

## FRESH WATER ON FORT YUMA DESERT.

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MARCH 14, 1878.—Recommitted to the Committee on the Public Lands and ordered to be printed.

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Mr. GAUSE, from the Committee on the Public Lands, submitted the following

### REPORT:

[To accompany bill H. R. 3834.]

*The Committee on the Public Lands, to whom was referred bill (H. R. 1153) to encourage the introduction of a supply of fresh water on the desert west of Fort Yuma, having had the same under consideration, make the following report:*

The object contemplated by the bill is the introduction of fresh water on a body of land which was formerly the bed of a salt-water gulf, the Gulf of California, by which it is expected to clothe this arid plain with products beneficial to man, reducing the over-heated atmosphere to a temperature which will permit its being inhabited by him and at the same time afford him the necessaries of life, and, with all, promoting our general welfare by the cultivation of such products as are in general demand.

This measure was inaugurated by the present applicant some nineteen years since; having received the approval and co-operation of the legislature of California by the passage of a bill (1859) granting the State's interest in those lands, and at the same time passing a joint resolution instructing the Senators and Representatives of that State to procure a cession from the general government of the unappropriated portion, with the view of accomplishing the work which the present bill contemplates.

The measure was brought before Congress, and after a lengthy and careful examination, the Committee on the Public Lands reported a bill making a cession of about one-half of the lands called for by the State. (See Appendix D.) It shared the fate of many meritorious measures—went to the public calendar and there rests.

The Commissioner of Public Lands, to whom the matter was referred for information, reported a suggestion "that the Secretary of War be authorized to cause a survey and examination to be made as to the practicability of supplying water to this region as proposed, and as to the character of the soil, &c. That should it appear from such survey that the work is a feasible one, and that the tract in its present condition is uninhabitable and incapable of cultivation, that power be conferred on the Secretary of War to make the grant absolute," &c. (See Appendix B.)

After a delay of sixteen years the survey has been made, the official and authoritative report published (see Appendix C); and, as will be seen, the measure is reported practicable, and only practicable on the

line of survey made by the present applicant sixteen years before (see Appendix D); and as to the fact of its being uninhabitable, in its present condition, there has been ample testimony furnished, officially, and by government officers. (See appendix of a portion of testimony furnished.) But the practicability of introducing water on this desert was established by the laws of nature, long before it was determined by instrumental survey, by the waters of the Colorado flowing into it through a natural canal. Having ample authoritative evidence now that this desert was appropriately named "*Jornada del la Muer*" (desert of death), and that it can be made a habitable, productive field by irrigation, it was again brought before the Forty-fourth Congress, again received the attention of the the Committee on the Public Lands, and again received their indorsement (see Appendix E); but owing to the pre-occupation of President-making, it was not considered.

The extent of dry land which was formerly the bed of the gulf may be set down approximately as one hundred and seventy miles in length, eighty miles in width at its base, diminishing to ten miles at its head. The base and greater portion of the lands are beyond our border, and within that of the Republic of Mexico; and in order to accomplish the work contemplated by the bill, a canal must traverse Mexican territory for some forty miles. Thus is perceived the magnitude of the contemplated work, and it must be equally apparent that nothing less than a sale of a large quantity of land would be likely to command capital to do the work. Our neighboring Republic of Mexico, with a view of developing her resources, invite immigration by offering her lands not only as a gratuity, but aiding those who may occupy them by removing all duties by import and export, and all other government burden for ten years. Your committee therefore are induced then to believe that the Mexican Government will liberally aid and facilitate the proposed measure, and that the inappreciable line between the two republics will not prove a barrier to our general welfare.

When we take into consideration that the applicant inaugurated this measure some nineteen years ago, and at his own expense ascertained the fact of the practicability of irrigating this desert by a survey actually made at his personal expense, and having waited the tardy action of the government up to the present time for its consummation and co-operation, it should be received as evidence indicating his ability and determination to carry out this great work to a successful termination.

It will be observed that this bill does not propose to donate these lands to Mr. Wozencraft and his associates, but provides that they shall be appraised by direction of the Secretary of the Interior, and shall be conveyed only after the appraised value has been paid. It is a sale of the lands in good faith and for a valuable consideration—all they are worth—and differs in no respect from the disposition of much of the public land. The Commissioner of the General Land Office, in his last annual report (1877), p. 34, says:

Recurring again to the desert-land bill, I would recommend its early repeal, and in lieu of it the enactment of a law *giving* to persons or corporations all the lands which are truly and unmistakably desert in character, which they may thoroughly and fully reclaim by means of irrigation, either from rivers, lakes, or artesian wells. If lands which require no irrigation are given away to any persons who will settle upon and improve them, why not give away desert-lands upon the same condition, especially when it requires so much money to improve them?

Your committee see no reason why this "Desert of Death," not only useless but formidable to progress in that latitude, should be withheld from sale to one who thinks, how vainly soever it may be, that it can be made to blossom as the rose, when the Commissioner of the General

Land Office recommends the absolute donation of all such land, conditioned only on irrigation. If it be a blessing to mankind to make a palm grow in the midst of the desert, how much greater blessing is it to clothe that desert with fountains of water, and fruits and flowers.

Sir S. W. Baker, in his exploration of the Nile tributaries of Abyssinia, demonstrates the truth that the beneficial results of irrigation are only equaled by the bounty of God in regular rain-fall.

The remains of the beautiful system of artificial irrigation by the ancients in Ceylon, attests the degree of civilization to which they had attained.

In that island the waters of various rivers were turned into valleys that were converted into lakes by dams of solid masonry, from which the waters were conducted by artificial channels through the land. In those days, Ceylon was the most fertile country of the East, and her power equaled her prosperity. Vast cities teeming with dense population stood upon the borders of the great reservoirs, and the people revelled in wealth and plenty. But the dams were destroyed in civil warfare. The wonderful works of irrigation shared the destruction. The country dried up. Famine swallowed up the population, and the grandeur and prosperity of that extraordinary country collapsed and withered in the scorching sun. At present ten thousand square miles lie desolate in thorny jungle where formerly a sea of waving rice-crops floated on the surface. The people are dead. The glory is departed. This glory was the fruit of irrigation.

The great famine prevailing in India has now enforced the necessity of repairing their ancient works of irrigation. These calamities of the present and past should counsel us to husband and utilize this bounty of God.

Your committee deem it unnecessary to elaborate further a measure which has been so long and thoroughly investigated and uniformly approved. The utter worthlessness of the lands as they now are; the detrimental effect of the sirocco blasts sweeping over this desert, carrying aridity to the surrounding country, are elemental arguments which can not be controverted.

From all the facts before us, your committee are unable to find any redeeming feature in this *Joranda del la Muerta*, other than a prospective one, which may be effected by the proposed system of irrigation. It is not only valueless as it now is, but is detrimental to the surrounding country by extending its aridity over it. Consequently we can see no objection to the proposed measure, but, on the contrary, much to recommend it.

By the proposed system of irrigation the temperature will be reduced so as to make it habitable for man, and affording him a soil and field for labor which will yield an ample return for his industry and wealth to the general government.

Your committee, therefore, report the accompanying bill as a substitute for House bill 1153 and recommend that it do pass.

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#### APPENDIX A.

(House Report No. 87, Thirty-seventh Congress, second session.)

*Mr. Chrisfield, from the Committee on the Public Lands, made the following report, to accompany H. R. No. 417:*

The desert character of this country proceeds not from the natural barrenness of the soil, but simply from aridity. In many parts of it the soil is of the very best quality, being composed of alluvial earths, marl, and shells; and whenever it has been tested, under favorable circumstances, it has proved fertile and productive. It needs only water. \* \* \* All the evidence before the committee goes to show that if this country can be sufficiently irrigated it will become productive. And when its surface is clothed

with verdure its now drifting sands will become fixed, and we may venture the opinion that its excessive heats will be moderated and its climate become pleasant and healthful to man.

In its present condition this country is of no use either to this government or the State of California. On the contrary, it is a positive injury to both. Over this plain lies the shorter and most direct route from the Pacific coast to Fort Yuma, the districts of the Gila and Arizona, and the Atlantic States; and is, indeed, the only route which can be formed through our own territory between these points. It is the best line for a railroad to the Pacific from the Southern Atlantic States. Over this route should pass the trade and commerce between these important sections, the supplies and munitions of the government, and the current migration to the Pacific coast; all of which is frustrated by the want of water. The mail has to diverge into Mexican territory; the rich mineral products of Arizona, instead of going out through some California port, are driven to the foreign and more distant port of Guaymas; travel is forced into circuitous routes, emigration suspended, and this immense region is left unpeopled, to the great detriment of the State of California in wealth and power. And such must forever remain its condition unless an adequate supply of water can, in some way, be found. With that all would be changed.

It is well ascertained that water cannot be obtained on the plain itself. It seldom rains, and when it does, it is only in light showers; and it is impossible to gather and preserve in cisterns an adequate supply even for the wants of travelers, and still more so to secure enough even for the most imperfect irrigation. All attempts to procure it by wells have signally failed. In some cases wells have been sunk to the depth of 120 feet and no sign of water found. In one case, where a small quantity was found, it was lost entirely by deepening the shaft in the hope of a greater quantity. The citizens of San Bernardino County have spent about \$4,000 in vain endeavors to procure water by sinking wells. This government has sent out frequent expeditions from Fort Yuma in search of water, but after hard labor and great suffering they have always returned without success. Even the streams that come down from the mountains are speedily evaporated in the hot atmosphere or soon lost in the arid plain.

The State of California is of opinion that a supply of water may be obtained by turning the waters of the Colorado River in sufficient quantities in upon this desert, and in this way the whole region may be reclaimed. The committee is of opinion that this is practicable, and promises success. At all events it is so hopeful as to justify the experiment.

Assuming what the committee thinks all must admit—the immense utility of reclaiming this desert—and assuming that water, the great desideratum, can be supplied from the Colorado as proposed, the question arises, by what agency can it best be done? It is very manifest that the work is beyond the scope of individual enterprise. It will require the use of large capital, applied on a single plan, embracing the whole region. No proprietor of one, or two, or even forty sections, if he could be persuaded to accept them, could effect anything. The supply of water must be drawn from a single source, and conducted through long canals, and the agency constructing them must, in addition to the capital required, have unity of purpose and free selections of way. Reclamation, if effected at all, must be by the proprietor of the whole.

In view of all the circumstances, the committee is of opinion that Congress should make the grant to the extent already defined, and herewith report a bill for that purpose.

The committee also annexes a number of letters and other papers in verification of the facts and opinions herein set forth, and desire the same shall be considered as a part of this report.

*Letter of Capt. H. S. Burton (late general), of the United States Army.*

GEORGETOWN, D. C., March 22, 1860.

SIR: In answer to the requirements contained in your note of the 19th instant, I have the honor to submit the following statement respecting the Colorado desert of California. I presume I am not required to make a minute report upon the geography of this formidable desert, as full and accurate reports upon it have been made by several scientific and capable officers of the Army, and are now on file among the archives of the War Department.

I consider it an immense waste of uninhabitable country, incapable of cultivation without irrigation. From about the 1st of April to October subject to the most intense heats, the atmosphere dry and scorching, like the hot air

from a furnace. From November to March subject to quite severe cold. At this season, the winds from the coast-range of mountains in California sweep across the plains to the Gulf of California with the greatest violence, raising the fine sand of the desert in immense clouds. \* \* \* \* Many a time I have been overtaken by the sand-storms while crossing the desert, and obliged to stop, roll myself in a blanket, and, holding my mule by her picket-rope, lie down upon the sand, without shelter, and wait until the storm was over.

Even the Indians think of this desert with terror. They believe that the souls of bad Indians are condemned to wander over this desert forever, in summer without water and in the winter without clothing, and from my own experience upon it I can well understand why they consider it the abode of the wicked after death.

I have the honor to be, sir, very respectfully, your obedient servant,  
H. S. BURTON,  
Captain Third Artillery, U. S. A.

Hon. R. W. JOHNSON,  
Chairman Committee on Public Lands, U. S. Senate.

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*Letter of Major (now General) Emory, of the United States Army.*

WASHINGTON, March 24, 1860.

DEAR SIR: In reply to your note, received this morning, asking me to furnish you a statement in writing "showing the physical geography of that portion of country between the eastern base of the main range of mountains on the Pacific coast and the junction of the Gila and Colorado Rivers," &c., I beg to refer you to my several reports on that subject, viz: Notes of Military Reconnaissance, Senate Ex. Doc. No. 7, Thirtieth Congress, first session, pp. 100-103, and Mexican Boundary Report, Ex. Doc. 108, Thirty-fourth Congress, first session, part 2, vol. 1, pp. 87, 88, and from p. 92 to p. 97, part 4, vol. 1, and also to the manuscript maps of the boundary of the desert deposited in the Department of the Interior.

The desert character of that country, the obstacles it presents to the transportation of government supplies and to emigration, are undoubted. These obstacles, unless removed, must in the end force all travel to take the circuitous sea route. That they will ever be removed under our present mode of disposing of the public lands is impossible. No single owner of a section of land, or of any ten consecutive sections of land, could, with the least prospect of success, attempt the cultivation of any part of the desert. To open any portion to settlement would require a large capital, and the absolute proprietorship of the right of way of the aqueduct from the source of water to the point to be irrigated, and that would cover a very considerable space. \* \* \*

The importance to California of having this basis established is very great; otherwise, all the immense mineral wealth of Arizona and Gila districts, now developing, must, instead of going out through some California port, seek the more distant port of Guaymas, in a foreign territory. It is also very important to the general government, for it is over this desert government stores are transported, and the overland mail has not been able to find a practicable *winter* route.

Very respectfully, your obedient servant,

W. H. EMORY,

O. M. WOZENCRAFT.

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*Letter of R. C. Matthewson, government surveyor in California.*

SAN FRANCISCO, April 4, 1859.

DEAR SIR: In regard to the information you desire respecting that portion of the Colorado desert, \* \* \* I have to state that I am familiar with a greater portion of it, having spent nearly two years in surveying the public lands there.

The whole tract embraced within the specified boundaries may very properly be termed a desert, inasmuch as it is all, with rare exception of a very few spots, utterly destitute of any kind of vegetation, notwithstanding the soil in many portions of it is of the very best quality, being composed of alluvial earth, marl, and shells, which, if it could be irrigated, would undoubtedly prove very fertile and productive. After showers of rain, which fall very seldom on the desert, and cover but small patches here and there when they do fall, I have known the "careless" weed to grow as high as ten and twelve feet in a few weeks. \* \* \*

The temperature of the desert, especially during the summer months, is very high, ranging from 120° to 130° Fahrenheit in the shade, and the sand-storms are sometimes so violent that mountains of sand are, during one continued storm, removed com-

pletely from one locality to another. There can be no doubt, however, with irrigation, and consequent verdure, the climate would be greatly modified and adapted to a dense population. At the Coyote Valley, where there is an Indian rancharia, near the eastern base of the mountains, grapes, watermelons, &c., are ripe six weeks in advance of those at San Diego and Los Angeles.

This section of country is of no earthly use in its present condition, and I think any company who would reclaim it for getting a fee-simple title to it would be conferring a blessing, not only upon the people of California and the United States generally, but upon the rest of mankind, and especially *those who have to travel across the Colorado desert.*

I am, very respectfully, yours, &c.,

B. C. MATTHEWSON.

Dr. O. M. WOZENCRAFT.

*Letter of A. B. Gray, esq., commissioner to run the boundary-line between the United States and Mexico.*

WASHINGTON, April 11, 1860.

DEAR SIR: In reply to your request to give my views in regard to the district of country lying between the Colorado River and the San Diego range of mountains of California, I would state that my knowledge of it, personally, is confined to that part from Fort Yuma to Correso Creek, some ninety-odd miles, by the present emigrant road.

As it now stands, this desert is unavailable for productive purposes, but your plan, if I comprehend it rightly, will, if practicable, I believe, conduce to the public good, and be of great benefit to the United States Government, to California, and to the trade and travel generally of that part of our continent.

Yours,

A. B. GRAY.

Dr. O. M. WOZENCRAFT, *California.*

*Letter of John Rains, esq.*

WASHINGTON, April 14, 1860.

SIR: In answer to your interrogatories relative to the Colorado desert, \* \* \* I would state that I have crossed and recrossed the above-described section of country some fifteen times, and have explored it in all parts where it was possible to go, consequently may claim to have a peculiar knowledge of it, and from that knowledge am free to say that there is no portion of it, with the exception of the location of the Indian rancharie, at the opening of the San Gargonio Pass, on which man or animal could subsist, or any portion of it that could be sold for any consideration, as there is neither water nor vegetation, and the excessive heat and drifting sands make it extremely difficult to cross over it, owing to which there has been great suffering, loss of life, and property. It would be difficult to estimate the amount of property and stock lost on this desert of death (as called by the Mexicans). I lost myself, at one time, some \$30,000 worth of sheep that I had driven thus far from New Mexico. I consider the entire section (named by you) not only valueless, but a great barrier to the prosperity of the State of California and to the general government, and if water could be introduced on it, it would be a blessing to mankind. \* \* \* I witnessed, in 1849 (after the overflow of New River), luxuriant growth of grass and other vegetation along and adjacent to the course taken by the water.

Yours, respectfully,

JOHN RAINS.

O. M. WOZENCRAFT.

Quite a number more of letters were furnished and published in the report, all of the same tenor. We deem it sufficient to offer but one additional letter, of Col. J. J. Abert, chief topographical engineers, in reply to the Secretary of War:

BUREAU OF TOPOGRAPHICAL ENGINEERS,  
*Washington, May 17, 1860.*

SIR: I have the honor to acknowledge the reference to this bureau of the letter of the Hon. M. S. Latham, of the 11th instant, with your directions to report "whether the Colorado desert, from the many surveys, &c., of Army officers, is not looked upon as a serious barrier to government service."

The country embraced between the 100th meridian and the coast-range of mountains of the Pacific, between the 32d and 49th degree of latitude, may be pronounced to be a desert, with occasional valleys susceptible of cultivation. The Colorado desert, however, has been regarded as one of the most serious obstacles to the overland journey. Major Emory, in his report of reconnaissance of 1846 and 1847, represents the journey across it as one of extreme hardship. [Here follows references to the different surveys and reports.]

*Extent and boundaries of the desert.*—The Colorado desert extends from the base of Mount San Bernardino to the Gulf of California, and is bounded on the north by a range of rocky ridges reaching from Mount San Bernardino to the junction of the Gila with the Colorado; on the south and west it is bounded by the Sierra of the Peninsula, and on the east by the Colorado River and Gulf of California.

The area thus inclosed is a long, nearly level plain, extending in a northwest and southeast direction, from latitude 34° in the north to parallel 32° in the south. Its greatest length in the above direction (from the base of Bernardino Pass to the gulf) is 170 miles; or measuring from base of the pass to the mouth of the Gila is 140 miles. Its greatest width is about 70 miles. \* \* \* \* \* This plain narrows as it extends back from the Colorado River. \* \* \* \* \* These measurements are approximate, and give for the whole area about 6,000 square miles. \* \* \* \* \*

Respectfully, sir, your obedient servant,

J. J. ABERT,  
Colonel Corps of Engineers.

Hon. JOHN B. FLOYD,  
Secretary of War.

APPENDIX B.

GENERAL LAND OFFICE, February 18, 1861.

SIR: I have the honor to return herewith the letter to you, dated February 16, 1861, from Hon. William Vandever, of the Committee on the Public Lands of the House of Representatives, respecting proposed grant of lands to California, in the southeastern part of the State, to aid in the construction of canals, &c., for the purpose of introducing water thereon. \* \* \* \* \*

It is understood, however, that of the triangular three-millionth part contemplated by the memorial there is a considerable body of good arable land, stretching lengthwise, from the southeast to northwest, yet all requiring water, its destitution in that respect rendering the country generally unfit for settlement. The water project is designed, it is understood, to open the way for intercommunication through the country for all purposes, and it is through that means portions of the lands will be redeemed. I would, therefore, respectfully suggest that should Congress contemplate favorable legislation, it be conditioned, that the Secretary of War be authorized to cause a survey and examination to be made as to the practicability of supplying water to this region as proposed, and as to the character of the soil, &c.; that, should it appear from such survey that the work is a feasible one, and that the tract in its present condition is uninhabitable and incapable of cultivation, power be conferred on the Secretary of War to make the grant absolute, with proper limits as to extent, and condition as to completing the work within a limited period, to be stipulated by them; that the lands shall be subject to the disposal of the legislature of the State for this work and no other; that they shall be disposed of as the work progresses, and if not completed within a limited time, to be fixed, the lands unsold to revert to the United States.

Very respectfully, your obedient servant,

JOS. S. WILSON,

MOSES KELLY, Esq.,  
Acting Secretary of the Interior.

APPENDIX C.

Extracts from Lieutenant Bergland's survey, under the direction of Lieutenant Wheeler, by order of the War Department:

In order that the canal should be entirely within the California boundary, it must cross the divide to the north of Pilot Knob. This, as has already been shown, would necessitate a long, deep cutting, partly through rock and a passage through the sand ridge. This passage could only be effected by means of a flume or tunnel to protect it from filling up with sand. A canal from some point below the boundary would be more practicable and less expensive in construction and maintenance. \* \* \* \* \* One of the

branches of New River leaves the Colorado near Algodon Station, and this artificial channel might be utilized in the construction of a canal for diverting the water of the river into the depressed area to the northwest. \* \* \* The amount of cutting required is difficult to estimate without further surveys, but it would doubtless be moderate, as the water flows into this area from the river when it overflows its banks. \* \* \* Mr. Hanlon, owner of the ferry at Hanlon's ferry, nine miles below Fort Yuma, says the channel of the Colorado opposite to Pilot Knob is about three-fourths of a mile east of where it was at the time of Mr. Wozencraft's examination.

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APPENDIX D.

SAN BERNARDINO, November 1, 1860.

SIR: In compliance with your instructions, I have made a reconnaissance and survey of the Colorado desert, with a view of determining the "*practicability and probable expense of introducing water on the said desert from the Colorado River, and the area of land which may be thus irrigated.*"

The reconnaissance and survey embraced that portion of the desert laying south of the range of mountains extending from the San Bernardino Mountains to the Colorado River. I deemed it unnecessary to go north of that range of mountains, having spent some time in surveying that region of country, and thus gained a familiar knowledge of its topography and physical geography, from which I am persuaded that water cannot be taken from the river over any considerable portion of it, or to the basin below that range of mountains; and, moreover, having found a point which was so well adapted in fulfillment of the object in view that I deemed it all-sufficient to limit the survey to the above-named region of country.

After having made a careful reconnaissance of the country, I was forcibly impressed with the *practicability* of taking water from the Colorado River over a great portion of it, inasmuch as there is the unmistakable evidence of water having flown from the river through innumerable channels and finally concentrating into one of some magnitude, by which the water is conducted far up into the basin; water having passed through this channel (from the Colorado River) soon after our acquisition of the country, it was called New River and Old River.

The *practicability* being thus settled by the laws of nature, I sought to determine on a suitable point to tap the river, and was fortunate in finding a location which possessed so many advantages that I was at no loss in making the selection. It is that point of rock adjacent to Pilot Knob, and immediately below our boundary-line with Mexico. The secondary and recent alluvial formations of the banks of the Colorado will not admit of tapping the river without risk of changing its channel and destruction of the works necessary in regulating the volume of water to be taken out. Hence the necessity of taking advantage of a point of primary and durable formation, and so situated as to insure a juncture with the river at all times.

This point possesses all of these requisites. There is a ledge of rock extending into the river some fifty-five feet, projecting out from an elevated point of rock against which the river impinges, and in all probability will ever continue to do so. This point being determined on, it was made the base of survey, and I proceeded to run a line of levels down and adjacent to our boundary-line with Mexico; the result of which showed a mean fall, with an equitable gradient of four feet to the mile through the entire extent of country proposed to be irrigated.

There is an elevated plain putting out from the river at the point of junction, which continues on in a southwesterly direction for some forty miles. It would be desirable to carry the level on and over it, but inasmuch as there are heavy sand drifts on it projecting out to the edge of this branch, it would be difficult, if not impossible, to carry water through it; consequently we will be compelled to take the water through Mexican territory for that distance.

*The probable expense of the work.*—It would be difficult for me to make an estimate, and am in hopes it may be sufficient to give the facts by which those who may engage in the work can make their estimates.

The ledge of rock at the junction is so formed by nature as to require but little additional work to make it complete for the introduction and regulation of the volume of water which may be required. Nature again has formed aqueducts from this point to the bed of Old River, but it will be necessary to cut one channel and thus confine and husband the water. This canal should be, say 45 feet in width and 10 in depth and forty miles in length through Mexican territory. We then can avail ourselves of the channel of Old River for thirty or forty miles through American delta, simply by deepening and straightening it, and finally extend it by smaller cuts some fifteen or twenty miles further up to the eastern depression of the basin, and to the base of the mountains.



After reaching the American soil the lateral canals may be cut at such intervals as the requirements for irrigation may demand, and of course the expense will be in due ratio to the number required, and that can only be determined by actual experiment.

The area of land which may be irrigated may be set down at twenty miles in width and forty in length. This estimate must be taken with all due allowance, and in connection with the obstacles in making the estimate. There are, in the first place, a portion of the lands within the boundary which may be irrigated, all irreclaimable, owing to their formation and composition, such as sand-drifts, elevations, mud-volcanoes, alkalies, and salt-beds; and, finally, it would be difficult, if not impossible, to make an estimate of the volume of water which may be spared or safely taken from the Colorado River, or the area of lands which a given volume of water will irrigate; all of this cannot be correctly fixed *a priori*, and can only be determined by actual experiment.

I can only say that there is the above-named amount of lands within the American boundary which will admit of irrigation from the Colorado River, and that those lands are unusually rich, being composed of clay, sand, marl, and shells, and withal presenting a remarkably favorable surface for irrigation.

EBENEZER HADLEY,

County Surveyor of Los Angeles, and Deputy County Surveyor of San Bernardino.

O. M. WOZENCRAFT.

#### APPENDIX E.

*Mr. Lane, from the Committee on the Public Lands, to which was referred bill H. R. 4129, by direction of the committee, having considered the same, made the following report :*

This bill proposes, in consideration of the introduction of a wholesome supply of fresh water into the Colorado desert, to cede to Oliver M. Wozencraft and his associates, the said desert tract as described in the bill.

This tract embraces about (Lieutenant Bergland makes it) 1,600 square miles in the basin of what is now, and must until an energetic and expensive system of reclamation is inaugurated and brought to successful completion, remain a valueless and horrible desert.

The labor of reclamation must be commenced within two years and completed within ten years. As fast as water shall be introduced, upon a report to that effect being made to the government by a duly appointed commission, patents shall issue for the parts reclaimed; and when all of the conditions of the act are fulfilled, then, and not until then, shall the title vest in the said grantee.

The bill contains a provision protecting any persons in their existing rights under the laws of the United States, whether acquired under the pre-emption laws or by grants of any character under the laws of the United States.

The apparent novelty of the proposition is not so great as at first view it seems. It has been established to be outside of the policy, if not clearly beyond the Constitutional competency of the government to undertake the initiation and direction of works of internal improvement, as one so vast and at the same time so speculative as are contemplated by this bill.

The principle is the same that has stood the test of wise and approved statesmanship in granting the States the swamp and overflowed lands within their boundaries.

These lands, in many instances, have been reclaimed and now constitute the most fertile and prosperous tracts in their respective States, bringing wealth and contentment to the citizen, and adding prosperity and luster to the enlightened policy of the government.

The wealth of a nation does not consist in its reserved or hoarded possessions; unpeopled, remote, unproductive wastes within the limits of possible improvement, are rather evidences of a narrow and false policy. The whole public domain of the nation is worth less to it than the allegiance of the people of the smallest State in the Union. A nation's revenues are a concession from the enterprise, the labor, and the accumulation of industrial citizens. All other possessions are a source of expense and weakness, or at least of uselessness. Whenever, therefore, the government can secure the production of values by encouraging individual enterprise at the cheap price of parting with that which is of no value to it, sound policy will favor such an exchange, subject only to the limitations and restrictions which will tend to secure the end proposed.

That part of the Colorado desert lying within the United States is a triangular tract of land between the Colorado River on the east and the Coast Range of mountains on the west, lying wholly within San Diego County, in the State of California. The base of the triangle extends along the southern boundary of California from Fort Yuma westward between eighty and one hundred miles, the apex of the triangle being

about one hundred and twenty miles to the northwest, and the sides, as they approach the apex, inclining toward the west. From the report of the several reconnoitering parties sent out by the government, from United States surveyors who have extended government surveys over it, and from the reports of Army officers who have frequently traversed it, come the concurrent and universal testimony of its utter aridity and barrenness. Even sage-brush, greasewood, and mesquite, those wretched products of the desert, with which, as with rags and tatters, nature vainly tries to cover her unlovely poverty, are unable to withstand the prevailing heats and withering winds. The Indians who live on the border of this region, with a lively appreciation of its horrors call it "Death Desert," and they have a belief that the wicked are doomed to wander there without water in summer and without clothes in winter.

At a period, geologically not remote, this region was a portion of the Gulf of California. The delta of the Colorado River extending southward has cut off communication with the waters of the gulf, and thus deprived of a connection with its source of supply, evaporation has changed it from an inland lake to an arid plain, whose surface is lower than the bed of the river, and quite a considerable portion is lower than the sea-level. The soil is in most parts a clay, more or less mixed with sand and lacustrine and marine shells, and of a quality that would, under favorable circumstances, be very fertile. It is believed that the superfluous waters of the Colorado River turned into this desolate plain, would suffice to change its resemblance to the Rhadamanthus abode of Indian fiends to fertile fields, the home of plenty and contentment.

The foregoing extracts show the feasibility of the proposed undertaking, and also foreshadow the difficulties by which it would be attended. They also show that it is a labor that can never be accomplished by the government without a departure from its traditional policy. That the enterprise is one meriting favorable consideration need not be further argued. It only remains to be considered whether the present bill meets the requirements and should become a law in its actual shape, or in an amended form.

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