# HOME COURSE IN SCIENTIFIC AGRICULTURE

## EIGHTEENTH ARTICLE. RAISING SUGAR BEETS.

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THE successful growing of sugar beets is an art that one acquires by practice. The farmer who has made a success of raising other crops will quite often fail at first in this one, as the methods of cultivating ordinary crops do not apply in the case of sugar beets.

In the manufacture of sugar from the beet the farmer plays an important part by supplying beets in an adequate quantity and of a high quality, but beyond that he can hardly hope to enter the field. The manufacture of beet sugar is an industry entirely distinct from agriculture. From the nature of the process it is quite improbable that any simple method of home manufacture of beet sugar will ever prove commercially successful. The juice of the beet is extracted with difficulty.

Experience has shown that the sugar beet reaches its highest development in north temperate latitudes.

This isothermal line for the United States begins near the city of New York and passes up the Hudson river to Albany; thence turning westward, it runs near Syracuse and passes in a southwesterly direction, touching the shore of Lake Erie near Sandusky, O.; turning thence in a northwesterly direction, it enters Michigan and reaches its highest point in that state near Lansing; then going in a southwesterly direction, it enters the state of In-

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diana near South Bend, passes through Michigan City, then in a northwesterly course continues through the cities of Chicago and Madison, reaching its highest point near St. Paul; thence it extends in a southwesterly direction until it enters the state of South Dakota, where it turns again northwest and reaches its highest point in Dakota just above the forty-fifth parallel of latitude, where it crosses the Missouri river. The isothermal line then turns almost due south, following very closely the one hundred and first degree of longitude until it leaves the state of Nebraska near the northeast corner of Colorado. Passing in a southwesterly direction through Colorado, it reaches, at Pueblo, almost to the one hundred and fifth degree of west longitude, whence it passes in a slightly southeasterly direction into New Mexico, turns to the west and crosses the one hundred and fifth degree of longitude at about the thirty-second degree of latitude. Then turning westward, it passes in a very irregular line through the states of California, Oregon and Washington.

Extending a distance of 100 miles on each side of this isothermal line is a belt which may be regarded as the theoretical beet sugar area of the United States. There are doubtless many localities lying outside of this belt, both north and south, in which the sugar beet will be found to thrive, but this will be due to some exceptional qualities of the climate or soil and not to any favorable influence of a higher or lower temperature. A study of the location of the sugar factories operating today will show that only five factories are outside of these lines.

Although conditions of temperature must be taken into consideration in selecting sites for beet sugar factories, those of rainfall must also be studied. The sugar beet requires a certain amount of moisture in order to produce its normal crop. This moisture must be derived either from precipitation in the usual way or from irrigation, or else the soil must be of that particular quality which will allow subterranean moisture to reach the rootlets of the plants.

The experience of more than twenty years in California and ten years in Colorado has shown that the climatic data, regarded as of prime importance in beet culture in Europe, cannot be regarded as rigidly applicable to this country. The successful growth of sugar beets in the arid regions of our country, with irrigation, has introduced a new factor into the science of beet meteorology. While the arid area on which beets can be grown without irrigation is probably confined almost exclusively to the coast valleys of California, the successful commercial production of sugar beets in Utah and Colorado has opened a new and extensive field. What has taken place in these states is being rapidly duplicated in Idaho, a beginning has been made in Montana, and the time is undoubtedly coming when beets will be grown in Wyoming and probably throughout the whole arid region.

The northern parts of our eastern and middle states and the states of Oregon and Washington have at least an equal chance for the successful production of beet sugar with the fields of Germany and France. The irrigable parts of the great southwest have advantages of soil and climate which will enable them to enter into competition in the production of beet sugar.

The high cost of good irrigation renders it imperative that the areas under culture be devoted to a crop which is capable of producing a more valuable yield than is afforded by cereal culture. If a net profit of from $10 to $20 per acre can be secured, from $100 to $200 per acre can be paid for the land. It is estimated that nearly 80,000,000 acres of land in the arid regions of the United States may eventually be irrigated, being nearly one-fifth of the total area. Of this area perhaps 10 per cent is capable of easy and speedy irrigation. Farmers who raise beets for a sugar factory are not left entirely to their own resources in growing the crop. They enter into a contract with the factory management which outlines the methods to be employed.

Then the factory employs an agricultural superintendent and a corps of assistants whose duty it is to go among the growers giving instructions and suggestions regarding the selection and preparation of the soil, planting, cultivation, time of harvesting, etc. These men are of course well informed on all phases of beet culture, and they are usually able to make valuable suggestions in regard to the cultivation of other crops grown in rotation with beets. Their instructions and influence therefore tend to improve the farm practice of communities in which sugar beets are grown.

The sugar beet does not require a particular kind of soil for its proper production. In general soils are described for practical purposes as clayey, sandy, loamy or alluvial soils. All of these soils will produce beets. The black prairie soils also have been found, with proper cultivation, to produce excellent beets.

New land should not be selected to grow sugar beets, for the crop is not a good reclaimer of soils. And especially to be avoided is new land containing decaying vegetable matter, which produces only rank growth with low sugar content. Preferably the most productive land on the farm should be used, such a soil as will yield a good crop of Indian corn, wheat or potatoes. The soil should neither be so compact as to interfere with cultivation to a depth of ten or twelve inches nor have a tendency to bake hard.

Happily in most American soils there is still sufficient natural fertility to produce a good crop of sugar beets, whereas in the soils of Europe, where sugar beets have been grown for years, the farmers must depend on fertilizers to insure a remunerative crop.

Every farmer should understand that he cannot continuously grow any crop on the same ground and secure maximum results. Beets do best after alfalfa, corn or small grains.

A good scheme of rotation is first wheat, then beets, then clover for two years, the last crop being plowed under; then potatoes, wheat and beets in the order mentioned. If alfalfa can be grown it should be included in the rotation of crops; also in some sections potatoes do well in the rotation. Beets do well after small grain crops, because these, being harvested early, leave the ground ready for late autumn plowing, an important point in successful beet culture.

The field in which beets are to be planted should be selected and plowed in the late autumn to the depth of at least nine inches. As a rule, the plow in each furrow should be followed by a subsoiler, which will loosen the soil to the depth of six or seven inches more.

Hand planting of the seed may be practiced when a very small plat is to be put in beets, but where a field embracing an acre or more is to be planted it is not convenient. In such cases planting by drill is best.

The beets should be covered to a depth of one-half inch to two inches, according to the state of the soil.

In the matter of space between rows there is considerable variation. In some cases the rows are made only sixteen inches apart and in others as wide as twenty-eight inches.

The cost of growing an acre of beets depends on so many varying factors as to render it impossible to give an estimate which is reliable for every locality.

It is probable that the actual cost to our farmers for the first few years of the beet industry did not exceed $25 to $35 per acre and in many instances fell below these figures.

It is reasonably certain, accidents of season aside, that a net profit of from $8 to $15 per acre may be expected from the proper culture of the sugar beet in localities near a factory when all the conditions of the best methods of culture are fulfilled.

The byproducts from beet culture on the farm are the tops and leaves, which are commonly used for feeding cattle. Some farmers, however, turn them under as a fertilizer. When used as a feed the beet tops can be eaten by the cattle on the field where they have been grown. If they are fed in stalls the manure should be returned to the field.

# FEEDING GRAIN TO COWS ON PASTURE

The question is frequently asked whether it is economical to feed grain to cows during the pasture season, writes E. V. Ellington in Orange Judd Farmer. On this question there is a considerable difference of opinion. Judging by the direct results in milk production from feeding grain to cows on succulent and abundant pasture, there seems to be no profit in such a procedure. While there may be some increase in milk yields, the increased yields do not in all instances pay for the grain consumed.

The pastures in the early spring are immature, and the grass contains a high percentage of water and a low percentage of dry matter, and the high producing cow does not secure sufficient nutrients to furnish the needs of the body and maintain a large production of milk. For a cow of this type—that is, one that produces one to two pounds of butter fat daily, a grain ra-

Photo by Kansas Agricultural college.

The Owl's Design, here pictured, a pure bred Jersey cow owned by the Kansas State Agricultural college, is the first Jersey in Kansas to make over 700 pounds of butter in a year. She completed her record on the 17th of March and made during the year 14,006 pounds of milk and 650 pounds of butter fat, which is equivalent to 758 pounds of butter. The milk record classes The Owl's Design among the first seven Jersey cows of the world. Only six have made more than this amount, according to R. M. Gow of the American Jersey Cattle club.

tion should supplement the pasture and she should be allowed all the leguminous hays that she will consume.

The cow that is producing an average quantity of milk—say from twenty-five to thirty pounds of milk of average quality—will produce but little more when fed grain to supplement good pasture and for economy of production should not be so fed. Experimentation has proved that an additional pound of milk was secured for each pound of grain fed, but it was observed that cows that received grain during the pasture season gave 16 per cent better returns after the grazing period was over than did those that received no grain. In other words, there was an increase in weight in the lot that were fed grain which resulted in the laying up of a considerable amount of surplus nutrients on their body which was utilized in future production.

### Weaning the Pigs.

Some people seem anxious to wean the pigs. I do not believe a person should be in too much of a hurry about this, however, says a correspondent of the Kansas Farmer. As a matter of fact, there is no feed quite so good as their own mother's milk. There is a limit, of course, for the length of time she can provide this food. If the sow is to raise two litters each year we must not expect her to care for each litter as long a time as when she raises only one.

If she is holding up fairly well in flesh I would not hesitate to leave the pigs with her nine or ten weeks. When you start to wean the pigs do not take the whole litter away at once. This will not only prevent the sow worrying, but it will probably avoid trouble with her udder. Take away the two hardiest youngsters first, and then, after a day or two, remove one or two more. Keep this up until the whole litter has been taken away.

### Removal of Shoe Boils.

To remove a shoe boil, if you cannot employ a graduate veterinarian, says the Farm Journal, proceed as follows: Put a twitch on the horse's nose and have one fore foot held up by an attendant. Make a single loop knot or noose on a length of piano wire. Put the loop over the shoe boil and pull tight so as to make the tumor have as narrow a neck as possible. Now cut off the shoe boil by means of a redhot hatched shaped iron or cut it off with a sharp scalpel and at once stop the bleeding by cauterization with a thermo cautery or redhot iron. This leaves a large, flat wound, but it is surprising how quickly it heals and what a small blemish (scar) it leaves if simply wetted a number of times a day with a lotion composed of one ounce of sugar of lead and six drams of sulphate of zinc shaken up in a pint of water.

### Piles in Pigs.

Piles, or protusions of the rectum, are common in young pigs and are often induced by overfeeding and lack of exercise. Give the pigs free range on grass and in addition feed light slop of sweet skimmilk, middlings and a little flaxseed meal. Mix one ounce of limewater with each quart of slop. The bowels must be kept active. If constipation is present omit the limewater and mix in an ounce or two of raw linseed oil to act on the bowels. Local treatment consists in bathing the protruded parts, wetting them well with extract of witch hazel, then smearing with witch hazel ointment and returning to place.—Farm Journal