The McCook Tribune.

By F. M. KIMMELL.

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IRRIGATION IN NEBRASKA.

The arid region of Nebraska adjoins the state of Colorado on the west and south. On both sides of this imaginary line the soil, the climate and all natural conditions are the same. But on one side there is agricultural prosperity of a high and growing order. On the other side there is poverty and distress. On one side lies the garden, on the other side the desert. During the past season the farmers living in the valley of the South Platte in Colorado raised train loads of potatoes and sold them for fabulous prices. In the same period the farmers living in the valley of the South Platte in Nebraska raised scarcely anything,and many of them are now receiving food and clothing from the state, and they must look to the same source for the seed of future crops.

Nebraska had the advantage of earlier settlement. She has a larger population and more wealth in the aggregate, but in the matter of irrigation she is but an infant to a man when compared with Colorado. And irrigation in Colorado has only begun.

These facts, however, are not as discreditable to Nebraska as at first appears. Nobody ever pretended that Colorado could depend on rainfall. Western Nebraska, with the aid of unscrupulous land agents, was persuded that she could. Experience is a hard master, but we are learning the lesson at last, and the late severe drouth may turn out to be a blessing in disguise.

As the best possible means of illustrating how irrigation can be accomplished here, this paper will undertake to trace how it has been accomplished in Colorado under similar difficulties.

I.—BEGINNINGS OF THE WORK IN COLORADO.

The total area of Colorado is 66,560,000 acres. Of this vast domain 26,560,000 acres is mountain land, hopeless for agriculture, but rich in minerals and timber. The balance, of 40,000,000 acres, is composed of plateau, plain and valley, and has a soil fit to grow any crops that will thrive in this latitude and altitude. But it is perfectly arid.

When the first pioneer settler pushed his way across the plains and into Colorado,over thirty years ago, he found only a few thousand of these millions of acres under cultivation, and these only by the means of rude ditches constructed by unskillful Mexican farmers. Now, according to the latest statistics available, Coicrado has 4,004,409 acres under ditch, for which she has paid, through the investment of private capital, $11,150,000. Better than this, she has organized all the public and private forces, enacted comprehensive laws,and done various other things to secure the further development of irrigation on the grandest scale. How has all this been done? It is a story of persistent energy and untiring efforts directed against difficulties, but aiming at great and certain results.

The first attempt to build a large ditch in Colorado was undertaken in 1860 by a few citizens of Denver. The spent $10,000 and managed to make a complete failure of it. owing to lack of experience and the unfortunate fact that their verdant engineer had omitted to give any fall to his grade line. Both the citizens and the engineer retired from the business, but the spirit of enterprise kept on. Two years later the Platte water company's ditch was built with better success, and it still furnishes Denver with its irrigating water. Between 1862 and 1880 the irrigation movement got well under way. Numerous small ditches were made, fully demonstrating the feasibility of the project, and a systematic effort begun to interest large capital. Colorado had first to overcome the skepticism of capital, as Nebraska still has in some measure.

The real development of the arid regions in the Centennial state began with the formation of what is locally known as the "English company," an association of Scotch capitalists. Their first undertaking was the construction of the Larimer and Weld canal, which takes its source in the Cache la Poudre river, two miles northwest of Fort Collins, and runs east across Larimer and Weld counties for a distance of forty-five miles. It is twenty-five to thirty feet wide and from five to seven feet deep. It has a capacity sufficient to irrigate 40,000 acres, almost all of which are now in a high state of cultivation. This large canal has now been in operation nearly ten years. Three small reservoirs are used in connection with this enterprise.

The success of this canal led the same capitalists to undertake a larger and more difficult project. This was to tap the Platte river as it leaves the mountains and develop the lands lying around Denver. The scheme has been long talked of and for years had waited only for the assistance of capital. The construction of the "High Line canal," as it is called, was begun early in the spring of 1880 and continued without cessation till 1883. It is a fine piece of engineering, with its dam in the river, its tunnel at the head of the canal, its flume in the canon, and its numerous flumes across the creeks that lie in its course. The main canal is seventy miles long, and forty feet wide for a large part of its length. It has a branch about twenty-five miles long and of smaller dimensions. It waters between fifty and sixty thousand acres. It cost $650,000.

This was the beginning of irrigation in Colorado. It demonstrated that if water could be applied to the arid soil the desert would blossom as the rose. It converted timid, unbelieving capital into an appressive ally of the state's development. With the success of these two undertakings of the English company,irrigation was established as a great and promising factor in the life of Colorado. Capital came from England, from Holland, from New York, from Chicago and St. Louis, to seek investment where returns were assured. And Denver itself—a hint for Omaha—readily invested in irrigation enterprises the capital it had accumulated with phenomenal rapidity in mining and real estate. Nebraska stands today where Colorado stood ten years ago.

II.—NORTHERN COLORADO.

From a Nebraska standpoint the most interesting part of irrigated Colorado is that portion lying between Denver and the Nebraska line, and especially in the valley of the South Platte.

This part of Colorado is exactly like our arid region. It has the same soil and climate and draws its water supply from one of the sources which we must utilize. The state line that separates Nebraska from Colorado is only imaginary, but the line that runs between irrigated prosperity and arid distress is a real line, plainly marked on the surface of the earth.

The association of foreign capitalists already alluded to undertook the development of the wide-streching plains in the northern part of the state. The Platte valley canal takes its source in the Platte river, about three miles north of Lupton, a town twenty-six miles north of Denver. The canal has an appropriation of 400 cubic feet per second and can irrigate 20,000 acres. The construction cost about $35,000. There is a substantial dam in the river, 200 feet long, which cost about $3,000. From the fact that there are no flumes nor any timber work of any kind on the canal, with the exception of the dam, its maintenance is comparatively inexpensive.

The Loveland and Greeley canal is another of the enterprises with which this same company is connected. Its head is located on the Big Thompson near Loveland. It is thirty-one miles long, twenty-six feet wide and five feet deep,with a variable grade. Its appropriation of water is 446 cubic feet per second, and it is capable of irrigating 22,000 acres, of which nearly one-third is under cultivation. This canal cost about $150,000. There are two reservoirs near its head, which have a surface of nearly fifteen hundred acres. A reservoir has also been constructed at its lower end, on the hill overlooking Greeley, which is capable of holding 2,000,000 cubic feet of water.

The North Poudre canal is worthy of mention in this connection. It is a private enterprire and presents some engineering features of more than usual interest. The canal take its water from the north fork of the Cache la Poudre river, in the northwestern part of Larimer county. The dam in the canon is as good a specimen of this class of work as is to be found in the state. The dam cost $7,500.

III.—SOME LARGER COLORADO ENTERPRISES.

In other parts of the state,especially in the San Luis, the Gunnison and the Arkansas valleys,there are still larger works of irrigation.

Prominent among them is the Empire canal, in the San Luis valley, which takes water from the Rio Grande, fourteen miles above Alamosa,and extends southward to the Rio Conejos. This is thirty miles long, sixty feet wide at the head and five and a half feet deep; discharges 1,400 cubic feet per second; covers 120,000 acres, of which the company owns 74,000. It has cost $120,000 and promises to be a most profitable investment.

The Del Norte is the largest irrigating canal in the United States. It is sixty-five feet wide on the bottom at the hesdgate, carrying water five and a half feet deep,with side slopes three to one, making the top width at water line ninety-eight feet. Four miles from the head it is bifurcated: the larger branch being forty-two feet wide at the bottom. and the smaller branch thirty-eight feet wide. There are about fifty miles of main channel. It carries something over 2,400 cubic feet of water per second and is circulated to irrigate over 200,000 acres. It is located in the San Luis valley in southern California, taks its supply from the Rio Grande river, and covers the land in the northern end of the valley. It cost three hundred thousand dollars. The peculiar feature in the construction of this canal was the rapidity of ils completion, the entire work being accomplished within a period of four months.

The Citizens' canal is in the same neighborhood, taking its supply from the Rio Grande river, eight miles below the Del Norte and on the opposite side of the river. It is designed to irrigate the lands in the southwestern part of the San Luis valley. It covers 120,000 acres and cost $200,000.

The Uncompahgre canal in the west central part of the state,covers about sixty-five thousand acres of the lands of the Uncompahgre valley. The entire valley has a considerable fall to the north, about sixty feet to the mile, which gives the canal the appearance of having an ascending grade, and necessitates the frequent use of drops or overfall. The entire cost of this canal was $210,000.

The Grand river canal system, in the extreme western part of the state, is a combination of three sanals, projected and largely built by the farmers of the Grand river valley, but purchased and united by the present owners. The combined appropriating capacity is 680 cubic feet per second. There rre about sixty-five miles of main channel, covering some forty thousand acres. A striking feature is numerous overfalls or "drops," ranging from four to thirty-six feet in height.

The Fort Morgan canal, in the northeastern part of the state,takes its supply from the Platte river, about ninety miles below Denver. It is twenty-eight miles long and thirty feet wide at the bottom; carries water three and a half feet deep and has a slope of one in 3,300; capacity something over three hundred and forty cubic feet per second. It irrigates twenty thousand acres and cost about ninety-five thousand dollars.

Besides these large enterprises many others are under way and irrigation is still in the full tide of development.

IV.—HOW THE STATE FOSTERS IRRIGATION.

It is neither possible nor necessary within the limits of this article to describe more fully the progress of irrigation in Colorado. The object is to show that our neighbors have successfully overcome every difficulty which we are now facing, and thereby point the way to the speedy and complete reclamation of our arid lands. For this purpose, however, it is very essential that the work done by the state should be understood.

In his report to Governor Adams of December, 1888, J. S. Greene, state engineer of irrigation, used these words: "But, however energetic her people may have been, however skilled in construction or fruitful in resources, it was in the legislative halls and court rooms that they fostered best Colorado's wonderful development in irrigation enterprises." In other words, there would have been no capitalists, no grand undertakings, if the executive and legislative officers of the commonwealth, and all manner of public associations, had not united in an effort to push the agricultural development of the state. That is the point which the people of Nebraska must comprehend at this juncture.

In the first place, Colorado has given great attention to her laws bearing on the subject of irrigation. She has constantly broadened them to meet the growing demands of the subject, and only recently has appointed a commission to completely revise them. The object has been to encourage capital, to protect the water supply, to guarantee equal opportunities to all parts of the state. A very important step in reaching these ends was the appointment of a competent state engineer, who should have the oversight of these enterprises and see that they conform to the wise laws of the state. The provisions of these laws will be more fully dwelt upon in a subsequent article.

In his message delivered to the legislature during the past week, Governor Routt admirably summed up the present relations of the state to this subject. He said that irrigation was the most vital and pressing subject that would come before the legislature; that the people were holding mass meetings in various parts of the state to discuss priority of rights and the use of water for domestic purposes; that this matter called for an early and decisive opinion from supreme court, and that the legislature should pass effective laws on the subject. He also advocates the establishment of reservoirs, and urges the legislature to call upon congress to assist in this work by speedily donating the arid public lands to the states.

Besides the assistance directly obtained from the state, various forestry, agricultural and fruit growers, associations are giving their influence systematically to the development of irrigation in all directions,and are guarding it from every standpoint, from the preservation of the water supply on the mountain tops to the fertilization of the farthest acre on the edge of the arid belt.

It was by means of this deep and earnest conviction of the value of irrigation that the work has been brought to its present stage in Colorado. It is by similar methods in cooperation with private capital and local enterprise, that a great empire west of the 100th meridian in Nebraska can be made prosperous.

Colorado ranks high among the mining states. It abounds in silver, gold, iron, coal and other minerals. But, without a single foot of naturally arable land, its agricultural product in the year of 1890 exceeded in value the output of all its mines. Could there be a more eloquent tribute to irrigation?

In closing this sketch of the progress in Colorado I leave untouched a mass of material on the subject for lack of space. But enough has been said to prove the truth of an old proverb, which, revised for the occasion, would read: "What Colorado has done, Nebraska can do."

Next week's article will deal with the irrigation laws of Nebraska and the urgent demands for their revision and enlargement,a subject rendered timely by the approaching convention at McCook.

WILLIAM E. SMMTHE.

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