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THE TURKEY FLOCK ON THE COLLEGE POULTRY FARM

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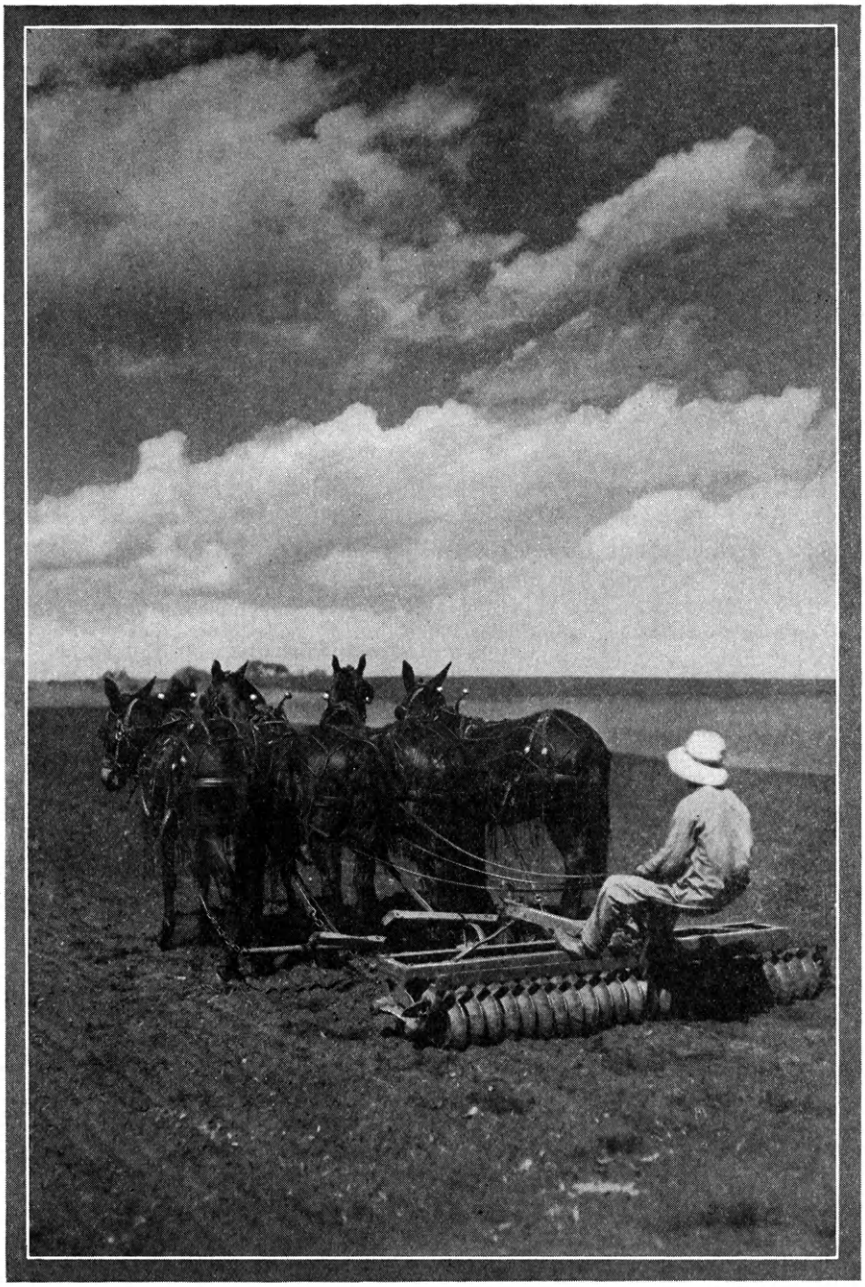


THE CULTIPACKER, A GOOD IMPLEMENT WITH WHICH TO LEVEL AND FIRM THE GROUND FOR SEEDING

The Kansas Agricultural Student

VOL. VII Manhattan, Kansas, October, 1927 No. 1

Mr. Tom Talks Turkey

H. H. Steup

Assistant Professor of Poultry Husbandry

My new breeding tom had just arrived. Released from his shipping crate he spread his tail and ruffled his feathers in a gorgeous bronze display of delight over his freedom. What a magnificent bird he was. Big-boned, wide-backed, long-bodied, he gave all the indications of being able to give to my flock the increased size it needed. It was with much pleasure and interest that I watched him get acquainted and listened to his remarks to my flock of turkey hens.

"Hello, sister," he gobbled at the sleekest hen in the flock, "are you late hatched to be so small?"

"Not so you could notice it, big boy," replied the hen. "I come from a refined family, I do, where big guys like you get very little house. Quit, quit."

"Gobble, gobble," chuckled the tom. "Yeh, I know those refined families. Little runts of 10 and 12 pounds at Thanksgiving time that do not bring in nearly the cash that birds of my size and breeding do. Very often have I heard my owner remark that he could not see why people fooled around with small turkeys when there were so many excellent mammoth varieties that would be more profitable. But don't become mad, sister, I am not holding it against you that you are so small as it is not in any way your fault."

"You big turkeys make me sick," answered the hen. "You eat your owner out of house and home and then brag about your size."

"Out of house and home? Say, don't you know how much we turkeys eat to reach 12 pounds in weight? Well, I heard my owner tell his neighbor one day that the Nebraska Agricultural Experiment Station found that their turkeys ate only 40 pounds of grain and mash and drank 30 pounds of milk apiece to reach this weight of 12 pounds. He said that was so efficient that I have been strutting around about it ever since."

"Well, you haven't so much to strut about, big boy," replied the hen. Then spying a grasshopper flitting down the alfalfa field away she went in hot pursuit.

The big gobbler strutted over to the self feeder and began inspecting it. Another hen was here gulping down mash in large bites and immediately he began to gobble to her.

"Say, sister, what do we get to eat here? What's in this mash anyway?"

"Well, big boy, I'm not so sure myself. It's called a growing mash and is the same the chickens get here. All spring and summer long we were fed the same as the chickens. I know because several times I flew over the fence hoping to get more grasshoppers where the chickens ranged and before coming back would visit their hoppers. Each time I found them having the same grain and mash we get over here."

"Didn't you ever get any cottage cheese?" asked the gobbler in surprise.

"Cottage cheese? What is that? We have never seen it. Our first feed was finely cracked grain and buttermilk to drink. A short time later we began to get this growing mash along with grain. Then one day dried buttermilk appeared in the mash and liquid buttermilk was given no more. After we reached about six pounds in weight the buttermilk disappeared from the mash and it tasted as though more meatscraps had been added. Lately the wheat and oats have disappeared from our scratch grain and now we get nothing but nice yellow corn. I'm getting fat on it, too. Come on, have some of this mash, you will like it."

So the turkey talk was interrupted while Mr. Tom filled up the cavity created by his sojourn in the shipping crate. Finally his

appetite was satisfied and once again his interest turned to his new surroundings so he flew upon the outdoor perch and snuggled down beside another hen.

"Are these all the turkeys your owner has?" he gobbled to his new companion.

"These are all that are left. We had quite a few more a while ago, but blackhead came along and nearly took all of us."

"Blackhead? What is blackhead?"

"You don't mean to tell me you don't know what that is?"

"Yes, I do not know. We have never had it where I come from."

"Well, for the land's sake. You surely have been lucky. This spring we started off fine here. We never lost a one of us up until we were about four pounds. I had so many nice friends in the flock, too. But one day the owner let us out of doors and we went over the fence with the chickens and the Leghorns flew over to visit us. First thing you know my girl friend, Tookle, began to feel ill. She gradually became thinner and thinner and seemed to lose all interest in life. Then one day she staggered around and fell down and she never got up. Just laid there and kicked and struggled at times and next morning she was stretched out cold and stiff.

"The owner came in and found her and whistled sort of surprised like. That night he caught every one of us and clipped our wings and our flying days were over for a while until the new feathers came. But the Leghorns still kept flying over to visit us and one by one my other friends went the same way as poor Tookle until there were left only those you see of us."

"You say none of you died until you weighed four pounds and were let out doors? Is that the first time you were ever out?" asked the gobbler.

"Yes, we were raised inside entirely up to that time and never knew what the outside was like. We used to hear our owner proudly tell his friends that that was the way to beat blackhead. Just keep your young poults inside away from trouble. He used to give us cod-liver oil in our mash those days. Said it was bottled sunshine and would keep leg weakness away."

"Gobble, gobble, gobble," shouted Tom in excitement. "I begin to see the light of day. You know our owner always loses a lot of us while we are young. He lets us out from the very start and some poults are foolish like and get chilled or wet or into other troubles that are very serious. They pay for their foolishness by stretching out and being carried off. Gee, that inside raising must be nice. No cold winds to dodge, no rain to avoid, no puddles to keep out of, no wet grass—just comfort and lots of it."

"But I thought you said you did not know what blackhead was" chided the hen.

"I don't, sister, I don't. Those poults died from undue exposure to discomfortable conditions—not from blackhead. I'll bet you those flighty Leghorns were the cause of your blackhead. I know my former owner used to take us miles from any chickens. You see he has a large ranch and plenty of room. Come to think of it, I heard him say one day that chickens do carry blackhead and that is why he took his turkeys far away from them and to new ground each year.

"But, sister, wouldn't it be fine to be raised inside as you have been and then when turned out to have a clean range away from chickens? Say, I bet none of us turkeys could get blackhead then and there would be no loss of young poults from exposure."

"Yes," agreed the hen, "but many places do not have ranges free from chickens. I heard my owner say so. He told a man the other night that next year his poults would never be turned outside until they averaged nine or ten pounds, and even then he was going to use only a small pen and have that covered with a layer of river sand to lift them away from all danger."

"Well," answered Mr. Tom, "that will work fine if he can keep the Leghorns out. There is one of them now. I'll get even for the blackhead they gave your friends."

With that the new gobbler jumped down from the perch and after the Leghorn he went. I left him all a-strut and went to the house thinking what fine results could be obtained by confinement brooding and sanded pens.

J. E. Norton, '25, is assistant agronomist in the Montana Agricultural Experimental Station, Bozeman.

The Experimental Fields of Southeastern Kansas

Ralph O. Lewis, '29

There has been a great deal of agitation both political and agricultural for several years for the establishment of an agricultural experiment station in southeastern Kansas. This obstinate corner of the state is in the denser populated part of Kansas and includes the section of heaviest rainfall. The soils are not of a single type but are of many kinds even in a small area. There is also much variation in rainfall.

The closest agricultural experiment station is at Manhattan, which is on a very different soil and has different climatic conditions. Thus it seemed to many that a substation was needed in southeastern Kansas, but others, including the administrators of the Kansas Agricultural Experiment Station, opposed the extension of the substation or branch station system. They also pointed out that no one place in southeastern Kansas could be selected for a substation that would be typical in soils and climate of the entire region. As a result of the discussion, partly as a compromise, but in the main as a constructive piece of legislation, provision was made for establishing experimental fields at various places in southeastern Kansas.

The State Legislature of 1922 passed a bill providing for an annual appropriation for the southeastern Kansas experimental fields. Five were selected by Dean L. E. Call and Prof. R. I. Throckmorton of K. S. A. C., each one on one of the major upland soil series of the region and scattered over the general territory. The following soil series were selected: Cherokee, Oswego, Summit, Crawford, and Bates—later reclassified as Gerald. These fields are in the following counties: Cherokee, Allen, Bourbon, Wilson, and Neosho.

The fields range in size from 13 to 26 acres. Each is leased from the owner and worked in cooperation with him. The work is directed by the Department of Agronomy of K. S. A. C. Mr. I. K. Landon, a graduate of K. S. A. C., has been in direct charge of the fields since they were established. He does what work he can and directs the rest which is done by the owners of the fields.

The experiments consist chiefly of fertility and variety tests. Each field has five or six series of 12 one-tenth acre fertility plats. Each plat with the exception of the checks has a different fertilizer treatment. The entire series is planted to the same crop each year and a regular rotation is followed. The rotation includes a legume and varies at the different fields to meet local adaptations and demands. The Cherokee soil is adapted to wheat and so more wheat is added to the rotation. The Oswego series is better adapted to corn so more of this crop is grown there. The legume varies also with soil and climate. Red clover, sweet clover, and soy beans are used. Alfalfa is grown on every field and kept as long as the stand is profitable. The fertilizers, acid phosphate, rock phosphate, a complete fertilizer containing nitrogen, phosphorus, and potash, and manure are used.

In the variety tests the standard crops are used, testing local varieties against introduced varieties and hybrids. The following crops are used at one or all of the fields: Wheat, oats, corn, sorghums, soy beans, flax, cotton, cowpeas, and alfalfa.

A wheat nursery is maintained at the Cherokee field under the direction of Professor Parker of the Department of Agronomy. The farmers of the region are interested in the work and are using the knowledge obtained in their own work. This plan of experimental work is not new but this is the first time it has been tried in Kansas. It is filling adequately the needs of this section of the state.

Another one of the Aggie's farmers is J. B. Angle, '19, junior member of the firm of N. H. Angle & Son, breeders of purebred Durocs, Courtland. J. B., "Fat," an Alpha Zeta man, now has full charge of the herd which he and his father have built up. They are located in the midst of a real corn and alfalfa community.

Some Kansas "Combine" Problems

E. D. Gordon
Instructor in Agricultural Engineering

There are something over eleven thousand combines on the farms of Kansas today; 8,274 were in use in 1926. This extended use of the combined harvester-thresher has shown itself throughout the Great Plains region, and its increasing popularity is making itself felt in the corn belt. The machines used for many years on the Pacific coast were not considered practical by farmers in the Great Plains. The older types were large machines, cutting a swath 20 to 24 feet, and were drawn by large tractors or teams of 20 to 36 horses. Such a machine required a crew of five men and the harvesting-threshing season extended over a long period.

The development of the small prairie type of harvester-thresher having a narrower cut, operated by a small crew and drawn by a tractor has led to its favorable reception by farmers in the Kansas wheat belt. Some of the recent models have a width of cut of 8 to 10 feet, deriving direct power drive from the tractor itself.

In this discussion some of the advantages and disadvantages of this method of harvesting grain will be considered. Economy in time, labor, and in the product harvested are affected to a notable extent. In a study made of the combine in the Great Plains region in 1926, the following facts concerning man hours involved in harvesting wheat by different methods were brought out: The total labor for harvesting and threshing would be reduced from approximately 4.6 man hours per acre for cutting with a binder and threshing with a stationary thresher, or 3.8 man hours for cutting with a header and threshing with a stationary thresher, to about 0.75 man hours per acre where the work is done with the combine, a saving of nearly 84 per cent over the binder and 80 per cent over the header. This does not include the benefits accruing to the women on the farm who formerly could not escape the task of cooking for crews necessarily large.

The efficiency of combine operation is generally conceded to be decidedly better than other types of harvesting operations even under adverse conditions. When threshing other crops the combine does not perform so well. This may be due to lack of experience on the part of the operator or reluctance on the part of the manufacturer in adapting the machine for anything but wheat. A study of losses occurring under various methods of harvesting wheat showed that the average loss from harvesting winter wheat with combines was 2.6 per cent, with headers 3.3 per cent, and with binders 6.1 per cent.

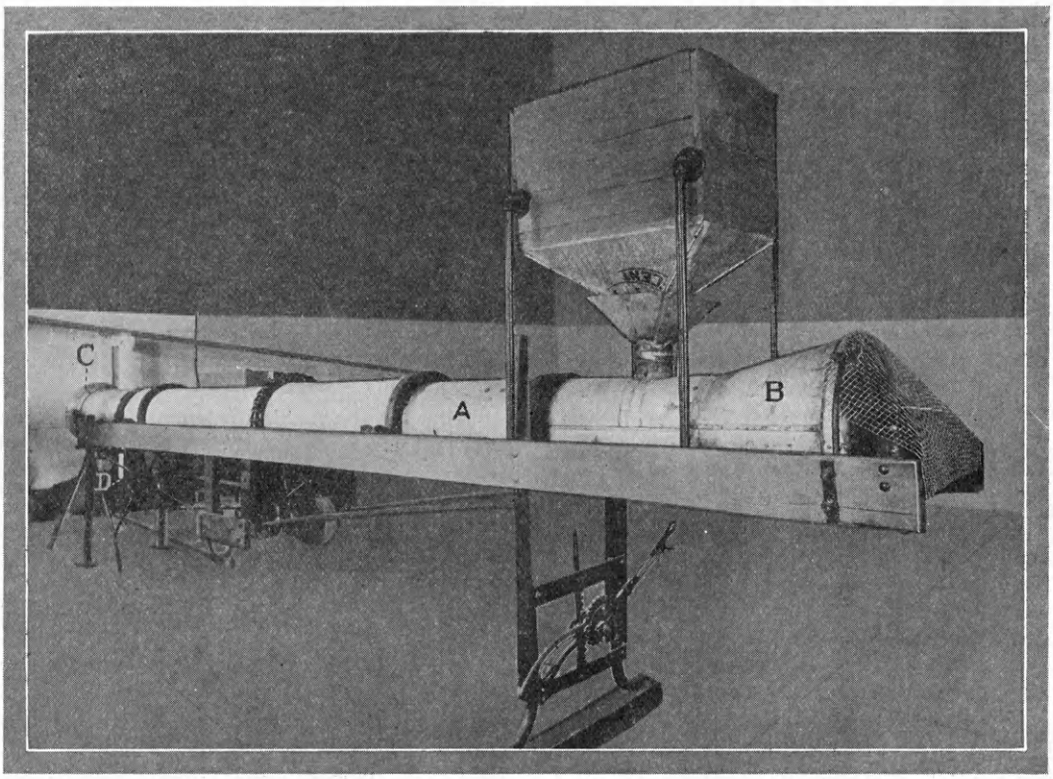
During wet seasons it is difficult to harvest by any method. It frequently happens, however, and was characteristic of this past season in Kansas, that the farmers in most instances with combines have their harvesting and threshing done when the rains come, while many farms with shocked grain suffer severe losses with the shocks covered with growing wheat.

In the more humid areas in which the use of the combine is steadily being pushed, the problem of safely storing combine-harvested grain is a persistent one. It may be further concluded that an unfavorable season will bring farmers and elevator men face to face with this problem. It is also probable that these difficulties will be increased by anxiety on the part of the farmer to get into his field too soon, especially when changing over from the binder method. A delay of two or three days, depending, of course, upon atmospheric conditions, may be necessary to bring the moisture content down to a safe figure of 12 or 13 per cent for combine wheat, whereas a 30 per cent moisture content can be safely handled with the binder method.

However, there are sections where hazards of hail and windstorms are augmented by delays. Lodging of ripe grain is a serious problem. These factors, when correlated with likelihood of a wet season, are conducive to bringing about the problem of damp grain and its attendant evils. The elevators and mills are coming to realize that they must find some inexpensive method of handling combine wheat to prevent heating during wet seasons. Some drying method must be made available at the mill or elevator, and in certain favored localities the farmer himself

may be equipped with a grain drier. At any rate, wherever the drying process takes place, the operation must be cheap and effective.

In an attempt to arrive at some satisfactory method for drying wheat, several agricultural experiment stations throughout the country have become engaged in this work. At the Kansas station two types of driers were designed and built. One is a continuous rotary type and the second is of the recirculating type, a "batch" type.



A CONTINUOUS ROTARY WHEAT DRIER

The wheat is augured into the coolest end of the rotating tube (A). The exhauster fan (B) draws heated air from the resistance coils (C), thus bringing the wheat in contact with the driest air as it nears the outlet (D).

By continuity of operation is meant that a continuous stream of wheat passes through the drier. By referring to the accompanying illustration the arrangement may be explained as follows: The wheat is augured from the hopper outlet into the rotating tube (A). In its progress to the opposite end of the tube the grain is lifted and dropped by a series of six vanes helically arranged along the interior wall of the tube. An exhauster fan (B) at one end draws in air heated by resistance coils (C) at the opposite end so that the air flow brings the driest air in contact with the grain as it flows to the outlet. The moist grain comes in contact with the comparatively cool air in this counter flow arrangement.

The machine was used in a cooperative experiment by the Departments of Milling Industry and Agricultural Engineering. The wheat used represented about four stages of maturity and was typical of the varying conditions under which combine wheat may sometimes be harvested; that is, certain sections of the field may be dead ripe and suitable for combining while other sections may

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The Factors That Influence the Pop-ability of Pop Corn

Philip Isaak, '28

One of the properties of the hard flint corns is their ability to pop when heated, but this characteristic is most marked in the small grains of the pop corn. This corn differs from other flinty varieties of corn in that it has a larger proportion of corneous endosperm. The plant is much smaller than ordinary field corn, with proportionally smaller ears and kernels. The exact origin of pop corn is not known, but all indications favor the opinion that it was first grown by the Indians.

There are many theories advanced as to the cause of popping in corn. Some attribute it to a small volume of air in the floury portion of the endosperm; others ascribe it to the vaporization of a volatile oil. These theories, however, have been discarded, and at present the phenomenon is thought to be influenced by these three factors: (1) Moisture content of the pop corn; (2) length of time taken in the popping process; and (3) proportion of vitreous starch.

If a sample of pop corn that has just been harvested is heated, it will not pop properly. The same thing happens when a sample is heated that has been stored in a dry place for a long period. In the first case the inability of the kernels to pop is due to an excess of moisture, in the second instance it is due to lack of moisture.

The optimum moisture content for good popping is approximately 13 per cent. In northern latitudes, where the growing season is short the pop corn must be cured until about Christmas, in order to pop well. If it is desired earlier, it should be dried artificially. Kansas, with a long growing season, is more fortunate and one can use the pop corn almost immediately after it has been shocked. If the corn is overdried, as is often the case with pop corn that is bought in grocery stores, it should be moistened before popping. This is done by putting the corn in a can, sprinkling water over it and then closing the container tightly. The corn is thus left for two or three days, and the moisture will be absorbed by the kernels. With this precaution, dry corn that has been popping poorly often gives large, flaky kernels, and no indication of toughness when first popped.

The length of time taken to pop the corn is considered by some authorities even more important than the moisture content. When the kernels are heated the moisture in the starch grains is changed to steam. Because of the flinty endosperm, the steam is confined within the grain. The seed coat of the kernel is only a weak structure and does not play any part in retaining the steam in the kernel. When the pressure within the kernel becomes great enough so that the flinty structure is broken, the sudden release of the pressure turns the grain inside out.

To have the maximum amount of popping the heat must not be applied too rapidly, as it tends to prevent the hydrolysis of the starch and later the formation of steam, which is the essential part in the popping process. Slow application of heat, on the other hand will result in the driving off of moisture and give as poor result as too rapid heating.

With the corn in the proper condition in respect to moisture content, about two and a half minutes is usually considered the most favorable length of time for popping. This, of course, depends upon the degree of heat, but since the distance between the source of heat and the bottom of the popper may be regulated, the proper time can be found and a good yield of fluffy kernels will result.

The third factor, namely, the proportion of hard starch, depends mostly on the variety of pop corn. When a microscopic study of the endosperm is made, it can be seen that each cell consists of numerous starch grains embedded in a mass of dissociated colloidal material—the dessicated protaplasm of the cell. In this colloidal material is found the seat of the protein of the endosperm, and the

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The Banker and the Cattle Industry

F. W. ImMasche, '29

The rural banker is connected with the cattle industry in several ways. He is considered to be a reliable adviser on financial matters. His position and occupation is such that he is always in contact with the market and with trade possibilities. The banker then is often called upon to give advice because he is usually the one in a community that can most nearly give an unbiased opinion. In addition to this connection with the cattleman the banker more often has credit relationship with him. Farmers may not have enough money to buy cattle but their facilities may be such as to warrant their purchase on credit. In such cases the banker comes to the rescue. The welfare and the prosperity of a community depends to a very large extent on the financial aid given and how it is given.

The Kansas banker is rapidly learning the seriousness and responsibility of his position in the community. He is beginning to seek new ways of helping the farmer and the stockman instead of standing back and waiting for them to come to him for aid.

The common method of handling cattle in the Flint Hill district of Kansas is to purchase them in the spring in western Kansas, Texas, or Oklahoma. They are then shipped during the latter part of April to leased or owned pastures in the Flint hills for grazing, being moved on to market from about the middle of July until the middle of October, depending upon the market. If the market is poor and the stockman has surplus feed on hand, the cattle may be fed a short time before they are marketed. If feeding is started early it is done while the cattle are still on grass. If it is continued after the grass season the cattle are usually taken to a dry feed lot. This method affords a means for marketing surplus feed on the farm.

The banker's big question each spring is whether he should advise the stockman to buy cattle for grazing that year. It is then that the banker is called upon to give advice. The chief factors that influence the profit or loss on grazing cattle are: (1) The general movement of prices from March through November, whether upward or downward. This factor is the most important. (2) The margin received of which the price movement is the determinant. (3) The cost of carrying the cattle through the season including cost of grazing, equipment, labor, and other charges, and interest on capital invested. (4) The length of the grazing season. This factor has a marked influence on returns, especially with aged cattle. It has been found that yearlings are less speculative than aged cattle. As a rule aged cattle are not so profitable as yearlings and, furthermore, less capital is required for stocking pastures with young cattle.

In making the purchase the buyer must estimate the price which must be paid for the cattle and yet handle them profitably under conditions that may exist at a future time. It is this phase of the cattle industry that is of vital interest to the banker. The banker is called upon to loan the buyer money to make the purchase. If the estimate is correct the transaction will become profitable to both the banker and the cattleman. If the deal is made unwisely, both the banker and the stockman will suffer.

In making such an estimate three things are involved: (1) the amount of gain, (2) the cost of gain, and (3) the margin between the purchase price and the probable sale price per hundredweight. With data on estimated carrying charges, one can readily compute the price which must be obtained for a steer in order to break even when it is sold.

Example of Banker's Estimate

Initial weight of two-year-old steer	980 pounds
Estimated gain	200 pounds
Out weight	1,180 pounds
Purchase price per hundredweight	$ 9.00
Man labor	2.5 hours
Horse labor	3.0 hours
Length of time on grass	120 days
Initial cost	$88.20
Carrying cost:	
Grass	$ 8.00
Feed	5.00
Man labor	.90
Horse labor	.30
Interest at 8 per cent	2.35
Death loss	.25
Other costs—insurance, etc.	1.00

Total carrying cost	$17.80	
Shipping cost to local station	2.10	$ 19.90
Total cost delivered at shipping point		$108.10
Market costs		4.50
Total cost at terminal market		$112.60
Price per hundredweight necessary to break even		9.55
Necessary margin		.55

The example shows that a lot of two-year-old western Kansas steers are estimated to weigh 980 pounds per head and are purchased at $9 per hundredweight, or a total cost of $88.20 per head. If each steer gains 200 pounds during the 120 days he is on grass he will weight 1,180 pounds when he is marketed. The carrying cost is estimated as follows: Grass, $8; man labor, $0.35; horse work, $0.10; feed on grass for 30 days, $5; interest, $2.35; death loss, $0.25; other costs, $1, making the total carrying cost $17.80 per head. The transportation charges on the steer from western Kansas to the local pasture were $2.10. This carrying cost added to the initial cost makes the steer cost $108.10 at the local shipping point. The marketing cost is estimated to be $4.50 per head. Thus to break even the steer must net $112.60 at the terminal market. Since the steer will weigh 1,180 pounds there he will have to bring $9.55 per hundredweight in order to break even. This selling price is $0.55 greater than the initial purchase price. In this case a plus margin is necessary.

These figures show how the banker and the cattleman can estimate the probable outcome of a cattle investment. The current market prices can be substituted and the weights estimated. In handling large herds the carrying charge is less because the man and the horse labor is less. In addition to the estimate shown to be the outcome, the farmer must consider that feeding cattle affords a market for his farm products. Also the farmer can maintain the fertility of the soil by cattle feeding.

The rural bank cannot make a large enough loan to one person to accommodate the large cattleman. For banks with a small capital the maximum loan to one patron is usually around $5,500. Such a loan only accommodates the stockman who wants to buy two or three carloads of cattle. It is such patrons that cooperate with the rural bank to the best advantage. If the farmer stockman is a reliable and responsible person and uses proved methods, there is no reason why he cannot cooperate with his bank. If he has resources such as pasture, feed, and good business ability, there is no reason why the banker should not be glad to loan him money for the purchase of cattle if the proposition is likely to be profitable. The two business enterprises are linked together very closely in the Flint hills of Kansas. During an era of agricultural prosperity there, the banker can do more for community welfare and prosperity by making CONSERVATIVE loans for the purchase of cattle than he can in any other way.

Kenney L. Ford, '24, is still at Norton where he started teaching vocational agriculture the fall after he graduated. That Norton has hired Kenney for his fourth consecutive year speaks well for what they think of him out there.

"Back to the farm for me!" was Fred Paulsen's war cry in '23 after receiving his degree, bachelor of science in agriculture. Fred has certainly done well. A combination wheat and stock farm at Stafford keeps him busy the year round.

I. K. "Ike" Landon, '21, is the hustling young man in charge of the state experimental fields in southeastern Kansas. Ike has five fields, one each at Moran, Fort Scott, Columbus, Parsons, and Rest. It surely keeps him stepping around to have them all in first-class shape all the time. Ike blows a wicked "slide" horn, too, and finds time to help most of the bands and orchestras over that section of the state.

Floyd Blauer, a junior last year, is out of college this semester owing to the serious illness of his father. Floyd has charge of all the farm work at their home at Stockton. His absence necessitated the election of a new secretary of the Agricultural Association for this year and George B. Wagner was elected. Blauer was a high-point man in stock judging and is greatly missed by his fellow students. He plans to be in college next semester.

The Soils of Southeastern Kansas

J. T. Whetzel, '27

The soils of southeastern Kansas have many outstanding characteristics. They are as distinctly in a group by themselves as are the glacial soils of northeastern Kansas or the windblown soils of northwestern Kansas.

The soils found in southeastern Kansas are typical of soils developed under fairly high rainfall conditions. A part of southeastern Kansas receives as high as 40 inches of rainfall a year or 100 percent more than is received in many parts of western Kansas.

The accompanying map of Kansas shows in a general way not only the distribution of rainfall, but also the various elevations and the length of the growing season, for all sections of the state.

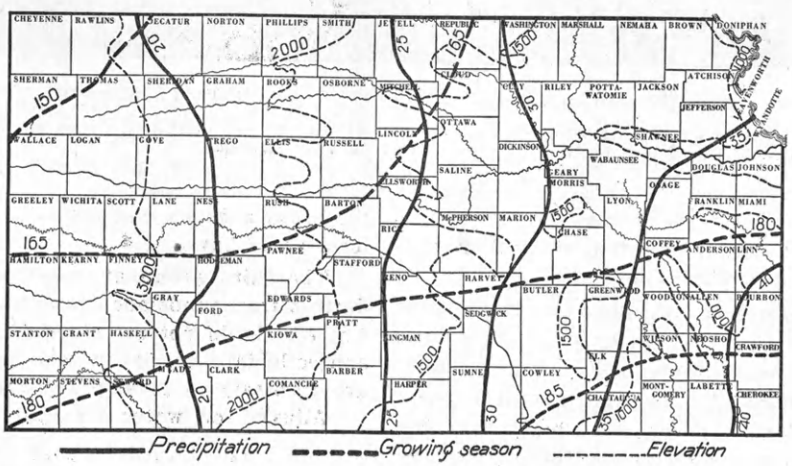
In studying the geography of southeastern Kansas, it is found that the strata or layers of rock dip gently to the west and northwest at the rate of about 20 feet for each mile. This leaves exposed on the surface a large number of strata.

To the casual observer the country appears to have a fairly level topography though careful observation shows many irregularities. The more resistant layers of rocks have withstood the erosion while the softer layers have eroded away. This accounts for most of the irregularities in the topography of the region.

It is quite frequently noticeable in mapping these soils that on a gentle slope to the west, the soil type is quite uniform. This is due to the fact that this soil has been formed largely from one kind of material. However, on the side of a hill sloping to the east, the soils are less uniform, due to the fact that a number of different strata were exposed on the surface.

The shales, limestones, and sandstones, belonging to the different strata have weathered and formed the soils. Such soils, being formed in place, are called residual soils

These residual soils may be classed into three groups. First, those soils occurring on relatively flat or level areas and derived largely from shale. Due to the heavy rainfall weathering and leaching have had a marked influence on these soils. They have a greyish silt loam surface soil to a depth of 10 or 12 inches, and the subsoil is a dark colored, tough, impervious, heavy clay. This clay is high in colloidal material due to the leaching of the surface soil by the water passing down through it, carrying down the finer particles to the subsoil where they are



KANSAS CLIMATIC DATA

The approximate elevation together with the approximate number of days in the growing season and the average annual precipitation for all sections of Kansas may be ascertained from the map.

deposited. As centuries have passed by this material has accumulated until the zone of accumulation is now about one and one-half to two feet thick. When this soil becomes wet the colloidal material absorbs a very large amount of water and swells, making the subsoil almost impervious to water and preventing drainage. On drying, the subsoil becomes very hard and large, vertical cracks form, due to contraction.

CAVITY PRODUCED BY DYNAMITING IMPERVIOUS SUBSOIL

The results shown were produced by one-half stick of 20 per cent Red Cross powder placed in the soil at a depth of three feet. (Courtesy Kan. Agr. Expt. Sta.)

It was formerly thought that dynamiting would help to break up the impervious subsoils of some of these soils. Experimental work conducted by the Agricultural Experiment Station, however, has shown that instead of breaking up or shattering the subsoil, the dynamite blew a cavity in the soil, tightly compacting the soil in the walls of the cavity. The increase in the yield of succeeding crops was not sufficient to pay for the expense of dynamiting.[1]

The second group of residual soils includes those soils found in rolling to hilly country. The water does not penetrate so deeply in these soils and erosion has more influence, so these soils have not developed the heavy subsoils that the soils on the more level areas have.

The third group of soils includes those derived from sandstone and arenaceous shale. These soils do not contain the fine particles and colloidal material in such proportions as are necessary to develop a heavy subsoil.

Alluvial or water transported soils are

(Continued on page 26)

1. L. E. Call and R. I. Throckmorton. The use of dynamite in the improvement of heavy clay soils. Kan. Agr. Expt. Sta. Bul. 209:1-34. Illus.

Fish Culture

Minna E. Jewell
Assistant Professor of Zoology

Although comparatively new in the United States, fish culture, that is the artificial breeding, rearing, and protecting of fish, is said to date from early ages and to have been practiced by the Chinese before European history began. Many of our ornamental globe fish, as the various kinds of comet tail, fan tail, and telescope-eyed goldfish, originated in China and give evidence of ages of domestication and selection.

The earliest European record of fish having been artificially hatched from eggs is that of a monk, who in 1350 raised fish in that manner. It was not until 1850 that the first government fish hatchery was established in Alsace and the following year a similar hatchery was established in Great Britain. In the United States it is said that as early as 1865 a gentleman living in New Hampshire imported salmon eggs from Canada to hatch in the waters of his trout pond. However, real fish culture began in 1871 when the United States Commission of Fish and Fisheries was established by Congress, its work to include "the propagation of useful food-fishes, including lobsters, oysters, and other shell fish, and their distribution to suitable waters."

At the present time the United States Government has established large salmon hatcheries in California and Maine. It operates 34 hatcheries in various localities. Western waters have been stocked with desirable eastern fish and exhaused streams have been restored with a new supply. Most of the states have also established independent State Fish Departments for the purpose of disseminating "fry" or young fish in public waters, while large numbers of private hatcheries have sprung up for the purpose of supplying the market demand for fish.

The late beginning and rapid growth of fish culture in the United States parallels the national history. When white men first came to America they found the streams and lakes and coastal waters full of fish, a wonderful natural resource, an apparently inexhaustible supply of food, to be had for the taking. To our pioneer forefathers the hatching and planting of fish in streams would have been as unnecessary and impractical as the planting of trees in the great primeval forests. But just as our forests have been cut down and depleted so it is now necessary for the government to spend large sums in reforestation, so, with the growing population of the country, the development of methods of canning and preserving fish, improved methods of transportation making possible their export, and better equipment for catching them, the fish resources of the country have become depleted.

Not only were the adult fish being caught more rapidly than the young could grow to take their places, but the draining of marshes and ponds and the pollution of shallow coastal waters and bays by refuse from large cities were destroying the breeding grounds of the young fish so that few were living to grow up. This is the condition which the United States Fish Commission and the various State Fish and Game Departments have undertaken to remedy by the establishment of fish hatcheries.

The first attempts made to remedy the depletion of our fish resources were largely regulatory measures such as closed seasons, limitations as to the size and number of fish to be taken by any one fisherman in a day, and outlawing of wasteful or destructive methods of securing fish; but in spite of these measures the fish population of our waters continued to decline. Limitations on the number of fish to be taken by each fisherman were offset by the increased number of men employed in fishing and laws protecting the breeding fish were nullified by the lack of suitable places for them to breed. The solution has been the rearing of young fish in hatcheries.

Among the first fish to be reared artificially were the salmon. An adult female king salmon deposits about 50,000 eggs, but of these probably not more than 25 hatch into young which survive to return to the ocean. In order then to have 50,000 young salmon it would be necessary to preserve

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THE KANSAS AGRICULTURAL STUDENT

KANSAS STATE AGRICULTURAL COLLEGE

MANHATTAN-KANSAS

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"FARM NOTES"

With this issue The Kansas Agricultural Student begins a department new in its columns under the heading "Farm Notes." It is not the purpose of the Staff to make this section of the magazine large but one really worth while.

We have in the Division of Agriculture almost 300 young men who have come direct from farms. A large per cent of them have come from Kansas farms—farms typical of the best class of farms in scores of Kansas communities. These young men are in touch with the best in Kansas farming for all sections of the state. During the year we expect at least 50 of them to write up some worthwhile farm activity that has come under their observation or experience. We believe the boys will respond with characteristic Ag pep and worth-while items from real farm accomplishments all over Kansas will be the result.

Kansas has much of which to be proud. Let us justly appreciate and extol her industries, her agriculture, and her people. The purpose of this section of the magazine may be said to be "to know the best in Kansas farming." We hope this department of the magazine will present much of interest to many of our readers.

OUR COVER PAGE

By the courtesy of our college photographer, F. E. Colburn, the cover page of this issue presents a wonderful picture of a fine field of Standard Blackhull White kafir, commonly known as Blackhull kafir. This variety of kafir was introduced into Kansas in the late eighties. It is grown very extensively in the eastern third of the state and is superior to other grain sorghums for that section. The field shown in the picture is on the Agronomy Farm. The land grew alfalfa for eight years. The alfalfa was plowed under last fall in preparation for the kafir.

SCHOLARSHIP

There is a certain minimum scholastic rating required of every student before he is eligible to a degree from Kansas State Agricultural College. This minimum scholastic rating is an "M" average.

But no student should be satisfied by merely striving for an "M" average. The more a student puts into his college work the more he will get out of it both immediately and throughout life. Many students of keen intellect allow others of less mental capactiy to win honors from them because they are not awake to their opportunities and willing

to put their best into their work day after day throughout the semester.

The honorary fraternity of Alpha Zeta is one of the first goals that should appeal to the college student of agriculture. This fraternity not only recognizes high scholarship but also leadership. In order to be eligible to membership in Alpha Zeta the student must have completed at least three semesters of work and his grades must put him in the upper two-fifths of his class. It should be borne in mind that grades alone will not get a student into Alpha Zeta. On the other hand unless he makes the required grades he is excluded from consideration for membership.

In K. S. A. C. Alpha Zeta not only recognizes high scholarship and leadership but also endeavors to encourage high scholarship by each year offering a gold medal to the freshman of the division ranking highest in his class during the entire year. Since this is the only scholarship medal offered to students in the Division of Agriculture, it is indeed an honor to the one winning the medal.

Last year this medal was won by Andrew P. Grimes. Those who have won the medal in the past are:

A. G. Jensen 1922-23
H. H. Brown 1923-24
H. E. Myers 1924-25
R. C. Hay 1925-26
A. P. Grimes 1926-27

The Kansas Agricultural Student is glad to commend and congratulate Andrew P. Grimes for winning the medal as freshman last year. Our honor roll shows Mr. Grimes passed 39 credit hours of work during the year and made 115 points, just two points less than the possible maximum. Mr. Robert W. O'Hara, who placed second, was a close competitor for first honors.

AN UNUSUAL ARTICLE

It is a distinct privilege to present in this issue an unusual article—an article from across the "pond," from the capital of England. The article was prepared by Oliver Winton Stebbings, a young man who for the past five years has been employed in the office of Baldwins Ltd., 67, Queen Victoria Street, London. Mr. Stanley Baldwin, president of the company, is the present prime minister of England.

Mr. Stebbings is one of the officers of the Junior Primrose League, a political party representing the Conservative Party, and writes regularly for the party magazine, "The Primrose League Gazette." During the past two years he has also given talks at various political clubs and meetings in London. His present ambition is to some day have a seat in the House of Commons. While born and educated in London he spends his vacations and holidays on his grandfather's farm in Suffolk county, England. He is a cousin of Ralph Stebbings, of Abilene, Kan., a sophomore in college, and Mrs. Lillian Mickel, chief clerk in the Department of Animal Husbandry.

The article comes from the pen of a keen young political leader but its agricultural slant wins it a place in an agricultural magazine. We believe it will broaden the fellowship of our readers and be of interest and value to them.

AG HATS

Advertisement? Yes, why not? Other big businesses advertise and why shouldn't we? The fact that this year's seniors have got together and cooperated to the extent of all wearing the same kind of hat for the whole division is an indication of what they will do in other phases of life's work, cooperating with their fellowmen for their mutual benefit.

In unity there is power, as is shown in our division this year by having a greater divisional spirit to put things over. The man who is afraid or ashamed to wear the trade mark of his profession is a rather mediocre sort of chap and is likely to enter the ranks of crier for legislation to end all his troubles.

—V. M. R., '28.

THE HONOR ROLL

The honor roll of the Division of Agriculture is based almost entirely on points. Sixty points for the two regular semesters of the college year win a place on the roll. If a student carried as many as 15 credit hours each semester, 50 points make the

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British Agriculture in the Valley of Decline

Oliver Winton Stebbings
London, England

Almost regularly there appears in the morning newspaper some agricultural news, and quite as regularly with the same fatal insistence that piece of news is of the most gloomy nature possible. Indeed it is of such a nature that one is led to despair of any hope of recovery, or of any return to prosperity in British agriculture. Although I have only time to give a cursory glance at the agricultural news I have come to the conclusion that British farming is in a very bad way, and to me the only way of saving what is left of this ancient industry is by decisive legislation on the part of the government.

One correspondent informs me that he once grew sufficient narcissus to pay for the labor he employed, now he says all the flowers he sends to Convent Garden—the London flower and fruit market— are unsalable and ultimately find their way to the refuse heap; all because Dutch blooms are a good deal better and cheaper. Although this might appear a very insignificant instance, it is indicative of what is happening—but on a much larger scale—all over England in every branch of the farming industry. In my opinion the British farmer should have some protection. He should not be driven out of his legitimate market by foreign competitors who have all the advantages of climate and cheap labor. However, free trade enthusiasts tell us that if industry cannot survive in active and open competition, it is certain that it will not survive under protection. Such a statement is a precious piece of illogical claptrap. In any case the Americans have proved their wisdom by raising tariff walls against foreign goods, and from what I can see their trade still survives and there does not appear to be any likelihood—at least in Europe—of an immediate or potential slump.

Of course, America is more fortunately placed in the matter of her self-supporting abilities and her mineral properties. The reaches of the American continent embrace every climate, consequently all kinds of edible vegetation can be grown within her territory, but we in England are not so happily placed. Our chief existence is maintained by our sea-borne traffic, and the life of the nation depends almost entirely upon imported foodstuffs. While this is true, it is also manifest that the British farmer must have a market for his goods, and that that market is most emphatically Britain. The British farmer cannot produce sufficient to supply the needs of the population, and to place a tariff embargo on imported foods would immediately have the effect of increasing the price to the consumer. It is, therefore, clearly a matter of much difficulty, and can only be approached by discrimination and discretion. Without attempting to deal with the issues such a measure would involve here, the important fact is that farming in Britain must not be allowed to become impoverished, and that a basic industry of the country must not perish for the want of a little legislation.

A few political observations have been given to emphasize how closely bound together are the problems of legislators and the fortunes of agriculture. The agricultural industry in England is prominently before the British public during the summer months by reason of the number of county shows and contests. But how little do those people who attend the shows know of the actual feelings of the depressed but plucky farmer.

Ploughland area in England and Wales has declined to the extent of 763,000 acres in the last five years, a dismal fact when one realizes that the measure of a country's success is calculated on its up-grade progress. Prior to 1921 most of this land was employed in the cultivation of wheat, which surely proves that today wheat growing in England is not a profitable speculation. Meat has followed in the same direction, but the present slump is largely a legacy of the Great War, during which period people were obliged to

(Continued on page 28)

COLLEGE NOTES

1927 AG FAIR YIELDS A PROFIT

The following is a financial statement of the Ag Fair furnished by H. L. Murphey, treasurer:

Cash on hand September 1, 1926	$195.48
Cash on interest for six months,	800.00
Interest	18.65
Receipts from 1927 fair	1,577.30
Total cash received	$2,591.43
Total expenses	1,540.02
Balance on hand	$1,051.41
Cash on interest	$1,000.00
Cash on hand	$ 51.41

The item "total expenses" includes some expense carried over from the 1926 fair and paid out of the receipts from the 1927 fair, thus more was made in 1927 than this statement actually shows.

RECENT PUBLICATIONS OF THE AGRICULTURAL EXPERIMENT STATION

Three bulletins recently issued by the Agricultural Experiment Station of Kansas will be of interest to many farmers and teachers of agriculture. They are:

No.	TITLE
238	Corn Production in Kansas
239	Crop Production in Southwestern Kansas
240	Sheep Production in Kansas

Bulletin 238 is a 42-page publication giving results of study and investigation and practical information on methods of growing corn in the various sections of Kansas. Nineteen figures are used in illustrating various phases of the discussion.

Bulletin 239, as the title suggests, is of interest primarily in a limited section of Kansas. After discussing briefly the general soil and climatic conditions of southwestern Kansas, the crop to grow, and a rational farming system for the region, production methods for the raising of winter wheat and sorghums are presented at some length.

Bulletin 240 is just what the title suggests, a general bulletin on sheep raising. In the course of the discussion of types of sheep, feeding and management of sheep, and the equipment needed by the Kansas sheepman, 41 illustrations are presented.

Requests for these publications should be addressed to:

Agricultural Experiment Station,
Manhattan, Kansas

AGGIE INTERCOLLEGIATE DAIRY JUDGING TEAM PLACES SECOND AT WATERLOO

The K. S. A. C. dairy judging team placed second, competing with nine teams at the Waterloo Dairy Cattle Congress, Waterloo, Iowa, Monday, September 26, 1927. The Iowa team which placed first is an unusual team in that two members of the team were members of the United States champion club team of 1923 and all three are intercollegiate debaters.

The high man on the Kansas team was Howard Vernon, who was third high individual of the contest. Harold E. Myers was second high man on the Kansas team and fifth high individual in the contest. It is obvious that the contest was very close for the top six men, as they were separated by only 20 points.

The K. S. A. C. team was high on Jerseys and second on Ayrshires. Howard Vernon tied for first on Jerseys and Guernseys. Harold E. Myers, who tied with Vernon for first on Jerseys, was second on Holsteins. The members of the Kansas team were: Howard Vernon, Oberlin; Harold E. Myers, Bancroft; T. W. Kirton, Amber, Okla.; and C. W. Clair (alternate), Mendon, Ill.

Held in connection with the Dairy Cattle Congress was the National Belgian Show, which is the strongest Belgian show in the United States. The coveted honor of grand champion stallion and best stallion or mare of the show went to the Hobart Horse Importing Company.

HONOR ROLL, 1926-27

Ninety-two students in the Division of Agriculture during the college year, 1926-27, received special commendation for outstanding achievements in scholarship. Each of these students carried on regular assignment not less than fifteen credit hours of work each semester (1), had practically no delinquencies against him throughout the year, and made a total of not less than fifty points on his two assignments, according to the K. S. A. C. point system (2).

The three highest ranking students in each class were given special mention as winners of high honors. The names and home addresses of the group winning "high honors" and the group winning "honors" are given below.

HIGH HONOR ROLL, 1926-27

Seniors	Home P. O.	Credit hours passed	Total points
T. Russell Reitz	Belle Plaine	33½	96½
J. P. Sellschop	Pretoria, South Africa	40	92
Oleve M. Manning	Peabody	36½	87
Juniors			
F. Leonard Timmons	Geneseo	39	115½
Morris Halperin	Manhattan	39	102½
A. W. Miller	Manhattan	37	99
Sophomores			
L. W. Koehler	Fairmount, Mo.	36	100
O. G. Lear	Stafford	36	84
C. C. Eustace	Wakefield	36	82½
Freshmen			
Andrew P. Grimes	Greenwood, Mo.	39	115
Robert W. O'Hara	Blue Mound	37	108½
Frederick H. Schultis	Sylvan Grove	38	83

HONOR ROLL, 1926-27

Seniors	Home P. O.	Credit hours passed	Total points
Paul A. Axtell	Argonia	34	54
Guy N. Baker	Syracuse	37½	53½
B. Lowell Barr	Manhattan	32	65
T. Lovell Barr	Manhattan	32	68
C. R. Bradley	Mayetta	36	62
H. A. Brockway	Olathe	32	87
L. B. Brooks	Garrison	36	74
Paul O. Brooks	Horton	40	65
C. M. Carlson	Lindsborg	31	66
Earl F. Carr	Byers	33	58
E. I. Chilcott	Manhattan	34	64
Loren L. Davis	Effingham	39	61
Raymond H. Davis	Effingham	36	86
O. K. Dizmang	Manhattan	32	55
C. O. Fisher	Fellsburg	37	52
J. H. Johnson	Norton	35	51
J. H. Kerr	Wichita	33	64
R. W. McBurney	Sterling	38	54
W. J. McMillin	Carlton, Colo.	32	56
Bernard I. Melia	Ford	37	51
H. L. Murphey	Protection	31	62
S. M. Raleigh	Clyde	35	68
Edward W. Schneberger	Cuba	31	57
H. C. Seekamp	Mulvane	33	59
George J. Stewart	Manhattan	30	61
J. T. Whetzel	Manhattan	33	64
Juniors			
K. H. Beach	Edwardsville	36	63
Floyd A. Blauer	Stockton	37	66
Orville R. Caldwell	Emporia	34	56
George J. Caspar	Alida	41½	75
Laurence M. Clausen	Alton	36	52
Clarence K. Fisher	Fellsburg	36	60
E. T. Harden	Centralia	40	85
Elmer F. Hubbard	Linwood	35	61
Philip J. Isaak	East Orange, N. J.	36	76
Clarence O. Jacobson	Manhattan	39	96
R. N. Lindburg	Osage City	35½	63
V. E. McAdams	Clyde	36	58
P. B. McMullen	Stella, Nebr.	36	55½
Lyle Mayfield	Manhattan	35	65
Leroy E. Melia	Ford	39	73
Harold E. Myers	Bancroft	37	85
A. H. Ottaway	Oswego	32	60
Vance M. Rucker	Manhattan	38	74
E. A. Stephenson	Alton	38	78
I. K. Tompkins	Byers	34½	56
L. F. Ungeheuer	Centerville	32	61
George B. Wagner	Whiting	32	60
Sophomores			
Forrest B. Alspach	Wilsey	37	51
Francis E. Carpenter	Wakefield	36	66
L. L. Compton	Formoso	36	53
Norman Curtis	Toronto	36	77
T. R. Freeman	West Plains, Mo.	36	74
Ralph C. Hay	Parker	28½	78
Sherman S. Hoar	Willis	37	51
F. W. ImMasche	Saffordville	39	56
S. G. Kelly	Seymour, Mo.	32	79
Ralph O. Lewis	Parsons	34	72
J. P. Lortscher	Fairview	36	57
C. P. McKinnie	Glen Elder	37	63
Arnold A. Mast	Abilene	37	52
H. A. Miles	Mutual, Okla.	37	79
J. H. Sutton	Ensign	37	69½
J. A. Terrell	Syracuse	33	52½
Freshmen			
R. E. Bonar	Washington	37	66½
Donald E. Cordon	Bancroft	37	69
G. J. Cunningham	Manhattan	36	65½
J. W. Decker	Birmingham	37	57
Otto E. Funk	Canada	38	59
E. H. Gerecke	Rocky Ford, Colo.	35	64½
O. E. Hays	Manhattan	37	64
E. F. Jenista	Caldwell	37	55½
W. A. Meyle	Holton	37	66½
Earl A Moody	Eudora	31	63
W. M. Newman	Centralia	36	61
Walter P. Powers	Netawaka	33	68
Oscar E. Reece	Hopewell	37	68½
J. L. Sinnott	Chase	37	58
Merrill M. Taylor	Perry	37	53
Frank Zitnik	Scammon	37	73

1. A student carrying less than 15 credit hours a semester was required to make a total of 60 points to win a place on the honor roll.

2. Passing grades given at K. S. A. C. are, from lowest to highest, P, M, G, and E. Each credit hour with a grade of "M" gives the student one point. Each credit hour with a grade of "G" gives two points, and each credit hour of "E," three points. No student will be graduated unless his total number of points earned at least equals the total number of credit hours required in his curriculum.

CHANGES IN AG FACULTY

The students of the Division of Agriculture returned this fall to find several new men on the faculty of the division. W. J. Caulfield replaced K. M. Renner in the Department of Dairy Husbandry. In the Department of Agricultural Economics, Harold Howe having returned from the University of Wisconsin where he was doing graduate work

has been made assistant professor and assigned to the research and teaching work formerly handled by Prof. Millard Peck. Homer J. Henny has been appointed to the position formerly held by Professor Howe. M. A. Alexander has taken the place of H. W. Marston in the Department of Animal Husbandry, L. R. Quinlan has replaced W. C. Fost as assistant of horticulture, and C. O. Grandfield has taken up the work of C. R. Enlow as assistant in cooperative experiments. A new position, instructor of milling industry, has been created and R. O. Pence elected to fill the place.

K. S. A. C. JUDGING TEAMS PLACE HIGH IN NATIONAL DAIRY EXPOSITION CONTESTS

Aggies Sixth in Judging Dairy Cattle

In the intercollegiate contest in the judging of dairy cattle held at the National Dairy Exposition, Memphis, Tenn., Saturday, October 15, 1927, thirty-two teams competed and the Aggie team placed sixth. The five teams at the top in the order of their placing were: Iowa, Nebraska, North Dakota, Ontario, and Illinois.

This contest was the largest ever staged by the exposition. The Kansas team was composed of:

Name	Home Address
T. W. Kirton	Amber, Okla.
H. E. Myers	Bancroft
Howard Vernon	Oberlin

The team was third and Kirton was fifth high individual in the judging of Holsteins.

Aggies Fifth in Judging Dairy Products

In the Eleventh National Contest in the Judging of Dairy Products held under the auspices of the National Dairy Exposition, fourteen teams competed and Kansas placed fifth. The four teams above the Aggies in the order of their placing were: Iowa, Nebraska, Massachusetts, and Tennessee. The following students composed the Aggie team:

Name	Home Address
E. W. Frey	Manhattan
E. F. Hubbard	Linwood
C. O. Jacobson	Sedgwick

The team placed first in the judging of milk. Frey was second high individual in the entire contest and Hubbard was sixth high man in judging ice cream. The members of the team returned with one cup and three medals.

ANDREW P. GRIMES

AG MIXER

The regular fall Ag mixer of the Division of Agriculture was held in the community house Tuesday evening, October 4. This was the annual get-together affair of the students and faculty of the division. A large per cent of the students, especially the old students, and an excellent representation of faculty members were present. A pleasant evening was spent in renewing old acquaintances and making new ones as well as boosting some of the leading activities of the division for the year. Apples or cigars, or both, were enjoyed by all.

E. A. Stephenson, president of the Agricultural Association, the organization sponsoring the meeting, in his characteristic and able way, presided. The program included

(Continued on page 28)

FARM NOTES

CORN SEED TREATMENT AND SMUT CONTROL

Why not treat seen corn for the control of corn smut, is the question frequently asked by many farmers. The thing that leads them to ask this question is the excellent results that have been obtained by the treatment of kernel smut of sorghums and stinking smut of wheat. The control of these diseases leads them to believe that corn smut can be controlled in the same manner.

The life history of corn smut shows clearly enough why it cannot be controlled by seed treatment. The spores that produce corn smut live through the winter in the soil. After the corn has made some growth in the spring and summer these spores are blown upon the plant where they germinate and produce tiny root-like structures which penetrate the corn leaf. Right there is where the first smut boil appears. It can now be clearly understood why the seed treatment will be of no use since the spores are in the ground and not on the seed corn.

The farmer now wants to know whether or not he can control the smut. The smut can be controlled by the means of rotation of crops which will prevent the spores from getting on corn plants. The land that has had no corn on it for a few years will not be bothered with smut. However, the smut-free fields may be infected again if there are other corn fields nearby which are infested as the spores will be carried some distance by the wind. —H. P. B.

ERADICATION OF MOUND-BUILDING ANTS DEMONSTATED IN JEWELL COUNTY

In spite of the fame the mound-building ant has gained because of its industry, its labors have always had a detrimental effect on the agriculture of western Kansas. While causing a great deal of trouble in cultivated fields, its greatest damage is done in tame and native pastures and in alfalfa fields. The ants throw up a mound a foot or more in height and destroy all vegetation within a radius of several feet.

An ant eradication demonstration was held recently on a school ground near Burr Oak, Jewell County. The county agricultural agent, Ralph P. Ramsey, performed the simple rites over the doomed colony. He bored a hole two or three inches in diameter and six or eight inches deep into the mouth of the colony, scraped all loose dirt away from the top of the hole, then put a teaspoonful of Cyanogas Flakes in the bottom of the hole. The ants did the rest, running wildly about because their home had been disturbed and falling into the pit where the deadly fumes soon killed them.

A BUTLER COUNTY FARMER FINDS A SIMPLE WOODEN ROLLER A VALUABLE IMPLEMENT IN RAISING CORN

Kansas is going to have a bumper corn crop this year. Thousands of acres of corn, however, were late in maturing and would have been injured severely had it not been for the exceptionally favorable late fall weather. Of course, weather conditions cannot be changed, but the time it takes corn to sprout and the shoot to get out of the ground after planting with a lister may be shortened by means of an implement used by R. E. Templeton of Butler county to pack the bottom of the lister furrows after planting.

The principle of this implement is simple. There are three rollers, each about 12 inches wide and 24 inches in diameter. These rollers are sawed from a log and hewed so as to have the rolling surface rounded to fit the botton of a lister furrow. They are mounted on a shaft about 10 feet long and fastened in a frame with the center roller turning without end play while the other two rollers are allowed to move along the shaft for a limited distance so they can always follow the furrows. This implement is light and easily pulled by two horses thus enabling the driver to keep the horses out of the fur-

rows and eliminating solid packing.

The idea of the roller is not to pack the ground solid as is often done when an iron wheel is used. The wooden roller is left rough when the hewing is done and this helps to press and pulverize the ground but still not pack it solid. This simple implement is also satisfactory in growing sorghums according to those who have tried it.

After five or six years experience with this method of planting, Mr. Templeton feels safe in saying that his corn has sprouted and been out of the ground earlier where the roller was used than where it was not used. His stalks have been hardier, his stand better and more uniform, and, while no definite records have been kept, he is satisfied the wooden roller increases his profits.

—E. A. T., '30.

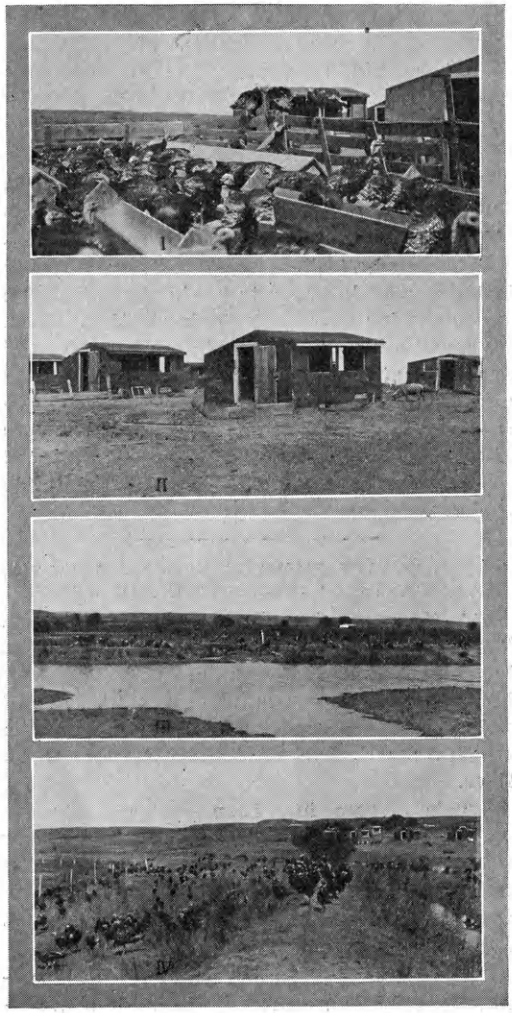
AN OUTSTANDING TURKEY-RAISING PROJECT

Surrounding the little town of Belvidere, Kan., lies the Robbins Ranch. This organization is very successful in all branches of live stock raising and equally successful in irrigation farming, but its most distinctive project is its successful turkey raising. Its turkey flock this year of 2,000 head represents the impossible to most farms. For this reason its turkey project is outstanding.

The two most distinctive enemies of turkeys are undue exposure when young and the dreaded disease of blackhead. The poults are hatched in mammoth incubators on the Robbins Ranch and then brooded in colony brooder houses surrounded by small wire pens. Coal burning brooder stoves are used and this system eliminates to a large extent the heavy loss of young poults by providing them a comfortable start free from exposure.

Blackhead is carried by chickens and infected turkeys. The brooder houses on the Robbins Ranch are moved to clean ground each spring where neither turkeys nor chickens have ranged before. They are so distantly removed from other birds that there is no possibility of any intermingling. These enormous, disease-free ranges have made blackhead virtually unknown on the Robbins Ranch.

The turkeys are started on an all mash feed containing meat scraps and bone meal. This system eliminates the danger of liquid buttermilk or cottage cheese becoming old and toxic. This mash feed is always available in large hoppers in the feeding pen and great care is exercised to keep any mash wet by rains from becoming full of maggots. About the middle of October the turkeys begin to take an interest in grain feed and are then fed all the corn or kafir they desire as this fattens them for market. —H. H. S.



VIEWS FROM THE ROBBINS RANCH TURKEY COLONY

Scene IV shows a general view of the turkeys on range. The irrigating ditch that supplies the drinking water may be seen at the right in the foreground. In the background may be seen the colony brooder houses and just in front of them the feeding pens. Scenes III, II, and I show closeup views of the irrigating ditch, the colony brooder houses, and the feeding pens, respectively.

BROWN COUNTY FARMER FIGHTS HOG PARASITES AND DISEASES BY RUNNING FROM THEM

Levi Byer of Hamlin, Brown county, owns and operates 400 acres of land. Diversified farming, with crop rotations including legumes, is practiced. He raises over 100 pigs every year. In recent years he has suffered heavy losses to his pig crop because of parasites and diseases. W. H. Atzenweiler, the county agricultural agent to whom he appealed for aid, suggested that he move the sows and pigs to clean ground and keep them away from the old hog lots until they were large enough to put in the fattening pen.

Last spring he built 25 individual "A"-shaped hog houses and put them in a 10-acre alfalfa field about a half-mile from the farmstead. He had the sows farrow rather late in the season in order to avoid the extra care and attention necessary during cold weather. He saved a high per cent of the pigs farrowed and has not lost one from disease. The pigs get shelled corn from a self feeder and have free range of the alfalfa field. Mr. Byer's alfalfa field has the appearance of a tented city but is the home of contented, profitable porkers.

AN INGENIOUS FARMER MAKES A SMALL CREEK HELP MODERNIZE HIS HOME

A Geary county farmer, L. B. Streeter, '07, living about two miles north of Milford, has all the conveniences of a modern city home as a result of his knack for "tinkering" with machinery and the presence of Madison creek, a small, sluggish stream near which he lives.

This stream has been working for the community for many years, for Mr. Streeter's father had built a dam and erected a grist mill in the early eighties. A sawmill also was installed and to this day grain is ground and logs are sawed by water power.

But "Lyman," as everyone in that community calls Mr. Streeter, although a graduate in agriculture, incidently acquired a few ideas about electricity in K. S. A. C. Soon a dynamo was installed at the old mill, a line was built to the house and other buildings and presto!—he had lights. Later motors were installed to run the washing machine, ice cream freezer, churn, sheep shears, and last and most important the milking machine and cream separator. The latter is a considerable item as the dairy consists of about twenty high-grade and purebred Holsteins.

The electricity is made as it is needed so no storage batteries are used. Since the mill is 300 or 400 yards from the house two cables were run from the dam to the kitchen where a windlass arrangement raises and lowers the gates to let the water into the wheel at will.

WIDE-SPACED CORN IN SOUTHWESTERN KANSAS

Wide-spaced corn appears to have a twofold advantage for the farmers of southwestern Kansas. First, it provides a means of fallow. Second, it makes possible the profitable growing of wheat on fields cropped to corn the previous year. In other words it is a dual-purpose way of farming. It is semifallow and at the same time semicrop farming.

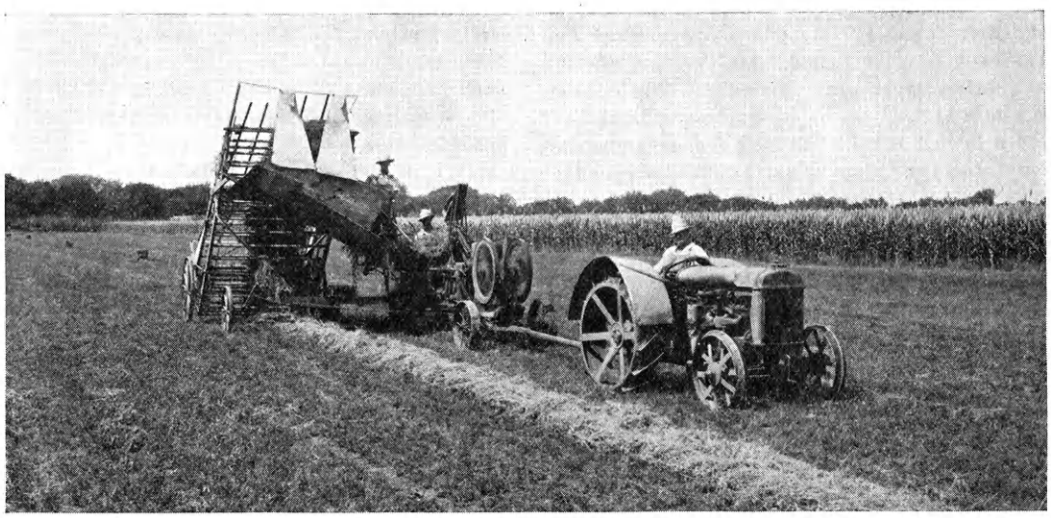
V. S. Martin of Edwards county three years ago had given up the raising of corn or sorghum row crops as had many of his neighbors because he was unable to secure a profitable yield of wheat after corn. Realizing, however, that continuous cropping of land to wheat was a poor practice, he sought a method of rotation. Summer fallowing was out of the question because the light sandy loam which he was farming was easily blown and drifted by the high winds frequent to western Kansas. Alfalfa, unadapted to his land, was also out of the question. Someone suggested wide-spaced corn as a means of solving the problem. Though skeptical, Mr. Martin gave it a trial, planting 90 acres of corn in wide-spaced rows in the spring of 1926. The season was not favorable for corn, yet his yield of 16 bushels per acre for double-spaced corn compared favorably with the 20 bushels per acre that regular-spaced corn yielded. In the fall at the time of wheat sowing the ground was in excellent tilth and was sowed to wheat following a good rain the last week of September.

The wheat crop of Edwards county for the last year was below average. The open ground or wheat that has grown on land previously cropped to wheat yielded 12 bushels per acre. The wheat grown on the wide-

spaced corn stalk ground yielded 13 bushels while that grown on the regular-spaced corn stalk ground yielded only 8 bushels per acre. This year Mr. Martin had enough faith in wide-spaced corn to plant 200 acres and many of his neighbors for the first time planted their corn wide-spaced.

Mr. Martin was troubled at first by weeds growing in the wide middles. To kill them he cut an old tandem disc down narrow enough to go between the rows of corn. This he pulled behind his tractor and was able to do a good job of cultivation leaving the ground in excellent tilth for wheat the following fall.

—D. J. M., '29.



BALING HAY FROM THE WINDROW ON THE LINN FARM

UNIQUE LABOR-SAVING EQUIPMENT USED IN MAKING ALFALFA HAY ON THE LINN FARM

The method of putting up alfalfa hay as practiced on the farm of John Linn and Sons southwest of Manhattan is unique. The farm consists of 480 acres, 225 of which is rich bottom land, and the Linns have had as much as 90 acres in alfalfa at one time.

To take care of this large acreage, in a climate where a delay of a day or two in getting the hay in the shed sometimes means loss in the quality of the hay, machinery must play an important part. As the result of a little thinking the boys devised the scheme of accomplishing several operations simultaneously. The hay baler was hitched to the left end of the draw bar of the Fordson tractor and the hay loader to the right end. A galvanized iron chute fastened at the top of the loader led down to the mouth of the baler. With a few simple adjustments the combination was ready for business.

The outfit was pulled down the windrows of hay, the loader picking the hay clean from the field and the baler leaving a string of bales, which were later picked up and hauled to the sheds. Three men were necessary to operate the outfit, one to tie bales, one to feed the baler, and a man or boy to run the tractor.

Mr. John Linn, Sr., says that from 8 to 10 tons of hay can be baled per day with this equipment, depending on the yield to some extent. He especially likes this system because it does away with the usual large crew of men and also because it shortens the time between the cutting of the hay and getting it into the sheds.

F. C. McNITT OF WASHINGTON COUNTY FOLLOWS A DEFINITE PLAN IN IMPROVING HIS FARMSTEAD

F. C. McNitt of Washington is one of Washington county's most efficient and progressive farmers. Mr. McNitt has kept records of his operations for the past few years and they show that he has made the farm pay.

Part of his profits has gone into the improvement of his farmstead and new buildings have been added from time to time until at present he has a modern well-improved place.

The one thing which strikes the observer as significant is the foresight with which Mr. McNitt apparently planned his improvements. The secret of the whole matter is this—whenever a new building was put up, its location and arrangement was decided after hours of planning and observation of approved practices and finally the securing of the approval of an expert on that particular kind of building.

His barn, the first building to be put up, was located for its convenience to water and to the other permanent buildings already on the site. It has every modern convenience and has been used as a model for the construction of similar structures throughout the county. A silo and feed house connecting with it have since been built. A straw-loft hen house has sheltered the chickens since this type of house was advocated by K. S. A. C. several years ago. A model movable brooder house completes the poultry equipment. A big permanent farrowing house with a concrete feeding floor adjacent and a 300-bushel self feeder takes care of the hogs, aided by several movable farrowing houses which are the latest in swine production.

A location has been made for a garage and soon a new house will be built, the plans for which Mrs. McNitt says will be drawn by Prof. W. G. Ward, extension architect of K. S. A. C. The McNitts have already many details listed which must be incorporated in the plans of the architect.

Editorial

THE HONOR ROLL

(Continued from page 15)

honor roll. Each student's record must be practically free from delinquencies.

These are worthy standards of scholarship and **The Kansas Agricultural Student** extends congratulations to each and every one whose name appears on the honor roll.

A few figures from the records of the year, 1926-27, may be of further interest. The scholarship records of 276 students (the number of students in the division who were in college both semesters) were considered in determining who were eligible to the honor roll. That is, approximately 33 per cent of the students of the division for the entire year made records which won them places on the honor roll. In the senior class out of 46 students, 29 or approximately 60 per cent, are listed as honor students. In the freshman class, however, out of 96 students eligible by attendance, only 19 or approximately 20 per cent, can find their names in the honor list.

It seems to us this spread is too great. Our freshmen should do better work. As students advance there is necessarily elimination. There is also marked growth on the part of many and failures to grow on the part of others. After all, however, too many freshmen take too long to get adjusted to their job. The fault cannot all be charged to the freshmen but the facts are worthy of consideration.

We might add in conclusion that we believe the freshman group in the Division of Agriculture this year will make a better scholarship showing than did the freshman group last year.

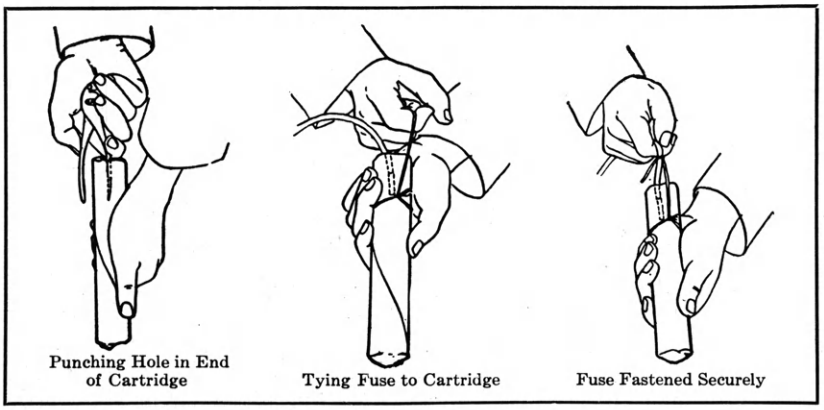
FRESHMEN ADVISERS

The freshmen of the Division of Agriculture have been divided into groups of five each and each group assigned to a member of the faculty of the division as an adviser. Each freshman meets his adviser at least once a week, oftener during the first few weeks.

The adviser becomes well acquainted with each man in his group and seeks to give him every possible assistance necessary to get him adjusted properly to his college work. It is thus hoped that difficulties that might otherwise be discouraging will be overcome. Timely assistance and encouragement is the watchword of the advisers.

It is believed that thoughtful, friendly advice will often prevent little but serious blunders and ultimately mean much to the students concerned. The freshmen boys are taking to the plan with zeal, the advisers are functioning sympathetically, and parents are writing letters of approval and appreciation of this real service to their boys—beginning college students.

PRIMING



Punching Hole in End of Cartridge

Tying Fuse to Cartridge

Fuse Fastened Securely

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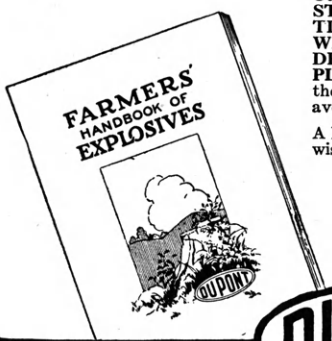

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THE SOILS OF SOUTHEASTERN KANSAS

(Continued from page 12)

found along the rivers and streams. These alluvial soils may be divided into two classes, terrace soils and first-bottom soils. The first-bottom soils have been the more recently deposited by the water and are quite productive. These bottom lands are subject to frequent overflow due to (1) the heavy rainfall of this region; (2) the crooked and winding channels of the rivers; (3) the low gradient of the rivers; (4) the heavy timber on the banks encroaching into the stream beds in some places; and (5) the removal of the cover or vegetative growth on the area that drains into the rivers so that the water is not held back but runs quickly into the streams and rivers after a rain.

The terrace or second-bottom soils are above probable overflow, and have been subject to weathering or leaching for a longer time. Hence, these soils have taken on some of the characteristics of the residual soils. Some of the terrace soils are underlain with a bed of water-worn gravel which unmistakably marks their alluvial origin.

The first bottom soils are the more productive soils of this region. In some places, mainly in the southeast corner of the state, grey bottom soils are found that are not so productive. Alfalfa is quite extensively grown on the darker bottom soils, while on the grey bottom soils as well as on the upland soils alfalfa is produced with more difficulty. Corn and also wheat are produced quite extensively on the bottom soils.

On most of the upland soils the use of lime gives good returns on land growing alfalfa or sweet clover. A few of the soils of limestone origin do not give profitable returns for the use of limestone. Phosphatic fertilizers give good results on alfalfa and wheat crops in particular. On grey, ashy soils, most of which are difficult to handle, these fertilizers are giving especially good results. Large amounts of prairie hay are produced on the less productive soils, which are those soils derived largely from sandstone and shale. Wheat, corn, kafir, and oats are other important crops produced on the uplands.

KANSAS "COMBINE" PROBLEMS

(Continued from page 7)

taper off to a wheat very high in moisture content. A portion of the wheat harvested in these four stages was put through the drier and observations were made on its behavior, its keeping qualities, its milling characteristics, and viability as determined by germination tests before and after each pass through the drier. The results of all these observations have not yet been completed.

As to the data secured on the performance of the machine, a moisture removal of about 3 per cent per kilowatt-hour of energy was secured based on a bushel of 60 pounds. If this bushel of wheat had 20 per cent moisture to begin with and was dried down to 12 per cent, it would take about 2 2-3 kilowatt-hours of energy. Whether the conditions that brought about the removal of 3 per cent of moisture per kilowatt-hour had any ill effects on the wheat berry, both from the standpoint of the milling quality and viability, will be definitely shown when the results are known.

The possibilities of the wheat drier have not been reached and a decided increase in efficiency may be possible through a redesign of certain features. Among these an arrangement for recirculation of a considerable portion of the air will be tried, thus increasing the work done per unit of air circulated. The removal of moisture from wheat moistened in the laboratory is only a fair indication of what the performance of the machine will be. Conclusions can be drawn only under actual field conditions.

A. R. Saunders, '23, is senior research officer and head of the Department of Agronomy in the School of Agriculture, Potchefstroom, Union of South Africa.

O. T. Bonnett, '18, M. S., '27, for two years county agricultural agent of Marshall county and for four years teacher of vocational agriculture in Alton Rural High School, has accepted a position as plant breeder in the Agricultural Experiment Station of Wyoming, Laramie. He is entering a big field with the best wishes of his classmates and fellow workers.

The New Prosperity

FARMING methods that only a few years ago seemed as permanent as the everlasting hills, are passing out of the modern picture with bewildering speed.

They are being replaced by methods that make use of more efficient equipment. The modern farmer is rapidly becoming a director of power and machinery.

It is significant that the most prosperous farmers today are those who accommodate their methods and their equipment to the new conditions. This new prosperity is based on the increased earning capacity of the man; determined, very largely, by the use he makes of power and machinery.

Case tractors, threshers, combines and other power farming machinery have long been known, everywhere, as profitable equipment for farmers to own and use. Under these new conditions their high efficiency, great economy and extreme durability give them special value to farmers who wish to increase their earning capacity to the utmost.

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BRITISH AGRICULTURE

(Continued from page 16)

eat imported meat and the once inherent prejudice was broken down.

During the last few years the only products which have given the British farmer any confidence are milk and sugar beets; and although the latter maintains its good position today some doubt must be expressed in regard to the former. On the basis of present contracts, the production of milk is leaving little or no profit for farmers who are not well favored by their holdings and the incidence of markets. The whole position is being prejudiced by the constantly increasing surplus of milk over the nation's demands for it in liquid form.

Space obliges me to be very brief and to touch upon only the brink of this all-important subject. Any statement, however, would be incomplete unless some reference was made to the financial position. The following figures showing the state of receiving orders against farmers in England and Wales in the last four years were recently given in the House of Commons: 1923, 317; 1924, 233; 1925, 238; 1926, 224. Although these figures record a diminution of extreme distress, the fact is gravely the opposite. I am told if bankers and merchants pressed their claims the whole of the farming industry would be in the bankruptcy courts. This is not an extravagant statement by any means, as the figures quoted above would easily represent the distress in single counties.

The only thing to save the farming industry, which is making a characteristically gallant struggle against adversity, is the creation of long-term credits and a stabilization of the markets. Under the conditions ruling in the farming industry in England today it is but elementary political economy that you either have more pasture and increased employment, or an agricultural insolvency which involves pasture as well as arable land in the general wreck.

This short article is by no means comprehensive and much more could be said, but it is indicative of the perilous plight—the veritable slough of despondency — in which British agriculture is struggling. Americans must look with interested eyes upon the manly bids for existence their English farmer cousins are making.

I will conclude by saying how singularly fortunate are the students of K. S. A. C. in having such an excellent little periodical as "The Kansas Agricultural Student" devoted to the interests of farming.

THE POPABILITY OF POP CORN

(Continued from page 8)

hardness of the kernel depends on how completely the protein matter fills the spaces between the starch grains. It is this flinty endosperm that is so important, because within it the steam forms when the kernel is heated.

The variety of pop corn to choose depends on the individual. From two types of pop corn—rice pop corn and pearl pop corn—about twenty-five varieties have been developed. The white rice pop corn is most extensively grown and is preferred on the large markets. It has a large flinty endosperm and at the same time gives a snow-white fluffy kernel when popped.

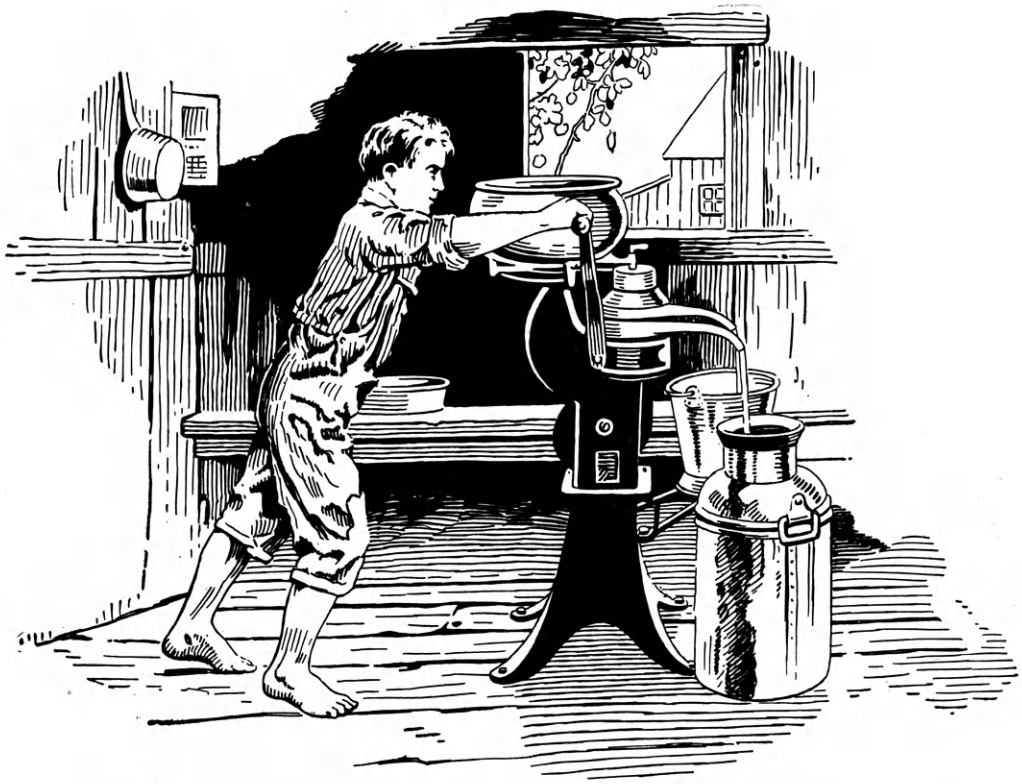
College Notes

AG MIXER

(Continued from page 19)

some regular business of the association and a few informal talks. The place and purpose of The Kansas Agricultural Student was briefly discussed by Prof Hugh Durham, assistant dean of the division. The pleasures and advantages to be obtained by members of judging teams were presented in outline by Prof. H. W. Cave of the Department of Dairy Husbandry. Prof. R. M. Green of the Department of Agricultural Economics talked about Alpha Zeta, the student honorary agricultural fraternity, and Prof. Albert Dickens of the Department of Horticulture concluded the program reading a few entertaining and appropriate poems.

W. H. Atzenweiler, '26, is one of the real live-wire county agricultural agents of Kansas. He gets his mail at Hiawatha and can usually be found in Brown county. "Atzy" is a natural stockman. His 4-H Club boys this year almost cleaned the slate with their steers at the Topeka Free Fair.



The Last Long Turn

THERE is always the separator, the woodpile, or the pump to add another hard job at the day's end—before electricity comes to the farm.

Then for a few cents an hour little motors do away with this drudgery. Not only do they run the separator, saw wood, and pump, but they help in the house.

Electricity cooks, washes clothes, cleans carpets, and churns. It pumps water; keeps food fresh. And MAZDA lamps, at the snap of a switch, flood the house or barn with light. "Last long turns" have ceased to bother the farm family that uses electricity.

If you are on an electric line or hope to be soon, ask your electric power company for a copy of the G-E Farm Book which explains many uses for electricity on the farm.

This monogram appears on G-E motors that run separators, washing machines, saws, milking machines, churns, and pumps—and on G-E MAZDA lamps that light the house, barns, and hen houses. It is a symbol of the endurance built into General Electric products and of the service that stands back of them after they have left the factory.

201-4B

GENERAL ELECTRIC

FISH CULTURE

(Continued from page 13)

2,000 adults. On the other hand, if all of the eggs of one female could be reared successfully the other 1,999 adults could be used for food. The advantage is obvious. In nature on account of enemies, inclement weather, fungus growths, etc., only a few of the thousands of eggs ever hatch and still fewer survive the first season. In a hatchery screened and protected from enemies, temperature and quality of water carefully controlled, dead or fungused eggs quickly removed, as high as 75 to 80 per cent of the eggs may hatch and produce young fish. The great mortality among fish comes during the first year and this mortality can be largely eliminated. The cost or rearing young fish in a modern hatchery is estimated at about $3 a thousand and many thousand young can be reared from the eggs of one female. Left to nature, 1,000 young would be the offspring of about 40 adults, each one worth as much as a dollar. Since the establishment of salmon hatcheries the annual catch of salmon from adjacant waters has shown steady increase. The hatcheries are operated by the government. The salmon fishermen pay a license for the privilege of fishing and the money from these licenses is used by the government to operate the hatcheries and so raise more salmon.

There are two different types of fish hatcheries — the trough hatcheries and the pond hatcheries. In trough hatcheries the eggs and milt are taken from the adult fish and placed together in pans. After the eggs have become inseminated they are spread out in shallow pans in troughs of fresh running water until they hatch. Any eggs which die or become fungused are removed by hand to prevent contamination of the other eggs. After the young hatch they are transferred to larger and larger troughs of running water where they are fed on chopped liver, clam meal, and other prepared foods until ready to be transferred to the streams.

In pond culture an attempt is made to duplicate the best possible natural environment. Brood fish are placed in ponds having a suitable water supply and good place for breeding, and kept free from natural enemies. Here they deposit their eggs and rear their young just as they would in nature but without the handicaps of possible drying or flooding, insufficient food, or attacks of enemies to which they would be subjected in nature.

Trough culture and artificial hatching have been found better adapted for the rearing of salmon, whitefish, and trout as these fish give no parental care either to their eggs or young. It has been estimated that the cost of raising young brook trout to the age at which they may be placed in the streams is about $200 per million or one-fiftieth of a cent each. Not only the Federal Government, but many States, as Michigan and Wisconsin, maintain trout hatcheries and there are a large number operated as private enterprises.

The natural or pond method of fish culture has been found much more practical for fish which build nests and care for their eggs and young. There is no need to hire a man to take care of catfish eggs when the old catfish will do it just as well and his time is so much less valuable. It has furthermore been found that young catfish reared in large natural ponds where they can secure their natural food grow more rapidly than those reared in troughs and fed artificially. Bass, crappie, and sunfish also care for their young and so are better adapted to pond culture methods.

Among these fish when the water reaches a favorable temperature, the male constructs a nest on a clean sand bottom and after a series of maneuvers resembling a courtship persuades one or more females to deposit eggs in his nest. From that time the nest is guarded most jealously by the male. He swims around and back and forth over the nest fanning the eggs with his fins, carefully removing any foreign material which may settle out of the water, and rushing savagely at any other fish which may venture near. Even after the eggs have hatched this vigil is continued until the young are ready to care for themselves. During the period of incubating and brooding, the father fish takes no food so by the time the young become independent, he is very hungry. Among channel cat it has been found that at this time the parental instinct is apt to disappear suddenly and the father's first meal may be the children he has just been so carefully guard-

(Continued on page 32)

Effect of Burning on Pastures

E. B. Coffman, '28

Today there is considerable difference of opinion in regard to the benefits obtained by burning pastures. Some believe that burning will reduce the number of weeds and provide earlier pasture and a more uniform grazing over the area. Others contend that the pasture does not acutally start earlier but appears earlier due to the absence of dead grass to hide the new growth. They further contend that burning kills out the desirable types of grass and allows an increase in the number of weeds.

Prof. Arthur W. Sampson of the University of California states, "In the forested areas of the United States the annual burning of grasslands has no place in judicious range or pasture management. It usually requires many years for closely burned and, more especially, for repeatedly burned grasslands to regain their original productiveness and yield their normal type of vegetation. Immediately after a fire, erosion, which follows the destruction of a large part of the soil binding roots, often causes serious soil depletion. As a consequence the forage production may be materially reduced for an infinite period. The vegetation that remains on the ground to decay enriches the soil by the addition of humus, nitrogenous matter, and other materials important to plant growth; it increases the water-holding capacity of the soil, thus making a large amount of moisture available to plant life; and it protects the soil from excessive evaporation and the vegetation against injury from wide variations in soil temperature, drouth, and other similar factors."

At the present time, the principal object in burning is to provide an early economical feed, and eliminate the higher-priced feeds in the spring. If the pasture is burned off, the areas which were lightly grazed the previous year and have a heavy growth of dead grass on them, will have an equal start in the spring with the more lightly grazed areas. It should be borne in mind, however, that **if pastures are properly grazed and managed, no burning would be necessary.**

Very little work has been conducted by the different agricultural experiment stations to test out the advantages and disadvantages of the burning of pastures. In 1918 the Kansas Agricultural Experiment Station began a series of studies to secure data showing the results of burning. Their experiments were conducted about 11 miles north of Manhattan on a 1,500-acre pasture owned by Mr. Dan D. Casement. This land is described as typical eastern Kansas prairie.

Experimental results indicate that burned pasture produces earlier feed, as the number of grass plants in the burned area exceeds those in the unburned areas in every case. There seems to be a decrease in the number of sedges in the burned areas in some cases, but the differenence is not evident in all cases. Just why the sedges are killed is not fully known as yet.

Apparently some types and species of prairie grasses are more resistant to the heat of burning than others, and survive the burning more successfully. The grasses that start earlier in the spring, such as the Big Bluestem and Kentucky Bluegrass, are the most easily injured by burning. The composition of the pasture will be the determining factor in the advisability of burning.

There is a general decrease in the number of weeds in the burned pastures while on the unburned pastures the weeds have a tendency to hold their own more successfully. This would indicate that burning does not cause an increase in the number of weeds in pastures.

In order to determine whether the burning allowed the soil to warm up earlier in the spring, temperatures were obtained by the use of thermographs. As a rule the seed that will germinate is found in the surface inch of soil and the majority of the roots are at a depth of about three inches. It was found that the heat does not penetrate to a depth of an inch, and the mean minimum temperature of burned pastures is higher than that of the unburned pasture. This was also true of the temperatures taken at a depth of three inches, though in not such a marked degree. This would indicate that if the grass

is burned the soil will absorb more heat from the rays of the sun and as a result growth will start earlier in the spring.

In the Flint Hill section of Kansas it is a common practice to put livestock out on pasture early in the spring, forcing them to eat the old grass for roughage and supplying protein in the form of cottonseed cake.

It has been found that if Bluegrass sod is burned while the sod is frozen in the spring, there is a 52.4 percent reduction in the yield of hay when compared to the areas that were not burned at all. If the sod is entirely thawed out, this reduction amounts to 71.3 percent and, furthermore, a large number of the plants are killed and are replaced by weeds.

In the semi-arid sections of the country, it has been found that if Buffalo grass is burned, it usually requires two or three years for the grass to "come back" to its original condition. No experimental work has been done in the short-grass country to determine the amount of damage done by burning.

FISH CULTURE

(Continued from page 30)

ing. In nature this is prevented by the fact that as the young become independent, they swim into smaller streams and shallower waters while the adult remains in deep water. In hatcheries the young are transferred to brood ponds by themselves as soon as they are ready to leave the nest.

Our Kansas State Hatchery at Pratt is of the pond type and is the largest hatchery of this kind in the United States.

Each kind of fish is a little different from any other and its habits, foods, enemies, diseases, etc., have to be studied in order that it may be successfully reared. Hence, the task of the fish culturalist is one requiring a large amount of knowledge and the judgment to apply it, but whereas restrictive laws alone failed utterly to prevent the depletion of our fish resources, the methods of fish culture have repopulated depleted streams and increased the number of fish where fish already existed. Where the fishermen pay licenses and the money from the licenses is used to raise more fish there will always be fish. It is to fish culture and better methods of distributing young fish that we must look for our food and game fishes in the future.

R. V. Morrison, '17, is teacher of vocational agriculture, Billings, Okla.

R. G. Lewis, '24, is chemist for the Armour Packing Company, Chicago. His address is 6326 S. Troy St.

N. H. Anderson, '22, is head of the department of Agriculture, Lincoln College, Lincoln, Ill. His address is 211 Pekin St.

G. W. Oliver, '20, is now special agent in the insurance business with headquarters at 305 American National Bank Building, Denver, Colo. His residence is 568 Grant, St., Denver.

Oscar K. Dizmang, '27, sends a check from Snell Hall, University of Chicago, for the regular issues of the Ag Student. He has a scholarship in economics and is doing graduate work.

J. K. Muse, '24, is plant foreman in the laboratories of the Aines Farm Dairy Co., Kansas City, Mo., and Kenneth W. Knechtel, '27, is chemist and bacteriologist in the same company and works under the direct supervision of Mr. Muse.

Karns Brothers, Henry, '24, and Ralph, '26, are now in the work of making loyal Aggies of their high school students. Both boys were a whiz at base ball, Ralph (Shorty) being captain of the team three years. Henry is superintendent of schools at Osborne. Ralph is teaching vocational agriculture in Byers Rural High School.

Russell Reitz, '27, editor of the Ag Student last year, honor student, and all-round leader in college, has returned to the home farm at Belle Plaine. The farm lays in the Arkansas valley and is ideal for fruit, so Russell has a sizable orchard already started. These agricultural graduates who return to the farm have the opportunity to prove to the farmers of the state just how valuable college training in agriculture in K. S. A. C. is.

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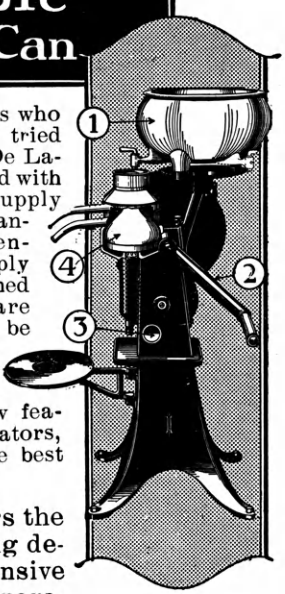

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