

Irrigation - Its Relation to the Development
of the Western Plains.

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It is a law of nature that man shall adapt himself to his surroundings. What may prove his best means of gaining a livelihood in one section of a country may be wholly unsuited to another. Methods of agriculture, successful in Florida or Louisiana are practically useless to the farmer in New York. No more are Illinois methods suited to the plains of Kansas, Nebraska and Oklahoma.

Practical experience has proved that to make it possible for any considerable number of people, more than the present population, to produce enough to live upon between the 98th meridian and the Rocky Mountains some other than the present system of farming must be adopted. The country has been settled by people bred to eastern customs — men fitted for successful farmers in the humid climate of their native state, but practically helpless when thrown under the changed conditions of the semi-arid West.

Ten to fifteen years have elapsed since the actual settlement of the broad strip of land of which this article presumes

to treat. Many took up land in it merely for speculative purposes but the great majority were home seekers. A few came with a fair knowledge of what the country, its climate and resources really were but the greater number were deluded by exaggerated reports from newspapers, boomers and friends. A series of fairly good crop years during the early settlement of the territory tended to give a coloring of truth to the falsehoods of the boomer. "That the statements by cattlemen that it never rains in the West are absolutely untrue and intended only to frighten away the granger"

When in a few years the rainfall settled back again to the average all were in some measure disappointed. The larger cattle companies had been driven from their ranges by the settler and he in turn was driven out by the drouth. A few saw their mistake in time and worked into pastoral pursuits. Others more favorably situated have adjusted themselves to their changed conditions and are using irrigation in conjunction with rain in

their farming. The vast majority, however are eking out a scanty subsistence with but little chance of bettering their condition under the present system of farming. In no part outside the irrigated portions of all this great tract is the population so great as it was eight years ago. A few isolated districts have gained in population and general prosperity while all the rest has stood still or lost in one or both respects. Here bare bits of prairie have been transformed into beautiful homes, prosperous communities in prairie that before man had taken the regulation of the water supply into his own hands was as undesirable as the sun scorched land that still adjoins it.

Here then seems the solution, if there is any, of the problem of the development of our western plains.

Granted this is the solution, for all concede it is, that all that is needed to render this land fruitful is the artificial application of moisture our next problem is how to obtain the necessary water.

Here lies the question that is confronting the western people today, a question that can yet be but partially answered. Can the requisite amount of water be obtained? Engineers have been studying the outlook for years. Their conclusion is that a considerable portion of it can be from the mountains alone. This with the other sources will certainly irrigate a large proportion if not all of the desirable land in question.

There are four great sources of artificial water supply utilized in different parts of the world: (1) from flowing streams (2) from the underflow of streams (3) local flood water held in reservoirs and (4) from wells. Each of these sources is drawn upon extensively for irrigation purposes on some part of the globe. All may be used successfully on our western plains.

As yet the first mentioned is the only system that has played any conspicuous part in American irrigation. It is the cheapest and most easily handled system of the four. Enough has been done already to show that the water supply from this source

as managed at present is inadequate to irrigate any considerable percent of the arid west. Not nearly all the available supply is yet utilized but that flowing away and wasting is chiefly in the smaller streams which will water but a few hundred acres each at most. Probably enough is wasted from this source if economically used to produce an abundance to support the present population that is now depending on dry farming.

To add to this supply Major Powell and other engineers have estimated that for an outlay, comparatively small for the benefit assured but too large for individual undertaking, reservoirs can be constructed in the mountains in which millions of cubic yards of flood water can be held in reserve till needed on the plains below. Water may thus be held and put to a profitable use that is being at present worse than wasted. It rushes down the streams in such quantities that all cannot possibly be used, and at a time when the farmer usually has least use for it. Undoubtedly this addition to the water supply would add greatly to the possibilities of

plains development.

This resource exhausted the underflow bids fair to have an extensive influence on the western water supply. Prairie streams though having an impervious bed rock at a greater or less depth below the surface have in nearly all cases an upper bottom of quicksand or gravel, this varying from a few feet to several hundred in thickness. Through this sand or gravel a stream of water flows the same as in the unobstructed stream above though very much slower. Often the volume of water passing a given point is greater in the underflow than in the overflow - indeed in very dry weather it contains the only water in many western creeks and rivers.

The average incline from the mountains eastward of seven feet to the mile makes it an easy matter to tap the underflow at a considerable depth and bring the water to the surface for use in the course of a few miles from the source. Some idea of the possibilities of irrigation from the underflow may be gained from the fact that a single ditch in the Arkansas valley near Dodge City

Kansas furnishes water to irrigate 30,000 acres of land. Ditching the underflow for irrigation purposes is distinctly an American idea.

The third source, local flood water, though seemingly impractical in the United States is one of the two principal sources of water for irrigation in India. In any country not a desert more water falls at some seasons of the year than is needed. In all countries there is some land not used by man on which moisture falls the same as on that which is used. On our western plains enough water falls on one acre in the course of a year to irrigate an adjoining acre were there any means of holding it in reserve till needed. In India immense reservoirs are constructed at enormous expense in which water enough is often collected to supply the dependent district for two seasons. One third of the water supply of the Empire comes from this source. At least one farmer in Kansas Mr. G. M. Munger of Greenwood County is irrigating successfully on a large scale from local flood water.

The last source, that of wells, must of necessity be confined to intensive farming market gardening or small fruit culture. This does not necessarily result from scanty water supply from wells but from the expense of raising it to the surface. It has been found impossible to lower the water very much in some wells in the Arkansas valley even with the best improved steam pumps.

Most farmers cannot command the means to put in an elaborate steam pumping plant even if it would pay when established. The wind mill furnishes at present and will probably continue to furnish the motive power to raise water from wells, at least for individual consumers. The best improved mills will furnish water for but a few acres at most, hence the conclusion that the well supply must be confined to intensive farming. This is nothing to the discredit of the system, however, and it places a means of obtaining a good living within the reach of nearly every industrious man. In India 20 000 000 acres are irrigated from wells alone, being raised almost exclusively

by man power. With our improved pumping machinery well water is destined to become an important factor in western irrigation.

Each of these four systems of irrigation is being successfully operated in some part of the world. Each may and will be used in the near future in some part of the West according as it is best suited to the natural conditions of the surface.

Americans have always been wont to look with pity on the farmer who must depend on the use of irrigation in the production of his crops. They have accustomed themselves to think of the labor expended in the artificial application of water as just so much in addition to that needed under ordinary conditions with no redeeming features to compensate. In short they have passed judgment in the irrigators case without a hearing in his defense.

Few people know that over half the worlds population live in countries where irrigation is absolutely necessary for the production of crops. Few know that the most fertile and most densely populated communities of

ancient or modern times depended on irrigated lands for sustenance. Fewer still know that the soil of our western plains is as rich, that rainfall is as great and that the facilities for irrigation are as good as in countries many times as densely populated.

The Anglo-Saxon has ever taken unto himself the best land of the world. Never until recently has he attempted farming where the rainfall was insufficient for the production of the staple product. The days of conquest are over. The unoccupied lands in humid climates is practically exhausted so he must adapt himself to changed conditions. For the Anglo-American the Great Plains is the only land left out of which he can carve himself a home. He will have to be educated in the new school of agriculture. The first generation will not learn to make the best use of its possibilities but a second generation will take up the work where the father left off and in time the last vestige of the Great American Desert will have disappeared.

It may never be possible — it would not

be desirable - that our plains become as thickly settled as other countries with no more favorable climatic conditions but with our improved machinery for lifting water, our superior farming implements and a more cultured class of citizens we should be able to provide comfortable homes for thousands where now hundreds exist.

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