

The KANSAS AGRICULTURAL STUDENT



VOL. VII, No. 3

MARCH, 1928

MANHATTAN, KANSAS

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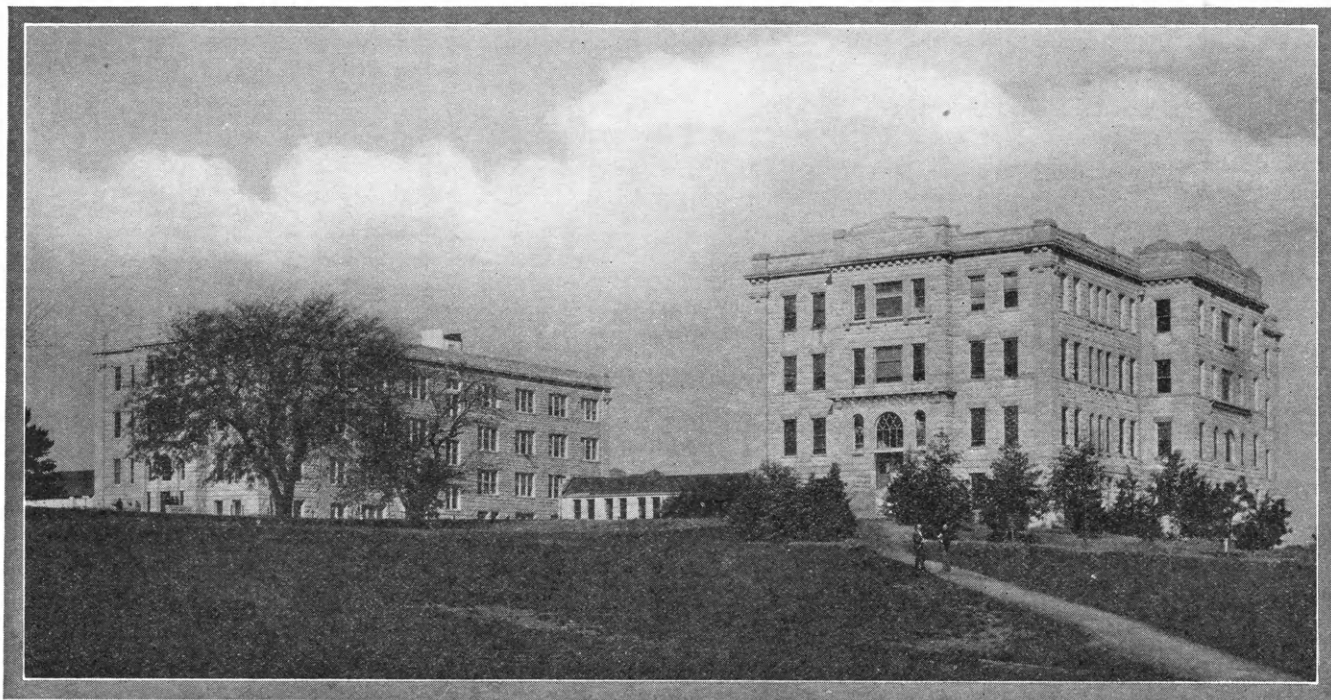


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WATERS HALL (AGRICULTURAL BUILDINGS)

These buildings are commonly known as the wings of Waters Hall. Plans to care for the growth of the college in future years provide for a large central section connecting the two wings.

The Kansas Agricultural Student

VOL. VII

Manhattan, Kansas, March, 1928

No. 3

Some Factors Affecting the Kansas Potato Market

D. N. Taylor, '28

The general factors that affect the Kansas potato market are the total supplies, the position of the supplies, the movement to market, the quality and condition of the product, the needs of consuming districts, and the general business situation.

The weather conditions at the time of harvesting make it very difficult to determine, with any degree of accuracy, the influence these factors may have on the market. It is frequently possible to anticipate only one or two factors with any degree of accuracy.

The period of harvest and market of potatoes in Kansas may be said to be from July 1 to September 1, the season being almost dominated by the Cobbler variety. These potatoes which are dug at this season are not generally capable of being stored successfully which fact makes it necessary that there be a ready market for the stock as soon as it is harvested. The crop must be consumed in a very short time owing to the warm climate and usual high temperature at the time of harvesting.

The total supplies available for market in any particular year have considerable influence on the general price level. In 1925 the supplies were short of average and the price level was above that of other years. Changes in weather conditions make a great deal of difference in the total supplies. In 1927 the entire crop was estimated as below normal, with a possible movement of 3,300 cars, the actual movement being over 4,300 cars. In Virginia for the same season the total possible movement was estimated before digging time at 10,000 cars, the actual shipment totaled over 23,000 cars. This variation which cannot be foreseen has made shippers and receivers base their actions on other market factors.

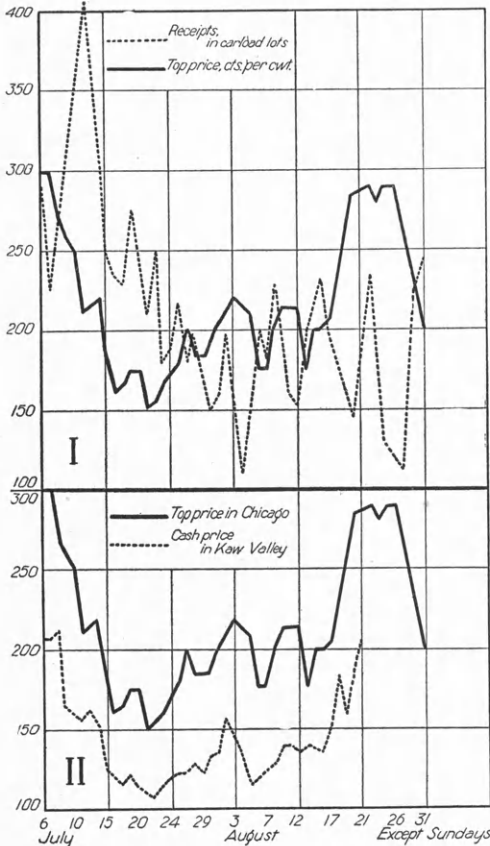
The position of supplies is a very minute factor, as the railway service to the consuming markets is excellent, diversions being capable of being made very easily.

The movement of Kansas potatoes to market follows the same general trend as the total Chicago receipts, as can be seen in the accompanying illustration (I). The movement is slow for the first few days then there is a high point in movement with a general decline until the first part of August when there is a slight ascent, then the movement varies from high to low. The graphs for 1926 are typical and show the correlation between receipts and the top price in Chicago. The other graphs in the illustration (II) show the correlation between top Chicago prices and the cash price in the Kaw valley of Kansas. The influence of Chicago prices on Kaw valley prices is very marked. However, the latter part of August generally shows a decline in the price of Kansas potatoes owing to the fact that the home gardens of the corn belt are by that time largely meeting the demands of the market.

The Chicago market has long been thought of as the dominating influence for the price of Kansas potatoes. When there is no market for potatoes either on a f. o. b. or delivery basis, they are sent to Chicago, generally as a consignment to some brokerage company. However, the growth of shipping point inspection is rapidly changing this situation, though Chicago receipts still seem to be the dominating influence on price. The Market News Service gathers most of the information regarding the influence of Chicago receipts upon shipping point price but this is oftentimes misleading due to the fact that there are not always funds sufficient to gather information and make reports from distant districts.

In 1927 there was a very small number of cars of Kansas potatoes on the Chicago tracks due to the enactment by the Kansas Legislature of compulsory shipping point inspection service. These Kansas regulations have raised the quality and grade of the product that is put on the market and have been helpful in stimulating the f. o. b. sales. Grade and quality can now be depended upon which

ume of shipments to Chicago could be regulated. This might be brought about by a cooperative association in Kansas working in cooperation with the Virginia association, or by means of a clearing house, which would determine where the day's product was to be shipped. This house should keep in very close touch with other houses so the supply of potatoes in Chicago would not become too large. A third method that could be used very well for Kansas would be to have an organization of an "estimate of arrivals service" by the Market News Service of the Bureau of Agricultural Economics in cooperation with shippers. Estimates would be made and corrected each day, the shippers being notified of these estimates made for each consuming center, so no one center would be overcrowded with potatoes. This method is of value in the live stock market and seemingly could be very profitably used by Kansas potato growers.



RELATION BETWEEN: (I) CHICAGO RECEIPTS AND PRICES, 1926; (II) CHICAGO PRICES AND KAW RIVER PRICES, 1926

is a wonderful means of broadening the distribution of the Kansas potato market.

The inspection service will create a great number of new markets that would not consider Kansas potatoes heretofore. This will greatly lessen the influence of Chicago receipts upon the price of potatoes in the Kaw valley.

The situation might be helped if the vol-

M. A. Smith, '22, has a fellowship in the Crop Protection Institute of Illinois and is working on the use of sulphur as a fungicide. His address is Box 531, Station A, Champaign, Ill.

Oscar E. Reece, one of the honor freshmen students in the Division of Agriculture last year, is principal of the grades and teacher of the eighth grade in Smith Center, Kan. He writes that he is planning to re-enter college next year.

The pretty dairy layout owned by Raymond Campbell, '20, of Parsons, is a real indication of the success he has enjoyed in supplying milk to his consumers in Parsons. The city is large enough to more than take all his supply, so he is in a remarkably good situation.

Paul O. Brooks, '27, (colored) is instructor in agriculture in Georgie State Industrial College, Industrial College, Ga. Mr. Brooks teaches vocational agriculture in the preparatory department and poultry production and types and breeds of farm animals to college freshmen. He is enthusiastic as regards the opportunities his position offers.

Bovine Infectious Abortion in the Dairy Herd

T. W. Kirton, '29

Bovine infectious abortion is the most disastrous disease that dairy cattle are susceptible to. It is a serious handicap to herd development and causes a great economic loss from the standpoint of herd efficiency. It limits markedly the amount of personal satisfaction one gets out of working with a good herd of cattle. During the past ten years it has been the main factor causing bankruptcy in the dairy herds throughout the country. No other disease or item of dairy herd management requires more skill to handle than does infectious abortion. A serious outbreak of this disease among the animals of a large herd develops a most alarming situation.

Live stock men fully recognize the economic importance of this disease and think of it as an unseen enemy of the live stock industry. The thing that must be done is to plan a combined attack and wage a country-wide war on the disease. First the strong and weak points of the enemy must be considered, and the campaign so planned to make the efforts most effective.

The infectious germ is passed from one animal to another by the feed's coming in contact with discharges from animals that have abortion. Animals may be infected with abortion germs and still have resistance enough to appear normal, yet they pass the infection on to animals with less resistance. At one time it was thought that a male might spread the disease during his service to various animals of the herd some of which were infected. This, however, has not been proved to the satisfaction of recent investigators.

At the present time the best known means of controlling infectious abortion is to develop and follow a program embodying the strictest of sanitary measures possible under the conditions present. The most pertinent of these measures will be discussed briefly under three headings: First, the use of maternity stalls for cows at calving time. Second, the establishment of an isolation herd. Third, the isolation of the heifers from the remain-

der of the herd. These measures can and should be applied to all herds.

In developing the first of these measures, namely the maternity stalls, every breeder should have a set of box stalls kept vacant for use during the calving season. These stalls should be thoroughly cleaned and disinfected each time after using. This may seem like a lot of extra labor, but if a cow is left out with the herd until she calves and then should unexpectedly abort the entire herd is exposed by her before the herdsman has time to disinfect the grounds. Of course, in some cases accidents or mistakes will lead to a case of abortion while the cow is still in the herd. But should such cases happen every measure of sanitation should be exercised in cleaning the premises.

To establish the isolation herd experimental data, released from the Agricultural Experiment Station, show that there are two general ways of selecting animals that should be isolated. First, all cows aborting should be placed immediately under quarantine. The other method to find the cow carrying the germ is to have the entire herd regularly tested through the use of the agglutination or blood test. This test is not entirely perfect but it gets a large per cent of the diseased cows before they abort and consequently decreases the exposure to the entire herd. Cows placed under quarantine should be given the best of veterinary treatment in order to keep them breeding and in a healthy condition capable of high milk production. The value of such cows to a breeder rests upon the quantity and quality of milk produced and also upon the number and vigor of the calves raised. The offspring from such animals if properly handled are thought to be free from the disease by the time they are old enough to wean. It is highly advisable to remove all healthy calves from these cows to another part of the farm where they should get nothing but pasteurized milk. All inferior cows should be sold, for their re-

(Continued on page 90)

Rotation and Deferred Grazing

J. W. Roussin, '29

By deferred and rotation grazing is meant a system of grazing based upon the growth requirements of pasture vegetation to allow the forage species to make enough growth to maintain their normal vigor. The plan provides for a utilization of forage plants consistent with maintaining their maximum productivity. It also involves the reserving of a portion of the pasture each year for two years until after a required growth has been made. After two years of such early protection the forage plants will have stored sufficient food material to withstand again rather heavy grazing during the early part of the season.

It may be said that the migrations of buffaloes suggested the practice of rotation and deferred grazing. The roving habits of these animals led them north in the spring and south at the approach of winter. Notwithstanding the enormous numbers of these animals there was practically no range deterioration.

Although a proper rotation of grazing and resting pasture lands brings about very marked results, stockmen have been slow to adopt such a plan. The majority of stockmen continue to graze their pasture lands the entire season, one year after another.

A system of range management was first put into practice by the United States Forest Service in 1910, but it was not until 1915 that the scheme was started on a practical basis on national forest ranges.

Experimental work was begun by the Kansas Agricultural Experiment Station in 1915, and was made possible largely through the good graces of Mr. Dan D. Casement, of Juniata Farms, who has placed approximately 1,600 acres of native pasture land and all the necessary live stock at the disposal of the station. Mr. Casement has also generously contributed his time and that of his employees when needed to handle the live stock as planned by the experiments. The pasture lands of Juniata Farms are located about 10

miles north of Manhattan and are quite representative of the pasture lands of the Flint Hills region.

There are many interesting phases of the pasture experimental work as carried out on Mr. Casement's ranch, but probably the most striking one is that of deferred and rotation grazing. The greatest advantage to be gained by a deferred system of grazing is in the physiological effect upon the forage plants. The fact that the plants are allowed to mature a crop normally, permits them to store up food in their root systems to aid in the production of the next year's crop. It is a well recognized botanical fact that the surest way to kill plants is to prevent them from producing green shoots. The continual removal of the early green growth by grazing, gradually reduces the vitality of the plants until they finally die. Some species, it has been found, are more susceptible to this kind of injury than others. This fact is well illustrated in the case of porcupine grass (*Stipa spartea*) which is rapidly reduced and thinned out by grazing and entirely eliminated by frequent clipping.

Year	Number of acres per head of live stock							Average number of livestock to 640 acres
	1915	1916	1917	1918	1919	1920	1921	
Pasture No. 1 season-long grazing	9.17	6.29	7.35	5.52	4.48	4.52	5.72	104
Pastures Nos. 2 and 4 deferred and rotation grazing	2.90	4.28	3.68	5.95	4.47	2.58	2.89	168

The advantage to be gained by the use of any system of grazing can be measured largely by the increased grazing capacity and the effect of the grazing on the quality and quantity of the vegetation. Considering only the increase in grazing capacity the above table shows the number of acres of pasture necessary to carry one head of live stock in the pastures grazed under the two systems, for the years 1915 to 1921, inclusive. In

(Continued on page 92)

Acknowledgment.—All credit for the information and data contained in this article is due Prof. A. E. Aldous, in charge of pasture improvement in the Agricultural Experiment Station of Kansas.

The General Course in Entomology at K. S. A. C.

Roger C. Smith
Professor of Entomology

Entomology is that branch of biology which includes the study of insects. It is usually taught with especial reference to the relation of insects to the welfare of mankind. Entomology is a specialized branch of zoology but, for various reasons, the subject is often taught in a separate department, as is the case in K. S. A. C. and in 24 other institutions.

For many years at this institution general zoology has been made a prerequisite for the first course in entomology. This is a logical development and a desirable arrangement. However, because of the aims and plans of the students desiring to take the course, this prerequisite is likely to be less rigidly enforced in the future or done away with entirely. The writer recently made a detailed study of the courses in entomology offered by American colleges and found that, generally speaking, where the entomological courses were offered in separate departments there was no prerequisite. Only a very few of the strong departments of entomology in the United States require any prerequisite course. It is agreed, however, that those students planning to take several courses in entomology should have a good grounding in zoology.

Entomology is a relatively young subject in college and university curricula. The first lectures were given at Harvard from 1837 to 1842 by Dr. T. W. Harris. It is interesting to note that K. S. A. C. was the second institution in the United States to include entomology in the college curriculum and to continue the instruction until the present time. A course entitled "Insects Injurious to Vegetation" was first listed for junior students in the catalog of K. S. A. C. for 1866 to 1867 (published 1867).

At least one course in entomology is now given in 153 colleges and universities in the United States, excluding junior colleges. A comparison of the courses offered by the

various institutions, indicates that the Department of Entomology in K. S. A. C. has just claim to be considered one of the strong departments in the United States. Fifty-one of our graduates are now engaged in entomological work throughout the world. One of them, Dr. C. L. Marlatt, is now Chief of the United States Bureau of Entomology, which is recognized as the greatest entomological organization in the world.

The first course in entomology in K. S. A. C. is a three-hour credit course consisting of two recitations and one three-hour laboratory period per week. Fernald's "Applied Entomology," now in its second edition, is used as a text guide for the recitation work. This is an excellent short treatise of the subject, only very slightly technical and emphasizing the economic aspects of the subject. The author is head of the Department of Entomology in the Massachusetts Agricultural College and his students are similar in their preparation and aims to K. S. A. C. students. This text is supplemented especially to emphasize the particular insect problems of Kansas. By means of this text and the additional material supplied in lecture form, it is aimed to introduce the student to the more important aspects of the subject, especially the following basic facts:

1. The relations of insects to other animals and how they differ from other animals.
2. The fundamental facts concerning insect development and growth.
3. A brief survey of insect control.
4. The names and characters of the orders of insects, the more common families of insects, and the accepted common name or names for the more important ones.
5. The specific life history, habits, injuries, and control for the more important insects of the state.
6. Sources of information, enabling the student to find more extended accounts of insects than are given by the text should he wish to do so.

The laboratory work touches the more technical phases of the subject. The aims in the laboratory work are:

(Continued on page 94)

Food Selection of Birds

Howard K. Gloyd
Instructor in Zoology

In maintaining their characteristically high rate of bodily activity, birds consume very large amounts of food, their digestion is rapid and powerful, and their diet is usually selective according to the food preference of each species. Food of an animal nature obviously affords the most concentrated form of nourishment, while seeds of all kinds with their stored energy of oily or starchy matter come next in value. Vegetable matter of other sorts, as leaves or pulp, is less nutritious, requiring greater amounts and longer periods of feeding to produce the equivalent energy.

Among the foods of animal origin, fish make up the diet of many water birds such as loons, grebes, pelicans, herons, gulls, terns, and diving ducks. Some birds of prey, the osprey, certain eagles and a few owls, feed mainly upon fish. The kingfishers, a group of land birds, have also developed the fish-eating habit.

Diverse and interesting methods of catching fish are employed by various birds. Herons display marked skill and patience standing quietly in the water until a fish approaches within reach of the long neck and bill. Loons, grebes, and the diving ducks give active chase under water, while kingfishers, terns, cormorants, and others plunge for their prey from a height above the surface.

Examination of the stomachs of a large series of fish-eating birds has shown no evidence that food fish are destroyed to any extent. Most of the species are of little or no value to man, although at times grebes may cause some damage in fish hatcheries.

Dead fish are eaten by comparatively few species. The larger gulls have developed this habit and have thus become useful as scavengers.

Small rodents of many different kinds make up a large part of the diet of most of the hawks and owls. These beneficial birds of prey are a powerful factor in the control of harmful mice, moles, and ground squirrels.

Among land birds the most general source

of animal food is that supplied by insects. So great is the variety and abundance of insects that birds have become adapted for pursuing them in all their varied modes of life. Tree-trunk species are attacked by creepers, nuthatches, and woodpeckers; those that frequent leaves and the smaller twigs are captured by warblers, sparrows, kinglets, and orioles; other groups of birds, swallows, flycatchers, and swifts pursue insects in the air capturing them as they fly, and ground-living insects are sought by birds that frequent that type of habitat, such as thrushes, ground sparrows, and meadowlarks.

Much has been written about the economic value of birds as insect destroyers. It must be kept in mind, however, that insects have enemies not alone in birds but in bacterial diseases and the vast numbers of parasitic insect species which tend to hold the insect population in check, and that while birds unquestionably eat many insect pests they also feed upon many that, from the human point of view, are either of neutral value or positively beneficial.

Of all vegetable foods, it is natural that seeds of plants should be most used by birds since they contain the most nourishment. Many birds such as finches and crossbills have developed ingenious methods of cutting open the seeds and extracting the kernels. Seed eating enables many species to survive the winter climate in the temperate zone and it relieves many of the necessity of migration. It is notable that most seed-eating birds take insects as well, and further that their newly hatched young are fed on insects until they are sufficiently grown to thrive on seeds.

The parrot family with their powerful beaks afford an example of a group of tropical birds that live in large part on nut-like fruits. Pulp fruits are relished by some birds and undoubtedly furnish nutritive salts, sugars, and acids. The river ducks as adults feed largely upon wild celery and seeds of water weeds and become excellently flavored for the table. Geese go a step farther and

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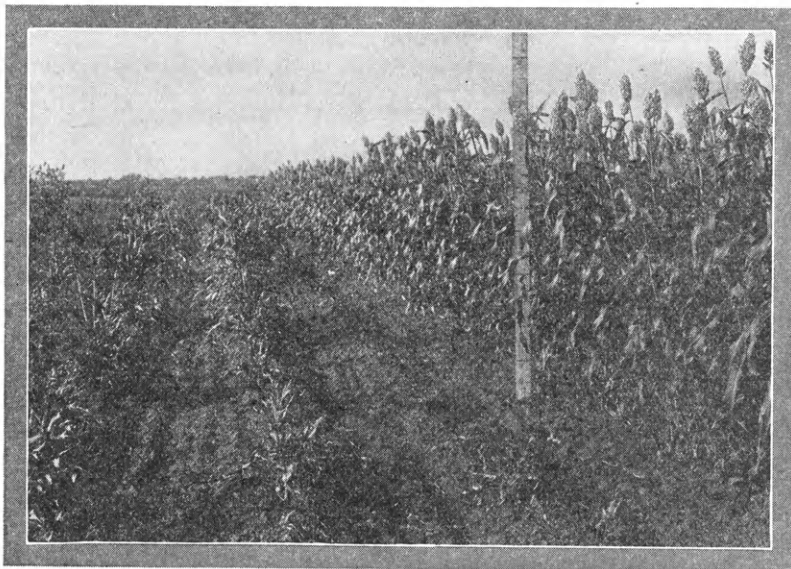
Breeding Crop Plants Resistant to Insect Attack

Harold E. Myers, '28

For a good many years it has been observed that certain varieties of plants were more resistant to insect attack than other varieties of the same crop. However, it has been only within the past few years that any attempt has been made to breed plants resistant to insect attack. A project, known

given additional support from Purnell funds. The results of previous work were of such a nature as to justify a fundamental study of the whole problem.

The present work is a cooperative project with the Department of Agronomy handling the agronomic and plant breeding phases and



RESISTANCE OF CROPS TO CHINCH BUG INJURY

The milo at the left has been practically destroyed by chinch bugs while the feterita at the right has been injured very little.

as the resistance of plants to insect injury, was started by the Kansas Agricultural Experiment Station in 1913. It is designed primarily to study the resistance of wheat to Hessian fly injury, the resistance of corn to corn ear worm and chinch bugs, and the resistance of sorghums and barley to chinch bug injury.

This project was enlarged in 1926, and

Acknowledgment.—The writer is indebted to Profs. J. W. McColloch, W. P. Hayes, and R. H. Painter of the Department of Entomology and to Profs. S. C. Salmon, John H. Parker, and A. M. Brunson of the Department of Agronomy for the information contained in this article.

the Department of Entomology handling the entomological phases of the problem such as feeding habits of the insects and the basis or cause of resistance.

It has been found that certain varieties of wheat are very resistant to Hessian fly when grown under conditions which would naturally produce a heavy infestation. These varieties are not well adapted to Kansas conditions. For this reason crosses have been made using some of the standard varieties such as Turkey and Kanred. These

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HOLD FAST TO THE FUNDAMENTALS IN EDUCATION

It is not within the province of this magazine to discuss at length educational principles. However, some fundamentals of our public school system are so clearly and forcibly presented by Pres. F. D. Farrell in an article in the February number of "The Kansas Teacher," that we cannot refrain from making brief comment. We wish that the teachings of the article could be burned into the mind of every Kansas public school teacher and administrator.

Education is the development of inherent powers and cannot be accomplished except by hard work. Many subjects and activities may educate but they can only do so by calling for such concentration, courage, persistence, and self-mastery as will require the student to overcome difficulties.

As the discussion proceeds Doctor Farrell raises and answers three questions as follows:

"Are the facts of these trite statements adequately taken into account in the facilitating of the learning process? When we increase the ease with which pupils learn conventional facts is there any likelihood that we shall unconsciously encourage the learner to undervalue the educational significance of

hard work? Is there a possibility that the road through school can be made so easy that many students who are capable, inherently, will reach the end of it with their mental and spiritual "muscles" still soft? The reluctance toward sustained effort exhibited by many inherently able boys and girls who have passed through the school system, their frequently expressed belief in the virtues of "getting by," and the numerous attempts to substitute cleverness for honest labor, suggest a negative answer to the first question and affirmative answers to the second and third."

It is our belief that 50 to 75 per cent of the scholastic failures of college freshmen are due to their lack in development of the ability to do hard work.

COLLEGE CURRICULA IN AGRICULTURE

During the month of May, 1928, several thousand high school seniors will be graduated from the high schools of Kansas. Many of these will go to college. Along with the decision that a young man or young woman is to go to college are the questions, what college? What curriculum? What will be my life work?

The young man from the farm who is to finish his high school work in the near future

should consider college agricultural curricula seriously. Many young men, not realizing their opportunities in agriculture, though they have a splendid background in this work, take up other curricula for which it is necessary to develop an entirely new background and thereby lose valuable time. Experience is a valuable asset to any individual. The young man who has spent his boyhood years on the farm and has this valuable farm experience will find it a broadening influence in pursuing college work in agriculture.

The curricula of agriculture offered by Kansas State Agricultural College are so planned that any capable young man finishing any one of them may enter a number of desirable fields of work if he does not care to return to the farm or is not financially able to do so.

K. S. A. C. offers four curricula in agriculture. The oldest is the regular four-year curriculum in agriculture. The first two years of this curriculum are the same for all students. During the second semester of the sophomore year each student is required to choose the department in which he wishes to major. This may be animal husbandry, agronomy, poultry husbandry, horticulture, dairy husbandry, agricultural economics, agricultural engineering, bacteriology, plant pathology, zoology, milling industry, or chemistry.

The primary purpose of the curriculum in agriculture is to aid those individuals that intend to return to the farm, but any student finishing this course will have sufficient training to enable him to enter some one or more of the many agricultural industries.

The curriculum in agricultural administration is one of the newer courses offered in the Division of Agriculture. This curriculum is planned to meet the needs of students preparing for industries that are closely related to farming and in which basic training in both agriculture and business principles are desirable. Students in this curriculum may also prepare for the teaching of high school vocational agriculture.

The other two agricultural curricula offered by K. S. A. C. appeal only to limited numbers of young men. For their purpose they are just as thorough and high-class as

any to be found in this section of the country. They are the curriculum in landscape gardening and the six-year curriculum in animal husbandry and veterinary medicine, the first four years of which lead to the degree of bachelor of science in agriculture and the fifth and sixth years of which lead to the degree of doctor of veterinary medicine.

The curricula in the Division of Agriculture are so arranged that they will give any individual a well rounded college education. This is made possible, first by an excellent program of required work including English, the basic sciences, and the fundamentals of agriculture; and second, by a liberal number and a flexible system of electives.

Since the background of experience is very valuable to everyone, high school seniors who have had experience in agricultural lines should capitalize this asset by taking advantage of the curriculum in agriculture that is most desirable for them. With this training they will be able to forge ahead and get the most desirable things from life.

Harry E. Kiger, '09, is engaged in the flour, feed and seed business, Alexandria, "vay oop north in the big veet country, yah!"

C. W. Mullen, M. S., '17, is associate editor of the Oklahoma Farmer-Stockman. His agricultural education serves him well in answering by letter over 20,000 specific questions which he receives each year.

The Purina Feed Company acquired two more Aggie men recently in Donald B. Ibach, '23, M. S., '27, and K. D. Thompson, '20, who have recently become their salesmen. Thompson had formerly been in the employ of the Thompson Lumber Co., of Kansas City.

Nevels Pearson, '20, assistant state club leader in Michigan with headquarters in East Lansing, visited the college during the holidays. He gave a group of Prof. F. W. Bell's live stock judging boys his usual words of encouragement. In his Michigan work he has as one of his associates and right-hand men H. F. Moxley, '25, who has recently been promoted to the position of animal husbandry extension specialist for Michigan.

COLLEGE NOTES

JUNIOR STOCK JUDGING TEAM PLACES THIRD AT DENVER

The K. S. A. C. junior live stock judging team competing in the intercollegiate live stock judging contest placed third at the National Western Live Stock Show in Denver, January 14, 1928. The Nebraska team placed first with a score of 3,573 points; Wyoming was second with 3,543; Kansas, third with 3,539; and Colorado, fourth with 3,447.

The team, coached by Prof. F. W. Bell, was composed of the following men: O. E. Funk, Marion; I. K. Tompkins, Byers; Sherman Hoar, Willis; Waldo H. Lee, Keats; T. W. Kirton, Amber, Okla.; and Dale A. Scheel (alternate), Emporia. O. E. Funk was high individual in the entire contest and won a cash prize of \$25. Waldo H. Lee was fifth individual in the contest. T. W. Kirton was high man of the contest on judging fat stock and won the gold watch offered as a special prize for this placing.

MONTHLY AGRICULTURAL SEMINARS

Col. J. M. Petty, head of the Department of Military Science and Tactics of the college, addressed the monthly Agricultural Seminar January 12, 1928, on the subject, "Philippine Agricultural Methods and Products." He gave some interesting observations made among various tribes on different islands during a residence of about ten years. Among other things he said:

"In some of the outlying districts the methods employed in harvesting and preparing crops show little progress over those employed in Biblical times, while in others the introduction and acceptance of modern machinery has increased and improved the yield at least 50 per cent."

The main products of the island, rice, hemp, sugar, and copra, were mentioned. Colonel Petty stressed the fact that the

natural resources of the archipelago are at present practically untouched.

J. Clyde Marquis, chief of the Bureau of Information, United States Department of Agriculture, Washington, D. C., addressed the Agricultural Seminar February 9. In his talk he explained the development of the Bureau of Market Information and stressed the opportunities which this department offers for college graduates entering this line of work. He brought out the fact that men trained along statistical lines were in demand not only in this department but also by commercial firms.

Following the talk of Mr. Marquis, Dean L. E. Call presented K medals to 21 students who had represented the college on various intercollegiate judging teams during the year. These medals were awarded by the Agricultural Association.

ANNUAL HIGH SCHOOL JUDGING CONTEST

The eighth annual State High School Judging Contest will be held at the college, Thursday and Friday, April 20 and 21, 1928.

Any boy enrolled in a Kansas high school who has not previously competed is eligible to enter. One team of three members from each school is allowed. The same team must go through the entire contest, placing classes of (1) beef cattle, horses hogs, and sheep, (2) dairy cattle, (3) grain, and (4) poultry. Prizes will be awarded to the team making the highest total score, to the high team in each of the four sections of the contest, and to the high individuals in the entire contest and in each section.

The numbers of high schools competing in this contest each spring has reached almost 100, including practically all the high schools of the state having departments of vocational agriculture and a number of other high schools, especially rural high schools, that offer well organized courses in agriculture.

SECOND ANNUAL AGGIE DAIRY SHOW

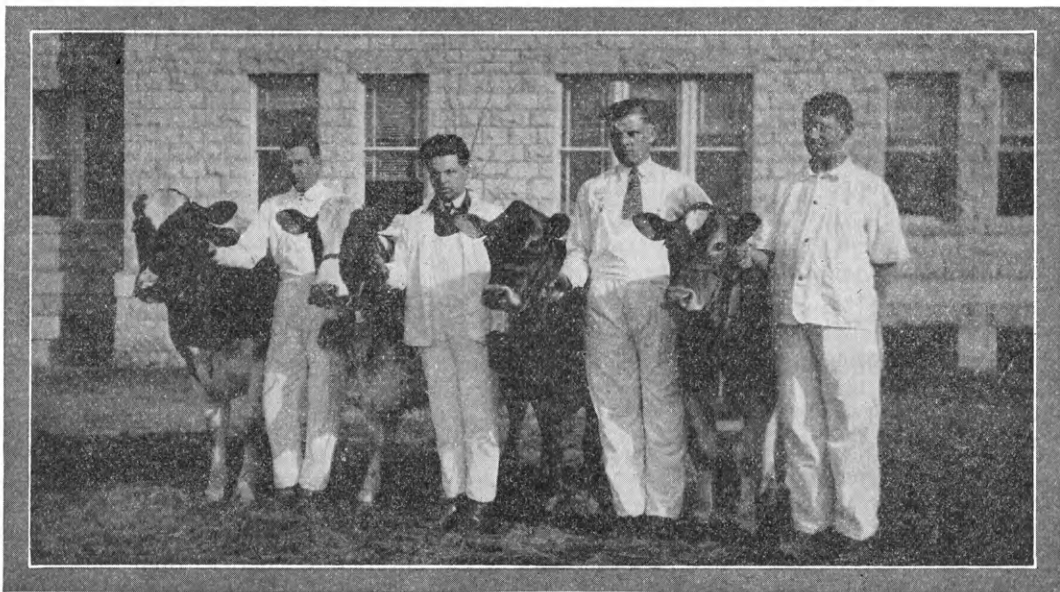
The second annual Aggie Dairy Show was held during Farm and Home Week on Wednesday and Thursday, February 8 and 9. There were 32 contestants, this being a decrease over last year, but the interest shown and the work accomplished make this year's show of great value.

Work encountered in fitting and showing a dairy cow gives one knowledge that is of use to anyone who expects to be associated with live stock after graduation. This is the purpose of the contest and it is sponsored by

in the preliminary contests Wednesday afternoon showed in a final contest Thursday night for grand championship honors and the coveted first place was awarded Mr. J. H. Alsop.

The ribbons offered for first three places in each preliminary contest and the purple rosettes for champion awards in both the preliminary contests and the final contests were furnished by the Division of College Extension of K. S. A. C. These were very pretty ribbons and the designs were such as to make them highly prized by the contestants.

The Dairy Club are sure that great benefit



THE FOUR CHAMPION SHOWMEN

From left to right these winners of champion awards in the preliminary contest of the Aggie Dairy Show are: T. W. Kirton, D. S. Waters, J. H. Alsop, and W. K. Scott.

the Dairy Club in the best way known to produce the desired results.

The Ayrshire, Guernsey, Holstein, and Jersey groups were well represented in the preliminary contests. The showmen were made up of short course students and regular agricultural students who were interested in the fitting and showing of live stock.

J. H. Alsop of Wakefield, W. K. Scott of LeLoup, D. S. Waters of Milford, and T. W. Kirton of Amber, Okla., were the four champion showmen selected. These four champions

is derived by students entering such a contest and would like to see cooperation lead to a "Little International" for K. S. A. C.

EIGHTH ANNUAL AG FAIR

Preparations are well under way for the eighth annual Ag Fair to be held on the north campus Saturday, April 21, 1928. The opening feature of the fair will be the parade through Aggieville and down town districts starting promptly at 1:30 p. m. Each de-

partment of the Division of Agriculture and several other departments of the college will be represented in the parade by floats. W. E. Schaulis and V. E. McAdams are in charge of the parade.

The fair will open at 3 p. m., and all grade and high school students will be admitted to the pike free. Chief among the attractions will be the follies, minstrels, special horse riding stunts, and side shows. Along with these entertainment features will be placed the educational exhibits which will be sponsored by the department of the division and by several other college departments with the cooperation of the departmental clubs. An effort will be made to excel both in number and in interest the worthy educational exhibits presented last year. In the evening a dance will be added to the list of attractions. Francis W. ImMasche is in charge of the dance.

Kenneth M. Gapen will direct the follies. Gapen has had considerable experience along this line and no doubt under his direction the follies will maintain their fine reputation as entertainers.

The minstrel show is in charge of O. E. Funk and with his present line up will present one of the best "darkie" shows ever produced.

The other committees have their plans well under way and the eighth annual Ag Fair promises to be unexcelled. The board of directors consists of the following students: Vance M. Rucker, manager; Ray L. Remsberg, assistant manager; "Pat" Murphey, secretary and treasurer; and H. P. Blasdel, fourth member of the board. The board asks for the support and cooperation of every student in the Ag division to make the fair a real event worthy of the support of college and community.

R. Reece Johnson, '25, is farming 4½ miles from Salina.

Clinton H. Morgan, '22, M. S., '22 is professor of agronomy in the Alaska Agricultural College and School of Mines, Fairbanks, Alaska, a position which he has held since shortly after receiving his master's degree.

K MEDALS TO MEMBERS OF JUDGING TEAMS

The 21 students receiving K medals this year for representing the college in intercollegiate judging are:

Dairy Cattle Judging Team

Howard V. Vernon, Oberlin
Harold E. Myers, Bancroft
Terrell W. Kirton, Amber, Okla.

Dairy Products Judging Team

E. Wayne Frey, Manhattan
Elmer F. Hubbard, Linwood
Clarence O. Jacobson, Sedgwick

Live Stock Judging Team

Harold L. Murphey, Protection
Verl E. McAdams, Clyde
Edward A. Stephenson, Alton
Howard V. Vernon, Oberlin
Ragnar N. Lindburg, Osage City

Meats Judging Team

Harold L. Murphey, Protection
Edward A. Stephenson, Alton
Hale H. Brown, Edmond
Verl E. McAdams, Clyde

Crops Judging Team

Harold E. Myers, Bancroft
Loren F. Ungeheuer, Centerville
F. Leonard Timmons, Geneseo

Apple Judging Team

Kay H. Beach, Edwardsville
Forest H. Hagenbuch, Troy
Albert H. Ottaway, Oswego
George B. Wagner, Eskridge

Poultry Judging Team

Lonnie J. Simmons, Manhattan
James R. Wells, Soldier
Albert W. Miller, Great Bend

No student is ever awarded more than one medal. The following members of this year's teams received medals for intercollegiate judging last year: F. Dale Wilson, Jennings, live stock judging team; and Leroy E. Melia, Ford, crops judging team.

Only seniors on the junior intercollegiate live stock judging team competing in the contest of the National Western Live Stock Show in January are awarded medals. Sherman S. Hoar, Willis, was the only senior on the team this year and hence was the only one of the team to be awarded the coveted medal.

D. L. Signor, '21, has been teaching vocational agriculture since his graduation. He is now starting his second year in Effingham.

Leon M. Davis, '09, of the Bureau of Agricultural Economics, Washington, D. C., had the honor to be one of the charter members of Alpha Zeta when the K. S. A. C. chapter was organized 19 years ago.

Place of the College Mill in the Wheat Improvement Program

R. E. McCormick, F. M. E., '29

To maintain the reputation "Kansas Grows the Best Wheat in the World" it is necessary to consider the quality of the wheat from the standpoint of the miller and baker, as well as the farmer. A wheat is satisfactory to the farmer if it yields well and has a quality that brings good prices. Good wheat prices, however, will not be maintained for any one large section of the country unless it produces wheat satisfactory to the miller and baker, as well as the farmer. Hence it is necessary in any wheat improvement program to consider the qualities of the wheat from the standpoint of all these industries.

To test the milling and baking qualities of wheat is the work of the Department of Milling Industry. To do this work there is available an exceptional equipment. It may be said that no state in the union has better equipment for experiments in milling technology.

Before the present reconstruction of the

mill was undertaken, the plant consisted of a 75-barrel modern flour mill built on usual commercial lines. Also a small laboratory experimental mill, together with accessory equipment.

The faith of the mill men in the college mill was shown by their donations of about \$9,000 worth of equipment. This included wheat-cleaning machinery, two bleaching systems, a small experimental mill, and most valuable of all, a system for atmospheric control. This makes it possible to conduct experiments in milling technology under uniform conditions.

Besides the above, the college mill is being remodeled and considerable equipment added. This will make the mill as good or better than any other experimental mill in the world. Thanks to an appropriation from the last legislature, there is also a well equipped laboratory for conducting chemical and baking tests. For the latter tests there is avail-

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The Time to Seed Oats in Kansas

L. E. Melia, '28

The farmers of Kansas could materially increase their oat production by timely sowing. Oats is a cool weather crop and must be seeded early so it will mature before the hot season. Late sowing throws ripening into the hot season decreasing the yield per acre.

Most of the oats grown in Kansas is produced in the eastern half of the state. Many experiments have been carried out to determine the proper seeding time and it has been found that for Manhattan, oats should be seeded as soon after March 1 as weather conditions will permit. This date will vary from about two weeks earlier in the southern part of the state to a little later in the extreme northern part. In the extreme southeastern portion of the state farmers are often justified in seeding oats during the latter part of

February, for wet weather often keeps them out of the field for a long period of time and if it is dry early in the season the opportunity to seed should not be neglected because the farmer may not be able to get into the field again until it is too late for best results. Oats should not be sown too early, however, because if sown too early the seed may rot in the ground before it is warm enough for germination to take place. Also when good stands are secured by extra early seeding there is the danger of a late freeze killing the young plants.

Often wet ground makes early sowing difficult. This is especially true of corn ground. Shallow plowing in the fall to turn the corn stalks under often makes possible sowing ten

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FARM NOTES

A RILEY COUNTY FARMER FINDS THE COW-TESTING ASSOCIATION PROFITABLE

J. V. Nauerth of Keats, Riley county, joined the cow-testing association in 1925. With an average of 10.5 pure-bred Holstein cows for the year their average production was 7,538 pounds of milk and 274 pounds of butterfat, giving an average profit above feed cost of \$90.66. He noticed that his cows were producing more per month at the end of the year than they were at the beginning, due to changes suggested by the tester in his methods of feeding and care of the cows, so he joined the association for the second year. The 12 cows in the herd finished the second year with an average production of 9,115 pounds of milk, 341 pounds of butterfat, giving an average profit above feed cost of \$117.22. Mr. Nauerth concluded that this \$26.56 gain per cow in profit above feed cost in one year was worth considering so he is now testing his third year. He is also a member of a cooperative bull association.

"STAY-AT-HOMES" ADVANCE INTELLECTUALLY BY USING THE HOME STUDY SERVICE

Prof. George A. Gemmell, head of the Department of Home Study Service of Kansas State Agricultural College, contends that his department is performing a real service for the people of Kansas by furnishing those whose circumstances will not permit them to come to college, an opportunity to study at home. It is through this service that high school and college credit is given which can be used toward graduation if one has the opportunity later to return to school. However, many use the correspondence work to increase their information on certain subjects with no intention of returning to school.

An outstanding instance is cited by Professor Gemmell to show how work in this department is being used as a stepping-stone to greater achievement. Deane Banta, a four-

teen-year-old boy of Little River, Kan., has recently completed the first course in agriculture, receiving an "E" grade, the highest given, and is now starting on the second course in agriculture. He cannot at the present time attend high school, but these courses, completed at home, can be used toward high school graduation. Deane is a boy scout; reads such magazines as *The American Boy*, *The American*, and the *National Geographic*; and some day wants to be a teacher.

Deane's mother has completed about two years of her high school work by correspondence and his father is now enrolled in courses in history, English, and agriculture. Studying is done in spare time after the hard work on the farm is finished. The essence of the spirit with which these people do their work is summed up in this statement which Mr. Banta made on the "acquaintance blank" which he filled out at the time he enrolled in the Department of Home Study Service:

"When a boy I was unable to complete my education sufficiently to enter professional work. Mrs. Banta and I are now determined to grow up with our family of five boys and prove to them that we have at least tried to make ourselves worth while and keep pace with the times."
—L. M., '28

ED MILLER, JUNCTION CITY DAIRYMAN, DELIVERS THE GOODS

E. J. ("Ed") Miller, prominent dairyman of Junction City prevents the multiplication of bacteria in his market milk by providing conditions which are unfavorable for their growth. The cows are thoroughly brushed and their udders washed and dried before milking. He uses a milking machine and the milk is run over the cooler as soon as it is drawn, and bottled promptly. The bottles are stored in his big refrigerator where a mixture of crushed ice and salt keeps the tem-

perature around 30°F. Delivery is made every morning in a truck, the body of which is virtually a refrigerator with double walls and a compartment for two large cakes of ice.

Because his equipment is kept absolutely clean and thoroughly sterilized and because of his care in handling the milk, he has put on the market a product with a surprisingly low bacteria count and has many times produced the cleanest milk in his community, if not in the state.

—L. M., '27

A DAIRY CLUB BOY BECOMES A SUCCESSFUL FARMER

Iver L. Peterson of Burdick is one of Morris county's successful young farmers. He and his brothers grew up on the farm owned by their father, the late F. O. Peterson, at one time president of the Morris County Farm Bureau and vice-president of the Kansas State Farm Bureau. F. O. Peterson joined the Morris County Cow-Testing Association in 1918, not because he had a lot of cows he wanted to put a record on, but because the

association needed another member. Such was his attitude toward things which would benefit the community.

That same year, 1918, Iver joined the Dairy Calf Club with a purebred Holstein heifer from Ohio. The regular visits of the tester, the weighing of milk and feed, and the balancing of accounts with the cows was of so much interest to young Iver that he waited impatiently for his calf to mature so he could have a cow to call his own.

The calf did not disappoint him and today (even after selling many of her offspring) he has one of the highest-producing herds in the county. He has always kept records on his farm and now is president of the Morris County Farm Accounts Club.

—L. M., '28

S. W. Decker, '24, received his master's degree from the University of Illinois last October. He is now instructor in floriculture in the university and is also doing graduate work toward his doctor's degree.

	AG FAIR	
AG F A I R	<p>NORTH CAMPUS—SATURDAY—APRIL 21</p> <p>Parade, 1:30 P. M.</p> <p>Pike Open 3:00 to 12 P. M. .</p> <p>Three Big Shows: Follies, Minstrels, Special Horse-Riding Stunts</p> <p>Educational Exhibits</p> <p>Side Shows—Concessions—Eats</p> <p>Big Dance—8 P. M.</p> <p>Eighth annual performance <i>DON'T MISS IT</i></p>	AG F A I R
Annual AG FAIR K.S.A.C.		

Helping the Little Pigs to Market

C. E. Aubel

Assistant Professor of Animal Husbandry

More than 50 per cent of all pigs farrowed are lost before they are weaned. A large part of this loss is during the first three days after farrowing. So it behooves the swine raiser to exercise as much care as possible with his charges at this time. Constant care and attention are required from the time the pigs are born until they are marketed. Attention should begin before birth as much can be accomplished through the feed and care of the pregnant sow. After the pigs are born their rate of gain can be controlled materially through the methods of feeding the sow.

It is important that bred sows be fed a satisfactory ration—one that will supply protein, minerals, and carbohydrates to the sow herself as well as a sufficient amount for her unborn litter. Such a satisfactory ration that will put the sow in proper condition for farrowing and provide herself and pigs plenty of nutrients, is about 1 pound of corn and $\frac{1}{4}$ to $\frac{1}{2}$ pound of tankage per 100 pounds live weight, together with all the good choice alfalfa hay she will eat. If the brood sow receives such a ration she is compelled to exercise and should be in excellent condition for her farrow.

Now that the pigs are farrowed, it is essential that they be kept healthy and growing. Economy in the selection of the ration should be observed. The sow first of all should be brought back to full feed after the farrow. The first 24 hours she should receive nothing but water, and the second day a double handful of bran and shorts mixed half and half. The third day she should receive two double handfuls, the fourth day three double handfuls, and the remaining days of the first week she should get four double handfuls. After this she should be brought to full feed by having her ration increased $\frac{1}{2}$ to 1 pound per day.

After reaching full feed she should not be fed too liberally nor too rich a feed, but principally feeds which stimulate milk production. The best feeds for this purpose are shorts and tankage with some oilmeal to promote a laxative condition and a certain amount of green feed to provide bulk and

vitamins. Straight corn is not a good feed because not enough protein and mineral matter are found in it. These are necessary in the ration because the milk must contain a high per cent of these elements so the little pigs may develop bone and muscle. However, corn may be the basis of a ration and be supplemented with tankage and shorts. There are a number of rations that will give good results. The one commonly used at the Agricultural Experiment Station is corn 50 per cent, shorts 40 per cent, tankage 5 per cent, and linseed oilmeal 5 per cent (these proportions by weight).

There are a number of combinations that can be used at this time. However, the ration for the sow suckling a litter should be rich in protein and minerals and fairly bulky. The sow and litter should be put out on good pasture as soon as possible. They also should be encouraged to exercise. In fact, if the pigs will not go out of their own accord they should frequently be put out. Pasturing will help give this exercise.

The amount of feed a sow should get at this time is hard to determine and much will depend on the judgment of the feeder. The average sow will lose weight during this period, many times even though she be given all the feed she will eat. The heaviest milking sows are generally the biggest eaters and heaviest losers. So the amount fed should be regulated by the appetite, just a little less being given than the sow desires. If a sow has a small litter she probably should have less feed than one with a large litter. The small-litter sow if fed like the large-litter sow will use the excess feed for fattening. They should be fed only enough to maintain their body weight.

It is best to keep one sow and her litter in a lot by themselves. When this is impossible then two or three sows with pigs of the same age may occupy the same lot and be fed together. Sows having different sized pigs should not be run together.

When pigs are two or three weeks old they will begin to eat. A creep should be provided where they can be fed separately from the

sows. Skim milk makes a good feed for the little fellows. Care should be taken that the milk is sweet and the trough kept clean or scours is likely to result. Shelled corn is relished by little pigs and makes a good feed to use in the creep. Pigs that are fed by this method are accustomed to eating when they are weaned and there will be less loss in flesh at weaning time. By the time the pigs are ready to wean they should be getting most of their feed independent of the sow. Such feeds as shelled corn, shorts, and skim milk fed in a creep before the pigs are weaned is the first step to successful feeding at weaning time.

During the first few weeks the life of the little pig is rather precarious. There is nothing gained by raising a pig and then losing him, hence he must be watched very carefully at all times.

Some pigs seem to contract scours very easily. But experience has shown that if they have dry clean beds and are not overfed, little concern need be felt. However, there are other causes of this ailment, as running in wet grass, cold damp weather, irregular careless feeding, and filthy troughs. There is no satisfactory treatment, except to feed a proper ration, and clean up the quarters. Preventive methods are the best to ward off scours. The sow should first of all be fed a balanced ration of corn and some other grain, to which is added tankage, linseed oilmeal, or skim milk. The improperly balanced ration for the sow causes digestive disturbances in the little pig which makes him more susceptible to the infection he takes in when suckling a sow whose udder is dirty.

Many pigs die of thumps. This is a violent jerky breathing caused by too much feed with not enough protein and too little exercise. With proper feed and exercise there will be no thumps.

As a rule pigs should be weaned when about eight or ten weeks of age. If they have had access to a creep and have been suckling a sow that has had the proper ration they will have enough size by that time and will be able to get along nicely without the mother's milk.

A few days before the sows are removed from their pigs, their feed should be cut

down and thus chances of inflamed udders and caked teats when the weaning is done will be somewhat eliminated. It might be advisable to return the sows to the pigs once the next day so that heavy milkers may not suffer unnecessarily. When the sows are removed finally, they should be put in a dry lot for a few days until their udders begin to dry up.

Just before weaning when the pigs are about 10 weeks old, they should be vaccinated by the double method. Vaccination is cheap insurance, and there is no excuse for not practicing it.

Most hog lots are infested with worms, hence most pigs are likely to be wormy. As worms are especially detrimental to successful hog raising, great care should be exercised in keeping the litter worm-free. The McLean county (Ill.) system recommended by the Federal Government should first of all be employed for precaution. This consists of cleaning thoroughly the premises and pens with hot water and lye and placing the sows, after thoroughly cleaning their udders, in these clean pens for farrowing. If it is decided that the pigs have worms one of the following methods should be employed to rid them of these parasites: They should be given santonin in the slop, after being kept off feed, or dosed internally with oil of chenopodium, or dosed with the so-called worming pill.

Efficient handling of hogs from farrowing until weaning depends on (1) healthy and worm-free hogs; (2) the use of a good protein supplement, as tankage or skim milk; (3) the use of some pasture crop or alfalfa hay; and (4) a fine appreciation of the art of feeding gained by actual experience.

Ward W. Taylor, '26, is farming near Smith Center. Ward and his father marketed over 300 turkeys last fall—a good lift for the farm income.

A. J. Ostlund, '10, is farming near Washington, Kan. He has developed a fine philosophy of farming that would do anyone good. He claims to keep the "waist-line perfect." Perhaps some of our modern co-eds would become interested.

Baby Chick Chat

A. W. Miller, '29

"Good morning, neighbor John."

"Morning, Al."

"Why are you so blue this fine morning?"

"Oh, nothin' much," said John. "Those chickens of mine are certainly most provoking. They didn't lay much during the fall and winter. Now it's the last of April and none of them want to sit."

"That's perfectly natural, John. Hens that do not lay during the winter do lay quite well during the spring months, especially low-quality birds. You ought to have a standard-bred flock. I don't believe that you want to be classed with the 39 per cent of the Kansas farmers who keep mongrels or cross-breds. Just think what a nice flock of Barred Plymouth Rocks would be worth to you in dollars and cents to say nothing about the other advantages. You could sell hatching eggs to the commercial hatchery for 10 to 25 cents above the market price for five months of the year. Or if you wanted to hatch your own eggs, you could get an incubator. Then you could set it whenever you could get fertile eggs. Thirty-two per cent of the Kansas farmers either use incubators or buy their chicks direct from the hatchery."

"No, an incubator costs too much money and besides, it causes too much trouble. You don't catch me gettin' up all hours of the night to see if that lamp is all right. No sir-ree! I have had my share of burn-outs already."

"Did you ever stop to figure up what those chicks cost you when you hatched them by hens? It will run something like this:

15 eggs at 30 cents a dozen	\$0.375
2 pounds loss in weight at 20 cents a pound40
2 hours labor for the 3 weeks at 25 cents an hour50
10 eggs that the hen would lay if broken up25
TOTAL	\$1.525

If you get 10 chicks, which is more than the average farmer gets from a setting, they have cost you over 15 cents apiece."

Acknowledgment.—The author is grateful to 25 farmers and 25 hatchery operators of Kansas, as well as to the members of the Department of Poultry Husbandry in K. S. A. C. who assisted in the preparation of this article.

"That might all be true but those hatchery chicks don't have enough pep and kick to live. They commence dying on the road and never let up until at least half of them are gone. I know because I got a bunch last summer and lost three-fourths of them."

"I'll admit that there are some hatcheries in Kansas that sell anything with a little down on it as a chick. Those that you bought cost about 7 cents apiece didn't they, John? We get in this world just about what we pay for. The average price for quality Barred Plymouth Rock chicks as advertised by 25 commercial hatcheries in Kansas this spring is 16 cents. These folks handle them as a business proposition. They supply what is demanded. Several of these hatcheries are considering the profits at the other end of the line as well as their own. Every flock supplying these commercial hatcheries with eggs was standard bred. Twelve per cent of the flocks were certified and eight per cent were accredited. That the farmer appreciates this service is shown by the fact that 56 per cent of the output of these hatcheries was sold in Kansas and 85 per cent of that was to farmers."

"But how am I to know whether the chicks will be standard bred or not? Bill Jones got some last week that were supposed to be high-class Barred Rocks. He had four different colors in the lot."

"In the first place, John, find out whether the flock has been certified or accredited, or both. If the owner's name is on that list, then see if he belongs to such an organization as the International Baby Chick Association the members of which pledge themselves to use truthful advertising, with production and sale of chicks as represented. Also remember that if you want a chick that will make a 200-egg hen, you must expect to pay at least double what you would for one that will make a 120-egg hen. Whether you want 25 or 10,000 it is possible to get them all at one time, one variety, brood them all at the same time, and by proper care and attention, have a brooding loss of less than 10 per cent.

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The Effect of Combines Upon Farm Organization in Edwards County

M. G. Mundhenke, '29

The combined harvester-thresher, commonly called the "combine," has caused a great change in methods of farming during the last five years in Edwards county, Kansas. The rainfall is usually light during the harvesting season and with the long, hot, dry days conditions are ideal for harvesting with a combine.

The change from the old header and binder to the combine has been a rapid one. Five years ago combines were few and scattered and only a small per cent of the farmers had much faith in them. At the present time more than 80 per cent of the wheat in Edwards county is harvested with combines. The only farmers still using the header are either those who live on exceptionally hilly farms, or those that do not have the money to buy a combine. Many of the farmers feel that they cannot afford a combine at present and prefer to hire their wheat cut with a combine rather than cut it in the old way. They have found that the combine gets more of the grain out of the field and gets the grain in the bin or on the market earlier, thus preventing rains and winds from spoiling it or blowing it away while it is in the stack, and in addition saves much time and labor. During the long, hot summer days, with flies usually at their worst, tractors are almost a necessity for pulling the combines and these combines and tractors together have caused a great change in the organization of the farm business.

While combines have been increasing in number constantly during the last five years, there has been a corresponding decrease in the number of horses and mules. The actual figures concerning this increase in combines and decrease in work stock for Edwards county are shown in the following table:

Year	Combines	Horses	Mules
1923	78	7,415	2,307
1924	90	6,078	2,188
1925	113	5,909	2,072
1926	173	5,485	1,861
1927	212	4,156	1,383

Along with the increase in the number of

combines there has been a gradual increase in the number of acres of wheat harvested in the county and a slight decrease in population.

Year	Acres of wheat	Population
1923	183,361	6,945
1924	167,789	6,683
1925	190,350	7,022
1926	196,015	6,717
1927	206,393	6,706

It may be seen there has been an increase of 23,032 acres, or 12.5 per cent, in the wheat harvested during the last five years. The population decreased 239 during this five-year period. The increase in 1925 can probably be accounted for by the big wheat crop in 1924, causing a number of people to move into the county.

With this increase in the number of acres of wheat and the slight decrease in population it is evident that the number of acres of wheat handled by each farmer is increasing. There has been a greater increase in the number of farms of approximately 500 acres in area than in the number of farms of either more or less than 500 acres. This is probably due to the fact that a farm of approximately 500 acres is well adapted to the average farmer using one combine.

Just what has this change meant to the farmer and how is it going to affect his farm organization? Certainly the average farmer, owning a combine and tractor, has less work stock on the farm, is farming a larger acreage, is doing his field work in a much shorter time than formerly, and is probably getting his work done at the proper time and season by being able to put in longer hours and at the same time use larger tools with which to do his work.

Due to the fact that farmers can farm more acres there has been a marked decrease in the number of tenant farmers, especially during the last two years. Land owners are buying up all the land they can get so as to have enough land to make the expensive tractors and combines pay for themselves. Con-

(Continued on page 96)

Some Interesting Facts Regarding the Soil and Insects

George B. Wagner, '28

It has been estimated by entomologists that the furrow slice of soil, under humid conditions, passes through the digestive tract of insects every 10 to 20 years. Distribution, relative abundance, and seasonal activities of insects may be correlated with certain soil conditions. On the other hand, while insect life is largely dependent on the soil, there is also a reciprocal relation, since the soil is greatly benefited by insects.

The average student of agriculture fails to grasp the close relationship existing between the soil and insects, and the entomologist has not given the soil consideration due it in the understanding of many of the fundamentals of insect activity. "A knowledge of the soil is fundamental to the development of many insect control measures," says Prof. J. W. McColloch. Besides affording a medium in which a great number of insects pass their entire life cycle, or a large part of it, the soil affords a shelter and enters, as a factor, either directly or indirectly in the food supply of all insects.

The soil consists of a complex of many factors which separately and together are of vital importance to insect life. The more important factors, in regard to the environmental complex, are topography, texture, moisture, temperature, structure, color, light, pressure, food, organic matter, materials of abode, nitrogen, carbon dioxide, oxygen, and presence of enemies. Some of these factors affect the life of insects very little while others exert a tremendous influence, but all are subject to wide seasonal changes.

The food of subterranean insects consists principally of decaying organic matter and lower forms of soil organisms. Decaying organic matter is probably the most important, and also influences the number of micro- and macro-organisms. Shelford states that every animal selects a definite environmental complex as its general habitat, that the breeding grounds are usually the most important index to the true habitat, and that each species is usually distributed as far as its en-

vironmental complex extends unless barriers are encountered. The practical application of environmental studies, therefore, is of the utmost importance in the development of insect control measures.

The soil is a vast food storehouse which is used in different ways. Some parasitic insects invade the soil in search of hosts. Lice, and in some cases fleas, infest moles and other rodents. The adults of certain wasps which parasitize white grubs belong in this category. The carrion beetles bury dead animal matter, while the ant lion constructs a conical pit for the capture of its prey, and the tiger beetle larva waits at the mouth of its burrow to capture its food. One of the tumble beetles rolls a ball of manure to its burrow and buries it, while another packs its burrow with dung. Solitary bees fill their burrows with pollen which is used as food by their larvae. Solitary wasps bury in the soil many different insects such as snout beetles, spiders, grasshoppers, flies, and crickets to be used as food by their larvae.

Benefits derived from the soil by insects are many. As stated before, one of the major benefits is the supply of insect food material. Other important uses are shelter, protection, moisture, heat, and an avenue of travel.

Shelter and protection are in general only temporary, as is the case of those insects which normally live above ground but burrow in the ground to escape their enemies, to avoid extreme climatic conditions, or to undergo metamorphic changes. Some insects' color pattern is such that they can escape detection by falling to the ground and feigning death when disturbed. Some of the darkling beetles have such a thick covering of earth that it cannot be removed, and thus forms a part of the covering of the body.

Some insects use the soil to construct shelters. The mason bees and wasps build elaborate structures for rearing their young. The enormous termite mounds of the tropics

(Continued on page 89)

Taxation for Highways in Kansas

Lawrence B. Brooks, '28

There has been ample opportunity of late for the student of public affairs to find that, in the opinion of certain newspaper men, our Kansas road system is on the sick list. The road system itself, however, has never been discussed adequately so as to acquaint the average tax-payer with its intricacies.

Just how does our present highway system operate? How is it financed? How and why has it developed into the present complicated system? It must be remembered that this system has not been adopted as it is to fit and care for a complicated problem but rather that it is a result of years spent in building and caring for roads in order that our ever growing problems of transportation and travel may be cared for. Also one should not lose sight of the fact that the townships and counties within the state have in times past seen their need, laid out and built the roads they needed, and then in turn have paid for them. It hardly seems likely that this major item of expense (cost of county and township roads) can be cut out without seriously injuring the local districts within and after all even if this cost for local dirt roads is one of the greatest of all road taxes it seems to be a necessary one and one which is for the most part paid for by these districts themselves.

Roads in Kansas come under one of four classes; namely, township, county, state, and federal-aid roads each of these being a system in itself controlled by its board which is responsible for maintenance, construction, and rerouting if necessary. Almost every tax payer uses and helps to support roads of each of the four classes.

The simplest and oldest type of road is the township type. It developed first in the days when transportation was of little concern to the public and at a time when little attention was given to the routing or upkeep of roads. Then, as today, the expenditure was met by a tax levied on the property of the township.

The administration rests with a township board of three members who are elected by the voters of the township and held in check

by these voters by law which provides that that rate of assessment cannot be over three mills unless so voted by voters of the township.

The second type of Kansas road, the county road, is an outgrowth of the old township system and consists in the main of township roads taken over by the county and made into a general county system. State law provides for counties to take over a certain part of the road systems from townships, map them out so as to connect certain market centers and cities and, with the sanction of the state highway engineers, declare them the county road system. The state highway engineer inspects all county systems as he checks them over and arranges for the county roads of one county to connect with those of another, thus making the foundation for a good state system to follow.

The county roads are kept up largely by a tax levy on general property within the county. These roads have some aid from different state funds which will be discussed later. The county commissioners are responsible for keeping up these roads and they select and hire a county engineer who gives the county road system his entire time.

The third, or state type of road, is cared for by a state commission composed of one man from each of six districts appointed by the governor of the state, a director whom they themselves choose, and an engineer who is appointed by the director. This commission has the power to designate certain highways which shall be known as state roads. This law also provides that the mileage in each county of state roads shall not be less than the combined distances of north to south and east to west within the county and that they shall so far as is possible connect county seats, market centers, and principal cities.

No direct property tax is levied by the state for the upkeep of its roads but rather it depends upon the motor vehicle license tax and the gasoline sales tax for its revenue. The former varies from eight to twenty dollars a car according to its size and is due the first of January each year.

This tax is collected by the county treasurer of each county and distributed as follows: Fifty cents of each license goes to the secretary of state for the manufacture and handling of the tag. Of the remainder 25 per cent remains in the county and is placed to the credit of the township funds in proportion to the amounts they contributed. The other 75 per cent goes to the state treasury and is placed in the state highway fund.

The second form or gas tax consists of a tax of 2 cents per gallon on all gas used in pleasure cars. It is collected by gas dealers and paid into the state treasury. Of this revenue from the two sources three hundred thousand dollars is placed quarterly in the state treasury to the credit of the state-aid road fund. This is expended within the various counties of the state upon state highways under the direction of the state highway commission acting in conjunction with the respective boards of county commissioners. The amount spent by the state cannot be over one-fourth the total cost of these roads or over ten thousand dollars per mile.

Next there is paid from the highway fund the amount apportioned by the legislature for the maintenance of the commission which shall not exceed one hundred and fifty thousand dollars per year and which by the way is a reasonable amount being much less than the amount received by the highway commissions of other states.

After these two deductions there remains a comfortable margin of which \$100,000 is placed quarterly to the credit of the county free fund. This fund is used in the payment to the counties to cover gaps in roads which have mostly been surfaced but which are unfinished due to lack of funds. This is for the sole purpose of making through routes across the state and should help a great deal in relieving bad breaks in roads.

After the three funds have been paid the remainder which still amounts to several millions of dollars goes back to the 105 counties of the state. Of this 40 per cent is distributed equally among them and 60 per cent is distributed back to them in proportion to their assessed valuation.

The latest type of roads is the so-called federal aid type. By this provision the secretary of agriculture is authorized to coop-

erate with the states through their respective highway departments in the construction of rural post roads. No money is allowed any state until its legislature has accepted the provisions of the act. The money for use as federal aid was apportioned out of the money in the United States treasury not otherwise used and is not raised from any specific source. Beginning in 1917 there was appropriated five million dollars from the treasury and this amount has been increased from 5 to 15 million each year until at the present time an appropriation of \$75,000,000 is voted each year for use on federal roads. Of this amount the secretary of agriculture can use up to 3 per cent for administrative purposes, the rest being apportioned in the following way: One-third in the ratio in which the area of each state bears to total area of the United States; one-third in the ratio in which the population of each state bears to the total population of the United States; one-third in the ratio of the number of miles of rural free delivery and star routes within the state to their total mileage in the United States.

A total of these apportionments gives the amount available to each state in case they can fulfill the requirements for securing the aid. To get this the project must be approved by the secretary of agriculture after it has been submitted to him in the form of maps, specifications, and estimates.

Kansas ranks second in the number of miles of federal-aid roads and has a very convenient location in this respect being geographically situated about in the center of the United States.

The fact that Kansas does not now have an enormous mileage of paved roads is not as serious a condition as might be supposed since roads built at the present time are much cheaper and much better than they were five years ago. The Kansas system has been one which has taken care of all sections of the state, providing fair dirt roads between all market centers and if given time it will provide for a number of paved roads across the state in both directions. As long as the people of Kansas want the great road mileage they now have, demand a good upkeep of all roads, and do not pay a higher tax for state roads, the present road system cannot be easily improved.

INTERESTING FACTS REGARDING THE SOIL AND INSECTS

(Continued from page 86)

may be placed in this category. Some aquatic insects construct larval cases of sand or mud, and elaborate mud larval cases are found attached to weeds.

There is also a reciprocal relation as insects are important in soil formation, renovation, and maintenance. The larvae of insects living in the soil are comparable in many ways to the earthworm which has been discussed by Darwin and others. Briefly, the benefits to the soil are interchange of soil, separation of soil, aeration, drainage, and addition of organic matter. The interchange of soil is probably the most important, although this phase has not been extensively investigated. As a parallel, however, Darwin estimated that earthworms annually bring 18 tons of earth to the surface of each acre. The termites of the tropics construct mounds of great size which contain many tons of earth.

The occurrence of this interchange of soil can easily be seen on the sand dune area south of Manhattan. In a certain area the surface 18 to 30 inches is pure sand underlaid by a layer of silt which is variable in depth. The silt-filled burrows can be readily seen in the top layer of sand and the sand-filled burrows are just as easily seen in the silt layer.

These burrows open up the soil for better aeration and drainage. The data on extent or length of burrows are very scant. In connection with the interchange of soil, there is often a separation of particles. This is particularly true of the ants, since many of them carry the finer particles to the surface and bury the coarser material.

The addition of organic matter to the soil is important. By bringing large amounts of soil to the surface insects cover up waste from plants and gradually incorporate it into the soil. Ants, cutworms, and termites carry large amounts of vegetable matter below the surface. The leaf-cutting ants which live in colonies will strip an entire tree and carry the leaves to their nests. A single pair of manure burying beetles will add several cubic inches to the soil.

Numerous wasps bury partially paralyzed

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insects to feed their larvae. Professor McCulloch of the Agricultural Experiment Station in the summer of 1925 followed the burrow of a species of the *Bembicidae*. He obtained 50 whole flies of several different species and remnants of many others. Professor Bryson found 16 imbricated snout beetles buried in the burrow of a wasp. This burrow was over 30 inches long and had over three ounces of fine particles of earth at the opening of the tunnel. He also captured another wasp which had carried over two ounces of dirt to the surface and had buried 14 snout beetles. These are not all left in the soil as the insect larvae eats a large part of them, but the remnants are left and this amounts to an enormous total amount of humus-forming material.

The excreta of insects which soon becomes incorporated in the soil is composed of chemical compounds which add much to the soil. Jaritz working in South Africa made an analysis of the droppings of a caterpillar and compared it with barnyard manure. The caterpillar droppings contained a relatively high per cent of potash and compared favorable with other manures in their content of nitrogen, lime, and phosphoric acid.

BOVINE INFECTIOUS ABORTION

(Continued from page 69)

turn will not pay for the extra trouble.

Finally the isolation of heifers, a policy followed by many breeders, is considered good herd management. This is accomplished by keeping the young heifers separate from the milking herd especially during the period of pregnancy. It is during this time that most cows react to the disease. Young heifers that become infested during their first period of pregnancy seem to suffer the ill effects more than if it occurs later in life. In most instances abortion occurs at the five- or seven-month period and coming at such a time the animal is undeveloped in udder and also in milking qualities. In a large majority of the instances the heifer never develops into the kind of cow that she would have been had she not become diseased. It is also hard to get a young cow, freshening in this way, to milk ten months,

which is very essential if she is to make a high-producing mature animal.

From the foregoing discussion it is clear that the presence of infectious abortion in a herd results in economic loss from two sources. One is the loss of calves which is very heavy to a breeder who can improve his herd only by raising superior young stock, unless he has plenty of money to buy and then he is not a breeder but a "collector." The other loss to a dairyman from abortion disease in his herd is the loss in the milk flow of his cows. It has been very carefully figured out that in a herd where an average number of cows are affected the loss in milk flow is 20 per cent and from sterility, 10 per cent.

In conclusion bovine infectious abortion is the most serious disease of the dairy cow. It can be controlled only by practicing the strictest of sanitary measures. It is essential that all breeders unite in an attempt to stamp it out or hold it in check by sanitation and quarantine.

FOOD SELECTION OF BIRDS

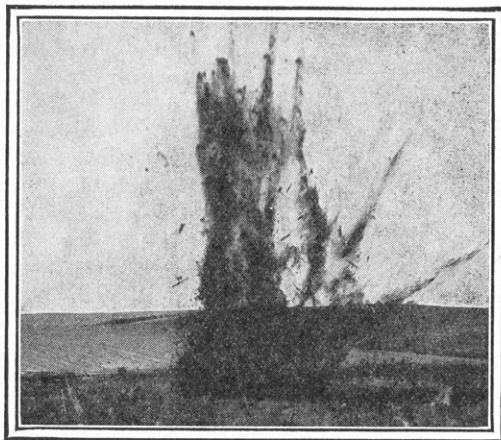
(Continued from page 72)

become largely grazers. The pheasant tribe, including native quail and grouse, subsist in summer on both animal and vegetable provender. In autumn and winter as insects become scarce, the diet becomes almost wholly vegetable, consisting of seeds, berries, buds, and leaves.

Most birds that have adopted a vegetarian diet take animal food during their younger stages. To become wholly vegetarian is a habit apparently rare. Among the pigeons only does it seem to be nearly universal. With these really remarkable birds, the young are at first still fed on food of an animal origin, though strangely enough it is not fresh caught, but consists of the so-called "pigeon's milk," a whitish fluid derived from the breaking down of the lining walls of the crop. Thus pigeons seem to be entirely emancipated from the need of catching animal prey.

A. M. Carkuff, '25, is assistant professor of agricultural economics in Clemson Agricultural College, Clemson, S. C.

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THOUSANDS of acres of rich, productive land have been added to the farms of this country by the removal of scattered stumps and boulders, which prevented the cultivation of the entire field, reduced its yield, and the farmers' income.

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grown on the sites of former stumps and boulders quickly pays the blasting costs. The cleared acre is the profit-maker.

By the du Pont Company making AGRITOL—a new and improved explosive for stump and boulder blasting and other farm uses—your college and other State Colleges are enabled to continue with the farm improvement work begun and carried so far with Pyrotol—the government explosive cartridge by the du Pont Company.

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ROTATION AND DEFERRED GRAZING

(Continued from page 70)

this table, pasture No. 1 was grazed under the season-long system, while pastures Nos. 2 and 4 were grazed under the deferred and rotation system.

The pastures used in the experiments were all very much of the same quality and the results were figured on a basis of a six-month grazing season and a two-year-old steer used as the unit of forage consumption. The experiments were discontinued from 1921 to 1926 because of lack of funds.

Year-long or season-long grazing is the most common pasture practice in Kansas. In this way, not only is the forage as a whole cropped too early in the spring, but it is usually grazed again and again when the secondary growth is trying to develop. Continual grazing in this way results in the failure of the palatable plants to hold their own and in their place is usually a conspicuous invasion of numerous unpalatable annual grasses and worthless weeds, the rate of the invasion being governed, of course, by the intensity of grazing.

Taking an average of all the years for which data are available, approximately 70 per cent more grazing has been obtained by the use of the deferred and rotation system over the ordinary system of year-long grazing.

BREEDING CROP PLANTS RESISTANT TO INSECT ATTACK

(Continued from page 73)

hybrids are now being tested for resistance to Hessian fly injury and for other characters. This work is producing some promising results, indicating that resistance is inherited in much the same manner as other characters.

The work with corn shows that some varieties are more resistant to chinch bug attack than others. Of the Kansas varieties Pride of Saline is probably the most resistant variety thus far studied. Certain introduced varieties such as Champion White Pearl from Illinois also show marked resistance to chinch bug attack.

In the sorghums it has been repeatedly shown that milos are very susceptible to chinch bug attack and that some of the sorgos

such as Kansas Orange are relatively resistant. Feterita also shows some resistance to the attack of chinch bugs as is brought out in the accompanying illustration where feterita growing along side milo is but little injured while the milo is practically destroyed. Crosses have been made between milo and Kansas Orange sorgo and some of the F_3 hybrids show marked resistance to the attack, indicating that the hybrids carry the same factors for resistance as are carried by the resistant parent.

The differing degrees of injury were not due entirely to the number of chinch bugs per plant. Counts showed no correlation between the average number of insects on a plant and the severity of injury. The average number of chinch bugs per plant was as follows: Twenty-six on the Kansas Orange, twenty-three on the milo, and seventeen on the F_3 hybrids, Kansas Orange X Dwarf Yellow milo. Kansas Orange sorgo although the least injured had the greatest number of insects per plant and the milo which did not have quite so many insects per plant showed much more severe injury.

There are three possible explanations for the difference in degree of attack; namely, (1) hybrid vigor, (2) a preference on the part of the chinch bugs, or (3) a specific character or property of the plant which can properly be considered as true resistance. It is thought by those carrying on the work that the relative freedom from injury is due to a resistant property of the hybrid plants transmitted to them from the resistant parent, Kansas Orange sorgo. What this character is has not been determined. Hybrid vigor is also considered as one of the conditions influencing resistance.

This work is not extensive enough to permit of any definite conclusions, but the results are promising, indicating the possibility of breeding plants for resistance to insect attack.

An old graduate, M. C. Sewell, '12, has been engaged in soil research work in K. S. A. C. since 1916. Professor Sewell received his master's degree from Ohio State University in 1914, and his doctor's degree from the University of Chicago in 1922.

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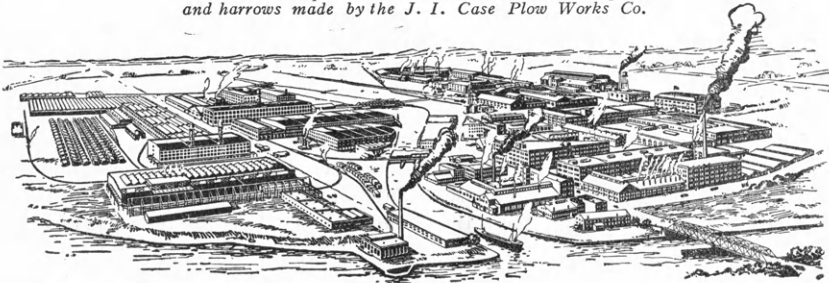
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THE COLLEGE MILL

(Continued from page 79)

able a high speed mixer, specially designed and built at the college. This machine has proved itself of great value in discovering weak wheats.

All this equipment is used in the wheat improvement program of the college. No inferior wheat variety can pass through the elaborate testing systems conducted by the college and win approval. The Department of Agronomy makes sure that a wheat meets the needs of the farmers. The Department of Milling Industry tests it for the needs of the miller and baker. Thus all work hand in hand to maintain and even improve the enviable reputation of Kansas wheat.

TIME TO SEED OATS

(Continued from page 79)

days to two weeks earlier than would otherwise be possible. While fall plowing is no better than spring disking if the oats is planted at the same time it is often advisable to plow in the fall because of the difference it makes in the time of seeding. Fall plowing also has the advantage of distributing labor. Most farmers are not so busy in the fall and if they plow the ground then they will have much of the heavy work done before the spring rush.

While late sowing affects all varieties of oats it decreases the yield of Kanota more than many other varieties. A majority of the oats grown in Kansas is Kanota. If sown as late as April 1, Kanota oats will yield no more than Burt or Red Texas sown at the same time. But if all three varieties are seeded March 1, the Kanota will often out-yield the other varieties as much as 10 to 15 bushels per acre.

BABY CHICK CHAT

(Continued from page 84)

All your poultry operations will become standardized; the young birds will be separated from the old ones and thus escape many parasites and diseases. If obtained early, the cockerels may be placed on the market at a good profit. The eggs that the

pullets lay will be more uniform and command a higher price."

"Are there many of that kind of hatcheries in Kansas?"

"No, not very many that handle the highest quality pedigreed chicks. In fact there are very few flocks that are being pedigreed. Nevertheless, those who are doing it are having more business than they can take care of. The hatchery field is the most profitable branch of the poultry industry at the present time. According to the Reliable Poultry Journal, 95 per cent of the hatcheries in the United States made a profit last year. That is something that no other business can claim. The slow wasteful method of hatching chicks by a hen is being rapidly replaced by the commercial methods of the commercial hatchery. Of these, the ones that will succeed the best in the near future in Kansas will be those who cater to quality chicks, the kind that will raise egg production to the 200-egg mark and then step in and win a blue ribbon at the fair because they have standard-bred poultry."

**THE GENERAL COURSE IN ENTOMOLOGY
AT K. S. A. C.**

(Continued from page 71)

1. To provide the student with a basic understanding of insect form and structure by the study of a half dozen types, representing the large orders.

2. To practice classifying insects at least to family by the use of keys. This emphasizes the structures used to distinguish them and the order and family to which they belong.

3. To collect, properly pin, and arrange insects. In other words, students learn how to make and arrange a collection of insects. A collection of a minimum of 50 insects properly placed as to order and family is required.

The secondary aims in the work have not been enumerated. One point, however, deserves especial mention. Entomology is primarily an outdoor subject. It is intended in the first course to stimulate the student's interest in the outdoors and in animal life generally. This point is aptly stated in the preface of Sanderson and Peairs' "Beginning Entomology:"

"To many the charm of the subject lies, not in the consideration of the hundreds of forms that have a direct bearing on the welfare of man, but rather, in the thousands and thousands whose claim to interest lies in the



Electricity Mothers a Flourishing Flock

THREE weeks of watchful care before the new brood steps out into the world. Then good food, plenty of fresh water, cleanliness—and another flock of chicks is on its way to profit-making.

The principles of success in raising chickens have not changed. But electricity with its automatic incubators, brooders, water-pumps, feed-grinders, and lights has assumed almost the role of the mother hen.

There is so much less of tedious drudgery and so much more of easy efficiency on farms where the worth of electricity is known. The choice of good equipment is the first step in successful electrification. That is why farmers are learning to look for the G-E monogram on electric devices.

Ask Your Power Company



If your farm is on or near an electric power line, ask the power company for a copy of the new G-E Farm Book which explains more than 100 uses for electricity on the farm.

GENERAL ELECTRIC

fact that they are a part of the great scheme of nature and that the study of them will, like few other studies, bring one into close touch with nature.

"To inculcate in the young student a love of nature and to stimulate the faculties to observe what is going on in the great world of nature, nothing is better than the study of insects."

Most of our students take entomology in order to get the necessary knowledge to deal successfully with injurious insects which may be attacking the crops on their farms or in their gardens. Some students go into agricultural extension work and in that capacity two or more courses in entomology are recommended as the minimum equipment; teachers of vocational agriculture find considerable application of entomology in their work.

But at least one course in entomology could be profitably included in the college course of most students. Practically everything we eat or wear and most everything we use is affected at some stage by insects. Household insects will always remain an important problem. In the field of medical entomology are a host of insects variously affecting the health and comfort of man. In fact, some of mankind's more important diseases, such as malaria, yellow fever, dengue, typhus fever, and the sleeping sickness of Africa are wholly insect borne. These are subjects of general interest and may be profitably included in a general education. On the other hand, many interesting biological phenomena are nicely illustrated by insects, such as principles of heredity, protective coloration, mimicry, and the interdependence of animal life. Insects should be no longer "just bugs" after a course in entomology, but living creatures in a sphere of intense competition. The world will be immensely larger and more wonderful after an introduction to the insect world. A walk, a fishing trip, or a hunting expedition should stimulate greater interest than before. There is an amazing ignorance on the part of the public concerning insects, which constitute more than half the species of animals, because people really have not seen them.

THE EFFECT OF COMBINES UPON FARM ORGANIZATION

(Continued from page 85)

sequently many tenants have been forced to move farther west or quit farming.

With combines and tractors the farmer has been better equipped to farm wheat than any other crop and consequently the corn acreage has dropped and many farmers are growing nothing but wheat. Several farmers are realizing, however, that this will soon deplete the fertility of their soil and are keeping dairy or beef cattle to aid in maintaining the fertility of their land. The wide-awake farmer should so organize his farm business as to give him employment the year round, and have several sources of direct income. He should also provide some means of maintaining the fertility of the land. This combination can best be obtained by keeping more live stock in the form of dairy or beef cattle, hogs, and chickens.

It seems now that the coming of the combine, along with the tractors and power machinery that go hand in hand with combines, will enable the individual farmers of this section of the country to grow a much larger acreage of wheat, to do it better, and at the same time have more time for other enterprises. The only aid to fertility will be that all of the straw will be scattered back on the land. There will probably be little work stock kept but the value of the work stock as a fertility factor on the land will probably be offset by an increased number of cattle and other live stock. The combine farmer will have a much larger investment and a greater turnover. It will undoubtedly take more managerial ability to handle such a farm but if the combine farmer is a good manager he should be able to make money faster than his predecessors.

Since conditions in Edwards county are fairly typical of the hard winter wheat belt it is fair to assume that the conditions and changes described apply fairly generally over this region.

H. L. Collins, '23, is assistant agricultural statistician for Kansas. He is located in Topeka.

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