant that will do our bidding in little things as well as big—a power that can be made to perform our work easier, better and cheaper in our industries and on our farms.

The du Pont Company has been making explosives since 1802. With the development in explosives manufacture have come many improvements to expand the use of the product. And it has been the privilege of du Pont, through exhaustive research and experiment, to lead the way.

Send for "Farmers' Handbook of Explosives" for full information about explosives on the farm.

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DU PONT DYNAMITE

Some Interesting Points in Chick Incubation

L. W. Taylor

Of all types of work in caring for poultry, incubation is probably the most interesting. There is something about the uncertainty of the results to be obtained, the hopes that are cherished for a successful hatch, and finally the downy chicks themselves, that calls forth one's interest with an irresistable pull.

Yet to one who has studied the formation of the chick during incubation, the work becomes still more interesting. Twenty-one days after the egg is put under incubating conditions there is formed from germ, yolk, and white a chick with all the necessary equipment for life.

From a study of the embryology of the chick many of the reasons for the problems in incubation can be explained. From the time that the egg is placed in the machine for incubation until the end of the 3rd day, very delicate changes and growth are taking place. From a mass of cells with seemingly little organization there are developed the beginnings of the brain, eye, heart, digestive tract, and other organs of the body. The heart is usually formed by the 32nd hour of incubation, and soon after is filled with blood and begins to twitch. By the end of the 2nd day it is beating regularly.

Because the embryo is forming these vital organs, the eggs are not turned until the end of the 3rd day. Practical experience long ago showed the poultryman that satisfactory hatches were not gotten by turning eggs in the first three days. The embryo is also sensitive to temperature changes during this period. It is imperative during this time that a constant temperature of a favorable degree be maintained.

Following these three days of growth, there comes a long period through which the chick embryo is enlarging those parts already formed and developing its body form. During this period it is relatively hardy and can withstand extremes of temperature, rough handling and the like which would have been fatal during the first three days. The embryo is further protected during this period by a liquid-filled sac which surrounds it and acts as a cushion preventing sudden shock.

This does not mean that the operator of an incubator can become careless and permit temperature changes to occur regularly. But it explains why, at times, incubated eggs may be left for several hours outside of the machine, or until they are "stone" cold, without seriously affecting the hatch. It also explains why, during this time, it is possible to turn the eggs and thus prevent the embryo from sticking to the shell membranes.

From the beginning of the 19th day until the chick hatches there is a succession of radical changes in the development of the chick. During this time the yolk remaining is drawn up into the abdomen of the chick and the abdomen sealed. The chick breaks through into the air cell and starts to breathe with its lungs. And finally by pressing and turning within the egg, the shell is pipped and the chick comes out into a new life.

The treatment given the eggs during these days is much like that for the first three. Special care must be taken to see that the temperature is kept constant. Too low or too high temperatures cause improper sealing of the abdomen and a weak chick. Also the eggs should not be turned during this time.

Much can be learned in artifical incubation by a study of the hen and how she behaves while sitting. Beyond that one has little to rely on except directions as furnished by the manufacturers of the various incubators. These should be followed carefully as they usually represent years of experience and experiments with a particular make of machine.

Successful results in incubation depend not only on the incubator and the operator, but on the stock which has produced the

(Continued on page 94)

Better Equipment The Great Essential

MANY other things about farming are important, but farm work is fundamental. The actions and reactions are self evident: No work—no results. Poor work—no progress. Fair work—a living, perhaps. Good work—a profit, smaller or larger according to the quality and timeliness of the work.

Only through better work can a farmer increase his chances for success. Only with efficient power and machinery can the best and most profitable farm work be done.

Therefore, every farmer's first consideration should be the selection of the most efficient power and machine equipment, for this is the great essential to success.

Case tractors, threshers and other machines meet the requirements of successful farming. Their high standards of efficiency, unfailing dependability and extreme durability give their owners every opportunity to achieve success. Case machines are used and recommended by successful farmers everywhere.

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NOTE—Our plows and harrows are NOT the Case plows and harrows made by the J. I. Case Plow Works Company.

ERADICATION OF TUBERCULOSIS

(Continued from page 87)

dustry to conduct a sanitary and educational campaign in that particular territory. After the campaign at least 85 per cent of the cattle owners must sign the petition. The number of cattle to be tested and also a plat outlining the boundaries as well as the roads of that area must also be sent to the commissioner.

When the foregoing arrangements are completed the commissioner appoints authorized veterinarians to do the tuberculin testing, the expenses being borne by the owners of the cattle. The expense of testing each animal varies, depending to some extent upon the number in a herd and the means of control; however, it should be about 50 cents per head. Kansas is handicapped to some extent in its area work for the money appropriated to carry it on is insufficient to meet the demand.

When a reactor is found the animal is appraised by three people and the ower has two alternatives. First, he may ship the reactor to a recognized slaughtering establishment and receive what the animal will bring; second, he may accept one-half of the appraised value and turn the animal over to proper authorities.

Since swine contract tuberculosis mainly from cattle and chickens, the elimination of the disease from the cattle and chickens will also eliminate it from swine. If the disease is found in swine it is best to slaughter them, unless the affected animals are valuable for breeding purposes. The diseased animals may be discovered by applying the intradermal test at the base of the ear. They should then be isolated or slaughtered.

In summing up the benefits that result from the eradication of tuberculosis it may be said that many human lives may be saved, large livestock economic losses eliminated, the value of the individual animal increased, and, in addition, the privilege of unrestricted interstate shipment granted.

SEPTIC TANKS

(Continued from page 79)

for the tank in more detail. The larger form at the right is that used for the septic chamber proper, the smaller form to the left is for the dosing chamber. The forms are placed in the pit and the concrete poured between them and the earthen walls. The top and bottom of the tank are also of concrete. Manholes are made in the top of each chamber and concrete covers provided for them.

Additional information on septic tanks and farm water supply problems is available from the Department of Agricultural Engineering, Kansas State Agricultural College.

CHICK INCUBATION

(Continued from page 92)

eggs. Some hens lay eggs which are never fertile even though all conditions are favorable. Others produce eggs which, while fertile, seems to lack the vitality necessary for normal development. With such eggs the embryo dies before it is ready to be hatched. Thus low hatches may result from causes other than poor incubation.

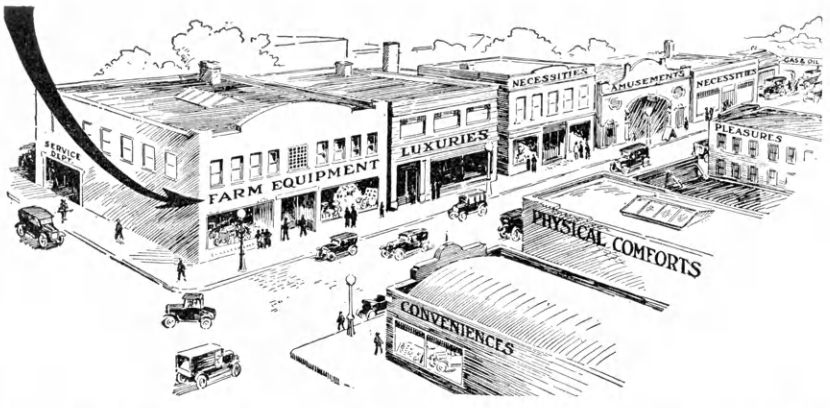
Incubation is a big link in the chain which connects one generation of poultry with another. Success in raising succeeding generations of improved types of chickens depends on it as well as breeding, feeding, rearing, and other factors.

Artificial incubation is necessary in order to hatch economically the large number of chicks now being produced commercially. While it is not yet developed to the stage where it can excel the good sitting hen in the number of chicks hatched from a given number of eggs, it is probable that future improvements will make it possible to beat the "mother hen" at her own game.

R. J. Silkett, '22, has recently been elected extension specialist in agronomy of the University of Missouri at a good increase in salary over that he is now receiving as assistant in cooperative experiments. His new work will be largely field work and will extend over about one-fourth of the farming section of Missouri, his territory bordering on Kansas and lying south of the Missouri River. He will begin his new work April 1.

J. T. Quinn, '22, is instructor in horticulture and in charge of vegetable experimental work in the University of Missouri.

Where the Farmer's Dollar Buys the Greatest Value



In some of the stores of any town the farmer's dollar buys the necessities of life; in others it buys physical comforts; in still others it buys pleasures. **In the farm equipment store the farmer's dollar buys the means to make many more dollars.** It buys the equipment which, like the land itself, is responsible for his progress and prosperity. When the farmer invests in modern farm machines, he is really buying clothing and education, electric lights, automobiles, radio outfits, etc., because these things are purchased with the money made by farm machines.

Of all the stores in town, **the farm equipment store is the one where the farmer gets the greatest return for his money.** This is true not only on the basis of the foregoing but it is found true also by comparing the prices paid by the farmer for different articles made of similar materials.

An interesting comparison has been made by the Research Department of the National Association of Farm Equipment Manufacturers. They took, First, a group of eleven basic farm machines: Sulky plow, peg tooth harrow, disk harrow, grain drill, corn cultivator, corn planter, corn sheller, grain binder, mower, hay rake, and farm wagon—and, Second, a list of common articles used on the farm but not classed as farm equipment. Then they obtained the pound prices of these articles by dividing the retail prices by the weights. The pound-price basis is the only practical way to compare these articles and it is entirely fair since the materials go through the same machine shop and factory processes and are handled by the same class of labor. Freight to the dealer's store was not included, since it applies to all articles the farmer buys and varies with the distance from point of manufacture.

The prices per pound on basic farm machines and a few of the other articles the farmer buys are as follows:

ARTICLE	PRICE PER POUND
Farm Machines	**13 cents**
Lawn Mower	30 cents
Carpet Sweeper	60 cents
Garden Rake	39 cents
Forge	26½ cents
Scythe	62 cents
Square	81 cents

The above comparisons, which can be duplicated in any community in this country, prove the statement that *the farmer pays less money, pound for pound, for the machines that do his work than he pays for any other similar manufactured article he buys.*

This shows what farm machines would cost if they were priced like other articles the farmer buys:

A sulky plow, priced like a wringer, would cost about **$45 MORE**
A peg-tooth harrow, priced like a forge, would cost about **$30 MORE**
A disk harrow, priced like a buck saw, would cost about **$50 MORE**
A grain drill, priced like a food chopper, would cost about **$390 MORE**
A corn planter, priced like a forge, would cost about **$60 MORE**
A corn cultivator, priced like a vise, would cost about **$40 MORE**
A corn sheller, priced like a milk can, would cost about **$20 MORE**
A 7-ft. grain binder, priced like the cheapest automobile, would cost about **$200 MORE**
A 7-ft. grain binder, priced like an ash can, would cost about **$150 MORE**
A 5-ft. mower, priced like a lawn mower, would cost about **$80 MORE**
A hay rake, priced like a garden rake, would cost about **$110 MORE**
A wagon, priced like a hand washing machine, would cost about **$50 MORE**

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A BELGIAN AND HER PROGENY

(Continued from page 77)

Farzelle 9219 (D), another daughter of Mirza de Bou, was foaled July 1, 1921. She was also bred by the college, her sire being the famous 47,500-dollar Farceur 7332, then in the stud of C. G. Good of Ogden, Iowa. Farceur was the greatest Belgian stallion ever imported to this country. Through Mr. Good's kindness, the college had two mares bred to Farceur in 1919. One of the colts produced by these matings was Farsar 11944, grand champion at the American Royal in 1922 and now at the head of the college stud. In 1921, Mirza de Bou and two other mares owned by the college were bred to Farceur and from this mating, Mirza de Bou produced the filly Farzelle, a grand champion at both Kansas fairs and the American Royal in 1922.

Rose D'Or 9218 (E), a daughter of Bernadine and by Murdock D'Or 9926, was bred by K. S. A. C., and was foaled June 27, 1921. This mare has never been shown, but is considered an excellent individual and a valuable member of the college stud.

Colgodine 13429 (F), a son of Bernadine and by Colgo 11942, bred by K. S. A. C. and foaled March 20, 1923, is a phenomenal youngster, weighing 204 pounds at birth and over 1,400 pounds at 12 months of age. His sire, also bred by the college, was grand champion at both Kansas fairs in 1921, and it is hoped that the colt will develop into as good, if not a better, horse than his sire.

The last member of this interesting group is Farsarette 10216 (G), bred by K. S. A. C. and foaled April 13, 1923. This filly is Mirzelle's first foal, and the first foal to be dropped, sired by Farsar. It is predicted that she also will develop into an outstanding individual.

The mares mentioned above are all in foal to the service of Farsar, and by next year there probably will be several more chapters in the history of Mirza de Bou and her progeny.

The development of this family by the Department of Animal Husbandry only serves to demonstrate that it is possible for any farmer to develop a stud of horses in a like manner, without investing a large amount of capital, provided he buys the right kind of mares in the first place, mates them judiciously, and takes care of them properly. Such work is both profitable and fascinating.

FARM MANURE

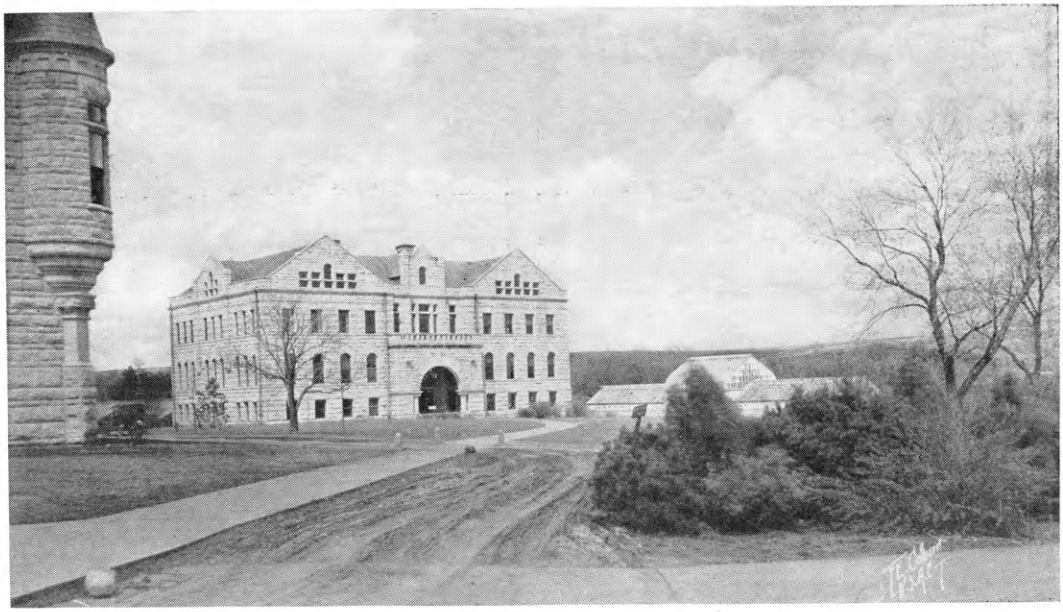
(Continued from page 70)

without manure produced an average annual yield of 3,002 pounds, while the average yield from land receiving 2.5 tons of manure per acre annually was 4,924 pounds. However, the increase in the yield of alfalfa from the use of acid phosphate has been almost as great and since manure contains a large amount of nitrogen and a small amount of phosphorus and since the alfalfa plant can obtain its nitrogen from the air, manure should be applied to the grain crops which generally need more nitrogen than many of the soils contain.

The use of farm manure in central United States will undoubtedly soon become as general as it is in the eastern states because farmers are coming to realize that it is the most practical and efficient way to maintain the fertility of the soil, especially the organic content. However, manure alone will not solve all the problems of soil fertility. Soils that are very acid should have applications of lime and those that are low in phosphorus may need applications of acid phosphate or rock phosphate before maximum yields can be secured because manure is very low in this nutrient.

In addition to maintaining the fertility of the soil, there is no method by which the farmer can maintain the organic content and improve the physical condition of his soil more profitably and easily than by the use of farm manure.

Prof. A. G. Phillips, '07, head of the Department of Poultry Husbandry, Purdue University, will represent Indiana at the World's Poultry Congress in Barcelona, Spain, May 10 to 16, 1924. He plans to visit France, Belgium, Germany, Denmark, and the British Isles to study poultry production and marketing methods before returning to America.



A FIFTY-FIFTY PLAN

The curriculum in agriculture at K. S. A. C. is divided about evenly between subjects which are of value principally in making a living and those which help us to learn how to live.

It is a combination of the technical and the liberal. Its object is to provide well-balanced training for young men who are interested in agriculture and who wish to live well-balanced lives.

The agricultural student at K. S. A. C. studies basic sciences, including chemistry, zoology, botany, entomology, bacteriology, and economics; and applications of these sciences in agronomy, animal husbandry, horticulture, dairy husbandry, milling industry, and poultry husbandry. He also studies history, English, and many other liberalizing subjects. Ample opportunity is offered for choosing elective subjects.

Agricultural students at K. S. A. C. are prominent and successful in many important activities besides those of the classrooms and laboratories, including athletics, musical and dramatic affairs, debate, public speaking, and literary contests.

The college trains men for 150 agricultural occupations and for good citizenship and right living.

Write for detailed information.

KANSAS STATE AGRICULTURAL COLLEGE

MANHATTAN, KANSAS