Our Family is Growing

When the last issue (April) of the FARM SCIENCE REPORTER was mailed to you, we had the names of about 12,000 people who had asked to receive forthcoming issues.

That issue was mailed to others for the first time in order that as many Iowa farm people as possible could become acquainted with the REPORTER. Despite the busy season in which this was mailed, about another 3,000 asked to be placed on the mailing list. So now more than 15,000 have asked that the REPORTER be sent to them.

Although some of you got more than one copy of the first two issues, we do not expect this to occur with this issue or any other future one. This issue is going only to those who have asked for it.

SOMETHING FOR CATTLE FEEDERS

Some of our readers have suggested that since cattle feeding is a pretty important enterprise on Iowa farms, we should offer some material on that subject. In this issue we have two articles, based on experiments of the last year at the Iowa, Illinois and Nebraska Experiment Stations.

There has been a good deal of talk about whether or not some of the new high yielding hybrid strains of corn were desirable because they were so hard. The tests of the past year indicated that corn can be too hard to make the best feed for fattening steers.

BULLETIN COMING ON HORMONES FOR ROOTING

There is now in process at the Iowa Station a bulletin on the experiments carried on with a hormone chemical for inducing cuttings to form roots. This will be a research bulletin and probably not of interest to many farmers, though it probably will interest many florists and gardeners.

At any rate, we thought many of you would be interested in knowing that such a material existed.

THE SORGHUM PROBLEM

Driving down the highway one day in Warren County, Iowa, a pile of crushed cane (bagasse) at the sorghum mill of Slack Brothers caught the eye of J. David Reid, one of the men sent out to Ames by the government for the Agricultural-By-Products Laboratory to help solve the problem of making use of farm by-products.

Into the yard of the Slacks Dr. Reid swung his car. He asked if he might take some of the bagasse. When they found he was from Ames, Slacks started plying him with questions: "What is this stuff that costs our steam coils in the boiling syrup vats? How is the best and quickest way to get rid of it?"

So back to Ames came these questions, and into the sorghum making business "dived" W. G. Gaessler, chemist, to help solve the problem of cleaning the steam coils. The use of clay in sorghum making interested these men and they took with them a man of another field, F. L. Cuthbert—a geologist—to try to find out what kind of clay works in this manner.

Out of this study in sorghum making came the story which you will find on pages 12 and 13.
Curing Partially in Swath and Finishing in Windrow Proved Best in Iowa Station Tests

This business of getting hay cut, cured and stored in the barn without losing the leaves and the green color—that's the problem which annually confronts some 200,000 Iowa farmers who have about 3 million acres of hay land from which they harvest around a 5-million ton crop.

It's a tough problem. To help us arrive at the most satisfactory method of making hay in Iowa, we seeded a field of alfalfa here at the Iowa Station back in 1926 for no other purpose than to study the methods of making hay.

In this search for the best method of making hay, we tried 13 different methods. With some of these methods in certain years, hay was cured and ready for the barn at the end of 17 curing-hours (“curing-hours” are those between 7 a.m. and 6 p.m.); other methods required 50 hours and with one method we tried it took 96 hours.

It was not because of the difference in maturity of the hay, the time of cutting or the weather, because it was hay of the same field, cut side by side at the same time for the different methods and with, of course, the same weather conditions. The loss in curing varied from as low as 1 percent to 13, 16 and 20 percent. And, of course, the part lost was leaves—the best part of the hay. The method of handling hay in the curing process does make a difference in the value of the hay that gets into the barn. And a difference in the cost of getting it there, too.

Swath-Windrow Best

It is almost self-evident that to cure hay quickest, it should be left in the swath. But hay produced in this way is of poor quality, both from the standpoint of color and loss from shattered leaves. In four series of comparisons we made on different dates, hay completely cured in the swath ranked lowest in color and also lost the most leaves, except when hay was tedded. Leaf-loss then was excessive.

Hay which was allowed to wilt thoroughly in the swath and was then placed in the windrow ranked almost at the top in color value and showed a relatively small loss of leaves.

Hay is usually considered safe to put in the barn when the moisture content is down to 30 percent. The moisture content of alfalfa when cut usually ranges from 70 to 75 percent. When the plants are well wilted and the moisture content is down to about 60 percent the hay is said to be one-fourth cured. This seems to be the stage of curing at which the crop can best be put in the windrow to complete the curing process.

But how is a farmer to know when his hay is one-fourth cured?
Hay containing not more than 30 percent moisture proved satisfactory for the barn. When moisture content was below 27 percent it retained its green color well.

Our answer to that is: Hay can be considered one-fourth cured when the plants are well or completely wilted, thoroughly limp or soft. The plants will be in this same condition at one-half cured, except that a few leaves will have begun to stiffen and harden.

Our tests showed that if the hay is not allowed to become more than one-half cured in the swath and is placed in the windrow before the leaves have become sufficiently dry to shatter, the quality will be almost as good as when put in the windrow sooner, and curing can be completed in 3 or 4 hours less time.

When the hay is allowed to become more than one-half cured in the swath before it is placed in the windrow, the loss of leaves is likely to be excessive and the color inferior. This combination means relatively low feeding value in comparison with that possible by the use of better methods.

Some good hay enthusiasts have advised windrowing hay immediately following cutting. In our tests, hay handled in this way required from 2 to 5 hours longer to cure than when allowed to partially cure in the swath and then windrowed. Contrary to expectation, the color value of the hay was not any better when windrowed as soon as cut than when partially cured in the swath. The loss of leaves was slightly less, but this is not a very important factor because the loss of leaves was very low when the hay was not allowed to become more than one-half cured while still in the swath.

We obtained the very best quality of hay from the standpoint of color and low leaf-loss when the hay was placed in medium-sized cocks, either immediately after cutting or when not more than one-fourth swath-cured. Few Iowa farmers are interested in curing hay in the cock because of the excessive amount of labor required and the length of time that the hay must remain in the field after cutting. Twenty-six curing-hours were required to complete the job when the hay was one-half swath-cured and then placed in medium-sized cocks; fifty-one when placed in small cocks immediately after cutting; and fifty-six when one-fourth cured then placed in medium cocks; and ninety-two hours when put in medium cocks immediately after cutting.

Turning Windrows

The effect of turning the windrow with the tail of the rake was determined in four series of experiments. Windrows were turned when the hay was one-fourth, one-half and three-fourths cured, respectively. In our experiments, turning the windrow was of no particular value in hastening the curing of the hay. Probably the only time when it is worth while to turn the windrow with the tail of Alfalfa can be baled directly from windrows if moisture content of the hay does not exceed 24 percent. Simple field tests may determine the safe moisture maximum.
the rake is when the hay has been wet with rain, or when the crop is very heavy and the windrows large.

Hay Tedder Out

A few years ago hay tedders were used on a good many farms, but now they are seldom found. This is as it should be. Tedding did not materially speed up the rate of curing in our studies. We found that tedding the hay, at almost any stage in the curing process, materially increased the loss of leaves, and loss of leaves seriously decreases the feeding value of hay.

With a very heavy crop of grass, such as timothy or brome grass, it is possible that curing can be hastened by tedding and without any serious loss of leaves. But this does not seem to be true with such crops as alfalfa or clover.

When to Cut

Having observed that plants are partially wilted in the field in the afternoon, some folks have been certain that afternoon cutting is advisable because a part of the excess moisture has already been lost. We wanted to know how much less moisture there was in the afternoon, so we determined the moisture content of alfalfa in the field hourly from 8 a.m. to 8 p.m. on certain days in July and August. The maximum difference was found to be not more than 4 percent, and generally 2 to 2½ percent. Because plants may give up from 10 to 15 percent of moisture in a 6-hour period after cutting, it is evident that when weather conditions are favorable nothing is to be gained by postponing cutting until mid-afternoon. The hay will be ready for the barn in the shortest time if cut relatively early in the day.

The results obtained at the Iowa Station agree with those obtained by other workers—they show that the moisture of the stem is not lost through the leaves; the stem dries as quickly with the leaves severed as when they are left on the plant. It is well to shade the leaves as much as possible, as in the windrow, but this is not so that the leaves may continue to function. It is to prevent them from becoming so excessively dry that they will be lost through shattering.

When to the Barn?

The general rules observed by farmers when making hay have too wide a latitude to insure good quality. In one community the moisture content from samples taken from hay being put in the mow was found to vary from 17 percent to 42 percent. Hay that is allowed to remain in the field after it is fully cured soon loses quality. The sun bleaches the hay and may do serious damage to its vitamin content, and in legume hay there is a serious leaf-loss. The loss resulting from handling over-cured hay has been shown to amount to as much as 20 percent. The losses resulting from storing under-cured hay also are tremendous—losses in lower feeding value and lower market grade of heat-damaged hay, to say nothing of the possible loss of the barn and livestock as a result of spontaneous combustion.

During these studies hay was placed in the mow with as low as 20 percent and as high as 58 percent of moisture. Hay that is allowed to remain in the field after it is fully cured soon loses quality. The sun bleaches the hay and may do serious damage to its vitamin content, and in legume hay there is a serious leaf-loss. The loss resulting from handling over-cured hay has been shown to amount to as much as 20 percent. The losses resulting from storing under-cured hay also are tremendous—losses in lower feeding value and lower market grade of heat-damaged hay, to say nothing of the possible loss of the barn and livestock as a result of spontaneous combustion.

It's all very well to say that hay is safe to go to the barn when it contains not more than 30 percent of moisture, but you may ask, "How is a farmer to know when the moisture condition is down to 30 percent?" The method in use by many farmers for years of deciding whether hay is dry enough for the barn, we found, works. This method consists of twisting a small handful of representative stems with the two hands until the stems twist in two and noting whether any moisture is brought to the

(Continued on page 16)
ONCE upon a time there was a homemaker who pulled her favorite rocking chair out of a corner and in the middle of the forenoon sat down to read the morning paper the mailman had just left in the box at the end of the driveway.

She rocked and read, and not once did she think about carrying the pudding down to the cellar pantry to cool on the floor, because the pudding was cooling in a refrigerator. She didn’t worry, every other sentence, about putting more cobs on the fire to cook the beans, because an electric range kept a constant heat. She wasn’t due to rush out after a pail of water, because it was on tap, motor-pumped. She didn’t... 

That’s a page from every farm homemaker’s mental book of favorite fairy tales—every homemaker who doesn’t have an electrified, emancipated-from-drudgery home.

A sample of 108 Iowa farm women for whom the dream-spun story has come true are quite agreed that electricity in their homes is “the grandest thing that ever happened.” Even the reading-in-the-middle-of-the-morning is no myth—100 of the 108 said that electricity saved both time and energy.

More than half said they used some of this “saved” time for reading, some for resting, some for recreation with their families and some for sewing. Half of them said electrical equipment made it unnecessary to keep hired help in the home, and many reported that they spent more time caring for the children.

Other activities mentioned and enjoyed by these homemakers because of time saved were: Home demonstration groups, church work, women’s clubs, 4-H clubs, community work, garden and yard improvement, health projects, Red Cross, school activities and trips.

First on the List

The electric iron seems to be a “must” in electrical equipment—all families had an iron. Practically all had a washing machine, too. These two pieces help with the hardest tasks.

Radios came near the top of the list of equipment owned. Many homemakers say that after they have purchased the iron and washing machine, which help with the hardest tasks, they feel that the family should have the radio because every member can enjoy it. The radio provides recreation, ed-
The facts in this interesting story are based on a thesis written by Mrs. McCordic for her master's degree in Home Management, which she received from Iowa State College in June. Her thesis included a survey of use of electrical equipment by Wisconsin and Iowa farm families. Upon receiving her degree, Mrs. McCordic returned to her position as home management specialist in the University of Wisconsin Extension Service.

Equipment was purchased in the following order: Iron, washing machine, motor for washing machine, refrigerator, motor for pump, radio, toaster, vacuum cleaner, range, milking machine, waffle iron and food mixer. With the exception of the radio, and perhaps the toaster and waffle iron, these appliances would save time and energy for the homemaker.

The Iowa rural families reported owning a total of 897 pieces of electrical equipment, or 8.5 pieces per family. Most of these were large appliances, of which 423 were used daily and 343 weekly.

The equipment reported as being used most frequently daily was, in order of use: Radio, refrigerator, motor for pump, clock, toaster, vacuum cleaner and food mixer.

Table, page 8, lists the number of families owning various pieces of equipment. It must be remembered, in judging these numbers, that no doubt many families still have non-electrical equipment in good condition which will do the work for them at present and which probably will be replaced later by electrical equipment. For example, some may still have a washing machine run by a gasoline motor, a good ice refrigerator, some other type of water system, a good non-electrical clock, a wood range or a foot-treadle sewing machine.

It was found that some families owning washing machines run by a gasoline motor had exchanged the motor for an electric one. This can be done for a small sum, and if the washing machine is in good condition the exchange is an economical way of owning an electrically-operated machine. This, too, releases money which may be used for other equipment.

A very small amount of electrical equipment was purchased on the installment plan. This plan of financing, when used, was for larger, more expensive pieces. Only 34 families purchased any equipment on time. The total amount still owed by these 34 families is remarkably small, only $309.

Selection of equipment isn't the only problem electricity brings. It is important, when purchasing electrical equipment, not only to know what to look for from a standpoint of saving time and energy and getting service and efficiency, but also...
It's no task at all to turn out evenly browned loaves of bread—what with the even, easily regulated heat of an electric range (and no handfuls of dusty cobs to be heaped on the fire every time she turns around).

It's no task at all to turn out evenly browned loaves of bread—what with the even, easily regulated heat of an electric range (and no handfuls of dusty cobs to be heaped on the fire every time she turns around).

equipment which they had as unsatisfactory, and that was because of too cheap construction. A homemaker in Marshall County said: “All electrical equipment should be of the best; cheaply made pieces soon short or burn out, and there is seldom any way to fix them. Get a good trade name, from a dependable dealer, and use your appliance—that would be my advice to anyone buying new electrical equipment.”

Besides efficiency and cost of operation of electrical equipment, its storage is to be considered. Eight families said they did not buy a food mixer, roaster, hot plate or ironing machine because they had no place to put it.

You’ve been in a kitchen where it has been awkward to use the refrigerator because the door seemed to open in the wrong direction? Since a refrigerator can be obtained with the door opening either way, its location in the kitchen should be studied carefully in advance in relation to the work surface near which it is to be used. And you’ve been in your neighbor’s kitchen when she was preparing a meal and heard her say, “I guess I’ll mix this with the hand beater; it’s too much trouble to get my electric mixer down?” This homemaker did not get the benefit from her mixer because she had no convenient place to use and leave it.

The Home Economics Extension Service and Household Equipment Department of Iowa State College are always glad to help plan wiring, to suggest the best arrangement of equipment in the kitchen and to give advice on the purchase of electrical equipment. How to wire farm buildings is explained in a bulletin which may be had for the asking.

Sixty-five families said that if electric rates were about one-fourth lower, they would buy such equipment as range, water heater, ironer, motor for pumps, refrigerator, hot plate, roaster and brooder. These families evidently have been doing some thinking and figuring on cost of operating.

Only six families reported any
After hybrid corn became popular many farmers decided that some varieties were too hard to feed successfully to beef cattle. At the Iowa Station we boiled the problem down to hard corn vs. soft corn—instead of hybrid vs. open-pollinated—and found in our first year's test that soft corn is superior for cattle feeding.

Five varieties of corn were selected on the basis of apparent hardness. One was Reid Yellow Dent and four were hybrid. By measuring the resistance of these kernels to pressure we ranked them in order of hardness. Partly because we had selected a type of Reid Yellow Dent that was rough and relatively high in floury starch, that variety was rated softest. In the hybrid group, Iowa 939 and Iowa 13 were medium soft, while Pioneer 307 and U.S. 44 were hardest. All varieties may vary in hardness from year to year, so there is no permanent significance to the order in which these varieties were grouped.

We picked five groups of yearling Colorado steers for the tests, and during the 210-day feeding period all were fed the same kinds and amounts of feed other than corn. They were fed corn silage the first 190 days, with linseed meal, alfalfa hay, mineral mixture and block salt. The silage was fed 15 pounds per steer per day for the first 160 days; 10 pounds the next 20 days; 5 pounds the next 10 days. During the rest of the feeding period the steers were fed a pound and a half of alfalfa hay a day instead of the silage.

We found that the group of steers fed the softest corn made an average daily gain of 2.17 pounds per steer—about 10 percent more than the steers getting the hardest corn. In the lots fed the hardest varieties, one group gained 1.97 pounds a head daily and the other gained 1.8 pounds. The groups fed the two medium soft varieties gained 2.09 and 2.02 pounds a head daily.

The feed cost of producing 100 pounds of gain on the lot fed the softest variety was $8.34, figuring corn at 50 cents a bushel. In the two lots fed the hardest varieties the costs were $9.45 and $9.84. The selling price of the steers fed the softest corn when we sold them in Chicago was $10.55. Those fed the hardest corn sold at $10.15—40 cents a hundred less than those fed the softest corn. Steers which were fed the medium soft corn were estimated at $10.25. Dressing percentages were about the same for all groups.

Hogs Saved Hard Corn

There was not a significant difference in results with the softest varieties and those which were medium soft. The difference was found between the two extremes—the very soft and very hard varieties.

Two groups of hogs followed each group of steers during the feeding period. There was no significant difference in results with the softest varieties and those which were medium soft. The difference was found between the two extremes—the very soft and very hard varieties.
period. For the first 50 days two pigs followed each group. When the experiment started they weighed about 190 pounds on the average. When they were taken out, four fall pigs averaging about 80 pounds were placed in each lot. The hogs were fed a supplemental mixture of tankage, meat meal and alfalfa meal, and as much shelled corn as they would eat and still pick up grain from the droppings of the steers.

A "check lot" of hogs was kept in dry lot and not allowed to follow the steers. This group enabled us to determine the amount of feed equivalent picked up which could be credited to the steers because of the hogs following. Hogs running with the steers fed the softest corn saved 31 pounds of feed for each 100 pounds of gain made by the cattle. But in the lots where the cattle were fed hard corn and made the lowest gain, hogs saved 92 pounds of feed for each 100 pounds of gain.

So if we credit to the cattle the feed picked up by the hogs, there isn't much difference in the degree to which hard and soft corn is used in the feedlot.

Hard corn is typically slick-surfaced, with flinty type starch. It is thought that the results of our tests may encourage corn breeders to develop more strains with softer, floury starch for feeding purposes.

When Joe L. Robinson, who is in charge of the State Corn Yield Test, was testing our corn samples for hardness he ran across something which "stumped the experts." Instead of finding that corn gets harder with age, Robinson's tests showed it grew softer! A machine had been developed for the purpose of testing the corn. The kernel of corn was placed on edge between the jaws of the apparatus and pressure was applied by a screw device until the kernel broke. For instance, the crushing resistance of one variety was 48.47 pounds on Nov. 29, but had dropped to 40.70 by April 12.

More Tests Coming

Nevertheless, both experience and recorded tests show that when corn gets to be a year or two old, the cattle don't take to it so readily as when it is new. Perhaps loss of moisture and flavor cuts down the palatability.

The University of Illinois ran some experiments using new and old corn to determine how the two compared for feeding. On full feed, one lot of steers in the trials ate 18 pounds of new shelled corn a day, while another lot ate but 17 pounds of old corn. Steers being fed the new corn spent only 14.8 minutes in eating 8 pounds of shelled corn, but those getting old corn munched away at the same amount for 25.5 minutes. Of 6 steers getting new corn, none left any feed. But 5 out of 6 getting old corn left a portion of it—about 26 percent on the average.

The final word has not been said about the relative value of hard and soft corn for cattle feeding. Whether the soft corn will produce faster gains consistently, we do not know; whether the value of the hard and soft corn will remain about the same if hogs follow the cattle and the gains of the hogs are credited to the cattle, we do not know. All we do know for certain is that in this first test it worked out that way. In coming years we are going to follow up these tests with others to prove that we were right or that the results we got in the first year's tests "just happened."

Possibly next year we shall try to find out whether grinding hard corn before feeding it to cattle will increase its value, or just what effect, if any, grinding will have.

A good many cattle feeders believe that it would be advantageous to crack or grind shelled corn, especially when it happens to be one of the hard hybrid strains. The grinding may be good procedure for the hard types, although grinding a relatively hard hybrid corn at the Nebraska Station the past year did not prove economical.

We need to know more about the effects of preparation on these harder types of corn. We have in mind for next year a feeding trial here at the Iowa Station in which a soft and a hard strain of corn will be fed side by side, probably in three different forms—shelled, ground shelled, and ground ear corn.