

## IN THE SENATE OF THE UNITED STATES.

JULY 9, 1890.—Ordered to be printed.

Mr. ALLISON, from the Committee on Appropriations, submitted the following

## REPORT:

[To accompany H. R. 10884.]

The Committee on Appropriations, in reporting back to the Senate the bill (H. R. 10884) "making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1891, and for other purposes," present the following statement showing the amounts estimated for these purposes in the Book of Estimates, the amounts provided by the bill as it passed the House of Representatives, the amounts recommended by the committee and the amount of the sundry civil appropriation act for the fiscal year 1890, and append hereto report of statements made before the subcommittee, and various communications received respecting the bill and matters considered in connection therewith:

*Sundry civil expenses, 1891.*

Amount of estimates for 1891.....	\$37,849,513.96
Amount of bill as passed the House .....	28,060,620.22
Increase made to bill by Senate committee (net).....	3,181,060.00
Amount as reported to the Senate .....	31,241,680.22
Amount of act for 1890.....	25,297,341.65
The bill as reported to the Senate less than estimates .....	6,552,172.31
The bill as reported to the Senate exceeds act for 1890.....	5,944,338.57

The changes made in amounts of House bill by Senate Committee on Appropriations was as follows:

## INCREASE.

Public buildings:	
Baltimore, Md.....	\$20,000.00
Chicago, Ill.....	55,000.00
New London, Conn.....	30,000.00
Wichita, Kans.....	8,000.00
Bureau of Engraving and Printing.....	80,000.00
Vaults, Treasury Department.....	333,500.00
	526,500.00
Light-houses:	
Lubec Narrows, Maine .....	15,500.00
Cornfield Point, Conn., light-vessel.....	70,000.00
Old Oxford Shoal, New York.....	60,000.00
Fenwick's Island Shoal, Maryland, light-vessel .....	70,000.00
Maryland Point, Maryland.....	50,000.00
Chincoteague buoy-depot, Virginia.....	1,000.00
Portsmouth light-house depot, Virginia.....	10,000.00

## Light-houses.—Continued:

Cape Hatteras, North Carolina.....	\$5,000.00
Martin's Industry, light-vessel, South Carolina.....	70,000.00
Frying Pan Shoals, light-vessel, North Carolina.....	70,000.00
Eleven-Foot Shoal, Michigan.....	60,000.00
Sherwood Point, Green Bay, Wisconsin.....	100.00
Chicago Breakwater, Illinois.....	15,000.00
Point Hueneme, California.....	1,250.00
New York Slough, California.....	10,000.00
Northwest Seal Rock, California.....	81,000.00
Columbia River, light-ship, Oregon.....	10,000.00
Tender, first light-house district.....	95,000.00
Tender, ninth and eleventh light-house districts.....	75,000.00
Tender, thirteenth light-house district.....	95,000.00
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Revenue-Cutter Service.....	863,850.00
Supplies of light-houses.....	10,000.00
Repairs of light-houses.....	10,000.00
Expenses of buoyage.....	25,000.00
Expenses of fog-signals.....	5,000.00
Lighting of rivers.....	40,000.00
Coast survey.....	4,000.00
Repairs, Smithsonian Building.....	45,000.00
National Museum.....	30,000.00
Fish Commission.....	80,100.00
Adulterated food and drugs.....	500.00
Transportation of silver coin.....	30,000.00
Distinctive paper for United States securities.....	10,000.00
Pay of assistant custodians and janitors.....	75,000.00
Furniture and repairs, public buildings.....	50,000.00
Vaults, safes, and locks.....	10,000.00
Binding manuscript papers.....	6,000.00
Portraits of Henry Clay and J. Q. Adams.....	2,500.00
Latin-American Memorial Library Building.....	500,000.00
Repairs, Pension Building.....	13,000.00
New boilers for Senate wing, Capitol.....	15,000.00
Capitol terraces.....	5,000.00
Registers and receivers' salaries.....	25,000.00
Contingent expenses, land offices.....	25,000.00
Surveys of the public lands.....	400,000.00
Survey of Port Angeles, Wash.....	5,000.00
Survey of tract in Alabama.....	300.00
Topographic surveys, Geological Survey.....	100,000.00
Insane Hospital.....	8,000.00
Howard University.....	12,000.00
Freedmen's Hospital.....	2,900.00
Springfield National Armory Building.....	100,000.00
Repairs, Congressional Cemetery.....	500.00
Executive Mansion, electric lighting.....	7,700.00
Underground cable for telegraph lines.....	18,465.00
Military posts.....	150,000.00
Signal Service.....	6,000.00
Burial of indigent soldiers in Arlington.....	1,000.00
Garfield Hospital.....	2,500.00
Rebellion Records.....	82,900.00
Fort Leavenworth military prison.....	200.00
National Homes.....	74,400.00
Court-house, District of Columbia.....	2,500.00
Utah Industrial Home.....	4,000.00
Utah penitentiary.....	1,000.00
Defending suits in claims against the United States.....	5,000.00
Payment of U. S. district attorneys.....	40,000.00
Payment of regular assistants.....	10,000.00
Payment of special assistants.....	10,000.00
Fees of clerks.....	25,000.00
Fees of jurors.....	35,000.00
Fees of witnesses.....	200,000.00
Support of prisoner.....	50,000.00
Pay of bailiffs and criers.....	34,400.00

## SUNDRY CIVIL APPROPRIATION BILL.

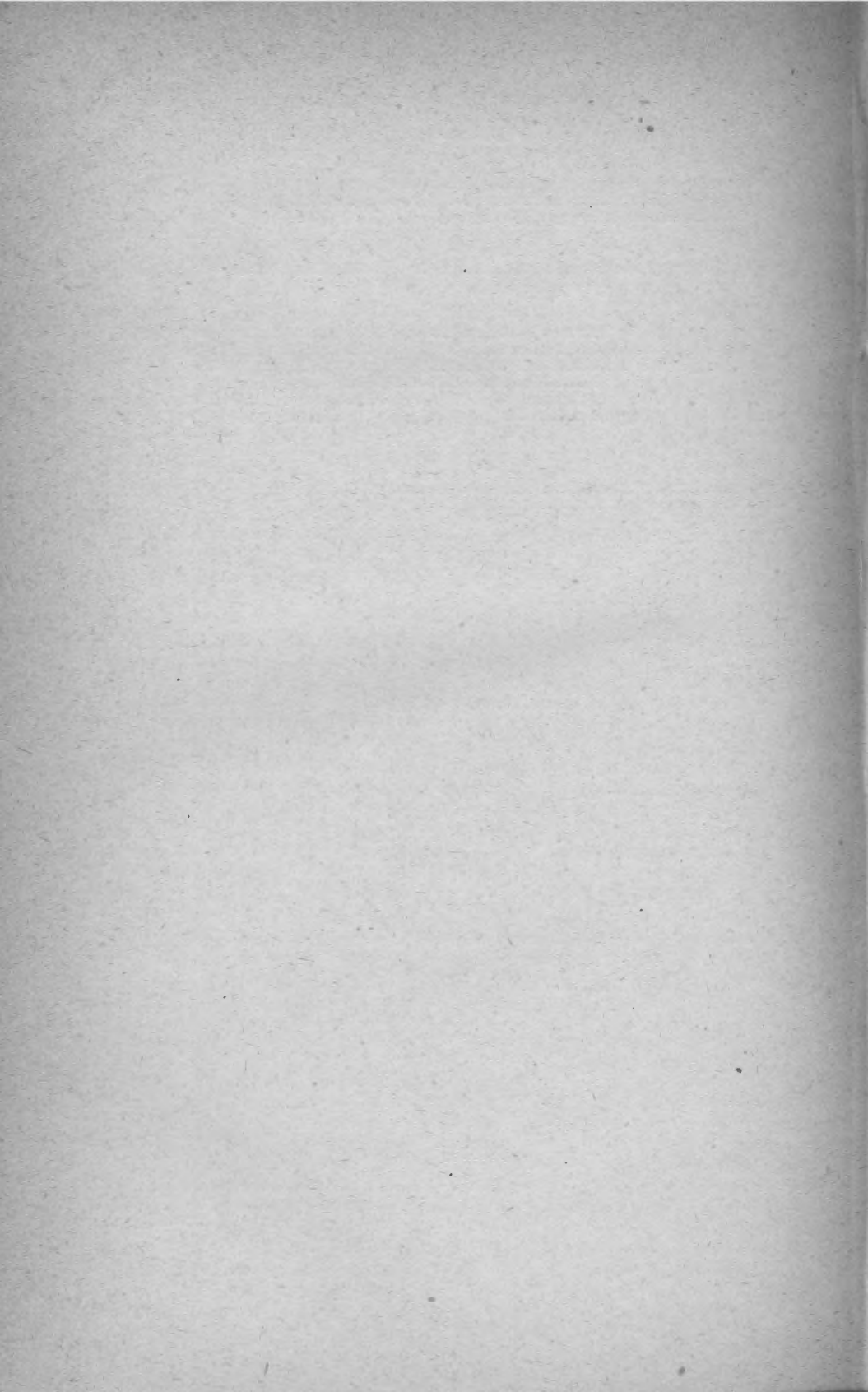
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Miscellaneous expenses .....	\$20,000.00
Payment to widow of late Chief-Justice .....	8,745.00
Portrait of Chief-Justice Marshall .....	1,000.00
New edition of tariff compilation .....	2,000.00
Botanic Garden.....	3,000.00
Public Printing Office building.....	250,000.00
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Total increase .....	2,699,910.00
	4,090,260.00

## REDUCTION.

Depredations on public timber .....	25,000.00
Protecting public lands.....	20,000.00
Irrigation survey .....	777,500.00
Roads, Watervliet Arsenal.....	9,700.00
Land for national cemetery at Hampton, Va .....	7,000.00
State or Territorial homes.....	70,000.00
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Total reduction.....	909,200.00

Net increase.....	3,181,060.00
Total of bill as reported .....	31,241,680.22



## APPENDIX.

### NATIONAL MUSEUM.

SMITHSONIAN INSTITUTION,  
UNITED STATES NATIONAL MUSEUM,  
Washington, June 12, 1890.

Hon. WILLIAM B. ALLISON,  
*Chairman of the Committee on Appropriations:*

SIR: I earnestly invite your consideration of the items relating to the National Museum in the sundry civil bill, as reported yesterday to the House of Representatives. Notwithstanding the constant growth of the collections, the great increase in the number of visitors, and the yearly extending demands of the public upon the scientific staff of the Museum, the appropriations for the coming year, as indicated in the report of the House committee, are no greater than for 1888-'89, and \$5,000 less than for 1889-'90.

I submitted an estimate, \$175,000, being an increase of \$35,000, for the "preservation and increase of collections," and \$30,000 for "furniture and fixtures," the same amount that was last year appropriated. The reduction of the furniture and fixtures appropriation by \$5,000 is not so important a matter, provided that an increase be allowed in the other item. At least \$20,000 additional is *actually necessary* for the proper conduct of the work now in hand, without allowing for any expansion whatsoever.

The appropriations for the maintenance of the National Museum of the United States are far smaller than those for similar government institutions in England, France, Germany, and Austria; and, notwithstanding the valuable gifts of collections constantly received, the Museum is unable to maintain a standing and dignity worthy of the nation.

The salaries paid to clerks and other administrative employés are so small that the best of them are constantly being taken away by the Executive Departments of the Government, much to the detriment of the Museum service.

The paid scientific staff is too small. Much of the scientific administrative work is performed by volunteers, who receive no pay for their service—a system advantageous to a limited extent, but not so to the degree to which it has been necessary to apply it in the National Museum.

More watchmen are required for the proper policing of the buildings, and more laborers and cleaners to keep the exhibition halls in presentable condition.

Indeed, the expansion of the Museum, which is really not keeping pace with the growth of the country and of the scientific work of the

Government in general, renders an increase in the appropriations imperatively necessary.

I do not wish to burden you with statistics, but as an indication of the change of conditions within a very few years, I may state that the number of visitors during the last fiscal year was about 375,000, compared with 167,500 in 1882; that the extent of the collections on July 1, 1889, was nearly 2,900,000 specimens, compared with less than 194,000 at the end of 1882, the first year of organized work in the new Museum building; that the number of letters sent out during the past fiscal year, chiefly in response to demands for information and other assistance in connection with scientific matters, has been 5,350, contrasted with 2,700 in the previous year; that the number of the scientific departments in the Museum is now 36 contrasted with 15 in 1882.

Although, as I have stated, the decrease of \$5,000 in the furniture and fixtures appropriation is not the most important of the matters which I wish to bring to your attention, I sincerely hope that the full amount may be granted for the following reasons: Every year the Museum is offered valuable private collections as gifts or as long-time deposits, on the condition that they shall be properly installed in suitable cases especially constructed for them, and it is from this source that many of the most important recent additions to the national collections have been received, for in a large number of instances collections thus placed in the custody of the National Museum, if installed to the satisfaction of the owners, are never removed.

The value of the collections thus acquired is always far greater than that of the cases in which they are placed, and any reduction of the furniture and fixtures appropriation at the present time will necessarily interfere to a certain extent with this important means of developing the collections in the National Museum.

I fear that I have not hitherto urged these considerations as strongly as it was my duty to have done, and I trust that your committee will be disposed to give them their most careful attention. I am sure that an examination of the reviews of the development of the Museum year by year since 1881, as given in the reports of the Smithsonian Institution, will convince you that the facts, as I have given them, are in reality understated.

I am, sir, yours, very respectfully,

S. P. LANGLEY,  
*Secretary.*

#### ENGRAVING AND PRINTING.

TREASURY DEPARTMENT,  
BUREAU OF ENGRAVING AND PRINTING,  
*June 30, 1890.*

Hon. WILLIAM B. ALLISON,  
*Chairman Committee on Appropriations :*

SIR: In compliance with the verbal request made by you when I was before the Committee on Appropriations to-day, relative to the items of appropriation for this bureau in the sundry civil bill for 1891, now being considered by your committee, I have the honor to state that the increase in the amount of work requested by the several bureau officers of the Treasury Department for 1891 over 1890 is as follows:

Treasurer of the United States, 1,200,000 sheets, or 16 per cent.;

Comptroller of the Currency, 80,000 sheets, or 6 per cent.; Commissioner of Internal Revenue, 2,485,100 sheets, or 9 per cent.; miscellaneous, 110,000 sheets, or 7 per cent.

The aggregate increase is 3,875,100 sheets, or 10 per cent. The amount of the appropriation asked for 1891 is \$80,000 greater than that asked for 1890, an increase of 8 per cent. There is, therefore, an increase in the work amounting to 10 per cent. and an increase in the appropriation of only 8 per cent.

The increased cost of plate printing caused by the discontinuance of the steam plate presses, taking the aggregate amount estimated to be required for the next fiscal year, and including the increased amount of work asked for by the several bureau officers, is only \$1.87 for each one thousand impressions.

Speaking from a practical experience of many years with all kinds of printing, I have no hesitation in saying that plate printing executed on steam plate-printing presses is inferior to that executed upon hand-presses. The securities that are now being delivered by this bureau to the several bureaus of the Department are executed in the best possible manner, by the best possible method, a fact which I think no one will dispute. This can not be said of work executed by the steam-printing method. In my judgment the superiority of the work executed fully justifies the additional expenditure made.

Respectfully, yours,

WM. M. MEREDITH,  
*Chief of Bureau.*

#### TRANSPORTATION OF SILVER COIN.

TREASURY DEPARTMENT,  
OFFICE OF THE SECRETARY,  
Washington, D. C., June 21, 1890.

Hon. W. B. ALLISON,

*Chairman Committee on Appropriations :*

SIR: I have the honor to invite your attention to the item "Transportation of silver coin," contained in the Book of Estimates for 1891, page 204, for which the sum of \$55,000 is estimated; also, to the note printed below the estimate showing that amount expended for year ending November 15, 1889, averaged about \$5,000 per month. The amount provided in the sundry civil bill (H. R. 10884) is \$25,000, which at the same rate of expenditure would last only to December 1, 1890.

If it is intended to continue to transport silver coin free of charge, as required by law, the entire amount of \$55,000 estimated for should be appropriated.

Respectfully, yours,

W. WINDOM,  
*Secretary.*

TREASURY DEPARTMENT,  
June 30, 1890.

*Committee on Appropriations :*

The full sum of \$55,000 is needed for "Transportation of silver coin," if it is intended to continue to transport silver coin free of charge, as required by the law mentioned in your telegram. No other statute re-

quires transportation of silver after it has been distributed from the mint where coined. Rather more than half is for standard silver. See Department letter to Senate Committee on Appropriations, 21st instant.  
W. WINDOM.

### DISTINCTIVE PAPER FOR UNITED STATES SECURITIES.

TREASURY DEPARTMENT,  
OFFICE OF THE SECRETARY,  
Washington, D. C., June 25, 1890.

*The Chairman Committee on Appropriations, United States Senate :*

SIR: I have the honor to state that the sundry civil bill contains an appropriation for \$40,000 for distinctive paper for United States securities (see page 32, line 13), while the amount estimated for this object, the details of which appear on page 205, Estimates for 1890 and 1891, was \$53,363.11. This estimate was based upon a careful calculation by the Treasurer of the United States of the amount of paper which would be required to fill his requisitions upon the Bureau of Engraving and Printing for United States notes and silver certificates during the next fiscal year, and the appropriation of any less amount will probably result in a deficiency. I therefore earnestly recommend that the appropriation be increased to the amount estimated for, viz, \$53,363.11.

Respectfully, yours,

W. WINDOM,  
*Secretary.*

### FURNITURE, ETC., FOR PUBLIC BUILDINGS.

*Synopsis of expenditures for furniture and repairs of furniture.*

Sheet No. 1, amount expended in 1889 .....	\$278,000.00
Sheet No. 2, amount expended in 1890 .....	200,000.00
Sheet No. 3, revised estimate for 1891 .....	381,171.00
Sheet No. 4, furniture and repairs of furniture additional to current appropriation, and additional to above estimates asked for April 4, 1890.	142,000.00

No. 1.—Amount expended from the appropriation, "Furniture and Repairs of Furniture, 1889," including deficiency act of March 2, 1889.

Building.	New furniture.	Repairs.	Carpets.
Aberdeen, Miss., C. H. & P. O .....	\$173.00		
Albany, N. Y., C. H. ....	728.50	\$258.91	
Astoria, Oregon, C. H. ....		2.50	
Atlanta, Ga., C. H. & P. O .....	272.00	30.65	
Austin, Texas, C. H. & P. O .....	28.55		\$52.10
Baltimore, Md., Ap. stores .....	68.28		
Baltimore, Md., court-house .....	46.50		
Baltimore, Md., custom-house .....	508.55	30.00	
Bangor, Me., custom-house .....	12.50	165.35	
Barnstable, Mass., custom-house .....	35.00		
Bath, Me., custom-house .....		48.50	
Belfast, Me., custom-house .....		2.50	
Boston, Mass., custom-house .....	516.09	20.80	93.96
Boston, Mass., P. O. & sub-T .....	1,723.45	200.00	129.07
Bristol, R. I., custom-house .....		20.00	
Buffalo, N. Y., custom-house .....	901.78	3.50	
Burlington, Vt., custom-house .....	96.63	3.00	



SUNDEY CIVIL APPROPRIATION BILL.

No. 1.—Amount expended from the appropriation, "Furniture and Repairs of Furniture, 1889," etc.—Continued.

Building.	New furniture.	Repairs.	Carpets.
Cairo, Ill., custom-house	\$42.75	\$1.50	
Charleston, S. C., custom-house	12.00		
Charleston, S. C., post-office	479.60	11.60	
Charleston, W. Va., C. H. & P. O.		5.00	
Chicago, Ill., custom-house	1,668.37	210.24	
Cincinnati, Ohio, custom-house	616.83	87.75	
Cleveland, Ohio, custom-house	542.75	2.50	
Columbus, Ohio, C. H. & P. O.	165.58	1.00	
Covington, Ky., C. H. & P. O.	6.50	8.50	
Danville, Va., C. H. & P. O.	187.73		\$76.94
Detroit, Mich., custom-house	635.32	154.08	
Dubuque, Iowa, custom-house	98.00		
Elleworth, Me., custom-house	11.50		
Evansville, Ind., custom-house	265.70	106.15	49.43
Eastport, Me., custom-house			57.47
Fall River, Mass., custom-house	10.00		
Frankfort, Ky., C. H. & P. O.	58.00	11.40	
Galesia, Ill., custom-house	15.65	2.00	
Galveston, Texas, custom-house	91.30	108.50	
Georgetown, D. C., custom-house	91.75		
Gloucester, Mass., custom-house	9.20	22.60	
Grand Rapids, Mich., C. H. & P. O.	219.17	17.91	
Harrisburgh, Pa., C. H. & P. O.	170.38	53.75	34.67
Hartford, Conn., C. H. & P. O.	343.73	25.50	
Indianapolis, Ind., C. H. & P. O.	430.42	140.06	
Jackson, Miss., C. H. & P. O.	1.50	1.00	
Jersey City, N. J., C. H. & P. O.	390.52	4.00	
Kansas City, Mo., custom-house	779.45	18.43	
Kennebunk, Me., custom-house	23.77		87.79
Knoxville, Tenn., C. H. & P. O.	161.25		
Lincoln, Nebr., C. H. & P. O.	15.39	14.25	
Little Rock, Ark., C. H. & P. O.	54.60	23.25	
Louisville, Ky., custom-house	1,537.00	31.40	
Madison, Wis., C. H. & P. O.	110.09		
Memphis, Tenn., custom-house	362.46	63.00	
Milwaukee, Wis., custom-house	97.32	12.09	
Mobile, Ala., custom-house	40.24	431.50	181.33
Montgomery, Ala., C. H. & P. O.	25.75	10.00	
Nashville, Tenn., custom-house	597.13	50.18	
Newark, N. J., custom-house	536.60	56.95	
New Bedford, Mass., custom-house	168.75		
Newburyport, Mass., custom-house	2.00		
New Haven, Conn., custom-house	506.69		25.34
New London, Conn., custom-house	16.00		
New Orleans, La., custom-house	2,929.31	1,781.63	571.70
New York, N. Y., barge-office	342.24	17.00	105.37
New York, N. Y., C. H. & P. O.	4,743.21	994.90	236.05
New York, N. Y., custom-house	1,552.76	61.85	
New York, N. Y., sub-treasury	1,427.66	418.40	
Norfolk, Va., custom-house	591.03	33.00	
Omaha, Neb., custom-house	1,129.43	76.45	220.90
Ogdensburg, N. Y., custom-house	76.92	29.45	
Oswego, N. Y., custom-house	175.99	20.00	
Oxford, Miss., C. H. & P. O.		7.20	
Paducah, Ky., C. H. & P. O.	3.75		
Parkersburg, W. Va., C. H. & P. O.	2.82	84.00	249.09
Petersburg, Va., custom-house	37.50		
Philadelphia, Pa., Ap. stores	1.50		
Philadelphia, Pa., C. H. & P. O.	2,408.42	100.40	
Philadelphia, Pa., custom-house	545.53	61.10	
Pittsburg, Pa., custom-house	288.50	5.00	
Plattsburgh, N. Y., custom-house	5.00		
Port Huron, Mich., custom-house	49.94	1.95	
Portland, Me., C. H. & P. O.	282.30	9.93	
Portland, Me., custom-house	86.40	1.00	
Portland, Oregon, custom-house	109.40	393.45	
Portsmouth, N. H., custom-house	131.50		
Poughkeepsie, N. Y., post-office	68.94	16.00	
Providence, R. I., custom-house	265.94	223.78	
Quincy, Ill., C. H. & P. O.	170.09		
Rockland, Me., custom-house	105.10	11.00	182.75
Rutland, Vt., C. H. & P. O.	103.97	20.80	46.74
St. Augustine, Fla., C. H.	111.50	7.50	
St. Louis, Mo., C. H. & P. O.	720.66	29.25	
St. Paul, Minn., custom-house	176.90	2.00	273.49
Salem, Mass., custom-house	6.00		
Sandusky, Ohio, custom-house	17.00	17.90	
San Francisco, Cal., ap stores	840.12	1.50	224.14
San Francisco, Cal., C. H.	443.22	83.50	87.34
San Francisco, Cal., sub-treasury	12.00		

No. 1.—Amount expended from the appropriation, "Furniture and Repairs of Furniture, 1889," etc.—Continued.

Building.	New furniture.	Repairs.	Carpets.
Savannah, Ga., custom-house .....	\$32.75	\$8.20	.....
Shreveport, La., C. H. & P. O. ....	111.00	.....	.....
Springfield, Ill., C. H. & P. O. ....	36.43	2.00	.....
Suspension Bridge, N. Y., C. H. ....	.....	5.10	.....
Toledo, Ohio, custom-house .....	1,762.69	14.00	.....
Topeka, Kansas, C. H. & P. O. ....	6.00	45.35	.....
Trenton, N. J., C. H. & P. O. ....	130.63	.....	.....
Tyler, Texas, C. H. & P. O. ....	432.00	1.50	.....
Utica, N. Y., C. H. & P. O. ....	202.17	.....	.....
Waco, Texas, custom-house .....	152.75	.....	.....
Wheeling, W. Va., custom-house .....	209.73	105.00	.....
Wilmington, Del., custom-house .....	26.40	8.50	.....
Wilmington, N. C., custom-house .....	.....	10.00	.....
Total .....	38,179.44	7,165.89	\$2,985.67
Aggregate .....	.....	48,381.00	.....

Amount allotted to Marine Hospital Service .....

Advertising, etc. ....

\$9,615.52

2,300.31

*New buildings furnished in whole or in part.*

	Furniture.	Carpets.
Angusta, Me., C. H. & P. O. ....	\$2,168.59	\$209.32
Baltimore, Md., C. H. & P. O. ....	27,780.12	2,249.80
Clarksburg, W. Va., C. H. & P. O. ....	4,241.79	449.47
Concord, N. H., C. H. & P. O. ....	7,726.89	781.52
Council Bluffs, Iowa, C. H. & P. O. ....	1,566.33	6.25
Dallas, Texas, C. H. & P. O. ....	9,826.47	574.79
Des Moines, Iowa, C. H. & P. O. ....	13,143.11	2,255.03
Erle, Pa., C. H. & P. O. ....	10,763.86	910.61
Fort Worth, Tex., C. H. & P. O. ....	8,172.00	734.18
Harrisonburg, Va., C. H. & P. O. ....	1,367.99	259.95
Hannibal, Mo., C. H. & P. O. ....	3,927.48	439.52
Jefferson City, Mo., C. H. & P. O. ....	5,570.54	564.09
Lexington, Ky., C. H. & P. O. ....	5,746.07	298.47
Fort Scott, Kansas, C. H. & P. O. ....	2,827.04	226.75
Keokuk, Ia., C. H. & P. O. ....	7,416.72	1,020.87
Leavenworth, Kansas, C. H. & P. O. ....	8,701.15	1,115.34
Lynchburg, Va., C. H. & P. O. ....	1,433.69	.....
Macon, Ga., C. H. & P. O. ....	7,413.01	593.81
Minneapolis, Minn., C. H. & P. O. ....	13,764.09	503.26
Nebraska City, Neb., C. H. & P. O. ....	3,855.11	219.65
New Albany, Ind., C. H. & P. O. ....	3,973.75	.....
Peoria, Ill., C. H. & P. O. ....	11,603.96	701.40
Reading, Pa., C. H. & P. O. ....	4,281.05	530.15
Richmond, Va., custom-house .....	7,206.75	1,405.41
Santa Fé, N. M., C. H. & P. O. ....	7,331.40	1,141.41
Springfield, Ohio, C. H. & P. O. ....	3,849.66	160.96
Syracuse, N. Y., C. H. & P. O. ....	1,737.52	1,281.62
Terre Haute, Ind., C. H. & P. O. ....	5,640.95	255.50
Toledo, Ohio, C. H. & P. O. ....	1,797.43	38.77
Tyler, Tex., C. H. & P. O. ....	433.50	.....
Total .....	198,258.02	19,977.90

Total of furniture and carpets of new buildings .....

Total of furniture, repairs, and carpets of old buildings .....

Deduct value of furniture on hand at the beginning of the fiscal year, 1889 .....

Amount expended .....

\$218,235.92

60,246.83

278,482.75

695.32

277,787.43

Furniture of the buildings at Angusta, Me., Baltimore, Md., Fort Scott, Kans., Keokuk, Iowa, Springfield, Ohio, and Des Moines, Iowa, incomplete on account of awnings, shades, etc.:

Regular appropriation .....

Deficiency appropriation .....

200,000.00

78,000.00

278,000.00

No. 2.—Authorized expenditures from the appropriation "Furniture and repairs of furniture, 1890," up to May 9, 1890.

	New furniture.	Repairs.	Total.
Aberdeen, Miss.	\$53.58		\$53.58
Albany, N. Y.	130.26	\$594.00	724.26
Alexandria, Va.		1.00	1.00
Astoria, Oregon		2.50	2.50
Atlanta, Ga.	8.25	197.00	205.25
Austin, Texas	299.24	137.50	436.74
Baltimore apps	12.75		12.75
Baltimore, C. H. & P. O.	382.99	6.00	418.99
Baltimore, Cust. H.	1,753.22	532.37	2,285.59
Baltimore, Court H.		8.75	8.75
Bangor, Me.	479.00	8.80	487.80
Barnstable, Mass.	16.50		16.50
Belfast, Me.	86.83		86.83
Boston, Cust. House.	576.41	587.48	1,163.89
Boston, P. O. & C.	3,753.85	648.30	4,402.15
Bristol, R. I.		4.00	4.00
Buffalo, N. Y.	272.00	8.00	280.00
Burlington, Vt.	65.50	15.95	81.45
Cañero, Ill.	1,172.58	4.00	1,176.58
Castine, Me.		3.00	3.00
Charleston, S. C., Cust.	277.00	21.00	298.00
Charleston, P. O.	300.25	5.00	305.25
Charleston, W. Va.		21.35	21.35
Chicago, Ill.	6,638.81	382.80	7,021.61
Cincinnati, Ohio	1,898.28	485.95	2,384.23
Clarksburg, W. Va.	298.79		298.79
Cleveland, Ohio	2,025.57	700.40	2,725.97
Columbia, S. C.	231.50	15.00	246.50
Columbus, Ohio	217.50		217.50
Concord, N. H.	783.50	5.00	788.50
Council Bluffs, Iowa.	83.70		83.70
Covington, Ky.	65.60	16.00	81.60
Dallas, Texas	227.10	13.50	240.60
Danville, Va.	695.70	142.00	837.70
Detroit, Mich.	528.07	135.65	663.72
Dubuque, Iowa	546.55	83.05	629.60
Ellsworth, Me.	70.00	7.50	77.50
Erie, Pa.	1,465.61	21.00	1,486.61
Evansville, Ind.	720.00	44.00	764.00
Fall River, Mass.	258.75	16.50	275.25
Fort Scott, Kans.	13.55	14.00	27.55
Fort Wayne, Ind.	264.00		264.00
Frankfort, Ky.	71.65		71.65
Galena, Ill.	4.00		4.00
Galveston, Tex.	6.00	14.00	20.00
Georgetown, D. C.	281.42	45.80	327.22
Gloucester, Mass.		1.75	1.75
Grand Rapids, Mich.	85.00	15.00	100.00
Greensboro, N. C.	210.40		210.40
Hannibal, Mo.	188.30	3.40*	191.70
Harrisburg, Pa.	710.79	193.00	903.79
Hartford, Conn.	390.91	49.78	440.69
Indianapolis, Ind.	1,519.93	1,074.57	2,594.50
Jefferson City, Mo.	315.41		315.41
Jersey City, N. J.	1,707.77	119.85	1,827.62
Kansas City, Mo.	252.10	516.75	768.85
Knoxville, Tenn.	1,596.67	21.13	1,617.80
Leavenworth, Kans.	1,024.50	2.00	1,026.50
Lexington, Ky.	842.48	3.52	846.00
Lincoln, Neb.	58.32	89.73	148.05
Little Rock, Ark.	188.31	78.65	266.96
Louisville, Ky.	1,082.27	166.76	1,249.03
Lynchburg, Va.	11.30		11.30
Macon, Ga.	7.00	3.15	10.15
Madison, Wis.	614.61	49.70	664.31
Memphis, Tenn.	1,624.00	326.22	1,950.22
Milwaukee, Wis.	482.24	71.51	553.75
Minneapolis, Minn.		99.32	99.32
Mobile, Ala.	15.08	53.50	68.58
Montgomery, Ala.	677.59	10.39	687.98
Nashville, Tenn.	302.01	107.38	409.39
Nebraska City, Nebr.	133.88	6.00	139.88
New Albany, Ind.	426.84		426.84
Newark, N. J.	450.88	109.85	560.73
Paducah, Ky.	95.50	11.50	107.00
New Bedford, Mass.	231.75	3.00	234.75
Newburyport, Mass.	60.53		60.53
New Haven, Conn.	466.02	3.50	469.52
New London, Conn.	139.64	22.00	161.64
New Orleans, La.	3,232.35	301.13	3,533.48

No. 2.—Authorized expenditures from the appropriation "Furniture and repairs of furniture, 1890," etc.—Continued.

	New furniture.	Repairs.	Total.
Newport, R. I. ....	\$823.11	\$13.75	\$836.86
New York, Barge O. ....	761.78	53.37	815.15
New York, C. H. & P. O. ....	8,010.56	905.54	8,916.10
New York, Cust. H. ....	5,644.58	1,293.81	6,938.39
New York, Sub-T. ....	245.91	392.99	638.90
Norfolk, Va. ....	228.00	97.45	325.45
Ogdensburg, N. Y. ....	404.67	17.84	422.51
Omaha, Nebr. ....	238.55	50.00	288.55
Owego, N. Y. ....	121.00	8.50	129.50
Parkersburg, W. Va. ....	948.80	22.43	971.23
Pensacola, Fla. ....	.....	3.00	3.00
Peoria, Ill. ....	1,130.13	170.14	1,300.27
Petersburg, Va. ....	907.89	58.68	966.57
Phila., Pa., Apps. ....	162.06	24.57	186.63
Phila., C. H. & P. O. ....	6,006.20	366.13	6,462.33
Phila., Cust. H. ....	443.58	452.04	895.62
Pittsburg, Pa. ....	3,010.35	27.74	3,038.09
Plattsburg, N. Y. ....	106.35	18.00	124.35
Port Huron, Mich. ....	3.23	4.60	7.83
Portland, Me., C. H. & P. O. ....	169.30	26.75	196.05
Portland, Cust. H. ....	132.07	79.00	211.07
Portland, Oregon, Cust. ....	360.25	88.50	448.75
Portsmouth, N. H. ....	434.00	49.50	483.50
Poughkeepsie, N. Y. ....	1,952.31	89.59	2,041.90
Providence, R. I. ....	766.00	332.00	1,118.00
Quincy, Ill. ....	885.01	28.00	913.01
Raleigh, N. C. ....	413.83	2.25	416.08
Reading, Pa. ....	.....	2.00	2.00
Richmond, Va. ....	2,370.10	145.00	2,515.10
Rockland, Me. ....	51.90	12.00	63.90
Rutland, Vt. ....	441.00	39.25	480.25
St. Augustine, Fla. ....	508.65	26.00	534.65
St. Louis, Mo. ....	5,041.74	375.01	5,416.75
St. Paul, Minn. ....	3,425.77	324.00	3,749.77
Sandusky, O. ....	150.00	3.00	153.00
San Francisco, Apps. ....	773.14	93.25	866.39
San Francisco, Cust. H. ....	716.39	113.50	829.89
San Francisco, Sub-T. ....	388.39	13.60	401.99
Santa Fé, N. M. ....	.....	5.50	5.50
Savannah, Ga. ....	374.00	22.25	396.25
Shreveport, La. ....	84.11	.....	84.11
Sitka, Alaska. ....	123.65	.....	123.65
Springfield, Ill. ....	2,339.98	45.41	2,385.39
Suspension Bridge, N. Y. ....	13.50	25.00	38.50
Syracuse, N. Y. ....	1,812.88	13.00	1,825.88
St. Paul and St. George Islands. ....	350.00	.....	350.00
Terre Haute, Ind. ....	1,453.55	.....	1,453.55
Toledo, Ohio. ....	282.10	25.95	308.05
Topeka, Kansas. ....	270.93	180.50	451.43
Trenton, N. J. ....	1,243.99	91.10	1,335.09
Tyler, Texas. ....	117.65	.....	117.65
Utica, N. Y. ....	931.18	252.02	1,183.20
Waco, Texas. ....	48.77	1.00	49.77
Waldoboro, Me. ....	35.00	.....	35.00
Wheeling, W. Va. ....	1,081.73	409.07	1,490.80
Wilmington, Del. ....	288.79	22.50	311.29
Wilmington, N. C. ....	80.09	8.50	88.59
Total. ....	105,029.75	15,438.68	120,468.43

*New buildings.—Furniture, new.*

Abingdon, Va. ....	\$140.25	Montpelier, Vt. ....	248.01
Auburn, N. Y. ....	4,711.15	Oshkosh, Wis. ....	5,313.70
Augusta, Ga. ....	2,157.20	Ottawa, Ia. ....	2,418.94
Binghamton, N. Y. ....	102.51	Owensborough, Ky. ....	3,938.78
Fort Smith, Ark. ....	8,080.28	Rochester, N. Y. ....	1,738.70
Jefferson, Texas. ....	3,921.82	St. Joseph, Mo. ....	9,792.18
La Crosse, Wis. ....	6,373.43	Wichita, Kansas. ....	121.00
Manchester, N. H. ....	99.85		
Marquette, Mich. ....	6,414.87	Total. ....	55,677.73

No. 2.—*Authorized expenditures from the appropriation "Furniture and repairs of furniture, 1890," etc.—Continued.*

RECAPITULATION.

	New furniture.	Repairs.	Total.
Old buildings .....	\$105,029.75	\$15,438.68	\$120,468.43
New buildings .....	55,577.73	.....	55,577.73
	160,607.48	15,438.68	176,046.16
Total authorization .....			\$176,046.16
Allotted to marine hospitals .....			9,600.00
Furniture being manufactured under existing contracts .....			7,847.25
Miscellaneous advertising, etc .....			1,258.24
Repayments due .....			830.00
Carpet in stock .....			2,105.36
			197,687.01
Authorized since May 6 .....			193.18
			197,880.19
Appropriation .....			200,000.00
			197,880.19
Balance May 9 .....			2,119.81
Balance June 30* .....			225.00

\* This balance is more than covered by requisitions for additional furniture, but it is being held to meet emergencies, such as leaks in gas-fixtures, etc.

No. 3.—*Revised estimates of money necessary for furniture and repairs of furniture, 1891, based upon the latest information received from the Supervising Architect's Office:*

[Furniture should be ordered four (4) months in advance of completion of building.]

NEW BUILDINGS TO BE COMPLETED.

Bridgeport, Conn. post-office .....	\$12,988.00
Brooklyn, N. Y., court-house and post-office .....	57,188.00
Charlotte, N. C., court-house and post-office .....	8,370.00
Dayton, Ohio, post-office, etc .....	9,400.00
Denver, Colo., court-house and post-office .....	20,345.00
Galveston, Tex., custom-house .....	16,980.00
Key West, Fla., custom-house .....	8,520.00
Louisville, Ky., court-house and post-office, etc .....	43,735.00
Pittsburgh, Pa., court-house and post-office, etc .....	38,785.00
Vicksburg, Miss., court-house and post office .....	11,355.00
Wichita, Kans., court-house and post-office .....	20,545.00
Williamsport, Pa., court-house and post-office .....	16,930.00
Wilmington, N. C. ....	13,630.00
Winona, Minn. ....	9,400.00
	288,171.00
Furniture for completed buildings, based upon an annual expenditure during the fiscal year, 1888-'89 and 1889-'90, of \$90,357.63, for old buildings .....	110,000.00
	398,171.00

TREASURY DEPARTMENT, *May 12, 1890.*

## No. 4.

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,  
Washington, D. C., April 4, 1890.

Hon. THOMAS B. REED,  
Speaker of the House of Representatives, Washington, D. C. :

SIR: I have the honor to invite your attention to the necessity for an immediate appropriation of \$142,000 for furnishing the United States buildings hereinafter named, the date of completion of which, together with the amount required for furniture, is set opposite the name of each; and for providing completed buildings with additional furniture to accommodate the constant increase in the postal service, and to replace worn-out furniture, viz :

Location.	Date of completion.	Amount.
Springfield, Mass.....	Mar., 1890	\$4,800.00
Montpelier, Vt.....	do	3,500.00
Manchester, N. H.....	do	4,600.00
Binghamton, N. Y.....	May, 1890	4,500.00
Rochester, N. Y.....	July, 1890	14,880.00
Gas-fixtures for above buildings.....		9,500.00
Carson City, Nev.....	Mar., 1890	12,875.00
Houston, Tex.....	do	5,200.00
Huntsville, Ala.....	do	11,250.00
Augusta, Ga.....	do	12,250.00
Wichita, Kans.....	do	20,454.00
San Antonio, Tex.....	May, 1890	13,700.00
Abingdon, Va.....	June, 1890	4,800.00
(Gas-fixtures included.)		
Old buildings.....		20,000.00
Total.....		142,000.00

It is estimated by the Department that there will be needed for the buildings referred to, to provide for fuel, lights (gas and electric), water, ice, and supplies of a miscellaneous character, the sum of \$30,000.

As the delay necessarily incident to the passage of the deficiency bill and the subsequent advertisement for proposals to manufacture the required furniture would prevent the equipment of these buildings upon their completion, and as such delays would involve an expenditure, by reason of the rental of premises for the accommodation of postmasters, collectors of customs and internal revenue, and other United States officials, I would recommend that the appropriation asked for be made available at the earliest practicable moment, to wit:

Furniture and repairs of furniture, additional to the current appropriation. \$142,000  
Fuel, lights, and water, additional to current appropriation ..... 30,000

In preparing the bill for the appropriation for furniture and repairs of furniture, it is recommended that the following named public buildings, completed and occupied, be named therein, in addition to those herein specified, as the amount appropriated for the complete furnishing of the same, as provided for in the act of March 2, 1889, to supply deficiencies in the appropriations for the fiscal year ended June 30, 1889, and prior years, was insufficient to properly equip them, viz :

Augusta, Me.	Harrisonburgh, Va.	Springfield, Ohio.
Keokuk, Iowa.	Baltimore, Md.	Des Moines, Iowa.
Reading, Pa.	Minneapolis, Minn.	Macon, Ga.
Fort Scott, Kans.	Santa Fé, N. Mex.	

The furniture for the new public building at Wichita, Kans., which is included herein, is also included in the estimate for furniture for the

fiscal year ending June 30, 1891. When that estimate was prepared, however, the opinion prevailed that the building would not be completed until the year 1891, but its construction having been vigorously pressed, it is now practically finished and ready to be furnished.

Respectfully, yours,

W. WINDOW,  
Secretary.

*Statement of the cost of furniture and fixtures in United States public buildings (owned and rented) under control of the Treasury Department, as shown by returns up to December 31, 1889.*

(NOTE.—In some instances, as in the accounts of the custom-house, court-house and post-office, and sub-treasury, New York; the court-house and post-office, Philadelphia; the custom-house, Chicago; the custom-house, New Orleans, and other older buildings, some of the articles are so old that it has been impossible to ascertain the date of their purchase. In these instances the cost has been estimated, the estimate being based on the known cost of articles of a similar character.) Those marked with a \* are not, as yet, completely furnished.

OWNED BUILDINGS.

Aberdeen, Miss., court-house and post-office.....	\$4,398.58
Albany, N. Y., custom-house.....	28,005.50
Alexandria, Va., custom-house.....	3,785.20
Astoria, Oregon, custom-house.....	3,639.30
Atlanta, Ga., court-house and post-office.....	21,885.35
Angusta, Me., court-house and post-office.....	5,232.32
Austin, Tex., court-house and post-office.....	17,287.08
Baltimore, Md., court-house and post-office.....	*30,403.20
Baltimore, Md., court-house.....	7,412.89
Baltimore, Md., custom-house and appraiser's stores.....	64,386.22
Bangor, Me., custom-house.....	14,970.66
Barnstable, Mass., custom-house.....	2,017.67
Bath, Me., custom-house.....	5,252.64
Belfast, Me., custom-house.....	2,627.77
Boston, Mass., custom-house.....	31,839.19
Boston, Mass., post-office and sub-treasury.....	92,205.79
Bristol, R. I., custom-house.....	1,511.21
Buffalo, N. Y., custom-house.....	41,825.67
Burlington, Vt., custom-house.....	5,029.34
Cairo, Ill., custom-house.....	16,523.00
Castine, Me., custom-house.....	1,702.10
Charleston, S. C., custom-house.....	16,172.28
Charleston, S. C., post-office.....	6,408.81
Charleston, W. Va., court-house and post-office.....	8,657.48
Chicago, Ill., custom-house.....	106,425.87
Cincinnati, Ohio, custom-house.....	110,545.88
Clarksburgh, W. Va., court-house and post-office.....	5,901.38
Cleveland, Ohio, custom-house.....	31,122.01
Columbia, S. C., court-house and post-office.....	17,092.69
Columbus, Ohio, court-house and post-office.....	22,110.85
Concord, N. H., court-house and post-office.....	9,215.52
Council Bluffs, Iowa, court-house and post-office.....	13,139.41
Covington, Ky., court-house and post-office.....	12,860.72
Dallas, Texas, court-house and post-office.....	11,018.16
Darville, Va., court-house and post-office.....	8,894.59
Des Moines, Iowa, court-house and post-office.....	23,682.11
Detroit, Mich., custom-house.....	22,241.83
Dover, Del., court-house and post-office.....	1,114.08
Dubuque, Iowa, custom-house.....	10,147.76
Ellsworth, Me., custom-house.....	1,086.96
Erie, Pa., court-house and post-office.....	13,668.15
Evansville, Ind., court-house and post-office.....	13,338.52
Fall River, Mass., custom-house.....	11,504.20
Fort Scott, Kans., court-house and post-office.....	*3,606.26
Fort Smith, Ark., court-house and post-office.....	*4,066.54

Fort Wayne, Ind., court-house and post-office .....	\$9,402.04
Frankfort, Ky., court-house and post-office .....	5,849.35
Galena, Ill., custom-house .....	2,494.92
Georgetown, D. C., custom-house .....	2,962.55
Gloucester, Mass. ....	2,795.83
Grand Rapids, Mich., court-house and post-office .....	13,189.73
Greensborough, N. C., court-house and post-office .....	4,002.80
Hannibal, Mo., court-house and post-office .....	7,099.73
Harrisburg, Pa., court-house and post-office .....	13,625.39
Harrisonburgh, Va., court-house and post-office .....	3,982.97
Hartford, Conn., custom-house .....	24,044.57
Indianapolis, Ind., court-house and post-office .....	6,955.22
Jackson, Miss., court-house and post-office .....	5,636.98
Jackson, Tenn., court-house and post-office .....	5,319.60
Jefferson, Tex., court-house and post-office .....	*1,830.81
Jefferson City, Mo., court-house and post-office .....	8,073.92
Jersey City, N. J., court-house and post-office .....	7,147.41
Kansas City, Mo., court-house and post-office .....	27,308.95
Kennebunk, Me., custom-house .....	293.04
Keokuk, Iowa, court-house and post-office .....	8,931.49
Knoxville, Tenn., court-house and post-office .....	24,849.78
La Crosse, Wis., court-house and post-office .....	*485.16
Leavenworth, Kans., court-house and post office .....	11,476.50
Lexington, Ky., court-house and post-office .....	7,883.72
Lincoln, Nebr., court-house and post-office .....	5,397.67
Little Rock, Ark., court-house and post-office .....	19,053.43
Louisville, Ky., custom-house .....	34,061.47
Lynchburgh, Va., court-house and post-office .....	9,697.98
Machias, Me., custom-house .....	2,913.78
Macon, Ga., court-house and post-office .....	7,906.47
Madison, Wis., court-house and post-office .....	12,176.11
Marquette, Mich., court-house and post-office .....	*898.34
Memphis, Tenn., custom-house .....	19,757.82
Middletown, Conn., custom-house .....	1,736.37
Milwaukee, Wis .....	22,864.30
Minneapolis, Minn., court-house and post-office .....	13,272.40
Mobile, Ala., custom-house .....	31,653.30
Montgomery, Ala., court-house and post-office .....	12,126.43
Nashville, Tenn., custom-house .....	38,087.71
Nebraska City, Nebr., court-house and post-office .....	4,187.05
New Albany, Ind., court-house and post-office .....	6,133.23
Newark, N. J., custom-house .....	7,617.69
New Bedford, Mass., custom-house .....	3,812.84
Newburyport, Mass., custom-house .....	1,716.42
New Haven, Conn., custom-house .....	12,953.95
New London, Conn., custom-house .....	3,478.52
New Orleans, La., custom-house .....	58,785.32
New Orleans, La., owned stations .....	2,028.65
Newport, R. I., custom-house .....	3,387.95
New York City, barge office .....	5,489.63
New York City, court-house and post-office .....	275,058.42
New York City, custom-house .....	91,283.35
New York City, sub-treasury .....	21,721.04
Norfolk, Va, custom-house .....	19,173.94
Ogdensburgh, N. Y., custom-house .....	12,611.90
Omaha, Nebr., court-house and post-office .....	10,562.72
Oshkosh, Wis., court-house and post-office .....	1,404.50
Oswego, N. Y., custom-house .....	4,877.81
Owensborough, Ky., court-house and post-office .....	3,166.78
Oxford, Miss., court-house and post-office .....	4,992.90
Paducah, Ky., court-house and post-office .....	8,539.70
Parkersburgh, W. Va., court-house and post-office .....	7,792.31
Pensacola, Fla., court-house and post-office .....	11,136.76
Peoria, Ill., court-house and post-office .....	13,258.05
Petersburgh, Va., custom-house .....	5,275.14
Philadelphia, Pa., appraiser's stores .....	4,887.55
Philadelphia, Pa., court-house and post-office .....	134,946.16
Philadelphia, Pa., custom-house .....	16,083.85
Pittsburgh, Pa., custom-house .....	13,423.99
Plattsburgh, N. Y., custom-house .....	3,688.19



Port Huron, Mich., custom-house .....	\$9,840.81
Portland, Me., court-house and post-office .....	10,340.22
Portland, Me., custom-house .....	9,469.86
Portland, Oregon, custom-house .....	11,226.82
Portsmouth, N. H., custom-house .....	10,996.96
Poughkeepsie, N. Y., post-office .....	7,038.42
Providence, R. I., custom house .....	14,654.81
Quincy, Ill., court-house and post-office .....	8,550.47
Raleigh, N. C., court-house and post-office .....	13,263.09
Reading, Pa., court-house and post-office .....	4,751.89
Richmond, Va., custom-house .....	23,809.32
Rockland, Me., custom-house .....	2,933.79
Rutland, Vt., court-house and post-office .....	4,182.07
St. Augustine, Fla., court-house and post-office .....	1,482.17
St. Louis, Mo., custom-house .....	112,310.64
St. Paul, Minn., custom-house .....	39,890.53
Salem, Mass., custom-house .....	2,663.19
Sandusky, Ohio, custom-house .....	5,343.20
San Francisco, Cal., appraiser's stores .....	69,331.59
San Francisco, Cal., custom-house .....	31,905.51
San Francisco, Cal., sub-treasury .....	10,215.03
Santa Fé, N. Mex., court-house and post-office .....	8,379.43
Savannah, Ga., custom-house .....	12,064.04
Shreveport, La., court-house and post-office .....	7,100.56
Sitka, Alaska, custom-house .....	4,142.43
Springfield, Ill., court-house and post-office .....	18,195.40
Springfield, Ohio, court-house and post-office .....	3,368.02
Suspension Bridge, N. Y., custom-house .....	4,607.82
Syracuse, N. Y., court-house and post-office .....	12,391.15
Terre Haute, Ind., court-house and post-office .....	8,077.13
Toledo, Ohio, custom-house .....	19,574.77
Topeka, Kans., court-house and post-office .....	21,857.35
Trenton, N. J., court-house and post-office .....	11,801.46
Tyler, Tex., court-house and post-office .....	5,483.60
Utica, N. Y., court-house and post-office .....	24,835.61
Waco, Tex., court-house and post-office .....	7,332.95
Waldoborough, Me., custom house .....	1,680.35
Wheeling, W. Va., custom-house .....	9,742.29
Wilmington, Del., custom-house .....	9,021.51
Wilmington, N. C., custom-house .....	3,939.76
Windsor, Vt., court-house and post-office .....	1,534.56
Wiscasset, Me., custom-house .....	2,251.04
Total owned buildings .....	<u>2,700,886.06</u>

## RENTED BUILDINGS.

Annapolis, Md. ....	80.00
Apalachicola, Fla. ....	1,134.78
Aroostook, Me. ....	764.62
Beaufort, N. C., custom-house .....	524.85
Beaufort, S. C., custom-house .....	624.16
Boston, Mass., custom-house, rented office .....	2,593.68
Brashier, La. ....	727.80
Bridgeport, Conn .....	1,315.38
Bridgetown, N. J .....	79.35
Brownsville, Tex .....	1,918.51
Brunswick, Ga .....	671.04
Burlington, Iowa .....	98.00
Camden, N. J .....	93.50
Cape Charles City, Va .....	115.00
Cape Vincent, N. Y .....	768.12
Cedar Keys, Fla .....	522.80
Chattanooga, Tenn .....	348.00
Coos Bay, Oregon .....	454.51
Corpus Christi, Tex .....	2,908.13
Crisfield, Md .....	372.45
Darien .....	
Denver, Colo .....	1,142.30
Duluth, Minn .....	380.50

Dunkirk, N. Y.....	\$370.00
Eagle Pass, Tex.....	678.81
Eastport, Me.....	1,921.18
Edenton, S. C.....	189.50
Edgartown, Mass.....	308.25
El Paso, Tex.....	2,467.75
Eureka, Cal.....	431.05
Fernandina, Fla.....	765.35
Fort Benton, Mont.....	378.50
Galveston, Tex., custom-house.....	11,596.40
Georgetown, S. C.....	317.29
Grand Haven, Mich.....	565.30
Houlton, Me.....	754.97
Jacksonville, Fla.....	832.75
Key West, Fla.....	1,493.96
La Crosse, Wis.....	423.70
Lamberton, N. J.....	22.00
Marblehead, Mass.....	339.94
Marquette, Mich., district of Superior.....	1,590.08
Messena, N. Y., district of Ogdensburgh.....	35.00
Morristown, N. Y., district of Ogdensburgh.....	327.70
Nantucket, Mass.....	300.72
Natchez, Miss.....	22.00
New Berne, N. C.....	778.39
New Orleans, La., rented stations.....	244.79
Newport News, Va.....	1,102.34
New York City, custom-house, rented.....	2,552.58
New York City, naval office.....	30,492.95
New York City, public stores.....	26,156.60
Onancock, Va., (Cherrystone).....	48.70
Perth Amboy, N. J.....	1,816.61
Plymouth, Mass.....	418.30
Port Jefferson, N. Y.....	110.00
Port Townsend, Wash.....	2,022.90
Rochester, N. Y., district of Genesee.....	1,390.09
Rome, Watertown and Ogdensburgh Railroad Depot, district of Ogdensburgh, N. Y.....	13.00
Rouse's Point, N. Y., district of Champlain.....	525.86
Sag Harbor, N. Y.....	585.00
St. Joseph, Mo.....	598.75
St. Mary's, Ga.....	340.00
St. Vincent, Minn., district of.....	1,804.15
San Diego, Cal.....	672.55
Shieldsboro, Miss.....	583.20
Sitka, Alaska, district of.....	5,047.43
Somers Point, N. J.....	273.90
Tappahannock, Va.....	194.50
Tuckerton, N. J.....	403.56
Vermont, district of.....	11,029.90
Vicksburg, Miss.....	165.00
Whitehall, N. Y., district of Champlain.....	125.75
Wilmington, Cal.....	539.00
Yaquina City, Oregon.....	125.00
Total rented buildings.....	123,930.45
Total owned buildings.....	2,700,886.06
Total rented buildings.....	123,930.45
Grand total.....	2,824,816.51

List of public buildings under the control of the Treasury Department showing cubical contents in feet.

Location.	Designation.	Cubical contents.
Class A (within 100,000 feet):		Feet.
Bristol, R. I.	Custom-house	25,000
Ellsworth, Me.	do	26,000
Kennebunk, Me.	do	45,000
Castine, Me.	do	52,700
Waldoboro, Me.	do	54,000
Barnstable, Mass.	do	60,700
Belfast, Me.	do	60,700
Wiscasset, Me.	do	94,000
Class B (100,000 to 200,000 feet):		
St. Augustine, Fla.	C. H. & P. O.	107,100
Burlington, Vt.	Custom-house	113,000
New London, Conn.	do	114,000
Gloucester, Mass.	do	115,000
Sandusky, Ohio	do	115,300
Newburyport, Mass.	do	118,000
New Bedford, Mass.	do	120,000
Wilmington, N. C.	do	120,000
Astoria, Oregon	do	123,000
Petersburgh, Va.	do	124,000
Jersey City, N. J.	C. H. & P. O.	126,000
Galena, Ill.	Custom-house	130,000
Georgetown, D. C.	do	130,000
Dover, Del.	C. H. & P. O.	136,000
Harrisonburgh, Va.	do	129,788
Newport, R. I.	Custom-house	138,000
Hoboken, N. J.	Post-office	104,377
Alexandria, Va.	Custom-house	170,000
Plattsburgh, N. Y.	do	170,100
Key West, Fla.	do	174,000
Bath, Me.	do	180,500
Machias, Me.	do	184,000
Rutland, Vt.	C. H. & P. O.	186,000
Portsmouth, Ohio	Post-office	187,510
Tyler, Tex.	C. H. & P. O.	191,868
Class C (200,000 to 300,000 feet):		
Jackson, Tenn.	C. H. & P. O.	214,000
Owensborough, Ky.	do	217,012
Aberdeen, Miss.	do	230,000
Jefferson, Tex.	do	233,536
Salem, Mass.	Custom-house	235,000
Oxford, Miss.	C. H. & P. O.	235,141
Fort Smith, Ark.	do	237,000
Houston, Tex.	do	242,417
Danville, Va.	do	250,000
Harrisonburgh, Va.	Extension.	250,124
Monroe, La.	C. H. & P. O.	254,205
Lancaster, Pa.	Post-office.	255,726
Camden, N. J.	Cust. H., P. O., etc.	260,383
Wilmington, Del.	Custom-house.	262,500
Abingdon, Va.	C. H. & P. O.	266,000
Windsor, Vt.	do	281,000
Poughkeepsie, N. Y.	Post-office	281,300
Greensborough, N. C.	C. H. & P. O.	288,659
Clarksburg, W. Va.	do	296,700
Class D (300,000 to 400,000 feet):		
Paducah, Ky.	C. H. & P. O.	300,200
Charleston, W. Va.	do	303,200
Tallahassee, Fla.	do	311,404
Jackson, Miss.	do	312,000
New Albany, Ind.	do	312,094
Portsmouth, N. H.	Custom-house	312,500
Eastport, Me.	Cust. H. & P. O.	312,562
New Bedford, Mass.	do	312,734
Savannah, Ga.	Custom-house	319,000
Springfield, Ohio	C. H. & P. O.	327,600
Oswego, N. Y.	Custom-house	328,200
Milwaukee, Wis.	do	332,100
Newark, N. J.	do	332,100
Wheeling, W. Va.	do	332,100
Helena, Ark.	C. H. & P. O.	334,700
Montpelier, Vt.	do	341,500
Oshkosh, Wis.	do	343,280
Shreveport, La.	do	344,600
Waco, Tex.	do	344,639
Marquette, Mich.	do	348,000
Statesville, N. C.	Cust. H. & P. O.	349,482
Dallas, Tex.	C. H. & P. O.	350,000
Dubuque, Iowa	Custom-house	350,000

List of public buildings under the control of the Treasury Department showing cubical contents in feet.—Continued.

Location.	Designation.	Cubical contents.
Class D (300,000 to 400,000 feet)—Continued.		
Key West, Fla.	C. H., P. O., etc	Feet. 354, 634
Fort Scott, Kans.	C. H. & P. O.	356, 000
Auburn, N. Y.	do	356, 516
Hannibal, Mo.	do	357, 073
New York, N. Y.	Barge-office	360, 700
Bridgeport, Conn.	Post-office	363, 166
Lynchburg, Va.	C. H. & P. O.	369, 319
Rockland, Me.	Custom-house	370, 000
Nebraska City, Nebr.	C. H. & P. O.	373, 600
Jefferson City, Mo.	do	376, 400
Asheville, N. C.	do	384, 851
Reading, Pa.	do	385, 000
Springfield, Mass.	do	387, 221
Los Angeles, Cal.	C. H. & P. O., etc.	391, 800
Macon, Ga.	C. H. & P. O.	395, 953
Class E (400,000 to 500,000 feet):		
Texarkana, Tex.	C. H. & P. O.	400, 000
Greenville, S. C.	do	408, 489
Austin, Tex.	do	410, 000
Keokuk, Iowa	do	413, 200
Lexington, Ky.	do	414, 000
Cairo, Ill.	Custom-house	414, 400
Carson City, Nev.	C. H. & P. O.	421, 528
Huntsville, Ala.	do	422, 529
Dayton, Ohio	Post-office, etc.	424, 030
New Haven, Conn.	Custom-house	424, 300
Vicksburg, Miss.	Cust. H., C. H., & P. O.	426, 090
Augusta, Me.	C. H. & P. O.	427, 600
Charlotte, N. C.	C. H. & P. O., etc.	441, 233
Lincoln, Nebr.	C. H. & P. O.	445, 300
Ogdensburgh, N. Y.	Custom-house	447, 600
La Crosse, Wis.	C. H. & P. O.	453, 290
Detroit, Mich.	Custom-house	454, 000
Providence, R. I.	do	456, 800
Fort Wayne, Ind.	C. H. & P. O.	461, 079
Sacramento, Cal.	Post-office, etc.	464, 830
Richmond, Va.	Custom-house	474, 200
Manchester, N. H.	do	482, 000
Wilmington, N. C.	Cust. H., P. O., etc.	486, 746
Baltimore, Md.	Court-house	490, 000
Harrisburg, Pa.	C. H. & P. O.	490, 000
Little Rock, Ark.	do	494, 700
Class F (500,000 to 600,000 feet):		
Terre Haute, Ind.	C. H. & P. O.	501, 927
Williamsport, Pa.	do	506, 050
Montgomery, Ala.	do	506, 300
Duluth, Minn.	Cust. H., C. H., & P. O.	507, 100
Madison, Wis.	C. H. & P. O.	511, 500
Santa Fé, N. Mex.	do	513, 696
Quincy, Ill.	do	521, 177
Council Bluffs, Iowa	do	522, 726
Grand Rapids, Mich.	do	524, 500
Portland, Me.	do	525, 000
Winona, Minn.	C. H. & P. O., etc.	528, 584
Augusta, Ga.	C. H. & P. O.	530, 412
Norfolk, Va.	Custom-house	542, 700
Port Huron, Mich.	do	644, 200
Knoxville, Tenn.	C. H. & P. O.	547, 000
El Paso, Tex.	Cust. H., P. O., & C. H.	548, 000
Portland, Oregon	Custom-house	549, 200
Portland, Me.	do	550, 000
Springfield, Ill.	C. H. & P. O.	550, 300
Savannah, Ga.	C. H. & P. O., etc.	550, 328
Binghamton, N. Y.	C. H. & P. O.	558, 690
Richmond, Va.	Extension	562, 228
Pensacola, Fla.	Custom-house	569, 726
Concord, N. H.	C. H. & P. O.	578, 018
Parkersburgh, W. Va.	do	585, 400
Columbia, S. C.	do	588, 000
San Antonio, Tex.	do	588, 300
Raleigh, N. C.	do	590, 700
Indianapolis, Ind.	do	594, 300
Class G (600,000 to 700,000 feet):		
Chattanooga, Tenn.	C. H. & P. O.	601, 854
San Francisco, Cal.	Custom-house	604, 200
Cincinnati, Ohio	do	607, 700
Leavenworth, Kans.	C. H. & P. O.	610, 174
Evansville, Ind.	Custom-house	615, 500

List of public buildings under the control of the Treasury Department showing cubical contents in feet—Continued.

Location.	Designation.	Cubical contents.
<b>Class G (600,000 to 700,000 feet)—Continued.</b>		
Utica, N. Y.	C. H. & P. O.	Feet. 630, 300
Trenton, N. J.	do	649, 200
Cleveland, Ohio	Custom-house	654, 200
Omaha, Nebr.	do	654, 700
Charleston, S. C.	C. H. & P. O., etc.	659, 060
St. Paul, Minn.	Custom-house	661, 300
Erie, Pa.	do	667, 500
Pittsburgh, Pa.	do	669, 400
Wichita, Kans.	C. H. & P. O.	677, 192
Buffalo, N. Y.	Custom-house	689, 000
Atlanta, Ga.	C. H. & P. O.	696, 000
<b>Class H (700,000 to 800,000 feet):</b>		
Fall River, Mass.	Custom-house	704, 000
Port Townsend, Wash.	Cust. H., P. O., etc.	704, 550
Covington, Ky.	C. H. & P. O.	708, 300
Philadelphia, Pa.	Custom-house	714, 000
Galveston, Tex.	Custom-house, etc.	715, 163
Peoria, Ill.	C. H. & P. O.	717, 580
Boston, Mass.	Custom-house	719, 200
Topeka, Kans.	C. H. & P. O.	755, 600
Columbus, Ohio	do	793, 954
Kansas City, Mo.	Custom-house	796, 200
<b>Class I (800,000 to 1,000,000 feet):</b>		
Memphis, Tenn.	Custom-house	803, 400
St. Joseph, Mo.	C. H. & P. O.	806, 600
Hartford, Conn.	Custom-house	811, 200
Birmingham, Ala.	C. H. & P. O.	827, 212
Toledo, Ohio	Custom-house	851, 940
Syracuse, N. Y.	Extension	879, 599
Des Moines, Iowa	do	911, 084
Charleston, S. C.	Custom-house	962, 500
<b>Class K (1,000,000 to 3,000,000 feet):</b>		
Mobile, Ala.	Custom-house	1,009, 600
Newark, N. J.	Cust. H. & P. O.	1,075, 258
Nashville, Tenn.	Custom-house	1,093, 500
Des Moines, Iowa	C. H. & P. O.	1,097, 500
Denver, Colo.	C. H. & P. O., etc.	1,138, 500
New York, N. Y.	Sub-treas.	1,146, 600
Rochester, N. Y.	Custom-house	1,311, 000
Louisville, Ky.	do	1,365, 700
Albany, N. Y.	do	1,404, 600
Minneapolis, Minn.	C. H. & P. O.	1,581, 000
San Francisco, Cal.	Sub-treas.	1,680, 8 0
Pittsburgh, Pa.	Custom-house	2,376, 000
San Francisco, Cal.	App. stores	2,385, 000
<b>Class L (above 3,000,000 feet):</b>		
Louisville, Ky.	C. H. & P. O., etc.	3,115, 235
Pittsburgh, Pa.	C. H. & P. O.	3,275, 977
New York, N. Y.	Custom-house	3,410, 000
Baltimore, Md.	do	3,539, 000
Boston, Mass.	P. O. & sub-t.	5,098, 100
St. Louis, Mo.	Custom-house (new)	5,855, 000
New Orleans, La.	Custom-house	6,025, 900
Chicago, Ill.	do	6,717, 100
Philadelphia, Pa.	Court-house	7,378, 900
Cincinnati, Ohio	Custom-house (new)	7,883, 500
New York, N. Y.	C. H., and P. O.	8,334, 200
Brooklyn, N. Y.	P. O.	3,565, 726

## HEATING APPARATUS FOR PUBLIC BUILDINGS.

TREASURY DEPARTMENT,  
OFFICE OF THE SECRETARY,  
Washington, D. C., June 21, 1890.

HON. WILLIAM B. ALLISON,  
*Chairman Committee on Appropriations:*

SIR: By reference to page 206 of the "Book of Estimates of Appropriations" for the fiscal year ending June 30, 1891, the fact will be observed that by the wording of the recommendation for the appropriation for heating apparatus for public buildings under the control of the Treasury Department, it was desired that the clause in the sundry civil bill making said appropriation should read "including personal service."

The reasons why the act making said appropriation should read "including personal service" are patent, and may be briefly cited as follows:

During the progress of the work on heating apparatus in various public buildings it becomes necessary that thorough inspections of the same should be made before payment is made for the work, and it also becomes necessary from time to time to direct examinations of the heating apparatus in various public buildings to be made by expert inspectors, in order that their condition, and the necessity for any work of repairs in connection therewith, may be satisfactorily known; thus avoiding injury or accident from, and facilitating proper preservation of, the machinery.

Heretofore the Department has deemed this an important service, and has employed a few men specially skilled as heating and ventilating experts to perform the same, and their compensation and actual expenses have been defrayed from said appropriation.

Notwithstanding the logical reasons for the recommendation that the act making said appropriation should read "including personal service," the fact is observed that on page 35 of the sundry civil bill recently passed by the House of Representatives, and now under consideration by your committee, the clause relating to said appropriations specifically reads "exclusive of personal service."

Should the bill be passed by the Senate without being amended to conform with said recommendation of the Department, the Department will be deprived of all opportunity to secure the valuable service above referred to.

The act making the appropriation for heating apparatus for the present year prohibits the employment of personal service, but the Department was enabled to secure the valuable service of such inspections of heating apparatus from the special appropriation for heating apparatus for twenty-three public buildings, which did not exclude such service, and which appropriation has now become exhausted.

In view of the above, I would specially request you to secure the amendment of line 21, of page 35, of the sundry civil bill as it has been presented to your committee for consideration so as to strike out the words "exclusive of" and insert the word "including" personal service.

Respectfully, yours,

W. WINDOM,  
*Secretary.*

GOVERNMENT HOSPITAL FOR THE INSANE.

GOVERNMENT HOSPITAL FOR THE INSANE,  
Washington, D. C., June 30, 1890.

Hon. WILLIAM B. ALLISON,  
*Chairman United States Senate Committee on Appropriations:*

SIR: There are one or two points in the sundry civil bill for the fiscal year 1891, as it comes from the House of Representatives to the Senate, to which I would respectfully ask attention from your committee.

In the Book of Estimates, item Government Hospital for the Insane, \$15,000 is asked for general repairs and improvements; in the House bill \$12,000 is appropriated. The difference may seem but trifling, but it makes in our case all the difference between sufficiency and insufficiency. This appropriation is relied on to keep the institution from deterioration in its buildings and grounds, and to make such minor improvements and changes as do not seem to require special appropriations.

I have feared that in reducing this estimate proper account has not been taken of the extent of this establishment. It is a township, including inmates and employes, of 1,900 inhabitants; its buildings cover nearly 3 acres of ground, with over 100,000 square feet of tin and slate roofing; the buildings occupied by the insane, exclusive of all the other departments, contain upwards of a quarter of a million feet of floor surface and nearly a million feet of plaster, wall and ceiling, requiring to be painted and kept in repair, with a class of tenants somewhat careless in their ways. I was about to mention the glazing of 3,262 windows, but forbear to weary you. I think the estimate of \$15,000 was a careful one.

One item of \$5,000 for extending kitchen seems to have been overlooked. This I regard as almost essential to the successful conduct of the hospital. A kitchen ample for 1,000 inmates proves inadequate for 1,500, and the numbers are constantly increasing by the increment of the Soldiers' Homes. It is very desirable to avail ourselves of the changes in the boiler-house incident to renewal of heating apparatus (already appropriated for) in extending the kitchen, and the changes can best be made at one time. I ask that the \$5,000 be granted.

Very respectfully,

W. W. GODDING,  
*Superintendent.*

EDUCATION IN ALASKA.

DEPARTMENT OF THE INTERIOR,  
BUREAU OF EDUCATION,  
Washington, D. C., July 7, 1890.

Hon. W. B. ALLISON,  
*Chairman Committee on Appropriations:*

SIR: I have the honor, in the absence of the Commissioner of Education, to forward the accompanying statement showing the application of the appropriation of \$50,000 for the education of children in Alaska for the year ending June 30, 1889.

I would respectfully add that the Commissioner, upon the urgent recommendation of Commander Charles H. Stockton of the U. S. S. *Thetis*,

who has lately visited the high Arctic coasts, is very desirous of establishing schools for the Eskimos at Point Barrow, Point Hope, and Cape Prince of Wales, where such a civilizing influence is greatly needed for the benefit of the natives themselves, as well as for the protection of our whalers and in the interests of trade. Several of the mission societies which are aided by this Bureau, notably the Romanists and Moravians, are extending their work and desire additional aid.

Careful and economical estimates of the needs of the growing work in Alaska, made by the General Agent of Education and the Commissioner, indicate \$75,000 as the least sum that a proper efficiency demands.

Very respectfully, yours,

J. W. HOLCOMBE,  
*Acting Commissioner.*

Appropriation for the schools of Alaska for the year 1889-'90.....	\$50,000
Allowed mission schools as follows:	
Presbyterian industrial boarding-schools at Sitka*.....	16,000
Moravian Board of Missions for the two schools at Bethel and Carmel, Alaska, \$1,000 each.....	2,000
Episcopal school at Anvik.....	1,000
Duncan's school at Metlakahtla, Annette Island.....	3,000
Catholic schools at Kosorisfky and Nulato.....	3,000
Additional to the Presbyterian school at Sitka.....	3,000
Methodist school at Unalaska (rent of building).....	200
	27,200
Public schools as follows:	
Sitka, schools Nos. 1 and 2; Juneau, schools Nos. 1 and 2; Douglas City, schools Nos. 1 and 2; Fort Wrangel, one school; Killisnoo, one school; Howkan, one school; Kodiak and Afognac, one school each; Unga and Unalaska one school each. The salaries of these thirteen teachers amount to.....	16,260
	43,460
Leaving a balance as above for school supplies, buildings, etc., salaries of Territorial board of education and general agent.....	6,540

#### SIGNAL SERVICE.

WAR DEPARTMENT,  
OFFICE OF THE ASSISTANT SECRETARY,  
Washington, July 3, 1890.

SIR: In reply to your telegram of this date, I have the honor to herewith submit a report from Captain Craig, of the Signal Service, giving explanatory answer thereto.

Very respectfully,

L. A. GRANT,  
*Acting Secretary of War.*

T. P. OLEAVES, Esq.,  
*Clerk Committee on Appropriations.*

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\* Over 150 pupils taught and maintained.



SIGNAL OFFICE, WAR DEPARTMENT,  
Washington City, July 3, 1890.

SIR: In the absence of the Chief Signal Officer, and in answer to the telegram of this date from Mr. T. P. Cleaves, for the subcommittee of the Senate Committee on Appropriations, and as verbally directed by you, I have to report that the medical accounts and the pay accounts of the Signal Service are now audited by the Second Auditor, but all other accounts are audited by the Third Auditor of the Treasury (thereby necessitating two sets of accounts current, abstracts, etc.), and in both cases sent to the Second Comptroller of the Treasury.

The new provisos on pages 65 and 66 of the sundry civil bill, as passed by the House, have been introduced in order that all payments may be made by the regularly bonded officer on duty as disbursing officer of the Signal Service; that all accounts might be audited and adjusted by the Third Auditor and Second Comptroller; that all deposits of enlisted men of the Signal Corps should pass to the credit of the appropriation for Signal Service pay, and when paid, including interest thereon, should be charged to that appropriation, thereby simplifying the work, and enabling it to be performed with less labor and more promptitude.

Very respectfully,

ROBT. CRAIG,  
Captain and Assistant Quartermaster, U. S. Army,  
Disbursing Officer, Signal Service.

The SECRETARY OF WAR.

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### REBELLION RECORDS.

WAR DEPARTMENT,  
Washington, July 7, 1890.

Hon. W. B. ALLISON,  
Chairman Committee on Appropriations:

DEAR SIR: I have the honor to renew the request contained in my letter of April 30, 1890 (a copy of which is inclosed), that the estimate for rent of buildings for the War Records Office be increased to \$3,000. Of this amount, the sum of \$1,200 was provided in the legislative bill, leaving \$1,800 to be appropriated, and I remain

Faithfully yours,

REDFIELD PROCTOR,  
Secretary of War.

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WAR DEPARTMENT,  
Washington, April 30, 1890.

Hon. W. B. ALLISON,  
Chairman Committee on Appropriations:

DEAR SIR: In view of the requirements of the act of March 2, 1889, requiring the work of preparation and publication of the Official Records of the Rebellion to be completed within five years, I have the honor to request that the estimate for rent of buildings for the War Records Office of the War Department may be increased from \$1,200 to \$3,000.

The building now in use is too small for the increased requirements of the office, and is so much out of order as to make considerable repairs necessary.

Very respectfully,

REDFIELD PROCTOR.

## BURIAL OF INDIGENT SOLDIERS, DISTRICT OF COLUMBIA.

WAR DEPARTMENT,  
Washington, June 25, 1890.

Hon. W. B. ALLISON,  
*Chairman Committee on Appropriations :*

SIR: It is observed that in the sundry civil appropriation bill, as reported from the Committee on Appropriations (H. R. 10384, page 68, line 23), the existing appropriation for burial of indigent soldiers is made available for payment of the expenses of the interment of deceased survivors of the Navy and Marine Corps as well as of the Army. This will, it is estimated, increase the expenditures under this appropriation about 50 per cent.

The balance now on hand of the appropriation of 1888-'89 for this purpose is not more than sufficient to pay claims outstanding, and there is needed, therefore, an appropriation of \$1,500 for the ensuing fiscal year, for the burial of indigent soldiers, sailors, and marines of the Army, Navy, and Marine Corps, under the provisions of the law as amended by this bill.

Very respectfully,

REDFIELD PROCTOR,  
*Secretary of War.*

## DEPARTMENT OF JUSTICE.

DEPARTMENT OF JUSTICE,  
Washington, D. C., June 19, 1890.

Hon. W. H. H. MILLER,  
*Attorney-General :*

SIR: I have examined House Report No. 2407, being a bill "Making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1891, and for other purposes." This bill, as I understand it, has already passed the House of Representatives and contains the appropriation for defraying the necessary expenses incurred in the examination of witnesses and procuring the evidence in the matter of claims against the United States and in defending suits in the Court of Claims, including the payment of such expenses as in the opinion of the Attorney-General shall be necessary for making proper defense for the United States in the matter of French spoliation claims, to be expended under the direction of the Attorney-General. The amount thus appropriated is \$20,000; the amount estimated for the above matters was \$25,600.

I think it proper to make to you a clear statement of the facts which, in my opinion, render it certain that this appropriation will not be sufficient for the purposes indicated. Hitherto the appropriations for the general defenses in the Court of Claims and the defense under the French spoliation act have been kept separate. The several appropriations for defenses under the French spoliation act have been as follows :

August 4, 1886.....	\$5,600.00
March 3, 1887.....	5,600.00
October 2, 1887.....	5,000.00
March 2, 1889.....	5,600.00

The appropriation for the general defenses in the Court of Claims for the fiscal year ending July 1, 1890, was \$15,000. The total amount for the general defenses, including French spoliation claims, was \$20,000. The appropriation for the ensuing year therefore reduces the aggregate of these claims \$600.

When the act in reference to French spoliations was passed there was no attorney specially designated to have the charge of these matters. There were six assistant attorneys having charge of the defenses in the Court of Claims. One of these gentlemen, Mr. Benjamin Wilson, was designated by your predecessor to have special charge of the defenses in these claims. The business incident to these claims has occupied almost the whole attention of Mr. Wilson, together with two clerks, to whom I shall hereafter refer. The force for the general defenses in the Court of Claim was therefore *lessened by one* assistant.

Soon after my accession to office, one year ago, I became fully convinced that the force of six assistants even was inadequate for the prompt and efficient disposal of the business of the court. On examining the appropriation bills you became satisfied of your authority to pay Mr. Wilson either from the appropriation for the general expenses or the special appropriation for defenses of spoliation claims. You therefore relieved Mr. Wilson from his position of assistant attorney, and gave to him a special retainer in the defenses under the spoliation act, and his accounts were duly passed by the Comptroller. Of the two clerks specially assigned to duties under the spoliation act, Mr. Russell received a salary of \$2,000, and Mr. Craigin a salary of \$1,800, while Mr. Wilson's salary was \$2,500, making the aggregate salaries for these defenses \$6,300.

Up to about two months ago Mr. Wilson's salary was paid from the appropriation for the general defenses. The sums heretofore appropriated by Congress for defenses of French spoliations, as above, have been held by the Comptroller not liable to be covered into the Treasury under the general provisions of law. Computing the salaries of Wilson, Russell, and Craigin for the month of June, there will be on hand the sum of \$1,722.34, which will be available in addition to the next year's appropriation. These three salaries amount to \$6,300, so that if the Department shall expend \$5,000 from that proposed, it will have \$422.34 to be applied to the general expenses of the French spoliation defenses. By actual computation I find that the expenses, outside of salaries, for French spoliation defenses have been as follows:

For the year ending—

June 30, 1887. ....	\$111.00
June 30, 1888. ....	1,800.00
June 30, 1889. ....	1,600.00
June 30, 1890. ....	788.13

It will thus be seen that the amount proposed to be appropriated upon the general basis of these calculations is not sufficient for the average business of the Department in these matters.

I do not propose to give to you at any length the facts which warranted the estimate made to Congress. It was based upon the ordinary appropriation of \$5,600 for French spoliations, and \$20,000 for the defenses of the Court of Claims. There is already a deficiency of several hundred dollars in the work of the present year. During the year the business of the court has very largely increased. There are pending about 1,500 cases under the general jurisdiction of this court. These cases extend from small class cases, involving but few dollars each, to

those involving many millions of dollars. They also involve almost every conceivable subject of contention.

In most instances the attorneys representing the claimants are clamorous for the preparation of the defenses on the part of this Department. This it has hitherto been impossible to do satisfactorily with the appropriations made for that purpose by Congress. I know it is the wish to have the assistants of this Department make the defenses full and adequate, and I know the embarrassment under which we labor by being obliged to deny the preparations for want of means.

The general appropriation is used for defenses in Congressional cases, of which there are many thousands pending in the court and which involve very large amounts. The records of the Department show that up to and including March 26, 1890, there have been sent to the Court of Claims for adjudication under the Bowman act, 7,481 cases; of these, considerably more than half, viz, 4,562, were transmitted in the year 1888. The fact that no appropriations have been made hitherto by Congress to pay the findings in these cases does not deter claimants from attempting to preserve the testimony, which, from lapse of time and the age of the witnesses, is rapidly disappearing. I anticipate during the coming session as many calls for the taking of testimony as during the last. This Department desires to fully defend these cases, and to do it well we must have the necessary means.

The same observations apply to the taking of testimony in French spoliation cases. In the spoliation cases the law imposes upon the Attorney-General the duty of defending in each case. The Department has been informed of the probability that many of the vessels and cargoes seized and condemned were insured in one or more of the insurance companies then existing in England. I believe it the view of the court that any payments therein made must be taken into consideration upon amounts awarded in this court. I find I can arrange to obtain information upon these points for a reasonable sum, and I conceive it a duty so to do. It is plain that with a sum available much less than that expended in the ordinary business of the defense, the Department will be unable to obtain this information.

I do not think that there can be any question that the amount estimated is too little to do the business of this Department well, and I feel unwilling that we should be placed in such a position without a strenuous effort to urge upon the Committee the propriety of granting the amount estimated.

Very respectfully,

JOHN B. COTTON,  
*Assistant Attorney-General.*

I strongly concur in the foregoing statement.

W. H. H. MILLER,  
*Attorney-General.*

## SUNDRY CIVIL APPROPRIATION BILL.

### PUBLIC LANDS.

UNITED STATES SENATE COMMITTEE ON APPROPRIATIONS,  
*Tuesday, July 1, 1890.*

The subcommittee (composed of Senators Allison, Hale, and Gorman) having under consideration the bill (H. R. 10884) "making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1891, and for other purposes," had before them Hon. Lewis A. Groff, Commissioner of the General Land Office; Mr. George Redway, chief clerk; Mr. R. J. Hartman, chief of the accounts division; W. H. Walker, and other gentlemen connected with the General Land Office; Mr. Frederick Brackett, chief clerk of the Treasury Department, and Maj. George B. Davis, U. S. A., in charge of Rebellion Records Office.

### STATEMENT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE, AND OTHERS.

The CHAIRMAN. Now, Mr. Commissioner, we find that the House has appropriated \$200,000 for the survey of public lands, and that you have estimated \$300,000.

Commissioner GROFF. That estimate was made on the best judgment of the General Land Office at the time the estimate was made.

The CHAIRMAN. We are having a good many requests for particular surveys in Washington, Montana, and in the Dakotas. If you had this \$200,000 only, have you any idea how you would distribute it?

Commissioner GROFF. Mr. Evans, who has had charge of the work of apportionment, can give you the exact figures. On the basis of \$230,000 we have given to Arizona \$5,000, to California \$10,000, to Colorado \$20,000, to Idaho \$10,000, to Minnesota \$20,000, to Montana \$25,000, to New Mexico \$10,000, to North Dakota \$25,000, to Oregon \$10,000, to South Dakota \$20,000, to Utah \$5,000, to Washington \$60,000, to Wyoming \$10,000; which makes in all \$230,000.

Senator HALE. And if you went on \$200,000, you would have to cut that down?

Commissioner GROFF. Then we would have to cut down our estimate.

The CHAIRMAN. Of course that \$230,000 is based upon an estimate of \$300,000, the other \$70,000 being used for other purposes.

Commissioner GROFF. Yes, sir.

The CHAIRMAN. That is based on the idea of getting \$300,000.

Commissioner GROFF. Yes, sir.

Senator HALE. What would the \$70,000 be used for beyond that?

Mr. EVANS. Forty thousand dollars is for surveys, and \$30,000 is for contingencies during the year.

The CHAIRMAN. I see on page 43, lines 13 and 14, that the sums hereby appropriated "may be expended for the examination of public surveys in the several surveying districts," not exceeding \$40,000, leaving only \$160,000 for the surveys.

Senator HALE. Which they absorb in the two items of Port Angelus, \$5,000, and Huntsville, \$300, making \$5,300.

The CHAIRMAN. What is this Port Angelus special survey town site?

Commissioner GROFF. That is part of the reservation for town-site purposes which is unsurveyed, and the people of Washington think that it should be surveyed. There are no unsurveyed lots remaining to be sold, and it is very desirable that they should be surveyed.

The CHAIRMAN. That is a special survey?

Commissioner GROFF. Yes, sir.

The CHAIRMAN. It does not come under the head of general surveys?

Commissioner GROFF. No, sir. I think the least we can possibly get along with, or should be asked to get along with, would be the amount of the original estimate. Of course, since then there have arisen necessities for further surveys of the lands which the new States are to get for educational and other purposes, and those new States are unable to make selections until those surveys are made. There is a demand from Washington, Montana, and the two Dakotas for additional surveys on account of their coming in as States.

Senator GORMAN. How did you distribute the \$200,000 you had last year?

Commissioner GROFF. I thought I had with me a statement of the distribution for last year, but I find I have not. We can give you that.

Senator HALE. You have no statement here showing how last year's appropriations were distributed?

Commissioner GROFF. No, sir. Here is an estimate of the amounts appropriated for the years from 1881 to 1890, showing: For 1881, \$300,000; for 1882, \$318,000; for 1883, \$400,000; for 1884, \$425,000; for 1885, \$350,000; for 1886, \$300,000; for 1887, \$50,000; for 1888, \$50,000; for 1889, \$100,000; for 1890, \$200,000.

The CHAIRMAN. What is the condition of these surveys in Montana and Washington?

Commissioner GROFF. What surveys do you refer to?

The CHAIRMAN. I mean the public land surveys, as to the wants or needs of the people there.

Commissioner GROFF. There is a considerable demand by people who are settling on the public lands for surveys in those new States, and then the delegations from the new States are pressing us to survey the public lands, so that they may make their selections for educational and other purposes.

The CHAIRMAN. But, as I understand the distribution there, it would not enable you to go very far in that direction, even on your \$300,000 estimate?

Commissioner GROFF. No, sir.

Mr. REDWAY. The estimate of the surveyors-general is over \$700,000 for the ensuing year, and the General Land Office cut it down over \$400,000.

Senator HALE. Do you find in your work, Mr. Commissioner, and in connection with these calls for surveys so that lands may be taken up for settlement, that you run across the lands which have been reserved and held up by reason of the irrigation feature?

Commissioner GROFF. I do not know that I exactly understand you, Senator.

Senator HALE. I will put it again. Do you find that your desire to survey lands that will be entered for settlement is interfered with by the lands being held up under the irrigation feature of the Government work?

Commissioner GROFF. I think they will be materially, unless there is legislation on the question of arid lands, under the present construction of the arid land laws. Under the act of October 2, 1888, settlement must necessarily be very much impeded within the arid land district.

Senator HALE. What is the construction you refer to?

Commissioner GROFF. I refer to the construction put upon the act by the Attorney-General.

Senator HALE. Have you that?

Commissioner GROFF. I have it here.

Commissioner Groff produced and presented to the sub-committee a copy of Senate Executive Document 136, Fifty-first Congress, first session, which contains the opinion of the Solicitor-General, acting in the absence of the Attorney-General, under date of May 24, 1890.

Commissioner GROFF. I want to say that that document contains the first expression from the General Land Office respecting arid lands, and that is contained in a circular issued by acting Commissioner Stone, August 5, 1889, to registers and receivers, directing them to receive no more filings on lands within the arid land districts, and to cancel all filings that had been made since the approval of the act up to that time. It also contains a letter from the present Commissioner to the Secretary of the Interior.

Senator HALE. And it was that action which gave rise to the action of the Attorney-General?

Commissioner GROFF. Yes, sir; an order was issued by the Land Office prohibiting any patent or any entries from going to patent, of lands within the arid regions where the entry was made, later than the approval of the arid land act, which was October 2, 1888.

The CHAIRMAN. Further distribution just for lands has been withdrawn from entry.

Commissioner GROFF. Such lands as are with the arid region.

The CHAIRMAN. What do you consider the arid region?

Commissioner GROFF. The only light which the General Land Office has as to what constitutes the arid region is from this map which has been handed to us by the director of the geological survey. Until this morning, the arid region, as we have understood it, was embraced within the red lines on this map; but the director sent in this morning this map, and he admits that this white portion of the map is not within the arid region and is subject to entry under the settlement laws of the United States.

Senator HALE. How much of all this vast territory west of that line is indicated here by the different colors as being subject to withdrawal under the irrigation survey?

Commissioner GROFF. All of it, as I understand—all embraced in these different colors.

The CHAIRMAN. Does that embrace the lands now withdrawn?

Commissioner GROFF. Yes sir; it does.

The CHAIRMAN. They have all been withdrawn within the areas delineated on that map in colors?

Commissioner GROFF. Yes, sir.

Mr. EVANS. Not designated as reservations?

The CHAIRMAN. And they are withdrawn from entry.

Commissioner GROFF. Practically withdrawn, yes, sir.

The CHAIRMAN. Now, state the outlines by meridians.

Commissioner GROFF. The 101st meridian is the beginning.

Senator HALE. Take all the Territory west of the 101st meridian to the Pacific Ocean and what is left that is not withdrawn?

Commissioner GROFF. A portion of Washington, a small portion of Montana, a portion of Oregon, and a portion of California.

Senator HALE. Does it include all the land in Arizona?

Commissioner GROFF. It does.

Senator HALE. Does it include all in Nevada?

Commissioner GROFF. It does.

Senator HALE. Does it include all in Wyoming?

Commissioner GROFF. Yes, sir.

Senator HALE. Does it include all in Colorado?

Commissioner GROFF. I think it does.

Senator HALE. Does it include all of Montana?

Commissioner GROFF. Not quite all.

Senator HALE. Does it include all of California?

Commissioner GROFF. All but a small portion of West California.

Senator HALE. All of Idaho?

Commissioner GROFF. It does.

Senator HALE. And portions of North and South Dakota?

Commissioner GROFF. Yes, sir.

Senator HALE. And all of New Mexico?

Commissioner GROFF. Yes, sir.

Senator HALE. And Southern California?

Commissioner GROFF. Yes, sir; almost all of California. Here [indicating] is a portion that it does not include. The portion next to the Sierra Nevada Mountains is not included.

Senator HALE. Does it include all of Washington and Oregon east of the Cascade Mountains?

Commissioner GROFF. It does, as I understand this map.

Mr. EVANS. The northern part of Washington is outside the line.

The CHAIRMAN. What do the various colors on that map indicate?

Commissioner GROFF. They represent, as I understand, the different irrigation districts. I may be mistaken in the terms.

The CHAIRMAN. This map was not prepared in your office?

Commissioner GROFF. No, sir; it was prepared by the Geological Survey.

The CHAIRMAN. And sent to you for what purpose?

Commissioner GROFF. I requested the director of the Geological Survey to send me a map that I might know, from his office, what constituted the arid region, in order that we might be able to act intelligently. We had had no definition placed upon that term, either by Congress or by the Department, and I was left to be guided by my own judgment; and I found one of these maps embracing all the territory between the red lines.

The CHAIRMAN. What is that red line?

Commissioner GROFF. About the one-hundredth meridian. It starts here [indicating] and follows the one-hundredth meridian very nearly.

The CHAIRMAN. Are you now substantially controlled by that map?

Commissioner GROFF. Yes, sir; and shall be until we are better informed on the subject.



The CHAIRMAN. A citizen trying to secure any lands in that area would not be recognized in your office?

Commissioner GROFF. I understand that some entries are being received, within the arid region, by the local land offices; but we have refused, until otherwise directed, to patent any lands in the arid region, on entries made since the passage of the arid land law, which was October 2, 1888.

The CHAIRMAN. You did that under the decision of the attorney-general?

Commissioner GROFF. I think we are justified in so doing by that decision.

Senator HALE. Then practically all this region you have described here is withdrawn from the operation of the land laws?

Commissioner GROFF. Yes, sir.

Senator GORMAN. About how many applications have you been compelled to suspend or reject?

Commissioner GROFF. It would be impossible to give you the figures. This law, as I understand, was passed October 2, 1888. The General Land Office, it seems, took no action till August 5, 1889, when Commissioner Stone, under the direction of the Secretary of the Interior, issued a circular, which is contained in the document which I have just handed to Senator Allison. Then no action was taken by the General Land Office until some time in April, when I began to feel somewhat alarmed in regard to this matter, as it seemed to me that there was danger of more of these entries going to patent in violation of the direction of the office; and so I issued these office instructions, I have already referred to, that no more entries should be approved or patented within the arid region which had been made since the passage of the arid land law. That brought forth an expression from Senators and Representatives living within the arid region, and I immediately submitted the question to the Secretary of the Interior. That submission is also embraced in the document which you now hold in your hand, and you will there see the views entertained by the General Land Office.

Senator HALE. And that gave rise to the Attorney-General's decision?

Commissioner GROFF. The Secretary then was in doubt about it, and submitted the question to the Attorney-General for his opinion.

Senator GORMAN. Can you not furnish a statement showing how much of the land has been applied for?

Commissioner GROFF. It would involve necessarily a great deal of work to make such a statement. But I may safely say that the entries made since the passage of that act, within the arid region, run way up into the thousands.

Mr. REDWAY. A hundred thousand, I should say.

Commissioner GROFF. That is a rough estimate, because the attention of the General Land Office was never called to that act previous to the time I have indicated. Ordinarily, certified copies of laws passed by Congress come to our office from the State Department through the Secretary of the Interior. But yesterday I inquired into that matter, and was informed by the old employes in the office that that act had never been certified to the General Land Office; it had escaped attention.

Senator HALE. You gave no attention to it?

Commissioner GROFF. The office did not. I came there last September, as you understand.

Senator GORMAN. The public statement has been made—I do not

know whether it is accurate or not—that after the passage of the act of 1888 the most of these entries were located so as to take in the streams and headwaters. What do you know about that question?

Commissioner GROFF. I do not believe that the public were generally informed as to the passage of that act. That is only my judgment about it, of course; but I think most of these entries were made in entire ignorance of that law. It was part of an appropriation act.

Senator HALE. And those entries, in your judgment, were not made for the purpose of appropriating those streams?

Commissioner GROFF. No such cases have been called to my attention. I can say, however, that in many cases parties have gone on and made valuable improvements on the lands. I have one case in mind, where the son of a gentleman in Chicago (the father furnishing the money) put a number of thousands of dollars' worth of improvements on 640 acres of land which he entered under the desert land law, and this man assured me that he knew nothing about the law at the time he made the entry, and I do not believe he did. He will not depend on any system of irrigation provided by the Government for watering his land; he already has a canal, or is connected with a company owning a canal, which will provide him with water for the land which he has taken.

Senator HALE. What would you do with any money for surveying in these States that seem to be absolutely covered by this withdrawal, if we gave it to you?

Commissioner GROFF. What the office will need under the present condition of things, and what it may need if something is done respecting this law, are entirely different questions. If this law is repealed we will need much more money than we have asked for, and could use it to advantage. If it is not repealed I do not know what we might need. Of course there will be calls for surveys as soon as these new States desire to select their lands to which they are entitled under the act for their admission.

Senator HALE. The impression made upon my mind by the process, as you describe it, is that the taking up of lands in settlement and maturing titles, is practically stopped by this withdrawal of the arid lands in all these regions?

Commissioner GROFF. Yes, sir.

Senator HALE. And, under the opinion of the Attorney-General, you can not do anything until some legislation is had in that direction?

Commissioner GROFF. That is my best judgment about it at this time.

The CHAIRMAN. Under that law as it stands can not the President at any time lift this suspension?

Commissioner GROFF. He can so far as homestead entries are concerned.

The CHAIRMAN. But no further?

Commissioner GROFF. No further. But this would not afford any relief to these many thousands of entrymen who entered lands within the arid regions under the other land laws of the United States—the pre-emption laws, the desert land act, the timber culture act, etc.

The CHAIRMAN. So that if you had a large amount of money now, for surveys within this area, it would be of no value until this order of suspension or withdrawal is removed?

Commissioner GROFF. Well, it would enable these new States, as I have before stated, to make their selections of lands, swamp lands, etc.

The CHAIRMAN. I do not know whether that opinion states, or not,

what the rights of these new States would be under this law. Take the State of Montana, for instance, are these lands withdrawn from the control of the State for her own purposes, such as school purposes, etc.?

Commissioner GROFF. My opinion would be now that they would not be.

The CHAIRMAN. That is, a State can take up any portion of these lands?

Commissioner GROFF. I take it that these new States can take up any land that Congress has given them under the act of admission or any other act. That is a matter I want to give some attention to.

Senator HALE. Only for the proposition that it is general legislation, and to that extent it is taken out of the operation of the withdrawal of the arid lands.

Commissioner GROFF. Yes; by putting that construction upon these laws. There is the great Sioux reservation which was ceded and which we are surveying now. It is the law now that entries may be made there notwithstanding this arid land law. That is the view the General Land Office has taken of it.

The CHAIRMAN. So that you can go right on?

Commissioner GROFF. So far as the ceded lands are concerned in the great Sioux Reservation.

Mr. REDWAY. This map which has been referred to just came to our office this morning, so that it is new to us as well as to you.

Senator HALE. The Acting Attorney-General, in giving his opinion, speaking about the wholesale withdrawal, uses this language:

This action will not, however, be necessary to the full extent intimated by the Commissioner, if the information in the possession of the Geological Survey is sufficient to make it possible to say that certain Territories within the larger limits of the arid lands are excepted from the operation of the law.

Now, is there anything in that map that indicates that in that large region inclosed by these colors anything is excepted from the operation of the general law?

Commissioner GROFF. Yes, sir; this district embraced in the light lines.

Senator HALE. I mean the central region embraced by the colors; does not that cover the whole of that vast region?

Commissioner GROFF. Yes, sir.

Senator HALE. Are there any exceptions?

Commissioner GROFF. There are none that I know of.

Senator HALE. Are not the only exceptions east of the line on the eastern side and east of the western red line, together with small exceptions in California and Oregon?

Commissioner GROFF. Yes, sir.

Senator HALE. But the great expanse covered by all these Territories and States, so far as this map goes, has no such exception as is referred to by the Attorney-General?

Commissioner GROFF. None to my knowledge. I may say, however, that the Director of the Geological Survey has lately said to me that he was going to recommend that certain sections of the country be restored to entry under the homestead law, and was going to ask the Secretary of the Interior to ask the President to open them up to settlement under the homestead act. He stated that to me two or three days ago. I do not think that would give any relief to the great number of entrymen who made their entries there after the passage of the law, many of whom acted certainly in the best possible faith.

Senator GOEMAN. Is it your opinion that sites for reservoirs and the

land adjacent to canals and streams ought to be withdrawn in the public interest?

Commissioner GROFF. Well, sir, my own views on that question are that I would leave that country to take care of itself in that particular. It has done it heretofore, and I believe it can do it yet; that it should provide its own systems of irrigation. You all remember the settlement at Greeley, Colo., which was made many years ago by Mr. Meeker, where they were given lands in what is known as the arid region, open to settlement. Those people went there, preferring to enter upon those arid lands, and have gone forward, as we know, and redeemed what was apparently a desert, making it a beautiful spot.

Senator GORMAN. Has not the result been that a few companies and a few individuals, getting possession of the sites of reservoirs and streams themselves, have absolutely controlled the large territories to the exclusion of others?

Commissioner GROFF. Of course those canals are owned by corporations, but they are subject to control, as I understand it; there is nothing, in my opinion, in the way of passing laws fixing the rates for the use of the water the same as is done for the use of gas in cities, and for the rates of carriage by railways by local legislation.

Senator GORMAN. So that you would withdraw the survey for this purpose?

Commissioner GROFF. That is a matter for Congress in its wisdom to determine. My own judgment is that I would leave that problem to the States and Territories to solve for themselves.

The CHAIRMAN. This irrigation must be either conducted by large companies or by the Government in the end, I suppose. Each individual having 160 or 320 acres can not bring a stream of water upon his land by his own volition.

Commissioner GROFF. Not very well. They will have to depend on organized companies and combinations of settlers. I believe they have some such companies as that in California now, where each land owner owns so much stock in the company and shares in the profit. That system works very well. My attention was called to that fact when I was in California some three or four years ago.

Mr. REDWAY. I am a member of a small company of that kind which irrigates 15 acres.

The CHAIRMAN. As I understand you, Mr. Commissioner, if this system is to remain as the law now provides, there is but little need of adding more to the appropriation for surveys.

Commissioner GROFF. I can not tell, Mr. Chairman, how much of this country might be thrown open to entry by the President under the homestead law; of course I could only conjecture as to that.

The CHAIRMAN. The surveys ought to precede homesteads.

Commissioner GROFF. Yes, sir.

The CHAIRMAN. Is that all you desire to call our attention to?

Commissioner GROFF. There is an item in the appropriation bill that I think we ought to call your attention to, and that is in relation to the salaries of registers and receivers. I believe, Captain Redway, that the bill provides for the same amount as for the last year, \$550,000?

Mr. REDWAY. Yes, sir.

Commissioner GROFF. We had one hundred and seven offices, but we have sixteen new offices this year.

The CHAIRMAN. You think the appropriation should be increased how much?

Mr. REDWAY. Six thousand dollars to each new office.

The CHAIRMAN. Do you mean \$96,000 altogether?

Mr. REDWAY. Yes, sir; that is the estimate.

Commissioner GROFF. Whether they will become maximum offices depends upon the withdrawal of the arid lands.

The CHAIRMAN. Would that also apply to contingent expenses?

Commissioner GROFF. Yes, sir. We had last year \$155,000 for contingent expenses and it was necessary to obtain a deficiency appropriation for \$28,000, making altogether \$183,000.

The CHAIRMAN. And they have given you \$175,000 in the House.

Commissioner GROFF. The House has given \$175,000.

The CHAIRMAN. You have an estimate of \$200,000; is that sufficient?

Mr. REDWAY. Two hundred thousand dollars was estimated on the basis of one hundred and five offices, whereas we have sixteen new offices. A supplementary estimate was handed in since the sixteen new offices were established asking for \$96,000 for salaries for the sixteen new offices, and for \$25,000, if I recollect rightly, for contingent expenses.

The CHAIRMAN. Have you one hundred and five land offices now?

Mr. REDWAY. One hundred and twenty-one, all told, with the new offices established; two hundred and forty-two offices.

The CHAIRMAN. That is all in the document here?

Mr. REDWAY. Yes, sir.

The CHAIRMAN. What about depredations on timber on the public lands?

Mr. HARTMAN. One hundred thousand dollars is all we want.

The CHAIRMAN. Protection of public lands from fraudulent entry?

Mr. HARTMAN. We need \$140,000; that is our estimate. We think we can carry the agents now employed and clear up nearly all the fraudulent cases; we can probably do it within a year with that amount; \$140,000.

The CHAIRMAN. You have \$119,500 this year?

Mr. HARTMAN. We had that amount last year.

Commissioner GROFF. The charges of fraud ought to be investigated as speedily as possible; we have made considerable headway in the offices and have reduced the fraudulent entries very materially.

Mr. REDWAY. There is a little item of \$2,000 for repairing of records. Mr. Walker has that matter thoroughly in hand. The House has omitted the item, which was estimated for, I think.

Mr. HARTMAN. Only \$2,500 was asked, Mr. Commissioner, to reproduce the plats that are handled in the office and are going to pieces; it would take considerably more money than that.

Mr. REDWAY. It would take thirty years to complete the work at that rate.

The CHAIRMAN. Can not that go on during the present year?

Mr. REDWAY. I think we ought not to agitate that now, because it is too late.

Mr. HARTMAN. Let that go.

The CHAIRMAN. The next item is "Transcripts of records and plats."

Mr. HARTMAN. Twelve thousand five hundred dollars. That is paid for by the exemplification fees received in the office; \$13,770 was received for the year ending yesterday on that account.

Mr. REDWAY. That amount really ought to be appropriated, if you will excuse me. The estimate was based upon last year's receipts, and as they are greater this year, the appropriation ought to be equivalent (and has been, as I understand, heretofore equivalent) to the last year's receipts.

The CHAIRMAN. It is so near that I do not think I would make any point about that.

Mr. HARTMAN. We can get along with \$12,500.

The CHAIRMAN. Now, gentlemen, is there anything more that the Commissioner desires to bring before us this morning? We may have to ask you to come again and see us, Mr. Commissioner, when we get some information from other sources.

Mr. HARTMAN. There was an estimate sent here from our office asking for \$2,000 for expenses.

Mr. WALKER. For putting in shape papers in the office of the surveyor-general of New Mexico. There is a large amount of papers connected with Spanish and American titles there which have never been translated and examined, and they are in danger of being destroyed by time and dust and constant handling. Unless they are properly translated and put into proper books of record they will be lost. Of course we do not know how valuable those papers are until they are put in proper shape. They may make for or against the United States. There are 111 cases now pending before Congress from New Mexico alone.

The CHAIRMAN. Are those papers in confusion?

Mr. WALKER. They are in confusion; that is, they may have been tied up in bundles and put up in boxes, but they ought to be translated and recorded in the surveyor-general's office. There are one hundred and eleven cases now pending before Congress from New Mexico, embracing 6,640,000 acres of land or more. Some of those papers may be highly important either to substantiate or defeat a claim.

The CHAIRMAN. The man who translates those papers ought to know what he is about.

Mr. WALKER. Certainly; and for that reason the surveyor ought to have a Spanish translator; he had none at that time, and it is impossible to tell what is in those papers without a competent Spanish translator.

Senator GORMAN. I do not see how he can properly administer his office without it.

Mr. WALKER. He can not. The reasons for the estimates are given. It is a very necessary thing to be done for the protection of the Government itself, in view of these claims.

Commissioner GROFF. That is a matter of great importance to the people of Arizona and New Mexico.

The CHAIRMAN. Could this be done under the control of the surveyor-general of New Mexico?

Commissioner GROFF. Yes, sir.

Mr. REDWAY. The title to vast tracts of land in New Mexico is dependent on these records.

The CHAIRMAN. Have you the form of the appropriation, such as you want?

Commissioner GROFF. It was transmitted to the Secretary of the Treasury; we have none here.

The CHAIRMAN. You had better follow that up and see what has become of it.

Senator HALE (to Commissioner Groff). I want to ask you one question, Mr. Commissioner, about this great subject of the withdrawal of these lands. The act of October 2, 1888, provides—

That all lands made susceptible of irrigation by such reservoirs, ditches, or canals are from this time henceforth hereby reserved from sale as the property of the United States.

Now, Major Powell's map shows the entire reservation, with no exception worth mentioning, of the ten States and Territories that you have described here, covering the whole ground. Has there been under that act any decision by the Secretary of the Interior establishing what are the lands that are susceptible of irrigation by these reservoirs, ditches, or canals?

Commissioner GROFF. None to my knowledge.

Senator HALE. You know no such decision?

Commissioner GROFF. No, sir. You will see from that document I handed the chairman that in my letter I asked directions, and that brought out this opinion of the Acting Attorney-General.

Senator HALE. You, having charge of the Land Office, ought to know about that. To your knowledge has there been done anything more than this work by the Geological Survey under Major Powell and the submission of these maps which you have just received, showing the entire absorption of this country? Has there been anything more done than that officially?

Commissioner GROFF. No, sir.

Senator HALE. You do not know that the Secretary has adopted that?

Commissioner GROFF. No, sir.

Senator HALE. There has been no order from the Interior Department recognizing that?

Commissioner GROFF. I asked instruction from the Department in my communication to the Secretary of April 2, 1890. I suppose the Secretary was of the opinion that the decision of the Attorney-General was a sufficient answer to my communication.

Senator HALE. The opinion of the Attorney-General does not cover that important point, and I do not discover thus far that there has been any action of the Department that has settled what portion of these lands is subject to that act.

Commissioner GROFF. I have had no directions. But 10 per cent. of those lands, according to the estimate of Major Powell, can ever be irrigated. I have no data to inform me which are the lands needed by the canals and ditches and which can be made susceptible of irrigation within that region. Therefore that must be reserved.

Senator HALE. That does reserve all.

Commissioner GROFF. That does reserve all, but any of them are liable to be made susceptible of irrigation.

The CHAIRMAN. There are no canals and ditches indicated on that map at all.

Commissioner GROFF. None at all.

Senator GORMAN. The survey has not been made.

The CHAIRMAN. Do you understand, Mr. Commissioner, that all those lands are susceptible of irrigation now?

Commissioner GROFF. No, sir; I do not understand that.

The CHAIRMAN. You do not think they are?

Commissioner GROFF. No, sir.

Senator HALE. You do not believe they are?

Commissioner GROFF. I do not believe they are. Ninety per cent. of them, according to the estimate of Major Powell, can never be irrigated, because of the limited supply of water in that region. I am giving his figures, not mine.

The CHAIRMAN. We may want to see you again, Mr. Commissioner, two or three days hence, and will let you know after we have looked further.

## PUBLIC BUILDINGS.

## STATEMENT OF THE CHIEF CLERK OF THE TREASURY DEPARTMENT.

The CHAIRMAN. We understand, Major Brackett, that you want to see us about some of these expenses?

Mr. BRACKETT. Yes, sir.

The CHAIRMAN. To what do you want to call our attention?

Mr. BRACKETT. Pages 33 and 34 of the bill, "Pay of assistant custodians and janitors." The amount appropriated last year for that purpose was \$500,000, and the House has given us this year \$525,000. This estimate, which is in the appendix to the Book of Estimates, was very carefully made. The estimates were first presented by the custodians of the various public buildings in the United States, and then cut down from their estimates, and the total was made \$698,000. Of course during the last year we have not been able to spend any more than the appropriation of \$500,000, whereas we have one building alone which will take all of \$25,000—Brooklyn, New York—and we have the public buildings at Brooklyn, Louisville, and Pittsburgh, three very large public buildings.

The CHAIRMAN. New buildings to be opened up?

Mr. BRACKETT. Yes; probably before Congress meets again.

Senator HALE. Has the Brooklyn public building progressed so far as that?

Mr. BRACKETT. Yes; that is our information from the architect's office. There will be only two things we can do if we have not any more money; that is, we can keep the new buildings unoccupied, or we can reduce the pay of the force in all the other buildings.

The CHAIRMAN. What is the lowest possible sum you think you can get along with for opening up these new buildings?

Mr. BRACKETT. I should not want to attempt to satisfy the custodians and the people who reside in those towns with a cent less than the estimate, Mr. Chairman, because there is not a building now—giving them what we have estimated here—where the custodians would be satisfied with that allotment.

The CHAIRMAN. Did you present these matters before the House?

Mr. BRACKETT. I presented them to the House committee, and they simply added \$25,000, I do not know why. They did not seem to take into consideration the number of new buildings erected every year. We have twenty-six new buildings to open this year.

Senator HALE. Do you remember how we fixed this last year?

Mr. BRACKETT. No sir. We must so apportion the fund as to prevent a deficiency. When I went into the office a year ago last April I found there would be a deficiency of \$12,000, and so I had to reduce the force in every public building, in consequence of which we saved a small amount.

Senator HALE. Did you not find that in a good many places they had a much larger force than was needed, say for some of the small public buildings?

Mr. BRACKETT. Not "a much larger force," but I found the prices paid were altogether irregular; and I suggested that the salaries be fixed at the same rate all through. So now we pay laborers \$540 a year, watchmen \$720, and elevator conductors the same, and engineers



\$900, unless in very large buildings. So now we have got the rates as nearly equalized as it is possible to make them. We make no additions to those sums except in the case of very large buildings, like New York, Cincinnati, Chicago and St. Louis, where we have had a little more to pay because they have electric-light plants.

Senator GORMAN. Do you consider that fair to the men employed in public buildings in small towns where they can live much more cheaply than in New York, Washington, and Baltimore?

Mr. BRACKETT. We pay more in New York than we do in any city.

Senator GORMAN. So that you can not have a uniform rule?

Mr. BRACKETT. No; for a very small building we pay very small prices.

Senator HALE. You endeavor to have a uniform rule outside of the large cities?

Mr. BRACKETT. Yes, sir. Every salary is named in this estimate here, but of course those people are continually asking for more money in all the buildings. We have the same difficulty to contend with that the Committee on Appropriations has.

Senator HALE. You have to say no all the time.

Mr. BRACKETT. We have to say no.

The CHAIRMAN. Your estimate in detail is what you want?

Mr. BRACKETT. Yes, sir; what I want. It will be difficult to get through with \$698,000. You see, they go to work and put in elevators. They are all the time putting in elevators in these public buildings. There have been a number put in since this estimate was made, and consequently we have not estimated for elevator conductors or engineers.

Senator HALE. Do they put in elevators where the public buildings are less than four stories high?

Mr. BRACKETT. They put them in where they are not needed at all.

Senator HALE. They ought not to.

Mr. BRACKETT. Then we have to add the cost of engineer and elevator conductor.

Senator GORMAN. How many public buildings have you in charge in which you have expended this \$500,000 last year for janitors, etc.?

Mr. BRACKETT. If you have the Book of Estimates there you will see on page 312 the list of old buildings closed, and on page 313 new buildings commenced; there is the entire list, running from page 308 to 312. In addition to that we have quite a number regularly open.

Senator GORMAN. How many, in round numbers, all told, had you in custody during the year?

Mr. BRACKETT. As nearly as I can recollect, two hundred buildings; I would not be certain about that.

Senator HALE. I have no doubt that there are that many, if not more.

Mr. BRACKETT. Of course we do not deal in numbers that way.

The CHAIRMAN. What do you think of this item for furniture and repairs of furniture? The House has given you \$200,000.

Mr. BRACKETT. That is all you care to hear about the other matter, is it?

The CHAIRMAN. That is all I care to hear; some of the other gentlemen may want to ask some questions.

Senator HALE. I do not.

Mr. BRACKETT. I submitted to the House the revised estimate for 1891, based on the latest information received from the Architect's Office, in which the new buildings to be completed require \$288,721.

The CHAIRMAN. Have you that in detail?

Mr. BRACKETT. I have it in detail and will leave it with you. There was something said to the effect that Congress would meet before some of these buildings were ready, but we have to be four months in advance of the completion of a building always, because we are required by law to advertise for one month, and we must give the dealer three months in which to make the furniture if we expect to have a good job. I have the whole thing in detail, showing that the amount required would be over \$288,000.

The CHAIRMAN. Have you the names of the buildings?

Mr. BRACKETT. Yes, and the furniture for completed buildings, based on the annual expenditures, making altogether \$398,171. Then I give the exact amount spent at every public building in the United States. I give you also the expenditures during the year 1889. On the 4th of April we asked the House, and I presume the Senate at the same time, for an appropriation of \$142,000 with which to furnish twelve buildings which are completed and have remained unoccupied, and will have to remain unoccupied for four months, because we have not the money.

The CHAIRMAN. Those are in addition to what you have already stated to us?

Mr. BRACKETT. Yes, sir.

Senator HALE. Do you expect to get the money for them?

Mr. BRACKETT. Yes, sir.

Senator HALE. In what way?

Mr. BRACKETT. By a separate deficiency appropriation. We have asked for it, but I do not know how they expect to put it in. It may be made a special bill.

There is another suggestion I would like to make in connection with this matter, and that is this: That whenever an appropriation is made for a public building I think there ought to be 3 per cent. set apart absolutely for furnishing the building; then we would avoid all this trouble. That is about as near as we can come to it. It takes about 3 per cent. to furnish. In that way, when an appropriation is made for a public building 3 per cent. of it would be set aside for furnishing.

Senator HALE. Take \$75,000, and 3 per cent. of that would be \$2,200 in round numbers.

Mr. BRACKETT. It would run a little higher than that, but very little higher than that.

Senator HALE. I should be willing, if I thought the Government would compromise on 3 per cent., to do it.

Mr. BRACKETT. If we wanted a deficiency at any time we could get it, I presume. The latest I have here is the building at Winona, Minn., where the appropriation is \$900, and I think that building cost about \$200,000. Three per cent. on the large buildings would be ample; but there is no uniformity in buildings. Some use a great deal more money for ornamentation than others.

Senator HALE. Can you not regulate that?

Mr. BRACKETT. The Architect does that.

Senator HALE. I mean as to furniture.

Mr. BRACKETT. Oh, yes.

Senator HALE. Take a \$100,000 building, and 3 per cent. of that would be \$3,000.

Mr. BRACKETT. It would very nearly do it.

Senator HALE. Of course \$3,000 spent upon plain, strong furniture would buy a good deal of it; but I remember last year, two or three cases in Texas, where the buildings cost less than \$75,000, and the fur-

niture cost nearly \$20,000. Now that is unfair. Are you doing anything of that kind now?

Mr. BRACKETT. No. Where they have court-rooms they must have a certain kind of furniture, for the judges' benches or desks, and the judges must have book-cases. But we vary only a little in our list of furniture. We do not show any partiality at all, and give them the least amount they can get along with.

Senator HALE. Furniture can now be had very cheaply.

The CHAIRMAN. What have you to say about fuel and lights?

Mr. BRACKETT. There is a statement showing the amount expended in 1889 for fuel, lights, and water, and another statement showing the amount expended in 1890 for the same. In 1890 we have expended \$650,000—right up to the limit. Now I have here an estimate of what it will require for 1891.

The CHAIRMAN. In detail?

Mr. BRACKETT. In detail; \$55,000 for new buildings. There were some buildings that were occupied only a portion of last year. I see they have not given me the right statement. I will give you the correct statement showing how much it will require for all the buildings and how much to run the new buildings, which should be added to the expenditure of last year.

The CHAIRMAN. Have you the aggregate figures before you?

Mr. BRACKETT. Yes, sir; \$768,420.34. I think they will vary a few thousand dollars. They have given me the wrong paper, but I will give you the correct statement, so that it will be satisfactory. But I want to say that the estimate, as it now appears, does not include electric-light wiring for any building in this country. That is very important.

The CHAIRMAN. You mean it does not include electric-light plants?

Mr. BRACKETT. The wiring simply.

Senator HALE. Are you putting them in?

Mr. BRACKETT. In all buildings where we can.

Senator HALE. What do you mean by wiring?

Mr. BRACKETT. When the gas-pipes are put in we follow with wires. We put in combination fixtures in every building; and then, as circumstances warrant, we put in gas or electricity, but electricity is much better.

Senator GORMAN. Does not that come out of the fund for the construction of public buildings?

Mr. BRACKETT. No, sir; it comes out of the appropriation for fuel, lights, and water. The terms of the appropriation are such that it has to come out of the fund for fuel, lights, and water. I will say to you very frankly that we need all the money we ask for; it was a close estimate, made so at the request of the Secretary of the Treasury; there was not to be a dollar used for any extravagance of any sort.

Senator HALE. When a building is erected, the gas-pipes, water-pipes, and drainage, and all that come under the head of plumbing, and are paid for out of the appropriation for the construction of the building, why should not that include electric-light wires?

Mr. BRACKETT. I think it ought to.

Senator HALE. If you put them up at the same time, I do not see why wiring should come under a different charge.

Mr. BRACKETT. It is because of the terms of the appropriation law.

Senator HALE. Of course when it comes to fixtures, I know they are considered furniture.

The CHAIRMAN. What about heating apparatus?

Mr. BRACKETT. Heating apparatus is provided for by the Supervising Architect. I can just give you a specimen of what is asked for in reference to fuel, lights, and water. A letter came to us recently from Boston in which the writer asked for \$334,000 to extend their electric-lighting plant; and we are getting such letters from all over the country. So that if we had every cent asked for we shall not have enough to supply one-half of the demands made.

Senator GORMAN. That is not for wiring.

Mr. BRACKETT. No; that is for new engines, etc., at the custom-house. We find that we can save a great deal of the furniture by using the electric lights. The gas in this country in many cities is very poor.

Senator HALE. Electric light itself costs more, does it not?

Mr. BRACKETT. We get it almost as low as gas where there is any rivalry at all.

The CHAIRMAN. "Vaults, safes, and locks."

Mr. BRACKETT. That comes under the Supervising Architect.

The CHAIRMAN. Is there anything else you want to call our attention to?

Mr. BRACKETT. No, sir.

#### REBELLION RECORDS.

#### STATEMENT OF MAJ. GEORGE B. DAVIS, IN CHARGE OF REBELLION RECORDS OFFICE.

The CHAIRMAN. Major Davis, I see this is the item contained in the bill that comes to us from the House:

For continuing the publication of the official records of the Union and Confederate Armies, including the atlas of maps and plans, in accordance with the plan approved by the Secretary of War, August-3, 1880, and for the compensation of the civilian members of the board of publication, appointed in accordance with the act of March 2, 1869, and for the compensation of such temporary expert services in connection with the preparation, publication, and distribution of said records as may be deemed necessary by the Secretary of War, such experts to be selected and appointed by the Secretary of War, from time to time, as the necessity therefor arises, and for the purchase of stationery, \$152,100.

Is that more than you need, major?

Major DAVIS. That is upon the basis of completing the work in six years. When I appeared before the House committee they asked me to submit an estimate for completing the records within three years, beginning with the 1st of July.

The CHAIRMAN. Three years from now?

Major DAVIS. Three years from now. The estimate for the three-year plan would be \$297,000; practically twice the amount for six years.

Senator HALE. I do not quite get that.

The CHAIRMAN. This appropriation is based upon the idea of completing the work six years from now?

Major DAVIS. Yes, sir.

Senator HALE. That is, if completed in six years, you want each year what the House has given?

Major DAVIS. Yes, sir.

Senator HALE. And if you complete it in three years you want twice that?

Major DAVIS. Yes, sir.

The CHAIRMAN. On the basis of four years what would you require?

Major DAVIS. It would require an annual appropriation of about \$435,000; it would run very near to the three-year plan.

The CHAIRMAN. Is there any difficulty in the way of completing the work in four years if you have the money?

Major DAVIS. No, sir; none at all.

The CHAIRMAN. That is to say, all the work can be brought into play and the whole thing completed in four years, provided you have the necessary appropriation?

Major DAVIS. That is all that is necessary, sir.

Senator HALE. Could you work to advantage and do it in two or three years?

Major DAVIS. It will be possible to do it in three years from this 1st day of July; I have made the estimate very carefully, but it would be out of the question to do it in less than three years from this 1st of July.

Senator HALE. Has not the Secretary of War an idea that it could be all done in one or two years?

Major DAVIS. No, sir; his idea is that it can be completed in four years from last July.

Senator GORMAN. Three years from now?

Major DAVIS. Yes, sir.

Senator GORMAN. What is there about the delay in printing? Where does that arise?

Major DAVIS. We print all that we get money for. This year our appropriation was \$100,000, and we printed and distributed ten volumes.

Senator GORMAN. So it is the amount of money that is to be considered, and nothing else?

Major DAVIS. That is all, sir.

The CHAIRMAN. You are of the opinion, Major Davis, that the economical way to complete the work is to complete it within four years, and have money enough to do it?

Major DAVIS. Yes, sir.

Senator HALE. According to law?

Major DAVIS. Yes, sir; we have worked on steadily under the law.

Senator HALE. So that on this basis this \$152,000 wants to be \$235,000?

Major DAVIS. Yes, sir.

The CHAIRMAN. Is there anything else you want to tell us?

Major DAVIS. No, sir.

The CHAIRMAN. We will make that amendment.

Major DAVIS. The verbiage of that amendment is that which I submitted to you last winter, and it will enable us to employ the persons.

The CHAIRMAN. You mean the phraseology here?

Major DAVIS. Yes, sir.

Senator HALE. It is right here in the bill, is it not?

Major DAVIS. Yes, sir.

## IRRIGATION AND RECLAMATION OF PUBLIC LANDS.

UNITED STATES SENATE COMMITTEE ON APPROPRIATIONS,  
*Wednesday, July 2, 1890.*

The subcommittee (composed of Senators Allison, Hale, and Gorman) having under consideration the act (H. R. 10884) making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1891, and for other purposes, and having particularly under consideration the items with reference to irrigation and reclamation of public lands, had before them Hon. J. W. Powell, Director of the Geological Survey, and others. There were also present Senators Allen, Casey, Moody, Paddock, Power, Sanders, Stewart, and Reagan.

## STATEMENT OF MAJOR J. W. POWELL, DIRECTOR OF THE GEOLOGICAL SURVEY.

The CHAIRMAN. Major Powell, we want to make some inquiries this morning respecting specially what is known as the irrigation survey. In the sundry civil act of last year we find this provision:

For the purpose of investigating the extent to which the arid region of the United States can be redeemed by irrigation, and the segregation of irrigable lands in such arid region, and for the selection of sites for reservoirs and other hydraulic works necessary for the storage and utilization of water for irrigation, and for ascertaining the cost thereof, and the prevention of floods and overflows, and to make the necessary maps, including the pay of employes in field and in office, the cost of all instruments, apparatus, and materials, and all other necessary expenses connected therewith, the work to be performed by the Geological Survey, under the direction of the Secretary of the Interior, \$250,000, of which sum \$50,000 shall be immediately available; and the Director of the Geological Survey, under the supervision of the Secretary of the Interior, shall make a report to Congress on the first Monday in December of each year, showing in detail how the said money has been expended, the amount used for actual survey and engineer work in the field in locating sites for reservoirs, and an itemized account of the expenditures under this and any future appropriation.

Will you be kind enough to inform the committee, as tersely and briefly as you can, what you have done under this provision?

Director POWELL. Mr. Chairman, I will say very briefly that under that provision we have entered the field on the Rio Grande in New Mexico, on the headwaters of the Arkansas in Colorado, on the headwaters of the Missouri in Montana, on the Truckee and Carson Rivers heading in the Sierra Nevadas in California and running into Nevada and used for irrigation in Nevada, as well as a series of rivers in California which come down into the great valley of California, and on the Shoshone, or Snake River, which heads in Wyoming and runs down to where irrigable land is found in Idaho; those are the regions in which we have been at work.

The CHAIRMAN. Does that embrace all the chief headwaters of these great rivers?

Director POWELL. Yes, sir. In that work we have proceeded and have made, first, a topographic survey; second, a hydrographic survey; and third, a survey for the purpose of determining the cost of irrigation works. The whole work has resulted in the selection of several hundred reservoir sites and a great number of canal sites, all of which I have detailed in my report which has been published. I need not go into statistics here.

The CHAIRMAN. No it is just the general statement that we want.

Director POWELL. It has also resulted in the selection of a large body of irrigable lands. The topographic survey is a survey of discovery of sites and lands. The hydrographic survey is a survey of discovery, first, of the amount of water which the streams will afford for irrigation; second, of the amount of water necessary to be used in irrigation—what is known as the duty of water; third of the amount of evaporation or loss from the reservoirs, the water being held over in the reservoirs from season to season. The survey for construction is an engineering survey to determine the cost of the works. All of these things we are doing under the law.

The CHAIRMAN. You mean the cost of the reservoirs, the cost of canals, etc?

Director POWELL. Yes, sir. For this purpose the sites for headworks on the streams, the lines for canals after they are discovered, and reservoir sites, are much more elaborately surveyed than the general survey which is used for their discovery. I have placed before you a map which will illustrate the work, and which we will call Map No. 1. This is a map that I constructed last summer in the field on the headwaters of the Apishapa River, one of the tributaries of the Arkansas, in Colorado. The area is shown in brown, and you see here the declivities shown; the reservoir sites are indicated and scattered about the map, and the irrigable lands are colored in green.

Senator HALE. What you mean by irrigable lands are the lands under this act made susceptible of irrigation by this work?

Director POWELL. Yes, sir.

The CHAIRMAN. Have you segregated those irrigable lands in any way?

Director POWELL. Yes, sir.

The CHAIRMAN. Have you marked them out? If so, how?

Director POWELL. In the field.

The CHAIRMAN. I mean in the field and on the ground, have you marked them out?

Director POWELL. Yes, sir. We made the surveys, and we have designated them in Land Office terms, making lists of them in Land Office terms, and on Land Office plats.

The CHAIRMAN. Surveyed by the Land Office, do you mean?

Director POWELL. They were originally surveyed by the Land Office. I mean all the irrigable lands are already surveyed by linear survey.

Senator HALE. You took the surveys already made, and in reporting to the Land Office you used those surveys in your designations?

Director POWELL. Yes, sir; designated them in Land Office terms.

The CHAIRMAN. Those are the headwaters of the Arkansas?

Director POWELL. Yes, sir.

The CHAIRMAN. Is that work complete now?

Director POWELL. Yes, sir. This is only a sketch map, but I have with me all the completed maps made under the Irrigation Survey.

The CHAIRMAN. But this work is not completed in any sense?

Director POWELL. No, sir; the reservoir sites are yet to be surveyed carefully, each one. This is only the map of discovery, showing what we have discovered. Now each reservoir has to have a special map of itself, with cost of construction, etc., determined.

The CHAIRMAN. That you have not reached yet?

Director POWELL. Not all of it.

The CHAIRMAN. That is an illustration of what you are doing at the headwaters of all these streams?

Director POWELL. Yes, sir.

Senator HALE. Before you leave that, Major, allow me; take the map you have shown us that covers one of your operations, and what is the extent in area as exhibited to us on that map, No. 1?

Director POWELL. That is a degree of longitude from that point to that (indicating) less than 60 miles; from there to there (indicating) is a degree of latitude.

Senator HALE. Then about how many square miles would be represented on this map we see here, with these different sites for reservoirs delineated?

Director POWELL. About 2,250 square miles on the sketch map.

Senator HALE. What do you think would be the extent of these irrigable lands as shown upon that map, stated in square miles?

Director POWELL. Less than 500 square miles.

Senator HALE. That is, represented by the green color?

Director POWELL. By the green color.

Senator HALE. What is represented by this paler or white coloring?

Director POWELL. Nothing whatever; that is, lands not irrigable, because the water can not be taken upon them, or because they are too rough in character, or something of that sort.

Senator HALE. How many reservoirs are shown upon this extent of 2,000 square miles?

Director POWELL. About thirty-five.

Senator HALE. In this territory covered by this map, are there, or have there been, lands already taken up under the different acts?

Director POWELL. Yes, sir; I have a somewhat long statement to make upon that. That is really the important point.

Senator HALE. Then I will not go into that now.

Director POWELL. The information I have gained in the last two or three weeks has been quite a revelation to me.

Senator HALE. The different points you have worked are shown by separate maps like this?

Director POWELL. Yes, sir.

Senator HALE. How many of them?

Director POWELL. There are forty one completed.

Senator HALE. Forty one separate maps?

Director POWELL. Yes, sir; each map covering an area the size indicated by that.

Senator HALE. Do you call that a district?

Director POWELL. No, sir; it is only a map district. I now show you map No. 2, being a map of the entire region embraced in the irrigation survey. Each distinct color and each distinct tone or tint of color represents a distinct hydrographic basin, a stream with its minor streams, etc. Here is the Rio Grande, for example, in green, and here are the different streams that flow in to the Rio Grande, each one with the lands drained by it constituting a district itself. For administrative purposes it is necessary to take into consideration each such hydrographic district, as we call it, and to make a separate and distinct survey of each, in order to determine the amount of water which the streams of that district will afford to the irrigable land, and the sites for diverting dams or canals and for reservoirs, and also to determine the lands that can be irrigated. It will be seen that there are a great many of these districts; there are more than 150 altogether, as we have worked them out up to the present time. The irrigable land in those districts does not all belong to the Government. I estimate that within the colored area, as you see it here, there are 100,000,000 acres of land that can be irrigated.



The CHAIRMAN. What is the total area, in round numbers, shown on that map?

Director POWELL. Nearly 800,000,000 acres. The total area is about 1,200,000 square miles, of which about 100,000,000 acres can be irrigated.

The CHAIRMAN. I understood you to say there were 800,000,000 acres in that area, of which 100,000,000 could be irrigated; that would be about one-eighth.

Director POWELL. You referred only to the coloring, I supposed.

The CHAIRMAN. I referred to the colored portion of the map.

Director POWELL. There are about 800,000,000 acres, of which 100,000,000 can be irrigated, and of which 10,000,000 are already irrigated.

Senator HALE. I do not comprehend. As we look at that map what is included in what we see colored is the whole of that space?

Director POWELL. Yes, sir.

Senator HALE. That contains how many square miles?

Director POWELL. That contains 1,200,000 square miles.

Senator HALE. The whole of that is embraced in your colored map there?

Director POWELL. Yes, sir.

Senator HALE. Then if there were 1,000,000 square miles there would be 640,000,000 acres.

Director POWELL. I say it is more than a million, or about 800,000,000 acres, of which 100,000,000 acres can ultimately be redeemed. That means the utilization of all the water; that all the streams must be stored so that there is no waste. In our work we take one district at a time, one hydrographic district, a region of country drained by some stream, and this covers the catchment area, the site for irrigating works, and the lands that can be irrigated thereunder within the district. Of the 100,000,000 acres that can be irrigated 10,000,000 acres are irrigated, and irrigation works are constructed probably for about 2,000,000 acres more.

Senator HALE. Constructed by private enterprise?

Director POWELL. By private enterprise. I estimated some weeks ago, in speaking to the House Committee on Appropriations, that 30,000,000 acres of those irrigable lands had passed from the hands of the General Government. But at that time I had not gone over the records of the Land Office. I had derived that impression from the best information I could get in the field. As we go on with this work in the field we find what lands are under cultivation and what lands are inclosed, etc.; but when we come to examine the records, as we are doing now, we find that there is a very much larger proportion of the lands that have gone out of the hands of the General Government, and that instead of there being only 30,000,000 acres there will be about 45,000,000 to 50,000,000 acres that have gone out of the hands of the General Government and into the hands of individuals and companies. So that at the present time three-fourths, and probably four-fifths, of the land that belongs to other parties than the Government—the irrigable lands (I am not speaking of the whole area)—three-fourths of those lands are held by persons who are not utilizing and cultivating them. In the main they are held for speculative purposes—for a rise in the value of the land. While in the West I observed a very great feeling of discontent in regard to the large quantities of land that were held by individuals. I supposed it was large, but had no appreciation until within the last few weeks of the extent of such holdings. I had estimated that there were about 30,000,000 acres of irrigable land out of

the possession of the Government; my estimate now is that there are from forty to fifty million held in that manner.

Senator HALE. Held by private parties?

Director POWELL. Held by private parties.

The CHAIRMAN. Or one-half of the irrigable land?

Director POWELL. Very nearly one-half of the whole are already held by private parties.

The CHAIRMAN. And that land thus owned is the best land; that is, the most easily irrigated?

Director POWELL. Not invariably so; it is sometimes the case that the best land remains.

Senator HALE. When you followed this out and discovered that so large a portion of these lands had passed from the Government into the hands of private parties, did you follow still further and find what proportion is still held in very large holdings?

Director POWELL. I am now at work at that, but I can not give the proportion yet; it will take three or four months more of examination.

Senator HALE. Do you think that a large portion of the 45,000,000 acres held by parties other than the Government is held in large bodies?

Director POWELL. Yes, sir; much the larger proportion.

Senator HALE. How large have you found any single body?

Director POWELL. Until the passage of the act of October 2, 1888, a man could take 1,120 acres of land; that is, he could take 640 under the desert-land act; and under other acts (the homestead-act, the timber-culture act, etc.), he could take 480 acres.

Senator HALE. And you found that even that 1,120 acres does not measure the size of the largest?

Director POWELL. It does not.

Senator HALE. What have you found to be the largest holding?

Director POWELL. About a million acres.

Senator HALE. Of contiguous holding?

Director POWELL. Yes, sir; that is the largest one I know of.

The CHAIRMAN. Where is that?

Director POWELL. In southern California.

This is a pretty large subject, gentlemen, and, not knowing what points you want to cover, I will go on and do the best I can.

The CHAIRMAN. I will ask you, while you are on that general map, whether all the work you have done under the last appropriation has been done within that area?

Director POWELL. All within that area.

The CHAIRMAN. Have you expended the whole of that appropriation?

Director POWELL. Yes, sir, practically; there may be \$150 remaining.

The CHAIRMAN. In general terms, what portion of it for topographic work, and how much for hydrographic?

Director POWELL. About four-sevenths for topographic, and the remaining three-sevenths about equally divided between hydrographic and construction surveys.

The CHAIRMAN. Now what portion of that work have you done within the whole of that area?

Senator HALE. Compared with what needs to be done?

The CHAIRMAN. Yes, certainly.

Director POWELL. About one-twentieth.

Senator HALE. Right there, in this territory which embraces ten

States and Territories and a million square miles, how have you been able to lay out the whole of it as if you had been over it, in these different districts, according to the water capacity?

Director POWELL. It is only done in a tentative way, not a final way, though some of it is final.

Senator HALE. You have not been on all of it.

Director POWELL. No, sir; but surveying parties have been on a good deal more than you would suppose. We have not only the surveys of the last year before us, but we have all the surveys heretofore made. I have explained to the committee before how I utilize all that old work.

The CHAIRMAN. That is to say, a great deal of this topographic work in that area has already been done under other surveys?

Director POWELL. Oh, yes. I have certified to the Land Office, I think, two hundred reservoir sites, and I have two or three hundred more almost ready to be certified. I could not have done that under this appropriation if I had not known something of the country before.

Senator HALE. Then your old surveys, which have no special reference to the question of irrigation I suppose, aid you very much?

Director POWELL. Oh, yes; from the first we had the idea before us that the question of irrigation would ultimately become the most important; and you remember that that was explained before the commission by me.

Senator HALE. So you did not lose sight of that feature when you were making your earlier surveys, long before this act was passed?

Director POWELL. No, sir.

Now, Mr. Chairman, I have estimated for work within the area which you see colored, \$720,000, and I want to distribute that amount in each State and Territory of the sixteen where irrigation is necessary.

Senator HALE. That would be outside of the territory shown on this map?

Director POWELL. No, sir.

Senator HALE. Does this map include sixteen States and Territories?

Director POWELL. Not the whole of each; the whole of some, parts of others. Last year I selected what are really the most complicated problems first—the most densely settled districts, where the water supply has come to be the most important question, to give the farmers the earliest possible relief. It will be remembered that the Irrigation Survey was not created on an appropriation bill; it was created by a prior act of Congress, an act which originated, I believe, in the Public Lands Committee of the Senate; but the appropriation bill restricted the use of the money.

Senator HALE. The appropriation bill of that year?

Director POWELL. Of that year; it restricted the use of the money and defined more clearly the duties of the survey, in the restrictive clause making the appropriation. But the survey itself was created by an act anterior to that.

Senator HALE. When you refer to the act of October, 2, 1888, do you refer to the appropriation act?

Director POWELL. Yes, sir.

The CHAIRMAN. The irrigation act passed the same year.

Director POWELL. The same year. It was a joint resolution, which had the force of an act.

Senator HALE. This is the language of the act of October 2, 1888:

For the purpose of investigating the extent to which the arid region of the United States can be redeemed by irrigation, and for the selection of sites and other hydraulic

works necessary for the storage and utilization of water for irrigation, and the prevention of floods and overflows, and to make the necessary maps, including the pay of employes in field and in office, the cost of all instruments, apparatus, and materials, and all other necessary expenses connected therewith, the work to be performed by the Geological Survey, under the direction of the Secretary of the Interior, the sum of one hundred thousand dollars or so much thereof as may be necessary; and the Director of the Geological Survey, under the supervision of the Secretary of the Interior, shall make a report to Congress on the first Monday in December of each year, showing in detail how the said money has been expended, the amount used for actual surveys and engineer work in the field, in locating sites for reservoirs, and an itemized account of the expenditure under this appropriation. And all land which may hereafter be designated or selected by the said United States surveys for sites for reservoirs, ditches, or canals for irrigation purposes, and all lands made susceptible of irrigation by such reservoirs, ditches, or canals, are from this time henceforth reserved from sale as the property of the United States and shall not be subject, after the passage of this act, to entry, settlement, or occupation until further provided by law: *Provided*, That the President may at any time in his discretion, by proclamation, open any portion or all of the lands reserved by this provision to settlement under the homestead laws.

That is the act you refer to?

Director POWELL. That is the act I refer to.

Senator HALE. Now, what do you say about the original joint resolution?

Director POWELL. The original joint resolution creating the survey directed what it should do, but the reservation of land was put upon the appropriation act. Now, under that law the lands that were made susceptible of irrigation were withdrawn from settlement except under the homestead act, and can no longer be taken up as desert-land claims, or under the timber-culture act and the pre-emption act; and under the homestead act they can be taken only after proclamation by the President. Now, the meaning of that act has been defined by the Attorney-General, and the effect of it is, practically, in the region of country colored as you see on the map, to prevent the settlement or occupation of those lands and the acquisition of title by individuals to any land except under the homestead act after proclamation by the President. Anticipating this, we pushed forward the selection of lands with as great rapidity as possible.

From our previous study of the country, not only of the lands where we were making surveys that year, but of lands that had been surveyed prior to that time, and from my general knowledge of the subject, I had selected about 30,000,000 acres of land to be withdrawn. But a very much larger part of the lands than we had anticipated have passed into the hands of individuals. That is to say, of the irrigable lands we selected, I thought that a small percentage only would be in private lands, and we had to go through the records of the Land Office to find what tracts of 40, 80, or 160 acres had been taken. We set to work a force of men to find what lands were already taken. The information I have obtained in the last three weeks of that investigation has led me to the conclusion that, instead of their being, as I had thought, about 30,000,000 acres of irrigable lands in private hands, there are from 40,000,000 to 50,000,000 acres practically in private hands, so that the Government will not have more than 50,000,000 or 55,000,000 acres of irrigable land left, and has not more than that now.

Senator HALE. Of the 30,000,000 acres you have selected for withdrawal, a part of which you have found to be in private hands, what proportion is covered by private ownership?

Director POWELL. I can not say.

Senator HALE. That is, of the whole 100,000,000, about 45,000,000 are in private hands, and about 55,000,000 in Government hands?

Director POWELL. That is correct.

Senator HALE. In those 100,000,000 acres in all, you selected 30,000,000 acres?

Director POWELL. Yes, sir.

Senator HALE. And do you not know what proportion of that 30,000,000 is in private hands?

Director POWELL. No, sir; but we have an idea of the general average. In some districts there is 20 per cent., in others 30 per cent., and in still others about 40 per cent. in private hands and unoccupied.

Senator HALE. Take it all through it will be nearly one-half.

Director POWELL. Yes, sir; taking the whole of it. But we were not selecting the lands actually under cultivation and irrigated; we were only selecting lands in the field not actually used, and of those a large percentage turn out to be held by individual owners.

Senator HALE. Does your 100,000,000 acres of irrigable land in this region include what you say may be 10,000,000 already in use?

Director POWELL. Yes, sir.

The CHAIRMAN. In making your surveys, of course you sometimes touch upon those irrigated regions?

Director POWELL. Precisely; but as far as possible we segregate those lands adjacent to land already under cultivation. There is a very important reason for that. The irrigable lands should be consolidated as much as possible, because then the water can be used to much greater advantage.

The CHAIRMAN. Do your surveyors in the field find that they can adapt their surveys and schemes for reservoirs, etc., to this irrigation already done?

Director POWELL. Yes, sir. The irrigation already done is the nucleus of the entire scheme.

The CHAIRMAN. That is to say, your scheme does not interfere with lands, canals, reservoirs, or what not, already cultivated?

Director POWELL. No, sir; it does not. I am not a lawyer, only an administrative officer, but there is one other point I wish to speak about: The act reserves only the lands that are to be irrigated under the new works—not the lands that can be irrigated under the old works. I had a chance yesterday to see a petition which was sent to me, a petition to Congress, containing the implication that the lands were reserved from settlement under existing canals, or canals existing at the time of the passage of the act of October 2, 1888. Such lands are not reserved from settlement under this law, as I understand it, but only the lands under the new works are thus reserved.

The CHAIRMAN. That is, the lands that are made susceptible of irrigation by the reservoirs which you yourself have selected?

Director POWELL. Yes, sir; so that the complaint which they have raised in their petition is not a valid complaint, as I interpret the law.

The CHAIRMAN. There have been reservations made under this act?

Director POWELL. No, sir; we do not make any reservations.

The CHAIRMAN. I mean from sale.

Director POWELL. The law reserves; we select lands to be restored.

The CHAIRMAN. I understand what the act does. But do you understand that this act does not reserve or interfere with public lands susceptible of irrigation under existing canals?

Director POWELL. If under existing canals they are not reserved; that is very plain.

Senator STEWART. Right there I would like to suggest, Mr. Chairman, that when a reservoir site is made in the mountains it will augment the water that could be used below the existing canal, and conse-

quently affects all the lands. It has been so construed. At all events it leaves the matter in great confusion. So it comes about that that is one of the embarrassments, whether, when the water is augmented by works in the mountains, it will include the lands below existing ditches.

The CHAIRMAN. Now, before we go further into that question I should like Major Powell to state what will be the progress of the work after he has expended the money supposed to be given him by this bill as it comes to us from the House. You have stated that you intend to distribute this among the sixteen States and Territories. Do you mean by that that you intend to apportion it, or do you mean to say that you will do work upon all the streams.

Director POWELL. No, sir; I can not do that without wasting money. I have to make selections. I can not take each one of these districts, with that amount of appropriation, but will take the more important. Last year, for example, I thought it very important to take the Truckee and Carson rivers in Nevada, and went on those. Many of the other streams in Nevada I had to neglect. We shall complete the work on the Carson and Truckee and some other streams this year, and desire to take up work in each State or Territory.

The CHAIRMAN. When that work is completed this year, then what will be its relation to the public? That land will then be thrown open under the homestead law, as I understand it?

Director POWELL. As I understand it, that means that the land which we select will be thrown open to settlement under the homestead law by proclamation of the President.

The CHAIRMAN. For example, you began on the Truckee and on the Carson rivers last year; now you propose this year, under this appropriation, to complete that work?

Director POWELL. Yes, sir.

The CHAIRMAN. That is to say, you propose to do everything that you are required to do, either under that joint resolution or any appropriation that has been made?

The CHAIRMAN. And dismiss that from your consideration?

Director POWELL. Yes, sir; but in each district much of the work which we do becomes available to the people before the whole is completed. For example, we are going on to select a part of the irrigable lands in each of the districts prior to the completion of the survey. The maps which we have heretofore made and the general knowledge which we have obtained of the whole country enable us to select some of the reservoir sites before final survey, but not all of them. We already know the approximate volume of many of the streams; not with sufficient accuracy to complete plans for work, but altogether we have information by which we can segregate a large part of the irrigable lands very rapidly. But the work of selecting the lands can not be completed in any district until the survey of that district is completed. For example, we know that a stream will irrigate more than a hundred thousand acres of land; it is sufficient for us to select of the best lands that can be reached by this stream 80,000 acres to begin with, and after the streams and lands have been carefully surveyed we can add the 10,000 or 15,000 or 20,000 acres necessary to complete the work. This makes it possible to select the lands as rapidly as they will be needed for homestead settlement and to keep no homesteader waiting until the work is finished.

The CHAIRMAN. Take the Truckee and Carson Rivers; now what do you do? In the first place, you select reservoir sites?

Director POWELL. Yes, sir.

The CHAIRMAN. Then if canals are required, you mark out the canals in a general way?

Director POWELL. Yes, sir.

The CHAIRMAN. Are you also expected to go on the sites of those canals, in the neighborhood of these reservoirs, and on down to the mouths of these rivers, in order to segregate the land which is irrigable under your survey?

Director POWELL. Yes, sir.

The CHAIRMAN. Do you make a survey of those lands?

Director POWELL. Not a linear survey; that is already made.

The CHAIRMAN. But a topographic and hydrographic survey?

Director POWELL. A topographic and hydrographic survey.

The CHAIRMAN. And those are the only two things you want to make?

Director POWELL. Yes, sir.

The CHAIRMAN. I do not see why it is necessary—and you may explain that, if you please—for you to go beyond that estimate of reservoirs and lay out the canals, because, after that is done, then whatever is possible under the reservation of water and the pouring of it out through these canals is no concern of yours or of the Government. Do I make myself understood?

Director POWELL. Yes, sir; very well.

Senator HALE. I had that same thing in my mind—if I do not interrupt you.

The CHAIRMAN. No, but I would like to stick to the Truckee and Carson Rivers.

Senator HALE. We will stick to them. But you follow that out, Mr. Chairman; I want to ask him some other questions.

The CHAIRMAN. Now, come back to the Carson River, for example; you say that there are certain lands where water can be gathered in reservoirs?

Director POWELL. Yes, sir.

The CHAIRMAN. You segregate them and make your plans. Then you observe after you have secured these reservoirs and this storage of water that it is necessary to project canals in order that the water may be utilized on the adjacent lands. Now, after you have done those two things what more is it necessary for you to do?

Director POWELL. Take it on the Carson or the Truckee River or on any river.

The CHAIRMAN. I merely used those for illustration.

Director POWELL. Canal sites are surveyed only to this extent. Many of the reservoir sites are not on the streams; it is desirable to store the water away from the streams. Canal sites from streams to reservoir sites have to be surveyed. Then the reservoir sites are generally not in the immediate vicinity of the lands, and canal sites have to be surveyed from the reservoirs to the lands for the purpose of determining whether the waters can be taken to the lands. At that the canal sites which we survey and segregate end. We do not survey a ramification of canals over the lands to be irrigated. Then a topographic survey of the lands to be irrigated must be made in order to determine that they can be irrigated. That is always a question of leveling, and a general survey of all the lands must be made in order that the selection be made and the best lands determined. The lands which it is possible to take water on are in general far in excess of the amount which the waters will serve, and upon the proper selection of these lands much depends. If the lands are properly selected the waters will irrigate a very much larger area than if improperly selected.

This difference may in many cases amount to from two to ten fold. For example, they are attempting to irrigate lands in Western Kansas today, 500,000 acres in round numbers, from the Arkansas River. In order to do it, it will be necessary to prevent the use of the Arkansas River above; it can not be used everywhere; it can only be used once for irrigation purposes, for irrigation is consumption. Suppose the land in Kansas is irrigated instead of land in Colorado; then five million acres of land above will be destroyed to save 500,000 acres of land below.

The CHAIRMAN. But that is a matter for legislation, is it not?

Director POWELL. Certainly.

The CHAIRMAN. After you have located these canals and fixed these reservoirs, then the question as to how that water is to be utilized there is certainly not a matter for the Government unless the Government intends also to build these reservoirs and dig these canals and appropriate the water.

Senator REAGAN. May I say a word?

The CHAIRMAN. Yes, sir.

Senator REAGAN. Unless you segregate the irrigable lands, how can you carry out the statute for reserving from settlement?

The CHAIRMAN. They are all open under the homestead law. The moment the President proclaims these lands open under the homestead law, that moment the man takes his chance, whether he goes on one of the canals or not.

Senator REAGAN. That is so, after you come to that point; but before the President opens them how are you to reserve?

Senator HALE. Now, Major Powell, let me see if I have the right idea of what seems to be the scope of the work. As I understand, you propose, under this act, to select the sites for reservoirs; and, in due time, to make more surveys of those reservoir locations; then to select and mark sites for canals; then to certify to the land office the lands made susceptible of irrigation by this work. Now, as I understand it, you do not propose to stop there; but, because of the provision here that the President may at any time in his discretion by proclamation open any portion or all of the lands reserved in this manner to settlement under the homestead law, you propose to go further and yourself make the selection of lands, extending it to lands that may be opened by proclamation by the President.

Director POWELL. The statute requires me to select the lands; after that I propose to recommend that those lands be opened to homestead settlement. It is a mere recommendation on my part.

Senator HALE. You do not stop with the work you have done, but you propose to go beyond and to be the fountain or source of information that the President shall have as a basis for issuing his proclamation for the opening of lands to settlement under the homestead law?

Director POWELL. So far as I have gone, it was with the idea that I should recommend that certain lands should be opened to homestead settlement by proclamation of the President.

Senator HALE. You say that the proportion that is given by the House this year would be about one-twentieth of what would do the whole work in that region?

Director POWELL. No, sir; that proportion I have already surveyed. It would be about one-tenth this year.

Senator HALE. Then, with that proportion for those sixteen States and Territories you would propose, in the ten years, or whatever time is taken to complete this work, first, to select sites for reservoirs, then



for canals, and then to certify the regions irrigable, and then by lists to certify to the President the lands ready for being opened to homestead entries; and that the whole of this work should be done under your supervision and by the appropriation to be given you?

Director POWELL. Yes, sir.

Senator HALE. So that really there is nothing left for the Land Office to do except to administer the law applicable to homestead entries, after you shall have selected the tracts and extent of tracts that will be subject to homestead entry.

Director POWELL. There will be nothing else to do except what they are doing; their duties will not be changed by what I do; if there are any lands not surveyed they will be surveyed by linear surveys.

Senator HALE. Your map covers the whole extent?

Director POWELL. The whole extent of those lands.

Senator HALE. And you do intend to cover all the irrigable lands?

Director POWELL. All the irrigable lands.

Senator HALE. And the final action of the Land Office will depend upon your final action, culminating in your certifying so that the President shall know what lands are to be opened by proclamation to homestead settlement?

Director POWELL. Yes, sir. The reason why those lands should be designated is a very simple one and can be made plain. The chairman raised the question why they should be designated at all; may I reply to that?

The CHAIRMAN. Yes, I wish you would.

Director POWELL. In the first place, the people are going on to establish irrigation where it is impossible for them to maintain it, by reason of their being ignorant of the conditions. If a tract of land is irrigated low down on a stream, 100, 200, or 400 miles away from the mountains in one State the people can take all that water away from them in the State or Territory above. For instance, if they complete these irrigation works in Kansas which they have to-day under way for 500,000 acres of land, the people of Colorado above them can take all the water away from them and use it in Colorado; and you will not be willing to step in and say they must not do it, because the people of Colorado can irrigate 5,000,000 acres of land with that water, instead of 500,000 acres below. Then if they take it all away, those settlers on the 500,000 acres of land below are ruined. So that I say you ought by some means or other to designate the lands, so that the settler will know, when he goes on a 160-acre tract of land that ultimately he can maintain himself there.

Senator HALE. What is the Government going to do, after these sites for canals and reservoirs are selected, about the distribution of water upon lands adjacent to the upper portion of a stream and those along the lower portion, unless it takes the whole matter into its hands?

Director POWELL. I think that on a stream where there may be 10,000,000 acres of land which could be irrigated, the Government of the United States ought to do what it has not done, but I think ultimately will do, and that is to say that the 10,000,000 acres of land here selected are the lands where that water must be used. That is my judgment of what ought to be done, and I have no doubt that it will ultimately be done. They will not permit claims, like that which has come up from El Paso, to be presented to Congress every year. There are \$500,000,000 worth of claims being rapidly established in that country by people who are taking homestead and desert lands on the condition that they must irrigate them, and they are doing

that where they can not maintain themselves. They have a contract with the Government to irrigate those lands, while the people above them can take the waters away from them. I contend that before making that contract with those people and saying therein, "You may have that land at \$1.25 an acre on condition that you will irrigate it," you ought first to find out whether they can permanently irrigate it. But this is something for the future; it is not in the law now.

The CHAIRMAN. I see, then, that your idea is that you will establish these reservoirs, project these canals, select the irrigable lands under them, and then it logically follows that the Government must say that the water thus stored and thus diffused must be used for the lands which you have separated, and for no other purpose?

Director POWELL. For no other purpose. That is not the law now, however.

The CHAIRMAN. I know, but that of course logically follows.

Director POWELL. That must follow, else you plunge the people of all that country into litigation and destroy one-half of the settlers that go in there.

The CHAIRMAN. That ought to follow very quickly.

Director POWELL. Yes, sir. Thousands of settlers have already been ruined.

The CHAIRMAN. You speak of this projected irrigation in Kansas. Suppose it turns out that the people who have already irrigated 10,000,000 acres find under that project that a portion of the water which they have utilized is cut off from them; what will they say?

Director POWELL. Pardon me; I did not quite understand that.

The CHAIRMAN. You say that of this 100,000,000 acres 10,000,000 have already been utilized by means of irrigating ditches

Director POWELL. Yes, sir.

The CHAIRMAN. By private parties, do you say?

Director POWELL. Yes, sir. Now I get your meaning.

The CHAIRMAN. Now, you project canals from the water sources; suppose it turns out that this water is exhausted before it reaches these irrigating ditches that have already been established by private parties?

Director POWELL. If you will read the reply which I drafted to the first Senate resolution on this matter, more than two years ago, you will see that I made the point clear that the first thing that had to be done was to maintain existing rights. Concede that by laying out the present work. If a man has already irrigated land, all that water might somewhere else irrigate ten times as much, yet we can not select land somewhere else and designate it, because that water is already condemned; and we are proceeding on that principle.

The CHAIRMAN. You take note of that?

Director POWELL. All the time.

The CHAIRMAN. So that, if these 500,000 acres are irrigated in Kansas by the Arkansas, you will not allow a million acres to be irrigated in Colorado?

Director POWELL. We will not designate the lands; that is as far as we can go.

Senator HALE. Your idea is that the Government should see to it that this general plan is carried out, and that the water should go where it is intended?

Director POWELL. Yes, sir.

Senator HALE. Have you ever thought of the processes by which this could be done?

Director POWELL. Yes, sir.

Senator HALE. How can the Government do that unless the Government builds the reservoirs and canals?

Director POWELL. I think it is very simple, but it will take some time to explain, and I think you would get out of patience.

Senator HALE. I do not ask you to explain, but tell me how the Government should do it.

Director POWELL. Take the North Platte, for instance. On the North Platte we can irrigate millions of acres of land in western Nebraska; that is good land; there is some sand there, but in the main it is good land. Suppose that in studying the conditions along the North Platte I find, as I do find, that I can utilize good lands enough above to use that water. Now, that is a fact. But at the same time it is possible to take all the water from the North Platte before it gets to Nebraska at all, and take it all out and irrigate mountain lands, lands of little value by reason of climate.

Now, except as to some of the valleys above that ought to be irrigated, it ought to be determined that the right to use that water should inhere in the lands of western Nebraska, because they can irrigate from a million and a half to two million acres of as good land as there is in the world. All of that water can be used, however, in Wyoming on mountain lands. Now, there are two results: one is that the water must not be taken out to irrigate lands in the mountains where it will be wasted by reason of the climate; the other is that it must not be allowed to run too far down stream—200, 300, 400, or 500 miles further than it ought to run—because when it gets there, there is little left. The lands ought to be selected as near the mountains as possible—all of which I have said to you heretofore—but not in the mountains, in order that the lands may be in a climate where agriculture is possible for a variety of crops, on the one hand, and in order that the water may not be wasted by being carried too far, on the other. Let me show you the importance of that. Considerably more than one-half of all the streams in the arid region sink before they reach the sea. For instance, here is a stream running across the plains; it gradually loses its waters and comes to an end.

Senator HALE. Do you mean more than one-half the streams in number?

Director POWELL. In number.

Senator HALE. Not in volume of water?

Director POWELL. In volume of water the proportion is very much greater. Not one-twentieth of the water that falls in the arid region runs to the sea. It is evaporated before it gets there. That brings up the general idea that the water gradually gets less and less as it goes down to the sea. A stream which would ordinarily irrigate 100,000 acres of land in one region, if carried 200 miles below will be all lost, and will not irrigate anything. So that it is important, if all the water is to be used to the best advantage, to select the lands as near to the mountains as they can be selected. That principle has been recognized by both committees on irrigation, and has been pretty fully explained.

The CHAIRMAN. Then if that be true, Major Powell, taking the North Platte for illustration further, it seems that it may be exhausted in Wyoming, and, if so, Nebraska would lose the water. Now is it necessary, under this general plan, that the Government itself should regulate the matter?

Director POWELL. Yes; I had not finished; I had only gone part way in answer to your question. How can the Government practically

do it, is the question. Here is a stream that can irrigate 100,000 acres of land. The Government now owns the lands, and can say, "We will only sell those lands that ought to be irrigated." That is plain; it is the simplest thing imaginable.

Senator HALE. Is this your idea: Here is a stream, say 1,200 miles long, with a volume of water of a given amount, and with a given irrigating capacity; is it the duty of the Government, in laying out reservoir sites and canals, to utilize this water, to select the lands nearest to the mountains so as to get the immediate benefit of the water, and in making its sales of land putting it on the market, or whatever it does to dispose of it that it should consider the irrigation question and consider the question where this water shall go? What are you going to do when the people take their chances, when the Government does not seize and take possession of these streams? What are you going to do with the people who are below, and who would be left out because they are too far from the mountains? They must take their chance?

Director POWELL. As the law now stands they simply take their chance, but if they had notice that they could not ultimately maintain themselves they would not go there.

Senator HALE. So that it seems to shift the scene, or the location of the arid lands, and in the end the water will be used nearest the mountains?

Director POWELL. Nearest the mountains.

Senator HALE. And if there are any arid lands they would be farther away?

Director POWELL. Yes, sir.

Senator HALE. Do you conceive that there is any risk or doubt in the Government's assuming that relation and undertaking to deal with the flow and use of the water in the great streams? Do you think it is better than to leave it to nature and the common incidents of human life?

Director POWELL. You ask me the question, and I will answer. I think it would be almost a criminal act to go on as we are doing now, and allow thousands and hundreds of thousands of people to establish homes where they can not maintain themselves.

Senator HALE. But you think that in time this question would settle itself and people would only go upon the lands near the mountains?

Director POWELL. If the legislation which is begun is perfected, the end is accomplished in great simplicity by saying that we will dispose of the irrigable lands to you on the condition that you irrigate them, and that we will not sell them to you in localities where we know you can not maintain irrigation.

The CHAIRMAN. What would the people of Nebraska, those who have settled along the North Platte, for instance, say if they were to find the Government itself exhausting the water and taking it out above them? What would be their proper remedy under such circumstances?

Senator HALE. They will not go there any more.

Director POWELL. I do not understand that the Government would take any water from anybody; I do not understand that the Government is going to control this water at all. It is true the Government controls indirectly by saying, "We will not dispose of lands for irrigation unless we know that if you go there you can maintain yourself;" that is all. The proposition is exceedingly simple.

Senator MOODY. Pardon me one moment, Mr. Chairman; it is almost 12 o'clock, and I would like to be heard a short time if I can, because I

am invited here. I would like the privilege of asking the Major some questions about South Dakota.

Senator SANDERS. Was it not contemplated that we should be here to-morrow for that purpose and let the Major have this session to himself?

The CHAIRMAN. We desire to go into this matter as fully as we can in the time we have; of course our time is limited; but we want all the information that is necessary to enable us to reach a proper conclusion on this subject.

Senator PADDOCK. I suppose the committee would like to get all the information possible from Major Powell while he is here, and we do not care to encroach upon his time or the committee's time.

The CHAIRMAN. I should be glad to inquire why he has included South Dakota in this irrigable region.

Senator HALE. My idea was that after the committee received its scope of Major Powell's ideas from his examination these Senators who are here representing their communities and their other committees would like—any and all of them—to ask Major Powell questions.

The CHAIRMAN. Yes.

Senator HALE. Because they can bring out detailed information that we can not. We are getting the general scope of Major Powell's ideas, whereas these Senators can bring out detailed information about localities much better than we can.

Senator MOODY. If we can have to-morrow as well as to-day that certainly would be far preferable.

Senator PADDOCK. That is a matter that is vital to several of these States.

The CHAIRMAN. We can probably go on this afternoon. I do not know what will be up for consideration in the Senate. I suppose Senator Fry's shipping bill.

Director POWELL. Shall I answer the question?

The CHAIRMAN. Yes.

Senator PADDOCK. What I want to hear from Major Powell is this: What is the necessity of tying up nearly one-half of the State of Nebraska, that tying up embracing within its area a vast territory, part of which does not require irrigation, and part of which is now occupied by farmers who are successfully prosecuting agriculture? Why draw an arbitrary line and tie up all that country, that which needs irrigation and that which does not? Of course, it is a very great hardship to those people. It disturbs titles. We are involved in unending complications. The Land Office is tied up. The people are tied up. Final proofs can not be made. It is a very great hardship.

The CHAIRMAN. Just answer that question, please, Major.

Director POWELL. Senator, I do not understand that the postulate of that question is correct; none of the irrigation districts which I have planned, in Kansas and Nebraska, are east of the one hundred and second meridian.

Senator PADDOCK. I understood that it was the ninety-seventh meridian.

Director POWELL. No, sir; there is another proposition about the ninety seventh.

The CHAIRMAN. The one hundred and second meridian is the east line?

Director POWELL. Yes; the one hundred and second meridian is the east line of the irrigation district of Nebraska.

Senator PADDOCK. Being corrected as to the line, my postulate is nevertheless correct.

Senator SANDERS. But the arid region is what he is inquiring about.

Director POWELL. As I understand it, that district of country colored brown on the map, which is a very small portion of Nebraska, is the district which should be irrigated by the North Platte, and if legislation is perfected to this end according to the plans which I have presented to you, I believe then the people who settled in that district along the North Platte will have the right to use the North Platte for irrigation. That is all I understand by that.

Senator HALE. If the water is not disposed of elsewhere?

The CHAIRMAN. Have they not the right to do it now? Suppose they thus irrigate?

Director POWELL. They can do it until the people of Wyoming take it away from them.

Senator PADDOCK. The difficulty of the scheme is illustrated by what now exists. The fact is that with the imperfect system of irrigation they have in Colorado during the summer season the water is almost entirely withdrawn.

Director POWELL. That is the South Platte you are speaking of.

Senator PADDOCK. That comes in below.

Director POWELL. I have only used the North Platte as an illustration; now let me use the South Platte. Suppose the people of Nebraska on the South Platte—there is but little of the South Platte in Nebraska—but suppose they should go on to-day and irrigate a large tract of land in Nebraska from the South Platte, they would do that with the certain knowledge on my part (and they ought to have the knowledge) that they could not maintain it; that the people of Colorado can take all that water, and that the people of Colorado will, and they have already taken all the flow except that which can be stored.

Senator SANDERS. Under the law as it existed up to October 2, 1888, if somebody in Wyoming should so reduce the flow of the river that any water-right which existed in Nebraska was rendered valueless, do you say there was no legal remedy extant at that time?

Director POWELL. I do not know of any.

Senator SANDERS. What would prevent the man from bringing a suit in the United States court, under which this right is recognized, enjoining all persons from diverting water that flows to him, notwithstanding it ran across a State line?

Director POWELL. I am not a lawyer. That is a legal and constitutional question which I am not competent to deal with. The probability is that if they took the water away from them above, they would have it. It is my opinion that the people of Nebraska would have no remedy in any court.

The CHAIRMAN. While I think of it, I want to ask a question. Since October 2, 1888, I take it for granted that irrigation has practically ceased; that is to say, a man in this arid region, unless he owned the land before that time, can not prosecute an irrigation canal, can he?

Senator PADDOCK. They have been doing it in some cases.

Senator SANDERS. The Department has seemed, in Montana and other States, to ignore this statute until a very recent date.

Senator HALE. They have not known much about it.

Senator SANDERS. No; I suppose they must have known something about its existence, but as to its scope and effect they knew nothing; and thousands of people have filed upon lands since the passage of that act in entire ignorance of it, I suppose.

Senator STEWART. And invested large amounts of money?

Senator SANDERS. And invested large amounts of money.

Senator HALE. I do not think any of us have realized the extent and scope of it.

Senator SANDERS. I am sure I have not myself.

Senator ALLEN. The Commissioner of the General Land Office said they were practically ignorant of it.

The CHAIRMAN. Under the terms of the opinion of the Attorney-General all these lands are practically withdrawn?

Director POWELL. Practically withdrawn.

The CHAIRMAN. I would like to prosecute one or two inquiries, and then these other gentlemen can ask questions, unless other members of the committee desire to ask. This House bill appropriates \$720,000. Now, how often must that appropriation be repeated to give the people residing in that region, or who may desire to go there, an opportunity of availing themselves of the advantages of this plan of yours?

Director POWELL. Six more years.

Senator PADDOCK. Not less than \$5,000,000 would carry out your plan.

Senator STEWART. There is nearly \$1,000,000 in this bill; there is \$200,000 for topography in addition to that \$720,000.

Senator GORMAN. I do not understand the major to say that the whole would be applied for six years.

Director POWELL. The \$200,000 for the geological survey will be used for the geological survey in other regions of country, and will not be used for the topographic survey connected with the irrigation survey. With the amount which the House has put in the bill for the irrigation survey we can open up the land for homestead settlement more rapidly than the people will take it, in all probability.

Senator SANDERS. Not so rapidly as in the past, however?

The CHAIRMAN. On that point I wanted to pursue my inquiry. You stated that the Truckee and the Carson Rivers would be completed during this year under this appropriation?

Director POWELL. Yes, sir.

The CHAIRMAN. Now, as you construe the law, you must go on locating canals and reservoirs and put your hands upon the lands that are eventually to be covered with this water or to be utilized by means of these canals. How long will that take you on the Truckee and the Carson?

Director POWELL. It can all be done this next year.

The CHAIRMAN. So that, so far as your survey on those two rivers is concerned, this year will enable the Government to deal with that question absolutely?

Director POWELL. Absolutely.

Senator HALE. And you can furnish the President with a list of lands competent to be opened up for homestead settlement?

Director POWELL. Yes, sir.

The CHAIRMAN. What other stream or streams will be in the same condition under your survey of this coming year, estimated and probable?

Director POWELL. I expect to finish, if this appropriation is made, the three forks of the Missouri, commencing at the north—

The CHAIRMAN. In Montana?

Director POWELL. In Montana.

Senator POWER. It is all settled there.

The CHAIRMAN. Settled now?

Senator POWER. Yes, sir; settlements are made and warrants have been taken out for practically the whole of that country.

Senator HALE. But the major can not interfere beyond certifying irrigable lands, and if the Government takes any of this property for sites of reservoirs and canals what are the settlers going to do?

Director POWELL. I have to-day a list of a million acres of land in that region to be certified.

Senator POWER. That will make a very fine harvest for the lawyers.

The CHAIRMAN. How far down the Missouri will that million acres take you?

Director POWELL. To where the Madison, Jefferson, and Gallatin unite.

The CHAIRMAN. To the point where they converge into the Missouri?

Director POWELL. Yes, sir. You asked me a question which will take me a long time to answer, but I will go on and you will see what I mean. Then the Toston Valley below the three forks; the next valley is that of the Sun River coming in from the left as you go down the stream. We can do the three forks of the Missouri, the Toston Valley, and Sun River Valley with the appropriation now on the bill.

The Senator will remember that we are to select sites for the storage of waters, to increase the area of irrigation in these valleys, and then we are to select the lands that can be irrigated. Only a small portion of the lands are now irrigated in these valleys. Much greater areas can ultimately be brought into cultivation, and we have to make a survey to determine what waters can be used and what lands can be redeemed, and we have been making that survey and shall continue it, if the appropriation is made, until it is finished—on the Jefferson, Madison, and Gallatin Rivers, and on the Missouri River, in the great Toston valley, and on the Sun River—and can finish all of those surveys in one year more. Now, this statement of what can be done with the appropriation in this bill for the coming year illustrates what can be done in each of the sixteen States and Territories. That is, sixteen times that amount of work will be done, but it will be scattered all over the arid region.

Senator SANDERS. You have not made any survey of that region at all, have you? Does not your report here say that all you have done up there is to make a reconnaissance? Does not Captain Dutton speak apologetically of the work in that way?

Senator POWER. No; he has not made a survey.

Senator SANDERS. On page 91 of your report Captain Dutton, under date of November 1, 1889, speaking of the Montana division, says:

It was decided that the work in this State should be chiefly of a reconnaissance character.

Director POWELL. Captain Dutton was right for the work of his division. Other divisions were making surveys. Then we were able to utilize the work which had been done in previous years; some of the maps of this region were made five years ago, some recently.

Senator POWER. You did not run any lines?

Director POWELL. We run contour lines all over the country. I will show you the maps; I have them here.

Senator MOODY. I think each Senator ought to have the privilege for his own State of asking Major Powell questions after the members of the committee shall have finished their examination, and that that examination ought to be conducted in the order which the chairman suggests.



The CHAIRMAN. Very well; the chairman will execute that delicate trust.

Senator HALE. That is very proper, because they can bring out matters of importance.

The CHAIRMAN. Each Senator who represents interests involved on that beautiful map of the Major's will have an opportunity of having explained to him whatever he desires.

Senator HALE. Let Senator Stewart have an opportunity to ask questions about the locality of these two streams that Major Powell has referred to.

Senator STEWART. I am pretty well acquainted with nearly every stream which he has named; I have been over that country a good deal.

The CHAIRMAN. I understand you to say——

Director POWELL. Pardon me; I have been interrupted three or four times, and have not had an opportunity to make one thing clear which is essential to an understanding of the matter; I had nearly finished, but not quite.

The CHAIRMAN. Go on.

Director POWELL. In the first place, as we go on with the survey it is incomplete in part; but something is done, although it is incomplete; ultimately it will be completed by districts. Each one of the districts marked there will have a map and a system of diagrams or an atlas showing the plans of dams and plans of canals.

The CHAIRMAN. When you speak of districts you mean those parts of the map designated in colors?

Director POWELL. Yes, sir. But in the mean time, before any district is finished, the work is in progress; something is being done in that district; among those things a part of the reservoir sites are discovered; afterwards more are discovered until we finally complete the whole district. But we discover them in part as the work goes on, and we discover irrigable lands in part as the work goes on; and as we discover irrigable lands we must designate them, and not wait until the whole work of that district is complete. It is in that way that we now have a very large body of land segregated, and ready to be designated for homestead settlement, in advance of the final completion of the work.

The CHAIRMAN. I understand. Now I want to ask you one more question in that connection. These lands are open to homestead settlement after the proclamation authorized by the act; suppose I go there to settle, and I find that water is the first essential, and I find that your reservoir and your canal have been designated. Now, practically, how am I to utilize that reservoir and that canal, neither of which has been constructed?

Senator HALE. How are you going to get water?

The CHAIRMAN. Yes; how am I going to get water—that is the question—until this system of reservoirs and canals is completed and carried out?

Director POWELL. That is a pretty serious question. In the first place, you can not make a home there until the lands are irrigated. The homestead settler who gets his 160 acres, or the settler who takes 1,120 acres, as the case may be, can not put water on there with his own private means, for it may take \$30,000, \$50,000, \$100,000, or \$500,000, or even \$1,500,000 of investment in water before he can do anything.

The CHAIRMAN. But the homestead laws require that he shall live there.

Director POWELL. Precisely.

The CHAIRMAN. So that I do not see how the opening up of these lands to homestead settlement is a very valuable privilege unless the land can have accompanying it at least some prospect that there is going to be a reservoir located and a canal dug.

Senator HALE. Of course your system of reservoirs and canals is exclusive. You must so construct your works and cover the region that private enterprise shall not construct others.

Director POWELL. It ought not.

Senator HALE. It is intended to be exclusive.

Senator REAGAN. There is a bill before the Senate now intended to meet, and which does meet, that very question.

Director POWELL. How shall that money be obtained? Shall the Government expend it? shall the companies own the water? or shall the farmers own the water? are the three alternatives. I suppose this committee does not wish to go into that.

The CHAIRMAN. No, sir. I only wanted to ascertain what advantage it would be to a man to get a homestead under the proposition of holding up all these lands.

Senator GORMAN. I understand, in the first place, Major, that you want to designate the lands on which the water shall be used so as to utilize the greatest amount of land on the streams where there is water sufficient to irrigate?

Director POWELL. Yes, sir.

Senator GORMAN. And, second, that you want to do that so that when the settler enters upon it he will have the right to use the water?

Director POWELL. Yes, sir.

Senator GORMAN. In contradistinction to the present system, by which he could obtain the land without any right?

Director POWELL. Yes, sir.

Senator GORMAN. And after you have done that, it is not in contemplation for the Government to take the canals or to make reservoirs?

Director POWELL. Not at all. The legislation already had makes it plain that it was never intended.

The CHAIRMAN. That is an open question.

Senator HALE. How can the settler have any assurance that he is going to have water, after the survey is made, unless the Government takes charge of the whole thing and furnishes the water?

Director POWELL. He must do as others do now; they unite and take out a stream; and under this law, if the canal sites or reservoir sites are to be located, he can do that and not have to buy out that right. He can do what is done in many cities—the city, as a municipality constructs water works and gets the water. It is a very interesting question, and I suppose that instead of attempting to talk about it I should attend to the specific questions to be asked me.

The CHAIRMAN. Is there anything further you wish to explain to us before these other Senators here proceed to interrogate you?

Director POWELL. I should like to talk about this subhumid region that these gentlemen are speaking about between the ninety-seventh and one hundred and second meridians.

The CHAIRMAN. We would like to hear you.

Senator PADDOCK. I should like to hear you on that.

Director POWELL. Now, Mr. Chairman, the region which I call the subhumid region, on either side of the one hundredth meridian, is the one about which I wish to say something.

Senator PADDOCK. Eastward to the ninety-seventh?

Director POWELL. Eastward to the ninety-seventh, and westward to the one hundred and second.

Senator HALE. Shown in white on that map?

Director POWELL. That line runs about midway through it. In my judgment, all land west of that line can be so improved by irrigation that farmers ought never to settle without expecting to irrigate. That, however, is merely an expression of opinion. East of this line they could settle without irrigation; and as it is a line it will be understood that one condition gradually fades into the other. I had to draw a line so as to make it clear, but it is not an absolute line. That region of country from the ninety-seventh to the one hundred and second meridian is peculiar, and wherever similar conditions prevail in other countries they have led to a peculiar state of affairs. What those conditions are I can state by reading from the reports of the majority and minority of the Senate Committee on Irrigation. I will first state what they say about it, and then I shall add something to it. Speaking of this region of the Great Plains, the majority of the committee say:

If anything can be done to encourage the people of these great plains, it is important that it should be done speedily. There are over a million people in this arid and semi-arid belt who have paid into the Treasury of the United States no less than \$40,000,000 for public lands. These people are in want, and are suffering all the hardships resulting from the failure of crops in a new country. They are anxiously looking for relief. Their crops having failed, and being without money, they are unable to prosecute experimental works of irrigation. The Government must demonstrate to them the practicability before they will have courage or can command the means to prosecute the work on any considerable scale.

I shall not read all that they said. Here are statements from the testimony in relation to the same country:

The story of the pioneer settlers of this territory, the one I am now speaking of, is full of suffering and pathos, as well as of courage and success. One witness stated that he had lived in southwestern Kansas for more than twelve years, and that in that time—

“There have been two or three new crops of people that have come in. Many of those who did come, went away.”

And so on at length. The minority say the following, and I wish to call the attention of the committee to the fact that there is practically unanimity in the committee on this point:

East of the one hundredth meridian there is a belt of country two or three degrees in width where the supply of rain sufficient for agriculture is precarious. In some years the rain-fall is ample; in other years it is entirely insufficient, and in such seasons the farmer reaps no reward for his toil.

The history of farming for the past two decades in this subhumid region is full of instructive lessons. Experience shows that wet and dry years alternate in groups. Two or more wet seasons will be followed by two or more dry seasons. When a period of sufficient rain-fall comes for several years in succession, settlers enter upon the subhumid lands in great numbers, tempted by the fertility of the soil and the salubrity of the climate, and their first years are marked by prosperity, especially in those regions where great wheat fields can be cultivated at small expense; but when a succession of dry years appears, and one crop after another fails, the wealth of the people melts away.

I shall not read it all, but I wish to say about this region of which I am speaking that there is practical unanimity of opinion in the committee; first, that it has been settled from time to time, and has from time to time been in part abandoned; second, that it has been a region of very great suffering; third, that irrigation at times is necessary, and at times is not necessary. Now this same condition of affairs exists in portions of India. There are portions of India where irrigation is not necessary; there are other portions of India where irrigation is always necessary. There are other portions that are between the two, such as

I have mentioned, where irrigation is not invariably necessary, but is at times necessary. The British Government has called that region I have spoken of the "famine" region. All the great famines of Asia have occurred in that subhumid belt of Asia. The people are encouraged to cultivate crops when the seasons are wet, and when the seasons are dry it has often happened that they have not stored away grain sufficient to last them, and so have great famines. The policy of the British Government was to construct what were called "protective" works in that region.

The British Government constructs two classes of irrigating works; what it calls "productive" works, and what it calls "protective" works. In the arid region of India, where irrigation is always necessary, they construct their productive works, and from them they get a revenue which steadily increases. Last year it was over 7 per cent. on the cost of the plant of their irrigation works, according to the latest advices I have. But in this subhumid region they construct reservoirs to hold water over until bad seasons come, and then they have a supply of water for the people there, and thus prevent famine. The British Government has found it economical and advantageous to make these protective works.

The CHAIRMAN. Are they reservoirs?

Director POWELL. They are reservoirs.

The CHAIRMAN. With no evaporation?

Director POWELL. Oh, yes; there is a great deal of evaporation. I want to tell you what has come from that. Gradually within ten years their so-called protective works have all been transformed into productive works, for the people, who supposed they did not need irrigation except in bad years, have found that they could utilize the water every year; and what were called protective works, which were really humanitarian works to prevent famine, have gradually within ten years become productive works, because the people use those reservoirs during all the time. Now, here is a region of country three or four hundred thousand square miles in extent, a flat country, where these irrigating rivers will not reach, becoming gradually more and more arid as you go from the 97th to the 102d meridian. The people of that region have already suffered a great deal. This I know from personal observation. I have been in that region of country many times myself, and I know that they have suffered a vast amount. Many settlers have made homes in that country and had to abandon them. Again and again within the last twenty years this has happened, but they continue to come in and start their farms in wet seasons. In a dry season a settler may be able to tide over, but if two or three come in succession he can not. He sells out and leaves. His stock is gone; his capital is gone. More than in any other portion of the country is that the case. There is no other portion of the country to compare with it. The lands of that region are being aggregated in the hands of a few.

The CHAIRMAN. What is your remedy?

Director POWELL. I think, in the first place, the Government should make a careful survey to ascertain what can be done. I think the land ought not to be settled upon in large tracts.

Senator PADDOCK. What do you mean by saying that the land ought not to be settled in large quantities?

Director POWELL. I believe that small homesteads are the true thing for that country.

Senator PADDOCK. No man can take more than 160 acres.

Director POWELL. I think it ought to be only 40 acres, or at most

80 in that country. I am here to say—and I hope you will pardon me if I say what it is unfortunate for me to say—that in the first place if that country is to be opened to homestead settlement the amount of land which each settler may take ought to be greatly reduced so that people will not attempt to carry on agriculture on a wholesale scale where they can not maintain it; secondly, I think that waters which can be used for irrigation—artesian waters so far as they can be had, or pump waters, or storm waters; and the few river waters—ought to be surveyed and the people to be informed to what extent they can irrigate when the dry years come. Then let it be settled in small tracts and homesteads, with the understanding that each man or each group of men may dig a well for artesian water on his or their own farms, or get water from a great reservoir, as the case may be. The country can be quietly and prosperously settled in that manner by small homesteads, and when that is done the history of the world warrants me in the statement that it will be not a land of wholesale farming but a land of beautiful gardens, where they will have fruits of various kinds and small flocks and herds. Not all the land can be cultivated in this way—only portions; the rest of that country can then be used for pasturage. Wholesale farming can not be prosperous here.

Senator SANDERS. What portion is now settled?

Director POWELL. It is largely settled.

Senator PADDOCK. I am told it is nearly all settled, and I can give my authority. I am told that all through that part of the country it is as thickly settled as it is in parts of Illinois or Iowa.

Director POWELL. When I was speaking about the small tracts I went ahead a little too far. The eastern portion of that is settled in the main, and the land has largely gone from the hands of the Government.

The CHAIRMAN. What do you recommend for that?

Director POWELL. The western portion is not so largely taken up, but there is a great deal taken up. Between the one hundred and first and one hundred and second meridians there is a good deal that is not yet taken up. That is the region of country where this small farming would be advantageous. But in most of the country it is too late; the land has largely gone out of the hands of the Government, and it is too late to divide the land up in small tracts and homestead it in that manner. If it had been done so originally a vast amount of suffering, trouble, privation, and want would have been avoided.

Senator PADDOCK. The surveys have all been made under the present system, so that you can not limit them?

Senator PIERCE. Why would it have improved the condition of the settler if he had been allotted only 40 acres instead of 160? Why would he have been better off?

Director POWELL. It would have directed his attention to the fact that wholesale farming can not be permanently maintained in the country; that irrigation is often necessary, and that those methods of farming where irrigation is used are the only safe methods for the country. Farming by irrigation is more like the gardening of the East—it is high cultivation; it is horticulture.

Senator CASEY. To produce what?

Director POWELL. Anything which grows in that country—wheat, or anything else.

Senator CASEY. Do you suppose it would be practicable for him to construct irrigation works for 40 acres for the raising of wheat?

Director POWELL. Yes, sir; I have no doubt about it. I think he

would raise more wheat from 40 acres irrigated properly than from 160 acres not irrigated.

The CHAIRMAN. I would like you to explain the surveys necessary, what you propose in any survey.

Director POWELL. A survey ought to be made for the purpose of determining what water can be used in irrigation, from whatever sources. To determine that requires a topographic survey primarily, and secondarily a geological survey.

The CHAIRMAN. You have power to make both?

Director POWELL. Yes, sir; under the Geological Survey, but not under the Irrigation Survey.

The CHAIRMAN. Why do you not make it now if that is such a pressing thing?

Director POWELL. In order to do that I have got to divert the funds for the Geological Survey.

The CHAIRMAN. Why do you not experiment?

Director POWELL. I have done it, and have the results here with me. That work was done in the subhumid region under the Geological Survey. That ought to be followed up by a geological survey for the purpose of discovering artesian waters and pump waters. The topographic survey reveals how storm waters can be stored. The geological survey reveals the underground waters. All the surveys that can be made for that country is just the survey which I have mentioned—a topographic and geologic survey, and the verification of the results of the geologic survey by an occasional experimental well.

The CHAIRMAN. What did you find in that region?

Director POWELL. We have made topographic surveys to find out how the water in that region can be stored.

The CHAIRMAN. And maps are prepared?

Director POWELL. And maps are prepared.

Senator HALE. But that does not pertain to the artesian waters?

Director POWELL. No, sir; I had no power to make that kind of a survey; that is under the Agricultural Department.

The CHAIRMAN. It is now a quarter after 12 o'clock, and we ought to go into the Senate Chamber. The committee will now take a recess until 1.30.

The committee took a recess from 12.15 to 1.30 o'clock p. m.

The CHAIRMAN. Senator Stewart, you are the chief of this Irrigation Committee which has given attention to this subject. Do you desire to put any questions to Major Powell?

Senator STEWART. Yes, I would like to call the major's attention to the Truckee and Carson Rivers in Nevada.

The CHAIRMAN. Yes, I wish you would.

Director POWELL. Mr. Chairman, I should like to say one word about one of the class of lands not embraced in what I spoke about before the recess. I did not complete my answer. Unfortunately, this morning I have hardly had an opportunity to complete any of my answers, and I have thought of one important matter which I omitted.

The CHAIRMAN. Go on with it, major.

Director POWELL. There is another class of lands that are not reserved, as I understand the law. You asked me for an interpretation of the law. Here is a map which exhibits the forests, in light green and dark green. The dark-green parts are all too high for agriculture, are not irrigable lands, and those forest lands are not embraced in the reservation made by the act of October 2, 1888.

The CHAIRMAN. They can be located now under the land laws, whatever they are?

Director POWELL. Whatever they are. Of course the desert-land law does not apply to it, because they are not desert lands and can not be irrigated.

The CHAIRMAN. What is the area of those lands in the aggregate?

Director POWELL. I have published the figures several times, but I do not remember now; I think altogether about 126,000 square miles.

The CHAIRMAN. About one-tenth of the total area?

Director POWELL. As nearly as I can remember it. Here is the great Sierra forest.

Senator HALE. What is that large thick tract?

Director POWELL. That is a great forest area in Montana.

Senator HALE. What is that forest composed of?

Director POWELL. Pine, fir, and spruce; all evergreen forest, of course.

Senator POWER. That takes in part of Idaho and Washington?

Director POWELL. Part of Idaho, Washington, and Montana. Here is another map. These are maps that I prepared for the irrigation committee last fall. That shows the land already irrigated.

Senator HALE. Do you think those are located with some degree of geographical accuracy?

Director POWELL. Yes, sir; they are represented in large solid bodies, not by a 40-acre tract here and there; it is not possible to be entirely accurate on a map on such a scale as that.

Senator HALE. There appears to be a good deal of irrigation in Colorado.

Director POWELL. Yes, sir.

Senator HALE. And considerable in Arizona.

Director POWELL. Considerable in Arizona and in California; large tracts are irrigated there.

Senator HALE. You think about 10,000,000 acres are now irrigated?

Director POWELL. About 10,000,000 acres, as near as I can come to it.

Senator GORMAN. Principally by companies?

Director POWELL. Very largely so, not altogether; in southern California principally by companies; in Utah, not at all by companies. Some of the most prosperous irrigation in Colorado is in places like that at Greeley, where small streams are taken out for the purpose of irrigating in a small way. But there are many large tracts irrigated by water companies. The old Spanish irrigation in New Mexico, Arizona, etc., was municipal in its character.

Senator STEWART. What has been done on the Carson and Truckee Rivers under this appropriation?

Director POWELL. I must refer to the map.

Senator STEWART. Can you not state it independently of the map?

Director POWELL. I may do so. On the Truckee and Carson we made a topographic map of the greater part of both of those basins. Here is one of the maps.

Senator STEWART. Have there been any reservoir sites surveyed?

Director POWELL. Yes, sir.

Senator STEWART. What ones have been surveyed?

Director POWELL. Hope Valley—

The CHAIRMAN. Excuse me. I would like to ask Major Powell, who has had charge of these locations of reservoirs in the mountains?

Director POWELL. Thirty or forty different men.

The CHAIRMAN. I did not know but there was some one who had chief charge.

Director POWELL. No, sir.

Senator STEWART. Captain Dutton has had chief charge of that division, has he not?

Director POWELL. No, sir. All my divisions were in that locality. I have utilized them all. I have been pushing the segregation of lands and the selection of reservoirs in advance of all the other work.

Senator STEWART. You say you have surveyed Hope Valley?

Director POWELL. And Truckee Lake.

Senator STEWART. Are they actually surveyed and the limits determined?

Director POWELL. Yes, sir.

Senator STEWART. How large a reservoir has Hope Valley?

Director POWELL. I do not know; I have published it all. Where there are hundreds of those things I do not remember a specific one.

Senator STEWART. What I want to know is if the surveys are actually made so as to determine the limits of that reservation, or any reservation?

Director POWELL. At Donner Lake the area is 1,387—

Senator STEWART. I am aware of the fact that you designated those lakes as natural reservoirs, but has the water-line been meandered so that it can be definitely located?

Director POWELL. It has.

Senator STEWART. In which cases?

Director POWELL. Donner Lake and all others.

Senator STEWART. Did you put the marks on the ground?

Director POWELL. No, sir; we did not have to put marks on the margin of the lake.

Senator STEWART. But you reserve something beside the actual water in the lake—some of the land on the bank—do you not?

Director POWELL. Yes, sir; we reserve all lands on the margin of the lake, if it happens—it does not happen in any of these cases you speak of—that the lake should be increased in area; we reserve sufficient land on the margin of the lake.

Senator STEWART. Do you mark the lands which are to be submerged in consequence of the building of dams, etc.?

Director POWELL. We designate them by sections and parts of sections.

Senator STEWART. And do not mark it on the ground at all?

Director POWELL. No, sir. This is all explained here. Here is an irrigable lake. If the lake or valley is to be used as a reservoir site we determine the height to which the water will ultimately rise in that reservoir. Then we put near where the dam-site is to be a stone to mark that as the point to where the water will rise. Then we do not run all the meanderings out and put stones all the way round.

Senator STEWART. If any person desires to locate at that point he must have a survey made?

Director POWELL. No, sir; not by any means. We do it practically for the people. We designate the lands in Land Office terms. We say such and such sections, or such and such quarter-sections, as the case may be. We do not put stakes around there, but we designate in Land Office terms.

Senator STEWART. How do you designate it in Land Office terms, and how do you put it on the Land Office maps? Do you make any surveys around the lakes?



Director POWELL. We do, always.

Senator STEWART. To determine where that line would be ?

Director POWELL. Yes, sir.

Senator STEWART. But you do not place stakes to determine ?

Director POWELL. No, sir ; we designate in Land-Office terms.

Senator STEWART. Does not the Land Office plant stakes ?

Director POWELL. Yes, but not above the margin of the reservoirs.

Senator STEWART. Then there is nothing you leave on the ground to enable any person desiring to purchase the land adjoining to determine his boundaries ?

Director POWELL. Only the datum points.

Senator STEWART. Take Lake Tahoe ; Lake Tahoe is 21 miles long and from 8 to 10 miles wide. A person going to purchase land at the upper end, away from your initial point, say 20 miles, would find it necessary to have a survey made to ascertain his boundaries, would he not ?

Director POWELL. No, sir ; he would not have anything of the sort to do.

Senator STEWART. How would he ascertain ?

Director POWELL. He would not have to ascertain anything because we do not reserve any lands about Lake Tahoe.

Senator STEWART. Take some place where you do.

Director POWELL. Then if there was a reservoir site where water had to be raised over it, we would designate that site in Land-Office terms, and the man would know that such and such a quarter-section could not be taken, because it had been reserved.

Senator STEWART. How could you reserve it in Land-Office terms if you did not survey it to know what section or quarter-section it was ?

Senator HALE. Refer to it by numbers.

Senator STEWART. Refer to it by numbers ?

The CHAIRMAN. As, for instance, the southwest quarter or the northwest quarter of section 2. Is not that what you mean ?

Director POWELL. That is exactly what I mean.

Senator STEWART. If it took a part of a quarter-section before the legal subdivision was made, do you mean that you would reserve the whole subdivision, or that you would meander the line ?

Director POWELL. In these small areas I should say the whole body.

Senator STEWART. Then you have not determined any more definitely than the legal division ; you have not determined the line as to fractional subdivisions ?

Director POWELL. Except to put a mark—a monument—on the contour to which it is to be raised.

Senator STEWART. Then you have not put anything there that would enable persons upon the ground, without a survey, to determine these parts of sections that would be left ?

Director POWELL. Yes, sir ; the monument is all that is necessary for that knowledge.

Senator STEWART. Then all you have to do where you have a natural reservoir is to plant one monument to determine the altitude to which to build the dam. That is not a very expensive thing to do, is it ?

Director POWELL. No, sir.

Senator STEWART. How many reservoirs on the headwaters of the Carson and Truckee Rivers have you surveyed in that form by planting your monuments ?

Director POWELL. Donner Lake, Independence Lake, Webber Lake,

Hope Valley, and Long Valley. We have discovered quite a number of others, but they were not yet segregated when this report was made last fall; about forty in all.

Senator STEWART. Have you located any lines of ditches in Nevada?

Director POWELL. Yes, sir.

Senator STEWART. What lines of ditches have you located?

Director POWELL. We have one from Lake Tahoe, one from Donner Lake, and one from Hope Valley.

Senator STEWART. Where do they run?

Director POWELL. Down the valleys toward the irrigable lands; I can not define the lines without the maps.

Senator STEWART. Do you mark those lines of ditches?

Director POWELL. Yes; with stakes.

Senator STEWART. What amount of money have you spent on those rivers in Nevada for actual irrigation work, for locating these reservoirs and lines of ditches?

Director POWELL. Every cent I have spent was spent on actual irrigation work. The total amount I do not know that I can state; I should think about \$55,000; the exact amount I can not state without looking it up. I have it all here in this report.

Senator HALE. A quarter of that appropriation?

Director POWELL. \$350,000 was the appropriation.

Senator HALE. About one-sixth.

Senator STEWART. Beyond locating the reservoirs, besides reserving these lakes, are you satisfied that any of the work in Nevada is, or will be, of any use and that anybody will ever adopt the lines that you have run?

Director POWELL. I believe they will.

Senator STEWART. You think they will?

Director POWELL. Yes, sir; I rather think the most of them are adopted now. I know a number of them are.

Senator STEWART. Had they not all been run out more or less by private enterprise before you went there, and were they not perfectly well known?

Director POWELL. Not one that I know of.

Senator STEWART. You say you spent \$55,000 in Nevada?

Director POWELL. I want it understood that I do not remember the exact amount, but my judgment is about that, without looking it up.

The CHAIRMAN. For my own information, will you tell me what amount of irrigable lands are on the Truckee and Carson?

Director POWELL. I shall have to guess at it.

The CHAIRMAN. I mean an estimate.

Director POWELL. I should say about 600,000 acres; it may be more than that, but it is about that, as I think over the ground.

The CHAIRMAN. Is any of the ground irrigated by private parties?

Director POWELL. Yes, sir; probably one-fourth of it is irrigated now by private parties.

Senator STEWART. Under whom were surveys in Nevada made?

Director POWELL. The topographic survey was made under Professor Thompson; the hydrographic survey was made under Mr. Newell; the planning of the irrigating works was done under Captain Dutton, though he was not in the field except for a few days; the man in charge in the field was named Lyman Bridges, in the first part of the season, and in the last part of the season it was Mr. William Hammond Hall.

Senator STEWART. How much money was allotted to Nevada for the

engineering work of locating the reservoirs and lines of ditches? Was it more than \$12,000?

Director POWELL. There are two operations: one is the discovery of sites—sites of reservoirs, canals, and lands. That is the topographic survey. For that about \$35,000 was allowed.

Senator STEWART. We will not go into that now; I want to know what was done.

Director POWELL. But you ask a question which can not be answered categorically.

Senator STEWART. I will ask a question which will give you a chance to answer. I want to divide it up under different heads.

Director POWELL. All the money that was expended was in one sense expended for that purpose. The fifty-odd thousand dollars—if that was the amount—was all expended for that purpose, discovery and locating sites.

Senator STEWART. Will you answer my question, Major Powell?

Director POWELL. I shall be pleased to do so.

Senator STEWART. How much was allowed for the engineering work, and was it more than \$12,000?

Director POWELL (to an assistant.) Just turn to the allotments. I do not carry thousands of items in my mind. While he is finding that I will state—

Senator HALE. How much money did it take to discover the fact that Tahoe, or Donner, or these other lakes were reservoirs?

Director POWELL. There are quite a number of reservoir sites of which we already had knowledge; we have segregated a great many of which we had knowledge; we did not discover them.

Senator STEWART. What reservoir sites have you discovered, of which you and the public and everybody did not have knowledge, at the head waters of these two rivers?

Director POWELL. Hope Valley and others. There are five of these large ones and about forty smaller ones.

Senator STEWART. Are you aware of the fact that Hope Valley and all those were examined twenty years ago and have been surveyed two or three times with a view of using them as reservoirs?

Director POWELL. No, sir; I do not know it.

Senator STEWART. It is a fact nevertheless. I have not heard of your finding any new ones.

Director POWELL. It is very strange, then, that the State authorities, wishing to construct reservoirs in this region with a State appropriation, appeal to me to find the sites for them, and will not go on with the construction of the works until the surveys under my charge are completed. They ask me to advise them how to use that State appropriation. The previous knowledge which they have seems to be of no avail, and this is the first I have ever heard of it.

Senator HALE. What is Hope Valley, a dry valley with a stream running through it?

Senator STEWART. A stream running through it.

Senator HALE. You propose to make an artificial pond there?

Senator STEWART. Yes; to fill it up. (To Director Powell.) Then you do not know how much was allotted for the engineering work and how much was allotted to Professor Thompson for topographic work out of the \$50,000 odd?

Director POWELL. (Referring to book.) Of the appropriation of \$250,000 made this last year for topography in general, for the discovery of sites and lands, \$35,500.

Senator STEWART. Is that part of the \$55,000?

Director POWELL. Yes, sir. Colorado, \$37,000; Idaho, \$14,000; Montana, \$7,000; New Mexico, \$15,000.

Senator STEWART. I did not ask you about those; I was asking you about Nevada. You said on these two streams there was some fifty thousand odd dollars used.

Director POWELL. That was for the two years. I should have to make a computation or go to my office in order to state the exact amount.

Senator STEWART. Do you stick to it that it was \$55,000?

Director POWELL. I did not say so positively.

Senator STEWART. What do you say now?

Director POWELL. I say about that.

Senator STEWART. Then, about how much was spent for engineering work?

Director POWELL. It was all spent for engineering work.

Senator STEWART. How much did it cost to locate and determine Lake Tahoe as a reservoir site?

Director POWELL. Nothing to determine that it was a reservoir site. The Senator will remember that I reported to Congress before this estimate was made that it was a reservoir site.

Senator STEWART. How much did it cost to place a monument there, indicating how much to raise it?

Director POWELL. We did not place a monument there.

Senator STEWART. How much did it cost to locate any one of those reservoir sites that were known before, to designate those locations?

Director POWELL. The cost to designate them as reservoir sites was very little indeed.

Senator STEWART. What topographic survey was necessary to ascertain that those lakes would make good reservoirs?

Director POWELL. That the lakes would make reservoir sites we knew before we went there. How much water could be caught in them it was essential to know. For that we had to measure the catchment area, and did it. We had to determine how much water would come into Lake Tahoe, and we did determine that by determining the catchment area and the declivities, and that was a topographic survey. Senator, you are proceeding with a misunderstanding, evidently. An explanation would make it clear.

Senator STEWART. Let me read a statement here in regard to the Truckee River, made by Captain Dutton, and then I want to ask you if that is correct:

In the Truckee and Carson basins Mr. Bridges made detailed surveys of Donner, Independence, and Webber Lakes as reservoir sites. A survey was made for a reservoir in Long Valley, with canals taking water across the Carson River to the lands on the east side of the Carson Valley. This last survey was not approved, nor was it authorized or intended. A survey was also made of Hope Valley at the headwaters of the west fork of the Carson. A trial line was surveyed from a point about 5 miles above Wadsworth to the lands southeast of that town to ascertain the possibilities of carrying water to them from the Truckee River. A large amount of canal line was surveyed by Mr. Bridges, but as none of the others was authorized or approved no further mention is made of them. His management of his division being very unsatisfactory, he was relieved from duty by me, and at my request was asked by the Director to resign. The surveys of Donner, Independence, and Webber Lakes, and of Hope Valley are of some value, but not commensurate with the expenditure. The accounts of the engineering work in this division were closed on the 30th of September, and at that time the expenditures were \$13,495.36. Since that time further office expenses were incurred in the office of the supervising engineer, Mr. Hall, which bring the total amount to about \$15,500. The exact figures it would require considerable labor to extract from the itemized vouchers. They appear on my books with the expenses of the office of the supervising engineer.

Captain Dutton does not attach any value, except as to what was done to those lakes. Now what particular thing was done with your \$55,000, or whatever the sum was, besides what is described here by Captain Dutton, who had charge of this division?

Director POWELL. The particular thing done, in the first place, was—

Senator STEWART. But—

Director POWELL. I beg, Senator Stewart, that you will not stop me. Either let me answer your questions or do not ask me questions.

The CHAIRMAN. I think that is fair.

Director POWELL. I want to answer questions if I am asked them. I have been made to state a number of things which were not fully accurate because I was cut off before I had an opportunity to finish. I want to answer in my own way.

Senator STEWART. Go on; nobody is hindering you.

Director POWELL. Each of those lakes has to have a series of things determined. If we use Hope Valley as a reservoir there is no use planning a dam and reservoir site until we know what water can be brought there. They are planning water works for Boston to-day. The engineer was in my office yesterday. What is the first thing he did for that? The first thing he did was, in order to determine what water could be furnished by a certain area of country, to have a topographic map prepared. That is, he wanted to determine the catchment area for that reservoir site. Having determined that, something else was to be done. There are two catchment areas at Boston, one of known magnitudes. The largest area contributes the smallest amount of water. The reason of that is, that one is mountainous and hilly, while the other is low and flat. The flat area loses its water by evaporation. They may have from 40 to 50 inches of rain-fall in the year on that flat area, while only 10 inches can be run off and secured from it; the rest evaporates. The other area, which has hilly declivities, will furnish a much greater quantity of water. So the first thing they had to do was to determine the catchment areas.

In the case of using Donner Lake, Independence Lake, etc., as reservoir sites, we had to determine the catchment areas and the declivities. That we did. That was an important part of the expense of the work. Further than that, in that \$50,000—if it was \$50,000; I do not remember the exact amount and am only approximating—in that \$50,000 we determined the catchment areas of all those reservoir sites, not only of this, but about forty more that are not yet designated to the Land Office. And more than that, the map which I have brought with me shows that we extended the survey from the catchment areas past the lines of the canals down into the irrigable lands, over the irrigable lands, and run lines to the irrigable lands, and were able to say approximately how much of the land was irrigable.

Senator STEWART. We do not want to have it made too long. You have said this over and over many times in print. I want to know if, before you can build a dam, you must ascertain just how much water will come into it?

Director POWELL. Yes, sir; always. There is no engineer of standing in the world who does not first ascertain these three things:—

Senator STEWART. That does not answer my question.

Director POWELL. Let me answer in my own way, if you please.

Senator STEWART. If you make a long speech, we will not get through.

Director POWELL. First, the maximum amount of water that must

be held if the dam is built strong enough to withstand floods; second, the minimum amount of water—how much water the reservoir will afford in times of scarcity; third, the mean amount of water.

Senator STEWART. How long will it take to ascertain those facts with regard to the Truckee River?

Director POWELL. We have determined it practically now.

Senator STEWART. You have determined the maximum that can possibly come in, and the minimum?

Director POWELL. Yes, sir.

Senator STEWART. Do you know about how often the maximum is reached?

Director POWELL. No, sir; the time is variable; the maximum may come in periods twenty or thirty years apart; the minimum may come in periods twenty or thirty years apart, or it may come only four or five years apart; it is variable. There is no well-defined period.

Senator STEWART. Are you aware of the fact that the maximum, so far as we have seen it, has occurred but twice since we have known that country—in 1861-1862, and during the last winter; and those are the two great flood seasons? Now, must we wait until we see whether there will be another greater flood season than either of those before we can build dams? Any dam will stand the minimum. Now you want to meet the possible maximum before you build a dam. Is it not possible that there may come floods greater than either of those I have named, and that we may have to wait to discover what that greater maximum will be before we go on and build a dam?

Director POWELL. We believe we have the maximum.

Senator STEWART. Do not practical men make allowance for contingencies, and build dams right along and have them stand?

Director POWELL. Some of them do, and some of the dams built by what you call practical men have been destroyed.

Senator STEWART. How do you know I call them practical men?

Director POWELL. As I understood you to use that phrase.

Senator STEWART. Then before anything can be done with the regions out there we have got to ascertain the maximum water and the minimum, and determine that before we can build dams, and the settlement of the country must wait for that, must it?

Director POWELL. No, sir; we shall have the data for the maximum for a great many of the streams by the first day of next October.

Senator STEWART. The experience of persons living in that country as to the amount of water that may be possible at any time, you would not regard as of any value; you have got to obtain it scientifically, have you not?

Director POWELL. I think we can determine it a great deal better by examining the ground and examining the conditions than by getting the neighborhood opinions.

Senator STEWART. It is necessary in order to determine its maximum, as I understand you, to have a careful topographical survey?

Director POWELL. Yes, sir.

Senator STEWART. That is, you must do that in order to have sufficient knowledge to warrant you in building dams?

Director POWELL. Yes, sir.

Senator STEWART. Do you not think that a little extra money put into the dam that you would spend on the survey and make it equal to any emergency would be just as well spent as it would to be so minute in your survey?

Director POWELL. Senator, you assume things as if I agreed to them

and want me in my answers to agree to the assertions which you make. You must pardon me when I state that I can not answer such a question unless I answer it in full. In laying out a plan for a reservoir of course every intelligent engineer uses a safety margin, he determines the maximum amount of water, and uses a safety margin as one of the simple principles used by school boys in studying hydraulics. I say he uses a safety margin, but he must know in an approximate way the maximum amount before he plans his work.

Senator STEWART. In any event, after you have measured it all you can, is it not necessary to exercise judgment in getting a safety margin?

Director POWELL. Yes, most certainly; judgment is necessary about everything.

Senator STEWART. Now, do you pretend to say that an experienced man, observing the flood marks, observing with the eye the general extent of the water basin, and knowing the history of the country as well as possible, can not make allowance for the safety margin without this minute survey in this system?

Director POWELL. No, sir; he cannot.

Senator STEWART. That irrigation must be postponed until this topographical survey is made?

Director POWELL. We have surveyed the sites selected for 30,000,000 acres of land.

Senator STEWART. Have you ascertained how much water will come into all the reservoirs?

Director POWELL. No, sir; not all, but very many; and by the 1st of October we will know the maximum for most of these reservoirs.

Senator STEWART. I do not know how you will ascertain it. Now you have the whole country reserved. Are you not aware of the fact that there is a large area of country in which there are small streams and places where small storage can be made—I am referring to the mountain region now—where homestead settlers can go if they were not excluded by this reservation?

Director POWELL. Senator, in the first place, you make a statement which you do not mean to make to me—that I have got the whole country reserved. No word was ever said to me about that reservation; that was put on by Congress; nobody consulted me about that in any way. I have not done it. I never advocated it. That reservation was put into the law independently of me. Yet you affirm here and put it in the record that I had it done. What had I to do with it? Nothing.

Senator STEWART. Are you in favor of its repeal?

Director POWELL. No, sir; I think it is wise.

Senator STEWART. Have you not insisted that it should be maintained?

Director POWELL. I have not insisted upon anything, but when asked my opinion as you ask it now, I have expressed it.

Senator STEWART. Have you not voluntarily expressed the opinion to this Congress that this reservation should be maintained?

Director POWELL. Yes, I believe I have—I beg your pardon, I do not want to go on record that way. I do not remember whether I ever did say that voluntarily to a committee or not.

Senator STEWART. You have said it to members of Congress; you have advocated its maintenance, have you not?

Director POWELL. I believe that the reservoir sites ought to be maintained.

Senator STEWART. The reservation of lands to be irrigated?

Director POWELL. I think that ought to be done until it is thrown open to homestead settlement.

Senator STEWART. Are you not aware that that excludes those seeking homesteads from making homes in almost every State and Territory where irrigation is now practiced, where they do it by private means?

Director POWELL. May I make my answer in full to that?

Senator STEWART. I want to know if you are aware of the fact.

Director POWELL. If I can answer it in my own way I shall be pleased to answer it. I do not think that the assertion in that question is correct, but I shall be pleased to answer in my own way.

Senator STEWART. Answer it in your own way.

The CHAIRMAN. Answer in your own way, major.

Director POWELL. In the first place, there has gone out of the hands of the Government four times as much land as is irrigated, owned by people who are not yet irrigating it; they can go on and develop the irrigation for that amount. There are only about 10,000,000 acres irrigated, and more than forty or fifty millions are in their hands. In the second place, so far as homestead settlement is concerned, we can designate the lands to be taken for homestead settlement faster than those people will take them up, or just as fast. And if the survey goes on as the bill now provides, there will be no difficulty in our designating lands so that every man can get a homestead who desires one. So that there will be no delay whatever about homesteading.

Senator MOODY. That is, providing that he will go into the country you open up for settlement.

Senator STEWART. That is not an answer to the question I asked. Are you not aware of the fact that since this reservation many settlers who wanted to do so have been deprived of the privilege of making homes on the public lands? Is that a fact, or is it not?

Director POWELL. I think there is very little of that, Senator. My reason for thinking so is this: That for a number of years actual settlers have not gone into that country and settled lands, as in the old times, to make homesteads. An irrigation company, designed to furnish water, brings people in to take up the lands around the canals which they want to dig or which they wish to construct; and lands are not sought by individual settlers who try to make homes, but people are brought into the country by land and water companies who expect in part to sell water to the farmers who will settle on those lands, and in part to get possession of the lands which they (the farmers) acquire from the General Government.

Senator STEWART. I will come to that in a moment. But I want to know now if you are not aware of the fact that a large amount of the country on the small streams, where individuals could go, was reserved, and that settlers have been deprived of making homes at all in that region?

Director POWELL. No, sir. The fact, I am certain, is quite otherwise.

Senator STEWART. You say the fact is otherwise. That is enough.

Director POWELL. The fact is that the small streams where individual settlers can go are already occupied and taken up.

Senator STEWART. That is what I wanted to get at.

Director POWELL. The little streams where individual settlers can go—there may be some exceptions, but in the grand aggregate—have passed from the hands of the General Government.

Senator STEWART. I think you are very much mistaken about that,



but I will not dwell upon that. When you open land for settlement, as you speak of, you open all districts; you open those that you select, and if settlers want to go elsewhere on the public domain they can not go; you say where they may go, and what places shall be opened?

Director POWELL. I designate the lands.

Senator STEWART. They have to wait for you. Now, when you have opened a piece of ground for settlement, how is it going to be settled? What is your plan for settlement? Is the Government going to dig the canals and make it possible for homestead settlers to go there? What are you going to do there when you have thrown it open for settlement?

Director POWELL. Does the Senator wish me really—

Senator STEWART. Say right off how you are going to do it; whether by the General Government or by private enterprise?

Director POWELL. By private enterprise.

Senator STEWART. Under existing laws, without further legislation enabling them to do it, is it possible, when you have made this selection, if this bill is passed giving you this appropriation, that you should open some of that region by private enterprise and get homestead settlers to go there under existing laws and claim it, or have they got to wait for something else?

Director POWELL. The statutes already in existence provide rights of way for water companies across lands. Whenever lands now belonging to the Government are declared open to homestead settlement, those lands can be irrigated under the present laws exactly the same as they have been in the past. There has been no change whatever in the statute in that respect. The law of October 2, 1888, provides that the sites of those waters cannot be filed upon and title thereto obtained for speculative purposes, but the statute of the United States provides that the people can still use them.

Senator STEWART. How is a homestead settler going to manage if he goes out there? How is he going to get water for his land? That has been asked you once. Is the Government going to do it, or is he going to do it himself?

Director POWELL. It will have to be done in some other way, in my judgment. I do not think the Government will do it.

Senator STEWART. You have had in the last two years \$750,000 for topographic and irrigation surveys; you have in this bill \$970,000 odd for this same purpose. How many like appropriations will be required before you can complete the arid region?

Director POWELL. You make an assumption in that question which is erroneous, Senator. The irrigation survey, which is confined—if the gentleman will pardon me—to the area which is colored on this map, is not covered by that appropriation for topography at all. We are not using it on that region. We are using it over the United States in places outside of that region. We have had only \$350,000 for the irrigation survey. If we go on with the irrigation survey it would cost, as I have explained to this committee many times—I am on record again and again about it before the Irrigation Committee—my judgment is that it will cost about \$7,000,000 to complete the survey of this area. When that is done we will have a topographic map, and it will save \$4,000,000 to the geological survey.

Senator STEWART. Is it not possible to conduct your irrigation survey, so far as it is necessary to establish reservoir sites, without a topographic survey?

Director POWELL. In my judgment it would be very much more expensive to do it in any other way.

Senator STEWART. What would it cost to have located all the reservoir sites that you have located on the headwaters of the Truckee and the Carson Rivers if there had been no topographic survey connected with it?

Director POWELL. Three of those I could have done at my office at the cost of a postage-stamp, because I had the requisite knowledge beforehand; for the others we had to have surveys on the ground. If you mean by locating the determining what water they will hold, what works should be constructed, or what the catchment area was, how much water would be fed to them, what the evaporation and run-off would be—if you mean all that—

Senator STEWART. I do not mean that at all.

Director POWELL. Then it would be more.

Senator STEWART. I do not think you can ascertain it in fifty years. Experience will determine it. But I mean setting aside the reservoir sites, what expense would we be?

Director POWELL. For the three of them it would be nothing, and for the others it would be many thousand dollars.

Senator STEWART. Two or three thousand dollars?

Director POWELL. Many thousand dollars.

Senator STEWART. So far as a general knowledge of the water-shed is concerned, can you not ascertain approximately what the water-shed of all those lakes is from the general maps?

Director POWELL. No, sir; it is not possible.

Senator STEWART. Approximately; I do not mean accurately.

Director POWELL. You can not determine the run-off—I suppose that is what you mean; there is no possibility of determining with economy the run off from the catchment areas without a topographic survey; direct gauging would cost much more.

The CHAIRMAN. I want to call your attention to one thing, Brother Stewart: you have consumed nearly an hour in questioning Major Powell, and I fear some of your brethren may get impatient.

Senator STEWART. I will not go any further.

The CHAIRMAN. I do not want to cut you off; I merely wanted to call your attention to the fact.

Senator HALE. Before you leave the Carson and Truckee Rivers, where do those streams flow?

Director POWELL. They head in California and go down into Nevada.

Senator HALE. Where do they finally go?

Director POWELL. They are lost.

Senator HALE. You found this region already occupied to a considerable extent?

Director POWELL. Yes, sir.

Senator HALE. What sources did they use for irrigation—these streams?

Director POWELL. The streams, but they did not store any water or utilize the season's floods.

Senator HALE. What particular new thing did you teach to those people down there that they did not know before?

Director POWELL. How to store the water so that they can increase their irrigation about four times.

Senator HALE. Not in the lakes?

Director POWELL. Partly in the lakes and partly in the valleys.

Senator HALE. But the knowledge that they could get water out of those lakes was common to those persons with yourself?

Director POWELL. Yes, sir.

Senator HALE. And that the lines on which the canals would run would be about the same as you determined?

Director POWELL. About the same.

Senator HALE. Then, so far as that went, you found it all understood when you went there?

Director POWELL. Yes, but they did not understand my plan about Lake Tahoe. It was brought out here that I discharged one of my engineers because he was inefficient. Let me tell about that. Lake Tahoe covers an area from 200 to 250 square miles.

Senator STEWART. Nearer 300.

Director POWELL. The catchment area is 507 square miles. He proposed to build a dam across the mouth of that Lake Tahoe so as to raise its waters.

Senator HALE. Across the outlet?

Director POWELL. Across the outlet, so as to raise the water. That would have increased the area of the surface. At present more than three-fourths of the water running into the lake is evaporated from its surface, and less than one-fourth of the water running into the lake is fed to the stream below. To increase the area of evaporation was to diminish the supply; to build a dam was to diminish the supply. What should have been done was to make a deeper outlet for that lake and draw it off. The real point about Lake Tahoe was to discover where that water could be drawn off so as to reduce the depth of the lake one or two hundred feet. It is now about eighteen hundred or two thousand feet deep. If we can reduce it one or two hundred feet in depth we can reduce the area of evaporation very largely. I sent him there to see if he could find a practical place to tunnel through the mountains for an outlet to reduce the depth of the lake, and he found he could not. Then he planned a dam to increase the surface of the lake, which was wrong. What the people want to know is, how they can get sufficient water from this vast body of water to irrigate 500,000 acres of land, and it must be done by deepening the outlet or running a tunnel. We do not know how we can use that water for more than 200,000 acres of land up to the present time. We have yet to run the right line to find it.

Senator HALE. That is an engineering problem.

Director POWELL. That is an engineering problem, and that goes along with our topographic surveys and will be discovered by them.

Senator STEWART. Now, Major Powell, if the work was confined to locating and reserving reservoirs and not determining the strength of the dams or the amount of water they would hold, could not that be done without a topographic survey further than what the engineers make in making the survey?

Director POWELL. I think not, sir.

Senator STEWART. Could not an engineer locate the reservoirs?

Director POWELL. No, sir; that is my judgment. He could locate some, but not all the reservoirs, and only a very small number, without the topographic survey.

Senator POWER. How do you locate the reservoirs? How do you designate the locations?

Director POWELL. Of the reservoirs?

Senator POWER. Yes; how do you do that?

Director POWELL. If it is a body of water we get the name of the body.

Senator POWER. I refer to the land. How do you do that?

Director POWELL. We designate it in Land-Office terms.

Senator POWER. And where there are no surveys made how do you do that? I do not understand that.

Director POWELL. Where there are no surveys made we have to mark it out.

Senator POWER. I do not know how you would mark it out. You stated that you did not make any mounds or have any bearing trees; so you must mark it out in some other way.

Director POWELL. Yes, but it so happens that the lands are all surveyed where we have worked.

Senator POWER. That is what I want to take up, so far as Montana is concerned. You have spoken of the Gallatin Valley. You said this morning that you proposed to commence at the headwaters. Here is the map showing the Madison and Gallatin rivers, the source of the Missouri River.

That valley produces millions and millions of pounds of grain, shipped out annually; has been settled for twenty-five years. You know that—that is, you know of it; that all the available land has been taken there; that it is only within the last four or five years—say six years—that they find that the second bench lands are the most beneficial for the raising of grain. They there produce now a better grain than they ever did before. That is a good valley, and your taking that out or reserving it for reservoir purposes is a great hardship to the people; there is no question about that. I have lived there and I have lived in Como County for the last twenty years. There is no system of reservoirs that is going to help them practically. Theoretically I do not understand how you are going to do it.

Director POWELL. Pardon me, Senator; you certainly did not mean to say what you said—that I am reserving that valley for a reservoir.

Senator POWER. The whole country is reserved; that is, nobody can go there and locate.

Director POWELL. I have nothing to do with that; the law makes the reservation; what I have to do is to select reservoir sites that are above the lands to be irrigated; then to select the lands under these reservoir sites that can be irrigated, and certify them to the Land Department, that they may be opened to homestead settlement.

Senator POWER. We want to have that obviated; that is what we are trying to get at for our different States. I believe every Senator here is in the same fix we are in Montana. I went into that country as a surveyor in Dakota, and did some surveying in Montana. There are a great many private companies taking out water, and all the good land is selected, from the base of the mountains.

Director POWELL. Not all. I have here a million acres in that valley, Senator, to be opened to homestead settlement.

Senator POWER. Which valley is that—the Sun River Valley?

Director POWELL. No, sir; these three valleys.

Senator POWER. The Toston country?

Director POWELL. This is chiefly in the three valleys.

Senator POWER. I speak about it generally, not taking any particular valley?

Director POWELL. You thought it was all used. Is it not worth while to remember that there are a little more than a million acres in that upper valley of the Missouri which can yet be irrigated?

Senator POWER. You stated this morning that over half the streams sunk before they emptied into any larger bodies of water. Now the trouble is that I believe you are comparing certain countries, and taking advantage of it, to throw ours in on that comparison, which is wholly wrong. I have been over the lands of Montana myself personally, and I know that there is not one stream in Montana that sinks. The Great Milk River and the Great Northern River are parallel, and at times get very low and apparently sink, but that is wrong; they do not sink entirely, though very nearly; and the Sun River never sinks; that is a regular mountain stream. What I say is true of every other stream in that country. But you are putting our people to that hardship with this act by comparing some countries down in Arizona and New Mexico, and even going over into India. What you say of those countries is true, but it does not apply to this country by any means.

I know this, because I know as much about land when I go over it as a lawyer does about a law book when he goes over that.

Director POWELL. Senator, I beg pardon; did I say aught in any way derogatory to the country? I did not intend to do so. I do not quite understand your point. What hardship would there be in my saying that half of the rivers sink—and I think that is true; in some lands they do not, and in some they do; in Nevada every river sinks.

Senator POWER. That is all right; I do not know about that. But when you make that comparison for Montana the theory is wrong, and we want to be left out. Our people do not want to be disturbed in that way. When they want water they can get it. Any man with a straight stick can take the range and locate a reservoir. So there is no trouble about getting water. Now, you have been in the city of Helena. The water companies there undertook to locate a reservoir, and they found a hundred places in half a day where they could make feasible reservoirs for the benefit of the citizens of that town to distribute water. Every gulch has its little gulches tributary to it and intersecting, and there is no trouble about opening reservoirs at all. I am talking strictly for Montana. I do not know anything about the other parts of the country, only as I have traveled through it, and much of it looks to me like a desert. What I am here for is to try to make the committee understand that it is a hardship to our people to have anything set aside for any of the purposes that you suggest.

Senator HALE. You do not think, Mr. Power, that the conditions which Major Powell has given here in connection with his comparisons applying to other countries apply in your State?

Senator POWER. Not in any manner whatever.

Senator HALE. And you do not think that Montana needs this public location of reservoirs on the lines of streams, and the segregation of arid lands and their opening to homestead settlement under proclamation? You do not need any of that in Montana?

Senator POWER. We do not need it, because if there was any surplus to expend and you wanted to spend it that might be arranged so as to be spent in a way to do some good eventually. But we are here begging and asking for money to make surveys of this whole country that these maps represent, and which will entail an expense not one-sixteenth as great.

Senator HALE. You want that rather than this process of irrigation?

Senator POWER. A hundred fold rather.

Senator HALE. Is that the general sentiment of your State?

Senator POWER. Yes, sir.

Senator HALE. There is no doubt about it?

Senator POWER. No doubt about it whatever.

Senator HALE. Your colleague agrees with you in that?

Senator POWER. I think so, sir. He was to be here.

Senator MOODY. You want, first, to get rid of what has been done?

Senator POWER. There is another question you do not want to forget, gentlemen. Take the Gallatin Valley. I am in business there and I know. There are from 1,000 to 1,500 car-loads of grain shipped out of Gallatin Valley yearly. It is an oasis. Every dry season there they get so terribly excited that murders are committed on account of conflicting interests about water, proprietary rights, and the like. You could not divert water; there is not money enough in the United States Treasury to think of trying it. In getting water for the city of Helena they could go up a gulch and try to get a little stream of 20 inches.

I tried it myself last year, and it would cost \$250,000 to get that 20 inches of water down to the city, 2 miles. As I said this morning, the lawyers would have a harvest of it, but it would bankrupt the Treasury if the Government were to attempt it. It is one of those things impossible to think of.

Senator HALE. You would leave that to natural conditions and natural enterprise?

Senator POWER. Yes, sir. Now if you take the Missouri River, or any large meandering stream, the smaller settlers along those streams could not interfere with so large a scheme as that. But it is different on the head waters of these streams where the settlers are. That applies to Montana, and my colleague will agree to that positively.

Senator STEWART. I would like to make this statement: What I believe the people there want—and if they can not have that without other conditions they do not want that—is to have these reservoir sites set aside. The difficulty was that it was apparent that they would be needed, and the lands were being taken up. Two or three years ago I introduced a resolution setting aside the reservoirs. Now, it is not necessary in setting aside these reservoirs to determine the sites of the dams or the exact amount of water; that would be left to private enterprise by observation of the streams and by the money they are willing to put in, because what amount of water will run down is a very indefinite matter; a very large quantity will run down from one, and from another very little; and to get at the average it requires experience; and as to the amount of land that can be irrigated that has to be experimented upon. The first year it will only be a few acres, but it will grow, and year after year man will extend his operations against the desert. Now all we want there is to have the reservoir sites set aside and to reserve by surveys.

The CHAIRMAN. But, Senator Stewart, Major Powell says he can not do that without making a topographic survey.

Senator STEWART. Then we would rather have no appropriation, because we do not want the money spent in that way. The engineers say that this topographic survey is not necessary.

The CHAIRMAN. You do not want the appropriation of \$720,000?

Senator STEWART. Not if it involves the tying up of the country by topographic surveys. If that plan is carried out it will swamp us. We would rather have nothing than have that plan carried out.

Senator MOODY. Mr. Chairman, I will try to confine my statements to the country I am particularly interested in.

The CHAIRMAN. That is South Dakota?

Senator MOODY. South Dakota. I am of course interested in the rest

of the country, as every other Senator is—no more, no less. I would like to ask Major Powell, if he will give me his attention, whether he was ever in South Dakota?

Director POWELL. Yes, sir.

Senator MOODY. Whereabouts?

Director POWELL. I have been along the Missouri River and up in the Cheyenne Valley.

Senator MOODY. You have been along the Missouri River?

Director POWELL. Yes, sir.

Senator MOODY. By what means of transportation?

Director POWELL. The first time by boat.

Senator MOODY. Going up, or going down?

Director POWELL. Both up and down.

Senator MOODY. By steam-boat?

Director POWELL. Yes, sir.

Senator MOODY. Were you ever on the land off the Missouri?

Director POWELL. Yes, sir.

Senator MOODY. Whereabouts?

Director POWELL. I was up the Cheyenne River.

Senator MOODY. How did you get up the Cheyenne River?

Director POWELL. I went north across the Niobrara from the North Platte.

Senator MOODY. Which Cheyenne?

Director POWELL. I know of but one.

Senator MOODY. How far from the Missouri River?

Director POWELL. Well, a hundred and fifty or two hundred miles.

Senator MOODY. What year was that Major?

Director POWELL. More than ten years ago.

Senator MOODY. Were there any settlements in that country through which you passed?

Director POWELL. Not many.

Senator MOODY. Did you find any settlements in Dakota?

Director POWELL. There were military posts there, and men ranching to get hay, etc.

Senator MOODY. What military posts were you at?

Director POWELL. I did not go to the military posts. That was not my purpose in going there.

Senator MOODY. Do you remember what one?

Director POWELL. No, sir.

Senator MOODY. Was it anywhere near Fort Meade?

Director POWELL. I do not remember those military posts, for they change their names so often.

Senator MOODY. Have you any employé in your bureau who has been in South Dakota since the appropriation was available, in October, 1888?

Director POWELL. No, sir; not in the irrigation survey.

Senator MOODY. Have you on any other survey?

Director POWELL. Yes, sir.

Senator MOODY. Who?

Director POWELL. The geologist—I can not think of his name; Professor Chamberlain has been one of them.

Senator MOODY. How long was Professor Chamberlain there?

Director POWELL. Not very long.

Senator MOODY. How many days?

Director POWELL. I can not say now; it was two or three years ago.

Senator MOODY. How long was the other one there?

Director POWELL. A large part of one summer; mostly last summer.

Senator MOODY. Do you know where he was?

Director POWELL. He was up on the James River, and in various portions of the States.

Senator MOODY. Was he in South Dakota or in North Dakota?

Director POWELL. In both the Dakotas.

Senator MOODY. Whereabouts on James River was he in that length of time?

Director POWELL. I don't remember at this moment.

Senator MOODY. Was he there over three days.

Director POWELL. I think he was, some months.

Senator MOODY. Did he make himself known to anybody?

Director POWELL. I was not with him. He made himself known to the irrigation committee; he was called before the irrigation committee and gave testimony. Then Professor Todd was there, and other assistants.

Senator MOODY. You have included South Dakota west of the one hundred and first meridian in the arid region in your map, have you not?

Director POWELL. My idea of what I call the arid region is that it commences farther east than that, Senator. My idea is that the arid region commences there. [Pointing on the map.]. This map shows the streams that can be used for irrigation and the land which can be used otherwise.

Senator MOODY. Very well. Now, in your colored map, in which you include the area of country which you say can be reclaimed by irrigation, you have included all of South Dakota west of the one hundred and first meridian, have you not?

Director POWELL. Yes, sir.

The CHAIRMAN. There is a bench or offset there.

Director POWELL. Yes, sir.

Senator MOODY. West of the one hundredth meridian and east of 102° 30', name one stream that can be carried out.

Director POWELL. State that again.

Senator MOODY. I say please name one stream that can be carried out for irrigation in South Dakota west of the one hundredth and east of the meridian of 102° 30'.

Director POWELL. The Cheyenne is one; there are others.

Senator MOODY. Is that the Cheyenne Valley in which you were?

Director POWELL. Yes, sir.

Senator MOODY. What is the depth of the Cheyenne River between the banks?

Director POWELL. Here is South Dakota, and here is the valley of White River; that can be used for irrigation. Here is the South Fork of the Cheyenne.

Senator MOODY. Is not the Cheyenne River more than a hundred and fifty feet deep down into the prairie?

Director POWELL. In some places it is.

Senator MOODY. Is it not, through its entire length, 150 feet from the top of the bluffs on the banks of the stream down to the water?

Director POWELL. It is in many places.

Senator MOODY. Is not that the case throughout its entire length, from the time when the Cheyenne River is formed until it reaches the Missouri River, with the exception of a little tract of country right at



its mouth where Fort Benton and the Indian agency are established? Now, how are you going to take out that river?

Director POWELL. Senator, you are describing the condition of nine out of ten rivers in that country. Do you suppose that because a river cañons it can not be used for irrigation? Here is a river that comes down from the mountains from 50 to 200 miles away, with a descent of from 10 to 20 or 30 feet to the mile. You can go above and take out the water on the mesa; all of those streams can be so taken out. The Yellowstone is, on the average, 800 feet below the surface, but we can take its water on to the mesa; and so with very many other streams.

Senator MOODY. You have pointed out the south and north forks of the Cheyenne River on that map. Do you know the altitude of the country on the east side of the South Fork of the Cheyenne River?

Director POWELL. No, sir.

Senator MOODY. That river runs nearly north a long distance, does it not, before it joins the North Fork, then constituting the Cheyenne? Do you know the altitude?

Director POWELL. No, sir; not without looking at the map; I have it on the map; I do not carry such things in my mind. There are millions of altitudes we have determined and I do not pretend to carry them all in my mind.

Senator MOODY. Do you not know it to be a fact, or do you know it to be a fact, that the banks along the South Fork of the Cheyenne River are over 250 feet above the water all the way, and there is no break anywhere where water can be taken out?

Director POWELL. There is no difficulty in taking the water out.

Senator MOODY. Then how are you going to irrigate that country with surface waters?

Director POWELL. Go above and take it out.

Senator MOODY. Do you know what is above?

Director POWELL. That is what the survey is for, to ascertain that. You are describing the normal condition of all that country. We have to go above to take the water out from any river.

Senator MOODY. Have you ever made a survey so as to know anything about it?

Director POWELL. Not there.

Senator MOODY. Why did you designate it as the arid region, and capable of irrigation?

Director POWELL. Because there is a body of water there which can be used; we know it can be used, and we know that the lands need the water.

Senator MOODY. Do you not know that those bodies of water during the season that irrigation is required, absolutely dry up so that there is not a miner's inch of water running in any of them?

Senator HALE. Is that true of the forks of the Cheyenne?

Director POWELL. No, sir, it is not.

Senator MOODY. Is not that true of the North Fork of the Cheyenne?

Director POWELL. No, sir.

Senator MOODY. How often have you had a report from there?

Director POWELL. I do not know about that. I know a great deal about the streams; we had a very good survey made of both those streams.

Senator MOODY. Of the North Fork and South Fork?

Director POWELL. Yes, sir; and both of them have many beautiful tributaries.

Senator MOODY. By whom were they made?

Director POWELL. By Mr. Jenny and Mr. Newton and Dr. McGillicuddy, of my office.

Senator MOODY. Were they the ones who went there in 1875 when they were guarded by the troops?

Director POWELL. Yes, sir.

Senator MOODY. Do you think they got down to the Belle Fourche or the Cheyenne River at all, except in the vicinity of the heads?

Director POWELL. I do not know about that. I was not with them, but I believe that they did, and that their report was honest.

Senator MOODY. Could they have got down there with a few thousand soldiers in 1875? Now, Major, do you know anything about the practicability of irrigating that country with any surface water that is there?

Director POWELL. I do not know all about it; I know something about it.

Senator MOODY. Does anybody in your bureau know anything about it?

Director POWELL. It has got to be surveyed, and then we shall know.

Senator MOODY. Do you know anything about the country between the forks of the Cheyenne?

Director POWELL. Certainly.

Senator MOODY. And you put it down as in the arid belt; that is, it is among the lands reserved from settlement under this act of 1888, is it not?

Director POWELL. I do not know; that is not for me to decide.

Senator MOODY. Did you not designate that country to the Secretary of the Interior, and did he not base his report upon what you reported to him?

Director POWELL. I do not know what he based his report on; all I know is that I have made out the districts—

Senator MOODY. Have you seen his order reserving this country from settlement or from entry?

Director POWELL. Do you mean the order that was published in August last?

Senator MOODY. The order which the Secretary of the Interior makes to shut up these land offices and reserve the lands; did you ever see it?

Director POWELL. No, sir.

Senator MOODY. Did you not certify to him the country from the one hundredth meridian west as the proper country to reserve?

Director POWELL. No, sir. Last Friday or last Saturday the Commissioner of these land office asked me for a copy of this map, and I sent it to him; for what purpose he wanted it I do not know. He may have based an order on it.

Senator MOODY. You had the one hundredth meridian designated as the line of lands at one time, did you not?

Director POWELL. Line of what lands?

Senator MOODY. The arid lands.

Director POWELL. I used that for my designation; yes. My judgment is that in this country west of the hundredth meridian it is unsafe to attempt agriculture without providing for irrigation.

Senator MOODY. How came you to make the line on the west side of Kansas?

Director POWELL. The waters of the irrigation district streams will not reach Kansas.

Senator MOODY. Are the lands not irrigated from those waters in Kansas now?

Director POWELL. No, sir; not that I know of.

Senator MOODY. Did you not state this forenoon that they were irrigating here, and that if the waters were utilized above—

Director POWELL. They are constructing canals across the Colorado line at the present time; they are probably irrigating something from the sand wells of the country also.

Senator MOODY. The under-flow waters?

Director POWELL. The under-flow waters.

Senator MOODY. What is this jog made out one degree, just below the south line of South Dakota?

Director POWELL. There are two of them. That is land which can be used on the Niobrara, a beautiful stream.

Senator MOODY. The Niobrara is a beautiful stream; how beautiful is it, say, at this time of the year? Is there any water in the Niobrara, except in extraordinary years, above the mouth of the Keya Paha, after the 1st of July?

Director POWELL. I would not say whether there is or is not always; there is some years.

Senator MOODY. The Keya Paha rises and flows through the Sioux Reservation and empties into the Niobrara just at the Nebraska line.

The CHAIRMAN. There is water in the Niobrara in the early spring, I think.

Director POWELL. The water that is used for irrigation, Senator, you seem to assume is that of the dry season. We do not stand on the same ground in regard to that question. My idea of the water to be used for irrigation is that which flows all the year round. My idea is that this water ought to be stored by constructing reservoirs, and then the Niobrara will irrigate a great body of land.

Senator MOODY. In that dry climate how long will a pond of water 10 feet deep last during the summer time, taking an ordinary season?

Director POWELL. The evaporation from the surface of water varies from forty to sixty inches annually in that region of country,

Senator MOODY. We will come back now to South Dakota. Do you know anything about the region of country east of the one hundredth meridian in South Dakota?

Director POWELL. Something; yes, sir.

Senator MOODY. Were you ever there except on the Missouri River?

Director POWELL. And on the railroad.

Senator MOODY. Which railroad in South Dakota?

Director POWELL. I do not remember.

Senator MOODY. Were you upon any railroad in South Dakota, or was it not North Dakota?

Director POWELL. I have been on railroads in both States, Senator.

Senator MOODY. Can you not tell where?

Director POWELL. No, sir; I do not remember just now the names of the railroads. I have been about a good deal. I was through there last year at the same time the committee was.

Senator MOODY. In South Dakota?

Director POWELL. The Senator might as well ask me about my habits at my house as the questions he is asking me now.

Senator MOODY. I want to get at your knowledge of it, that is all.

Director POWELL. My knowledge is obtained from a study of it: I do not pretend to have seen all that region of country myself.

The CHAIRMAN. You have not been all over the country represented by that decorated map of yours ?

Director POWELL. Not at all; but I have been in every State and Territory, more or less, and some of them I have surveyed, and for some of them I have made maps myself.

Senator MOODY. Were you in South Dakota last summer with the Senate Committee on Railroads ?

Director POWELL. No, sir; I was there at that time, but not with them. I traveled by myself.

Senator MOODY. Whereabouts in South Dakota ?

Director POWELL. In a number of places.

Senator MOODY. Do you know anything about the artesian waters in that region of country ?

Director POWELL. Senator, if you mean to ask whether I have studied the subject of the artesian waters, I have; but if you mean to ask whether I have dug wells, I must say no.

Senator MOODY. Do you know personally about that ?

Director POWELL. Yes, sir; I have made a study of that subject.

Senator MOODY. Did you ever see one of the wells ? I am trying to get at your personal information, and not that of somebody else. Did you ever see one of the wells ?

Director POWELL. Yes, sir, several of them.

Senator MOODY. Now, Major, have you any opinion as to the value of that artesian basin for irrigation purposes ?

Director POWELL. I have a very decided opinion.

Senator MOODY. What is that opinion ?

Director POWELL. I believe that artesian basin is one of the best in the world. I answered that before your committee, if you remember, and before the House committee.

Senator MOODY. What is your opinion of it as a source of water supply for irrigation purposes ?

Director POWELL. I think that as an artesian supply it ranks among the first. As compared with other supplies, that is a very different question.

Senator MOODY. Do you know of any other supplies in South Dakota save that which can be utilized for irrigation purposes ?

Director POWELL. Yes, sir.

Senator MOODY. Where ?

Director POWELL. The storm waters and the river waters are far in excess of the artesian waters.

Senator MOODY. Give me some river waters that you think can be utilized ?

Director POWELL. My judgment is—I do not know, as the survey has not been made—that the Missouri itself can be taken out.

Senator MOODY. State at what points ?

Director POWELL. Oh, I don't know where; no level has been run; that is only a general opinion of mine from a study of the country. I do not know it.

Senator MOODY. Do you know that 500 miles north of the line of South Dakota the Missouri can be brought into South Dakota for that purpose ?

Director POWELL. I do not know absolutely any place where the Missouri can be taken out, from Toston to its mouth.

The CHAIRMAN. Where is Toston ?

Director POWELL. Toston is just below the junction of the three rivers, the Madison, Gallatin, and Jefferson Rivers.

Senator MOODY. Do you know of any other river the waters of which can be taken out for irrigation purposes?

Director POWELL. The James River can sometimes be used, and will some time be used in that way by storing.

Senator MOODY. Did you ever see the Jim River?

Director POWELL. Yes, sir.

Senator MOODY. Whereabouts?

Director POWELL. I went up the valley of the Jim River in Colorado, or across the valley.

Senator MOODY. Were you at Huron?

Director POWELL. I have forgotten the point. I travel thousands of miles annually, and I forget the data of each journey.

Senator MOODY. Are you aware that there are natural storage places, as you call them, in South Dakota for every drop of storm water that comes?

Director POWELL. My judgment is that there are.

Senator MOODY. Do you think we need any assistance from the Government on such a proposition as that?

Director POWELL. I think if you had a survey to point that out to the people it would be advantageous to them.

Senator MOODY. Is it not a fact that there are innumerable lakes and ponds that accumulate and hold all the storm waters of that country, and that when they go dry it is because there are no storm waters to fill them, and then comes the necessity for irrigation? Is not that the fact?

Director POWELL. That is the fact.

Senator MOODY. Then what good would storm water storage do us, even if we needed any help, if we have plenty of rain at the time we stored, and hold it?

Director POWELL. I do not quite get the drift of your question.

Senator MOODY. Perhaps that is asking your opinion on a theoretical matter. Do you know what the rain-fall of South Dakota has been for a number of years?

Director POWELL. No, I do not. I have published it, but I do not carry it in my mind.

Senator CASEY. I think that what Senator Moody was trying to get at was that Nature has provided these reservoirs in which the storm waters flow in any case; what better method of surface storage would you bring about by any plan of yours? Is not that it, Senator?

Senator MOODY. Yes.

Director POWELL. The subhumid region is composed more or less of valleys and hills, together with level plains that are carved by series of streams—streams that, first, are perennial; second, into those perennial streams flow intermittent streams, those carrying in some seasons a great deal of surface water. All over that country in the wet seasons and in seasons of great rain-fall a vast amount of water flows off and is lost to that country. Wherever there is a valley or natural pond or lake, at such a place as that, which can be utilized by damming it, we can create what is known in irrigation throughout the world as a "tank;" that is, we can make dams and catch that storm water which is now lost, and save it for dry seasons.

Senator CASEY. What is the evaporation in that country?

Director POWELL. It varies; as I said a few moments ago, from forty to sixty inches.

Senator MOODY. In an ordinary season it would probably be five feet of water?

Director POWELL. That would be an extraordinary season.

Senator HALE. What is the rain-fall in any season?

Director POWELL. It varies from ten inches to twenty-five.

Senator MOODY. Is not the whole country in South Dakota along the Missouri River one great plain, practically level as it appears to the eye?

Director POWELL. Largely so; still there are a good many depressions in it.

Senator MOODY. West of the river until you reach the Black Hill country is not that the fact?

Director POWELL. It is rather hilly on the west side, Senator.

Senator MOODY. Is there any range of mountains in that portion of the country except a mere divide between the Cheyenne and the Bad Rivers?

Director POWELL. Not much more. Some parts of it are a little hilly. It is cut by cañons more than by anything else.

Senator MOODY. Is not the country west of the Cheyenne River, from South Fork and away into Wyoming, watered as well as any portion of New York State, Massachusetts, or any other portion of the country?

Director POWELL. I should say not, Senator.

Senator MOODY. Did not your Professor Jenny put down on the map innumerable streams running out of the Black Hills in many places?

Director POWELL. He put in a good many of them.

Senator MOODY. Did you cross both forks of the Cheyenne when you went into that country?

Director POWELL. Yes, sir.

Senator MOODY. Did you cross the drainage, or follow down some stream?

Director POWELL. We meandered about.

Senator MOODY. On the west of the South Fork of the Cheyenne River, crossing the drainage, can you go anywhere over seven miles without crossing a stream of water?

Director POWELL. Perhaps not; I do not know the distance. The streams which come down from the Black Hills are numerous and quite beautiful.

Senator MOODY. Is it not an excellently well watered country?

Director POWELL. It depends on what you compare it with. If you compare it with Virginia, I would say it was a very poorly watered country; if you compare it with Nevada you might say it is a finely watered country. It is a question of comparison. There is not one-half the water there that there is in Virginia, for example, or Iowa, but there is a great deal more there than there is in Nevada.

Senator CASEY. Is there not as much in the Black Hills country as there is in Iowa?

Director POWELL. I should say not.

Senator MOODY. That region is about 140 miles by 120, is it not?

Director POWELL. Perhaps so.

Senator MOODY. You have put it in the arid region, and I want to find out why you put that in and excluded settlers from it. Now, major, if it is a fact that, commencing at the south end of the hills is the South Fork of the Cheyenne River—and I will repeat the names of the principal streams: Beaver Creek, French Creek, Battle Creek, Rapid River, Box Elder, Elk Creek, Bear Creek, Whitefoot Creek, Spearfish, Red Water, North Fork of the Bellefourche—that each and every one of those streams is a considerable stream, having sufficient

water to run good-sized flouring-mills, and that they take their rise on the west side of the hills and run through or around them, and empty into one fork of the Cheyenne, either the North or the South Fork, would you call that a country that ought to be withdrawn from settlement for the purpose of irrigation?

Director POWELL. I call that a country where they will use all these streams for irrigation, and that is why an irrigation survey is needed.

Senator MOODY. Would you call that an arid country?

Director POWELL. I call it a country where they can not carry on agriculture successfully without using irrigation.

Senator MOODY. Would you have that country withdrawn as being in the arid lands?

Director POWELL. I have nothing to do with the law. All I have to say is that I think they can not carry on agriculture without irrigating by those streams. I thought my great fault was that I had not brought the arid region to the ninety-seventh meridian.

Senator MOODY. I want to find out who had it reserved from settlement—you or the Land Department. I understand from them that they are not responsible. I want to know who is responsible for the interpretation of this law and why you make this jog?

Director POWELL. You ask me a question; may I answer it?

Senator MOODY. Yes.

Director POWELL. Let me answer in full: The law reserves the lands, not myself nor my survey. As I understand it, where irrigation is necessary for agriculture it becomes the duty of the Director of the Survey to select reservoir sites and to select canal sites and lands.

Senator MOODY. Have you selected any reservoir or canal sites there?

Director POWELL. No, sir. Let me finish my answer. It is the duty of the Director of the Survey to select reservoir sites where irrigation is necessary—

Senator MOODY. Do you say irrigation is necessary in a region 100 miles by 130?

Director POWELL. The lands are irrigated there.

Senator MOODY. Is irrigation necessary?

Director POWELL. Yes; because they are doing it.

Senator MOODY. Do you know anything about it? What is the rain-fall in that region of country?

Director POWELL. It is quite variable; it varies from 10 to 22 inches.

Senator MOODY. Suppose I should say to you that the rain-fall was over 30 inches in 1887 and over 35 inches last year, what would you say then?

Senator REAGAN. Where was that?

Senator MOODY. In western Dakota—in this country.

Director POWELL. I should say that it was an error.

Senator MOODY. Would you say that it was a country that needed irrigation absolutely?

Director POWELL. I should say that it would be erroneous to say that there were 35 inches of rain.

Senator MOODY. What would you say to a rain-fall of 28 inches?

Director POWELL. There are stations all over that arid region, particular places, where the rain-fall, as I have explained to your committee fully, runs up to 50, 60, 70, and even 80 inches, on high mountains.

Senator CASEY. Not in the flat country?

Director POWELL. No, sir; what I refer to is the region on top of the mountains where irrigation and agriculture are not possible at all.

In all that region the rain-fall is concentrated on the mountains; and there may be places in the Black Hills—no doubt there are such places—where there are 20 inches of rain-fall; but I am speaking of the valleys below.

Senator MOODY. I have a memorandum here which shows that at Fire Steel, on the Jim River, near Mitchell, there was a rain-fall of 27.61 inches; at Huron, on the Jim River, 23.65 inches.

Director POWELL. Jim River and Huron are away over here [pointing to the map 200 miles, or 150 from where you were pointing, in the subhumid region, where the survey does not extend.

Senator MOODY. In eastern South Dakota. Morrystown, 31.03.

The CHAIRMAN. Is that near the Jim?

Senator MOODY. I do not know where Morrystown is.

Senator CASEY. That must be a mistake in the transcription; I do not know where it is.

Senator MOODY. Olivet, 26.50. That is near the Jim River. Pembina, northern Dakota, 21.91. Fort Randall, in South Dakota, 28.93. Yankton, 28.43. Webster, 44.61. Deadwood, 28.23.

Director POWELL. Deadwood is up in the mountains.

Senator MOODY. Alexandria, 30.55. Would you call that in the arid region, with all that rain-fall?

Director POWELL. Nearly every place you have mentioned is away out of the arid region.

Senator MOODY. Is not Fort Randall west of the one hundredth meridian, or very close to it—and Deadwood?

Director POWELL. Deadwood is up in the mountains.

Senator MOODY. Would you regard it as feasible to supplement the rain-fall of southern Dakota by the use of these artesian waters for irrigation?

Director POWELL. Yes, sir.

Senator MOODY. Would you regard it as wise to make sufficient expenditure to determine the area and probable importance of that artesian basin?

Director POWELL. Yes, sir.

Senator MOODY. You have changed your mind very considerably since this investigation on that subject began.

Director POWELL. Not one iota. I stated that to your committee and to other committees.

Senator MOODY. Did you not say to the committee, and say to me and to several members of the Senate from that country, that you regarded the artesian basin supply as of no importance whatever?

Director POWELL. No, sir.

Senator MOODY. And that we would have to rely upon storm water?

Director POWELL. May I answer your question in full?

Senator MOODY. Certainly.

Director POWELL. I stated that the artesian waters were of value. I stated that the storm waters, river waters, and pump waters were all of more value. I stated that it was a relative question. But all through, in everything you have published that I have said to you or to the other committee, or in any of my publications, I have said that the artesian waters ought to be used to the extent that they are found.

Senator MOODY. When did you procure information about the artesian waters—since this investigation by the Secretary of Agriculture, or prior?

Director POWELL. Prior to that.

Senator MOODY. Have you obtained any information from the Secre-



tary of Agriculture, or the persons engaged in that survey, with reference to these artesian waters?

Director POWELL. Not a word.

Senator MOODY. Do you know anything whatever about these wells in that artesian region?

Director POWELL. Nothing more than I knew before that; but I knew much about them before the Agricultural Department began investigation, and published what I knew.

The House Committee on Irrigation have published a very lengthy statement from me about those wells, you may remember.

Senator MOODY. That is in the investigation commenced by the Secretary of Agriculture?

Director POWELL. No, sir; it was prior to that.

The CHAIRMAN. Since that you have ascertained nothing from the investigation of the Secretary of Agriculture?

Director POWELL. I know nothing about that; that has not been published.

Senator MOODY. What extent of country would you estimate as being capable of irrigation by the artesian system?

Director POWELL. Comparatively a very small area.

Senator MOODY. About how many acres?

Director POWELL. I do not remember; I made a computation and it was published.

Senator MOODY. Was it some five thousand acres?

Director POWELL. No, sir; it was more than that. Look at my testimony before the House committee. I can not carry such things in my mind for the whole country.

Senator MOODY. You now think that it is a matter of very grave importance to endeavor to develop that source of water supply, do you?

Director POWELL. I think it is a matter of importance, but not of as great importance as some others.

Senator MOODY. What others are of greater importance?

Director POWELL. The pump waters, in my judgment, will ultimately exceed in importance the artesian waters. That is in my testimony. The pond waters will far exceed them all; and if we can find where to take out the Missouri River, that will be the most important of all.

Senator MOODY. About what would you estimate the cost of taking water out of the Missouri River to bring it on the surface?

Director POWELL. I do not know the facts.

Senator MOODY. Have you any sort of opinion on the subject?

Director POWELL. No, sir; none that I would express as an engineer.

Senator MOODY. Has not the estimate been made heretofore by you that it would require the waters to be taken out somewhere near Great Falls to be brought there?

Director POWELL. I do not know where they would be taken out, Senator. The survey has yet to be made.

Senator MOODY. Have you not expressed that opinion generally?

Director POWELL. I have expressed the opinion that it is possible that at Great Falls the water can be taken out, but we do not know where it can be taken out.

Senator MOODY. You do not know of any place nearer to the north line of south Dakota than Great Falls where the water can be taken out?

Director POWELL. I do not know where the water is to be taken out; I explained that ten minutes ago. We do not know where the

Missouri River can be taken out anywhere below Toston to its mouth. There has been no survey made.

Senator MOODY. You do not know that it can be taken out. You do know that water can be brought from the artesian basins?

Director POWELL. Yes, sir.

Senator MOODY. You do know that it can be brought in very considerable quantities, do you not?

Director POWELL. Yes, sir; very considerable quantities, but not as compared with pump water or storm water.

Senator CASEY. I would like to know how the major knows that? No, I withdraw that question because it involves a long answer. I have heard that once or twice, and it is not very satisfactory. I do not care to press it.

Senator MOODY. It is reported by the Secretary of Agriculture that one well, at Woonsocket, throws 2,750 gallons per minute, with a pressure of 147 pounds to the square inch, measured very accurately; would you call that a considerable amount of water?

Director POWELL. Yes, sir; I would, for if you are comparing it with some other well, it is very large. I reported substantially that same fact to your committee long ago.

The CHAIRMAN. What is the amount of water necessary to irrigate an acre so as to make it productive?

Director POWELL. Ordinarily an acre of water one foot deep will irrigate an acre of land for one year.

Senator MOODY. Now, in addition to that, supplemented by the rain-fall in South Dakota, which I have described to you, how much would be necessary?

Director POWELL. Every dry season you want one foot of water; in wet seasons when you do not need it, two or three or four inches would answer; four or five inches would improve it. That is, an acre of water three or six inches deep would irrigate an acre of land in a wet season and improve the crop. In every dry season you would have to have an acre of water a foot deep for an acre of land.

Senator MOODY. That would be equivalent to a rain-fall of 12 inches?

Director POWELL. Yes, sir. Now, you must remember when I say that, that must be qualified, else I may be led astray. You must remember that irrigation should be practiced with the very greatest economy. On an average they put on from eighteen to twenty-four inches of water on an acre of land in Colorado. It is only in southern California, where they irrigate with very great care, that an acre-foot of water irrigates an acre of land.

The CHAIRMAN. The economy in the use of water and the economy as to the time of distribution are important elements?

Director POWELL. Yes, sir.

Senator MOODY. In that connection, is it not a fact that soil similar to the soil of South Dakota can be irrigated sufficiently with very much less water than the soil found in what are practically the arid regions?

Director POWELL. I do not understand that to be so.

Senator MOODY. Do you know anything about the subsoil of that country?

Director POWELL. Yes, sir; it is all a glacial drift.

Senator MOODY. Do you know anything about the texture of the subsoil?

Director POWELL. It is exceedingly variable; it varies from clay to gravel; it is variable subsoil which is found everywhere.

Senator CASEY. You would say the same thing of North Dakota?

Director POWELL. Yes, sir.

Senator MOODY. Would you say the same thing of the arid region—the desert country?

Director POWELL. No, sir. There are some portions of the arid region where we have a glacial subsoil, and other portions where we have not. The best portions of the irrigable lands, on the eastern slope of the Sierra Nevada, have glacial subsoil, but not all.

Senator MOODY. Do you know what the surface of the soil is in southern Dakota?

Director POWELL. It is loam in the main; it is sandy in some places.

Senator MOODY. Sandy loam, is it not?

Director POWELL. It varies from sand to loam.

Senator MOODY. This report says that the Woonsocket well would irrigate, with the rainfall of that region, 1,200 to 1,500 acres, or more than 2 square miles?

Director POWELL. Would it do that in time of drought?

Senator MOODY. I read you the opinion expressed. The Woonsocket well would irrigate with the rainfall of the region. He gives the rainfall as variable. He says it would irrigate, with the rainfall of the region, 1,200 to 1,500 acres, or more than 2 square miles.

The CHAIRMAN. Who expresses that opinion?

Senator MOODY. Mr. Hay, I think it is. It is incorporated in an extract from the report of Professor Hay, who is here. Possibly it may be the expression of Mr. Culver, of the Vermilion University, and he is perfectly familiar with that region of country. The report continues:

It is too much to say that eight or ten thousand wells as large as the Woonsocket well could be put down on the Dakota artesian area without reducing the head of water, but it is a reasonable expectation that half that number of wells might be placed and could irrigate several hundred acres each.

The CHAIRMAN. What was the cost of that Woonsocket well?

Senator MOODY. In regard to that, Supervising Engineer Edwin S. Nettleton, says:

The geologists intimate that the source of supply comes from the mountains to the west. If this be true, the gathering ground is sufficiently elevated and the supply is ample to lead us to predict, with considerable certainty, that this basin will maintain its present force even when penetrated with a much larger number of wells. The average flow of the wells in Dakota is about two cubic feet per second.

If all the water from one of these wells was stored, allowing that one-half of it be lost by evaporation, percolation, and transportation from the reservoir to the field, it would cover about one thousand acres nine inches deep, per annum. The cost of wells from eight hundred to twelve hundred feet deep ranges from \$3,200 to \$5,000—we will say \$5,000, including reservoir—then we have \$5 per acre as the first cost to provide for irrigation.

I think that estimate of the cost is based on the uncertainty which attended the sinking of wells in Dakota before this investigation, and before any sort of scientific or regular knowledge was applied to it.

The CHAIRMAN. Now, Judge Moody, I want to remind you that time is flying.

Senator MOODY. I am very much obliged to the Chairman.

Director POWELL. May I say one word, Mr. Chairman? I want to make it clear—and I do not think I have—why that district is cut up.

The CHAIRMAN. I think that ought to be made clear.

Senator STEWART. Before we conclude I am anxious that Colonel Nettleton, who was an engineer there, and Captain Dutton, should state their views of what is necessary to certify reservoir sites.

The CHAIRMAN. Is Captain Dutton here?

Senator STEWART. I have not seen him. I believe he has been sent for.

Senator MOODY. I have forgotten one thing, if the Chairman will pardon me, which I regard as of importance. Major Powell, out of this \$720,000, appropriated by this bill, how much do you intend to assign to South Dakota for operations there?

The CHAIRMAN. One-sixteenth of \$800,000 would be \$50,000 in round numbers.

Director POWELL. Senator, I estimated by States and Territories but the House committee concluded to lump it. I have been sometimes blamed for lumping estimates, and Congress will very often take my items and throw them into lump sums. This time the House threw my estimate into a lump sum. I asked for \$40,000, if I remember rightly, for South Dakota, and \$40,000 for North Dakota, to be used in this region of country (pointing on the map).

Senator MOODY. If this appropriation is made, is that what you still intend to assign to South Dakota?

Director POWELL. I shall have to submit that point to the Secretary of the Interior. I should recommend about that.

Senator MOODY. What would you propose to use that \$40,000 for in South Dakota?

Director POWELL. For studying the streams, some of which you have mentioned; for studying all the streams of South Dakota.

Senator MOODY. I thought you said you knew them. How long will it take, and how much will it cost, to study those streams of South Dakota?

Director POWELL. It will take a good deal of money.

Senator MOODY. What sort of study would you give them?

Director POWELL. I should make a topographic survey of them for selecting reservoir sites, canal sites, and lands.

Senator MOODY. Throughout the eastern part of the State have you not already what is equivalent to a topographic survey—the elevations at the railroad crossings everywhere?

Director POWELL. Some of them.

Senator MOODY. Are there more than a few miles at any place where you have not that information?

Director POWELL. No, sir.

Senator MOODY. Is not that the case also in South Dakota?

Director POWELL. Not to the same extent.

Senator MOODY. To a considerable extent. Have you not kept posted about railroad building there?

Director POWELL. Oh, yes; we keep the railroad profiles.

Senator MOODY. You would expend \$40,000 in studying the streams.

Director POWELL. As the bill stands now I should expend \$40,000, if the Secretary allotted that amount to it, for topography, hydrography, and construction surveys.

Senator MOODY. How much hydrography survey would you make on this Jim River when the water would not run from it?

Director POWELL. The Jim River is 200 miles east of where I work. Under the law I have no right to work on the Jim River. You have been talking about localities and places not embraced in my territory. You have been giving the rain-fall at 37, 47, and 27 inches at different localities not embraced in my territory at all. Everything you have said to-day is about another region of country with which I have nothing whatever to do.

Senator MOODY. What would you do west of the one hundredth meridian?

Director POWELL. Just what I have said.

Senator MOODY. Study the streams?

Director POWELL. Study the streams—that is, as the law stands now. As the law stands now I have no right to study the artesian basins. I made an argument for it this morning.

Senator MOODY. Then your construction of the language as proposed by the House would be that you had no authority to study this artesian basin system?

Director POWELL. Yes, sir. I made an argument this morning in favor of studying the artesian basins, and brought with me a clause which I wanted to suggest to the committee in order to permit that.

Senator MOODY. Then you would propose an amendment to this bill.

Director POWELL. Yes, sir; I have four amendments to suggest, if the committee will hear me.

The CHAIRMAN. We will hear you right now, Major.

Director POWELL. (Reading). "For the purpose of investigating all the sources of water supply to be used in irrigation in the region known as the subhumid region"—that is the region about which he has been asking, and not the region where I am at work—"extending from the ninety-seventh to the one hundred and second meridian: For topographic work, \$100,000; for geologic work, \$30,000; for boring artesian wells to determine the extent and value of artesian basins, to be used at the discretion of the Secretary of the Interior, \$30,000.

The CHAIRMAN. You want that in addition to what you have?

Director POWELL. Yes, sir.

The CHAIRMAN. Suppose you put in all the amendments you propose, and we will see what they are.

Director POWELL. I would rather have it itemized by States, Mr. Chairman, because it puts the burden of the decision upon me if they are not itemized in the law. With a small appropriation I can not go everywhere, and then they tear me to pieces because I don't go. I do not know that it is proper to refer to what occurred before another committee, but Senator Moody will pardon me if I refer to my understanding of what occurred before the first meeting which we had of the irrigation committee, and before which I was called; he will remember the circumstances, and he will remember what he said to me—why didn't I draw the red line at the ninety-seventh meridian? Do you remember that, Senator Moody?

Senator MOODY. The red line? No; I do not remember that.

Director POWELL. At that time I explained that I could not go into that. You must remember that that was before this question of reservation came up.

Senator MOODY. My recollection is this, that I asked why you did not expend some of this \$250,000 in North Dakota and South Dakota where the people were living; why did you go off into some region of country where there was nobody and spend this money? That is what I said.

Director POWELL. The law would not permit me to go there, that is all.

Then I desire to submit this further amendment:

For discovering by means of a topographic survey the catchment areas and the reservoir, canal, and headwork sites for irrigating works and the lands best adapted to irrigation by such works, and for segregating such sites and lands	\$420,000
For the hydraulic survey	150,000
For making plans of irrigating works and for determining the cost of the same	150,000

I think that is about the way I would like to have it apportioned. I would rather have it itemized. There are some little amendments to the bill suggested by the Comptroller when it comes to maps, that I wanted to call attention to.

The CHAIRMAN. You can send those to us in a few days.

Senator HALE. Will you not send to the committee the draughts as you would like them to appear in the law?

The CHAIRMAN. He has proposed here, and has just read, a suggestion of a division as to topographic and hydrographic surveys.

Director POWELL. The House committee rejected my proposition to divide it among the States and Territories. The Book of Estimates shows how I would divide it. I sent in detailed estimates by States and Territories, and now I propose to divide it by classes of work.

Senator POWER. I want to say to the committee that I have good, reliable information on the artesian water question at Yankton and all through the southern part of Dakota, to the effect that it is about the same kind of country from the Jim River over to the Milk River and clear to the base of the mountains north of Fort Benton, about 1,000 miles, and I believe that money expended in getting artesian water there would be a beneficial investment. The cost would be very reasonable, and I really believe that it would do our people in that country a great deal of good. To talk about storm waters, or getting water out of the Missouri River for that vast area of country north and east of the Missouri River, is utterly impracticable, all theory. As I said before, I have been out in that country surveying, following engineering. It can be done if there is a sufficient amount of money put into it, but I do not know where you will get the money. I am talking about the country north and east of the Missouri River clear down to the mouth of the Jim River.

The CHAIRMAN. Now go on, major.

Director POWELL. I have no objection, Mr. Chairman, to making a survey for artesian waters; I have never had any objection to that. The only thing is that I think it unwise for the people to undertake to irrigate vast tracts of land in that way. There is another point: I do not believe in going ahead and boring for artesian waters until we determine by geological survey where we ought to bore. I do not believe in boring at random. If there is anything I have said contrary to that I challenge its production. I have never said anything but in favor of artesian wells when you know where to bore them; but I am not, and never have been, in favor of boring at random. How many thousand dollars have you already wasted, and where is the well which has been found? In Captain Pope's time you were boring for artesian wells, and all the money has been wasted because you did not precede it by a geological survey.

Senator POWER. The wells now producing have not been made after a survey.

Director POWELL. Some have, and some have not; the majority have.

The CHAIRMAN. You said you wished to explain why you included Dakota in the arid region. I wish you would do that, and then Mr. Allen wants to ask some questions.

Director POWELL. Because irrigation is necessary there; they already irrigate there. Irrigation is necessary in western Dakota. We are commanded by the law to investigate, and I have investigated the streams marked on that map which the law commanded me to survey. Where the streams are needed for irrigation I am commanded to survey.

Senator CASEY. Has the investigation of North Dakota only been one of the same general character which characterized that of South Dakota?

Director POWELL. Only of that general character. I explained to this committee last year that I could only go in five or six States for accurate surveys with the appropriation given.

Senator CASEY. Who designated at the Land Office sites for reservoirs and ditches? Yesterday the Commissioner of the General Land Office stated to this committee, that under the law certain lands had been withdrawn from settlement.

Director POWELL. I have not designated any lands in North or South Dakota.

Senator HALE. That region is included in your map?

Director POWELL. Yes; it is included in the map.

The CHAIRMAN. I see that it may become material, and it may not. There is a colored map. That is, as I understand it, your view of the region which was designated and characterized in the act of October 2, 1888?

Director POWELL. Yes, sir.

The CHAIRMAN. And that map you furnished to somebody, I suppose?

Director POWELL. I furnished that map one day last week to the Land Office.

The CHAIRMAN. Under the opinion of the Attorney-General land has been set apart as being within this arid region, by the act of October 2, 1888. Now where, when, and how do we know that certain lands are included in the act of October 2, 1888, and certain lands are not?

Director POWELL. There has been no decision rendered on that subject by anybody that I know of—the Secretary or anybody else.

The CHAIRMAN. Then how does it come that any portion of these lands are withdrawn?

Director POWELL. The act says that the lands are withdrawn "from this time henceforth," that is all.

The CHAIRMAN. But somebody must know where those lands are located. You have not withdrawn any?

Director POWELL. No, sir.

The CHAIRMAN. I want to know who it is that fixes the arid regions.

Senator HALE. I take it that the Interior Department, a part of which is the Geological Survey, does it. The action of the Department is based partially upon the surveys and upon the theories and opinions that Major Powell, as Director of the Survey, has brought out in these examinations.

The CHAIRMAN. So do I, but he says he does not know.

Director POWELL. I had nothing to do with the execution of the act.

Senator PADDOCK. Is it not true, Mr. Director, that under the requirements of this statute of October 2, 1888, you did undertake to make a survey and to indicate by your report to the Secretary of the Interior, the particular regions which you thought should be segregated or withdrawn?

Director POWELL. Yes, sir.

Senator HALE. Is that not what you are doing?

Director POWELL. By fragmentary efforts.

Senator HALE. And you propose to go on and finish?

Director POWELL. Yes, sir.

Senator MOODY. I understand that is the very end of it. He now

makes a report in order to have the President issue his proclamation restoring the lands to homestead settlement.

Senator PADDOCK. How does it happen that this condition of things exists that makes this map possible? There is a map which indicates that a certain region of country is arid land, which is treated, or already undertaken to be treated, by this act of October 2, 1888, as such?

Senator HALE. That is what it is.

Senator PADDOCK. It has been marked out by somebody and so designated. The Secretary of the Interior could not do that.

Director POWELL. May I answer? Pardon me.

Senator PADDOCK. Certainly.

Director POWELL. I constructed this map for the use of the Senate Irrigation Committee, to show them what I thought were the irrigation districts of the arid lands. So far as I know, they have never had that map in the Interior Department until one day last week, when it happened that I was in conversation with the Commissioner of the General Land Office who wanted to know what I thought about these irrigation districts. I said I had presented that whole subject by map to the Senate committee. I prepared that map to show to the Senate committee what I thought would be the irrigation districts under the act.

The CHAIRMAN. That is what I supposed to be true. But the Director stated that he had nothing to do with this question. Then I wanted to know.

Director POWELL. There must be in the minds of some of the gentlemen here some order which I do not know anything about.

Senator CASEY. You have actually designated that portion of North Dakota as susceptible of irrigation?

Director POWELL. I say that in each one of the districts there is a stream which can be used for irrigation, which they are beginning to use, and which I have studied.

Senator CASEY. You are assuming without having made an examination. If you had made any survey I would find no fault with it.

Senator ALLEN. While you are on that subject I wish to ask you this: Have you not by your official course designated to the Government the region indicated by this colored map as the arid region, within which are lands susceptible of irrigation?

Director POWELL. State that again, please; I do not quite catch your meaning.

Senator ALLEN. I say, have you not by your official course for the Government designated this region of country indicated by this map as an arid region, within which are lands susceptible of irrigation?

Director POWELL. I have exhibited this map to various committees of the House and Senate and to the Commissioner of the Land Office to show the arid region. I have not officially to the Land Office or Interior Department given any interpretation of the law.

Senator ALLEN. But I ask you if that has not been the drift or course of your official information, that that is the arid region within which are the lands that are susceptible of irrigation? Now one question further: Is it not a fact that the lands within that region that are susceptible of irrigation have not yet been segregated from those that are not susceptible of irrigation?

Director POWELL. Only in part.

Senator ALLEN. And that this withdrawal is being made until such time as the susceptible lands may be ascertained?

Director POWELL. That is as I understand it, Senator.



Senator ALLEN. I notice that you have within this area designated parts of eastern Washington, eastern Oregon, and western Idaho.

Director POWELL. Yes, sir.

Senator ALLEN. Did you ever hear of the failure of a crop in that region (pointing to the map)?

Director POWELL. I do not know about that country.

Senator ALLEN. Have you not heard that that region designated, in eastern Oregon, eastern Washington, and western Idaho, is the most productive wheat region in all probability on the continent?

Director POWELL. A portion of that comes out here (pointing on the map). In here (indicating) the testimony which the committee took shows a general failure of crops this year.

Senator ALLEN. Have you heard that that region has produced some fifteen million or more bushels of wheat per annum?

Director POWELL. I know that districts in that region are productive without irrigation.

Senator ALLEN. Have you in your inquiries obtained any information as to how much of that land is cultivated by means of irrigation?

Director POWELL. Very little.

Senator ALLEN. There is not 1 per cent. of it. You never heard of a grain field in eastern Oregon, eastern Washington, or western Idaho cultivated by means of irrigation, did you?

Director POWELL. Very little, indeed.

Senator ALLEN. Did not the result of your inquiries lead you to this conclusion, that that region has either been actually acquired from the Government, or that there are now large populations coming in there and in process of acquiring it under the homestead, pre-emption, and timber-culture acts from the Government?

Director POWELL. I do not know that.

Senator ALLEN. What is your object in designating that region as you have?

Director POWELL. Because portions of that country will need irrigation; that is the universal testimony of your people. You will see a large area in the northwest marked with bars. The purpose of that peculiar marking is to show that the lands where irrigation is necessary are not yet selected from the lands where irrigation is unnecessary. All of the lands will be benefited by irrigation, but some of them do not absolutely need it. Other of the lands, like those on the Yakima and on the plains of the Columbia, do need irrigation, and the people are practicing irrigation. Now, the districts which are marked out in that region are the districts where sites for reservoirs, canals, and irrigable lands that need irrigation are to be selected, but they are not yet differentiated from other lands, and the map shows that.

Senator ALLEN. Are not the streams of all that region rapid streams, flowing down from snow-capped mountains, as a rule, through narrow cañons before they come out into the plains?

Director POWELL. Yes, sir.

Senator ALLEN. Now is not this a fact; that a practical man, considering the condition of the country, together with the populations that are going into it and in process of acquiring lands, might go over that region and easily designate in the most permanent manner the natural sites of reservoirs, and that without expense and without disturbance to the general drift of settlement, designate those selections which might be made?

Director POWELL. I think not. I do not think it could be done in a satisfactory manner without a survey. Guess work will not do.

Senator ALLEN. And is it not a good deal as it would be on a small scale, to take a bearing here, for instance, and another there, and could not an intelligent man in that way go out and see the depressions and the small and exceptional places in which water might be gathered, and separate those from the main body? Would not the principle be about the same?

Director POWELL. Yes, but, Senator, if you were to store water for agricultural purposes you would have to store the water with sufficient economy to make it pay. It has been said here that you can find reservoir sites everywhere. That is true. But we want to find sites that with reasonable economy may be used for agriculture.

Senator ALLEN. Can that not be done approximately without entering into any elaborate survey, and do not those surveys and examinations depend upon the construction work that follows when you come to utilizing the lands?

Director POWELL. I do not quite understand the drift of your question.

Senator ALLEN. I say why is any elaborate or expensive survey necessary if we can select the natural sites for reservoirs? Why not leave the expense of obtaining exact knowledge until the time when the lands are wanted to utilize the reservoirs?

Director POWELL. That is simply to make the topographic survey, and leave the hydrographic survey and the survey for the cost of the work, until later?

Senator ALLEN. Certainly. If you find the bed of an extinct lake, you say that it is a natural site. It occupies from twenty thousand to fifty thousand acres. You simply reserve that, and leave the entire question, of gathering this water supply and estimating the cost of making the dam, to a future time when you want to utilize the water?

Director POWELL. Well, Senator, in my judgment that part of the work of least value to the people, which I am doing, is what has been called here this afternoon the engineering survey or survey which estimates the cost of the works. I think the topographic survey is of far more importance to the people, and the next in importance is the hydrographic survey. Those two are of great importance to the people; the other is of minor importance. The topographic survey discovers the sites and lands and is of prime importance, but it is the most expensive part.

Senator ALLEN. Have you taken into consideration the great damage and inconvenience that will be done to the settlers who are in process of acquiring the lands, by making these sweeping withdrawals?

Director POWELL. I think in many cases it will be a great hardship.

Senator ALLEN. And do you not think that justice and equity will demand that these selections shall be mere approximations in ascertaining the natural sites of reservoirs, so that you disturb the least possible the people of the community?

Director POWELL. You mean on the reservoirs themselves?

Senator ALLEN. Yes, sir.

Director POWELL. I think the selection of reservoir sites ought to be made in the beginning with care.

Senator ALLEN. Why should men be prevented from going upon the public lands that they can cultivate, and making their homes upon them or lose their initial rights, simply to wait upon the selection of sites for reservoirs?

Director POWELL. I do not think they ought.

Senator ALLEN. Do you not know that the effect of this withdrawal

is simply, in a great many instances, to destroy their rights and to practically expel them from the country by making these withdrawals?

Director POWELL. My judgment is that with the appropriation that has been recommended by the House we can designate the reservoir sites and the lands that the people should occupy just as fast as they want them. That is my opinion.

Senator ALLEN. Have you thought of the condition in which, by these sweeping withdrawals, you would leave men who have made initial entries under the desert land act, for instance, which would prevent their going on and utilizing streams in the neighborhood in which they have made their selections?

Director POWELL. Those who have selected lands under the desert land act are not prohibited from using streams.

Senator ALLEN. But they can not comply with the law until they introduce water upon the lands?

Director POWELL. No, sir.

Senator ALLEN. Does not this withdrawal exclude them from introducing water upon their lands until you ascertain what lands will be withdrawn?

Director POWELL. Oh, no. You do not understand it that way, do you?

Senator ALLEN. That seems to be the effect of it.

Director POWELL. The man who has land to irrigate can go on irrigating.

Senator ALLEN. But suppose he has no title; that he has simply made a filing under the desert land act?

Director POWELL. If he has made a filing under that act since October 2, 1888, then he has made a filing which, under the decision of the Attorney-General, is illegal, as I understand it.

Senator ALLEN. Did you intend to have such regions as eastern Washington, shown on your map, withdrawn from settlement?

Director POWELL. No, sir; I had no idea of that kind. I made this map to illustrate irrigation.

Senator ALLEN. Whence comes the authority by which settlers are prohibited from going into certain regions of country and making their filings on land? That is what we are seeking to know.

Director POWELL. I do not know of any authority whatever, except that which is in the law. I know of no decision, except the general decision that the law says so and so.

Senator ALLEN. You do not know of any decision as to the character of the land that is contemplated by the law?

Director POWELL. I know no such decision.

Senator PADDOCK. The law says that on designations, surveys, etc., after the designation it shall be withdrawn; and the designation has been made, and they have been withdrawn. Of course, the Secretary of the Interior was compelled under the law to withdraw after the designation had been made.

Director POWELL. I have made no general designation of lands to the Secretary of the Interior or to the Land Office at all. I am preparing the papers for a number of million acres of lands, designating them as irrigable lands. I am all the time designating reservoir sites.

Senator HALE. When you designate sites for reservoirs, does the fact of so designating lands set them apart for irrigation?

Director POWELL. It is part of the whole system.

Senator HALE. That stops homestead entries.

Senator PADDOCK. As I understand, these reports from the Geolog-

ical Survey, from surveyors in the field in different sections, have gone in some form or other into the hands of the Land Department; that plats have been made in some form, or designation has been made, either in the local land offices, or by them forwarded to the General Land Office, so that, through and under this act, in the Geological Survey performing its duty these designations have come about in the regular way.

Director POWELL. We have selected as lands susceptible of irrigation under this act a little over 30,000,000 acres. I have sent those lists of lands into the Land Office. As they have gone into the Land Office, the Land Office clerks and my clerks are making an examination to see how much of those lands have already been taken and what remains. When that work is concluded then we shall have a list of lands of many million acres which I shall certify to the Land Office as being irrigable lands under the terms of that act.

The CHAIRMAN. I wish you would define at this moment, for my own information, what you understand to be the arid region of the United States.

Director POWELL. In general, I should say that region where irrigation is necessary to agriculture.

The CHAIRMAN. Is there any map anywhere showing absolutely that region?

Director POWELL. No, sir.

The CHAIRMAN. What is that map there?

Director POWELL. That map expresses my opinion of it. But there will be excluded from that map all the timber lands, etc., within that region.

The CHAIRMAN (reading):

And all the lands which may hereafter be designated or selected by such United States survey for sites for reservoirs, ditches, or canals for irrigation purposes—

Having in mind your definition—

and all the lands made susceptible of irrigation by such reservoirs, ditches, or canals are and from this time henceforth reserved from sale as the property of the United States.

Now, as it seems to me, the moment you designate a region that is arid in its character as susceptible of irrigation for agricultural purposes, then this law sets in and takes hold of it?

Director POWELL. Precisely.

The CHAIRMAN. Have you found all that region, lying within that map, of this character?

Director POWELL. No, sir; only one-tenth of that is susceptible of irrigation.

The CHAIRMAN. Then, if I want to occupy land under any law of the United States, I can go now upon it and occupy it, but I do so at the risk of having you step in to-morrow and say, "My dear sir, you are upon a reservoir site," or, "You are upon lands susceptible of being irrigated and are therefore withdrawn." So that the result is practically, is it not, that all the region within that colored map is absolutely withdrawn from occupation under any law of the United States?

Director POWELL. Except the homestead law after proclamation by the President.

Senator PADDOCK. As to the proclamation, that is secondary. As the law stands to-day, the proclamation not having been issued or even anticipated.

The CHAIRMAN. I would like to ask you, Major Powell, how long it

would be under the appropriation provided for by the bill as it comes to us from the House and under your scheme and plan of operation until this cloud—for it is a cloud upon every man's title—will be lifted so that any citizen of the United States can go into that region and plant himself under the law?

Director POWELL. There are forty-five million acres that have gone out from the hands of the Government.

The CHAIRMAN. I want your general view.

Director POWELL. Of the remaining portion, the fifty-five million acres, at the end of this fiscal year I can designate half.

Senator MOODY. But the forty-five millions are tied up, are they not?

Director POWELL. No, sir; I do not understand how they are.

Senator MOODY. No man who has gone there since October 2, 1888, can perfect his title in any shape.

The CHAIRMAN. But he has stated that prior to October 2, 1888, forty-five millions of these one hundred millions had been taken up by people who have the right now to settle upon those lands.

Senator PADDOCK. They have been taken up, but their titles have not all been perfected.

Director POWELL. They can go on and perfect them.

Senator PADDOCK. No; under this designation they can not allow a final proof on any of these lands. If final proof has actually been made and they have their certificates for patents, then they are all right, and the Government is concluded. But if they have not, and their title is in process of being perfected, until they get the certificate for the patent nothing whatever can be done; their titles must remain in abeyance.

Senator STEWART. That was decided distinctly at Vallejo, in the Frisbie case, that until the patent certificate was issued the legislation of Congress withdrawing lands, or making any disposition of them, controlled the Department; that inchoate titles are intercepted by this reservation, and the Land Office is stopped.

The CHAIRMAN. When this cloud is lifted, these men who had taken these initiatory steps prior to 1888, do not lose their rights by this intervening act?

Senator PADDOCK. Oh, no.

The CHAIRMAN. Their rights are held in abeyance.

Senator STEWART. More than that, they are reserved from disposition absolutely under the United States, which has a perfect right to reserve, under the Frisbie decision, until certificate for patent is issued. They are absolutely reserved, and the government has power to reserve until the certificate is issued; and consequently they are reserved; and as to these forty-five million acres that have been applied for and for which patents have not been issued, they are in the same fix as those that were entered before, as well as after, October, 1888, because it was an absolute reservation. The Government can reserve until patent issues.

Director POWELL. Let me explain that map once more, and make my disconnected statements plain. In the progress of the work of the irrigation survey in my office I found it necessary to plan the work systematically, for the sake of economy and that I might be able to complete the work of the irrigation survey within the limits of the estimates which I had made. To lay-out the work properly I had to consider hydrographic basins, and for this purpose I had the arid region of the United States carefully mapped, leaving out the mountains, but delineating with great care the streams, together with the highways,

railroad routes, cities, towns, etc. Then, by long and patient study, assisted by a number of gentlemen in my office, I outlined the hydrographic basins. Many of them I could outline with great accuracy from actual surveys that had been made during the past twenty years; others I could outline only approximately, from such general geographical knowledge as is available. Having outlined these districts, I colored them separately. Then I grouped them, as you see on the map, throwing all of those on the Upper Missouri together with a large outline, those of the Rio Grande del Norte together with a large outline, and so on. Now, what do these geographic basins represent? Simply this: In each basin irrigation is necessary, but these are a few basins in the Northwest where only a part of the lands require irrigation; those are marked, as you see, in a special way. All the rest require irrigation. In all of these districts some irrigation has already been accomplished. In all but the very few there is no agriculture without irrigation. Now, each district is a hydrographic basin, and by that I mean that all the waters within each district can be used in such district for irrigation, and ought to be used therein and not elsewhere. Each district embraces a catchment area and the streams that run therefrom. Each district embraces all of the reservoir and canal sites, and these reservoir and canal sites in the main lie above the lands that can be irrigated, higher up in the valleys and on the mountains. The lands lie lower down. You will see from that statement how my work is systematized, organized, by geographic basins, and how necessary it was for me to construct such a map in order to plan my work.

In appearing to give testimony before the Senate Committee on Irrigation I used this map to illustrate my statement, but in appearing before the House Irrigation Committee I made another set of maps, on a very much larger scale, preparing one for each hydrographic district; but I prepared mere outline maps, and they were cheaply and roughly made, but being on a much larger scale, my statements were more thoroughly understood. Last week, after a conversation with the Commissioner of the General Land Office, I sent him a copy of this map at his request. I do not know what use he will make of it; but as it exhibits the substantial facts relating to this question, that sites and lands are to be selected in each one of those districts, it is very possible, and I believe it would be right, to use it to define the region over which the reservation of lands from disposal under the act of October 2, 1888, extends. I have no authority to interpret the law for the Land Office or for the Department, but only under the approval of the Secretary, to direct the operations of the survey; but were I called upon to interpret the law, I should be compelled to decide that its provisions extend over the districts which I have colored on the map. But I should further decide that the reservation of lands from sale, except to homestead after proclamation by the President, does not apply to the timber lands, nor to any lands that can be irrigated lying under canals that were constructed or begun prior to the act of October 2, 1888. The map was designed to be used in the administration of the work of the survey, but it may properly be used in the Land Office; but I do not know that it will be so used. I have not been consulted about its use in that manner.

Senator SANDERS. I wanted to have Mr. Stewart, who is more familiar with the decisions than I am, although I have practiced law in that western country, to explain what is the effect of a piece of ground being reserved or granted, and described as part of a larger tract, so far as the larger tract itself is concerned. In other words, here are reservoir

sites withdrawn, and here are irrigable lands withdrawn, within a larger limit. Now until those reserved tracts are ascertained, what right remains to go upon the larger tract?

Senator STEWART. None whatever. I was talking with the President about that very point, and he said very pointedly that while it is not determined, and there is a reservation you must keep the whole land to see what is located—the same as in the Spanish grant country, where they would reserve all within the exterior boundaries, although it means three or four times the amount covered by the grant, because the party had a right to have it located anywhere within the exterior boundaries.

Senator HALE. Then this map as originally drawn takes the whole?

Senator STEWART. As originally drawn it takes the whole. The Attorney General was right; it covers the whole. No matter when titles were initiated, if they have not been completed, they never can be completed unless there is legislation to relieve the people from the effect of the reservation in the law.

The CHAIRMAN. Then I understand you to intimate, Mr. Sanders, that if it should turn out that this arid region extends further east than we have any intimation here, all those lands by this legislation are also in jeopardy?

Senator SANDERS. And they are withdrawn. That map, as I understand Professor Powell, showing the irrigating districts, does not assume to cover all the arid region. Major Powell went on to except from that mountain lands and timber lands, which certainly he could mean. This arid region, although it may not be land capable of being irrigated or desirable to irrigate, is still within that region. But the reports of Major Powell—and in respect to them I have no doubt as to their correctness—repeatedly designate about the one hundredth meridian as the eastern confines of the arid region, and he makes the statement that for a hundred or a hundred and fifty miles still further east there is what I suppose he designates as a subarid region. Of course he did not assume to say that it was a meridian line exactly, but practically that was as near as he could get at it to define it in general terms. I believe all the authorities—and they have been multitudinous in the last ten or fifteen years—designate about the one hundredth meridian as the point where the arid region of the United States begins.

Senator MOODY. If a man gets the idea into his head that the arid region extends only to the one hundredth meridian east, he does not know anything about it, for that is as fine agricultural country clear up into Wyoming as there is in the United States.

Senator PADDOCK. It does not seem to me that the Interior Department in its work of administration can take cognizance of any peculiar characteristic of any particular section within these arid regions. Here is an official map. It is a map of the United States, made by the officer charged with the responsibility and duty of making it, and which he has made in pursuance of law. The administration charged with the duty of making the reservations under that law has got to do it. The officer is bound by the limits of that map made by the officer charged with the duty of making it, as long as the law remains.

Senator ALLEN. I understand this to be the law: that until the designation is officially made of the lands susceptible of irrigation, every acre of land within that great belt designated as the arid region is withheld from settlement, and nothing will make it lawful to make settlements there until this designation has finally been made and the body of land afterwards released from the effects of it.

Senator PADDOCK. This discussion has been a very long one, and yet

I do not see that the characteristics of the different sections within this general area are to be taken into account at all.

That discussion is utterly outside of the question to be determined here, it seems to me.

The CHAIRMAN. We have several questions to determine; one is how much we shall appropriate for this purpose. So that I think that brings pretty nearly everything fairly within the range of our discussion.

Senator HALE. That covers the whole question.

Senator PADDOCK. But I mean the discussion about the particular matter before us.

Senator SANDERS. Major Powell seems to be held responsible for the law. This may possibly put him in a wrong position. I do not wish to be extravagant, but I will say that our amazement was excited by reading this law and comprehending its effect upon our people, and we went to the President of the United States—I speak for the Senators of several of the States included within that region—to ask him to issue a proclamation whereby he would open all this land at least to homestead settlers. That was as far as we made any requisition. The President said wisely and well, “How can I do that and still leave places reserved for reservoirs when I do not know where those reservoirs are to be, when the law has reserved all that country until the reservoir sites themselves, the irrigable lands themselves, and the rights of the public in those lands have been determined by law?” So that it seems to us that before this question as to the advisability of continuing the survey is determined, and what appropriation shall be made available to Major Powell, the first thing for us to do is to put the country upon a secure basis and in the position it was on the 2nd day of October, 1888, and out of which inadvertently it has been taken. For it is more startling than anybody would at first think to suppose that the homestead law of the United States (which was the result of a struggle of ten years’ duration and of intellectual activities such as we never had before on any other subject in the United States, I think I may say) has been repealed practically. My friend who sits in front of me (Senator Reagan) has not seen the scope of this law, although his vision is wider than the State of Texas.

The CHAIRMAN. That is pretty wide.

Senator SANDERS. Yes; I am glad to say it is pretty wide. We begin to feel it now, and we should have felt it painfully oppressively if the officers of the United States had known the scope of this law and had enforced it. We are having thousands of people, I do not suppose it is any exaggeration to say, going on those lines of latitude every day. The railroad trains at this time of the year are laden with families going there on the supposition that they can have 160 acres of that land. It is not true. Now, we think anybody is entitled to that who will occupy it. This whole law proceeds upon the hypothesis that the Government shall become paternal and form a kind of Procrustean bed upon which it will lay down these two gifts of irrigation and settlement, and compel settlers to take both or have neither, and that, too, upon the painful doubt or solicitude that haunts the gentleman that somebody will locate himself out there unwisely. I do not deny but that is to the credit of the Geological Survey and the Congress that passed this law. But if we are going to adopt a paternal system of government we should undertake to find out that those men out there who work hard for their money do not invest in securities that



do not pay dividends. If we are going to take charge of them in this respect we should take charge of them in all respects.

My friend, Major Powell, has pictured to us the ruined homesteaders out there. He says there are thousands of homesteaders that have gone out there and unwisely located themselves. Now, I have lived in that country a quarter of a century, in the midst of those people, and I have seen as much of these "shipwrecks" as any other man, and, for one, I do not believe that the Government can do any better for those people than to leave it to their instincts and sagacity and their own care for themselves. Major Powell, so far as he has seen anything about the State of Montana, has simply been over the country that has been occupied before. But I know that a farmer or a miner with an old empty gun-barrel can locate his ditch, and with his eyes can see the water supply that is to feed that ditch. All those elements are brought into operation. I am not saying this in any derogation of the work of Major Powell at all. I believe in science perhaps more than some of my colleagues who speak of it probably somewhat sneeringly. But I say that in this respect a community must work out for itself this problem, and that it is unwise for the Government to take hold of the matter.

I do not believe that it is necessary that we should produce an equilibrium of streams that run from one State into another, or that we must move the people that have settled in the regions adjacent to the upper portions of such streams, and thereby depopulate Colorado and make Kansas populous, depopulate Wyoming and make populous Nebraska, or depopulate Montana and make Dakota populous, as would no doubt be in the interest of citizens who have been so fortunate as to settle lower down upon the streams. I do not believe it would be wise in Congress or in the Geological Survey to undertake to designate anything of the kind. And yet, if there is any logical conclusion to be derived from the argument of Major Powell, that is it. We can irrigate more land with this water nearer the source, for he says very truly that as these streams run down to the plains they lose much by evaporation. That is true. It is true that along the forty-ninth parallel of latitude you may travel from the Lake of the Woods to the Rocky Mountains and find immense rivers that have never had steam-boats on them. Another thing is true, that on that parallel of latitude, and crossing, for instance, the bed of Milk River, it is within the knowledge of my colleague and myself that you can walk dry-shod across the upper stream, and yet you can go down stream 50 miles and you will come to a very considerable river. Between those two points the river will have disappeared under ground. Of course, when water is exposed to the air it evaporates somewhat, although I do not understand that by evaporation the water is lost.

The CHAIRMAN. You think the act ought to be repealed?

Senator SANDERS. Utterly repealed as to the reservoirs.

Senator HALE. This matter is of the deepest interest to you and to your constituents. This is the Committee on Appropriations, and does not deal summarily with the question of the repeal of laws, but deals only with appropriation questions. Now, what steps have you gentlemen taken towards securing the repeal of this law which works such immense mischief to your constituents?

Senator STEWART. The committee has reported in favor of its repeal, but it will be impossible, we fear, to have it passed, because it has not passed the Senate yet. But let me say this: This legislation was put upon an appropriation bill by the House; this reservation was put in and held in by the House, and it seems to me that without any

very great stretch it would be legitimate to insert a repealing clause upon an appropriation bill.

The CHAIRMAN. Then any man could make the point of order on you, and out it would have to go. That is the trouble about that.

Senator STEWART. I do not think anybody in the Senate would make the point of order. Can they make a point of order in the House?

The CHAIRMAN. No.

Senator STEWART. Then it will not be done in the Senate.

Senator PADDOCK. From the Committee on Public Lands I wish to say that I was instructed to report a bill, first, and secondly an amendment, embodying the judgment of the Committee on Public Lands, not for an entire repeal, but for a repeal as to the selection of reservoirs, ditches, and canals.

Senator SANDERS. What I was saying had reference to the repeal. In the first place, I think this entire matter may be left to the people who occupy those States and Territories. The doctrine did originally prevail in Montana, and perhaps I might say it was declared correct in California by my friend here and others as to the private ownership of water (that is private ownership of the right to use it and take it out of the streams, a practical annihilation of riparian rights), but we came to the conclusion after awhile that that was not wise, and so we provided in our constitution that the waters in the State of Montana which are to be public property shall not be subject hereafter to this ownership by appropriation which has heretofore obtained and which still obtains in California. I think that is the general drift of all legislation. I think statesmanship points in that direction.

But there is another feature of this matter. Nobody is going to contend that these reservoirs will frighten the people there so that they can not sleep of nights. No doubt Major Powell sent out very competent young men to make those surveys, and perhaps they are not frightened, they have no children. But our people out there are not going to sit down contentedly with a perpetual overshadowing terror in the idea of one of these reservoirs breaking and sweeping those valleys and all citizens and property in them out of existence. Those sites are selected upon the bodies of the streams themselves. What is to be the result? If the upper reservoir breaks, they all break, and your cities and villages and farms are swept out of existence.

The essential necessity for a reservoir is that it shall be a reservoir lateral with the stream. That is a mere matter of engineering. Major Powell and I discussed that matter last summer, but I see it is not observed in that little map. Perhaps it may be said that the reservoirs will not break, or perhaps it may be said that the country is not good for anything. Let that go. The people of the State of Montana will not accept the determination of the location of these reservoirs except after the most scrutinizing and careful examination as to their location, so that if they do break, as the best of them will, they shall do as little damage as possible.

Therefore I say that if the entire country was left as it was prior to the second day of October, 1888, barring the ownership of the water, whenever we want reservoirs, whenever the people of the State of Montana come to the conclusion that the water there must be preserved to be used in the summer months when it is needed, they will select a place for the reservoir, and if anybody owns a farm upon which the site is selected it shall be condemned, for it is provided by the law that lands may be condemned for such purposes.

Of course in the State of Massachusetts they go further, and allow

a man's land to be condemned for a mill owned by an individual. But when you are undertaking to furnish water for irrigation for a whole community, you can certainly go to work and condemn any farm for reservoir purposes. It will not do. It is not possible for anybody to run over that country and say, "That is a good place for a reservoir, because the valley spreads out and comes near together at a point lower down, and therefore we will designate it as such," and then expect the people to live there under that overhanging terror that such a reservoir will always be for them.

I think the survey should have been created by law and its purposes have been something more than mere irrigation. In other words, I think every piece of ground out there should be examined geologically, and hydrographically, too, if you please, and in all these respects; but when you have made the map and made an examination of the townships, that ought to be useful for every economical purpose for which you had the map made.

Senator ALLEN. For information, not amusement.

Senator SANDERS. Yes, sir. It is more important for the people of Montana to know what sections of land contain minerals than it is to know whether the water will be made to run down hill or up hill. This has been a mere partial examination of the country, and you will have to go over it again. If Major Powell should get through in six years (and I say he can not in twenty) I contend that it shall be so done that he will not have to turn round and go over it again.

Senator REAGAN. I want to refer to the question as to why this joint resolution of March, 1888, was passed, and why the acts of October 2, 1888, and March 2, 1889, were passed.

The Senate and House would never have adopted these but for some moving cause which they deemed sufficient to justify the passage of these acts and this joint resolution. No doubt most of you will remember the discussion of this joint resolution and this act of 1888 when they came up for consideration.

The CHAIRMAN. I recollect it very well. It originated in this committee room.

Senator REAGAN. The purpose was to prevent the monopolizing of the waters of that country which might be utilized for irrigation purposes—to prevent persons from seizing upon them, thereby arresting the settlement of that country, and subjecting the people who obtained land that might be supplied by that water to such charges as the owners of the water might demand. The Senate put in the provision making the reservation—and I believe it was on my motion—of the water and the reservation of the ditches. When the bill went to the House, the House amended the bill by providing for the reservation of the land which was liable to be irrigated. I think it probable that there ought to have been a reservation made by this legislation in favor of those who had taken the incipient steps to obtain titles, and my judgment would be now that that reservation ought to be made if it is necessary, and I incline to think it would be necessary to the preservation of their rights, because I believe it is true that under judicial decisions inchoate titles are subject to the political authority and may be disposed of by the Government. That being so, it seems to me that it would be but just that whatever act is passed those persons who had made selections under any one of the laws should be allowed to protect their titles.

Then the question is pressed upon the committee about the withholding from entry of a large amount of land. That is a question that I suppose could not have been overlooked when Congress adopted this

legislation, as it unquestionably had for its object the securing of lands not already taken up for the benefit of actual settlers and to prevent their being taken up by syndicates and by corporations and individuals seeking to monopolize the water and control the land.

The CHAIRMAN. If you will allow me, I was a member of the conference committee that agreed to this final suggestion. My remembrance is that the House was against this provision, that we put it on in the Senate, and they insisted that if it was adopted there should be an absolute reservation of all these lands. We had three or four conferences, according to my recollection, and finally we hit upon this idea of homestead entries. I want to say that this provision was submitted, as we supposed, to every friend of the measure before we agreed to it in conference.

Senator REAGAN. I think there was a general concensus of opinion in the Senate that that was right.

Senator HALE. I think further, if the Senator will allow me—to bring out the matter a little further—that the idea that the conference committee had of the force of that feature which allows the President by proclamation to open lands for homestead settlement, was not thought of; that that was to wait until other processes had been gone through; that there was in the President's discretion at any time the right to so intervene that actual settlements would not be impeded; that we had not got to await the other stages to see what the geological survey would report as to what lands should be withdrawn, but that was considered as the healing clause of the whole thing.

Senator REAGAN. This legislation, so far as it has gone, could only have been considered as tentative legislation, preliminary legislation; and with that view, the majority of the committee on irrigation has reported one bill, which is before the Senate, and the minority has reported another, having for its object, not to repeal this law, but to carry out its purposes and secure the lands not already appropriated for the benefit of actual settlers.

Now, while I have said that it seems to me that it would be but just to make such provision as would secure the rights of those who have taken steps to acquire titles before this law was passed, still I desire to state to the committee that the repeal of this law at this time would simply be to turn over the valuable water and the valuable land not already appropriated to companies and syndicates that are now organized for the purpose of taking charge of them.

Senator HALE. Under the homestead act?

Senator REAGAN. That you may see that I am not speaking at random about this, you will see a statement here of thirty-three corporations that have been formed in the single Territory of New Mexico since the passage of that law.

The CHAIRMAN. Since 1888?

Senator REAGAN. Yes, sir; and very large amounts of money are being expended by them, with a view of covering an extensive portion of the eastern part of New Mexico, at least.

Senator HALE. They can not get any new lands since the passage of that act.

Senator REAGAN. They are getting them, and whenever you repeal this law they will have got them. My understanding is that in each of the States and Territories the same process is going on, in the face of the law; that, in violation of the law, these companies are going on with their projects, and I have no doubt they have offered every inter-

est they could to members of Congress in order that they may seize upon this vast domain.

The difference between carrying out the former legislation on the one hand, to utilize the land for settlement, and the repeal of the law upon the other hand, so as to open it to be grabbed at once, is that, if you carry out the purposes which caused the passage of this legislation, you will make homes for millions of people, you will make some of the most populous portions of this country, while if you repeal that law you will retard the settlement of that country certainly for half a century. I say this because it seems to me that if we repeal legislation in this way we ought to inquire why it was enacted, whether the purpose was beneficent and right, and whether it is better to carry it out or to repeal it in the interest of corporations and syndicates which are now prepared to seize upon pretty much all the valuable land and water.

Senator SANDERS. They always will be prepared, will they not?

Senator REAGAN. There will be very little left when they shall be satisfied.

Senator MOODY. I would like to ask the Senator if he knows of any body or association of individuals or partnership of any kind or character in my State that is doing anything of the kind he describes?

Senator SANDERS. Or mine?

Senator STEWART. Or mine?

Senator REAGAN. I have not the information at this moment, but I think before long I shall have it.

Senator SANDERS. Or ever did anything of the kind in my State?

The CHAIRMAN. You gentlemen all speak at once.

Senator REAGAN. The same thing has prevailed in other States and Territories.

Senator HALE. What, since the act of October 2, 1888, is it that these syndicates in New Mexico and other Territories are doing when the Government withdraws these lands? What can they do now?

Senator REAGAN. What they are doing is to go on and build ditches.

Senator HALE. That is, they are simply going on as trespassers; they are acting under color of title, but that can not take the place of good title.

Senator REAGAN. Will the Senator allow me to repeat my statement? These things have gone on, and the point is to repeal the law now, and then they will have their titles, either inchoate or complete, as the case may be.

The CHAIRMAN. According to Major Powell, 45,000,000 acres of these lands were taken up by people before the passage of the law of the 2d of October, 1888.

Senator REAGAN. I understand that.

The CHAIRMAN. Now, do you think it is right for us, either by that legislation or by any subsequent legislation, to deprive these people of whatever their rights were and ought fairly to be under the laws as they existed at the time?

Senator REAGAN. I have stated that it seems to me that equity should secure to them their inchoate titles.

The CHAIRMAN. Their titles, whatever they were. That takes nearly one-half these lands.

Senator HALE. A great many of them have perfected their titles.

The CHAIRMAN. I suppose so. Is it true that since the passage of this law in addition to the owners of that 45,000,000 acres there are other people who are forming combinations to seize upon the balance of this land? Is that the idea as shown from the testimony?

Senator HALE. I do not see what they can do if they try.

Senator ALLEN. Let me ask you a question, Senator Reagan.

Senator REAGAN. Certainly.

Senator ALLEN. Take such a young State as Washington, Montana, or either of the Dakotas; are there any laws under which persons can acquire lands except under the homestead, pre-emption, and similar laws?

Senator REAGAN. No, sir.

Senator ALLEN. Can these companies, if they organize, do more than dig water-ditches for furnishing water? And then would they not be subject to public regulation, like all other corporations?

Senator REAGAN. What they can do legally and what they can do in violation of law are two entirely different things. I am not talking about what they can do legally, but what they are doing in violation of law. Let me read an extract from the report of the minority of the Committee on Irrigation:

A list is subjoined of the corporations formed for purposes of irrigation during the single year ending September 1, 1889. The most important operations now in progress are those of the Pecos Irrigation and Investment Company, in the valley of the Pecos. This company is now constructing two immense canals; the first being 40 miles long, 35 feet wide at the bottom, and carrying 7 feet of water, and the other 45 miles long, being no less than 50 miles long, 45 feet wide at the bottom, and also carrying 7 feet of water. These are both to be fed by the Pecos, the flow of which is calculated to be 1,000 cubic feet per second. The intervening space is to be supplied by immense reservoirs; three of which are in process of construction; one being 1½ miles long, three-fourths of a mile wide, and 12 feet deep; one 1½ miles long, 1 mile wide, and 18 feet deep; and the largest, which merits the name of a lake, being 7½ miles long, 2½ miles wide, and 40 feet deep. This vast work will cost about \$1,000,000, and it is expected to irrigate between 200,000 and 300,000 acres of land. No one can even imagine what New Mexico will produce when her immense acreage of fertile soil is brought under cultivation through enterprises of this kind.

*List of corporations for irrigation.*

Corporation.	Locality.	Corporation.	Locality.
Reservoir Irrigating Company.	Near Navajo Springs.	The Dark Canyon Ditch Company.	Lincoln County.
The Pecos Valley Land and Industrial Company.	West side of Rio Pecos, in Lincoln County.	Springer Land Association	Colfax County.
The Pecos Irrigation and Investment Company.	Lincoln County.	The Lincoln County Ditch Company.	Rio Hondo, Lincoln County.
White Oaks Development Company.	Do.	The Spring Valley Ditch Company.	Lincoln County.
Peñasco Tank Irrigating Dam and Ditch Company.	Do.	Perry Fountain Ditch Company.	Do.
The Union Ditch Company.	San Juan County.	Albuquerque Irrigating Canal and Land Company.	East bank of Rio Grande in Bernalillo County.
The Guadalupe Valley Ditch Company.	Lincoln County.	The San Juan Water Company.	San Juan River, San Juan County.
The Rio Chama Mining and Improvement Company.	Rio Arriba County.	The Fort Sumner Land and Ditch Company.	Any place within the Territory.
The Detroit and Rio Grande Reservoir and Pipe Line Company.	Doña Ana County.	The Roswell Water Company.	Roswell, Lincoln County.
Lower Belix Ditch Company.	Rio Felix, Lincoln County.	The Dark Canyon Water Company.	Lincoln County.
The Bowman Irrigation Company.	Lincoln County.	The Mountain Irrigation Company.	Do.
The First New Mexican Reservoir and Irrigation Company.	Do.	Una de Gato Canal and Irrigating Company.	Not specified.
San Juan South Side Canal Company.	San Juan County.	The Santa Cruz Land and Irrigation Company.	Rio Grande, between La Joya and Santa Cruz.
Lincoln Aquegia Company.	Lincoln, Lincoln Co.	Jicarilla Mining and Water Company.	Not specified.
The Guadalupe Valley Irrigating and Milling Company.	Lower Rio Peñasco.	The La Plata Ditch Company.	Do.
The Pecos River Ditch Company.	West side Pecos River, terminus near Salt Creek.	Rio Puerco Irrigation and Improvement Company.	Bernalillo County.

Senator STEWART. I would like to ask the Senator if he knows any where in the United States where there has been any monopoly of land by irrigation companies; if it is not a fact that where irrigation has been undertaken it was the very necessity of the case that there should be a population to whom to sell and dispose of the lands; whether the irrigation of land has not operated in California, where it has been carried on most successfully, as a distribution of land, or otherwise it was effectually tied up; and if that is not the necessary result of irrigation to be carried on profitably by large companies. My experience is that every company that has tried to irrigate land, and has had Mexican grants, before they could make any money were compelled to colonize the land. The greatest irrigation enterprise in California is that on Kern River, by Hagan & Co., and they are offering their land for sale. I believe it has operated that way.

The CHAIRMAN. I also want to ask Senator Reagan a question, if he will allow me. These companies seem to be irrigating companies; they do not seem to be companies for the purpose of getting lands. I would like to ask you right in that connection if this whole plan of reservoirs and canals does not contemplate an enormous expenditure of money either by the Government or by individuals or an aggregation of individuals?

Senator REAGAN. Yes, sir.

The CHAIRMAN. How is the Missouri River to be changed and taken out of its course except by enormous expenditure either by the Government or by somebody else? So that it seems to me those people are carrying out the exact views of the promoters of the scheme.

Senator REAGAN. I am asked if I know of any large aggregations of land. I believe the Senator and I passed through one holding of about 40,000 acres in California.

Senator SANDERS. Obtained under the homestead and pre-emption land laws, or under Mexican grants?

Senator REAGAN. No, sir; it was a large holding of land under irrigation; I do not know how extensive this is. Now, Mr. Chairman, with reference to the question you propose, that is not provided for in the law. There is a bill now pending before the Senate, the twelfth section of which makes this proposition for the disposition of the matter:

SEC. 12. That it shall be lawful for any State or Territory in which are situate any of the irrigation districts authorized in this act to provide by general statute for the purposes herein named, to wit:

First. For the use of the waters of such irrigation districts for service on the lands selected and segregated as irrigable lands by the United States, and for other useful and beneficial purposes; and, further, for the construction of irrigating works under authority of the commissioners of the several irrigation districts by any of the methods, to wit: First, by the co-operation of the people interested therein; second, by taxes levied on the lands irrigated; third, by the issuance of irrigation-district bonds, the interest and principal to be paid by taxes levied on the land irrigated; fourth, by granting to persons or corporations the right and imposing on them the duty of supplying water for irrigation and other beneficial purposes, through the agency of irrigation works, for a term of twenty-seven years, and by providing that the services of such persons or corporations shall be paid for by the users of the water at just and reasonable rates for measured quantities of water, and not at rates per acre or quantity of land irrigated, and by further providing that at the expiration of twenty-seven years from the beginning of the first service of water, the rights and duties of such persons or corporations shall terminate, and all such irrigation works shall thereupon become and be the property of the irrigation districts to which they pertain.

Second. For the use of the timber and fire-wood of such irrigation districts for domestic, mining, and other purposes, and that the users of timber and wood for such purposes shall pay to the commissioners of any irrigation district from which timber or fire-wood is taken an amount sufficient to cover the expense of the maintenance

of the forestry organization in such irrigation district, and not more than twenty per centum of the same added thereto; and all revenue derived from the sale of timber and fire-wood by the commissioners of any irrigation district shall be used, first, for the maintenance of the forestry organization of the irrigation district; and, second, for the construction and maintenance of irrigation works. And the forest areas from which such timber and fire-wood are taken shall be designated by the commissioners of the irrigation districts in such manner as they may deem wise for the protection and advantage of the sources of the water supply for irrigation, and for the protection and permanence of reservoirs and other works of irrigation: *Provided*, That the administration of such statutes shall be relegated to the irrigation districts.

Third. For the use and protection of the pasturage of such irrigation districts: *Provided*, That the administration of such statutes shall be relegated to the irrigation districts.

The CHAIRMAN. Is it proposed by this legislation that the United States shall go into a State and control its water-courses and streams?

Senator REAGAN. That is just exactly what it does not propose to do. Let me state. This bill has for its object, first, under the topographic surveys, to lay off the irrigation district, segregate the irrigable lands, and point out the places for building diverting dams or reservoirs; and, when that is done, to let the people of that irrigation district organize themselves under the legislation of that State or Territory; and, when they have organized themselves, among other things they are to take water as provided; and then the bill provides further for utilizing the pasture lands and timber lands of each irrigation district by making provision that while the pasture and timber lands shall remain the property of the United States, the pasture lands shall be common to the people of that irrigation district. One of the great difficulties of that country is the destruction of timber by fire. It was assumed, in the preparation of this bill, that the people of the irrigation districts had a higher interest than others in the preservation of that timber as a means of preserving their water supply and for fuel, timber, and commercial purposes, and so it was proposed to put that timber also under the control of this irrigation district and make absolute self-government for each irrigation district, controlling its waters, its lands, its pasturage, and its timber.

The CHAIRMAN. That is, the Government was not to dispose of the land at all?

Senator REAGAN. Not the pasturage and timber lands. That is to be done, however, under such laws as are necessary to be provided by the legislatures of the States and Territories; and the provision is made that they are not to have the benefit of the law until they make provision for carrying out its purposes. The foundation for this means of carrying it out was made in the joint resolution and in the two acts to which I have referred.

The inquiry has been suggested a time or two to-day, and it is a matter of some interest, about what the people would do. It should be understood that there is not an irrigation district in that country, that has not more or less population in it. We have a statement of those irrigation districts with the population as shown by the census of 1880, by which it is seen that the population ranges from over 100,000 down.

Then people, of course, will be interested in whatever works are built. Provision is also made in the bill to which I have referred, where the land is already owned by persons now within the irrigation district, that they shall be entitled to the benefits of this water by paying their proper proportion of the tax for the benefit of any works made by the irrigation company.

Now, Mr. Chairman, I did not intend to occupy this much time; I simply intended to call attention to what seems to me worthy of atten-



tion. Repeal this law and let that land go into the hands of the few; arrest the settlement of that country, and the judgment of the future will not be very flattering to us. But carry it out, and you make gardens of those various valleys.

The CHAIRMAN. Your theory is that this legislation, from which you have read extracts, ought to be the legislation supplemental to the execution of this work?

Senator REAGAN. That is my idea. If the members of the committee have time to look at the bill they will see that it purports to be a perfect system for time and all time.

The CHAIRMAN. We will have time to look up on it. You may rely upon it we will look at every section; at least I will.

Senator REAGAN. I want to say, Mr. Chairman, that I am as much interested in that particular part of the country as other Senators. I do not want to combat any just claims they may have, but I do want to call their attention to facts as to what I happen to know, and I do know that those interested in securing those lands have had their agents here, many of them, during this session of Congress, urging the repeal of this law and the defeat of this legislation. I do know that there are very powerful interests at work, not for the benefit of the public, but for the protection of individual interests, seeking the defeat of this legislation. I doubt the policy of it. I think it dangerous.

The CHAIRMAN. Let me ask you one question more. Your idea, then, Senator, would be that this legislation should be preserved practically intact, and that all the land within that colored area on the map should be withheld for the time being?

Senator REAGAN. Until surveys can be made and proclamation issued by the President. If you should have occasion to look on page 133 of this report of the minority of the Committee on Irrigation you will see the population in each of these irrigation districts, and you will see that the basis is already there—a population that is to go to work building dams and making irrigation ditches by association, as they have done in Utah, as I mentioned, or by taxing themselves, or by making contracts with companies and corporations, or by any of the means that other people pursue.

Now, to guard against people doing what they very often do, you find this bill provides that if they make contracts for the building of dams and ditches, those contracts are made subject to the supervision of officers outside of themselves, to see that they do not involve themselves in an indebtedness more than may be reasonably safe for them to do.

I have said all I desired to say, Mr. Chairman, by calling attention to what seems to me to be the danger of repealing this legislation and the injury to the ultimate interests of the country.

Senator SANDERS. I should like to inquire what authority there is in the Constitution of the United States for Congress to pass such a law as that affecting the waters within the States?

Senator REAGAN. If you will refer to the bill you will see that it turns the whole matter over to the States.

Senator SANDERS. It is in the hands of the States now. May they not legislate fully and completely?

Senator REAGAN. The State might legislate regarding the public lands, but it would not be of very much force until Congress gives its consent.

Senator SANDERS. Here is the danger always, that when A B has 80 acres of land, or 160 acres, with stock, horses, etc., somebody may come

along and offer him such an amount of money as he will covet more than he covets his farm, and he will swap the one for the other. That is the difficulty the Senator fears. Now if we wait until A B proceeds there to settle, and dies, and his successor proceeds there and settles and dies, and the country in lumps of 160 acres of land and water is handed over to the President for proclamation that the homesteaders may settle upon it, then we will be precisely where we are now, for when a man leaves his 160 acres somebody else will be liable to buy it, and the proposition is really not made in the legislation which the Senator fears.

I suggested that there was but one remedy, and there is but one; treat these settlers upon the public domains precisely as you treat the Indians—separate them from the soil and say they shall not be competent to swap.

That is the worst form of paternalism, and I am amazed that anybody who believes in Democracy as it has been defined to us in times past should propose to run into everybody's home and make him stay there whether he wants to or not. It is the very desire on the part of the settler to better his condition that frequently shipwrecks him.

The CHAIRMAN. That is very severe criticism on you, Mr. Reagan. Senator Sanders thought you were a Democrat.

Senator REAGAN. I am very much obliged for his idea of Democracy.

Senator SANDERS. I am very happy if I have been able to recall Senator Reagan to the paths trod by his fathers.

Senator REAGAN. Allow me to supplement what has been said. It may be known to the committee—it is certainly known to the people in the West—that this irrigable land, worthless without irrigation, when the dams and ditches are made is estimated in all these reports to be worth from \$25 to \$200 an acre. We took testimony in many cases, especially in southern California, about the value of these irrigable lands, and it was testified that in some places where they planted fruit trees and vines the land was estimated to be worth from \$500 to \$700 or \$800 an acre.

Senator STEWART. Yes; \$1,500 an acre.

Senator REAGAN. I mention that for this purpose, that they can well afford to give a small part of it in order to secure the balance to be made worth from \$25 to \$600 an acre, and I hardly suppose there is an acre of land under irrigation that is not worth more. I remember the testimony in regard to a single section of land at Phoenix, Wyo., that had ditches around it, and which was sold by its owner in Massachusetts at \$200 an acre, and which had never had a plow or hoe in it. But I have no doubt it was worth that amount. I mention this to show the facilities for making immense fortunes by getting possession of this land and increasing its value by irrigation. I do not think there was ever such a field for investment in this country within my knowledge. That that field will be occupied, and that the repeal of this law will leave it in the hands of men who mean to occupy it, I do not for a single moment doubt.

Senator SANDERS. My friend is evidently a disciple of Henry George, and is combating the "unearned increment" of this homesteader who holds land worth \$200 an acre, which value has not been earned.

It is said that some exterior influence is here urging the repeal of this law. I would like to know what evidence Senator Reagan has in regard to that. I can go to-morrow to the State of Montana and march one half of her citizens on foot, if necessary, to the City of Washington to petition for the repeal of this law, and those petitioners will be the

men that have not homes, but want them, and the men who have homes and want neighbors, and know they have the land for them.

The CHAIRMAN. Have you not seen those fellows around here?

Senator SANDERS. No human being has spoken to me about this matter except Senators officially connected with it. If I were suspicious and believed in talking about such matters, I should expect to see the agents of the great land and railroad companies here urging us to retain this law, for this law is a godsend to the Northern Pacific Railroad Company in Montana. That company has 20,000,000 acres of land there for sale, and we have withdrawn the balance of the Government lands from competition with the railroad lands. Nobody can get 160 acres as he could twenty years ago—for nothing almost—but he has got to go to the Northern Pacific and pay what they ask. The lands have quadrupled in value.

We have put the people into the position where they are compelled to buy of the railroad company or go without. What is true there is true all along this line, and it is true of all the other railroads, I think. I think I may be acquitted of having interfered by a hair's breadth in this matter from considerations of aught besides pure justice and right. Nobody has intimated to me anything of that kind, but I know that it is understood that these monopolies, as they are called, want to keep this law on the statute books.

Another thing to be considered: What are you going to do as to the waters of that country yet owned by the Northern Pacific Railroad Company, for you have granted to them every alternate section of land over a tract of country 80 miles wide, which includes water, for the water is land just as much as trees are land? That company has rights there as owners that you can not interfere with, and they may drag you and your men into court and make you answer for any damage you do or propose to do, or for the diversion of any water, and they may snap their finger in your face when you undertake to say that they can not conduct the water from the adjacent sections of land and use it as riparian owners have the right to do. We are simply getting into an inextricable and endless mass of confusion, and I undertake to say that the enforcement of that law is more liable to breed riot and disorder among the poor people of the land than it is to aid in getting large tracts of this land into the hands of single individuals.

There are two places in Montana where one partnership owns 9,000 acres of land, about one-tenth of which was bought of the Northern Pacific and the balance was taken up under the various land laws by probably a dozen men; there is another tract of 5,000 or 6,000 acres; and aside from those two I do not know of a holding in the entire State of Montana of a thousand acres of land by anybody.

Senator REAGAN. We visited a farm under cultivation containing 4,000 acres, and a gentleman here in Washington is the owner.

Senator SANDERS. That is a pretty good sized farm, but the land is there. The theory of the gentleman that the land is liable to be gathered together in large holdings by single individuals or corporations is not a good theory to go upon.

The CHAIRMAN. Now we would be glad to hear from other gentlemen. We should be glad to hear you gentlemen farther, but we have given you a rather long time.

Senator STEWART. I would like to have Mr. Nettleton or Captain Dutton say a few words about this survey.

The CHAIRMAN. Now is the time.

Senator STEWART. Mr. Nettleton is here. He has had charge of the

recent investigation in the field under the \$20,000 appropriation, and he was also under Major Powell in the hydrographic survey. I would like him to make a short statement.

#### STATEMENT OF MR. EDWIN S. NETTLETON.

Senator STEWART. Is it necessary, in order to locate reservoirs and segregate the irrigable lands from the others, to have a topographic survey? State all you know about that.

Mr. NETTLETON. I have been in this business of locating and laying out reservoirs for twenty years. I think I have been successful. I have always done it without the aid of maps or a topographic survey. During all this time I have studied economy—how to do the most work in the shortest time with the least money—and to that end have adopted all the known plans. I have not yet found it necessary to make a topographic survey in order to select a reservoir site—that is, I mean a topographic survey of the whole country. Selecting sites and surveying sites for reservoirs means doing some topographical work, such as is required to be done in hydraulic engineering.

The CHAIRMAN. What is your profession?

Mr. NETTLETON. I am a civil engineer.

The CHAIRMAN. You have been engaged in projecting canals?

Mr. NETTLETON. Yes, sir.

The CHAIRMAN. And establishing reservoirs?

Mr. NETTLETON. Yes, sir.

The CHAIRMAN. Where?

Mr. NETTLETON. In Colorado, New Mexico, Idaho, and Wyoming.

The CHAIRMAN. I understand that you make mere reconnaissances, that you do not make topographic surveys?

Mr. NETTLETON. I merely take the topography sufficiently in the vicinity of the reservoir to know its area, its depth, and capacity, with a survey of the dam-site, for the purpose of determining the best construction of the dam and its cost.

The CHAIRMAN. Is it an expensive thing to locate a reservoir?

Mr. NETTLETON. No, sir. The locating of it is simply the finding of it. The determining of its holding capacity and estimating the cost of making the dam to make the reservoir are somewhat expensive. But that depends.

The CHAIRMAN. In selecting a site for a reservoir I suppose you generally take one or two sides at least of natural ground whether it be hills or what not, and three of them if you can find them.

Senator HALE. You do not survey generally the water-sheds or catchment basins?

Mr. NETTLETON. No, sir; we always find maps sufficiently accurate to determine that.

Senator HALE. You find local information touching it?

Mr. NETTLETON. Yes, sir.

Senator STEWART. You had charge of what division last year?

Mr. NETTLETON. I am supervising engineer of the eastern division of the arid country, including the two Dakotas, Wyoming, Arizona, Kansas, Nebraska, and New Mexico.

The CHAIRMAN. Under Professor Powell?

Mr. NETTLETON. Yes, sir.

The CHAIRMAN. Now?

Mr. NETTLETON. Yes, sir. I have been detailed since the 15th of

April last for this artesian-well investigation, the field work of which I have finished.

Senator STEWART. State the results of what you have done in that regard.

Mr. NETTLETON. We have had very little time to make an examination, but we made it the best we could, with a party of geologists and field agents for collecting data regarding the number of wells and what they will cost. The geologists have examined the country to see the extent of these artesian basins. I have had general charge of that field work. We have looked over the country quite thoroughly, from the British line on the north to the Gulf of Mexico on the south, through the country that is semi-arid. We have examined the country to the foot-hills of the Rocky Mountains; we did not have time to take in all the country, but took in mainly the Dakotas, Kansas, Nebraska, eastern Colorado, Texas, and part of New Mexico.

The CHAIRMAN. Did you dig wells?

Mr. NETTLETON. No sir; we had not time in six weeks?

The CHAIRMAN. You looked at wells already dug?

Mr. NETTLETON. Yes, sir.

Senator MOODY. Digging wells was forbidden by the appropriation.

Senator STEWART. State the conclusion to which you arrived?

Mr. NETTLETON. We conclude that the Dakota artesian basin is the largest in this country yet found, and possibly as large as any in the world. It extends from the Nebraska line to Manitoba, and we do not know how much farther west. The indications are that it goes considerably west of the Missouri River, and possibly well into eastern Nebraska. But there are smaller basins.

Senator MOODY. Have you come to any conclusion about how that is to be supplied?

Mr. NETTLETON. Yes, sir; the strata are composed of soft rock, the thickness of which has not yet been determined; the thickest was about 80 feet; a rock which is so soft that the dwellers say it is sand, and the drill will sink into it by its own weight. The openings into that strata are rather small, some of them being only  $3\frac{1}{2}$  inches. Yet those wells throw up immense quantities of water, immense quantities of sand coming along with the water. At one well I suppose there have been several train loads of sand come up through the tube. It has probably thrown up a quantity of sand equal to the cubical contents of this room.

Senator STEWART. Did you arrive at any conclusion as to where the supply of water comes from with which these artesian strata were fed?

Mr. NETTLETON. The indications are that the supply came from the west. The indications are also that the Dakota sandstone, as geologists call it, the water-bearing rock, crops out somewhere east of Great Falls in Montana.

Senator STEWART. You made examinations also down in Texas?

Mr. NETTLETON. Yes, sir; I find that there are no indications of a powerful artesian supply in Texas. One well was completed at Waco, Tex., which compared very favorably with those of Dakota, being somewhat deeper.

Senator HALE. What is its depth?

Mr. NETTLETON. The Dakota wells range from 600 to 1,200, and as high as 1,500 feet deep; the Waco well is about 1,800 feet deep.

The CHAIRMAN. And has a heavy flow?

Mr. NETTLETON. Yes, sir.

Senator HALE. Does it throw the water?

Mr. NETTLETON. Yes, sir.

Senator HALE. To what extent?

Mr. NETTLETON. It has over 60 pounds pressure to the square inch. That would elevate a column 150 feet above the surface.

Senator STEWART. Did you arrive at any conclusion as to what the Government could do to aid these people without going into a general system; I mean what the Government could legitimately do to help the people to irrigate?

Did you come to any conclusion as to whether it was worth while for the Government to aid these people farther than instructing them in regard to the probable supply and ascertaining the extent of the basin?

Mr. NETTLETON. In regard to this large basin in the Dakotas there is only a small portion, in my opinion, that has been developed; that lies in the valley of the James River, probably 400 miles long and 40 miles in its widest part. West of that we anticipate that there will be found a belt that has the same strata underlying a great area of country. We can not say that it is prolific unless that fact has been verified by actual boring. The eastern rim of that belt has been very well determined by the geological strata.

Senator STEWART. Where is that?

Mr. NETTLETON. That is between the James and the Red River of the North, where they struck granite instead of this Dakota sandstone.

Senator MOODY. That is practically the line between the Dakotas and the States of Iowa and Minnesota, is it not?

Mr. NETTLETON. Yes, sir.

Senator HALE. Is there anything in the way of your survey or investigation that indicates where a well should be dug?

Mr. NETTLETON. Yes, sir; perhaps the indications are better defined where not to sink. But there are geological indications where you might reasonably expect to find water. At the same time the problem can not be solved without trials.

Senator HALE. Did you find places where attempts had been made to dig artesian wells and had failed?

Mr. NETTLETON. Yes, sir.

Senator HALE. Did you find extinct wells—wells that had given out?

Mr. NETTLETON. Yes, sir; we found some that went down quite a distance and that are now not flowing wells, but pump wells.

Senator MOODY. State where they are.

Mr. NETTLETON. One is in Denver, one at Fort Worth, Tex. Those are shallow waters, being less than 300 feet deep.

Senator STEWART. Is there any diminution of the water supply from the wells in Dakota?

Mr. NETTLETON. No, sir; we have not yet learned of any decrease in pressure or volume.

Senator STEWART. Would you recommend experimental wells in any of that region by the Government as necessary in order to the encouragement of people to go on with the work?

Mr. NETTLETON. There is no question but that is the only means of irrigation of some of that country, which requires some irrigation during some years; and I think it would be well enough for the Government to make a few experiments to determine the limits of that basin.

The CHAIRMAN. How many wells would you sink?

Mr. NETTLETON. It would depend upon the amount of money I had at command.

The CHAIRMAN. Having the Treasury at command (that seems to be

the idea), how much money would it require to make that development for experiment, or whatever you call it?

Senator HALE. What does it cost to ascertain whether there is an artesian supply 1,000 feet below?

Mr. NETTLETON. It would not cost over \$2,000 or \$3,000.

Senator HALE. For each well?

Mr. NETTLETON. Yes, sir.

Senator GORMAN. You can not dig an artesian well for less than \$5 a foot ordinarily, can you?

Senator STEWART. Oh, yes.

The CHAIRMAN. The town in which I live dug an artesian well that cost less than \$3 a foot.

Senator MOODY. Everything, site and all told, it cost only \$3,300, and that is 1,100 feet deep.

Senator STEWART. What is the distance from where the wells are already flowing to what you suppose to be the outcrop of this sandstone where the mountains supply it with water? What is the interval that has not been developed yet?

Mr. NETTLETON. It is over 400 miles.

Senator STEWART. To where you suppose the outcrop is?

Mr. NETTLETON. Yes, sir; that is 400 miles, very nearly, from the Missouri River.

Senator STEWART. And you say it is possible to find artesian waters in that great space?

Mr. NETTLETON. It looks so, from all the geological and other knowledge we have, that this Dakota sandstone must extend over the whole country from where it crops out.

Senator STEWART. Then you would recommend the digging of a few wells to ascertain that fact?

Mr. NETTLETON. Yes, sir.

The CHAIRMAN. You would begin those wells, I suppose, at the extreme western limit, and as you found the sandstone there you would take it for granted that the whole intervening space was susceptible of being utilized?

Mr. NETTLETON. Yes, sir. I should put a well down in a country that needed irrigation or where the water could be utilized.

There is one point that ought to be decided on; near the James River are high table-lands called the Coteaux where it is possible there is not pressure enough to reach land at the surface. I think it ought to be decided by one test well whether the water will rise to those heights.

Senator HALE. Is this region much in need of irrigation?

Mr. NETTLETON. It has been in the last two years; there have been failures in crops, as much so as in the arid countries.

Senator HALE. Are people moving away?

Mr. NETTLETON. Yes, sir.

Senator STEWART. In regard to Texas what would you suggest about investigating the extent of that belt?

Mr. NETTLETON. I have not formulated any opinion regarding Texas. I know there is one well in that State.

Senator STEWART. Did any of your party make any investigations there?

Mr. NETTLETON. Professor Hay has seen that one well, and studied the geology of the country. He is here.

Senator STEWART. Can we have Prof. Robert Hay?

The CHAIRMAN. Yes, sir.

## STATEMENT OF PROF. ROBERT HAY.

The CHAIRMAN. State your occupation.

Mr. HAY. I am a geologist.

The CHAIRMAN. Where are you employed?

Mr. HAY. I have been employed on the artesian-water investigation by the Department of Agriculture.

Senator STEWART. State what regions you have examined.

Mr. HAY. In this investigation I have been most familiar with Kansas, eastern Colorado and neighboring portions of the Indian Territory, Nebraska, and the southern part of Wyoming. Previous to this investigation I had not seen much of the other countries.

Senator STEWART. Have you examined the Dakotas in this investigation?

Mr. HAY. I have.

Senator STEWART. Did you make an examination to see where the water supply came from?

Mr. HAY. We have done so to a certain extent. I had colleagues who have had considerable local experience in the several States which we have examined—Professor Culver, of Vermillion University, who had already considerable knowledge of the Dakotas; Professor Bailey, of Rapid City, S. Dak.; Professor Hicks, of the State University of Nebraska; and Professor Van Diest, of the Land Office. We have also a short report from Professor Dumbler, of Texas.

Senator STEWART. Are you familiar enough with the Dakotas to state what the general conditions are?

Mr. HAY. I think I am.

Senator STEWART. Do so.

The CHAIRMAN. Do it as briefly as you can.

Mr. HAY. I will, sir. I will say, Mr. Chairman, that the region that we may call the Dakota artesian region as at present identified, very much as stated by Colonel Nettleton, extends from Nebraska, south of the Missouri River, to near the north line of the Dakotas, near the British frontier; that in it are something like one hundred and fifty wells, having considerable force at this time. The largest is at Woonsocket, in South Dakota, but not in the most southern part of that State. The district nearly coincides with the valley of the James River, but we do not suppose that the James River at all defines its area. At present, however, its area may be said to be nearly coincident with the valley of the James River.

The water supply is obtained in sandstone formations that we know geologically as the Dakota sandstone, which I think I may say have a minimum thickness of 150 feet; in many places it is much more. Probably in all the region of which we are speaking these sandstones are thoroughly saturated with water.

Senator MOODY. That is, the minimum depth of the basin would be 150 feet?

Mr. HAY. Yes, sir; they lie under strata of later formation belonging mainly to the cretaceous, which are all much more impervious than these Dakota sandstones; indeed, some of them are clay shales and seem to be perfectly impervious, perhaps their saturation making them so, and the water is held down. In the southern part of South Dakota the depth of water is between 400 and 500 feet. In North Dakota, at Jamestown, the depth of the water is over 1,400 feet, and there is a very general inclination in that direction corresponding with the



rise of the land, showing that there is a dip of water-bearing strata from the north. Professor Culver has prepared a sheet indicating that. [Exhibiting sheet.] The depth increases from Nebraska as you go northerly, this line being the general surface of the country.

The CHAIRMAN. Does that show this sandstone formation?

Mr. HAY. This lower line is said to be the top of it. We also know that it dips easterly from the west. I would say further that this Dakota sandstone crops out not only on the eastern side of the Black Hills in Southern Dakota, but on the western slopes of the Black Hills, and also away to the northwest in Montana, towards the Great Falls of the Missouri, and that for the whole region of this outcrop it is from 2,000 to 5,000 feet higher in its position than the James River banks; that its composition in the region of this outcrop is such as to make it readily absorb the rain-fall upon it; and, besides that, to the west of it is an outcrop of formations that we know as the jurassic or triassic, as the case may be, which are more impervious, do not absorb the water so readily as the Dakota sandstone, and the rain-fall on them, they being at a higher level, largely passes over onto the Dakotas, so that, with the large rain-fall of that region, which is more or less mountainous, running from 25 to 35 inches, there is an ample supply of water for this underground storage.

The CHAIRMAN. What is the character of the water?

Mr. HAY. In the Dakota wells the water is all more or less mineralized. In the more northern wells, which are the deepest, it is most mineralized, but not uniformly in accordance with the depth; but so far as known no well is so mineralized as to be injurious to vegetation. We devoted attention to that personally when we were there, and the reports and the statistical information we have been able to obtain bear that out. That question has been definitely asked and answered.

The CHAIRMAN. Do they use these as table waters?

Mr. HAY. They do in some places; in some places it is not fit for that purpose. The well at Huron has been supplying that place with all its water and a strong force for fire purposes since 1887, and there is no evidence of any diminution. A well has been sunk within the last years 2 miles from the place. The Dakota formation extends south of the Dakotas; it underlies Kansas, Nebraska, eastern Colorado, and runs farther south, and in all those places it yields waters, but not often artesian waters. There is a small group of wells in the Arkansas valley, just on the Kansas-Colorado line; one is in Colorado, and five or six of them are in Kansas.

Those wells obtain water at about a depth of 300 feet from the same Dakota sandstone, but they have very little force. There is nothing in connection with them to suggest that they obtain their water supply from the mountains. There are in some parts of that region springs and a few other wells of an artesian character, which rise in the tube without actually overflowing. That suggests that they have a still further water-bearing character. But on the high flanks of the mountains in southern Wyoming and northern Colorado the Dakota sandstone, where exposed, does not have the same porous character that it has farther north and south; and it is not to be expected of them, in the region east of that, say one degree or a degree and a half on each side of the fortieth parallel, that they would yield much water.

The CHAIRMAN. Unless some Senator wants to go more into detail in this matter, you may state your conclusions.

Mr. HAY. There is one point about the water farther west, in the Dakotas especially. The later formations are of great thickness as you

go west of the Missouri River. It is not likely that the Dakota sandstones will be reached in the region west of the Missouri River, except at great depth, which will make the wells costly, and perhaps it would be questionable whether the force would be sufficient to raise the water to the surface, except in certain areas that warrant a careful immediate investigation of this subject. One of those areas is the recently opened settlement at the Sioux Reservation. There the conditions are such as to warrant the expectation that the Dakota sandstone may be reached at much greater depth. At Denver they have artesian water. At Miles City, in Montana, there is a group of thirty wells with not very large flow, and they are not very deep wells, all of which obtain their supplies from this Laramie formation, which lies over the Dakota sandstone, and it is quite probable that greater depths in the Laramie than a few hundred feet may yield more prolific wells. There is also in southern Kansas a small group of artesian wells of another formation entirely. The largest of those wells yields about 66 gallons per minute, the force not being very great, and the water would not rise to the height of the surrounding prairie, but it comes from a formation which has extended all over the plains from southern Dakota to Texas. That is the source of all the water of all the wells of the plains, and will be of very great service, for the water from those wells can be pumped without any possibility of diminishing the supply.

The tertiary formation, which I have called the tertiary grit simply to avoid stating it to be of any particular age of tertiary, is the water-bearing stratum of the plains. Professor Hicks suggests that on that depends the future of western Nebraska.

There has been a good deal of talk here about the great rivers that have their origin in the mountains and come down to the plains. There are the Republican, the Smoky, the Cimmaron, the Saline, a branch of the Republican, and some others, and not one of those rivers has got water in it permanently until it has obtained the level going through the tertiary formation. After that, with the exception of some few places where it disappears for a few miles, there is permanent water in those streams, and on that it is relied to supply the large amount of water needed for pumping-wells, and it is quite likely that the conditions of the small artesian wells I referred to in Kansas may be repeated and that investigation would find them revealed where they may be used.

It ought to be said further that there is a drift area in western Dakota.

The whole surface of the Dakotas west and north of the Missouri River is covered with a blanket of glacial drift, and it contains numerous beds of gravel, in which in many places are quite large areas of stiff clays which hold down the water in the ground. These yield artesian waters, not to a very large extent, but still they are locally used.

I would like to call attention to a statement that was read perhaps this morning, and which may be likely to make a slightly wrong impression. It is stated in the preliminary report of the Secretary of Agriculture, which statement was prepared by myself, that—

The Woonsocket well—

that is in South Dakota, and, by the way, is probably the second well in the world for size—

would irrigate, with the rain-fall of the region, from 1,200 to 1,500 acres, or more than 2 square miles. It is too much to say that eight or ten thousand wells as large as the Woonsocket well could be put down on the Dakota artesian area without reducing the head of water, but it is quite a reasonable expectation that half that number of wells might be placed that would irrigate several hundred acres each.

That statement conveys the idea that the Woonsocket well would irrigate more than 2 square miles.

The known area of that region is from fifteen to twenty thousand square miles. I say perhaps it is too much to expect that such a well may be sunk in every area of 2 square miles, but I say it would be quite a reasonable expectation that half that number of wells might be placed which would irrigate several hundred acres each, and if the waters can not be raised to the level of the Coteaux, as suggested by Colonel Nettleton, there is still the valley of the Missouri, in which it is quite probable that all this might be repeated without injuring the flow.

Senator MOODY. Will you proceed to give to the committee your views as to the probable continuance of the flow of that artesian water, from what you have already examined, with the increased use which population would naturally cause?

Mr. HAY. It seems to me that there would be no diminution of the supply if the wells were not put too close together. I so intimated in my last remarks, that there would be no diminution for perhaps scores of years. The rocks have been lying there for a long while and are thoroughly saturated. There is a reservoir larger than we can ever hope to build anywhere, and we can tap it at discretion.

Senator STEWART. Is it necessary for the Government to do anything more in regard to those wells than to inform the people?

Mr. HAY. I think it is. Our geological investigation has revealed to us the apparent conditions in New Mexico, as well as in the Dakotas and in Colorado—regions that seem at first sight to have artesian conditions. We would like to verify or negative that seeming. In regard to actual experiments, it would seem that the following-named regions are entitled to something: For instance, the newly opened reservation, the great Sioux Reservation, in the Dakotas. There is a region in which we think at present water may be reached at a reasonable level. It would be reasonable to try it. Also the high divides of the two Dakotas, to see whether the water will rise to the surface. And this all the more because the people in these regions are not used to irrigation, and every well that is put down and used in that way will be an instructor long before any great scheme that could come to help them could be accomplished, and they would learn how to irrigate and would irrigate to some purpose every year.

Adjourned.

FRIDAY, July 4, 1890.

The subcommittee met at 10 o'clock a. m. Present, Senators Allison (chairman), Hale, and Gorman.

#### STATEMENT OF MAJ. JOHN W. POWELL, DIRECTOR OF THE GEOLOGICAL SURVEY.

The CHAIRMAN. Major Powell, you have your stenographer here, who will furnish us with a copy of your remarks. Just state what you wish to say in addition to your statement the other day.

Major POWELL. On the forty-sixth page of the bill the eleventh and twelfth lines read:

For engraving the geological maps of the United States, "forty-five thousand dollars."

Now, the same wording that we have on the forty-seventh page, lines 9 to 12, should be had here, namely :

For the engraving of maps, including the pay of employees, the cost of apparatus, instruments, and materials, and all other necessary expenses connected therewith, fifty thousand dollars.

Senator HALE. The language last year was, "For engraving the geological maps of the United States, forty-five thousand dollars."

Major POWELL. Precisely; but in this bill that is cut off from the preceding paragraphs, by a period, in a way which the Comptroller thinks it ought not to be. On the forty-fifth page, lines 13 to 16 read, "to continue the preparation of a geological map of the United States, including the pay of temporary employees in the field and office, and all other necessary expenses \* \* \* namely." Now all of the items following relate back to that except the last one, which is excluded by the summation and period preceding it.

The CHAIRMAN. Suppose we introduce the two lines now numbered 11 and 12 between lines now numbered 6 and 7?

Major POWELL. That will be all right if you then change the total.

Senator HALE. Now tell us exactly what is the difficulty you have found there.

Major POWELL. The difficulty is I can not employ men to do the work under the present wording of this bill.

Senator HALE. Don't you propose to do it by contract?

Major POWELL. I do; but I want to be able to say to contractors, If you do not do this at a reasonable rate I have authority under the law to employ engravers and do the work in my own office. I have done this for the past year; have a small force of engravers employed, and from actual experience I know what the work will cost, and by continuing this arrangement I am able to contract for engraving at a fair rate. It must be understood that map engraving on copper as it is done for the Government is not a commercial business in the ordinary sense, that is, the Government furnishes the only work of this character done in the United States. There is, therefore, no open market in which you can go to get maps engraved on copper.

Senator HALE. You have been doing this by contract, and have reduced the cost per sheet to \$250, but you now want to organize an engraving department of your own?

Major POWELL. No, sir; but I want to be in a position to say to contractors, If you don't take the work at reasonable rates I will do it myself.

Senator HALE. How would that change the language?

Major POWELL. I wish the language to authorize me to purchase the copper and do the work myself.

Senator HALE. I should not have any question now that you could do that under that language.

Major POWELL. I have not myself, but the Comptroller thinks I had better have it changed.

The CHAIRMAN. I think we had better put it up about line 7 and end it with a semicolon.

Senator HALE. Put lines 11 and 12 up between 6 and 7.

The CHAIRMAN. And the semicolon at the end and increase the total correspondingly.

Senator HALE. That would make the "four hundred and three thousand dollars" four hundred and forty-eight thousand.

Major POWELL. Now there still remain in this bill, on the forty-seventh page, third line, these words: "shall make a report to Con-

gress on the first Monday in December of each year, showing in detail how the said money has been expended, the amount used for actual survey and engineer work in the field in locating sites for reservoirs, and an itemized account of the expenditures under this and any future appropriation." I want to ask that the words "the amount used for actual survey and engineer work in the field in locating sites for reservoirs" be stricken out, or that new words be added.

The CHAIRMAN. "The amount used for actual survey and engineer work in the field in locating sites for reservoirs." Those are the words you want stricken out?

Major POWELL. "In locating sites for reservoirs" will be sufficient. The same party is practically doing all that work at once.

Senator HALE. Major Powell, don't you begin to appreciate the fact that your troubles in life arise largely from having too many things put upon you? You are getting a whole section of the country dead against you?

Major POWELL. The irrigation survey did not originate with me, Senator. If I can be allowed to go ahead one year I am satisfied that all antagonism will be allayed. If this language of the bill should read "in locating sites for reservoirs, canals, and irrigable lands" it would be satisfactory, for it is all done at one operation.

The CHAIRMAN. Major Powell, you have furnished a statement of the expenditures thus far made?

Major POWELL. Yes, sir.

The CHAIRMAN. Is that in printed document form?

Major POWELL. Yes, sir.

Senator HALE. That covers the requirements of the law?

Major POWELL. Yes, sir; as plainly as I can make it.

On the forty-fifth page, in lines 21 and 22, I estimated for \$15,000 more. I wanted to make that \$115,000. The purpose of that was to take up work in the State of Washington and in Florida, because they are pressing for work in those regions very greatly.

The CHAIRMAN. They are pressing in my State, also. You have not got into it yet.

Major POWELL. Oh, yes, sir; I did a piece of work in your State last year. You will see it indicated on the map there [pointing to a map on the wall], in eastern Iowa.

The CHAIRMAN. Then, if for the Geological Survey we were to give you \$15,000 more, that would be exactly to your liking?

Major POWELL. Yes, sir.

The CHAIRMAN. That gives you money enough to carry on your operations pretty thoroughly?

Major POWELL. Yes, sir.

The CHAIRMAN. Did you do any of this geological work in any of these new States and Territories?

Major POWELL. Yes, sir; we are doing some in Colorado and other States.

The CHAIRMAN. The topographical work connected with the irrigation survey is valuable for the Geological Survey?

Major POWELL. Yes, sir; everything done in the map-making for the Irrigation Survey serves the purposes of the Geological Survey.

Senator HALE. On the other hand, if you do it under the Geological Survey it would be utilized for the irrigation survey?

Major POWELL. Precisely.

Senator GORMAN. Is that literally so? Will it answer the same purposes in the end?

Major POWELL. Yes, sir.

The CHAIRMAN. In other words, if it were not for this pressing of the irrigation work, you would in time have all this done in your regular geological work?

Major POWELL. Precisely.

Senator HALE. Have you done any work in Florida?

Major POWELL. Yes, sir. We have been working there in a small way, spending one or two thousand dollars a year, for three years. I have started a very little topography, as you see indicated on the map in blue. Under present appropriations I can spend about \$2,000 a year, and the legislature has petitioned twice for me to take up that work, because of the enormous development of phosphates there.

Mr. Chairman, I wish to say a few words in relation to the irrigation survey which I was prevented from saying when before you last by the interrogatory form of the interview.

Prior to the creation of the irrigation survey bills had been passed in both Houses of Congress repealing the desert-land law, the timber-culture laws, and the pre-emption law, and providing that lands should thereafter be acquired from the General Government only under the provisions of the homestead laws. The measure, however, ultimately failed to become a law, as it was not reported from the conference committee. Thereupon a practical repeal of these laws for the arid region was accomplished in the sundry civil bill as a restrictive clause to the operations of the irrigation survey, but it provided that the irrigable lands might be acquired by homestead settlement after proclamation by the President. Assuming what I am compelled to assume as an executive officer, that Congress accomplished what it intended to accomplish, and that hereafter in the arid region lands are to be acquired only under the homestead settlement in tracts of 160 acres instead of in tracts of more than a thousand acres, and that it is the intention to have the lands selected for this purpose, the irrigation survey has been prosecuted with the utmost vigor, and in such a manner that the lands may be selected and opened to homestead settlement by the earliest possible date. From the best information we have, derived from a careful study of the facts, it seems probable that there are from fifty to sixty million acres yet in the hands of the Government in the region where irrigation is necessary out of which homesteads can be made.

During the past two years only \$350,000 has been appropriated for the work of the survey, and yet with this small appropriation a very large body of lands has been selected. The amount can not yet be stated with accuracy. In the field there were selected more than 30,000,000 acres of land uncultivated and unoccupied, but it was not possible in the field to determine to what extent these unoccupied lands had passed out of the hands of the General Government, and a body of clerks are now at work in the Land Office, a portion of them detailed from the irrigation survey, in examining the records to determine to what extent these lands are now in private hands. As this examination progresses—and it has been going on only a few weeks—it is revealed that an important part of these lands thus selected have already passed from the possession of the Government. What amount of these lands will remain to be certified to the Department and the Land Office is uncertain, but the quantity will be greatly diminished. Still, there will be many million acres ready to be taken by homestead settlement in a few weeks, and these will be pretty widely scattered throughout the arid region, and will mainly be situated in the regions

most densely settled where of course the demand for them is the greatest. If the estimates made by the Director and approved by the House of Representatives and appearing in the items of the bill before you are ultimately granted, the work of selecting these lands can progress as rapidly as they are needed by homestead settlers. If the law is repealed and the lands are opened again to the provisions of the desert-land act, timber-culture act, pre-emption act, and also to the homestead act as now, they will probably be taken up much faster. It is probable that the great body of them would pass out of the hands of the General Government in five or six years. But if they are to be homesteaded only they will go out of the hands of the Government less rapidly, and if the survey can be completed in eight or ten years all of the lands will be selected in advance of requirement.

I am of the opinion that actual settlement and cultivation will progress much more rapidly by an exclusive system of homestead settlement. When the lands can be taken up in large tracts of more than 1,000 acres by one individual they are acquired largely for speculative purposes and are held as uncultivated land, as an investment for the profits arising by increase of values. The wholesale disposal of the lands in this manner has the effect to retard actual settlement and cultivation, and it is my experience and observation that everywhere in the West the farmers themselves protest against disposing of them in this manner. They want the country settled, that they may have neighbors and society and schools and the increase of values which comes with the progress of civilization, and do not want the lands to lie fallow for speculative purposes, nor do they want them to be developed for wholesale farming. In fact, I believe that the general sentiment in the West among farmers is in favor of a much smaller homestead.

But be this as it may, the lands are now reserved for homestead settlement after proclamation by the President. If this policy is to continue, the selections should be made as rapidly as possible. Unless selected, actual settlers do not to any large extent enter upon these lands of their own motion, but are attracted to them by promoters or agents of land and irrigation companies. As long as the lands are unselected the settler himself does not know whether a tract can be irrigated or not; but if selected wisely so that the settler may know that his lands can be irrigated and that he can permanently maintain his home by irrigation, and that the right to use water upon his land can not be taken from him, then the lands will be actually settled and cultivated very rapidly. The legislation in relation to these lands and waters is not yet perfected. Assuming that the General Government will not construct the irrigating works, the legislation necessary to utilize the lands and waters may take either of two courses. By the one course the waters and to a large extent the lands may be controlled by companies. If the legislation should take a course favoring this, the lands will more speedily pass out of the hands of the General Government. But the legislation may take a course so as to attach water-rights to lands and to dispose of these lands in small parcels, and to give the reservoir sites, canal sites, and sites for other irrigating works to the settlers instead of to the companies, and this can be done in such a manner that the settlers may own their own irrigating works, either immediately or ultimately. If this is done it will take a longer time to dispose of the lands, but a shorter time for their cultivation.

Actual settlement and the progress of industrial civilization will be much greater under such a plan. This statement is fully warranted by the facts of experience. Those districts of the arid region where irri-

gation is under the control of companies are in striking contrast to those where irrigation is under the control of communities of farmers. The colony towns of Colorado, the village communities of Utah, and the towns of Southern California are the most prosperous of the communities of the arid region. Similar districts are found elsewhere, but not on so large a scale; but everywhere where the individual holdings are comparatively small and settlement is comparatively dense, there prosperity and a high state of civilization are witnessed and the agriculture actually practiced is developed to the highest degree.

And finally, Mr. Chairman, permit me to say that the development of irrigation and the construction of irrigating works without the intervention of the General Government, and without the intervention of great irrigating companies, but wholly controlled by communities, has been abundantly tried and has been most successful.

The farmers do not need the aid of the General Government to construct their works; the increased value given to the land is more than sufficient to pay for the cost of the works. Nor do they need the intervention of great land and water companies. They can construct the works for themselves, and own them, and be independent farmers—freemen. Often they can construct the works by co-operative labor. When they can not they can easily obtain capital and issue bonds, to be paid at a reasonable time, and thus construct the works and own them. The cry that intermediate companies are necessary is everywhere repudiated by the farmers themselves. If a simple district system is established, by which a community of people are enabled to construct their own works, that will be all that is necessary for the growth and development of agriculture in the arid lands, and two decades will find the whole country full of settlers and these lands under the plow, and millions of people will have homes of their own.

Mr. Chairman, at the last interview my opinion on this subject was not volunteered, but was called out by the interrogatories, and I failed to state it fully, being cut off by subsequent interrogatories, and I thank you for allowing me to make a fuller statement.

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