The pioneers of science in the American West were more often than not those trained in the “art” of surveying. Exploration surveys were funded by Congress, led by military officers (King, Hayden, Wheeler, Ives, Powell), and necessarily included surveyors, photographers and artists many of whom achieved fame in their own right.
1870

William Hooper before Congress opposing Anti-Mormon bill

On March 22 and 23 William H. Hooper, Delegate from Utah, opposed the bill.

Mr. Speaker, I wish to make a few remarks concerning the extraordinary bill now under consideration. While so doing I crave the attention of the House; for I am here not alone as one of the people sought to be cruelly oppressed, not only as the delegate representing Utah, but as an American citizen, to utter my solemn protest against the passage of a bill that aims to violate our dearest rights and is fraught with evil to the Republic itself.

I do not propose to occupy the time of the House by dwelling at length upon the vast contributions of the people of Utah to the wealth of the nation. There is no member of this House who does not recollect in his schoolboy days the vast regions west of the Rocky Mountains characterized in the geographies as the "great American desert." There, said those variegated textbooks, was a vast arid region wherein no man could live, around the borders of which roamed the painted savages, only less cruel and remorseless than the desert itself.

In the midst of this inhospitable waste to-day dwells an agricultural, pastoral, and self-sustaining people, numbering one hundred and twenty thousand souls. Everywhere can be seen the fruits of energetic and persistent industry. The surrounding mining Territories of Colorado, Idaho, Montana, Arizona, and Nevada in their infancy were fed and fostered from the surplus stores of the Mormon people. The development of the resources of these mining Territories was alone rendered possible by the existence at their very doors of an agricultural people who supplied them with the chief necessities of life at a price scarcely above that demanded in the old and populous States. The early emigrants to California paused on their weary journey in the redeemed wastes of Utah to recruit their strength and that of their animals, and California is to-day richer by thousands of lives and millions of treasure for the existence of this halfway house to El Dorado.

This, however, is but a tithe of our contributions to the nation's wealth. By actual experiment we have demonstrated the practicability of redeeming those desert wastes. When the Pacific slope and its boundless resources shall have been developed; when beyond the Rocky Mountains forty million people shall do homage to our flag, the millions of dwellers in Arizona, Nevada, Idaho, Colorado, and Montana, enriched by the products of their redeemed and fertilized deserts, shall point to the valley of Great Salt Lake as their exemplar, and accord to the sturdy toilers of that land due honor, in that they inaugurated the system and demonstrated its possible results. These results are the offering of Utah to the nation.

For the first time in the history of the United States, by the introduction of the bill under consideration, a well-defined and positive effort is made to turn the great law-making power of the nation into a moral channel, and to legislate for the consciences of the people.

Here, for the first time, is a proposition to punish a citizen for his religious belief or unbelief. To restrain criminal acts,

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GREAT DEBATES IN AMERICAN HISTORY

From the Debates in the British Parliament on the Colonial Stamp Act (1764-1766) to the Debates in Congress at the Close of the Taft Administration (1912-1913)

EDITED BY
MARION MILLS MILLER, LL.D. (PRINCETON)
Editor of "The Life and Works of Abraham Lincoln," etc.

IN FOURTEEN VOLUMES
EACH DEALING WITH A SPECIFIC SUBJECT, AND CONTAINING A SPECIAL INTRODUCTION BY A DISTINGUISHED AMERICAN STATESMAN OR PUBLISHER

VOLUME EIGHT
Civil Rights: Part Two
With an Introduction by Walter Hixon Park, LL.D.
American Ambassador to the Court of St. James
Elizabeth Wood Kane kept a journal during her stay in St. George, Utah during the winter of 1872 - 1873.

“She noted that she often felt she was living in an old Syrian world among pastoral folk fulfilling Isaiah’s promise of making a fertile land of the desert plains.”

I wonder whether just such scenes were not familiar to David! The Mormons have redeemed these little fertile oases from the desert of a country resembling Palestine geologically, chemically one might say, and topographically. And if these industrious thrifty settlers should be driven off by the shiftless lazy horde who generally settle first on the rich soil of the West, men who expect to reap harvests without labor, these places will soon fall back into desert again. “Blessed are they that sow beside all waters, and send forth thither the feet of the ox and the ass.”

I begin to realise now why it is that Palestine seems so barren a country now, and why the Jews deemed it so fertile. With irrigation trees grew and they had magnificent crops. When the enemy overran the land, and the heart of the people failed them, they neglected the water channels, and the hot sun and the strong salts in the soil burnt up the vegetation. So it will be here. I do not suppose now, as I used to do at home, that Palestine was once a country wooded and green as Pennsylvania. It must have been like this land, with timber of poor quality growing in the canions, and here and there spots like Lebanon, of whose mighty trees they talked as the Mormons do of the forest on the San Francisco Mountain in Arizona.
Thirty years of data concerning climate change were analyzed by the J. W. Powell Survey in 1877. Powell and other government scientists were aware of claims by Mormon settlers that the increased precipitation was a result of their prayerful requests to the Almighty.

G. K. Gilbert provided this explanation of the rise of the level of Great Salt Lake over the thirty year period following the Mormon’s arrival.

John W. Powell believed that the phenomena was a result of the actions of man. This was termed the Theory of Human Agency.

Southern Illinois Normal School Professor, Cyrus Thomas, was the leading proponent of the theory that “Rain Follows the Plow”.

Thoughts on “Redeeming the West”
1891

First Irrigation Congress held in Salt Lake City, Utah

A convention “to consider matters pertaining to the reclamation of the arid
public lands of the West,”

I joined my neighbors in placing a dam in a stream from the
mountains (then called Mill Creek, now Canyon Creek), and in
opening up an irrigating ditch of sufficient size to bring water
to their land and mine. This water I have used, and this land I
have cultivated, from that time to the present. The products of
my farm have been wheat, oats, barley, corn and potatoes. I made

From this twenty-acre farm has come the main support of my
family during nearly forty-four years. Only once in that time have
I had less than forty bushels of wheat to the acre. Four years ago

As to the amount of water needed, I give again my own ex-
perience: I irrigate my crops not more than twice in a season,
and the wheat generally but once. As to fertilizers, I have used
nothing but barn-yard manure.

“Here are a thousand miles, I might say, through these mountains, filled with cities,
towns, villages, gardens, and orchards, and the produce of the earth that sustains the
people. Without this water, this irrigation for which you have met here today, this
country would be as barren as it was in 1847, when we found it.”

mental to the
Congress of the United States
National Irrigation Congress
Salt Lake City, September 15, 16 and 17, 1891.

To the Honorable, the Senate and House of Representatives in
Congress Assembled—Your memorialists represent that in pursu-
ance of a call issued by the Hon. Arthur L. Thomas, Governor of
Utah, for a convention “to consider matters pertaining to the recla-
mation of the arid public lands of the West,” the Irrigation Con-
gress met at Salt Lake City on September 15, 1891, and remained
in session for three days. There were delegates in attendance
from the States of California, Colorado, Idaho, Kansas, Montana,
Nebraska, Nevada, Oregon, Texas and Wyoming, and the Terri-
tories of Utah and New Mexico, and the body was in a notable
degree representative of that large section of the Union to which
the rainfall is inadequate for the purposes of agriculture.

“My Twenty Acre
Farm”, Wilford
Woodruff

“The Mormon
Land System”,
George Q.
Cannon
The accompanying map of Canaan and the Salt Lake valley strikingly exhibits the topographical similarity between the Promised Land to which Brigham Young led the Mormon pioneers of 1847. In both localities a River Jordan connects a body of fresh water with a Dead sea, and the surrounding mountain landscape is almost the same in both cases.

The railroad pamphlet advised “Follow prairie dogs and Mormons, and you will find good land.”

The National Irrigation Congress was held annually from 1891 until 1916, by which time the organization had changed its name to the International Irrigation Congress.
Powell’s Colorado River expeditions 1869-1873 were for the Smithsonian. He became head of the USGS in 1876.

Elwood Mead completed his *Irrigation Investigations in Utah* in 1902, the same year the Reclamation Act was passed by Congress.
Thoughts on “Redeeming the West”

1903 Movement of Water in Irrigated Soils, John A. Widtsoe

In 1900, John A. Widtsoe, a Norwegian immigrant, became the director of the Experiment Station at the Utah Agricultural College (USU) which had a branch location in Washington County.

For a short time after 1905, he established the Biology/Agriculture program at BYU in Provo. In 1907, he became the president of the Agricultural College. In 1916, he was appointed president of the University of Utah. In 1921, Widtsoe was ordained an Apostle in the LDS Church.

Widtsoe went to Washington DC to serve as Secretary of a Fact Finding Commission which reformed the Reclamation Service beginning in 1923 and ending in 1924 with the appointment of Elwood Mead as Director of the Bureau of Reclamation.
St. George tithing clerk, Thomas Judd, became a founding partner in the cooperative mercantile firm Woolley, Lund and Judd in 1874. In 1889, he organized the La Verkin Fruit and Nursery Company and built the five mile long La Verkin Canal and 900 foot long tunnel that brought Virgin River water to the La Verkin Ranch. In 1890, Thomas leased the Washington Cotton Factory and operated it at a profit until 1898. He was appointed president of Utah’s Horticultural Board when it was first organized in 1897 and remained in that position until 1914.

As a part of his duties he supervised the Southern Utah Experimental Farm (later Experimental Station) in cooperation with the Agricultural College in Logan. Scientific methods were introduced and promoted transforming family farms into an expanding and competitive horticultural industry during his tenure.
The tentative plan for the construction of a rock-fill dam at Lee’s Ferry by the American Society of Civil Engineers in 1922 would have had a maximum storage capacity of 50,000,000 acre-feet of water, more than twice the capacity of Lake Powell. At 780 feet high it would have been taller than the 710 feet concrete gravity arch dam built at Glen Canyon, fifteen miles upstream from Lee’s Ferry in the early 1960’s. The 1922 ASCE proposal was motivated by the California’s growing electrical power needs and the funds that could be spent on hydro-electric projects. It was anticipated that the rock-fill dam type could be built by blasting the upper portions of the canyon walls away and allowing the loose debris to fall and be maneuvered into place below.
Thoughts on “Redeeming the West”

1922

The Great Boulder Canyon Project, Popular Science Monthly

“The incentive for harnessing the mighty Colorado is threefold:

First, flood control.
Second, irrigation of 4,000,000 acres of arid land.
Third, the increase of hydroelectric power to 5,000,000 horsepower -- or one half the total hydroelectric power now (then) generated in the entire United States.”
Between 1935 and 1940 respected and influential documentary photographer Dorothea Lange worked for the *Resettlement Administration* and the *Farm Security Administration* largely bringing the plight of displaced families and migrant workers to the attention of the public.

Yet, her photograph of the peach harvest taken in Springdale, Utah in 1938 tells a different story of bounty, togetherness and being prepared for tough times.

Dorothea Lange, *Migrant Mother*, 1935

Dorothea Lange, *Peach Harvest*, *Springdale, Utah*, 1938