

FALL IRRIGATION.

BY DR. JOHN A. WIDTSOE.

Of the value and importance of fall irrigation, Dr. John A. Widsøe has the following to say in the Deseret Farmer:

The irrigation season is over and most of the available water is running to waste. Water in the irrigated west is waste. Water is wasted at any period preceding the fall of the year. The waters of the fall should be used. Instead of letting the water run to waste, it should be brought in the fields that are to be used next year. The best water reservoir, after all, is the soil. It is not that planned and built by the engineer, but is the deep permeable soil of the west and other arid countries.

It is scarcely possible for the man who has not studied the question to realize the large amounts of water that can be held in the soil. Under favorable conditions, soil can hold water to a depth of 4.5 inches of rainfall. That is the rainfall of the average year in Utah. Talk about a deep soil. A deep soil is the ideal water reservoir. Not only is it capable of holding much water, but it also retains water well. The evaporation from a free water surface is much greater than the evaporation of a bare soil nearly saturated with water. Since, however, there are many instances of western farmers securing 45 inches of water for the fall irrigation of their farms, the soil is far from saturated, and the evaporation from the surface is consequently much diminished.

The water now running to waste in our ditches, canals and rivers, should be brought on the lands as soon as possible. The water will distribute itself very uniformly to considerable depths in the soil, and be held there by capillary forces. Small quantities will naturally evaporate from the surface, and if the weather is warm, a very large quantity of the applied water may escape into the atmosphere. To prevent this, the top soil should be carefully stirred with harrow or disc as soon as the soil appears dry enough to be worked without danger of pulling. The loose mulch thus formed, will effectively check any serious loss of water from the soil. In this connection it should be remembered that deep stirring of the soil is much more effective than the shallow cultivation commonly given to soils.

It need not, perhaps, be said that on a shallow soil, underlain by gravel, fall irrigation will be of little or no value. In fact, on such soils, heavy irrigation should never be applied, since in all probability much of the water will wash through to the gravel stratum to be lost. The ideal soil for fall irrigation purposes is the deep, uniform, loamy, sandy or clay, through which the water can distribute itself uniformly, in the form of a thin film around the soil grains.

If by careful use of the fall water, the soil has been stored with moisture, the farmer may rest assured of a good crop the next year, whether the season be dry or wet. Experience and experiment have taught that when the soil is well stocked with water in the spring, most plants will grow through the season successfully without irrigation. Especially is this true of all planted crops. In confirmation of this statement recall the success of arid farming in Utah. This method of farming depends almost wholly upon the success with which the soil may be stored with moisture before the opening of the hot season. Of course, when spring comes the farmer must see to it that the top soil is not allowed to dry out to such a degree that seeding, if done in the spring, should be done early in the year, the top soil should be stirred as early as possible to form a mulch to prevent the escape of water.

It can be very advantageously irrigated in the fall. The ground can be brought into such shape that water is easily absorbed. Early cultivation can be given in the spring, and rich harvests of fruit can be secured as a

result of the husbanded moisture. Orchards should be irrigated, preferably, long enough before the first winter frost to allow the water to distribute itself well throughout the soil.

For sugar beets, grain and similar crops, nothing can be better than to secure soil which, at seeding time, is well stocked with moisture. Even for lucern and permanent grass fields fall irrigation is of great value. It is not very probable that, if the water is applied as to permit of uniform distribution in the soil, the freezing of the water will injure the plants any more than will the water that naturally falls upon the soil in the winter time. In many parts of southern Utah and other western states the precipitation of the winter is so low that farmers find it necessary to irrigate up the crops in the spring. It is very probable that by the wise use of the fall water, the soil could be charged with sufficient moisture to permit, with the assistance of the spring rains, the germination of seeds without a previous irrigation. This is a subject worthy the careful thought of the farmer of the south.

But the objection may be urged against fall irrigation that in the spring there is plenty of water, so much, in fact, that it cannot all be used. That is true only in a few places, and in those localities it ought to be held as a reserve against the irrigators. In this state there is, and always will be, more land than can be irrigated. Bring more acres under cultivation with the spring water. Give the soil in the spring a thoroughly good soaking to a depth of four feet. Care for the top soil properly, and a grain crop, to speak cautiously, may certainly be produced on the land.

Moreover, the more moisture in the land in the spring the more will be in it after the first spring irrigation and after every other irrigation. The yield of any crop is dependent, within certain well defined limits, upon the water at the disposal of the plant roots.

In localities where there is a superabundance of water, this article need not be read. There, too much water is probably used. But, the waste water and the loss of the fall water to agricultural purposes is a waste. In the great majority of the farming districts of the irrigated west, the fall water should be converted into dollars and cents for jingling in the farmers' pockets.

In confirmation of the value of autumn irrigation, Robert Pearce of Paradise, Cache Co., writes the Deseret Farmer, giving his personal experience as follows:

Several years ago we had a very dry autumn, no rain nor snow worth mentioning fell until after Christmas. We had a nice little orchard containing about one acre planted mostly in apples and pears with plums and small fruit set in between.

This orchard was commencing to bear nicely and we felt anxious to give it every advantage necessary for its benefit. We quit watering in September, thinking the fall rains would be sufficient to carry the trees through, but a long dry spell caused us some uneasiness about our trees. And, what made it worse, some of our neighbors argued that if we irrigated trees in the fall that the sap would run up into the tree and the sap would freeze and kill the tree.

We had our doubts about this theory because we noticed that the trees growing on the ditch banks, where they got water almost continuously, were doing very well, and nothing unusual happened to them.

We decided to irrigate the orchard and did so until late in November. That winter the snow was very light, but the weather was very cold.

Next spring in many of the orchards around us, which had not been irrigated, the trees were dead or nearly so, and some people lost from one-half to two-thirds of their trees.

Furthermore, we had a small patch of alfalfa at the lower end of the orchard that we watered also. Next spring this alfalfa was a foot high, when alfalfa that had been left unwatered was just starting.

This article applies to land where the water is not very near to the surface of the ground, and at times when rainfall is scarce in the fall of the year.

We argue that a vigorous plant, like a vigorous animal, can stand the rigor of a cold climate much better than a dry, neglected one. We usually mulch our trees with rotten manure just after the first snowfall. This protects the roots, helps to retain the moisture, enriches the soil, and seems to keep the tree from starting out too soon, which is a good thing in this climate.

nately the experiment was tried under favorable conditions. No other country was able to furnish us any definite facts bearing on this subject. The result of these experiments in Utah was of vital interest to the people of the whole arid region. In many sections the people profited by Utah's experience, and the arid region, through sugar beet culture and its benefits, assumed a vastly increased importance. It must be regarded as an important factor in the future not only in the production of sugar, but in general agriculture. Dry weather is favorable to the ripening and maturing of the beet crop and it is usually desirable to leave the beets in the soil until late in October, and sometimes until early in November, if the season is favorable. Sometimes, however, late autumn rains occur that produce a new growth of beets and a decline in the percentage of sugar. In this event it would be best to harvest the crop immediately after the rain, before growth sets in, provided it occurred at a time when the beets were about to mature, if not, it would be better to allow them to remain in the ground as late as possible. No flexible dates can be fixed for harvesting sugar beets, but the grower may be guided by a careful study of the conditions herein mentioned. The maturity of the crop is indicated by the leaves taking on a yellowish cast.

THE SUGAR BEET INDUSTRY.

THE largest consumption of sugar is in the most advanced nations—that is, consumption per capita, says the Rural Californian. The people of England consume most, about 65 pounds per capita, the Americans are next and consume 55 to 60 pounds. Sugar chiefly is a product of the beet or cane, the larger part of the world's production is from the beet, and the countries that produce most from it are the following order: Germany, France, Austria and Russia. Several other European countries produce in comparatively small quantities. Cane sugar is exclusively the product of tropical and semi-tropical climates. In this country beet sugar can be produced successfully in many localities, but in our continental possessions there is but a small part that is capable of growing sugar cane at all, and nowhere is the climate such that it can be produced profitably in unaided competition with warmer climates.

This has been demonstrated in Louisiana especially, and a few other localities on the Gulf coast. Without a duty on the foreign product the cane sugar industry would have to be abandoned in all those localities where it exists on the continent. Two crops from one planting are all that can be grown, while in Cuba and other islands of the West Indies from five to fifteen can be grown. In other respects the cost of growing a crop is materially greater in the continent. Cuba at the present time produces one-half of all the cane sugar of the world, and the prospect for the promotion will be much increased in the near future. The United States is her principal market, from the fact that the two countries

are in close proximity, and Europeans are chiefly supplied with beet sugar. This country is paying very nearly \$100,000 annually for sugar from foreign countries. If this outgo can be avoided by home production it will be source of large accession to our national wealth. We are now annually consuming more than 4,000,000 tons, and from the country bordering on the Gulf, Hawaii and Porto Rico we obtain about one-fifth of the sugar we consume. The balance is obtained in foreign countries and our domestic production of beet sugar.

Our insular possessions will hardly be able to supply our continental people with all the sugar they will require, certainly not for many years to come. It being questionable whether the population will not increase quite as rapidly as cane sugar production will be developed in our islands. Home producers of sugar need have no fear that production in the Philippines will have a crushing effect upon the sugar industry at home. Cost of transportation will afford the needed protection.

If America would produce all the sugar the people will need it must be from the beet. In Germany the cultivation of the beet began when the sugar cane was but seven years old. By care in the selection of seed and improved cultivation the percentage has been raised to about 12. So far as raw sugar in this country are available they nowhere at the present show so low a percentage as in Germany and other European countries. In California it is exceptionally high, materially above the percentage in Europe after years of experience. If it were at all ever some when America shall produce her own sugar it will chiefly be from the beet, and it is an industry that must be patronized and encouraged in order to prevent depletion of our wealth.

So far the beet sugar industry has not been as successful in this country as in some of the European countries, notwithstanding the higher percentage of saccharine here. The reasons are that as yet the American grower of beets has not the dogged industry of the Europeans, especially the Germans, though it requires more labor over there to produce a crop than here, and that here the owners of the establishments

for converting the beet into sugar exact too much profit, and leave too little for the beet cultivators. Any plant which yields a high percentage of saccharine is extremely exhaustive of the fertility of the soil. Californians have not yet learned that refertilization is essential to profitable production except in respect to citrus fruits.

Sugar Beet Growing in Central America.

HON. GEO. AUSTIN, agricultural superintendent of the Utah Sugar company, writes the Deseret Farmer as follows:

The new beet sugar factory in Sanpete and Sevier counties will be erected in ample time to work up the crop of 1906. About 4,000 acres have already been contracted for a term of years. About 2,100 in Sevier county and 2,000 in Sanpete county. We are pleased to say that most of the farmers in both counties are taking great interest and are plowing up their alfalfa and selecting the very choicest land for the beet crop of next season. Should next year be favorable to the beet crop, there is no reason why this new plant should not make one of the greatest records that has ever been made for the initial run of a sugar beet factory. We have now employed for the Sanpete and Sevier districts three capable agriculturists, two in Sanpete and one in Sevier county, who are giving their attention in visiting the farmers who are now under contract, and also soliciting more acreage from new contractors; and encouraging the farmers to prepare their land in good shape for the receiving of the beet seed next spring.

This year the beet crop is not very favorable, and especially is it quite poor in Sanpete and Sevier counties, but we have learned by past experience that in the year following a poor crop, a large yield is almost invariably obtained. Were it not for this fact, we hardly think that any of the company could be induced to erect a factory in either of these counties under the present conditions. Eight years ago we had the same trouble with the beet crop, the entire yield averaging only about seven

tons per acre, the following season our yield was nearly 14 tons per acre, and taking the two years and averaging them up, makes about 10 tons per acre. We hope that the farmers of these two counties will be able to raise sufficient beets so that we can erect another factory in the very near future in Sevier county. We would encourage every farmer who is under contract with us, through the columns of this paper, to plow up his alfalfa land at once, so that it will be in good shape to receive the seed next spring. By so doing the seed can be planted early in the spring, which will give the beets a chance to grow and cover the land before the weather gets too hot. In districts where the beets have to be irrigated to bring up the seed (which is the case in many instances in Sevier county) a good crop can hardly be expected.

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G. W. Wright, Naacodoches, Texas, says: "My daughter had chills and fever for three years, she could not find anything that would help her till she used Herbine. Her wife will not keep her without it, and cannot say too much for it." Sold by Z. C. M. I. Drug Dept. B.

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