

CHAPTER IX.

ADVANTAGES AND DISADVANTAGES OF IRRIGATION.

THE advantages of irrigation and the benefits resulting are to be inferred from what has been given in the preceding pages. In brief, it may be said that these consist in the ability to supply water at the right time and in proper quantities to the growing plants, resulting in the largest and best development of these and facilitating a close tilling of the soil, a rapid succession of crops where the temperature is favorable, intensive farming, and a dense rural population; with all of the accompanying benefits of rapid communication, modern improvements, and social intercourse. As one of the advantages also may be enumerated the ability to put to use, by sewage irrigation, the waste matter from organic life, bringing together and making of value the sandy places and the substances which otherwise become nuisances.

There is no gain without some small loss, and it must be recognized that there are some disadvantages connected with irrigation. Labor and vigilance are necessitated in applying water to the fields. The proper supply may not be available

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when needed. Marshy conditions may result from excessive use of water by neighbors or from unavoidable causes, and, worse than all, the artificial application of water to the soil may bring to the surface such a quantity of earthy salts, known as alkali, that the land, otherwise fertile, is ruined. In humid climates also, after a heavy or clayey soil has been irrigated, a sudden shower may occur, drenching the fields and injuring the crops. Under proper conditions, however, such as those realized in parts of the country where water is intelligently applied to the soil and the tilling is thoroughly done, the most remunerative and beneficial returns are had from the irrigated lands.

If, for any cause, the proper amount of water cannot be had and applied as needed, irrigation fails of being complete, and disasters ensue detrimental to the further spread of this method of agriculture. Incomplete irrigation, like an unfinished building or any other project stopped half-way, is always discouraging. In so far, therefore, as irrigation may be chronically liable to lack of completeness through a deficient water supply, it becomes disappointing.

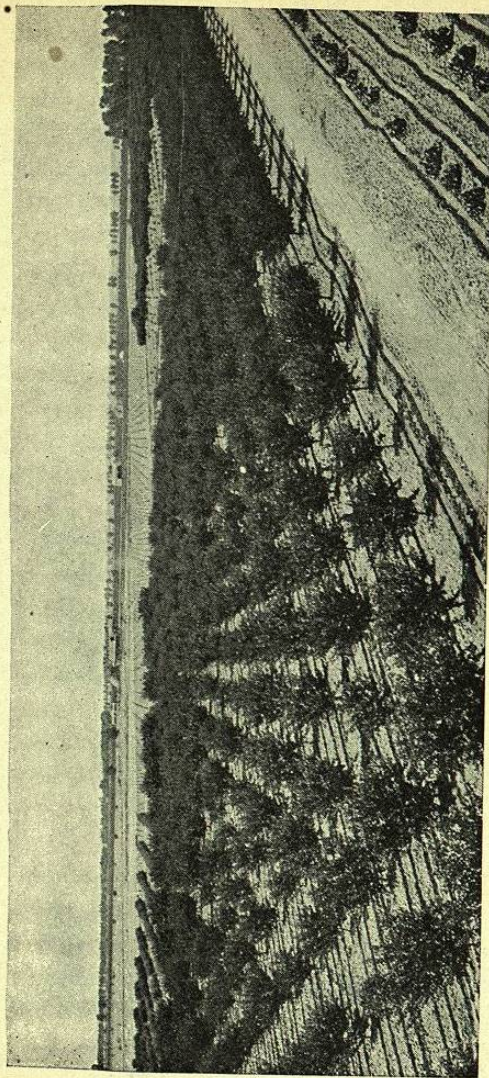
A serious source of annoyance is that occasionally experienced by scarcity of water. While many of the irrigators enjoy a perennially abundant supply, there are others in nearly every community whose farming operations are rendered precarious because in one year or another they

suffer from a shortage of water. The disaster resulting depends largely upon the character of the crops planted; some kinds may be able to survive the drought and yield a small return, while others may be a total loss.

The higher the development of an industry, the greater the opportunities for failure and the wider becomes the effect of disaster. Irrigation may be considered as the highest type of agriculture, and, under favorable circumstances, largest results may be expected; but, as in every other highly specialized industry, not every man makes a success.

If one hundred men should be placed upon new land in a humid climate, and the same number on irrigated farms in the arid region, it is probable that at the end of five years there would be a greater proportion of successful farmers among those on the land depending upon rainfall. As time went on, however, and the art of irrigation became better understood, the returns from the irrigated lands would far outstrip those from the humid. With ability to apply water to the dry fields at the right time, the regularity of the crop is insured, and farming operations can be conducted with a certainty unknown in humid climates.

Small farms are characteristic of successful irrigation development. Throughout Utah, for example, the average size of an irrigated area is less than thirty acres. By means of this, a family is supported in comfort and there is a gradual in-



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crease in wealth. The advantages of ownership in small tracts can be seen at a glance in the well-tilled fields and the general appearance of suburban activity and prosperity. There is none of the loneliness and isolation, so depressing where farmers' families live a mile from one another and rarely see any one except a few acquaintances and have little means of keeping in touch with the activities of the outside world. The cultivation of small tracts also necessitates more or less diversified farming: fruit trees and vines are raised, and when one crop is removed another may be planted if the season is not too severe. A few cattle and sheep are kept upon the neighboring open range, and there is continued occupation throughout the year for all able-bodied members of the family in caring for the fruits, the gardens, or the animals. This is in marked contrast to the great wheat farms, where the work is concentrated during a few months and the prosperity of the family is dependent upon a single crop. There is developed in the irrigated regions a better class of citizens, with broader experience and wider interests.

SEWAGE IRRIGATION.

Irrigation affords not only a method of stimulating plant development, but it has been found to be advantageous in both humid and arid climates in furnishing a means of disposal of various waste products resulting from human and animal activi-

ties, making these of use instead of allowing them to become sources of annoyance. One of the most convenient ways of getting rid of deleterious substances has been to throw them into running water, or to use flowing water as a means of convenience for taking away organic matter which otherwise, by accumulation and decay, would be injurious to health. From the earliest times creeks and rivers have been regarded as the natural means of deliverance from nuisances. With the introduction of waterworks and systems of sewerage, we have, in effect, diverted the streams to our doors and made them carry away our refuse.

At the same time these streams, or portions of them, serve as sources of water supply, and it not infrequently happens that a river which is in effect an open sewer for a considerable population is used at lower points to furnish drinking water. This condition, when plainly stated, is highly repugnant, but nevertheless exists throughout the United States. The city of Washington, for example, has for many years taken water directly from the Potomac River, which receives near its head waters the drainage from coal mines, the refuse from manufactories, and along its course the sewage from towns and cities of considerable size. Although a large portion of the organic matter in the water may be destroyed by sunlight and exposure to the air, yet, with the known great vitality of the lower forms of life, it is highly probable

that the germs or bacilli of typhoid and related filth diseases travel for many days without complete destruction.

The existence of this condition has led to careful study of the question whether a better disposal of sewage cannot be made. Although sources of annoyance and even danger to public health, yet these waste products have some value as fertilizers. If, instead of defiling the rivers, the sewage can be put upon agricultural land, two objects will be accomplished—the preservation of the purity of rivers, and the consequent great gain to health and to various industries dependent upon pure water, and the increase in fertility of sterile soil.

The conditions in Europe in regard to pollution of streams have become far worse than in the United States, because of the greater density of population. Elaborate experiments have been made to demonstrate the practicability of using sewage in the irrigation of farming land; and in the vicinity of Paris, Berlin, and a number of other cities large tracts are being cultivated by its use. The chief difficulty arises from the fact that there is a certain amount of sewage to be disposed of, summer and winter, in the crop season and out of it, and this quantity is often greatest during storms or at times when plants do not need additional moisture. It is, therefore, necessary to provide large areas of land, and to regulate the application of water to these more with reference to getting