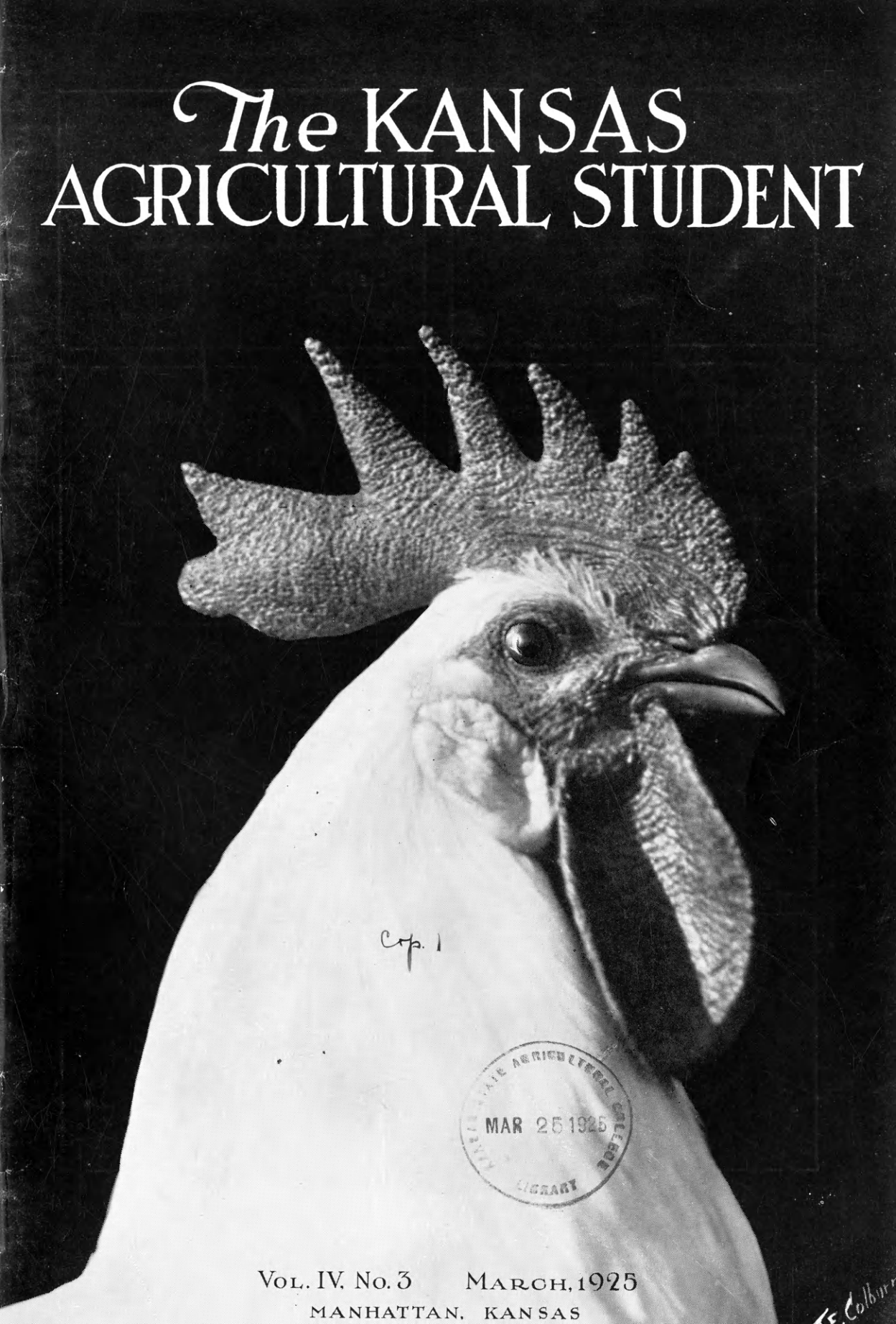
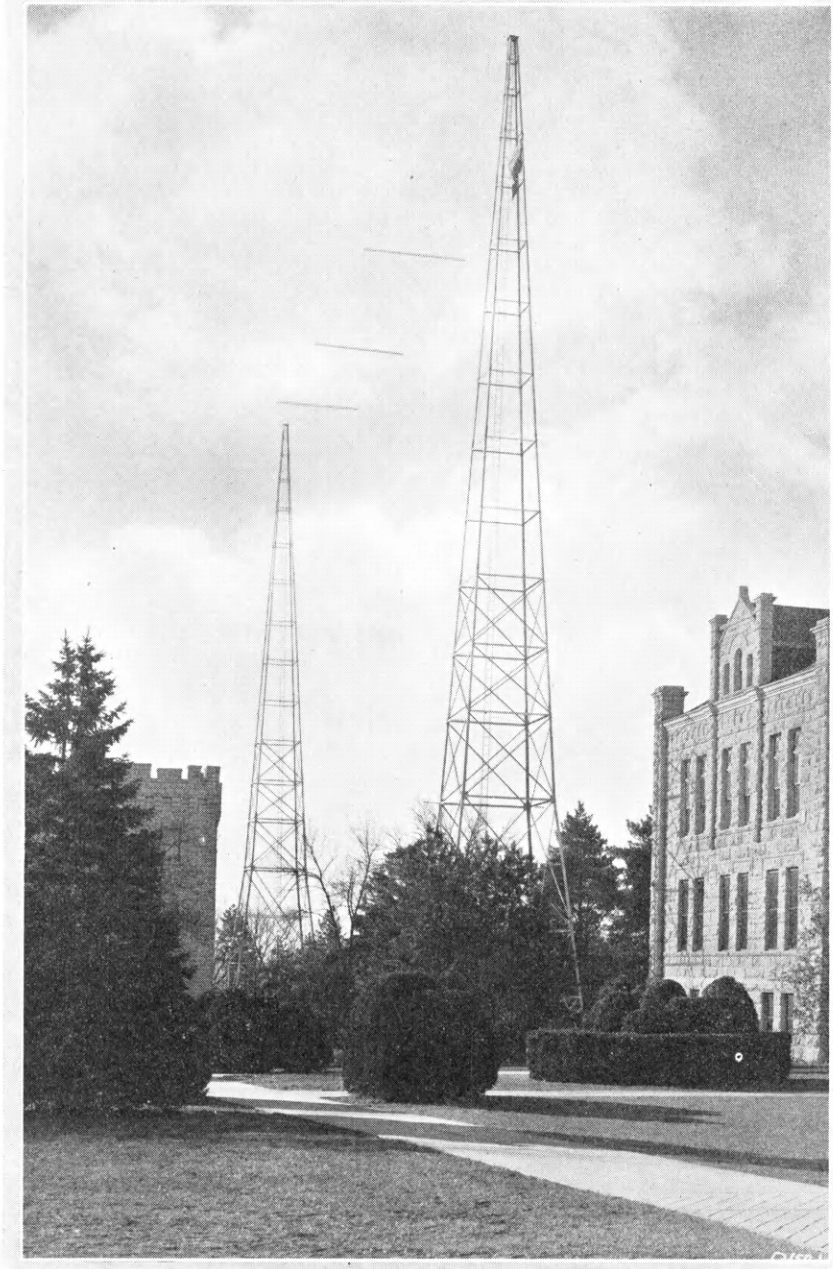
The KANSAS AGRICULTURAL STUDENT



VOL. IV. NO. 3 MARCH, 1925
MANHATTAN, KANSAS

CONTENTS



ANTENNA AND TOWERS OF RADIO STATION KSAC

The Kansas Agricultural Student

VOL. IV Manhattan, Kansas, March, 1925 No. 3

Broadcasting Agricultural Information —a New College Service

R. J. Barnett, '95

Kansas State Agricultural College has from its youth up been dedicated to the service of all the people of the state but more particularly to those living under rural conditions. This ideal of agricultural service had its birth during the administration of President Anderson and was then typified within the college by the substitution of instruction in the sciences and the applied arts for much of what had constituted the curricula of colleges seeking to prepare students for the "learned professions" or a life of leisure. President Fairchild brought with him from Michigan Agricultural College ideas for further extensions of this change, and it was he who established the division of the students' work into thirds, one devoted to each of three general lines of study characterized as cultural, scientific, and practical or technical.

This introduction of the sciences, pure and applied, into collegiate instruction revolutionized higher education and this college has long enjoyed the distinction of being among the pioneers in effecting this transformation. Very soon after serious scientific work in agriculture was made part of the college curriculum came the realization that facts regarding agriculture which would pass the tests applied to the facts on which more fully developed sciences were based were few in number. So, in 1888, the Kansas Agricultural Experiment Station was established and systematic experimental and research became integral parts of the college at Manhattan. The Agricultural Experiment Station was recognized as a necessary adjunct if instructional work in agriculture were to develop.

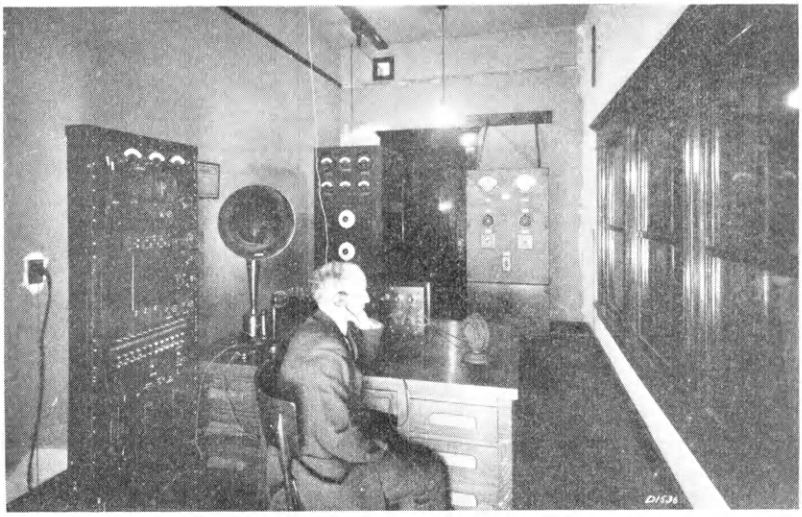
But a new need soon became manifest. The college was educating only a very small per cent of those who were to become the future farmers of the state and was having too small an influence on the practices of those actively engaged in farming. A few leaders were being trained but the rank and file were offered only an occasional publication as their share of the returns from the State's small investment in the college. The first organized attempt to correct this weakness assumed the form of farmers' institutes, short meetings which were addressed by members of the faculty or the station staff.

From this humble beginning has developed the third great division of college activities, the extension service conducted by the Division of College Extension. Through the extension service every farmer in Kansas has an opportunity to keep in touch with the approved and newest practices in the broad field of agriculture and, through extension demonstrations, to observe their practical working out in his own or a neighbor's field. Better agriculture is carried to every Kansas farm and the campus of the college has truly become co-extensive with the boundaries of the state.

In extension work speed of dissemination has always been an important factor. When valuable information is obtained by a station investigator the more quickly it is carried to the farmers the greater its value is likely to be. Because it met this requirement of rapid transportation, the Ford car has been credited with making the work of the county agricultural agent possible. But, now, even an automobile is too slow for some extension service needs, and radio, newest of major American inventions, has been called in to aid. Through it information can be sent to all parts of the state almost instantly.

Kansas State Agricultural College was one of the first educational institutions to make use of radio. Information was broadcast

from a Kansas City station and from Milford by remote control months before Station KSAC was ready to take the air. During the spring of 1924 connected talks on various agricultural subjects were broadcast and in the fall a catalogue of Radio Extension Courses was issued. This catalogue represents the first concerted effort of any educational institution to disseminate a systematic course of instruction by radio. The construction of Station KSAC was completed early in December, 1924, and the college thus added another new and interesting method of carrying information to the people of the state. The station serves to round out the extension facilities of the institution.



TRANSMITTING ROOM, RADIO STATION KSAC
The operator, in the foreground, is shown looking through the window into the studio.

Thus, there are now in operation at Kansas State Agricultural College three great agencies seeking to better the agriculture of the state and the nation. Basic among these is the Agricultural Experiment Station. Its function is to organize and direct the search for new facts and new relations between previously known facts. Its workers carry on a large number of comparatively simple but important tests and experiments and along with them a smaller number of even more important research problems. The tests are expected to aid in answering pressing, immediate, and practical farm questions and the time and labor required for their prosecution are comparatively small. In contrast, research seeks to discover new truths of such significance as to lead to the formulation of fundamental natural laws, truths of such general importance that they sometimes revolutionize certain phases of agriculture. This process is long and laborious. It requires, on the part of those engaged in it, intellectual honesty, high scientific training, the ability and time required for mental concentration, and a certain quality of creative imagination without which real research work cannot be properly planned, successfully carried on, or its results correctly interpreted. Experimentation and research supply the information on which is based all the work of teaching and extension in agriculture and without which these latter functions would quickly become unproductive.

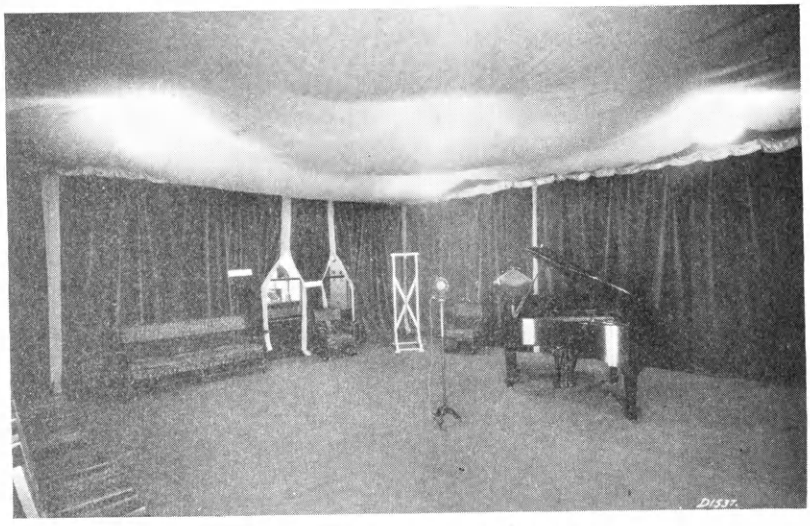
Resident instruction in the many subdivisions of agriculture is the second great service rendered by K. S. A. C. The students who enroll in the Division of Agriculture receive broad training in the humanities, social science, natural science, and technical agriculture. They are, it is true, trained in proper farming methods but they also know the reasons which lie back of specific farm practices and are prepared to demonstrate the most

up-to-date methods of crop or animal production and to devise new methods better fitted to peculiar conditions under which they may be placed. They are prepared for scores of positions, and the best of them rapidly develop into real leaders in agriculture whether they are on the farm, teaching in school or college, employed as county agricultural agents, or in other agricultural work. The training of this energetic, educated leadership for the agricultural industry of the country is and will ever remain the principal task performed by the agricultural faculty of K. S. A. C.

The Division of College Extension performs the third great agricultural service to the people of Kansas. Its aim and purpose is to serve that great majority of the residents of the state who are unable to appear on the campus for resident instruction. The college goes to the home and offers training in agriculture to those actively engaged in farming. It does this through home study courses, county agricultural agent work, extension schools, traveling specialists, and now, radio broadcasting. As its name indicates the work of this division is extensive rather than intensive. It reaches great numbers and benefits all of them to some degree but rarely concentrates sufficiently on any small group to make genuine leaders of them.

The place which radio occupies among the many activities of K. S. A. C. can now be defined. It is one of several means whereby information relative to their daily work and problems may be quickly carried to the farm homes of those possessing receiving sets. It complements the home study work, that of the county agricultural agents, and the agricultural specialists. It will often prove of vast and immediate aid to the agricultural interests of the state by broadcasting such information as market reports, crops estimates, spray dates, and outbreaks of animal diseases —facts of great value today but replaced by others tomorrow. It will be of great use in the dissemination of agricultural information of many types and regarding a multitude of subjects. It will provide entertainment as well as instruction for a country-wide audience. It will assist rural schools, farm bureau meetings, and boys' and girls' clubs. It will serve to keep the alumni and other friends of the college in closer touch with the activities and needs of the institution. It is a service of wonderful possibilities and he would be a daring prophet who would attempt

(Continued on page 96)



STUDIO, RADIO STATION KSAC
The studio is adjacent to the transmitting room. The curtains on the left, slightly drawn, show the loud speaker and some other equipment in the transmitting room at a distance.

Feeding Hens for Egg Production

Wilfred J. Kraus, '26

Any one considering feeding a flock of hens for egg production desires to be reasonably assured of sufficient returns to make the project a profitable business enterprise. These returns can be obtained by correctly feeding the right kind of hens, housed in sanitary, comfortable, well-ventilated quarters, providing plenty of direct sunlight.

The feed that a hen eats is used for two main purposes; namely, bodily requirements and the production of eggs. When these requirements are more than supplied by the feed a third process is carried on within the body of the fowl known as the storing of fat.

The composition of hen's eggs is quite variable; a composite of many analyses is as follows:

Water	65.7 percent
Ash (mostly shell)	12.2 percent
Protein (white)	13.2 percent
Fat (yolk)	8.7 percent

The chief requirements of the hen's body are as follows: Protein to build up tissues of immature birds and to repair the small daily waste of nitrogenous (muscle) tissues; fuel to maintain the body temperature; energy to carry on such vital processes as the work of the heart, lungs, etc.; mineral matter to replace the small but continuous loss of these materials from the body; and, vitamins, which recent investigations have shown to be just as necessary as other nutrients.

During the last 10 years more knowledge has been gained in regard to the fundamentals of animal feeding than had been accumulated in all previous history. Practical experience had taught feeders what to do but the fundamental principles in many cases were not known. It is known that certain substances are absolutely essential if the feed is to be adequate for maintaining the hen herself and enabling her to produce eggs. These substances are commonly known as nutrients. A nutrient may be defined as any constituent of a feed that can yield energy, serve for the production of body tissue, or regulate body functions. It is customary to group nutrients into the following classes: (1) Minerals, including water; (2) proteins, (3) carbohydrates, (4) fats, and (5) vitamins. With the exception of water and some of the other minerals, each group of nutrients is made up of several chemically related compounds.

The hen requires a relatively large quantity of water both because of the high water content of the egg and because of the fact that she actually breathes three times as much air in relation to her weight as does the average cow; this air when exhaled is saturated with moisture. The hen's source of water is the water that is set before her, succulence which she eats, and the water content of milk when milk is fed.

The ordinary mineral feeds used in poultry feed are salt, calcium carbonate in the form of limestone or oyster shell, and calcium phosphate in the form of bone products or rock phosphate. Ordinary poultry feed contains potassium, magnesium, iron, etc., in combination with phosphorus, chlorine, and iodine.

The common grain feeds do not contain a sufficient amount of calcium, phosphorus, and salt to meet the needs of the laying hen. The salt, phosphorus, and part of the calcium deficiencies are made good by the addition of meat scrap or tankage, which contain these substances. Calcium in addition to that found in the meat scrap should be added in the form of calcium carbonate. Oyster shell, or ground limestone, may be used for this purpose. If vegetable proteins such as soybeans or gluten feed are used in the place of tankage, the salt and phosphorus will have to be provided in a supplementary form. Phosphorus can be given in the form of bone products or rock phosphate.

Carbohydrates, such as starch and sugar, are used by the hen to supply most of her energy and to build up her body fat. Since the starches from all grains yield exactly the same sugar when digested, it makes no difference at all what grain is employed in the poultry feed so far as the carbohydrates are concerned. For this reason, various cereals may be interchanged. It should be borne in mind, however, that yellow corn cannot be replaced by any other cereal, unless the other substances in the feed carry an abundant supply of vitamin A. Yellow corn contains this vitamin and none of the other cereals contains it in any appreciable quantities.

The word protein refers to a group of compounds found both in feedstuffs and the hen's body and egg, which contain nitrogen. Their most distinguishing characteristic is the constant presence of nitrogen. Besides nitrogen, protein compounds always contain carbon, hydrogen, oxygen, and sometimes sulphur, phosphorus, and iron.

Some of the constituents of the proteins can not be made in the hen's body. She must receive them in her food. The common grain feeds will not meet this protein requirement of the hen for body maintenance and egg production. Therefore, the poultry raiser must supply protein to his flock in a suitable protein concentrate such as meat scrap, tankage, milk, green bone, gluten feed, and soybean meal.

The fat laid down in the hen's body as well as that found in the egg may come from either of two sources. It may come directly from the fat found in the food or it may be manufactured in the hen's body from the carbohydrates contained in the feed. Therefore, no particular attention need be paid to the amount of fat found in the ration. However, the quality of the body fat in the hen will be influenced by the character of the fat in the feed. For example, if a substance like soybeans, containing a high percent of oil (liquid fat) is used, the body fat will become oily in character.

Recent investigations have shown that certain vitamins are an essential part of the feed. The chemical composition of these substances is not known. They have not so far been isolated as separate substances and are known only by their nutritional effects. If one of these essential vitamins is left out of the feed, definite disease conditions will develop just as surely as if water were withheld from the bird.

These vitamins are commonly designated by the letters A, B, C, and D. Of these, three, A, B, and D, are known to be absolutely essential in poultry rations. Vitamin A can be provided in any form of green leaves, good-quality alfalfa hay, yellow corn, or whole milk. The following substances can be considered as free from vitamin A so far as practical feeding is concerned: All grains except yellow corn; skimmed milk; meat scrap; tankage; and sprouted oats which have been sprouted under such conditions that they are not green.

If conditions are such that none of the ordinary substances containing vitamin A may be included in the ration, this important substance may be added by the use of cod liver oil at the rate of about 1 percent of the ration. The outstanding thing about the disease caused by the lack of vitamin A is a weakened condition of the eye which makes it very susceptible to all sorts of infections. The lack of vitamin A in the ration is by far the most important cause of outbreaks of roup in poultry flocks. During six years of experimental work, the Agricultural Experiment Station of K. S. A. C. has been unable to produce roup in flocks receiving an abundant supply of vitamin A. This is because the tissue of the eye is in such a healthy condition that it is immune to the ordinary disease germ found around all poultry flocks. It is just as hopeless to try to produce eggs without vitamin A as it is to try to produce them without water. Failure in egg production and death will not come so quickly, but it will come just as surely. So the importance of including in the ration substances containing vitamin A must be kept in mind if good results are to be secured.

Under ordinary conditions, the providing of vitamin B is no problem to the poultry raiser as the covering of all ordinary cereals found in poultry feeds contains an abundance of this substance.

It seems from all experimental work that vitamin C is not needed by poultry.

Vitamin D, which is also called antirachitic vitamin, is important for the proper utilization of mineral feeds. It is not essential, however, if the hens get sufficient direct sunlight. In the absence of this vitamin and direct sunlight, hens will very probably lay very thin-shelled eggs. Under extreme conditions, as when growing pullets are placed in a laying house which does not provide sufficient sunlight and the mineral elements of the feed are somewhat inadequate, the pullets will develop weak legs. Under these conditions, it sometimes happens that pullets will retain fully-developed eggs. It has also been found that hens suffering under these conditions contain ruptured egg yolks. The surest way of pre-

(Continued on page 89)

The Correlation of Type and Production in the Dairy Cow

Walter J. Daly, '25

This topic is being much discussed by breeders of dairy cattle. In the past the idea has been prevalent that a breeder must either develop his herd for type or for production if he was to attain the highest perfection along either line. Breeders seemed to have the idea that type and production were antagonistic; that the greatest development along either line could not be obtained without a sacrifice of the other. The reason for this belief is evident. Dairymen tended to base their opinion upon a few isolated cases rather than an analysis of the matter as a whole. It is not difficult to pick out a few animals with outstanding type who are failures as milk producers and it is even easier to locate high producers who are quite faulty from a type standpoint. These examples, however, may be exceptions to the general rule.

The development of the leading dairy breeds may be briefly summarized as follows: Their exact origin is rather obscure, but there are fairly definite records to show how they have been improved. Improvement has been brought about largely by selection together with some outside infusions of blood. In selection, type was the most important factor. This is especially true of Jerseys and Ayrshires and to a lesser extent among Holsteins and Guernseys. These early breeders believed that form largly determined function and the progress they made stands as evidence of their good judgment. Of course beauty had a lot to do with determining this form and often a certain fad, which they thought lent beauty to their cattle, proved very detrimental to the breed.

It is only since the introduction of the Babcock test that breeding from production records has become prominent. Before the Babcock test there was no accurate and convenient method of determining just how much a cow was producing, but now the Babcock test and the milk scales leave no doubt. These records offered a wonderful opportunity for constructive breeding and were quickly made the principal basis upon which breeding stock was selected. In America this system began in 1885 when the Holstein-Friesian Association established its advanced registry organization and began official testing. Other breeds later began testing and soon there was accumulated a large number of reliable records. Now after 40 years of experience some criticism of this method of breeding may be offered, notwithstanding its recognized merits. Within recent years it has been the predominating factor in improving the production of dairy breeds. It has enabled practical dairymen to locate the boarders and thus intelligently cull their herds.

But valuable as production records are, it is now being demonstrated that their use can be carried to an extreme, and results in many cases show that, in some instances at least, this has been done. There is no doubt that a system of breeding in which form is ignored will soon result in animals that have no fixed type, and it is further now being shown that such breeding will even undermine production. C. L. Burlingham of the American Ayrshire Breeders Association makes the statement that "Breeding production to production alone does not tend to result in further increases in productive capacity; it more often ends disastrously." J. E. Dodge, former herdsman of Hood Farm and now manager of the Emadine Farm Guernsey herd, expresses his opinion as follows: "I am more and more of the opinion that if we breed real dairy type and conformation, the animal will give all the milk and fat necessary." Many authorities on the subject are now making similar statements.

To obtain maximum production there must be combined in the same individual "the will to produce," together with sufficient body capacity to enable the animal to produce. One is as essential as the other. It takes great digestive capacity and constitution to stand up under years of heavy production. What dairy type means is a combination of great constitution and capacity throughout, together with sufficient quality, balance, and symmetry to give the animal a pleasing ap-

(Continued on page 94)

Obtaining a Good Stand of Alfalfa

D. E. Lathrop, '26

As a rule it is a difficult and expensive task to obtain a good stand of alfalfa in Kansas. Undoubtedly this fact keeps many farmers from attempting to raise the crop and otherwise seriously limits the Kansas acreage. This difficulty is becoming more and more pronounced each year, as the continuous cropping of cultivated land is gradually decreasing the vast store of plant food. A good stand of alfalfa may be obtained on vast areas of Kansas soil by any one who is willing to invest the time, labor, and money. Anything that is worth having is worth working for and alfalfa is no exception. Many factors enter into obtaining a good stand of alfalfa, and the omission of any one is liable to result in a poor stand or total failure.

The time to plant alfalfa depends both on seasonal conditions and the section of the state. In the eastern third of the state fall seeding is preferred. In the central section both spring and fall seeding may be used with success. In the western third of the state spring seeding is the most certain.

Fall planting is preferred in eastern Kansas because the spring rains are much greater in this section and give the weeds a greater opportunity to choke out the young alfalfa. As a rule in this section a better crop of hay is obtained the following year, when alfalfa is seeded in the fall. When planted in the spring the field must be moved several times to keep down the weeds, whereas when fall planted, a crop is obtained the following year, thus saving one year's hay crop. The latter statement is the main argument in favor of fall planting for central Kansas.

Spring planting is the most reliable method of obtaining a stand in western Kansas, as the moisture condition of the soil is much better at that time. There is also less danger from winter killing, loss from soil blowing, or attack from grasshoppers which are most troublesome in the fall.

The preceding crop often determines the method of preparing the seedbed for alfalfa. When preceded by a cultivated crop the ground is usually plowed in the spring and summer fallowed until seeding time in the fall. If preceded by a small grain crop such as wheat or oats, the ground is generally plowed shallow after harvest and worked down into a firm seedbed. Should the summer happen to be dry, however, there will hardly be sufficient moisture in the soil to germinate the seed, the previous small grain crop having depleted the soil of its moisture supply. The amount of rainfall during the fall is likely to be insufficient to support plant growth even though germination might take place. Summer fallowing is the most reliable method as it insures sufficient moisture.

The depth of plowing also depends on the preceding crop. If alfalfa is to follow a small grain crop, it is best to plow shallow as the time between plowing and seeding will hardly be sufficient to make a firm seedbed if plowed deep. However, if the ground is to be summer fallowed, it may be plowed deep. The ground should be cultivated sufficiently during the summer months to keep down the weeds and also to keep the surface in an open condition to prevent excess runoff from summer rains. Shortly before seeding the ground should be packed with a soil packer and when possible the drill should be followed by a packer.

None of the Kansas soils is overly supplied with organic matter and it is advisable whenever possible to precede alfalfa with some green manure crop. This is especially true in southeastern Kansas where the organic content of most soils is low and hard subsoils are prevalent. Sweet clover is perhaps the best crop for this purpose as it has a well-developed root system which penetrates the subsoil. Since it often requires as much time and capital to obtain a good stand of sweet clover, farmers more often use barnyard manure instead of a green manure crop. The best time to apply manure is during the winter months at the rate of 10 to 12 tons per acre.

When lime is needed, it is advantageous to add it as early in the summer as possible, as cultivating and working the seedbed thoroughly mixes the lime in the soil and provides time for it to correct soil acidity before the seed is planted. Not all soils need lime, and

the first thing to do is to make sure whether liming is necessary. A soil sample may be sent to the Department of Agronomy, Kansas Agricultural Experiment Station, for analysis and recommendations as to the amount to add. The amount varies according to location and runs from one to three tons per acre. The lime spreader is the best method of spreading the lime as it is easily handled, and distributes the material evenly and quickly. Lime may also be spread by a manure spreader placing a layer of crushed limestone on top of the manure and unloading the spreader in the usual way.

Alfalfa is a heavy feeder and not only requires a sweet soil, good seedbed, and plenty of organic matter, but a good supply of minerals as well. Nitrogen, phosphorus, potassium, and calcium are the important elements necessary for plant growth that are found in the soil.

Nitrogen may be added to the soil by the use of either a commercial fertilizer or barnyard manure. It is essential that some form of available nitrogen be in the soil for the immediate use of the young alfalfa plant. If manure is not added it is necessary to add some nitrogen in the form of a commercial fertilizer on many soils of eastern Kansas. A 2-12-0 mixture added at the rate of 200 pounds per acre is satisfactory. The most convenient method of applying the fertilizer is to use a fertilizer attachment and sow it at the same time the alfalfa is seeded. After the plant has become firmly established the bacteria in the nodules are able to maintain a supply of nitrogen sufficient for the plant's use.

The best alfalfa soils in Kansas are well supplied with potassium and it will be a long time before this element will have to be included in the fertilizer. Calcium is also found in sufficient quantities except in the acid soils of eastern Kansas, where lime must be added.

Phosphorus, however, is the plant food that is deficient in all Kansas soils. There is no easy or cheap way to obtain this food except by the addition of manure, in which it is present in small quantities. It can be purchased as bone or other by-products of the packing plants, or as finely ground rock phosphate in which the phosphorus becomes available as it weathers, or as acid phosphate in which the phosphorus is immediately available. The acid phosphate is the most satisfactory.

As a rule to insure a healthy and permanent stand of alfalfa in eastern Kansas, inoculation is necessary, except in the case of some river bottom soils or fields where alfalfa has been grown previously. Practically all the soils in central and western Kansas contain alfalfa bacteria and inoculation is not necessary. These bacteria are instrumental in fixing the free nitrogen of the air into compounds which may be used by the plant, thus maintaining the nitrogen content of the soil. It is because these bacteria will not live in an acid soil and alfalfa uses so much calcium that the acidity must be corrected by liming before alfalfa can be successfully grown.

The pure culture and the soil method are the two methods of inoculation that are in general use. The soil method is perhaps the most certain, although it has the disadvantage of spreading weed seeds which are undesirable in a young alfalfa field. In using the soil method the surface layer of an area on a desirable field is scraped off and the next five or six inches scattered over the field to be inoculated. The scattering is done either by hand or by the use of a drill, from 200 to 500 pounds per acre being used. The ground should be harrowed immediately to prevent killing the bacteria by the sun's rays. The pure culture method is much simpler and in most cases equally satisfactory. A small bottle, sufficient for experimentation may be obtained from the United States Department of Agriculture free of charge. Cultures may also be obtained from commercial concerns. Instructions for use are sent with the cultures.

For alfalfa seeding, the use of grain drills with special grass-seed attachments are much preferred to any other method, although excellent results are obtained by broadcasting and following with a harrow. From 12 to 15 pounds of seed per acre is about the average throughout the state for high-grade seed. Plantings in the spring are usually made from March 15 to May 15 and in the fall from August 15 to September 15, depending upon the moisture content of the soil.

Edwin W. Winkler, '21, is teaching agriculture and coaching athletics in the high school at Washington, Kan.

Growing Cucurbits with the Aid of a Straw Mulch

Henry L. Lobenstein, '26

There is scarcely a person who does not enjoy a well-grown, fully ripened muskmelon, cantaloupe, or watermelon. The midsummer meal often includes a relished dish of sliced cucumbers and every housewife who prides herself upon the many well-filled shelves of canned products in her cellar always reserves space for cans of sweet, sour, and dill pickles.

In spite of the very evident popularity of these vegetables, many instances of partial or total failure result from attempts to grow them owing to adverse weather conditions or destructive insects and diseases. Many a gardener has despaired when a fine stand of melons or cucumbers succumbed to a sudden dry spell or to a severe outbreak of disease or insects.

The cucurbits, or vine vegetables, seem able to stand considerable dry weather and hot winds when grown on bottom land and in sandy soil to which they are best suited. However, when grown on upland, especially on clay soils, the drouthy or semi-drouthy conditions common to nearly all of Kansas during the latter part of July and the fore part of August, spread havoc among cantaloupes, cucumbers, muskmelons, and watermelons. These fruits contain a very high per cent of water and the lack of sufficient soil moisture, coupled with a high rate of evaporation, prevents their proper maturity with a very marked decrease in quality, size, and yield. A melon ripened under such conditions is insipid, leathery, under-sized, with no good qualities whatever. A cucumber is tough, small, and misshapen. The eating quality of a cucurbit is more dependent upon crispness of flesh than any other one factor, and humid weather conditions, coupled with high moisture content of the soil, are essential to obtain this desirable character.

Anthracnose *(Colletotrichum lagenarium)* is the most destructive melon and cucumber disease in Kansas. The symptoms are brownish (black in the case of the watermelon) circular or oval lesions on stems, petioles, leaves, and fruits. The lesions on the leaves present a dry parched appearance and frequently fall out giving a ragged appearance to the leaves. They frequently coalesce and may entirely cover the leaves and girdle the stems or petioles causing a burnt, parched appearance of the whole vine. Commonly, the disease first appears in the center of the hills, spreading outward thus presenting the familiar bare appearing centers of the hills. On the fruit lesions first appear as black spots circular to oval in shape, coalescing very readily. The lesions soon become deep, sunken, and produce masses of pinkish spores lending a distinct pink color to the acervuli, as the lesions are known, when sporulation occurs.

The lesions upon the leaves, stems, and petioles, particularly those upon the leaves, may completely kill the vine or reduce its vitality to such an extent that the fruits are greatly damaged or fail to mature. On the fruit the lesions offer places of entrance for various rot organisms, and, besides affecting the quality of the fruit, render it very unsightly.

Climatic factors favoring this disease are a cold spring followed by a warm humid summer accompanied by frequent rains. The disease does not become widespread until late in the summer, about the time the melons or cucumbers are reaching maturity.

One of the best methods of controlling both of these limiting factors in cucurbit production, at least when grown on a small scale such as for home consumption, is the application of a straw mulch, combining with this treatment the carrying out of a suitable spray schedule.

The straw mulch protects the plants in drouthy periods conserving soil moisture and keeping it very much closer to the quite shallow feeding roots. The mulch also keeps down weeds which, if allowed to grow, contrary to an opinion often expressed, reduce yield and quality. If properly applied the mulch accomplishes the above results under drouthy conditions while under the opposite wheather conditions it serves in quite another manner. The carrying of spores by the splashing effect of rain, by surface water, and by cultivation has been definitely proved to be the most impor-

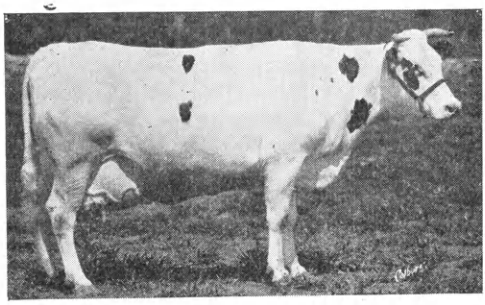
(Continued on page 90)

Inka Hijlaard Walker Makes Another Record

A. R. Sargent, '25

Every student in dairy judging during the past six years has been speedily introduced to Inka. Hundreds of visitors to the college dairy barn have admired her while others have read of her merits. It seems hardly necessary to add that she is the most valuable cow in the dairy herd of the Kansas State Agricultural College.

A year ago last November Inka freshened and made a very creditable record of 558.5 pounds of milk and 24.9 pounds of butter in seven days. She was continued on semi-official test for the year. The official figures for her year's production have just been received and



INKA—THE MOST VALUABLE COW IN THE COLLEGE DAIRY HERD
Inka freshened again February 12, 1925, with a bull calf. She is now producing approximately 80 pounds of milk per day.

they credit her with 21,068 pounds of milk containing 775 pounds of butterfat for the year. This amount of butterfat churned into butter would yield 968.7 pounds or nearly three pounds of butter a day for 365 days. Inka has been a persistent rather than a heavy producer but during one day she produced over 90 pounds of milk, which is more than 10 gallons.

While this is not the highest record made by a K. S. A. C. cow, it is the best record made in Kansas during the year 1924 and the highest record as yet made by Inka. However, she has another record of 770 pounds of fat and her average on four yearly records, including her two-year-old record, is 18,134 pounds of milk and 675.8 pounds of butterfat.

The amount of feed consumed by such a cow is almost unbelievable. During her last record she consumed an average of 19 pounds of grain and 16 pounds of alfalfa hay each day. She also consumed more than 5 tons of silage which amounts to about 30 pounds per day, also 13 pounds of wet beet pulp flavored with molasses was consumed each day. During the summer she was out on bluegrass pasture every evening.

The cost of her grain during the year amounted to $120.81 while the roughage feed cost was $117.42. This gives a total feed cost of $283.23. Only cows of high-producing ability can handle this much feed and return a profit, but Inka is of that class. During the past year the value of her milk at 23 cents a gallon exceeded the cost of her feed by $305.20. If the value of her milk at retail price was considered she gave a return above the cost of her feed of $600. If one goes to the other extreme and credits her product with butterfat prices she still returns $150 above the feed cost.

A cow must have abundant feed to produce and generally speaking the more she produces the more economical the production. This is well shown by the two records Inka has made during the last two years. During the year, 1923, she was not pushed or fed heavily, consequently her production was only 16,162 pounds of milk and 572.4 pounds of fat. Her feed cost was accordingly lower being only $165.87 as compared to $283.23 for the year, 1924. But the returns above feed costs of the lower record were only $266.36 as compared to $305.20 last year. In the past 3½ years, making allowance for dry periods, Inka has given a return above cost of feed of approximately $800.

Inka is also of very good breeding, being richly bred in some of the best Holstein blood lines. Through her sire, Walker Copia Champion, she traces to King Segis with 87 A. R. O. daughters and 87 proved sons. Her dam was sired by Korndyke Butterboy, Jr., undoubtedly one of the best bred bulls ever brought

(Continued on page 94)

The Dawes Plan

L. J. Schmutz, '25

GENERAL PRINCIPLES

The Dawes report has involved immense research and a broad grasp of economic principles. It is a thorough assembling of relevant facts and scientific honesty. The acceptance in good faith by France, Germany, and other interested countries of the Dawes Plan constitutes the turning point in Europe's economic life. The recovery of debt and not the imposition of penalties is what has been sought. The argument that Germany's full domestic demands constitute a first charge on her resources is dismissed. The entire plan is based on the assumption that the financial and economic unity of Germany will be restored and that economic activity will not be hampered by political and military control.

The committee considered two chief questions: First, how can the German budget be balanced and German currency stabilized? Second, provision for adequate reparation payments.

MACHINERY OF THE DAWES PLAN

A. New Bank of Issue.

The first constructive step needed is to stabilize the currency. To do this, the experts propose the establishment of a new bank in Germany with a capital of 400,000,000 gold marks or an equivalent of $100,000,000. One-fourth of this capital is to be furnished by absorbing the present Reichsbank and three-fourths is to be furnished by new gold capital subscribed by German and foreign investors. The new bank is to be managed by a German president and a managing board and is to be supervised in large matters affecting creditor nations by a general board of seven Germans and seven foreigners, one of these foreigners being the bank commissioner.

Besides the capital mentioned above, the Dawes report proposed a loan of 800,000,000 gold marks which will serve the double purpose of assuring currency stability and financing essential deliveries during the preliminary period of economic rehabilitation. The deposit of this amount in the new bank will be an important and necessary contribution to its gold reserves and enlarge the basis of its currency issues. Some will ask how the German government can use the same fund of borrowed money both for the purpose of creating a gold reserve for the bank and for the purpose of financing payments in kind to the Allies. The answer is, that the German government will deposit with the bank the proceeds of the loan in gold values, dollars, and other foreign currencies, at their gold or dollar value, and will receive from the bank a deposit credit in German marks. As it draws on this deposit credit for the purpose of buying goods produced in Germany for delivery to the Allies, it will not reduce the liquid assets of the new bank in the form of gold or gold exchange reserve, but will rather transfer to the sellers of these German goods the mark liabilities of the new bank, either in the form of deposit credits or bank notes. The new bank will thus be able to preserve the gold proceeds of the 800,000,000 gold mark loan.

The assets of the bank are to consist of gold, gold exchange, and short-term liquid paper. Its lending operations are to be governed by banking rather than political considerations. It is to be a liquid bank. It is to have not less than 33⅓ percent reserve of gold and of foreign balances payable in gold, subject to special emergency provisions which properly permit the reserve to go lower, if necessary, to protect convertibility.

In summary, the bank has three primary functions: (1) It is to supply Germany with a stable bank note issue. (2) It is to serve as a bank of rediscount for short-term credit operations. (3) It is to be the depository of reparation payments which the German government is to make in marks to an agent of the Allies.

B. Reparations.

The experts have divided the reparations into two parts. First, the amount which Germany is to pay in the future into a reparation account in German marks in the new German bank to the credit of the reparation agent; and second, the transfer in foreign moneys to the other countries for reparation payments in proportion to the amounts coming to them such as, France, 52 percent; England, 22 percent; etc., under the Spa agreement.

The sources of revenue to make up this account are to be from the following: (1) Taxes or budget, (2) railroads, (3) industry, (4) transport tax, and (5) the foreign loan of 800,000,000 gold marks which is a part of the first year's payment.

Proportional taxation is provided. The German people are to be taxed as heavily as those of the Allies. A prosperity index is proposed to measure German prosperity so that a sliding scale of reparation's load can be calculated accordingly. This index is to be based not merely on German exports, as has been the case before, but on the average comparative figures of railroad traffic, population, foreign trade, consumption of tobacco, budget expenditure, and coal consumption. There is no revenue from the budget the first two years except in so far as the budget can be helped by moneys from outside secured by loan or by sale of the railway's preferred stock. The third year $27,500,000 is to be raised; the fourth year, $125,000,000; the fifth year, $300,000,000 is to come from the budget.

It is purposed that the entire German railway, including the Rhine and Ruhr railways, shall be turned over for fifty years to a foreign trustee and that they shall be recapitalized on the basis of a new mortgage (11 billion gold marks, 2 billion marks of new preferred stock, and 13 billion marks of new common stock). This new mortgage, bearing 5 percent interest and 1 percent sinking fund, is to be turned over to the reparation agent to hold and collect the interest, or to sell, if in the future that may be possible.

The transport tax as is now levied on all tickets and freights shall continue this way the first year to help balance the budget, but after that it shall go into the railroad (revenue) fund.

All the industries of Germany are, like the railroads, to be considered free from debt due to the process of inflation and making valueless the German mark. They are free from debt only at the expense of the prior holders of those bonds. The German industries, excluding agriculture, are to be freshly bonded with a total of 5 billion gold marks or an equivalent of $1,250,000,000 bearing 5 percent interest and 1 percent sinking fund. This is to be a lien on all business and is to be turned over to the reparation agent to hold and collect the interest, or to sell those bonds, if in the future that may be possible.

C. Control and Guaranties.

After five years all sources of revenue are to supply a total of 2,500 million gold marks or an equivalent of $600,000,000 annually. It is to be more than that if Germany turns out to be unexpectedly prosperous as told by the prosperity index, and conversely, if she is less prosperous the extra payments are to be deferred somewhat. If Germany cannot meet her obligations each year as expected then the amount for each year is to be made up through an emergency branch of the budget that will be guaranteed by direct taxation receipts from customs, sugars, tobacco, beer, and alcohol. Thus the total of $600,000,000 is to be assured.

D. Receipt of Reparations.

Germany's responsibility will cease when she has paid her annual reparation payments. The job of transferring the mark into foreign currencies is the task of the Allies as represented by a reparation agent who is to be the chairman of a board of six, himself and five experts in international exchange, who are to represent the United States, Great Britain, France, Italy, and Belgium. For the stability of a country's currency and for a balanced budget to be permanently maintained, its earnings abroad must equal the payments made abroad, including not only payments for imports, but also reparation payments. The committee says that experience alone can tell what transfers into foreign currencies can be made.

Reparation funds are not to be deposited in the bank of issue in excess of two million

E. SCHEDULE OF GERMAN PAYMENTS IN MILLIONS OF GOLD MARKS

Year	Railway Bonds	Transport Tax	Industrial Bonds	Budget Revenue	Sale of Railway Shares	Foreign Loan	Total
1st	200	.....	.....	.....	.....	800	1,000
2d	595	.....	125	.....	500	.....	1,220
3d	550	290	250	110	.....	.....	1,220
4th	660	290	300	500	.....	.....	1,750
5th	660	290	300	1,250	.....	.....	2,500

marks. Funds accumulated in excess of this amount are to be employed in bonds and loans in Germany, but total accumulation in Germany must not exceed five billion marks. If this limit is reached, the reparation payments are to be reduced so as to keep the accumulation within the stated limits. Some economists question the problem whether or not Germany can produce an exportable surplus and find a market for her products. The Dawes Plan does not solve this problem.

F. Summary.

The Dawes Plan may create difficulties but these will be temporary and readjustments will finally take place. If Germany can make and sell more goods as a result of financial assistance, she can buy more from others, and the more she sells the more she will buy.

Germany has great sums to pay. The total is still set at 33 billion dollars. That is probably beyond her capacity. The plan has been accepted by Germany. Six controls are established: (1) Agent for reparation payments. (2) Trustee for railway and industrial bonds. (3) A commissioner for railways. (4) A commissioner for banks. (5) A commissioner for controlled revenues. (6) A transfer committee.

The three main sources of Germany's payments are from: (1) Ordinary budget. (2) Industrial bonds. (3) Railway bonds and transport tax. To assist Germany in making the first payments, the world has loaned 200 million dollars, the security of which there seems to be no doubt.

Germany must retake her place in the economic family of nations. The Dawes Plan is the latest and greatest effort to rebuild prosperity not only for Germany, but also for the rest of the world.

REFERENCES

Congressional Digest, November, 1924.

Chase Economic Bulletin, "Summary Dawes Plan," by B. M. Anderson, Jr.

Economic World.

The Annals of the American Academy of Political and Social Science. July, 1924.

"Business Man's View" by J. H. Scatterfield.

Early Methods of Milling

W. H. Hanson, '25

It was early discovered that both in the case of mastication and in flavor grain is much improved by grinding, therefore the first crude milling processes developed soon after the cultivation of the soil began. Prehistoric man pounded his grain with rude implements of stone which method existed for thousands of years before the beginning of recorded history. That better results were obtained by rubbing or grinding was a later discovery.

Presumably it was from observing the fact that a twisting motion on the crushing stone was more effective than a mere downright blow that flour milling made its first real advance. The first grinding was undoubtedly a combination process, the grain being first broken with blows by pounding with a stone, and then rubbed into a coarse meal. Little by little the rubbing process increased in relative importance until the entire reduction of the grain to meal was accomplished by this method. The saddle stone was perhaps the first true grinder, and there is good reason to believe that it was used four thousand years before the beginning of the Christian era. Saddle stones have been discovered in the sand caves of Italy, among the lake dewllings of Switzerland, and in the pit dwellings of the British Isles. The lower stone had a flat or slightly concave upper surface generally inclined away from the grinder, while the upper stone was in the form of a roller somewhat larger than the extrmee width of the lower stone. The grain was crushed or ground by rolling or pushing the upper stone over the lower.

Grinding was done by slaves and captives were compelled to grind in prison. Most of the early grinding was probably done at home; the maid servant behind the mill belonged to the lowest stratum of society. The millstone

(Continued on page 90)

THE KANSAS AGRICULTURAL STUDENT

KANSAS STATE AGRICULTURAL COLLEGE

MANHATTAN, KANSAS

VOL. IV MARCH, 1925 NO. 3

Published quarterly by the students of the Division of Agriculture. Subscription rate, one dollar a year; single copies, twenty-five cents; advertising rates on application. Address all communications to The Kansas Agricultural Student, Manhattan.

DOCTOR JARDINE OUR NEW SECRETARY OF AGRICULTURE

We are proud of the fact that President Coolidge came to K. S. A. C. to get the Secretary of Agriculture. The honor comes for meritorious service and primarily to our highly esteemed President, but K. S. A. C. and Kansas share in the recognition.

The administration of President Jardine at K. S. A. C. has been marked by harmony and strong team work. We predict for him not four years but many years of outstanding service in the United States Department of Agriculture. He is prepared to give the best years of his life in the development of a constructive program for American agriculture.

OUR COVER PAGE

The Single Comb White Leghorn cockerel whose head appears on this month's cover page is a member of the production bred college flock. He is the son of a hen who laid 282 eggs during her first year of production. His ancestors for several generations have been in the high-record class at the college plant. In addition to being of high-production breeding, this cockerel also possesses good standard qualities of the breed which he represents. The characteristics shown by this head are indicative of unusual vigor, which is a necessary quality of any high-producing strain. This individual exemplifies the aim underlying the poultry breeding work at the college, the combination of the beautiful and the useful. The picture is presented by the courtesy of F. E. Colburn, college photographer.

TO OUR READERS

It is believed the two leading articles in this issue will be of unusual interest to a large majority of our readers. The first article reviews briefly the work of K. S. A. C. with special reference to the radio service which has been developed and organized during the past two years. It presents a conservative but optimistic discussion of the mission of Station KSAC, justified by the fine record which the new radio station has made during the first three months of its service.

Practically everyone who will read an agricultural magazine is interested in poultry. The article on poultry feeding will enable any poultry raiser, on the farm or in the city, to study his own poultry management, especially his feeding operations, and remedy defects, if any. The farm poultry flock with plenty of range may be well provided for during much of the year. Deficiencies for short periods of time during the year, however, may be a serious menace to profits of the flock. Faulty conditions in any flock for a few weeks or slight deficiencies in the ration more or less prolonged often mean a serious reduction of the total annual egg production.

The Water Supply System of the Agronomy Farm

H. A. Wright, Agr. Engrg., '25

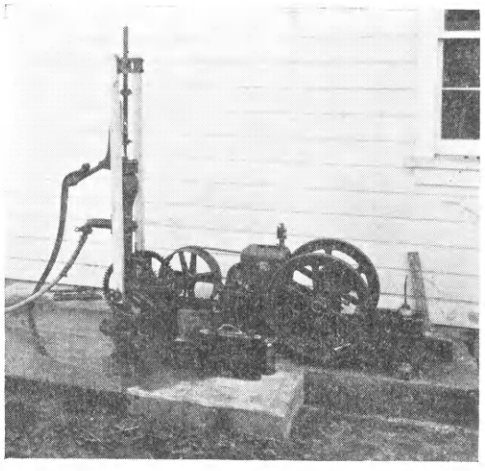
One of the outstanding improvements on the Agronomy Farm of K. S. A. C. is an automatic water pressure system. The system, which has just recently been installed, is characteristic of a large number of farm water systems which may be installed for farm use where automatically controlled power is available.

No improvement on a farm can be made which will contribute more toward making the farm home a more pleasant place to live than a good method of supplying running water. In the modern farm house running water is essential, as the use of plumbing systems, sewage disposal, and an efficient laundry depend upon a constant water supply. Aside from the house, water should be available in the barns, feeding lots, garage, lawn, and garden. After a water system is once installed it requires very little attention and the benefits derived from it are worth many times the cost.

There are two general classes of water systems used on farms. These are the gravity system, in which an elevated tank is used, and the pressure system. The pressure system consists of a steel tank, pressure pump or air compressor, power for pumping, and the piping system. The two kinds of pressure systems most commonly used are the hydro-pneumatic, which stores air and water in the same tank, and the pneumatic system, which stores compressed air only.

The system used on the Agronomy Farm is of the hydro-pneumatic type. The pumping capacity of this pressure system is about 250 gallons per hour. The steel hydro-pneumatic storage tank is placed in the basement of the house. The size of the tank is 36 inches in diameter by 10 feet long. It is filled about two-thirds full of water and one-third full of air under pressure. The compression of the air in the tank forces the water through the pipes and out of the faucets when they are opened. An automatic electric pump maintains the pressure within the tank between the limits of 20 pounds and 40 pounds per square inch. That is, when the pressure drops to 20 pounds per square inch the pump starts filling the tank with water and air. The tank is filled until the pressure is 40 pounds per square inch, when the pump automatically stops. The pump starts and stops automatically so it requires no attention.

The well is situated 130 feet from the house and is 80 feet deep. The water surface is about 30.5 feet below the pump. A pit 5 feet 4 inches deep is dug over the well and the pump and motor are placed in this pit so that they are below the frost line. The pump is protected by the attractive shelter. An electric



GASOLINE ENGINE AND PUMP OF A HYDROPNEUMATIC WATER SYSTEM

motor drives the water pump and the air pump, and all three are attached together forming one compact piece of machinery. As stated above, the pumps are operated automatically. Air and water are pumped at the same time so that they are kept in the right proportion in the tank. All pipes and other equipment are below the frost line or otherwise protected from the danger of freezing. While water is stored in the tank, fresh water may be had at any time by putting a fresh water attachment on the pump. The accompanying illustration shows a part of a hydro-pneumatic water system which is run by a gasoline engine. This

(Continued on page 92)

College Notes

INTERCOLLEGIATE POULTRY JUDGING CONTEST

The Kansas Intercollegiate Poultry Judging team placed seventh in the closest race ever witnessed in the International Poultry Judging Contest held in the Chicago Coliseum, December 11, 1924. Michigan placed first with a score of 3,336, defeating the Kansas team by a margin of only 286 points. H. Arlo Stewart, of Topeka, member of the Kansas team, was awarded fourth place in the individual judging of the exhibition classes.

Results of the contest were as follows: Michigan, first; Iowa, second; Purdue, third; Illinois, fourth; Missouri, fifth; Oklahoma, sixth; Kansas, seventh; Nebraska, eighth; and Ohio, ninth.

The men representing Kansas besides Stewart were: Stanley Caton, Manhattan; W. J. Kraus, Hays; and R. W. Fort (alternate), St. John. Prof. H. H. Steup coached the team and accompanied them on the trip.

JUNIOR STOCK JUDGING TEAM WINS SECOND AT DENVER

The Kansas State Agricultural College junior stock judging team placed second in the student judging contest held in connection with the National Western Livestock Show in Denver, January 17, 1925. First place was won by the Colorado Agricultural College with a score of 3,572 points, a margin of 26 points over the Kansas team.

Mary Haise, Manhattan, was the first girl to represent the college on a stock judging team in intercollegiate competition. She ranked second in individual ratings for the entire group of 20 contestants (four teams). The other Kansas contestants stood as follows in individual ranking: Lionel Holm, Lincoln, seventh; A. C. Hoffman, Abilene, eighth; T. M. Kleinenberg, Transvaal, South Africa, fifteenth; and Walter Atzenweiler, Huron, seventeenth. W. W. Taylor, Smith Center, was alternate.

The rank and score of the teams are as follows: Colorado first, 3,572 points; Kansas second, 3,546 points; Wyoming third, 3,529 points; and Nebraska, fourth, with a score of 3,485.

The Denver contest closes the livestock judging season. The college record is outstanding as it includes a first place at the American Royal Livestock Show in Kansas City, fifth place at the International Livestock Show in Chicago, and second place at the National Western Livestock Show in Denver. Both junior and senior livestock judging teams are coached by Prof. F. W. Bell of the Department of Animal Husbandry.

ALPHA ZETA HOLD INITIATION

The annual initiation program of the local chapter of the Alpha Zeta fraternity, national honorary student organization in agriculture, was held in the chapter hall, Monday, January 12, 1925. The following students in agriculture were initiated: O. L. Norton, of La Cygne; D. E. Lathrop, of La Harpe; R. W. Fort, of St. John; R. M. Karns, of Ada; and H. A. Brockway, of Olathe. Aside from the student initiations two members of the faculty, Prof. R. M. Green of the Department of Agricultural Economics and Hugh Durham, assistant to the dean of the Division of Agriculture, were initiated as honorary members.

Following the initiation service an informal dinner was held in the Gillett Hotel. Harry B. Potter, of Marshall, Ill., general secretary of the Alpha Zeta fraternity, was the main speaker of the evening.

FEEDERS' DAY CONVENTION

The regular annual feeders' day convention will be held at K. S. A. C., Saturday, May 23, 1925. Feeding reports of unusual interest and value to the livestock feeders of the state will be made on that occasion by members of the staff of the Agricultural Experiment Station having the work in charge.

One phase of the cattle feeding investigations for the year deals with the maximum utilization of pasture in summer feeding. Another phase deals with the determination of the extent to which silage can be depended upon economically as the sole roughage in fattening baby beef. The sheep feeding ex-

periments parallel those conducted with the calves on the maximum utilization of silage.

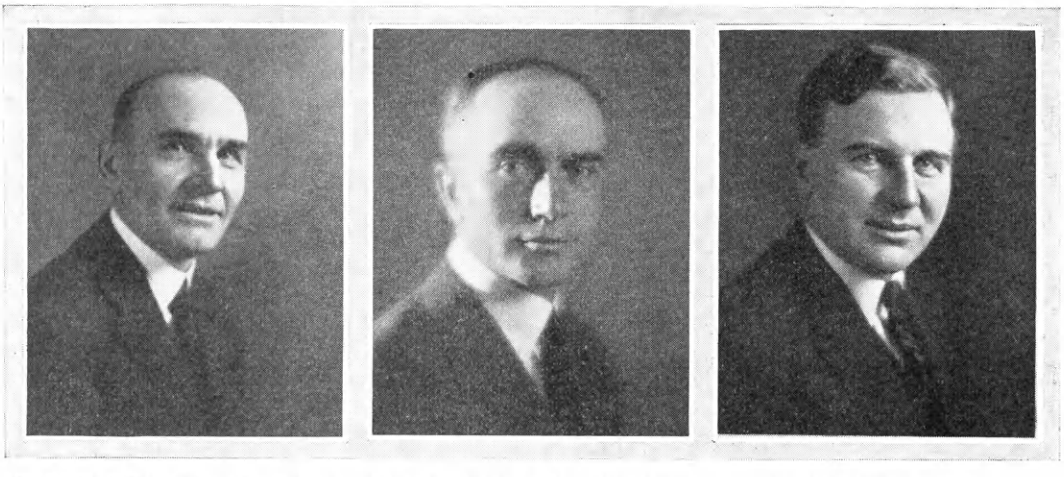
The hog feeding experiments are along three lines: (1) To determine the relative value of alfalfa and sweet clover pastures in fattening hogs; (2) to secure more data on the relative merits of raising pigs for September market and raising them for December market; (3) to determine to what extent linseed oilmeal can replace tankage as a protein supplement for fattening hogs.

The program is in charge of Dr. C. W. Mc-

AGRICULTURAL SEMINAR

Dr. W. M. Jardine, president of the college, addressed the general Agricultural Seminar, Thursday, December 11, 1924, on the Agricultural Commission appointed by President Coolidge in November.

Doctor Jardine spoke briefly of the personnel of the commission, stating that each member represented a distinct phase of the agricultural industry of the United States. President Coolidge called the commission together in November, pointed out the acute situation



SECRETARY W. M. JARDINE PRESIDENT F. D. FARRELL DEAN L. E. CALL

These men have recently received promotions which were well merited. Each has stepped into a higher rank of leadership with the unanimous good will and best wishes of those concerned. One thousand "home folks" attended a farewell banquet given in honor of Doctor Jardine, Wednesday evening, February 25. The Agricultural Association sponsored a banquet given Thursday evening, March 12, in honor of President Farrell and Dean Call and in recognition of full confidence in their leadership. These changes are but indications of the growth of K. S. A. C. Its good reputation will continue to spread within the boundaries of Kansas and to the far corners of the earth.

Campbell, head of the Department of Animal Husbandry. One thousand visitors is not an unusual crowd for the day and the vital interest in the reports to be made should insure a record crowd for this convention.

IMPORTANT FACULTY CHANGES

Dean F. D. Farrell became acting president of the college, March 1, 1925. On Monday, March 2, he appointed Prof. L. E. Call, head of the Department of Agronomy, acting dean of the Division of Agriculture and acting director of the Agricultural Experiment Station. At the same time he named Prof. R. I. Throckmorton, professor of soils, head of the Department of Agronomy.

of agriculture during the last five years, and set the commission to work, giving little advice, but suggesting that they use any source of information available.

The commission, at its first session, chose to examine carefully the 17 agricultural relief measures either enacted by Congress during the past two years or being considered at the present time. Further immediate congressional action awaits the recommendations of the commission. It may be said further that relief for the cattle industry is considered by the commission to be a matter of paramount importance.

Besides recommending relief legislation, the commission proposes to crystallize a na-

tional agricultural policy. This policy must be broad and comprehensive and be enthusiastically and effectively backed by bankers, farmers' organizations, agricultural experiment stations, and government agencies. Each state will have problems of its own to solve. For instance, Kansas will need to grow fewer acres of wheat with higher acre yields, and grow more sheep, alfalfa, sweet clover, and cattle.

President Jardine also pointed out that the farmer was behind in price information and that considerable service could be done by

WINNERS IN THE FOURTH ANNUAL STATE HIGH SCHOOL JUDGING CONTEST, K. S. A. C., MAY 1 AND 2, 1924

(1) Karl Garrett, (2) Ralph Grose, (3) Edgar Webster of the Burlington High School, winning team of the entire contest. (4) Daniel Root, (5) Raymond Appleton, (6) Chauncey Clark of the Wichita High School, winners in the judging of dairy cattle and grain. (7) Clifford Harding, (8) Russell Schaulis, (9) Howard Elkins of the Wakefield Rural High School, winners in the judging of beef cattle, hogs, horses, and sheep. (10) Glenn Harries, (11) William Whitney, (12) George Taton of the Garden City High School, winners in the judging of poultry.

government agencies by gathering this information and disseminating it by radio. These are problems for the United States Department of Agriculture.

The fourth meeting of the general Agricultural Seminar was addressed by Prof. H. B. Walker, head of the Department of Agricultural Engineering. This meeting was Thursday, January 8, 1925. Professor Walker spoke on the relation of engineering to the science of agriculture.

Professor Walker stated that agriculture in the twentieth century has been marked by a tendency toward larger farms, a greater production per man, an increased use of equipment, and toward cooperation in marketing and production. These circumstances account for the fact that comparatively fewer men are engaged in agriculture today than ever before. However, the number of men engaged in agriculture today includes a larger proportion of eminent scientists and business men than heretofore. The technically trained men now engaged in agriculture include not only the agronomists, animal husbandrymen, dairymen, horticulturists, and economists, but engineers as well.

Engineering is coming to be more and more a part of agriculture. The general trend has been toward efficiency in improved methods in agricultural production. Man labor is being reduced through the substitution of machine and horse power. In Kansas, there are one thousand fewer farms today than there were 30 years ago; yet, Kansas has 50 per cent more improved acres today than 30 years ago. The tendency is toward a larger unit in farm management.

With the increased use of farm machinery and farm power, and with drainage and irrigatation becoming necessary in many localities, agricultural engineering is coming to be one of the most important phases of farming.

According to Professor Walker, the agriculturist of the last half century has called for the assistance of the engineer. This demand has created departments of agricultural engineering in most of the land grant colleges where men may be trained analytically as engineers but with the viewpoint of the agriculturist. These departments are divided into four fields; namely, farm power and machinery, farm structures, farm sanitation and water supply, and reclamation of land.

E. L. Lahr, '21, is farming near Abilene.

V. S. Crippen, '20, formerly county agricultural agent of Reno county, is cashier of the Langdon State Bank, Langdon, Kan.

FIFTH ANNUAL STATE HIGH SCHOOL JUDGING CONTEST

The fifth annual State High School contest in the judging of farm products will be held at the College, Thursday and Friday, April 30 and May 1, 1925. These contests increase each year in numbers and interest. In 1923, 49 high school teams competed; in 1924, 53 teams competed. Practically all the high schools represented in the contest last year will enter teams in the fifth annual contest and a score or more of other high schools are keenly interested and planning to be represented.

In the coming contest, 22 classes of crops, livestock, and poultry are to be judged. It means two full days of hard work for the entrants. It is work, however, not without rewards even if substantial prizes are not given to more than three or four teams and a half dozen individuals. (See The Kansas Agricultural Student, Volume IV, No. 1, pages 16 to 19 for further information regarding the fourth annual contest.—Editor.)

FIFTH ANNUAL AG FAIR

The best fair ever, that is the slogan for the Fifth Annual Ag Fair to be held on the north campus, just south of the two Ag buildings, Saturday, May 9, 1925.

The parade is to start for the business section of the city at 12 o'clock; the Pike will open at 3 p. m., and the fair will be in full swing from then until midnight. The biggest entertaining features of this year's fair are to be "The Rodeo" and "The Farm Hand Follies." A real New Mexico cow puncher is in charge of "The Rodeo" and his motto is to be "action." The follies show will be in the north half of the stock-judging pavilion and "The Rodeo" will be in an open air corral on the south side of the fair grounds. Other features that will be close rivals of these are the "Minstrel Show" to be housed in a large tent on the pike, and "The Farmers Vaudeville" to be held in the Veterinary Amphitheatre. Other entertaining features will include the Ferris wheel, the crazy house, the

(Continued on page 96)

Success in Farming

S. F. Kollar, '25

Many people are discouraged if farming operations do not prove directly and immediately successful. Yet success, in a large way, comes only to those who have fought price depressions and the physical agencies of nature with a smile, and have had a determined spirit to come back to play their hand again. Success in agriculture cannot be reached, as a rule, from a few years of toil, but it is a business game which must be pushed, worked, and perfected over a long period of years.

Whatever of useful information or helpful inspiration may come to the reader of this article must be credited to Mr. Fred G. Laptad's ability to discuss his work in a clear and concise manner. The writer was impressed with the fact from the beginning of his interview that Mr. Laptad is no "plunger," who flares up and tries to make a "killing" out of farming in a year or two. On the other hand, he is conservative, a philosopher. He has a golden rule, as it might be called, which he has followed successfully for years. When prices are on the downward trend he produces less and is less concerned about price conditions. As soon as prices are on the upward trend he produces to the limit.

For 20 years Mr. Laptad has been managing a grain and livestock farm near Lawrence. He believes balanced agriculture is the first essential practice to follow if one intends to reap success in farming. The work carried on at the Laptad farm has been in continuous cooperation with Kansas State Agricultural College. He attends all important agricultural meetings put on by the college for the farmers' benefit. He is a charter member of the Kansas Crop Improvement Association and was for four years president of this organization, which gave him a chance to receive early training in the importance of better farming.

From his work along crop improvement lines Mr. Laptad foresaw the importance of pedigree selection of crops and applied the principle to livestock raising. All of his crop operations have been practiced on the crop rotation basis. His common rotation is wheat, clover, corn, and oats, no one crop grown more than two years in succession. Wheat is grown more as a supplementary crop to livestock than as a cash crop.

The inspected and certified seed era in Kansas had its first real existence about 1919. The benefits from growing certified seed were limited for the first few years owing to the fact that farmers were unwilling to accept the idea that pure seed was a means toward improving agriculture. For the past few years, Mr. Laptad, as a forerunner of this movement, has been able to realize a profit from growing certified seed of Kanred wheat, Kanota oats, field corn, and soybeans.

For the past two years the farmers of eastern Kansas have been growing varieties of soft red winter wheats. The variety most commonly grown is the Harvest Queen. It is one of the highest-yielding varieties of the northeastern section. Along with Mr. Laptad's numerous other variety tests he has in the past year made an effort to develop a 100 percent pure Harvest Queen variety by making head selections of the very best plants from the fields, and harvesting and cleaning by hand. Under similar selection methods Mr. Laptad's 90-day red corn has been produced from undesirable seed corn obtained from an Iowa seed house. He has demonstrated in many ways the importance and value to every farmer in the state and elsewhere of practicing careful seed selection.

Threshing machines can be classed as the foremost and constant source of seed contamination. Mr. Laptad has observed the long-time need of seed-cleaning devices which practically will eliminate the greater percent of seed contamination. As result, he has had a thresher designed which is absolutely cleanable, with which he intends to thresh his seed plots.

From 600 to 1,000 bushels of certified seed corn and from 1,000 to 2,000 bushels of certified Kanota oats seed are sold each year from Laptad's farm. He has been successful in showing prize-winning corn, both of Reid Yellow Dent and Laptad 90-Day Red, at the Chicago International Hay and Grain Show and at the Topeka Free Fair. He has made shipments of seed corn into South America

(Continued on page 96)

The Rise of the Cattle Industry in South Africa

T. M. Kleinenberg, '26

South Africa is not a land of "Niggers and snakes," as one individual expressed his thoughts, nor is it a primitive uncivilized country where wild beasts roam about the towns at night, as another imagines it, but a country of prospects and a bright future.

Agriculture has been appropriately named "The Backbone of the Country," and it is on that industry that its future depends. Hitherto farming has not received its full degree of attention owing to the fact that the gold mines and diamond mines have always received preference; but in spite of this fact agriculture is progressing by leaps and bounds.

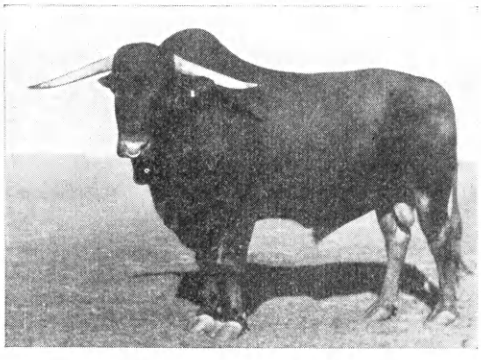
Up to the time of the Anglo Boer War in 1898, the cattle industry was relatively unimportant. The outbreak of rinderpest in 1896 decimated the herds of cattle which had by that time become established in the northern provinces. Since then a notable advance has been made in cattle breeding. The prevention and control of stock diseases, now extended to all parts of South Africa, have reduced the risks previously involved. Reliable statistics are not available for the period prior to 1902, but census returns taken in 1904 show that the cattle of South Africa numbered 3,500,000 head. In 1911, the number had increased to 5,797,000; in 1918, to 6,852,000; and in 1921, to 8,557,000.

By far the larger proportion of these cattle is of mixed breeding possessing a marked infusion of Afrikander blood. It might be well to mention that the Afrikander breed of cattle originated from animals brought to South Africa by the early colonists. These cattle, in the absence of railway transportation, had to be relied upon for the development of the country. As a consequence, cattle were bred chiefly for draught purposes, and in the course of time there was created a distinct type which came to be known as the Afrikander. It possessed the quality of hardiness and is today unsurpassed in South Africa for draught purposes.

Large numbers of cattle in South Africa today, however, show the influence of the improved European breeds. During the last decade in particular, a marked improvement has been noticeable in the herds throughout the country brought about by the importations of sires and by the establishment of pure-bred herds from which bulls in considerable numbers are now used for the grading up of ordinary herds.

The government has been sympathetic to the cattleman, and under the Ocean Mail Contract registered cattle are conveyed to South Africa free of freight, a factor which has been a great impetus to the cattle industry.

The formation of the South African Herd Book Association in 1905, and at a later stage of development, of different breed societies affiliated thereto, has promoted and fostered the interests of breeders. Each of the following breeds has its breed society: Holstein, Shorthorn, Hereford, South Devon, Aberdeen Angus, Ayrshire, Afrikander, and Sussex.



A TYPICAL AFRIKANDER BULL

During recent years the prospects of an export trade have stimulated breeders to improve the type of beef cattle, and the old method of marketing entirely grass-fed cattle is being superseded by stock feeding.

Finally, as insignia of the growing interest in the agricultural progress of the country, the Johannesburg Agricultural and Livestock

(Continued on page 96)

Condition Powders: Their Use and Abuse

F. E. Hull, V. M., '25

The problem of most vital importance to the livestock feeder at the present time is, how to produce meat more economically. Because of this fact numerous concerns have placed condimental stock foods upon the market. These condimental stock foods are well advertised through the various farm papers, by circular letters, and by traveling salesmen.

Before entering upon a discussion of condimental stock foods and their value in the nutrition of livestock, it may be well to state definitely what is meant by this term. The condimental stock foods and all preparations of a similar composition are mixtures of some well-known feed material such as mill feed, corn meal, bran, oilmeal, etc., and a number of simple herbs, roots, and barks that possess or are supposed to possess medicinal properties. Common salt, Epsom salts, sulphur, charcoal, or coloring matter are also added, in most cases, to increase the palatability or supposed medicinal effect of the condimental stock food or to disguise its true composition.

Before a condition powder can be presented for sale in the state of Kansas it must be registered with the Control Division of the Kansas State Board of Agriculture. Labels giving specific and prescribed information must be attached to each container of condimental stock food or livestock remedy. At the present time 62 compounds are registered as condition powders. The following ingredients are used most frequently: Anise, red pepper, charcoal, American worm seed, fenugreek, gentian, copperas, licorice root, horse medley, epsom salts, middlings, nux vomica, oilmeal, salt petre, quassia, rosin, bloodroot, Glauber's salt, sulphur, common salt, and baking soda.

Anise, red pepper, and fenugreek are of some value in cases of colic, but are chiefly used to impart odor to the preparation and to disguise other substances. Charcoal is often used in cases of intestinal gas, indigestion, and as an absorbent. Gentian, copperas, nux vomica, and quassia are recognized tonics and appetizers. American worm seed is one of the best remedies for roundworms, if given in the proper dosage. Licorice root is used to disguise the taste of other drugs. Horse medley has no remedial value, and is often found to be nothing more than coal dust. Middlings have a nutritive value but must be regarded as a filler. Epsom salts and Glauber's salts are valuable purgatives when given in large doses, in small doses they serve as laxatives. Oilmeal is a filler with a laxative action. Salt petre increases the action of the kidneys. Rosin has no value internally. Bloodroot is an emetic, but it is not used at the present time. Sulphur passes through the system unchanged if given in large amounts, and is usually regarded as a filler. Common salt is a necessity to livestock, but when used in excessive amounts it must be regarded as a filler. Baking soda is useful in acidity of the stomach.

Due to a demand from livestock owners for reliable scientific data concerning condimental stock foods, several of the agricultural experiment stations have conducted investigations to determine the value of condimental stock foods compared to other supplemental feeds. It has been found that many of these so-called "scientifically blended compounds" are merely mechanical mixtures of such simple ingredients as corn and bran with common salt, fenugreek, charcoal, and gentian; or bran and milling offal with charcoal, pepper, gentian, common salt, and numerous weed seeds.

The Iowa Agricultural Experiment Station reports that condimental stock foods reduced the price received for corn from 21 to 33 cents per bushel below the amount received when corn alone was fed to hogs. Every well-informed hog feeder knows that corn and water is not a twentieth century hog ration, therefore corn and condimental stock food must belong in the stone age.

At the Kansas Agricultural Experiment station a ration of 70 parts corn, 25 parts shorts, and 5 parts meat meal was cheaper and more efficient than a ration of corn with any of the condimental stock foods tried. The hogs receiving the stock foods gained from 0.87 to 0.96 of a pound less per head per day, and required from 192 pounds to 268 pounds more feed per

(Continued on page 96)

FEEDING HENS

(Continued from page 71)

venting this trouble is to provide direct sunshine. As the sunlight which has passed through glass has lost much of its value, it is important that a good portion of the front of the laying house be kept open when the sun is shining.

While it is known that some green feeds contain some vitamin D and that cod liver oil contains a considerable amount of the substance, sufficient work has not been done to warrant the substitution of these substances for direct sunlight. The light produced from the ordinary electric light bulb does not aid in the proper utilization of minerals and therefore will not take the place of direct sunlight. This does not mean that it is not valuable in a poultry house for it can be used to lengthen the day so the hen will eat more feed. If the feed is adequate, this means that she will produce more eggs.

An electric lamp is now being developed by a company working in cooperation with Dr. J. S. Hughes, specialist in animal nutrition of the Department of Chemistry of the Agricultural Experiment Station, which will provide the kind of light which aids in mineral metabolism. While such a lamp may not find much use in sunny Kansas, it ought to be of great value to poultrymen in states not favored with so much sunshine.

SUMMARY AND APPLICATION

In selecting rations care should be taken that all the essential nutrients are provided in proper proportions.

1. Carbohydrates.—The carbohydrates may be provided by any of the grains.

2. Protein.—Grains will not supply an adequate amount of protein. They must be supplemented by protein concentrates such as meat scrap, tankage, milk, cottonseed meal, oilmeal, gluten feed, soybean meal, etc.

3. Fat.—Under ordinary conditions, the amount of fat in the ration need not be considered.

4. Minerals.—The grains and their products which form the basis of poultry feeds are deficient in common salt, phosphorus, and calcium. Tankage and meat scrap contain a fairly large amount of these minerals so that, if one of them has been included in the ration to provide the protein, it will also provide sufficient salt and phosphorus, but not enough calcium for laying hens. This calcium can best be provided in the form of oyster shell or crushed high-grade limestone. Vegetable protein supplements do not contain a sufficient amount of any of these minerals, so if they are used, salt and phosphorus will have to be added in addition to calcium. The phosphorus can be added in the form of some bone product or rock phosphate.

5. Vitamins.—Vitamin A can best be introduced by the use of yellow corn, green leaves, or good-quality alfalfa hay. Cod liver oil may be used if others are not available. The outer covering of grains contains an abundance of vitamin B. Vitamin C is not essential in poultry feeds. Vitamin D is found to some extent in certain green leaves and in cod liver oil. Direct sunshine, however, will take the place of vitamin D.

GROWING CUCURBITS

(Continued from page 75)

tant method of dissemination of the organism causing anthracnose. A suitable straw mulch will largely prevent dissemination of spores by these methods, since infections of the cucurbit host must take place on the leaf, stem, petiole, or fruit. Those lesions which occur on the stem seldom sporulate, thus practically eliminating secondary infection from this source. In addition the mulch provides a source of organic matter valuable to the succeeding crops.

A very common source of infection and one of the most destructive ones is the infection of the fruit through the portion resting on the ground by spores carried by surface water. Organisms causing various rots are practically always present and infection often takes place through the anthracnose lesions, consequently, the cucurbit soon becomes unfit for use. When the mulch is used the surface water film is inches below the fruit and vine thus materially lessening infection.

Undiseased fruits of the cucurbits frequently exhibit a light colored portion where the fruit touches the soil in unmulched fields. This area very soon becomes soft, in fact the rind is usually very much weaker at this spot. This affects, to no small extent, the shipping and keeping qualities of the fruit. Mulched fruits exhibit little or no such characteristics, cantaloupes, for instance, being nearly as heavily netted and fully as firm on the lower surface as the top. Cucumbers when mulched seem to make larger, straighter, and plumper fruits than when not so treated.

Last but by no means least of the advantages of the mulch is the cleaner, brighter fruits obtained and the better condition under foot when gathering. This is particularly valuable in rainy weather.

The mulch should be applied when the vines first begin to run. It should be four to six inches thick when applied. In plots of much size the best method of application is to drive through the field directly over a row, pushing the straw off on each side in windrows which lie between the rows. The straw is later evenly scattered to the desired depth with pitchforks. Perhaps in some localities wind might be a disturbing factor in the use of such a mulch, especially while the straw is still loose, but the writer has not experienced this difficulty.

When tried with cantaloupes in a certain year, and including a spray schedule, this method yielded a clear profit of $79 per acre, producing a fruit larger, more firm, and of far better quality than those grown on the check plot which was unmulched. By the arrangement of the plots the effects of mulching and spraying, mulching alone, spraying alone, and neither mulching nor spraying were observed, and results showed that mulching was the most important factor in this particular case and under the existing conditions for that year. [1]

Spraying consisted of the application at 10- to 20-day intervals of Bordeaux mixture, 3-4-50, plus Black Leaf 40, 1 to 800, applied with an angle spray in order that the under surface of the leaves might be reached, since aphis are located there and the majority of leaf infections by anthracnose take place on the lower surface. A force in combating a severe attack of aphis the mulch would probably be of little avail beyond facilitating spraying operations.

If there is an old strawpile rotting somewhere on the farm and you have just about given up trying to raise a crop of good cantaloupes, or watermelons, or some fine cucumbers, try once more, and if there is any straw left when the cucurbits are mulched, put it around the tomatoes, peppers, or other vegetables. The results will often be surprising and entirely pleasing.

1 These tests were carried on near Bonner Springs on the farm of the writer's father.

EARLY METHODS OF MILLING

(Continued from page 79)

for each household was regarded as a most important possession, and it was unlawful for a person to accept millstones as collateral for a loan as it was considered a necessity of life. The early bakers probably did much of their own grinding or secured flour from the prison mills.

The change from the saddle stone to the revolving quern was brought about by the desire, not to produce a better quality of flour, but to economize power. The earliest revolving mill seems to have been little more than a development of the saddle stone, with the lower stone hollowed in such a way as to resemble a cup, while the upper stone was more

The CASE Engineering Code

The Secret of Case Efficiency

CASE field reports cover fully the cause and remedy of every interruption in the satisfactory operation of Case machines. Case engineers have reduced the handling of these reports to a science.

Month by month they chart the comparative efficiency and durability of the parts and units affected. Month by month the charted information is checked against the record of repair parts sold. From this record an endurance factor is established by the simple formula:

$$\frac{\text{Number parts used}}{\text{Number machines}} = \text{Endurance factor for each part.}$$

Every effort is made to reduce this factor to the lowest possible point. The whole process of refinement is continuous and now almost automatic in its operation. No weakness of any kind can escape attention.

This is why the development of Case machines can be, and has been, carried to a point far in advance of the ordinary. This is the secret of the efficiency and dependability of every Case machine.

J.I. Case Threshing Machine Co.

(Established 1842)

Dept. C75 Racine, Wisconsin

Case Farm Tractors, Steel Threshers, Silo Fillers, Baling Presses, Steam Engines, Road Machinery, Grand Detour Plows and Disk Harrows.

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

globular in shape and large enough to fill the cuplike hollow. It soon became apparent that the size of the mill could be greatly increased because of its revolving nature, and thereafter the mechanical growth of flour milling was almost exclusively concerned with the application of different forms of power for turning the mill.

As long as flour milling remained essentially a matter of hand labor, its control necessarily was limited to the state with its unfailing supply of criminals, or to private individuals rich enough to maintain a large force of slaves. Milling as a business was dependent upon sufficient economy of operation, principally the reduction of labor costs. This latter was made possible by the development of the water wheel. Very likely the Greek water wheel was horizontal and connected directly with the upper millstone by a shaft. With this arrangement the water wheel had a very low efficiency except with rapid streams. The invention of a really efficient water driven mill was perfected by the Romans, but because of the Roman monopoly of the grain and flour trade and of the further fact that slave and criminal labor remained abundant, the Romans did not develop the flour-milling industry for nearly four hundred years.

During the Middle Ages there was industrial and mechanical stagnation. For ten centuries hardly a miller in Europe owned his own mill but all land and property belonged to feudal lords and barons. From a mechanical standpoint there was practically no improvement in flour milling from the late Roman days to the eighteenth century save for the introduction of the windmill which furnished a new source of power.

It is a long way from these crude methods of milling to some of the large modern up-to-date flour mills making from one to six or eight thousand barrels of flour in 24 hours. The annual per capita consumption of flour is a little over one barrel. This means that a mill whose capacity is rated at one thousand barrels, makes as much flour in 24 hours as is consumed by over 900 people in a year. In a modern up-to-date mill the flour production is from 20 to 38 barrels for each 8 hours of man labor. That is with modern equipment one man will make in eight hours as much flour as 20 to 30 people will eat in a year. This means that the actual labor costs of making flour under modern conditions is insignificant. The labor cost of making all the flour one person consumes in a year is about 15 cents, and the cost of the use of the machinery is an additional 35 cents. Compare this with ancient methods when the grinding of wheat consumed such a large amount of human labor. The flour made by these ancient methods would today be acceptable only as chicken or hog feed. The flour bought by the most humble housewife of today is far superior to the finest flour made for kings in ancient times, but this is less remarkable than the fact that the slave or prison miller of ancient times has been transformed to the efficient man he is today.

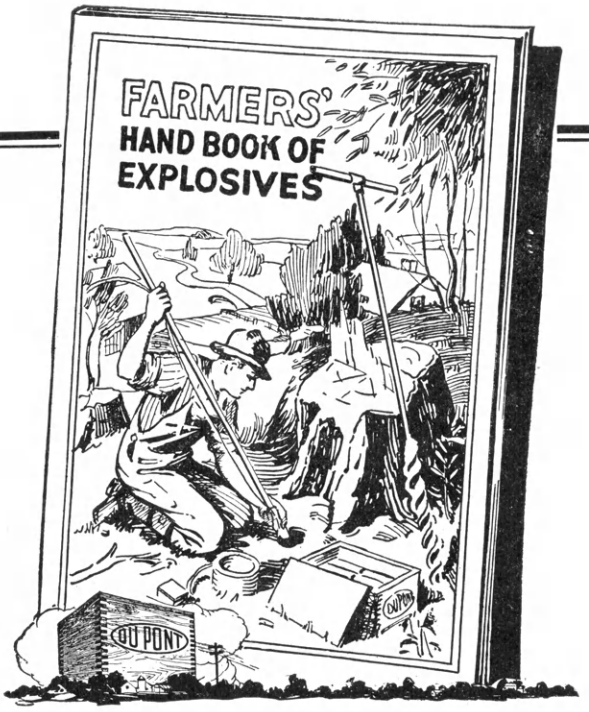
FARM WATER SUPPLY SYSTEM

(Continued from page 81)

does not operate automatically, but must be started and stopped by an operator. In such cases the pressure in the storage tank must be watched and some one must give attention to it as often as necessary to maintain the pressure. The pump shown must have a good solid foundation, preferably of concrete, which serves also as a foundation for the engine. The pump and engine should be protected by a shed or building. The pipe line to the tank is attached below the pump, which places it below the frost line.

Of the two hydro-pneumatic systems described, the one which is installed on the Agronomy Farm has the advantage of being altogether automatically operated and of requiring practically no attention, except to oil it about once in six months. The other system has the advantage of lower first cost but it requires the time and attention of someone for its operation. Both systems are in actual use on farms and both have given entire satisfaction.

The Agronomy Farm gets electrical power from a high voltage line which comes from the college power plant. An electric motor may be had which will run on the electricity produced for farm use by a small electric lighting plant. This makes it possible for a farmer to have all the advantages of the automatic electric pump system even though he may not be near a high-voltage electric power line.



Send for free book on farm explosives

EVEN if you had to pay for the "Farmers' Handbook of Explosives"—which you don't—you would profit by sending for a copy.

The handbook is a textbook on the use of explosives on the farm. It is authentic, comprehensive, profusely illustrated and it gives you complete information on the selection and application of dynamite to land-clearing, ditching, drainage, planting and cultivating trees, subsoiling, and for other purposes on the farm.

Dynamite does all these things easier, quicker, better and cheaper. It is the *modern* form of power for certain farm work. You are vitally interested in efficient and economical farming methods. The Farmers' Handbook is packed full of interesting and instructive facts that will enable you to use explosives efficiently and safely.

Don't fail to send for your free copy today. Just ask for the "Farmers' Handbook" and, as a favor to us, please mention this publication. You'll get your copy by return mail.

E. I. DU PONT DE NEMOURS & CO., Inc.

Arcade Bldg., St. Louis, Mo., Joplin, Mo.

DU PONT

TYPE AND PRODUCTION

(Continued from page 72)

pearance. Mating production to production, without regarding type, will intensify any weakness in constitution or capacity and result in animals which are unable to stand up under the strain of heavy milk production. But if the breeder will only select animals with both production and type, there is no reason why he will not be able to produce cows with both these qualities.

At present there are many examples of such a combination. Sociable Sybil, seventeen times grand champion, including the National Dairy Show, has recently finished a record of 855.16 pounds of fat. Langwater Levity is one of the Guernsey class leaders and also grand champion at the 1923 National. She is also the dam of Shuttlewick Levity who recently sold for $22,100, the record price for a cow of the Guernsey breed. Only a few months ago Lone Pine Molly Cowan sold for $15,100. As a three-year-old she was first at the National Dairy Show and she has a junior two-year record of 703.81 pounds of fat. The get of Phiebe Laura Ollie Homestead King has for three years won first at the National and he himself is a bull of excellent type. At present he has 53 A. R. O. daughters and more are continually being added. All have very good records and two have gone over the 1,000-pound mark. One daughter, May Walker Ollie Homestead, has a record of 31,610.6 pounds of milk and 1,218 pounds of fat. She and two of her progeny were first at this year's National in the Advanced Registry class.

These are only a few examples of the combination of type and production. In fact if one will analyze the matter he will find a high correlation between the animal with type and the high producer. For two years Prof. H. H. Kildee placed the advanced registry classes of Ayrshires in the National Dairy Show and later on investigation found that he had lined them up almost exactly in accordance with their production. A little study also brings out the fact that the breeder who is combining type with production is the one who is receiving the high prices for his stock. Production without type no longer brings much of a price.

Type as it is fixed today may not be perfect, but it is safe to say that it is not far off and everything is being done to improve our present standards. The Holstein breeders have their true type models and at present the Guernsey, Jersey, and Ayrshire breeders are each trying to decide upon some definite type. Sophie the 19th of the Hood Farm, a great producer for many years, was recently dedicated to science and measurement of all her parts both external and internal made by the United States Department of Agriculture. It is hoped that by continuing such work more definite ideas can be obtained as to which form is best suited for production.

All this is very promising and it certainly shows that breeders are realizing that it is necessary to breed for both type and production in their herds, breeding type not only because it adds symmetry and beauty, but because it is also necessary in securing maximum production.

INKA HIJLAARD WALKER

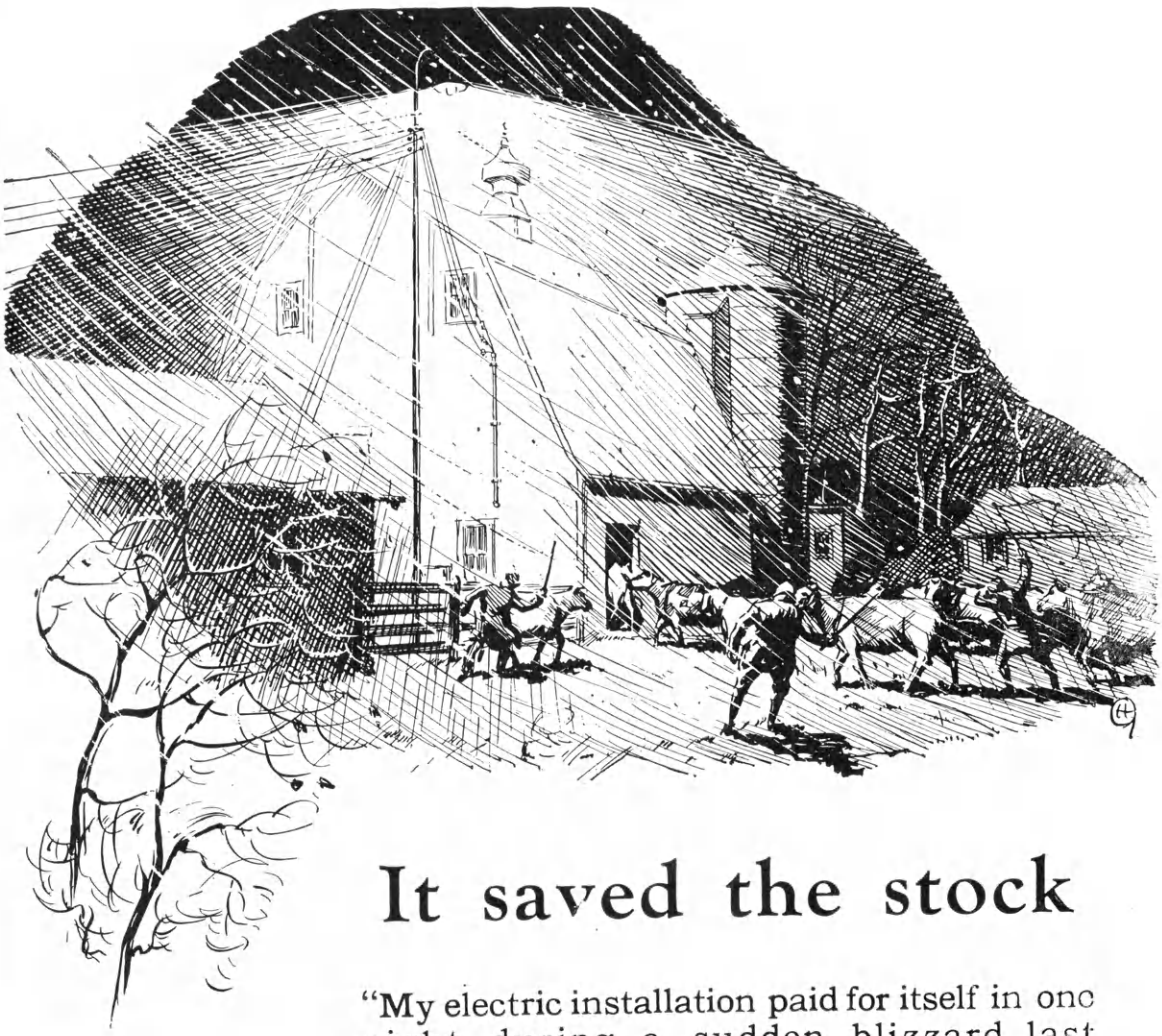
(Continued from page 76)

into Kansas. The sire of Korndyke Butterboy, Jr., was Korndyke Butterboy, a son of DeKol 2nd's Butterboy 3d, with 119 A. R. O. daughters and 95 proved sons, one of the best sons of DeKol 2nd. DeKol 2nd is generally recognized as one of the greatest foundation cows of the Holstein breed.

Inka has three full sisters which have made some very creditable records. One sister, Inka Segis Copia Johanna, produced 13,709.3 pounds of milk and 490 pounds of fat in 305 days. Another sister, Inka Hijlaard Copia, produced 355.9 pounds of milk and 14 pounds of fat in 7 days. Another sister, Inka Johanna Cornucopia, has not finished her record but has produced 10,593.7 pounds of milk and 352.1 pounds of fat in 202 days. Inka is the dam of a bull which heads a purebred Holstein herd at Horton, Kan. She is also the dam of four heifers including one which won second prize at the 1920 National Dairy Show in Chicago.

Is it any wonder that this Holstein cow is rather proudly exhibited in the college dairy barn and in judging classes at K. S. A. C.?

Alfred Paden, '23, is teacher of vocational agriculture in the Argonia Rural High School, Argonia, Kan.



It saved the stock

"My electric installation paid for itself in one night during a sudden blizzard last winter," says an Ellis County, Kansas, farmer. "The big light on a high pole near the barn helped us to drive all the cows and calves to shelter. Without it many would have been frozen to death."

Electric power on a stock farm will economically pump water, cut ensilage, grind feed and do other jobs, as well as light the home and the farm buildings.

Whether it is a big light in the barnyard or a little one in the automobile headlight, a MAZDA lamp made by the General Electric Company has been designed for just that use.

GENERAL ELECTRIC

57-1GC

H. O. 179
A. O. 107 P 1
Req. 43336-D
1-22-25

BROADCASTING

(Continued from page 69)

to set the limits of its future development as a portion of the extension agencies of the college.

It does seem possible, however, to name certain agricultural aims and functions of the college which cannot be extended through the air. Radio can never replace the personal contact with the farmers of the state which is an important and necessary part of the extension service rendered them. Viewpoint would be difficult to exchange by radio. Neither will radio ever be able to perform research functions; it cannot discover new facts or new relationships between facts already known. Nor can radio ever train leaders in agriculture. This will always remain the greatest work of the agricultural colleges, for on it depends all future progress in scientific agriculture. If the stream of trained men well-grounded in the agricultural knowledge of the ages and inspired with a passion for research were to dry up for even a few years, the material on which both extension and resident instruction subsist would fail. Resident instruction and personal experience with the modes and tools of research is the only method yet discovered by which such leaders can be produced in adequate numbers.

So Radio Station KSAC is welcomed by the college and the people of the state as a new phase of extension service. It has already a place peculiarly its own and only the future can show what its possibilities are. This much is certain: "It will," in the words of ex-Governor Davis, "enable the people to know more rapidly the work the college is doing and will also spread the knowledge of this service into more communities of the state."

CATTLE IN SOUTH AFRICA

(Continued from page 87)

Show witnessed, in 1924, at Milner Park, one of the world's largest attendance records, surpassing that of the Highland Agricultural Show and taking rank with the great livestock shows of America and Argentine. Over 100,000 people visited the show in one day which means that one person in every fifteen of the European population of South Africa is more or less interested in the farming industry of this country. No other nation on the face of the globe can show such a record. If the same proportion of the American people, in comparison with the total population of the United States, were to visit the International Livestock Show in Chicago it would mean an attendance of over ten million visitors.

SUCCESS IN FARMING

(Continued from page 86)

and the Union of South Africa.

The results of these painstaking operations may impress the reader with the tenacious spirit and the well-formulated plans with which successful farmers attack their problems. The long view and perseverance for decades are important factors in a farmer's success.

CONDITION POWDERS

(Continued from page 88)

100 pounds gain, than those receiving no stock food. The Kansas experimenter concludes that in most cases condimental stock foods are worse than worthless.

Results reported from the Wisconsin, New Jersey, Indiana, and Maryland stations agree with the results reported from Kansas and Iowa. All of the stations recommend, that the feeder of livestock feed a balanced ration, provide plenty of clean water and good shelter, and consult a graduate veterinarian when his livestock are sick or appear to be unthrifty.

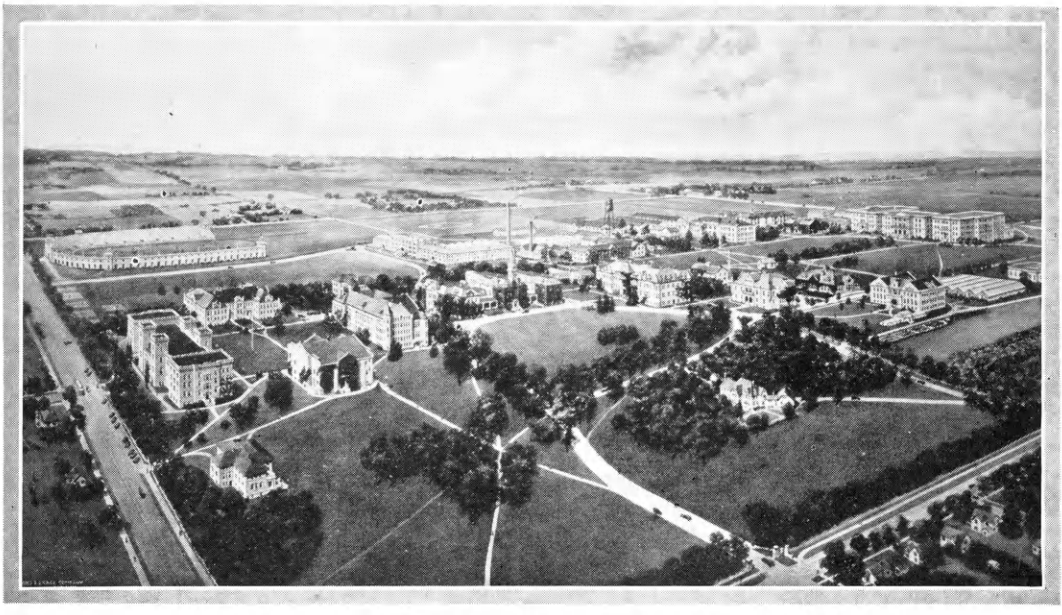
FIFTH ANNUAL AG FAIR

(Continued from page 85)

house of a million thrills, the fortune teller, and other side shows and features too numerous to mention here.

There will be the usual doll racks, ice cream stands, hot dog stands, etc. Farm machinery hall will be fitted up for a lively dance. The educational exhibits, which are always full of interest, are to be enlarged and improved in several ways.

Walter J. Daly, of Tucson, Ariz., is manager of the fair. He and his workers are well organized and are determined to realize their slogan. Every minute the Pike is open will be full of amusement, fun, and education.



AIRPLANE VIEW OF KANSAS STATE AGRICULTURAL COLLEGE

At Kansas State Agricultural College, education for agriculture is accompanied by education for life. It provides not only for basic and special training in the fundamental sciences and in agriculture, but it also provides for association between students of agriculture and students who are preparing to enter other fields of work.

The above illustration shows the agricultural buildings, at the right; the buildings used for basic sciences, veterinary medicine, and engineering, in the center; and those used for home economics, physical education, and music at the left.

The organization, equipment, teaching force, and spirit of K. S. A. C. promote well-balanced education—education which helps the student to learn to earn a good living and to live a satisfactory life.

The college offers agricultural courses ranging in length from one week to four years. The four-year courses are for high school graduates. The others are open to anybody more than 17 years of age. The college trains men for more than 150 agricultural occupations, on the farm and elsewhere, and for good citizenship.

KANSAS STATE AGRICULTURAL COLLEGE

MANHATTAN, KANSAS

"The College that Serves a State"