average, due to the first class methods of construction and the character of the country. Their dam across Current creek conserves water enough for irrigating 25,000 acres adjacent to the town of Goshen. The land, being exceptionally well adapted to fruit culture and the raising of the sugar beet, lies along the lines of the Union Pacific and Rio Grande Western railways, while a constant market is insured from the contiguous mining districts.

The boldest project now under way is that known as the Mammoth reservoir on Gooseberry creek in Sanpete county, eight miles east of the town of Fairview. The dam of this company will be a most massive structure of earth and of stone masonry, 25 feet high. It is between solid ledges of rock with curved line up stream and solidly built into the ledges. The outlet is by tunnel, also through the solid rock, and the spill way, likewise, in the natural rock, has a discharge capacity twice that of the creek flow during the heaviest freshets. As there are very few higher dams than this in the world it shows the immense progress making in engineering work and in public opinion of the advisability of such great structures and also warrants a more detailed description than usual. As now designed a short canal connects the reservoir with a tunnel westward through the adjoining range; this tunnel is four feet wide by six feet high, and will be about one and one-half miles long. Debouching into a ravine on the west slope it allows the water to reach some 30,000 acres in the San Pitch valley of great richness of soil. This reservoir will store 60,000 acre feet of water.

In summing up we find that there has been inaugurated and under construction irrigation works for watering over one-third of a million acres. Not the least important feature of this progress is the greatly improved character of all the works now being built, whereby a saving in the cost of annual maintenance is being brought about. Another pleasing feature is that the young generation of Utah, educated naturally to irrigation methods, is rapidly settling up these newly opened regions. The vastly improved methods of construction moreover has not enhanced the cost of a perpetual water right; for in Utah it is the rule that the land and the water go together and that the owner of the land eventually becomes the owner of the right to use the water.

The cost of this perpetual water right averages about $10 per acre; lands subject to it are worth about $25 per acre, while the average for all Utah of improved farms is $84 25 per acre. The farm unit is rarely more than 40 acres, while for the whole Territory the average holding is 27 acres. The cost of annual maintenance has heretofore been high, but it is rapidly coming down to less than one dollar per acre.

Another gratifying feature is that the duty of water is being greatly enhanced, our people are learning that much less work suffices for a given acreage while an increase in products is also brought about. Heretofore the acreage duty in Utah has been 100 acres for a cubic foot of water per second. In many places this amount now irrigates twice that area. Notably do we have an object lesson given us by the people of the settlement at Levan. Here 365 miners inches or 7 cubic feet per second thoroughly irrigate 2,100 acres of diversified crops. This is a duty of 300 acres to the second foot, and the yield per acre is above that of the rest of the Territory.

The year's record of active work has more than ever emphasized the Utah system of building even great irrigation works by association, by co-operation, by swapping land for both labor and material, and by making a beginning finally construct the whole without debt.

In the field of irrigation inquiry much has been done during the past year. Careful measurements and study demonstrate that no more perfect conservers of water exist than our irrigated lands themselves. Water thus applied is only partially evaporated while on the longer streams this water drains back and is so used over and over. In the forty miles of the Jordan river this occurs at least three times, and a project is now on foot to take the water out again by current motors near the outlet on the adjacent lands fifteen to twenty feet above the river level. While these return waters vary with different streams it is a great step in advance to even partially determine them locally.

A forestry association, composed of some of the best educated and thinking men of this region, who are earnest workers, is already doing good work to not only save what we have left of our forests, but also by "parking" to promote forest growth all along the lines of the headwaters of our streams.

In this connection, however, the best result effected has been the founding of the State Irrigation association for Utah. As a potent factor in promoting irrigation and all cognate matters this will probably do much to educate our people and keep them in the front rank of irrigation agriculturists. The machinery of this organization is simple but we believe effective.

In conclusion we of Utah feel that no better move has ever been made for the people of the West than that of bringing about our National Irrigation Congress. Without taking into account what has been done to concentrate our ideas and our efforts in a legislative way, the incentive given for increased and better work along all the lines of irrigation would alone compensate Western people for the time, trouble and expense incurred.

Gentlemen, that Utah thoroughly appreciates the benefit she has derived by meeting you year after year is best evidenced by the annually increasing number of our delegates.

IRRIGATION AND FRUIT.

MOAB, Grand Co., Utah,
August 26th, 1895.

Reading over Utah Agricultural College Bulletin No. 39 caused me to think in regard to the watering of our crops. The report gives the amount of water used and the result of crop. Now my experience is that this is a hard point to settle—to say the amount of water and the time between watering, as there is so much difference in the evaporation. Sometimes we have warm still days, not any wind; and even the weather is hot and a few clouds are passing over, evaporation is not as much in a week as there is in a day of dry wind. A person has to watch and examine his crop to know when it needs water. It will do as much damage to water some crops before it is needed as it is to let them suffer some for water. Corn is a crop easily damaged by water. While young it should not be watered if it will grow at all without; then when it is watered it should be cultivated as soon as dry enough. Some think cultivation is only to kill weeds and grasses, but that is a mistake; the soil wants stirring because the plants get a great deal of nutrimen from the air through the roots. Some say we never cultivate small grain; yet if you will experiment by planting some in hills and giving it a good cultivating through the season, you will be surprised at the results.

Now to return to irrigation; how many of our farmers can tell when a crop needs irrigation? I knew a man who had a crop of corn and who said to me one day, "My corn is yellow, and I have watered it every week;" while at the same time if he had not watered at all his corn would have been better for it, as I had not watered my corn at that time. An orchards does not need near as much water as other crops. In my travels I notice that the most of the orchard are watered too much.

On page seventy-five of the bulletin, in speaking about sub-irrigation, it suggests having a hole bored in the tube opposite the vines. If I were only to have a hole at every vine I would as soon have it between the vines as there are more small roots to take up the water. My way for irrigation is to get all the ground watered; if there is a dry spot it does not furnish any nutriment to the tree or vine. I have seen parties run a furrow alongside of the trees and then dig a hole by the tree to hold water, then leave all the ground between the trees dry, as though a tree was like a cow and could drink its fill as if it had a mouth at the trunk of the tree. A tree has a multitude of mouths but they are at the end of the roots; all of the little fibers have a mouth, and if they are supplied they will multiply very fast. A person to be a successful horticulturist should be able to tell by the looks of a tree whether it was famishing or not as readily as a stockman can tell whether his cows or horses have enough to eat. It does not pay to raise hogs and not feed them enough, nor does it pay to grow fruit unless you grow the best; and the way to do is to feed the trees, fill all their mouths—not only a few at the trunk of the tree. I can tell a tree that is famishing as well as I can tell a fat horse from a poor one.

But there are a great many things I do not know. I do not know, for instance how to prune so as not to grow too much wood. I have wagonload after wagonload to move from my orchard. I have read where men have said you should prune for fruit; I would like someone to inform me through the NEWS how to prune so there would not be so large a growth of wood and a good growth. I notice where I have large fruit the trees make a large growth. I have apple trees