

CHAPTER I.

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INTRODUCTORY.

The following is the act of Congress authorizing the commission:

AN ACT to provide a board of commissioners to report a system of irrigation for the San Joaquin, Tulare, and Sacramento Valleys, in California.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President be, and he is hereby, authorized to assign two engineers of the Army and one officer of the Coast Survey now stationed on the Pacific coast, for the purpose of examining and reporting on a system of irrigation in the San Joaquin, Tulare, and Sacramento Valleys of the State of California; and for that purpose the officers so assigned may associate with themselves the chief of the geological survey of California, and also one other civilian distinguished for his knowledge of the subject.

Sec. 2. That these five persons shall constitute a board, with power to fill vacancies, whose duty it shall be to make a full report to the President on the best system of irrigation for said valleys, with all necessary plans, details, engineering, statistical, and otherwise; which report the President shall transmit to Congress at its next session, with such recommendations as he shall think proper.

Sec. 3. That the Secretary of War shall furnish subsistence and transportation for the board while in the field, and the compensation of the members of the board who are not in the service of the United States shall not exceed two thousand dollars each, but the other members of the board shall receive no additional compensation for their services.

Approved March 3, 1873.

We insert here the following order of the Secretary of War, organizing the board of commissioners:

[Special Orders No. 75.]
 WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, April 9, 1873.

Under the act of Congress approved March 3, 1873, published in General Orders No. 56 of 1873 from this office, Lieut. Col. Barton S. Alexander and Maj. George H. Mendell, Corps of Engineers, are hereby appointed members of the commission, Lieut. Col. Alexander to be president thereof, for the purpose of examining and reporting on a system of irrigation in the San Joaquin, Tulare, and Sacramento Valleys of the State of California, and will hold themselves in readiness to proceed to the duties of the commission on receipt of further instructions from the Secretary of War.

By order of the President of the United States:

E. D. TOWNSEND,
Adjutant-General.

Official:

J. P. Martin,
Assistant Adjutant-General.

Also the further instructions of the Secretary of War:

OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D.C., April 12, 1873.

SIR: A copy of the act of Congress approved March 3, 1873, published in General Orders No. 56, current series, Adjutant-General's Office, authorizing the assignment of two engineers of the Army and one officer of the Coast Survey now stationed on the Pacific coast, for the purpose of examining and reporting on a system of irrigation in the San Joaquin, Tulare, and Sacramento Valleys of the State of California, and for that purpose the officers so assigned may associate with themselves the chief of the geological survey of California, and also one other civilian distinguished for his knowledge of the subject, is herewith transmitted for your information and guidance.

The President has, in Special Orders No. 75, Adjutant-General's Office, Washington, April 9, 1873, a copy of which is inclosed herewith, appointed you and Major Mendell members of the board, and also Prof. George Davidson, assistant in the Coast Survey, as contemplated in the first section of the act.

The board so constituted are authorized to associate with themselves the chief of the geological survey of California, and also one other civilian distinguished for his knowledge of the subject.

As the president thereof, you will convene the board in San Francisco, or such other convenient place as you may select, and proceed to the business devolving upon it.

As soon as practicable, the board will proceed to the valleys mentioned, and make the investigations called for in the act, reporting progress monthly.

Having completed these investigations, the board will return to San Francisco and make up their report, and, if practicable, transmit it to this office in time to be handed to the Secretary of War before December 1, 1873.

Estimates will be made upon this office from the appropriation for "surveys for military defenses," for such sums as may be necessary to carry out the provisions of the act, not exceeding in amount five thousand dollars.

By order of the Secretary of War:

Very respectfully, your obedient servant,

A. A. HUMPHREYS,
Brigadier-General and Chief of Engineers.

Lieut. Col. B. S. Alexander,
Corps of Engineers, San Francisco, Cal.

Professor Davidson received the following instruction from Prof. Benjamin Peirce, the Superintendent of the Coast Survey:

Cambridge, Mass., April 25, 1873.

Dear Sir: As already advised by telegraph, you have been appointed by the President of the United States as commissioner for examining and reporting on a system of irrigation in the San Joaquin, Tulare, and Sacramento Valleys of California, as by act of Congress approved March 3, 1873.

You are authorized to accept the appointment, and to proceed to the discharge of the duties specified in the act.

Yours, truly,

BENJAMIN PEIRCE,
Superintendent United States Coast Survey.

George Davidson, Esq.,
Assistant, Coast Survey, San Francisco, Cal.

In accordance with these instructions the board, consisting of Lieut. Col. B. S. Alexander, Corps of Engineers; Maj. George H. Mendell, Corps of Engineers; and Prof. George Davidson, of the Coast Survey, met in San Francisco, April 23, 1873, organized, and elected Professor Davidson its secretary and Major Mendell its treasurer.

A letter signed by the members of the board was forwarded to Prof. Joseph D. Whitney, State geologist of California, but then at Cambridge, Mass., inviting him, in accordance with the first section of the act of Congress, authorizing the commission, to become a member of the same.

At the same time a telegram was sent to Professor Whitney asking him to join the commission as a member.

In answer to the telegram, Professor Whitney replied that he could not join the commission.

On the 6th of May, 1873, it was unanimously resolved that the president of the commission be instructed to invite Mr. R. M. Brereton, of San Francisco, to join the board as a member, in accordance with the terms of the act of Congress.

In answer to the letter of the president of the commission, Mr. Brereton declined to become a member in consequence of professional engagements.

Having thus exhausted the requirements of the law creating the Board of Commissioners on Irrigation in reference to its organization, it was determined to proceed to the duties before us, under our present organization, and without any further addition to our numbers.

We may add that we were driven to this course by the want of funds at the disposal of the commission for the purpose of making the necessary reconnaissance and report.

Only \$5,000 were allotted to us for carrying out the provisions of the act of Congress in reference to this subject.

If two civilians had been associated with the board, they would each, by the terms of the law, have been entitled to \$2,000 as compensation for their services. This would have left us only \$1,000 for making the necessary maps to illustrate our report, and for the transportation and subsistence of five members instead of the present organization of only three members without salaries.

With only \$1,000 for these purposes, we feared that the object to be attained in creating the commission would have been defeated.

PRELIMINARY RECONNAISSANCE.

On the 13th of May the board proceeded to make an examination of the Merced, San Joaquin, King's, Kaweah, and Kern Rivers, from the plains to the mountains. They also examined the eastern side of Tulare Valley as far as Kern Lake, and inspected the systems of irrigation that have been introduced at Centreville, Visalia, and Bakersfield.

Returning, the board examined the west side of the San Joaquin Valley, between Watson's ferry and Banta's,¹ observing particularly the works of the San Joaquin and King's River Canal and Irrigation Company,² and the system of irrigation which this company is introducing on the west side of that valley.

In the month of June, the board examined the Tuolumne, Stanislaus, Calaveras, Mokelumne, and Cosumnes Rivers, on the east side of the San Joaquin Valley, from the points where they escape from the foot-hills to the plains. This completed our examination of the San Joaquin and Tulare Valleys.

The Sacramento Valley was also thoroughly examined at various times during the summer and fall.

On the east side, we examined the American River, the different branches of the Yuba and Feather Rivers, and the various small streams emptying into the Sacramento River between the Feather River and Tehama; and on the west side of the valley we examined the Sacramento River itself as high up as the town of Shasta; also Stony Creek, Cache Creek, (including Clear Lake,) and Puta Creek.

Having thus examined the three valleys mentioned in the act of Congress, the San Joaquin, Tulare, and Sacramento, which, taken together, we have designated "the Great Valley of California," and having seen the lands which may be irrigated, and ascertained from observation the necessity for its irrigation, and having seen the principal lakes, rivers, and creeks from which the water for irrigation must be obtained, we proceed, in accordance with our instructions, to present our views on the subject of the irrigation of these valleys.

THE MAP.

For the purpose of illustrating this report we have had a topographical map of the great "Valley of California" prepared. This map embraces the San Joaquin, Tulare, and Sacramento Valleys, and shows the Sierra Nevada Mountains on the east side of the valley, and the Coast Range of Mountains on the west side, to the summits of the respective ranges. We refer to this map in all subsequent discussions. The map shows the "Great Valley of California," and the foot-hills and mountains by which it is surrounded, all the lakes, rivers, and principal creeks, with their catchment-areas; the overflowed or swamped lands, of which there are about 1,225,000 acres; the division into counties, and the township-lines of the United States surveys; the railroads and principal towns. On this map the canals that have already been constructed are laid down in heavy, full, red lines; the canals that have been projected, and actually surveyed, on the southern end and west side of the valley, in light, full, red lines; and we have also indicated a hypothetical system of irrigating canals on the eastern side of the valley in dotted red lines.

On the eastern side of the Great Valley, all the way from the southern end of Tulare Valley, south of Kern Lake to Red Bluff, the ground rises from the lowest depressions or central lines of drainage in a gentle inclined plain, swelling then into undulations, and then into foot-hills, which, as we proceed eastward, rise into mountains, culminating in the Sierra Nevada.

On the western side of the valley the ground first rises in a plain of gentle slope, then swells into foot-hills, then mountains, culminating in the Monte Diablo range on the west side of the San Joaquin and Tulare Valleys, and in the Coast Range on the west side of the Sacramento Valley.

The ascent from the foot-hills to the summit of the mountains is much steeper on the western side of the Great Valley than it is on the eastern side, and the drainage-area is much smaller on the western side than it is on the eastern.

Again, the Sierra Nevada being much higher than the Coast Range or the Monte Diablo range of mountains, the condensation of moisture, or the amount of rain-fall and snow in a year, is far greater on the Sierra Nevada than on the lower mountains to the westward.

An inspection of the map shows a marked contrast as regards the water-supply of the eastern and western sides of the valley.
