at Denver. The interchange of ideas at all of these gatherings, formal and informal, has proved most beneficial, not only from the irrigation standpoint, but in showing the great value of water, even in small streams, and how they may be utilized for power transmission and subsequently perform their duty as promoters of agriculture.

During the past year in Utah more work of this character has been placed under construction than ever before and ere long some 50,000 or more horse power will be added to our steam plants and at a cost for working averaging one-third less, and this without interference with the waters of irrigation.

Essentially a great mining region, our people have seemingly just found out the immense value of water in promoting more cheaply the production of the metals, crude and refined, and now tunnels driven into the bowels of our mountain ranges and miles in length are furnishing their quota of stored waters in addition to the stream supplies.

Perhaps as notable an instance of this as any is furnished by the new drain tunnel of the great Ontario silver mine at Park City. Here we have an adit with a cross section 6x8-6, three miles long and through which literally courses a small river flowing 1,333 cubic feet or 10,000 gallons per minute. Not only does this tunnel unwater the mine to a depth of 1,500 feet but it also furnishes the electrical power for lighting the entire mine and extensive mills of the company and running a portion of the machinery. Having thus fulfilled its function as a creator of power, our little river flows on and irrigates some thousands of acres of land along the Provo valley.

In like manner we find the water flow from the adjacent tunnels of the Anchor and Alliance mining companies, respectively 1¼ and 1½ miles long, harnessed to Pelton wheels supplying power and light for mines and mills and for operating power drills in the prosecution of the mine work and then these streams pass on to water the farms fifty miles away.

In the canyons of the Big and Little Cottonwood creeks there will soon be completed electric plants for supplying energy to operate the street railways of Salt Lake City, thirteen miles distant, and furnish light and power to it and to the great reduction works, mills and factories along the line of the Union Pacific railway south of that city. Here again the 20,000 and more horse-power that can be obtained is generated above the lines of the highest irrigation ditches and the present system of watering the valley of the Jordan from the mountain streams is in no way interfered with. The largest and most complete work of this kind is now being constructed by the Pioneer company, and utilizes the upper waters of the Ogden river, one of the larger streams of the Territory. The power thus obtained will be used for the city of Ogden for like purposes as that of the Cottonwoods for Salt Lake City, and also for extensive manufactories at that point near the line of the Southern Pacific railway; this power can be increased immeasurably by continued series of plants above.

I must not here omit mention of another great work, the Samson tunnel; this means the tapping of what is known as the "Oquirrh range," commonly called West mountain or Bingham district. Well under way the "Samson Tunnel" is now drifting westward to perform a work like its predecessors on the Park City side of the Wasatch mountains. With five miles of length, it underlies a thousand or more feet deep some of the world-renowned producing mines whose present pumping expenses are a severe tax. The water thus released, it is estimated will irrigate 3,000 acres above the high line ditch on the west side of the Jordan river, lands now worth perhaps prospectively five to ten dollars per acre with no possible present sale, yet which such supply of water will make worth from $150 to $200 per acre at once when irrigated, on account of their proximity to Salt Lake City.

While this form of utilization of our flowing waters is in no way new it is cited as showing the great progress made in Utah during the year in this direction, and how vastly it will add to the material resources of the State and cheapen the cost of production in many lines.

The past year has also seen the completion of the outlet sewer for Salt Lake City, which in itself at once becomes an important factor in irrigation progress, especially valuable for its proximity to a great city.

Six miles long, with a terminal diameter of 5½ feet, it can deliver to the rich but now barren lands adjacent to its outlet, some 44,000,000 gallons per day and for this usage the City of Salt Lake has called for proposals of rental. Seven thousand acres of market gardens thus rendered possible lying alongside of two transcontinental railways is surely a valuable adjunct to any great town like Salt Lake.

In this connection we must not forget to mention another project fast approaching completion, viz. the pumping of the waters of Ophir creek to the great gold camp at Camp Floyd and the town of Mercur, 15 miles distant, to furnish a supply which renders it possible to increase the gold output of that camp two to three million dollars per year.

The most interesting feature of this enterprise is the fact that the water is pumped by Worthington engines to a vertical height of 1,300 feet through 13,500 feet of pump main, showing a forcible exemplification of the value of water in promoting our material interests, and this brings us to a statement of what has been done in the irrigation field proper.

During the past year we may be said to have fairly inaugurated in Utah the era of reservoir construction for irrigation purposes, thereby making available three times the amount of water possible to obtain heretofore from our streams. In no region probably has there been exhibited a stronger opposition to the impounding of water by construction of dams, and one of the factors that tended most strongly to do away with this sentiment was the great success of the people of Gunnison, who with a few hundreds of dollars constructed an earthen dam some thirty feet high across a small stream known as the San Pitch river, and which during the irrigating season dwindled to a flow sufficing for only a few thousand acres, the winter and spring flows enabling the reservoir to be twice filled, and this season their drain will be raised another five feet and by also draining some of the small affluents the Gunnison irrigation district now covers 25,000 acres.

The success of the Bear river dam, or rather diverting weir, across that river, further strengthened the belief that dams could be built which would stand all freshets. It may be well to here state that the Bear River company's works are among the large irrigation plants of the West. At a cost of nearly $2,000,000 there is here over 100 miles of canals, with towns and settlements thereunder, already covering 315 square miles of most fertile lands, part being colonized. During the past year 5,000 acres have been placed in cultivation, 40,000 fruit trees set out and an extensive grain elevator constructed alongside of the Southern Pacific railway.

Among the first to go extensively into the impounding of water we find the works of the Clear Land and Irrigation company situated on the Sevier river, near Deseret, in Millard county, where Swan Lake and a series of smaller lakes are connected and raised by dams to cover some twelve square miles of surface, which reclaim upward of 15,000 acres. This company has some fifty miles of ditches, the main canal being thirty-eight feet wide and seven feet deep.

The Snake Valley Land & Water company also of Millard county, and some 200 miles south of Salt Lake City, has recently completed its reservoir receiving the waters of Lake creek. With a dam forty-five feet in height the supply has been determined as sufficient for 54,000 acres of land which seems admirably adapted to general forest and almond raising as experience has shown. The elevation is between five and six thousand feet above sea level and singularly free from frosts.

The Leamington Irrigation company is just inaugurating its system. Its reservoir with a fifty-foot dam across the Sevier river will be one of the largest in the world, covering a surface area of about twenty square miles and impounding some 400,000 acre feet of water, sufficing with the average Utah duty for 200,000 acres of land availably situated several miles west of the reservoir site.

Still further south in Beaver county is the recently constructed system of the Beaver Valley Land & Irrigation company with impounding reservoir five miles long, having sufficiency of water to cover 30,000 acres. This company is organizing a somewhat unique system for colonization. Four thousand or more acres are divided into farms of forty acres which are fenced and on each of these will be erected a small dwelling house. These improved tracts will be sold on the installment plan, no payment being required the first year. As the same parties have made this method a success in Texas, it is presumed it will work well here.

Near the south end of Utah Lake is the extensive reservoir and canal system of the Mt. Nebo Irrigation company. The works of this company are of a more expensive character than the