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AGRICULTURE.

THE COST OF A FIELD OF GRAIN.

Few farmers know the labor cost of a field of grain. Few know whether the crop harvested pays the labor cost. It is less difficult than troublesome to carry a record, but if the farmer will carry a little book and make a memorandum of the hours actually spent in plowing, in preparing the seed bed, in sowing or planting, in cultivating, in harvesting—in fact a record, by hours, of all time consumed by man, or man and team, he will discover a new light and begin to find remedies. An account should be kept with each field, as with an individual. Charge the field with the labor at a price the farmer would pay for it if he hired the work done. Each item of cost should be charged to the field. If a machine is broken, charge the expense of repairs to the field in which the accident occurs. When the crop is taken off, credit the field with its value. The difference between the two footings will show where the loss or gain falls. Going further in book keeping, the cost of seed, to which the cost of cleaning, etc., might be added and made a part of the record. When the farmers are making but 4 per cent on their investment in Minnesota, on an average, as shown by Experiment Station reports at University Farm, some making, others losing money, each should know for himself what he is doing, and, if losing, apply the remedy and stop the leak with prosperity.

CORN HELPS OUT IN PASTURAGE.

An easy means of supplementing grass in the pastures and stimulating the flow of milk in the dairy herd is to feed green corn late in the summer. With a continuance of the present drouth this supplement is liable to be required earlier than usual. A small amount of corn cut each day and taken to the pasture will amply repay the labor it costs in an increased flow of milk. As soon as ears begin to form green corn can be fed to advantage; and it may be so fed until it is near maturity. The Experiment Station at St. Anthony Park has records of good crops of fodder corn planted as late as the middle of July. In view of the present dry season it may be advisable to plant a crop of fodder corn this month, as pasturage is reported to be very short and a scarcity of hay is likely to follow. It is better to try fodder corn now on any vacant land the farmers may have, and to cultivate it well, than to allow the land to grow a crop of weeds.

If the Farmer Really Desires to free his land he must both cultivate his ground and stop sowing weed seeds. He should be as familiar with the seeds of weeds as he is with the seeds of grain he sows. To enable the farmer to know the weed seeds the division of botany and plant pathology of the Minnesota Experiment Station has prepared a case of twenty-four varieties of common weed seeds that infest the farms of Minnesota. The case is so constructed that unless broken it will last for years and will always contain a reliable collection with which the farmer may compare the seeds he may find in his grain and be certain of their identification. The Division of Botany and Plant Pathology, University Farm, St. Paul, will send these cases prepaid to any resident of the state on receipt of fifty cents, and to non-residents on receipt of seventy-five cents.

Arbor Day and Flag Day have come to stay in Minnesota. Seed corn week will come next September, and it will come to stay. The Minnesota Experiment Station will observe the week by sowing its own seed corn, and will encourage farmers everywhere to do likewise and enable themselves to produce good crops the succeeding year.

Live Stock on the farm will supply manure necessary to soil fertility and maintenance of humus in the soil. Live stock, in the experience of the Minnesota Experiment Station, requires clover, corn and other forage crops to keep up the supply of manure. The Experiment Station records show that

the largest yields of the various farm crops are secured when grown in rotation, including clover and corn with the application of barn yard manure. These crops, in conjunction with grain crops in a three to five-year rotation, produce a balanced condition of fertility and provide a good way of keeping the farm free from weeds.

Manure for Hay Land. Wheat, corn and other crops are no more improved by rotation than hay. The Minnesota Experiment Station shows that a plot continuously cut for hay the past fifteen years has given an average yield of 1.73 tons per acre, while on a plot under a three-year rotation of wheat, clover and corn hay has yielded the past ten years an average of 2.9 tons per acre. In a five-year rotation of wheat, timothy and clover, pasture, oats and corn, the hay has yielded an average of 3.9 tons per acre since 1900. Eight tons of manure per acre were applied once in five years on the five-year rotation plots. There is money in manure.

It is the Custom of the Minnesota Experiment Station to shock grain so it will permit the free circulation of air between the bundles to hasten its curing. To do this the Station places three pairs of bundles in a line and two pairs on the outside of these. Cap sheaves are then put on, the heads having first been broken down, and the bundles spread over the shock, when both head and butt ends are pressed firmly into the shock so as to shed rain and avoid as far as possible the soaking of the shock with water.

Larger Crops in Minnesota.—Elements that will produce larger crops in the state, as demonstrated at the Experiment Station, are an increase in soil fertility, the use of improved seed, better cultivation and a proper system of rotation, shown in numerous bulletins published by the station and sent free on application to the Experiment Station, at University Farm, St. Paul.

Mark Each Patch of quack grass, work around it to avoid scattering the roots with the harrow or other machines. If the patch is not too large, smother the quack with tar paper, held in place with dirt, for several weeks. This method of eradication has found favor at the Minnesota and other state experiment stations.

Small Patches of Quack Grass have been cleared by digging the roots with a four or five-tined fork, removing the stuff from the field and burning. Doing this in hot, dry weather is best. Do it now, is advised by the Minnesota Experiment Station.

If Sheep are on the Farm give them a chance at the quack grass. They will destroy much of it. Turn them upon a newly plowed field and see them take care of the roots left exposed.

BOTANY AND PLANT PATHOLOGY.

SULPHATE SPRAYING AND CANADA THISTLES.

Experiments with Canada Thistles and iron sulphate spraying at University Farm, St. Anthony Park, have conclusively shown that sulphate of iron solution, properly applied with force, in form of spray, will destroy the leaves and stems of the weed, and so far hold their growth in check as to prevent the ripening of seeds. Spraying has a weakening effect only on the roots of the plant and does not injure the grain, but gives it a chance to mature with less hindrance from the weed. To eradicate the weed is the great problem. The most practical way thus far discovered for thorough elimination of Canada Thistles is to mow the thistles close to the ground, when in full bloom, and plow the ground very shallow,—two or three inches—in August. Disc it thoroughly and harrow so as to expose the roots to sun and air. Gather and burn all the roots that can be seen. Having great vitality, roots, seemingly dry and dead, will grow when the conditions become favorable. Drag and disc the ground weekly in August and September and sow it to winter wheat or rye. This crop may be pastured in April and May succeeding, plowed under in June and the ground planted to a cultivated crop. Sorghum is said to be an excellent smother crop for Canada Thistles, if planted at the rate of fifty or sixty

pounds of seed to the acre. On very fertile soil sorghum will grow luxuriantly and may be converted into hay toward fall. The ground should then be again plowed, and in the following spring be again planted to cultivate crops, which must be well and frequently cultivated. Faithful, persistent and intelligent work will finally overcome this pest, as it will quack grass or other noxious weeds.

AGRICULTURAL ENGINEERING.

BLASTING BOULDERS.

Prof. Stewart, chief of the division of engineering at the Minnesota Agricultural College, says that ordinarily it is not economical to break rocks by placing explosives on top of them—a method requiring a very high grade and large quantity of dynamite. In such case, if the boulder is hard, the attempt will often result in failure. The efficiency of this method may be somewhat increased by laying the explosive in a depression in the rock and covering it with wet clay.

Another method is to make a hole with a long auger or spade through the earth to a point under the center of the rock, and place the explosive there, tamping the hole full of dirt afterward. This method is much more satisfactory than the first, though it many times throws the rock out of the ground unbroken.

The surest method, and the one requiring the least explosive, is to drill a hole in the rock and tamp in the charge with damp clay.

The proper plan, where a large number of rocks are to be broken up, is to do a little experimenting. Try each of these methods, keeping an account of the time required to prepare the charge, the cost of explosive used, and the results, and from these determine the best method to use with the rocks in question. With high priced explosive and cheap labor it will ordinarily be most economical to drill the rock. If labor is scarce and high priced it may be more desirable to use a larger quantity of explosive under the rock as suggested above. Rock has been satisfactorily disposed of by all three methods.

GENERAL AGRICULTURE.

Potato Bugs are at work. They are an enemy to be poisoned by the potato grower. War must be commenced early and continued with vigilance. Paris green is the most highly recommended. It may be used as a spray, with a sprinkler, mixed with air slaked lime, flour, or fine, dry road dust, sifted over the potato plants when covered with dew or rain. In any form of application at least one pound of Paris green should be used per acre, but when the plants are large a greater amount may be required. The Minnesota Experiment Station prefers to use Paris green mixed into a thin paste with water and then stirred in the larger volume of water to be used in a sprayer. Very good results, however, have been obtained by the use of a common sprinkler. Where the crop is large and it is possible to procure one, a power sprayer is advised and regarded as almost indispensable. Milk of lime, made by slaking two pounds of stone lime in water to each pound of Paris green, should be carefully strained into the poisonous mixture to prevent burning of the plants. Arsenate of lead may be used as a potato bug poison, but it is more expensive than Paris green. Paris green may be mixed with Bordeaux mixture, when the mixture is used as a disease destroyer. In this case no additional lime need be added.

HAY CROP SHORT.

Disquieting reports from various parts of Minnesota in regard to the hay crop are reaching the Experiment Station at St. Anthony Park. These reports show a probable shortage of hay owing to the drought. Although rains may come during this month it is improbable that the hay crop can catch up with the demand for winter fodder. Millet may yet be sown if no time be lost in doing so, and even sorghum and fodder corn may be planted with hope of a fair crop of fodder before frost. This sort of feed may also be needed to supplement pastures for the dairy herds, for pastures are now reported to be short. The Experiment Station advises activity immediately in raising a crop for winter roughage, and to make the

most possible out of millet, sorghum and fodder corn. Thorough tillage will enable one to produce a fair crop of fodder corn with a comparatively small rainfall.

CHEAP WAY OF BREEDING.

The cheapest way for a poor man to obtain the use of a pure bred sire is to induce a dozen of his neighbors to co-operate with him in the purchase of such a sire of merit as may be desirable. The Minnesota Experiment Station believes this a feasible plan for poor or well-to-do farmers. The poor man can hardly afford to own such a sire for his exclusive use. The more fortunate neighbor doesn't want to waste money in exclusive ownership, so the practical way is to own a bull in neighborhood partnership and all use him until his usefulness to the partnership is exhausted by reason of relationship to the cows of the community. Then he may be disposed of to some other equally wise neighborhood, when the first purchaser should procure another.

The Best Price for Farm Products may be had by keeping up the quality. The Minnesota Experiment Station suggests that a large number of farmers in any locality grow one kind of product as one variety of potatoes or one breed of live stock. In this way they will attract purchasers because they can quickly and economically procure the commodity in large lots of uniform quality. Quality in farm products is as valuable as it is in merchandise.

A Manure Spreader is used at University Farm because with it manure can be applied more uniformly. As a top dressing manure well disced in will usually give better results than when plowed under because its tendency is to leach downward and its office in fertilizing is near the surface.

Red clover is one of the best foods for poultry as well as for cows. It can be fed green during the summer and fall, and cured and stacked for winter feeding of poultry.—N. E. Chapman, Farmers' Institute lecturer.

FARMERS' INSTITUTES.

WEAN THE COLT NOW.

Forest Henry, one of the Farmers' Institute workers in Minnesota, and a successful farmer, says that his experience teaches that the time to wean the colt, even if not more than three months old, is before going into the harvest field with the mare. He teaches his colts to drink skim milk and to eat oats with the mare before weaning. But in feeding skim milk caution is used on Mr. Henry's farm at first, and the amount of milk is limited to two or three quarts a day. After a few days the amount is increased at each feeding time. Oats and wheat bran are fed the colts quite freely. Second crop clover, free from mold, is excellent hay for the colts. Provide plenty of exercise with access to shelter. Darkening the stall during fly time through the day and turning the colts out at night is a good plan to follow. When the flies are gone and cold weather approaches, reverse the scheme by sheltering at night and giving exercise through the day.

The Minnesota Farmers' Institute recommends spreading manure on sod fields that are to be plowed next year, and it would get the manure out of the barn yard as soon after it is made as possible, so that the soil may have the benefit of its entire value. Careful experiments have shown the institute workers that about half of the value of manure is lost by leaching if left in the yard over summer.

ENTOMOLOGY.

POCKET GOPHER SEASON.

Pocket gophers can be successfully handled at this time of the year, says Prof. Washburn, Minnesota State Entomologist, by the use of good traps, covered cones, or by poisoning pieces of potato with powdered strychnine, putting the powder into slits in the potato, and placing the piece of potato into a long-handled spoon tied to a stick and thrusting it down the hole. Some good poisoned baits for these pests are now on the markets.

The Minnesota Experiment Station finds that leads in the garden do excellent service in killing insects.

THE DAIRY.

FEED GRAIN TO LIVE STOCK.

The Experiment Station at St. Anthony Park, by its attention to the dairy cow, as well as to all other animals on University Farm, shows that stock provides the best market for Minnesota grain. With the dairy cow there is an abundance of skim milk and buttermilk for calves, pigs and poultry. Cattle, sheep, hogs, horses and poultry return to the soil fertility taken in the production of grain. No less grain may be raised but more will be sold in butter, eggs, beef, pork and mutton. That means more money for the farmer than selling grain at the elevator. The acreage may be shorter but the yield will be larger, involving less labor. The methods of dairying and stock raising at University Farm, if faithfully followed by the farmers generally, will soon pay the mortgages.

The Minnesota Experiment Station agrees with Prof. E. K. Slater, that when a dairy cow is utilized as a market for Minnesota grain, cheese factories and creameries will be abundant and contribute their full share to the prosperity of the farmer and the wealth of Minnesota; that farmers will learn to co-operate and work together for each other's mutual advantage in creamery building, in stock breeding, in marketing farm products and in buying farm supplies. When stock is the farmers' grain market, "the little brass kettle" will not affect the price; the farmer will have less stuff to haul to market over poor roads and have profitable trips to town.

The Silo.—Silage is one of the best foods for dairy cows in winter. It is easy to handle, and a silo is recommended by the Minnesota Experiment Station to farmers having fifteen cows or more. An ordinary silo, built of lumber, is good for ten or fifteen years. The cost of the building, machinery for loading the silo, and all expenses of growing the corn and getting it into the silo does not exceed \$2.00 a ton. Owing to the cost of the silo it is not thought practical for a farmer having less than ten to fifteen cows to build one.

The Cow, in Her Natural Condition, gives milk enough to feed her young. By intelligent feeding, care in breeding under rules and suggestions which any farmer may have for the asking of Prof. T. L. Haecker, University Farm, St. Paul, some dairy cows have been brought up to a production of ten thousand pounds of milk a year, and in some cases to a much larger annual yield. A cow will not continue to give this service unless she is bred, fed and housed in proportion to the demands made upon her.

A Co-operative Creamery brings the farmers the highest price for butter, removes from the burden of tired farm women the work of butter making, and gives to a community a higher commercial standing in the business world, is a statement made by Supt. McGuire of the Northeast Minnesota Experiment Station. This is demonstrated wherever the farmers have in good faith co-operated to develop their own business.

A Well Bred Dairy Cow will give about eight thousand pounds of milk in a year. Some exceptional cows are known to have given about sixteen thousand pounds. The proof of the amount of the butter fat in such milk is in the testing. All milk at the Experiment Station, St. Anthony Park, is weighed and tested. Cows not testing up to standard are retained as object lessons in class work.

Dairying has been the principal occupation at the Northwest Minnesota Experiment Station at Grand Rapids. From a herd of six cows and a few head of young stock, in 1904, Supt. McGuire says the herd has increased to 75 head, of which 30 are cows, 20 are heifers that will come in milk within the next year, and 20 are heifers under one year.

The 1909 sales from the herd amounted to \$2,376.97.

The Buying of Feed at present prices quickly reduces profits in dairying. Minnesota Experiment Stations have developed their dairy herds very largely on roots, clover hay, and fodder corn.