60TH CONGRESS, 1ST SESSION, DOCUMENT NO. 246. IRRIGATION IN IMPERIAL VALLEY, CALIFORNIA: ITS PROBLEMS AND POSSIBILITIES. FEBRUARY 11, 1908

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Irrigation in Imperial Valley, California

Its Problems and Possibilities

BY

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IRRIGATION ENGINEER

PRESENTED BY MR. FLINT

FEBRUARY 11, 1908

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IRRIGATION IN IMPERIAL VALLEY.

DESCRIPTION OF THE VALLEY.

What is now known as Imperial Valley occupies the greater portion of what was formerly the Colorado Desert. It occupies the eastern end of San Diego County, but it is now being formed into a new county to be known as Imperial County. The desert is a great basin 110 miles long by 40 miles wide and the part comprising Imperial Valley is mostly below sea level. The basin is formed by mountain ranges on all of its sides except one—the southeast. The basin extends into Mexico, but Imperial Valley is entirely in the United States. By reference to the accompanying map, Plate I, it will be seen that the international boundary line between California in the United States and Lower California in Mexico runs nearly east and west through the center of the map. The basin extends from the northwest to the southeast, being bounded on the northeast and southwest sides by mountain ranges. The northwestern part of the basin beyond Salton Sea is known as the Coachella Valley. At the southeast the open country in Mexico is crossed by Colorado River in its course to the Gulf of California. The mountain range on the northeast is an extension of the San Bernardino Mountains, known as the Chucawalla Range. The mountains on the southwest in California are the San Jacinto and Coast ranges. Those in Mexico are the Cocopah Range. The basin included between these ranges is really a delta of Colorado River.

There are evidences that this country was once a portion of the Gulf of California. The old beach line is yet plainly visible entirely around the portion below sea level, except at the southeast, and practically coincides with the sea-level line, which is shown on the map. The soils of the basin are an alluvial deposit. A well was bored at the town of Imperial, about the center of the basin, in the hope that artesian water might be secured, but after reaching a depth of about 600 feet without striking either water or rock it was abandoned. The strata throughout the entire depth were similar to that at the surface, showing that the depth of deposit was something in excess of 600 feet at that point. The river emerging from the mountains and entering the basin on what was once the gulf, at the northeast side near where it now meets the international boundary, deposited the silt with which it is very heavily laden and gradually formed a delta spreading out fan-shaped toward the south and southwest until it reached the Cocopah Mountains on the southwest near the site of Volcano Lake. Here it was interrupted and the water passed to the northwest into the basin or to the southeast

into the gulf, and finally it is to be concluded that the main channel became established toward the south. Thus an inland sea was formed which gradually diminished in size by evaporation until nothing remained but a dry basin. The long gradual slope of the delta reached nearly to the farther end of the basin at the northwest and here we naturally find the greatest depression. This lowest portion of the basin is 287 feet below the sea level and has been known as Salton Sink, or Salton Sea, the name being derived from the large deposit of salt which was deposited on complete evaporation. It is probable that the river from time to time by overflow broke into the basin and that Salton Sea varied from a dry bed to a lake of considerable size.

In the triangular section of country in Mexico between Colorado River, the international boundary, and the Cocopah Range there are numerous channels with their general direction to the southwest, chief among which is Rio Paredones, apparently an old channel of the Colorado, and Rio Pescadero. Rio Paredones runs along the top of the ridge of the delta. The altitude decreases from about 100 feet above sea level on the Colorado at Hanlon to about 24 feet above sea level at Volcano Lake. Volcano Lake, like the channels leading to and from it, contains water during flood seasons and approaches a dry bed at other times. Hardy River drains Volcano Lake on the southeast to the Gulf.

New River has its source at Volcano Lake and flows down the slope to the northwest across the boundary line through Imperial Valley and into Salton Sea, having a total fall from 24 feet above sea level at the source to −287 feet at the bottom of the sink. Alamo River, formerly known as Salton River, runs first westward in Mexico, thence northward across the boundary line and through Imperial Valley to the Salton Sea. These two streams are the channels by which any overflow of the Colorado toward the northwest enters the lowest portion of Salton Sink.

The Colorado overflows its banks in Mexico annually and in recent years some of the water found its way into Salton Sink from natural causes, and once, through the work of man, it was unintentionally entirely diverted from its present channel into Salton Sink. Alamo River originally ran through Mesquit Lake by making a sharp turn to the west at that point, but the channel was straightened by a ditch known as the Alamo cut-off, leaving the lake off its course. The lake has also been almost completely drained by another ditch. A few years ago the Alamo was larger than New River, but in recent floods most of the water in the Alamo passed over to New River through Beltran and Garza and Pink Mountain sloughs in Mexico, so that through Imperial Valley New River has been much the larger stream. The recent flood caused by the diversion of the Colorado into Salton Sink forming the sea is described in the latter part of this report, together with the costly measures which restored the river to its former channel and which will prevent any further overflow into New or Alamo rivers in the future.

The Salton Sea as it is at present was formed during 1905 and 1906. It is 42 miles in length and from 10 to 15 miles in width and has a water surface of about 400 square miles. The water surface is now 205 feet below sea level and the greatest depth of the water is 82 feet. Prior to 1905, and since there is any authentic record, it