DEPARTMENT OF THE INTERIOR

WATER-SUPPLY

AND

IRRIGATION PAPERS

OF THE

UNITED STATES GEOLOGICAL SURVEY

No. 28

OPERATIONS AT RIVER STATIONS, 1898.—PART II

WASHINGTON
GOVERNMENT PRINTING OFFICE
1899

IRRIGATION REPORTS.

The following list contains titles and brief descriptions of the principal reports relating to water supply and irrigation prepared by the United States Geological Survey since 1890:

1890.

First Annual Report of the United States Irrigation Survey, 1890; octavo, 123 pp.

Printed as Part II, Irrigation, of the Tenth Annual Report of the United States Geological Survey, 1888-89. Contains a statement of the origin of the Irrigation Survey, a preliminary report on the organization and prosecution of the survey of the arid lands for purposes of irrigation, and report of work done during 1890.

1891.

Second Annual Report of the United States Irrigation Survey, 1891; octavo, 395 pp.

Published as Part II, Irrigation, of the Eleventh Annual Report of the United States Geological Survey, 1889-90. Contains a description of the hydrography of the arid region and of the engineering operations carried on by the Irrigation Survey during 1890; also the statement of the Director of the Survey to the House Committee on Irrigation, and other papers, including a bibliography of irrigation literature. Illustrated by 29 plates and 4 figures.

Third Annual Report of the United States Irrigation Survey, 1891; octavo, 576 pp.

Printed as Part II of the Twelfth Annual Report of the United States Geological Survey, 1890-91. Contains "Report upon the location and survey of reservoir sites during the fiscal year ended June 30, 1891," by A. H. Thompson; "Hydrography of the arid regions," by F. H. Newell; "Irrigation in India," by Herbert M. Wilson. Illustrated by 93 plates and 190 figures.

Bulletins of the Eleventh Census of the United States upon irrigation, prepared by F. H. Newell; quarto.

No. 35, Irrigation in Arizona; No. 60, Irrigation in New Mexico; No. 85, Irrigation in Utah; No. 107, Irrigation in Wyoming; No. 153, Irrigation in Montana; No. 157, Irrigation in Idaho; No. 163, Irrigation in Nevada; No. 178, Irrigation in Oregon; No. 193, Artesian wells for irrigation; No. 198, Irrigation in Washington.

1892.

Irrigation of western United States, by F. H. Newell; extra census bulletin No. 23, September 9, 1892; quarto, 22 pp.

Contains tabulations showing the total number, average size, etc., of irrigated holdings, the total area and average size of irrigated farms in the subhumid regions, the percentage of number of farms irrigated, character of crops, value of irrigated lands, the average cost of irrigation, the investment and profits, together with a résumé of the water supply and a description of irrigation by artesian wells. Illustrated by colored maps showing the location and relative extent of the irrigated areas.

1893.

Thirteenth Annual Report of the United States Geological Survey, 1891-92, Part III, Irrigation, 1893; octavo, 486 pp.

Consists of three papers: "Water supply for irrigation," by F. H. Newell; "American irrigation engineering" and "Engineering results of the Irrigation Survey," by Herbert M. Wilson; "Construction of topographic maps and selection and survey of reservoir sites," by A. H. Thompson. Illustrated by 77 plates and 119 figures.

A geological reconnoissance in central Washington, by Israel Cook Russell, 1893; octavo, 108 pp., 15 plates. Bulletin No. 108 of the United States Geological Survey; price, 15 cents.

Contains a description of the examination of the geologic structure in and adjacent to the drainage basin of Yakima River and the great plains of the Columbia to the east of this area, with special reference to the occurrence of artesian waters.

1894.

Report on agriculture by irrigation in the western part of the United States at the Eleventh Census, 1890, by F. H. Newell, 1894; quarto, 283 pp.

Consists of a general description of the condition of irrigation in the United States, the area irrigated, cost of works, their value and profits; also describes the water supply, the value of water, of artesian wells, reservoirs, and other details; then takes up each State and Territory in order, giving a general description of the condition of agriculture by irrigation, and discusses the physical conditions and local peculiarities in each county.

Fourteenth Annual Report of the United States Geological Survey, 1892-93, in two parts; Part II, Accompanying papers, 1894; octavo, 597 pp.

Contains papers on "Potable waters of the eastern United States," by W J McGee; "Natural mineral waters of the United States," by A. C. Peale; "Results of stream measurements," by F. H. Newell. Illustrated by maps and diagrams.

 (Continued on third page of cover.)

DEPARTMENT OF THE INTERIOR

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UNITED STATES GEOLOGICAL SURVEY

CHARLES D. WALCOTT, DIRECTOR

OPERATIONS AT RIVER STATIONS, 1898

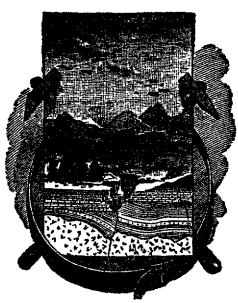
A REPORT OF THE

DIVISION OF HYDROGRAPHY

OF THE

UNITED STATES GEOLOGICAL SURVEY

PART II



WASHINGTON

GOVERNMENT PRINTING OFFICE

1899

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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
DIVISION OF HYDROGRAPHY,
Washington, March 2, 1899.

SIR: I have the honor to transmit herewith brief descriptions of the river stations in the western portion of the country at which work was carried on by the Division of Hydrography of this Survey during 1898, together with tables of daily height and related data, for publication in the series of Water-Supply and Irrigation Papers. The data for the eastern and central portions of the country (Part I) have been transmitted as the preceding number of the series.

In this paper (pp. 193–196) is given a list of low-water measurements made in California during 1898. This work was carried on by Mr. J. B. Lippincott, who states that the season of 1897–98 was one of unusual drought throughout the State. The average rainfall for the city of Los Angeles between the years 1871 and 1898 was 16.59 inches, but for 1897–98 it was only 7.10 inches and for 1898–99 to May 1 it was 4.91 inches, resulting in extraordinarily low stream flow. During the nine years ending in 1898 the precipitation for only one season has substantially exceeded the average of 16.59 inches. During another year it has been slightly in excess, but during the remaining seven years the precipitation has been below this average, and during four of these seven years the deficiency has been very marked. Objection has been made to the publication of these measurements of low-water flow as prejudicial to private interests, but it is believed to be highly important to give the facts as obtained. At the same time it should be clearly stated that absolute correctness is not claimed for measurements of this character, but that the results are accurate within ordinary or practical requirements, being as complete as is possible with the available funds. The results furnish a fair general indication of the flow of the streams. The measurements made with current meters are known to be reliable, and the volumes determined from the intermediate rod readings are approximately correct within the limit assignable to ordinary engineering estimates.

Very respectfully,

F. H. NEWELL,
Hydrographer in Charge.

Hon. CHARLES D. WALCOTT,
Director United States Geological Survey.

OPERATIONS AT RIVER STATIONS, 1898,

PART II.

ARKANSAS RIVER DRAINAGE.

DESCRIPTION OF RIVER STATIONS.

Granite station on Arkansas River.—Described on page 117 of Paper No. 16; results for 1897 given on page 353 of the Nineteenth Annual Report, Part IV. The observer is W. R. Reed. The record has been kept only for August and September, 1898.

Salida station on Arkansas River.—Described on page 118 of Paper No. 16; results for 1897 given on pages 354–355 of the Nineteenth Annual Report, Part IV. The observer is William Furniss.

Canyon station on Arkansas River.—Described on page 119 of Paper No. 16; results for 1897 given on pages 355–356 of the Nineteenth Annual Report, Part IV.

Pueblo station on Arkansas River.—Described on page 120 of Paper No. 16; results for 1897 given on page 356 of the Nineteenth Annual Report, Part IV. Neither of the rods described in Paper No. 16 are now being used, being replaced by one at Main Street Bridge, described below, where measurements for all three rods have been made. The river is confined by city levees, and the bed is sandy and constantly changing. The observer was R. L. Holden up to August 31, at which time observations were abandoned at the Santa Fe Avenue Bridge, being replaced by those taken at Main Street Bridge. The list of discharge measurements for this station will be found under the heading of Main street station, they being applicable to both points, and all having been taken at the Main Street Bridge, which is located between Santa Fe Avenue and Victoria Avenue bridges.

This station, as above stated, is intended to take the place of the Santa Fe Avenue Bridge at Pueblo, from which reports were received up to September 1, but which was abandoned because of the cutting down of the bed of the river and the unreliability of the reports. The new station on the east side of Main Street Bridge was established July 10, 1898, by A. L. Fellows. The gage rod consists of an inclined 2 by 6 inch by 15-foot plank, with a slope from the vertical of 4.6 feet in 15 feet. The space between the marks on the rod is 0.104; the gage rod is well painted and is fastened by iron bolts in the masonry wall. The initial point for sounding is the north end of the bridge on the east side. The channel is straight above and below for about 1,000 feet, and is of gravel and sand. The banks are high city embankments of slag and masonry and are not liable to over-

flow. The cross section of the channel is good, but fills up somewhat in low water and scours in high water. The observer is Mr. C. W. Reece, water commissioner of district No. 14. Readings are also taken at this point by the Pueblo city engineer.

Nepesta station on Arkansas River.—Described on page 121 of Paper No. 16; results for 1897 given on page 358 of the Nineteenth Annual Report, Part IV. S. M. Butts was observer until July 2, and J. P. Haines for balance of the year.

Rocky Ford station on Arkansas River.—Described on page 122 of Paper No. 16.

Manzanola station on Arkansas River.—This station is located about one-half of a mile north of Manzanola, Colorado, at a wagon bridge, and was first established September 29, 1897, by Porter J. Preston, when a measurement was made, showing a discharge of 208 second-feet. The rod was changed in May, 1898, however, and is now nailed to a 2 by 4 inch timber, which is securely fastened to an iron pier in the center of the stream. The rod consists of a 2 by 6 inch by 12-foot timber, marked in tenths by means of a 1 by 6 inch scale. The initial point for soundings is on the right bank, which is high, while the left is low and liable to overflow. The river bends at this point and is not straight for any considerable distance above or below, but the channel, which is in sand and gravel, is not liable to much change. The observer was M. D. Lyle, a ditch rider on the Catlin Canal. No sufficient number of discharge measurements were made upon which to base a rating table.

Trinidad station on Purgatory River.—Described on page 123 of Paper No. 16; results for 1897 given on pages 358–360 of the Nineteenth Annual Report, Part IV.

J. J. Ranch station on Purgatory River.—This station is located 22 miles south of Lajunta, Colorado, and is approximately 27 miles above the mouth of the Purgatory River. The gage rod is placed one-half mile below the mouth of Smith Canyon, a large tributary of the Purgatory. It is nailed to a pole, which is securely fastened by means of stakes driven into the bank. The rod was originally graduated for a vertical position, but was afterwards placed in a sloping position. The elevations of the several footmarks were taken with a wye level, and a correction table was made, giving the corresponding vertical values for the inclined rod. The elevation of the gage rod was established in reference to a bench mark placed on the foot of a large cottonwood tree. The river channel is straight for a distance of 400 feet above and 250 feet below the gage rod. The bottom is of gravel, and there is considerable fall both above and below the rod. The discharge measurements were taken in 1898 by C. W. Beach, but owing to the fact that the two gagings were made at times when the gage rod was in different positions, there is no known relationship between them, and no rating table was constructed. The observer is Edward Sanborn, a ranch laborer.

Las Animas station on Arkansas River.—This station is located about one-half of a mile north of Las Animas, Colorado, at a wagon bridge, having been established May 13, 1898. The gage consists of a 1 by 5 inch board marked in tenths and wired securely to an iron bridge pier on south side of river and upstream side of bridge. The river is straight for 200 feet above and 300 feet below; the bed is sandy and shifting. The banks are not liable to overflow excepting at very high water. The observer was C. W. Beach in May and C. L. Morris after July 19. No gagings were made in 1898.

Amity Canal headgates on the Arkansas River.—This station is located at the head of the Amity Canal, 7 miles west of Lamar, Colorado. The canal is taken out on the north side of the river at a point where there is a wooden dam extending across the stream. The dam is 365 feet long; the crest of the last 81 feet on the south side is 15 inches higher than the crest of the remaining 284 feet, which latter is 4 feet and 4 inches above the floor of the head gates. The river at this point washes against a sandstone bluff. The dam makes the river channel unchangeable, and, taken in connection with the canal, it furnishes an excellent place for obtaining the total discharge of the Arkansas River at this point. During the past year the gagings of the canal have been taken in its rating flume; this necessitates a separate gage for crest of dam. It is expected, however, that on January 1, 1899, one gage rod will be so placed as to serve both for the dam and the canal. The observer is Mr. E. R. Bannister, headgate keeper of the Amity Canal.

Granada station on Arkansas River.—This station was located at the head gate of the Buffalo Creek Canal, 2 miles northeast of Granada. The equipment consists of a bridge upon the head gate of the canal, there being an earth dam across the Arkansas at this point, which sometimes breaks during high water and has to be repaired, thus making the results of the gage readings of not great value, excepting as showing the rise and fall of the water. The gage rod is vertical and well painted, nailed to the head gate. The channel is straight for about 2,600 feet above and about 800 feet below, and the water runs swiftly both above and below. The banks are high on each side and the bed of the stream is of gravel and more or less changeable. The observer is Ben Riley, a ditch rider of the Buffalo Creek ditch, who takes the observations once each day at 7 a. m. No gagings have been made at this point, as the bed of the stream is so changeable that gagings would be of but little value. It is expected that different arrangements, giving more valuable results, can be made during 1899.

Hutchinson station on Arkansas River.—Described on page 124 of Paper No. 16; results for 1897 given on pages 360–361 of the Nineteenth Annual Report, Part IV.

Liberty station on Verdigris River.—Described on page 125 of Paper No. 16; results for 1897 given on pages 369–372 of the Nineteenth Annual Report, Part IV.

Iola station on Neosho River.—Described on page 126 of Paper No. 16; results for 1897 given on pages 361–363 of the Nineteenth Annual Report, Part IV.

TABLES OF DAILY GAGE HEIGHT.

Daily gage height, in feet, of Arkansas River at Granite, Colorado, for 1898.

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1	3.50	3.35	9	3.50	3.20	17	3.30	3.10	25	3.45	2.90
2	3.50	3.35	10	3.50	3.20	18	3.30	3.10	26	3.40	2.80
3	3.50	3.35	11	3.50	3.30	19	3.30	3.10	27	3.30	2.80
4	3.50	3.35	12	3.50	3.30	20	3.30	3.10	28	3.30	2.80
5	3.50	3.35	13	3.40	3.30	21	3.30	3.00	29	3.35	2.80
6	3.50	3.35	14	3.30	3.20	22	3.30	3.00	30	3.40	2.80
7	3.50	3.30	15	3.30	3.20	23	3.30	3.00	31	3.35	.....
8	3.50	3.20	16	3.49	3.15	24	3.40	2.90			

Daily gage height, in feet, of Arkansas River at Salida, Colorado, for 1898.

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1	1.05	0.90	0.70	0.90	12	0.80	0.80	0.80	0.80	23	0.75	0.70	0.90	0.75
2	1.05	.85	.70	.90	13	.80	.80	.70	.80	24	.85	.70	.90	.80
3	.90	.80	.65	.90	14	.80	.80	.70	.80	25	.90	.70	.90	.85
4	.90	.80	.60	.90	15	.80	.80	.70	.80	26	.85	.70	.90	.80
5	.90	.75	.70	.90	16	.80	.75	.70	.80	27	.80	.70	.90	.80
6	.90	.70	.60	.90	17	.80	.70	.70	.80	28	.80	.70	.90	.80
7	.90	.70	.60	.90	18	.90	.70	.80	.80	29	.80	.70	.90	.80
8	1.00	.70	.70	.80	19	.80	.70	.80	.90	30	.75	.70	.90	.90
9	.90	.70	.75	.80	20	.80	.70	.80	.90	31	.70	.....	.90	.....
10	1.00	.70	.80	.80	21	.80	.70	.80	.90					
11	.90	.90	.80	.80	22	.75	.70	.90	.75					

Daily gage height, in feet, of Arkansas River at Canyon, Colorado, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.50	.....	.....	.....	2.80	3.85	4.00	2.80	2.30	2.10	2.60	.....
2	.....	.....	.....	2.50	2.90	4.10	3.90	2.80	2.20	2.10	2.50	.....
3	.....	.....	.....	.....	3.05	4.20	3.80	2.70	2.20	2.10	2.50	2.70
4	.....	.....	.....	.....	3.20	4.50	3.70	2.60	2.20	2.10	2.50	.....
5	.....	2.60	2.70	.....	3.30	4.50	3.75	2.60	2.20	2.10	2.50	.....
6	.....	.....	.....	.....	3.40	4.15	3.85	2.50	2.20	2.10	2.50	.....
7	.....	.....	.....	.....	3.50	4.10	4.00	2.40	2.20	2.10	2.50	.....
8	2.50	.....	.....	.....	3.40	4.25	4.20	2.65	2.20	2.10	2.45	.....
9	.....	.....	.....	2.70	3.40	4.35	4.15	2.85	2.20	2.10	2.40	.....
10	.....	.....	.....	.....	3.40	4.25	4.00	2.85	2.30	2.10	2.40	2.70
11	.....	.....	.....	.....	3.30	4.30	4.05	2.80	2.30	2.20	2.40	.....
12	.....	2.60	2.60	.....	3.30	4.35	4.35	2.70	2.30	2.25	2.50	.....
13	.....	.....	.....	.....	3.25	4.40	4.50	2.60	2.30	2.30	2.50	.....
14	.....	.....	.....	.....	3.35	4.35	4.75	2.50	2.30	2.30	2.50	.....
15	2.40	.....	.....	.....	3.40	4.45	4.50	2.50	2.30	2.40	2.50	.....
16	.....	.....	.....	3.00	3.30	4.65	4.75	3.25	2.30	2.40	2.60	.....
17	.....	.....	.....	.....	3.30	4.85	4.50	2.65	2.20	2.40	2.60	a 2.60
18	.....	.....	.....	.....	3.20	5.05	4.30	2.55	2.20	2.40	2.60	.....
19	.....	2.70	2.70	.....	3.15	5.15	3.85	2.50	2.20	2.40	2.60	.....
20	.....	.....	.....	.....	3.10	5.15	3.70	2.50	2.20	2.50	2.60	.....
21	.....	.....	.....	.....	3.05	5.00	3.70	2.50	2.20	2.50	2.60	.....
22	2.40	.....	.....	.....	3.05	5.00	3.60	2.50	2.20	2.50	2.60	.....
23	.....	.....	.....	2.70	3.10	4.90	3.50	2.55	2.20	2.50	2.70	.....
24	.....	.....	.....	.....	3.10	4.80	3.50	2.50	2.20	2.50	2.70	a 2.60
25	.....	.....	.....	.....	3.00	4.75	3.50	2.50	2.20	2.50	2.70	.....
26	.....	2.80	2.60	.....	3.05	4.60	3.40	2.45	2.10	2.50	2.70	.....
27	.....	.....	.....	.....	3.25	4.45	3.30	2.40	2.10	2.50	2.70	.....
28	.....	.....	.....	.....	3.50	4.25	3.15	2.40	2.10	2.50	2.70	.....
29	2.60	.....	.....	.....	3.70	4.15	3.00	2.40	2.10	2.60	2.60	.....
30	.....	.....	.....	2.80	3.90	4.05	3.00	2.40	2.10	2.60	2.60	.....
31	.....	.....	.....	.....	3.90	.....	2.90	2.40	.....	2.60	.....	a 2.60

a Approximate.

Daily gage height, in feet, of Arkansas River at Santa Fe Avenue Bridge, Pueblo, Colorado, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	0.40	0.30	0.45	0.20	0.60	1.20	1.35	0.35
2	.45	.20	.45	.20	.70	1.20	1.20	.35
3	.45	.30	.40	.20	.75	1.50	1.20	.30
4	.40	.40	.40	.30	.85	1.55	1.15	.30
5	.40	.40	.40	.25	.90	1.55	1.00	.35
6	.40	.40	.35	.20	.85	1.50	1.30	.30
7	.40	.50	.30	.20	1.00	1.55	1.35	.45
8	.40	.50	.30	.20	1.10	1.80	1.55	.45
9	.40	.50	.30	.20	1.15	1.80	1.60	.50
10	.40	.45	.30	.20	1.20	1.70	1.45	.45
11	.40	.45	.35	.25	1.00	1.80	1.50	.45
12	.40	.40	.40	.55	.90	1.85	1.50	.30
13	.40	.35	.30	.55	.90	1.80	3.20	.20
14	.35	.40	.30	.45	.95	1.85	2.70	.15
15	.30	.40	.30	.45	.90	2.05	2.20	.20
16	.30	.40	.30	.60	.90	2.10	1.90	.25
17	.30	.50	.30	.65	.95	2.25	2.05	.40
18	.35	.45	.30	.65	.80	2.50	1.70	.35
19	.40	.40	.30	.60	.75	2.70	1.35	.30
20	.35	.40	.30	.50	.65	2.80	1.05	.30
21	.35	.40	.30	.45	.65	2.80	1.05	.25
22	.25	.40	.30	.40	.60	2.55	1.00	.30
23	.15	.40	.35	.35	.60	2.45	1.00	.25
24	.20	.40	.30	.30	.50	2.40	.90	.20
25	.10	.40	.30	.30	.50	2.40	1.10	.25
26	.10	.35	.30	.30	.90	2.35	1.25	.25
27	.30	.45	.30	.30	.90	1.90	.95	.20
28	.25	.40	.30	.30	.75	1.60	.75	.....
29	.25	.....	.30	.55	.85	1.45	.50	.....
30	.40	.....	.30	.50	1.10	1.35	.45	.....
31	.30	.....	.20	.....	1.15	.....	.40	.....

Daily gage height, in feet, of Arkansas River at Main Street Bridge, Pueblo, Colorado, for 1898.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.50	—0.05	—0.35	0.34	0.37	17	2.10	0.95	0.15	0.26	0.30	0.37
2	.....	.40	+ .05	— .35	.34	.30	18	2.20	.40	.15	.26	.35	.51
3	.....	.40	— .10	— .40	.25	.25	19	1.50	.18	.10	.28	.29	.51
4	.....	.30	— .23	— .40	.25	.25	20	1.40	.18	.20	.32	.30	.50
5	.....	.20	— .18	— .43	.24	.25	21	1.15	.12	— .10	.32	.39	.47
6	.....	.20	— .21	— .44	.22	.31	22	1.10	.10	— .20	.32	.35	.45
7	.....	.50	— .38	— .38	.22	.40	23	.95	.10	— .20	.32	.32	.35
8	.....	.50	— .34	— .30	.25	.10	24	.85	.15	— .17	.32	.35	.34
9	.....	.58	— .21	— .20	.30	.11	25	.95	.15	— .14	.41	.38	.49
10	1.60	.65	— .11	— .10	.30	.27	26	1.30	.12	— .11	.42	.37	.49
11	1.30	.50	+ .15	— .13	.32	.30	27	.80	.06	— .12	.44	.32	.50
12	2.40	.43	.12	— .09	.20	.40	28	.80	.01	— .23	.45	.27	.48
13	4.45	.20	.21	.00	.30	.33	29	.68	.00	— .26	.40	.42	.49
14	3.20	.10	.12	.02	.34	.31	30	.58	.00	— .32	.45	.32	.47
15	3.30	.20	.19	.04	.34	.33	31	.50	—.04	.....	.37	.....	.45
16	2.00	.20	.18	.10	.32	.40							

Daily gage height, in feet, of Arkansas River at Nepesta, Colorado, for 1898.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	2.80	3.30	3.20	3.00	2.60	2.40	3.20
2	.....	3.10	3.30	3.80	2.90	2.70	2.60	3.15
3	.....	3.00	3.30	3.70	2.80	2.60	2.70	3.15
4	.....	3.40	3.50	3.50	2.70	2.50	2.80	3.10
5	.....	3.10	3.60	3.40	2.60	2.40	2.80	3.10
6	.....	3.10	3.65	3.50	2.50	2.50	2.80	3.10
7	.....	3.10	3.50	3.70	3.05	2.50	2.90	3.00
8	.....	4.30	4.00	3.80	3.20	2.50	2.90	2.90
9	.....	6.00	4.50	4.40	3.30	2.55	2.90	2.90
10	.....	4.20	4.30	4.00	3.30	2.50	2.70	3.05
11	.....	4.00	4.00	3.80	3.20	2.70	2.60	3.05
12	.....	4.00	4.30	3.70	3.10	2.80	2.80	3.10
13	.....	3.60	4.30	4.00	2.60	2.90	2.80	3.10
14	.....	3.50	4.30	6.10	2.10	3.00	2.80	3.20
15	.....	3.40	5.70	5.10	2.80	3.00	2.80	3.15
16	.....	3.45	4.80	4.70	2.90	2.90	2.80	3.10

Daily gage height, in feet, of Arkansas River at Nepesta, Colorado, 1898—Cont'd.

Day.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
17	.....	3.50	4.80	4.40	2.80	2.90	2.80	3.10
18	.....	3.00	4.80	4.50	3.10	2.90	2.90	3.10
19	.....	3.60	4.80	4.00	3.10	2.90	3.00	3.10
20	.....	3.40	4.80	3.80	2.90	2.90	3.00	3.10
21	.....	3.40	4.70	3.50	2.80	2.90	3.00	3.10
22	.....	3.70	4.80	3.20	2.70	2.90	2.95	3.10
23	.....	3.20	4.80	3.00	3.35	2.90	3.00	3.10
24	.....	2.90	4.80	2.60	3.00	2.90	3.00	3.10
25	.....	2.70	4.50	2.20	2.90	2.90	3.00	3.00
26	2.60	2.50	4.40	3.90	2.90	2.90	3.00	3.00
27	2.55	4.00	4.20	3.70	2.80	3.00	3.10	3.00
28	2.50	3.10	4.60	3.10	3.00	2.80	3.10	3.00
29	2.70	3.10	3.80	3.20	2.80	2.80	3.10	2.90
30	2.80	3.30	3.50	3.10	2.90	2.80	3.20	2.90
31	.....	3.30	.....	3.00	2.60	.....	3.20	.....

Daily gage height, in feet, of Arkansas River at Rocky Ford, Colorado, for 1898.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.90	0.72	1.20	1.02	0.91	1.00	0.74	0.72	1.19	0.81
2	.....	.93	.71	1.25	.95	.98	.93	.79	.70	1.18	.75
3	.....	.93	.82	1.32	1.04	1.35	.93	.69	.65	1.00	.60
4	.....	.98	.92	1.50	1.34	1.50	1.00	.65	.62	.95	.60
5	.....	.95	.79	1.50	1.48	1.40	.90	.60	.62	1.05	.60
6	.....	.92	.70	1.36	1.48	1.32	.81	.60	.60	.92	1.00
7	.....	.90	.70	1.50	1.45	1.35	.80	.55	.60	.91	1.00
8	.....	.92	.72	2.20	2.05	1.60	.96	.54	.65	.90	1.00
9	.....	.98	.70	2.80	2.15	2.80	1.18	.52	.70	.90	1.00
10	.....	.98	.60	2.10	2.25	1.74	1.13	.52	.68	1.18	1.00
11	.....	.98	.52	2.10	2.13	1.55	1.08	.58	.65	.98	1.00
12	.....	.92	.80	2.05	2.38	1.27	1.02	.71	.65	1.00	1.00
13	.....	.89	.97	1.70	2.35	1.55	.95	.75	.84	1.12	.80
14	.....	.89	.85	1.55	2.37	3.15	1.03	.87	.73	1.16	.70
15	.....	.95	.89	1.52	2.85	2.70	1.00	.95	.83	1.20	.70
16	.....	.88	.85	1.38	2.75	2.40	.80	.95	.90	1.20	.75
17	.....	.83	.90	1.33	2.62	2.23	.77	.98	.84	1.20	.70
18	.....	.87	.98	1.25	2.25	2.19	.80	.89	.85	1.22	.....
19	.....	.98	1.10	1.06	2.77	1.75	.83	.88	.98	1.20	.....
20	0.52	1.01	1.11	.90	2.85	1.50	.75	.84	1.00	1.19	.....
21	.42	1.01	1.04	1.60	2.90	1.28	.77	.83	1.03	1.20	.....
22	.30	.88	.98	1.22	2.75	1.20	.79	.80	.88	1.25	.....
23	.41	.80	.93	.94	2.50	1.00	.85	.80	.89	1.25	.....
24	.45	.80	.86	.80	2.40	.85	.78	.80	.94	1.30	.....
25	.45	.80	.81	.70	2.35	1.10	1.05	.82	1.00	1.30	.....
26	.54	.80	.80	3.20	2.15	1.18	.81	.90	1.00	1.20	.....
27	.70	.78	.72	2.02	2.00	1.25	.72	.82	1.05	.98	.....
28	.86	.75	.70	1.40	1.60	1.35	.81	.77	1.05	.80	.....
29	.....	.80	.71	1.25	1.43	1.18	.80	.75	1.05	.60	.....
30	.....	.79	.82	1.15	1.18	1.08	.79	.82	1.12	.74	.....
31	.....	.75	.....	1.15	.....	1.05	.75	.....	1.12	.....	.....

Daily gage height, in feet, of Arkansas River at Manzanola, Colorado, for 1898.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1	.....	3.40	3.40	2.40	1.60	2.20	17	.....	4.40	4.40	2.20	2.50	2.40
2	.....	3.40	3.30	2.50	1.00	2.30	18	3.30	4.80	4.00	2.40	2.50	2.50
3	.....	3.50	3.50	2.30	.80	2.30	19	3.30	5.20	3.80	2.30	2.40	2.50
4	.....	3.90	3.40	2.30	.80	2.20	20	2.90	5.20	3.30	2.20	2.40	2.50
5	.....	3.80	3.50	2.20	.80	2.20	21	4.00	5.00	3.00	2.00	2.40	2.60
6	.....	3.70	3.40	2.00	.80	2.20	22	3.30	4.90	2.70	2.00	2.40	2.60
7	.....	3.50	3.40	2.00	2.00	2.20	23	3.20	4.70	2.50	1.90	2.50	.....
8	.....	4.30	4.20	2.60	2.00	2.20	24	2.90	4.60	2.40	1.90	2.50	.....
9	.....	4.00	5.50	2.50	1.90	2.30	25	3.10	4.40	2.50	3.00	2.40	.....
10	.....	4.40	3.90	2.40	1.90	2.30	26	4.55	4.40	3.00	2.80	2.30	.....
11	.....	4.40	4.00	2.40	2.00	2.30	27	4.20	4.36	3.60	2.00	2.30	.....
12	.....	3.70	4.20	2.40	2.20	1.90	28	3.40	4.00	3.00	1.90	2.20	.....
13	.....	3.50	5.20	2.30	2.50	2.40	29	3.30	3.80	2.70	1.90	2.20	.....
14	.....	4.30	6.00	2.30	2.70	2.50	30	3.30	3.50	2.40	1.80	2.20	.....
15	.....	4.00	5.00	2.30	2.80	2.60	31	3.50	.....	2.40	1.60	.....	.....
16	.....	4.40	4.60	2.30	2.80	2.60							

Daily gage height, in feet, of Purgatory River at Trinidad, Colorado, for 1898.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	3.90	4.00	3.95	3.95	3.50	3.50	3.50
2	3.90	3.95	3.80	3.90	3.55	3.50	3.50
3	3.90	3.90	3.90	3.80	3.50	3.50	3.50
4	3.95	4.00	4.35	4.10	3.50	3.40	3.50
5	4.00	3.90	4.00	4.00	3.50	3.40	3.50
6	4.20	3.90	3.90	3.90	3.50	3.40	3.50
7	4.10	4.00	3.90	4.30	3.50	3.40	3.50
8	4.35	4.00	3.90	4.30	3.50	3.40	3.50
9	4.25	4.00	3.95	4.25	3.50	3.40	3.50
10	4.20	4.05	3.90	4.10	4.00	3.40	3.50
11	4.20	4.05	3.85	4.00	4.50	3.40	3.50
12	4.10	4.00	3.90	3.85	4.50	3.45	3.50
13	4.15	4.10	4.45	3.75	4.50	3.45	3.50
14	4.10	4.30	4.10	3.70	3.50	3.45	3.50
15	4.10	4.05	4.10	3.70	3.50	3.45	3.50
16	4.00	4.05	4.00	3.75	3.50	3.55	3.50
17	4.00	4.00	4.00	3.80	3.50	3.50	3.50
18	3.90	4.35	3.95	3.75	3.50	3.50	3.50
19	3.90	4.50	3.80	3.75	3.50	3.55	3.50
20	3.90	4.40	4.15	3.65	3.50	3.60	3.50
21	3.90	4.35	3.90	3.70	3.50	3.55	3.50
22	3.90	4.25	3.80	3.70	3.50	3.50	3.45
23	3.85	4.20	3.80	3.90	3.50	3.50	3.50
24	3.80	4.20	4.35	3.90	3.50	3.50	3.50
25	3.80	4.10	4.05	3.70	3.50	3.50	3.45
26	3.95	4.00	3.90	3.60	3.50	3.50	3.50
27	3.90	4.00	3.85	3.60	3.50	3.50	3.50
28	3.90	3.85	3.70	3.60	3.50	3.45	3.50
29	3.90	3.80	3.70	3.60	3.50	3.40	3.50
30	3.90	3.80	3.70	3.60	3.50	3.45	3.50
31	4.00	.....	4.05	3.50	.....	3.50	.....

Daily gage height, in feet, of Purgatory River at J. J. Ranch, for 1898.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	2.20	.....	2.70	2.70	2.70	17	2.90	.....	2.90	2.70	3.00	.....
2	.....	2.20	.....	2.70	2.70	2.70	18	2.50	.....	3.00	2.70	3.00	.....
3	.....	.....	.....	2.70	2.70	2.70	19	2.50	.....	2.90	2.70	2.90	.....
4	.....	.....	.....	2.70	2.50	2.70	20	3.00	.....	2.90	2.70	2.70	.....
5	.....	.....	.....	2.70	2.50	2.70	21	3.50	.....	3.00	2.70	2.70	.....
6	.....	.....	.....	2.70	2.50	2.70	22	2.60	.....	3.00	2.70	2.70	.....
7	.....	.....	5.20	2.70	2.50	2.70	23	2.50	.....	3.00	2.70	2.70	.....
8	.....	.....	5.70	2.70	2.50	2.70	24	2.30	.....	3.00	2.70	2.70	.....
9	.....	.....	4.00	2.60	2.50	2.70	25	2.30	.....	3.00	2.70	2.70	.....
10	.....	.....	3.80	2.70	3.00	2.70	26	2.50	.....	2.30	2.70	2.70	.....
11	.....	.....	3.80	2.70	2.80	2.70	27	2.30	.....	3.00	2.70	2.70	.....
12	.....	.....	3.80	2.70	2.70	2.70	28	2.90	.....	2.70	2.70	2.70	.....
13	2.30	.....	3.00	2.70	2.50	.....	29	2.70	.....	2.70	2.70	2.70	.....
14	2.40	.....	3.30	3.70	2.80	.....	30	2.50	.....	2.70	2.70	2.70	.....
15	2.40	.....	3.40	2.70	2.80	.....	31	.....	.....	2.70	.....	2.70	.....
16	2.95	.....	2.90	2.70	3.00	.....							

Daily gage height, in feet, of Arkansas River at Las Animas, Colorado, for 1898.

Day.	May.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	.....	3.10	2.40	2.30	2.90	17	2.80	.....	3.10	2.40	2.30	.....
2	.....	.....	2.80	2.40	2.30	2.90	18	.....	.....	2.80	2.40	2.30	.....
3	.....	.....	2.70	2.40	2.30	2.90	19	2.75	3.75	2.70	2.40	2.40	.....
4	.....	.....	2.80	2.40	2.30	3.00	20	.....	3.45	2.60	2.40	2.40	.....
5	.....	.....	2.70	2.40	2.30	3.00	21	2.80	3.20	2.60	2.40	2.40	.....
6	.....	.....	2.70	2.30	2.30	2.90	22	2.80	3.10	2.60	2.40	2.75	.....
7	.....	.....	2.80	2.30	2.30	3.00	23	2.80	3.00	2.50	2.40	2.80	.....
8	.....	.....	2.70	2.30	2.30	3.00	24	.....	3.00	2.50	2.40	2.80	.....
9	.....	.....	2.60	2.20	2.30	2.90	25	2.40	2.80	2.50	2.40	2.80	.....
10	.....	.....	2.60	2.30	2.30	2.90	26	2.40	2.70	2.50	2.40	2.90	.....
11	.....	.....	2.50	2.30	2.30	2.90	27	5.50	2.60	2.50	2.40	2.80	.....
12	.....	.....	2.50	2.40	2.30	3.00	28	3.20	2.60	2.50	2.30	2.80	.....
13	3.50	.....	2.50	2.50	2.30	.....	29	.....	2.60	2.50	2.30	2.70	.....
14	3.20	.....	2.50	2.50	2.30	.....	30	.....	2.90	2.50	2.30	2.90	.....
15	3.10	.....	2.50	2.50	2.30	.....	31	.....	3.00	2.50	.....	3.00	.....
16	3.30	.....	2.25	2.50	2.30	.....							

Daily gage height, in feet, of Arkansas River at Amity Canal head gate, for 1898.

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.35	0.55	0.10	1.90	3.00	17	5.50	.60	.40	1.60	2.30
2	2.95	.40	.10	1.90	3.00	18	3.90	.60	.50	1.60	2.30
3	2.10	.30	.10	1.90	3.00	19	2.30	.50	.70	1.60	2.30
4	2.05	.25	.10	1.90	3.00	20	1.75	.40	.90	1.60	2.00
5	1.82	.20	.10	1.90	3.00	21	1.55	.40	.80	1.50	2.00
6	2.20	.15	.10	1.95	3.00	22	1.30	.40	.80	1.00	2.00
7	2.20	.10	.10	1.90	3.00	23	1.30	.40	1.10	2.90	2.00
8	2.40	.10	.20	2.00	2.55	24	2.30	.30	1.30	4.80	2.00
9	3.15	.10	.20	2.00	1.80	25	1.30	.30	1.50	5.00	2.00
10	2.75	.20	.20	2.00	1.90	26	1.15	.30	1.60	5.00	2.00
11	2.05	.20	.20	1.90	1.90	27	1.00	.30	1.70	5.00	2.00
12	1.85	.60	.20	2.00	2.00	28	1.65	.30	1.70	4.00	2.50
13	1.70	.80	.20	2.00	2.15	29	1.35	.20	1.50	3.50	2.50
14	1.60	.80	.20	2.00	2.30	30	1.05	.20	1.40	3.20	2.00
15	1.55	.70	.20	2.00	2.30	31	.80	.....	1.60	.....	2.00
16	1.45	.60	.40	1.90	2.30						

Daily gage height, in feet, of Arkansas River at Granada, Colorado, for 1898.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	1.20	0.60	0.60	1.00	17	.....	0.60	0.60	0.80	0.60
2	.....	.80	.60	.40	.90	18	.....	1.60	.60	.60	.60
3	.....	.80	.80	.40	.90	19	.....	.80	.80	1.50	.60
4	.....	.60	.80	.40	.90	20	.....	.60	.70	1.50	.....
5	.....	.40	.80	.40	.90	21	.....	.40	.60	1.30	.....
6	.....	.40	.60	.40	.90	22	.....	.60	.60	1.30	.....
7	.....	.40	.60	.40	.90	23	.....	.60	.60	1.30	.....
8	.....	.40	.60	.40	.90	24	0.60	1.00	.60	1.30	.....
9	.....	.40	.60	.60	1.00	25	.60	.90	.60	1.00	.....
10	.....	.40	.80	.60	1.00	26	.80	.60	.60	1.00	.....
11	.....	.40	.80	.60	1.00	27	1.20	.40	.60	.80	.....
12	.....	.40	.80	.60	1.00	28	1.20	.40	.60	.80	.....
13	.....	.40	.60	.60	1.00	29	.80	1.00	.60	.80	.....
14	.....	.20	.60	.60	1.00	30	.60	.80	.60	.80	.....
15	.....	.20	.60	.60	1.00	31	1.00	.40	.....	1.00	.....
16	.....	.30	.60	.80	.60						

Daily gage height, in feet, of Arkansas River at Hutchinson, Kansas, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.50	2.10	1.95	1.60	2.55	3.50	3.20	1.90	1.30	1.50	1.30	1.60
2	1.50	2.10	1.90	1.60	2.80	3.60	2.90	1.85	1.20	1.50	1.30	1.55
3	1.50	2.20	1.90	1.60	2.30	3.40	2.90	1.75	1.20	1.50	1.30	1.50
4	1.50	2.30	1.90	1.60	2.20	2.70	2.80	1.75	1.20	1.45	1.30	1.60
5	1.50	2.30	1.90	1.60	2.20	2.60	2.80	1.70	1.20	1.40	1.30	1.60
6	1.50	2.30	1.90	1.70	2.20	2.55	2.80	1.60	1.20	1.40	1.30	1.40
7	1.50	2.40	1.90	1.70	2.20	2.50	2.65	2.05	1.20	1.40	1.30	1.55
8	1.50	2.40	1.90	1.65	2.20	2.70	2.55	2.05	1.20	1.40	1.30	1.50
9	1.60	2.40	1.90	1.60	2.20	2.70	2.45	2.00	1.10	1.40	1.30	1.60
10	1.75	2.55	1.90	1.60	2.10	2.60	2.35	1.90	1.10	1.45	1.30	1.50
11	2.00	2.85	1.90	1.60	2.10	2.60	2.25	1.90	1.35	1.45	1.30	1.50
12	2.00	2.75	1.90	1.60	2.10	2.60	2.20	1.90	1.40	1.40	1.30	1.50
13	2.15	2.70	1.90	1.60	2.00	2.65	2 15	1.90	1.40	1.40	1.30	1.50
14	2.30	2.55	1.85	1.65	2.00	3.80	2.05	1.85	1.40	1.40	1.30	1.60
15	2.40	2.40	1.80	1.60	2.00	3.70	1.90	1.75	1.35	1.30	1.30	1.60
16	2.40	2.40	1.80	1.60	2.00	3.60	2.55	1.70	1.40	1.35	1.30	1.60
17	2.50	2.40	1.80	1.65	2.00	3.55	2.85	1.65	1.50	1.50	1.30	1.60
18	2.60	2.40	1.85	1.70	2.15	3.50	2.80	1.60	1.50	1.40	1.30	1.60
19	2.60	2.30	1.80	1.75	2.15	3.40	2.65	1.55	1.40	1.40	1.30	2.25
20	2.50	2.20	1.75	1.90	2.00	3.35	2.45	1.50	1.40	1.40	1.30	2.50
21	2.50	2.10	1.70	2.00	2.00	3.30	2.35	1.50	1.50	1.40	1.30	2.35
22	2.35	2.10	1.70	2.00	2.00	3.30	2.25	1.50	1.75	1.40	1.30	2.20
23	2.35	2.10	1.70	2.00	2.00	3.45	2.05	1.50	2.05	1.40	1.40	2.00
24	2.20	2.00	1.70	1.90	2.00	3.25	2.00	1.50	2.30	1.40	1.45	1.85
25	2.20	2.00	1.65	1.90	2.00	3.05	2.00	1.50	2.05	1.40	1.55	1.80
26	2.20	2.00	1.60	1.80	2.05	3.10	2.00	1.45	1.95	1.40	1.60	1.80
27	2.20	2.00	1.60	1.80	2.15	3.35	2.00	1.40	1.80	1.40	1.60	1.70
28	2.20	2.00	1.60	1.70	2.20	3.40	2.00	1.40	1.75	1.40	1.70	1.70
29	2.30	.....	1.60	1.70	2.70	3.30	1.95	1.40	1.60	1.40	1.65	1.70
30	2.10	.....	1.60	2.40	3.10	3.20	1.90	1.35	1.60	1.30	1.70	1.70
31	2.10	.....	1.60	.....	3.30	.....	1.90	1.30	.....	1.30	.....	1.70

Daily gage height, in feet, of Verdigris River at Liberty, Kansas, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.90	.....	2.40	3.45	5.40	3.50	4.30	12.25	1.80	2.00	2.30	2.90
2	.....	2.40	2.40	3.30	18.85	4.65	3.50	4.90	1.80	2.00	2.30	2.80
3	1.90	.....	2.40	3.20	26.70	4.75	3.50	4.50	1.80	2.00	2.30	2.80
4	.....	2.30	2.30	5.30	31.50	4.10	3.20	3.65	1.70	2.00	2.20	2.80
5	1.90	.....	2.30	7.35	29.00	3.80	3.05	3.30	1.70	2.00	2.20	2.80
6	.....	.....	2.30	5.50	25.00	3.45	2.90	2.95	1.70	2.00	2.20	2.80
7	1.80	2.20	2.30	4.30	12.50	3.60	2.80	3.05	1.70	2.00	2.20	2.70
8	.....	.....	2.30	4.20	7.30	4.80	2.70	5.15	1.65	2.00	2.20	2.70
9	.....	2.20	2.30	3.90	6.50	4.15	3.15	4.75	1.60	2.00	2.10	2.60
10	1.80	.....	2.30	3.60	5.90	5.20	2.90	3.30	1.60	2.00	2.10	2.50
11	.....	16.30	5.70	3.35	5.45	4.15	2.75	3.00	1.60	2.00	2.10	2.50
12	1.80	5.20	11.00	3.25	5.10	4.10	2.70	2.75	8.35	2.00	2.10	2.50
13	.....	.....	5.80	3.20	4.65	6.70	2.70	2.55	7.25	2.00	2.10	2.50
14	2.20	3.90	4.60	3.10	4.60	6.40	2.55	2.45	5.05	1.95	2.20	2.50
15	.....	.....	4.40	3.10	4.60	4.35	2.45	2.35	3.80	1.90	2.30	2.60
16	.....	3.20	4.40	3.05	10.65	9.65	2.40	2.25	3.20	1.90	2.20	2.60
17	2.20	.....	4.35	3.00	11.35	14.10	2.40	2.20	4.40	1.95	2.20	2.60
18	.....	3.00	11.15	3.00	8.05	7.30	2.35	2.15	5.00	2.00	2.20	3.00
19	2.20	.....	9.70	3.00	7.85	7.15	2.20	2.20	4.85	2.15	2.30	14.20
20	.....	.....	5.60	3.00	12.90	6.90	2.20	2.20	4.00	2.65	2.30	16.80
21	2.20	2.70	4.45	2.95	8.40	5.30	2.35	2.20	3.35	2.75	2.30	15.95
22	.....	.....	8.70	4.10	9.45	5.75	2.45	2.15	3.05	3.00	2.90	8.05
23	.....	2.60	5.00	6.35	8.45	8.05	3.85	2.10	2.80	2.90	2.60	5.50
24	2.40	.....	4.10	6.45	5.20	5.10	3.40	2.10	2.55	2.90	4.10	4.90
25	.....	2.50	3.70	5.45	4.55	4.20	2.80	2.10	2.40	2.65	3.60	4.40
26	4.40	.....	3.55	4.70	4.20	3.75	2.60	2.10	2.30	2.70	3.20	4.20
27	.....	.....	4.30	4.15	4.05	12.00	2.60	2.10	2.20	2.45	3.10	4.10
28	2.60	2.50	4.30	3.90	4.15	15.65	2.50	2.10	2.10	2.40	2.70	4.00
29	.....	.....	4.35	3.65	4.00	8.80	2.35	2.05	2.10	2.30	2.70	3.80
30	.....	.....	4.15	3.55	3.90	4.95	2.25	1.90	2.00	2.30	2.70	3.80
31	2.40	.....	3.60	.....	3.65	.....	10.35	1.80	.....	2.30	.....	3.80

Daily gage height, in feet, of Neosho River at Iola, Kansas, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.80	1.95	2.25	2.70	11.00	9.40	3.65	2.40	2.50	2.20	2.40	2.90
2	1.80	1.95	2.25	2.80	18.80	8.00	3.45	2.45	2.40	2.20	2.30	2.90
3	1.80	1.95	2.20	2.80	19.50	5.70	3.25	2.75	2.30	2.20	2.30	2.90
4	1.80	1.80	2.15	3.15	19.50	5.15	3.10	3.00	2.30	2.10	2.30	2.90
5	1.80	1.95	2.10	6.85	16.80	4.40	3.00	2.65	2.30	2.10	3.30	2.90
6	1.80	1.80	2.10	4.55	12.30	4.15	2.90	2.25	2.30	2.10	3.75	2.80
7	1.80	1.80	2.10	3.60	7.50	4.00	2.90	2.20	2.20	2.10	3.10	2.80
8	1.80	1.95	2.10	3.25	6.20	4.10	2.90	2.20	2.20	2.10	2.85	2.80
9	1.80	1.95	2.10	3.10	5.70	5.50	2.80	3.35	2.20	2.10	2.75	2.70
10	1.80	6.60	2.20	2.95	4.95	4.85	2.80	4.35	2.20	2.05	2.70	2.70
11	1.80	4.80	7.85	2.85	4.70	7.30	2.80	3.85	2.50	2.00	2.70	2.70
12	1.80	4.20	4.75	2.70	4.30	9.35	2.80	3.80	3.20	2.00	2.60	2.70
13	1.80	2.95	3.30	2.70	4.25	7.80	2.80	3.45	5.80	2.00	2.60	2.80
14	1.80	2.85	3.10	2.60	4.95	5.10	2.80	3.05	3.90	2.00	2.60	2.80
15	1.80	2.90	3.80	2.60	5.50	5.40	2.80	2.85	3.50	2.10	2.50	2.90
16	1.80	2.95	3.30	2.60	17.50	5.30	2.80	2.70	3.40	2.10	2.50	2.80
17	1.80	2.85	3.15	2.55	11.60	5.50	2.70	3.20	4.80	2.25	2.50	2.70
18	1.80	2.80	3.05	2.50	6.10	7.80	2.70	4.50	6.70	5.70	2.50	2.80
19	1.80	2.70	3.35	2.50	5.70	5.80	2.70	4.10	3.85	5.20	2.50	11.50
20	1.80	2.70	3.30	2.50	9.80	5.10	2.70	3.70	3.35	3.80	2.50	13.35
21	1.80	2.55	3.20	2.55	12.35	5.80	3.80	3.35	3.10	3.35	2.60	8.90
22	1.80	2.45	3.15	2.85	12.30	4.70	2.90	3.20	2.90	3.05	5.80	8.85
23	1.80	2.30	3.10	2.70	8.00	5.70	2.75	3.10	2.80	2.80	4.15	7.70
24	1.80	2.25	2.90	2.80	6.45	5.30	2.70	2.95	2.60	2.70	3.30	5.70
25	1.80	2.20	2.75	4.35	5.45	4.20	2.65	2.80	2.50	2.60	3.05	4.60
26	1.85	2.20	3.00	4.75	4.60	5.40	2.60	2.70	2.40	2.60	2.80	4.15
27	2.00	2.10	3.75	4.05	4.10	20.50	2.60	2.60	2.40	2.50	2.70	4.00
28	2.00	2.10	3.70	3.60	4.00	19.00	2.55	2.60	2.30	2.50	2.80	3.90
29	2.00	.....	3.30	3.15	6.45	7.00	2.50	2.60	2.30	2.40	2.90	3.75
30	1.90	.....	2.85	3.60	6.70	4.25	2.45	2.50	2.20	2.40	2.90	3.60
31	1.80	.....	2.85	.....	8.20	.....	2.40	2.50	.....	2.40	.....	3.20

List of discharge measurements, 1898.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
July 30	Arkansas River	Granite, Colo	A. L. Fellows	3.50	151
Aug. 26	do	do	do	3.40	112
Oct. 26	do	do	do	3.30	75
Apr. 27	do	Salida, Colo	do	1.10	480
May 20	do	do	do	1.10	445
June 25	do	do	do	3.10	2,352
July 29	do	do	do	1.25	568
Aug. 26	do	do	do	.90	360
Oct. 26	do	do	do	.80	222
May 21	do	Canyon, Colo	do	3.05	608
June 25	do	do	do	4.82	2,830
July 28	do	do	do	3.05	611
Oct. 27	do	do	do	2.60	316
Apr. 5	do	Pueblo, Colo	P. J. Preston	.27	248
Apr. 29	do	do	A. L. Fellows	.60	513
May 5	do	do	C. W. Beach	.90	876
May 30	do	do	do	1.00	1,144
June 3	do	do	do	1.40	1,639
June 9	do	do	A. L. Fellows	1.80	2,002
June 14	do	do	C. W. Beach	1.90	1,987
July 8	do	do	do	1.63	1,727
July 26	do	do	A. L. Fellows	.85	816
July 28	do	do	C. W. Beach	.81	743
Aug. 2	do	do	do	.45	405
Aug. 11	do	do	do	.50	468
Aug. 20	do	do	R. W. Hawley	.15	211
Aug. 30	do	do	A. L. Fellows	.00	134
Oct. 20	do	do	C. W. Beach	.20	290
Oct. 29	do	do	A. L. Fellows	.40	320
Nov. 3	do	do	C. W. Beach	.30	344
Apr. 27	do	Nepesta, Colo	P. J. Preston	2.55	360
May 6	do	do	C. W. Beach	3.05	746
May 10	do	do	do	4.25	1,998
June 6	do	do	do	3.43	1,060
July 28	do	do	do	3.25	573
Aug. 20	do	do	do	2.85	247
Nov. 6	do	do	do	2.93	212
Apr. 17	do	Rocky Ford, Colo	P. J. Preston	.90	237
May 27	do	do	C. W. Beach	1.83	1,692
May 18	do	Manzanola, Colo	do	3.25	847
Sept. 15	do	do	do	2.38	208
Apr. 28	Purgatory River	Trinidad, Colo	A. L. Fellows	3.90	150
July 27	do	do	do	3.90	149
Aug. 6	do	do	do	3.76	101
Aug. 29	do	do	C. W. Beach	3.60	45
Oct. 28	do	do	A. L. Fellows	3.40	31
June 13	do	J. J. Ranch, Colo	do	2.30	37
Aug. 5	do	do	do	3.65	60
May 12	do	2 miles east of Las Animas, Colo.	C. W. Beach	1.50	382
May 20	do	do	do	1.17	119
Feb. 14	Arkansas River	Hutchinson, Kans.	W. G. Russell	2.55	736
Mar. 1	do	do	do	1.90	197
Apr. 26	do	do	do	1.85	96
May 5	do	do	do	2.20	373
May 25	do	do	do	2.00	163
May 31	do	do	do	3.35	1,792
June 1	do	do	do	3.50	2,106
Sept. 15	do	do	do	1.30	34
Oct. 25	do	do	do	1.40	21
Mar. 24	Verdigris River	Liberty, Kans	E. C. Murphy	4.00	771
Mar. 25	do	do	do	3.80	674
May 19	do	do	do	9.70	5,040
May 20	do	do	do	14.40	8,654
July 12	do	do	do	2.80	251
Mar. 24	Neosho River	Iola, Kans	do	2.80	400
May 19	do	do	do	5.50	3,427
May 20	do	do	do	10.60	11,213
July 11	do	do	do	2.85	386

Rating tables.

Granite.		Salida.		Canyon.		Pueblo.		Nepesta. *a*		Nepesta. *b*	
Gage height.	Discharge	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.80	8	0.6	100	2.0	135	—0.4	38	2.0	168	2.1	1.7
2.85	10	.7	169	2.1	160	— .3	54	2.1	200	2.2	136
2.90	12	.8	241	2.2	186	— .2	75	2.2	234	2.3	147
2.95	14	.9	314	2.3	213	— .1	102	2.3	270	2.4	160
3.00	17	1.0	387	2.4	242	.0	136	2.4	308	2.5	175
3.05	20	1.1	460	2.5	276	.2	232	2.5	350	2.6	192
3.10	24	------	------	2.6	316	.4	380	2.6	396	2.7	212
3.15	35	------	------	2.7	360	.6	568	2.7	447	2.8	236
3.20	47	------	------	2.8	408	.8	780	2.8	504	2.9	260
3.25	60	------	------	2.9	476	1.0	1,006	2.9	568	3.0	294
3.30	75	------	------	3.0	560	1.2	1,258	3.0	641	3.2	511
3.35	93	------	------	3.1	682	1.4	1,512	3.2	817	3.4	759
3.40	112	------	------	3.2	807	1.6	1,766	3.4	1,025	3.6	1,007
3.45	131	------	------	3.3	932	1.8	2,020	3.6	1,250	3.8	1,255
3.50	151	------	------	3.4	1,057	2.0	2,274	3.8	1,480	4.0	1,503
3.55	171	------	------	3.5	1,182	2.5	2,909	4.0	1,710	4.2	1,751
------	------	------	------	3.6	1,307	3.0	3,544	4.2	1,940	4.4	2,000
------	------	------	------	3.7	1,432	3.5	4,179	4.4	2,170	4.6	2,250
------	------	------	------	3.8	1,557	4.0	4,814	4.6	2,400	4.8	2,500
------	------	------	------	3.9	1,682	4.5	5,449	4.8	2,630	5.0	2,750
------	------	------	------	4.0	1,807	5.0	6,084	5.0	2,860	5.2	3,000
------	------	------	------	4.1	1,932	5.5	6,719	5.2	3,090	5.4	3,250
------	------	------	------	4.2	2,057	6.0	7,354	5.4	3,320	5.6	3,500
------	------	------	------	4.3	2,182	6.5	7,989	5.6	3,550	5.8	3,750
------	------	------	------	4.4	2,307	7.0	8,624	5.8	3,780	6.0	4,000
------	------	------	------	4.5	2,432	7.5	9,259	6.0	4,010	6.2	4,250
------	------	------	------	4.6	2,557	8.0	9,894	------	------	------	------
------	------	------	------	4.7	2,682	------	------	------	------	------	------
------	------	------	------	4.8	2,807	------	------	------	------	------	------
------	------	------	------	4.9	2,932	------	------	------	------	------	------

Rocky Ford.		Trinidad.		Amity Canal.		Hutchinson.		Liberty.		Iola.	
Gage height.	Discharge.	Gage height.	Discharge	Gage height.	Discharge.	Gage height.	Discharge.	Gage height	Dis charge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.3	34	3.4	31	0.0	0	1.1	4	------	------	1.8	1
.4	48	3.5	42	.1	6	1.2	10	1.5	0	1.9	25
.5	64	3.6	58	.2	11	1.3	18	2.0	20	2.0	50
.6	84	3.7	81	.3	17	1.4	32	2.5	87	2.2	105
.7	108	3.8	109	.4	23	1.5	44	3.0	256	2.4	170
.8	150	3.9	157	.5	30	1.6	60	3.5	501	2.6	245
.9	237	4.0	230	.6	38	1.7	82	4.0	770	2.8	340
1.0	393	4.1	335	.7	47	1.8	110	4.5	1,073	3.0	455
1.1	550	4.2	492	.8	56	1.9	140	5.0	1,400	3.2	590
1.2	706	4.3	752	.9	66	2.0	188	5.5	1,760	3.4	745
1.3	862	4.4	1,012	1.0	77	2.1	248	6.0	2,160	3.6	920
1.4	1,019	4.5	1,282	1.2	100	2.2	325	7.0	2,980	3.8	1,115
1.5	1,175	------	------	1.4	125	2.3	420	8.0	3,800	4.0	1,330
1.6	1,331	------	------	1.6	151	2.4	540	9.0	4,620	4.2	1,565
1.7	1,487	------	------	1.8	179	2.5	645	10.0	5,440	4.4	1,715
1.8	1,644	------	------	2.0	207	2.6	765	11.0	6,260	4.6	1,980
1.9	1,800	------	------	2.2	234	2.7	885	12.0	7,080	4.8	2,250
2.0	1,956	------	------	2.4	260	2.8	1,000	13.0	7,900	5.0	2,520
2.1	2,113	------	------	2.6	284	2.9	1,120	14.0	8,720	6.0	4,150
2.2	2,269	------	------	2.8	306	3.0	1,245	15.0	9,540	7.0	6,200
2.3	2,425	------	------	3.0	328	3.1	1,385	16.0	10,360	8.0	8,500
2.4	2,581	------	------	3.2	352	3.2	1,525	17.0	11,120	9.0	11,200
2.5	2,738	------	------	3.4	377	3.3	1,690	18.0	12,150	10.0	14,250
2.6	2,894	------	------	3.6	402	3.4	1,885	19.0	13,250	11.0	17,350
2.7	3,050	------	------	3.8	430	3.5	2,106	20.0	14,470	12.0	20,450
2.8	3,206	------	------	4.0	460	3.6	2,310	21.0	15,890	13.0	23,550
2.9	3,363	------	------	4.2	490	------	------	22.0	17,370	14.0	26,650
3.0	3,519	------	------	4.4	520	------	------	23.0	18,850	15.0	29,750
3.1	3,676	------	------	4.6	560	------	------	24.0	20,330	16.0	32,850
3.2	3,832	------	------	4.8	580	------	------	------	------	17.0	35,950

a Applicable from April 26 to July 14, 1898.
b Applicable from July 15 to November 30, 1898.

WESTERN GULF DRAINAGE.

DESCRIPTION OF RIVER STATIONS.

Dallas station on Trinity River.—This is located at a point 3 miles north of the court-house. It was established by Prof. Thomas U. Taylor on October 1, 1898. The observer is J. M. Bassett, engineer at the Turtle Creek pump house. Observations are made at 6 a. m. and 6 p. m. upon a gage in the well at the pump house. The height of water is indicated by a pointer which slides up and down. The well is connected with the river by a pipe. The top of the well is 99 feet above the city datum. Measurements of discharge are made by wading. The channel is nearly straight both above and below the point of measurement; the right bank is high, and the left bank is low and liable to overflow. The bed of the stream is of gravel, and shifting.

Waco station on Brazos River.—This station is at the Austin Street Bridge, northwest of Waco, being about 75 miles above the station at Lewis. The observer is C. E. Rogers, a watchman, who takes readings at 6 a. m. and 6 p. m. The gage is inclined, the channel straight, the banks high, but the bed of the stream is of shifting sand. Measurements of discharge have been made under the suspension bridge, above the railroad bridge. Under the former, at low water, is a sand bar, which does not affect, however, the reliability of the measurements, as there are then two distinct channels. This is the condition during the greater part of the year.

Lewis station on Brazos River.—This station is about 1¼ miles southwest of Lewis, Texas, at the International and Great Northern Railroad bridge. The observer, J. M. Proctor, post-office, Hearne, Texas, is a bridge watchman, and takes readings at 6 a. m. and 6 p. m. The gage is vertical, fastened to a post of the bridge. The channel is nearly straight, and the water moves with moderate rapidity. The banks are high and the bed of the stream sandy. Since the establishment of the station at Waco this locality has less importance.

Austin station on Colorado River.—Measurements of Colorado River of Texas are made at two points near Austin. The first of these (Station No. 2) is at the Lake McDonald dam, 3 miles west of the city, and the other at a point above the Congress Avenue Bridge, south of the city. Observations of height of water in Lake McDonald above the dam are made by means of a float placed above the bulkhead of the power house and between it and the breakwater. This float is connected by wire to a suitable index in the power house. The table on page 122 gives the average daily reading thus obtained. The values are expressed in plus and minus, according as the water surface is above or below the crest. A similar reading has been kept since September 1, 1895. A measurement above the head of the lake was made on January 8, 1898, at Sulphur Hollow. The water from the tailrace of the power house flows along in front of the toe of the dam

and parallel with it. When the water is below the crest the flow in the tailrace has been determined to be fairly uniform. Measurements of discharge are made from a temporary bridge placed across this race. The following measurements give the flow: January 5, 1898, 226 second-feet; January 6, 230; January 7, 233; January 13, 234; December 21, 298; December 22, 296.

The observations south of the city are made on a vertical gage attached to a bath house. The observer is W. Peterson. The bench mark is on the first flange above the crib work of the north pier of the highway bridge. Its height is 4.78 feet above the zero of the gage. Measurements of discharge are made at a narrow place in the river, about one-fourth of a mile above.

New Braunfels station on Guadalupe River.—This station is about 1 mile east of the town of New Braunfels, Texas, near the highway bridge below the International and Great Northern Railroad bridge. Observations were begun on March 13, 1898. The observer is G. Behnsch, a storekeeper living about 200 yards from the gage. The readings are made at 8 a. m. and 6 p. m. The gage is an inclined rod, marked to vertical feet and tenths. Discharge measurements are made at a point above the railroad bridge, where the river is divided into two channels by an island. The channels are nearly straight, the bed of the stream rocky, and the results are believed to be reliable. The flow is so nearly constant that observations through a year are believed to be sufficient for all purposes. The following discharge measurements have been made by Prof. Thomas U. Taylor: March 12, 1898, gage height 2.00, discharge, 350 second-feet. On December 20, 1898, gage height 1.90, the discharge of the Guadalupe above the junction of Comal and Guadalupe, 1½ miles north of the city, just below the cemetery crossing, was 44 second-feet.

Pecos station on Pecos River.—Observations of height of Pecos River have been made at a point 6 miles above the town of Pecos, on the Texas and Pacific Railway. The observer is Willard H. Denis, water master, and the time of observations 6 a. m. and 6 p. m. Readings are made at two points, one of these being in the river itself, under the flume of the Margueretta Canal, and the other in the flume which carries the water across Pecos River from the right-hand side to the left, as shown on page 62 of Paper No. 13, where is given a view of the flume. The channel at this point is nearly straight, the water sluggish, the banks high, and the bottom sandy and shifting.

High Bridge station on Pecos River.—This station was established on March 17, 1898, and maintained until December 3, 1898, being discontinued on account of the difficulty of access. It is located at the Pecos viaduct of the Southern Pacific Company. This viaduct is 2,180 feet long and the base of the rails are 321 feet above low water. The observer is J. H. King, post-office, Lozier, Pecos County, Texas. He is section foreman on the railroad, and makes observations

at 6 p. m. The gage is vertical, fastened to the bridge pier. The channel is straight and the banks high and rocky. The first measurement, that made March 16, 1898, at a gage height of 1.00, gave a discharge of 388 second-feet.

Del Norte station on Rio Grande.—Described on page 127 of Paper No. 16. Results for 1897 given on page 381 of the Nineteenth Annual Report, Part IV. Observations are made on alternate days.

Embudo station on Rio Grande.—Described on page 128 of Paper No. 16. Results for 1897 given on page 384 of the Nineteenth Annual Report, Part IV.

Rio Grande station on Rio Grande.—Described on page 130 of Paper No. 16. Results for 1897 given on page 386 of the Nineteenth Annual Report, Part IV.

San Marcial station on Rio Grande.—Described on page 131 of Paper No. 16. Results for 1897 given on page 387 of the Nineteenth Annual Report, Part IV.

El Paso station on Rio Grande.—Described on page 132 of Paper No. 16; results given on page 389 of the Nineteenth Annual Report, Part IV. Work at this locality has been carried on by T. M. Courchesne, under the direction of Mr. W. W. Follett, consulting engineer, International (Water) Boundary Commission. A large number of measurements were made during 1898, as shown in the following list. During the months of October and November the water was so low (probably not more than 2 to 3 second-feet) that the meter could not be used during that time.

List of discharge measurements on Rio Grande at El Paso, Texas.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1898.	*Sec.-ft.*	*Sec.-ft.*	1898.	*Sec.-ft.*	*Sec.-ft.*	1898.	*Sec.-ft.*	*Sec.-ft.*
Jan. 3	7.00	458	May 2	11.00	5,218	July 27	8.40	1,891
Jan. 5	7.20	471	May 3	11.40	6,059	July 29	8.00	1,366
Jan. 7	7.60	640	May 5	11.00	4,773	Aug. 3	7.30	813
Jan. 10	7.50	630	May 7	10.40	3,623	Aug. 6	7.20	637
Jan. 12	7.40	513	May 9	9.50	2,547	Aug. 8	7.10	515
Jan. 14	7.60	676	May 14	9.00	1,184	Aug. 11	7.60	803
Jan. 15	7.30	456	May 17	9.10	1,769	Aug. 13	8.50	2,026
Jan. 17	7.30	474	May 19	9.10	1,884	Aug. 16	7.30	649
Jan. 19	7.90	703	May 23	8.80	1,455	Aug. 18	6.70	353
Jan. 22	7.30	440	May 25	8.40	1,071	Aug. 20	6.40	249
Jan. 25	7.30	434	May 27	8.30	958	Aug. 22	6.00	160
Jan. 28	7.10	400	May 30	7.60	627	Aug. 25	5.90	122
Jan. 29	7.00	361	June 2	7.50	522	Aug. 27	5.70	111
Jan. 31	6.70	207	June 4	7.80	605	Aug. 29	6.30	253
Feb. 2	7.10	404	June 6	8.50	1,137	Aug. 31	5.80	122
Feb. 4	8.10	862	June 7	9.50	2,640	Sept. 3	5.40	64
Mar. 2	7.40	361	June 9	9.00	1,961	Sept. 5	5.30	41
Mar. 20	7.40	405	June 11	10.10	3,080	Sept. 7	5.10	23
Mar. 22	7.10	280	June 20	8.90	1,344	Sept. 10	5.20	25
Mar. 24	6.80	192	June 22	8.70	1,288	Sept. 12	5.00	18
Mar. 27	6.60	120	June 24	8.80	1,484	Sept. 15	5.90	185
Mar. 28	6.50	136	June 27	9.80	2,674	Sept. 17	5.50	84
Mar. 31	6.30	99	June 30	9.60	2,153	Sept. 19	5.30	46
Apr. 1	6.30	96	July 2	9.60	1,926	Sept. 21	5.10	30
Apr. 3	6.10	63	July 6	10.40	3,629	Sept. 24	4.70	9
Apr. 16	7.00	266	July 7	11.00	3,860	Dec. 6	5.40	79
Apr. 18	8.80	1,693	July 9	9.50	1,965	Dec. 19	5.50	96
Apr. 21	9.80	2,461	July 12	9.90	3,105	Dec. 21	5.40	75
Apr. 22	10.30	3,093	July 20	13.60	9,791	Dec. 24	5.40	67
Apr. 23	10.50	3,634	July 23	10.00	3,898	Dec. 27	6.10	196
Apr. 29	10.70	4,443	July 25	8.80	2,920	Dec. 29	5.80	125

TABLES OF DAILY GAGE HEIGHT.

Daily gage height, in feet, of Trinity River at Dallas, Texas, for 1898.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	55.85	54.50	55.80	12	55.15	54.00	54.85	23	55.15	53.00	58.10
2	55.50	54.40	55.75	13	54.85	54.10	54.70	24	55.00	52.90	57.65
3	55.45	54.30	55.55	14	54.65	54.00	54.65	25	54.85	52.85	57.30
4	55.20	54.30	55.45	15	54.50	53.90	54.90	26	54.75	58.20	56.45
5	55.35	54.30	55.25	16	54.55	54.00	55.00	27	54.95	57.15	56.40
6	57.25	54.15	55.10	17	54.45	53.90	55.05	28	54.75	56.60	56.20
7	56.30	54.10	55.10	18	54.30	53.90	57.40	29	54.55	56.25	55.95
8	55.75	54.00	55.20	19	54.35	53.75	62.35	30	54.80	56.05	55.80
9	55.45	53.90	55.20	20	54.60	53.70	65.60	31	54.65	.....	55.65
10	55.35	54.00	55.15	21	54.90	53.60	58.95				
11	55.15	54.00	55.05	22	55.20	53.15	58.35				

Daily gage height, in feet, of Brazos River at Waco, Texas, for 1898.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1	.....	4.40	2.30	2.20	12	.....	2.80	2.60	2.30	23	2.70	2.80	2.20	2.90
2	.....	4.10	2.30	2.20	13	.....	2.80	2.50	2.30	24	2.70	2.80	2.20	2.80
3	.....	3.70	2.30	2.20	14	2.70	2.60	2.40	2.30	25	2.70	2.70	2.30	2.60
4	.....	3.60	2.30	2.20	15	2.70	2.60	2.40	2.30	26	6.50	2.50	2.40	2.50
5	.....	3.50	2.40	2.30	16	2.70	2.50	2.30	2.40	27	5.60	2.50	2.40	2.50
6	.....	3.50	2.30	2.30	17	2.70	2.50	2.30	2.40	28	5.10	2.50	2.40	2.50
7	.....	3.90	2.20	2.20	18	2.70	3.20	2.30	2.50	29	4.90	2.50	2.30	2.50
8	.....	3.30	2.20	2.20	19	2.70	3.30	2.20	3.80	30	4.70	2.40	2.30	2.50
9	.....	3.20	2.40	2.20	20	2.70	3.10	2.20	3.30	31	.....	2.40	.....	2.50
10	.....	3.10	2.50	2.30	21	2.70	2.90	2.40	3.00					
11	.....	3.10	2.50	2.30	22	2.70	2.70	2.30	2.90					

Daily gage height, in feet, of Brazos River at Lewis, Texas, for 1898.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	7.30	7.75	6.70	7.45	11.90	7.85	8.35	7.35	4.40	4.15
2	.....	7.10	7.95	6.70	7.40	10.40	8.00	9.60	7.00	4.35	4.10
3	.....	7.25	8.30	6.45	7.80	9.75	7.35	9.00	6.70	4.30	4.10
4	.....	7.50	8.55	6.40	8.90	8.80	6.95	8.15	6.45	4.40	4.10
5	.....	7.50	8.75	8.30	7.95	8.80	6.60	7.60	6.00	4.30	4.00
6	.....	7.50	9.30	8.10	7.50	8.45	6.40	7.00	6.00	4.50	4.10
7	.....	7.50	9.55	7.85	7.80	9.50	6.30	6.85	6.10	4.40	4.10
8	.....	7.55	8.55	7.95	9.40	9.00	6.10	6.40	5.90	4.25	4.10
9	.....	7.65	7.70	8.35	9.60	8.15	6.55	5.95	5.80	4.00	4.10
10	.....	7.85	7.45	8.65	8.65	8.00	8.85	5.70	5.60	4.05	4.10
11	.....	7.90	7.75	8.60	9.40	7.65	8.30	5.50	5.40	4.10	4.10
12	.....	7.70	8.20	8.15	11.25	7.20	7.95	5.45	5.30	4.10	4.10
13	.....	7.85	9.80	10.55	17.45	9.20	7.70	5.30	5.15	4.15	4.10
14	.....	9.20	10.75	10.55	20.40	8.70	7.20	5.15	5.00	4.20	4.10
15	.....	9.30	9.25	9.30	17.15	8.15	6.80	5.00	5.05	4.20	4.00
16	.....	8.65	11.00	8.60	16.05	8.45	6.60	5.05	4.90	4.20	4.00
17	.....	8.00	8.55	8.15	13.95	11.40	7.05	5.05	4.60	4.15	4.10
18	.....	7.75	9.25	7.95	13.65	10.10	7.05	4.95	4.60	4.15	5.20
19	.....	7.20	21.20	7.90	13.80	9.20	6.70	4.90	4.75	4.20	6.10
20	.....	7.55	14.00	7.90	15.00	8.70	6.25	4.85	5.15	4.20	6.55
21	.....	7.30	12.10	7.80	16.20	8.20	6.05	4.80	6.00	4.20	6.15
22	7.05	7.45	11.50	8.30	14.10	7.65	5.75	4.80	5.65	4.10	5.65
23	7.50	7.40	11.00	8.90	12.75	11.00	5.60	4.75	5.45	4.10	5.50
24	7.25	7.15	9.35	8.40	12.15	10.05	5.55	4.60	5.00	4.10	5.15
25	7.05	7.15	8.45	11.45	11.25	9.35	5.35	4.65	4.90	4.10	5.00
26	6.90	7.35	7.90	10.50	10.55	8.75	5.25	4.70	4.75	4.15	4.85
27	6.90	7.60	7.50	9.80	9.85	8.45	5.40	7.85	4.60	4.10	4.70
28	6.80	7.85	7.25	9.60	9.20	8.90	6.45	8.90	4.45	4.10	4.50
29	6.70	7.85	7.15	9.10	10.10	9.70	6.45	8.10	4.35	4.10	4.50
30	.....	8.45	6.95	8.45	11.20	8.35	6.35	7.45	4.30	4.15	4.45
31	.....	8.00	.....	7.85	.....	7.75	6.40	.....	4.35	.....	4.40

Daily gage height, in feet, on crest of dam of Colorado River at Austin, Texas, for 1895.

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.45	0.65	0.30	0.30	17	.30	.25	.30	.30	.25
2	.....	.40	.50	.30	.30	18	.30	.25	.30	.30	.20
3	.....	.40	.90	.40	.30	19	.30	.25	.30	.30	.20
4	.....	.40	.85	.20	.30	20	.30	.20	.25	.40	.30
5	.....	.50	.70	.20	.25	21	.30	.15	.25	.40	.30
6	.....	.50	.60	.20	.25	22	.40	.10	.25	.60	.30
7	.....	.45	.55	.20	.25	23	1.20	.15	.25	.80	.35
8	.....	.40	.50	.20	.20	24	1.40	.10	.25	1.00	.40
9	.....	.40	.50	.20	.20	25	1.00	.60	.25	.80	.40
10	.....	.35	.45	.30	.30	26	.80	.50	.25	.60	.35
11	.....	.35	.45	.50	.20	27	.40	.25	.20	.40	.40
12	.....	.35	.40	.60	.20	28	.45	.25	.20	.30	.45
13	0.40	.40	.35	1.00	.25	29	.50	.40	.20	.30	.55
14	.30	.40	.35	.50	.25	30	.50	.80	.25	.40	.55
15	.30	.35	.35	.30	.25	31	.45	.....	.25	.....	.50
16	.30	.25	.30	.30	.25						

Daily gage height, in feet, on crest of dam of Colorado River at Austin, Texas, for 1896.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.50	0.90	0.90	0.30	0.50	—0.50	—5.70	0.15	0.30	1.30	1.20	0.30
2	.50	2.20	.80	.10	.45	— .60	—4.00	.10	.30	1.20	.90	.30
3	.45	1.80	.70	.20	.40	— .70	—2.20	.10	.30	1.00	.90	.30
4	.40	1.40	.60	.30	.35	— .80	—1.00	.05	.25	.80	.80	.30
5	.30	1.20	.60	.30	.30	—1.00	— .60	.00	.20	.50	.70	.30
6	.30	1.00	.60	.40	.30	—1.15	— .20	— .10	.15	.40	.70	.30
7	.30	.80	.60	.15	.25	—1.35	+ .50	— .30	.10	.40	.60	.30
8	.30	.80	.60	.90	.40	—1.50	.60	— .40	.05	.30	.40	.40
9	.30	.70	.60	.80	.35	—1.80	.60	— .50	.00	.30	.40	.40
10	.30	.60	.70	.70	.30	—2.00	.50	— .60	— .05	.30	.40	.40
11	.30	.50	.60	.70	.25	—2.20	.45	— .80	— .15	.30	.50	.40
12	.30	.70	.70	1.30	.20	—2.40	.45	—1.00	— .25	.30	.50	.40
13	.30	.60	.70	1.20	.20	—2.60	.50	—1.05	— .35	.40	.45	.40
14	.30	.50	.60	1.20	.20	—2.80	.90	—1.15	— .45	.50	.45	.35
15	.30	.50	.60	1.20	.20	—3.00	2.60	—1.30	— .50	.60	.45	.35
16	.30	.60	.50	1.20	.20	—3.20	2.50	—1.40	— .60	.50	.40	.35
17	.30	.55	.50	1.10	.20	—3.30	2.00	—1.50	— .70	.40	.40	.30
18	.25	.50	.50	.90	.20	—3.50	1.20	—1.90	— .90	.40	.30	.30
19	.25	.45	.50	.60	.20	—3.60	1.00	—2.05	—1.00	1.00	.30	.30
20	.35	.40	.50	.70	.20	—3.70	.90	—2.20	—1.10	1.60	.30	.30
21	.35	.40	.50	.70	.20	—3.80	.80	—2.50	—1.30	1.80	.35	.30
22	.35	.40	.50	.70	.20	—4.00	.75	—2.60	—1.50	1.60	.35	.30
23	.35	.40	.50	.70	.15	—4.20	.70	—2.80	+2.50	2.00	.45	.30
24	.35	1.00	.50	.70	.10	—4.30	.60	—3.10	1.60	3.00	.35	.25
25	.30	1.20	.50	.60	.05	—4.50	.35	— .20	1.10	3.00	.35	.25
26	.30	1.10	.50	.70	.05	—4.80	.30	+1.50	2.70	2.60	.35	.25
27	.30	1.10	.50	.70	.00	—5.00	.20	1.00	2.60	2.00	.35	.25
28	.30	1.00	.40	.60	—.10	—5.20	.20	.60	2.60	1.60	.35	.25
29	.25	1.00	.30	.60	—.20	—5.40	.20	.50	1.80	1.60	.25	.30
30	.35	.....	.30	.50	—.30	—5.60	.15	.40	1.80	2.00	.25	.40
31	.90	.....	.30	.....	—.40	.....	.15	.....	.....	1.60	.....	.....

Daily gage height, in feet, on crest of dam of Colorado River at Austin, Texas, for 1897.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.80	0.40	0.25	1.05	0.70	0.35	0.25	0.20	0.30	—0.03	0.50	—2.00
2	2.20	.30	.23	.90	.80	1.10	.20	.18	.25	— .25	.25	—2.40
3	2.00	.30	.23	.80	.70	1.10	.08	.20	.18	— .30	.15	—2.40
4	1.40	.30	.23	.70	.60	1.00	.00	.20	.20	— .35	.12	—2.40
5	1.00	.30	.23	.60	.50	1.20	— .05	.20	.20	— .50	.12	—2.40
6	.80	.40	.23	.50	.50	1.40	— .15	.20	.30	— .65	.12	—2.40
7	.80	.30	.25	.60	.60	1.00	— .28	.18	.35	— .75	.12	—2.40
8	.80	.30	.23	.95	.60	1.35	— .40	.08	.33	— .85	.17	—2.50
9	.60	.30	.23	.90	1.45	1.00	— .65	.00	.20	— .95	.05	—2.60
10	.60	.30	.23	.98	1.93	.83	— .80	— .05	.15	—1.02	.01	—2.60
11	.50	.35	.23	.85	1.40	.73	— .90	— .20	.10	—1.05	— .02	—2.75
12	.40	.30	.25	.80	1.30	.60	—1.08	— .20	.15	—1.20	— .12	—2.65
13	.50	.30	.20	.70	.95	.50	— .60	— .35	.15	—1.40	— .17	—2.75
14	.55	.30	.20	.50	.83	.48	— .25	— .60	.20	—1.47	— .27	—2.90
15	.50	.30	.20	.55	.85	2.00	— .20	— .40	.50	—1.55	— .10	—3.00
16	.40	.33	.20	.60	1.70	1.85	.00	.....	.65	—1.35	— .07	—3.07
17	.40	.35	.45	.60	1.43	1.93	.15	.....	.60	.00	— .10	—3.15
18	.50	.35	.63	.50	1.10	1.83	.20	— .40	.60	.30	— .10	—3.15
19	.40	.28	.60	.50	.93	1.08	.20	+1.15	.50	.60	— .12	—3.00
20	.40	.30	.60	.50	1.20	.80	.50	1.45	.40	.57	— .40	—3.00
21	.40	.30	.50	.40	1.53	.73	.40	1.30	.40	.55	— .60	—3.15
22	.40	.30	.45	.30	.98	.58	.35	.85	.35	.50	— .65	—2.90
23	.40	.30	.40	.30	1.05	.45	.30	.80	.30	.57	— .70	—3.00
24	.40	.25	.40	.30	.70	.40	.25	.78	.28	.55	— .70	—2.90
25	.40	.25	.35	.30	.55	.38	.20	.65	.18	.50	— .70	—2.90
26	.40	.23	.40	.30	.50	.40	.60	.50	.15	.15	—1.37	—2.80
27	.40	.23	.30	.30	.48	.35	.40	.48	.15	.80	—1.55	—2.70
28	.40	.23	.85	.40	.40	.28	.50	.35	.10	.85	—1.60	—2.70
29	.40	.....	2.40	.35	.45	.28	.45	.40	.05	.65	—1.80	—2.70
30	.30	.....	2.80	.30	.40	.28	.38	.33	.03	.55	—2.00	—2.70
31	.30	.....	1.70	.....	.40	.....	.30	.30	.....	.55	.....	—2.00

Daily gage height, in feet, on crest of dam of Colorado River, at Austin, Texas, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	—2.30	—1.60	0.20	—1.10	0.2	0.20	1.70	0.20	0.50	0.30	—3.90	—5.30
2	—2 30	—1.60	.20	—1.10	.30	.10	1.00	.20	.40	.30	—4.10	.....
3	—2.30	—1.60	.10	—1.30	.30	.10	.80	.20	.30	.20	—4.40	.....
4	—2.20	—1.50	.10	—1.20	.40	.10	.70	.10	.30	.10	—4.60	.....
5	—2.50	—1.50	.10	—1.30	.40	.10	1.10	.10	.30	.10	—4.80	.....
6	—2.50	—1.50	.05	—1.50	.30	.50	.70	.10	.20	.05	—5.00	.....
7	—2 50	—1.50	.05	—1.50	1.20	.00	.60	—.05	.20	.30	—5.20	—6.30
8	—2.50	—1 50	.00	—1.70	1.50	.00	.50	—.15	.10	.30	—5.50	—6.60
9	—2.50	—1.30	.00	—1.80	1.20	1.50	.50	—.10	.10	.20	—5.70	—6.80
10	—2.50	—1.10	.00	—2.00	.80	.90	.30	—.20	.10	.10	—5.90	—7.30
11	—2.40	— .50	.00	—2.00	.60	1.00	.40	—.30	.00	— .10	—5.90	—7.70
12	—2.40	— .20	.00	—1.90	.50	1.70	.40	—.30	— .10	.00	—5.70	—7.50
13	—2.40	.03	.00	+ .80	2.10	1.70	.30	.00	— .30	— .20	—4.70	—7.60
14	—2.40	.20	.00	1.80	2.20	2.30	.40	.70	— .40	— .30	—4.20	—7.40
15	—2.50	.20	.00	1.10	1.20	3.70	.40	.80	— .70	— .50	—3.80	—7.40
16	—2.50	.20	.00	.90	.90	4.20	.30	.70	— .80	— .60	—3.90	—7.40
17	—2.40	.50	.00	.70	.70	3.60	.30	.70	—1.00	— .50	—4.00	—8.00
18	—2.50	.40	.00	.80	.50	2.60	.30	.50	—1.20	— .90	—3.60	—7.30
19	—2.40	.40	.00	1.50	.50	3.90	.10	.50	—1.50	—1.00	—3.50	—7.10
20	—2.30	.40	.00	1.60	.40	4.00	.20	.05	—1.60	—1.30	—3.00	—6.90
21	—2.30	.30	.00	1.10	.40	3.40	.20	.00	—1.90	—1.80	—4.00	—6.60
22	—2.20	.20	.00	.90	.30	1.70	.40	—.10	—2.10	—1.50	—4.20	—6.50
23	—2.20	.30	— .10	.70	.30	1.40	.30	—.30	—2.50	—1.70	—4.30	—6.50
24	—2.10	.20	— .20	.50	.30	1.10	.30	—.40	+2.00	—2.00	—4.60	—6.30
25	—2.00	.20	— .30	.50	.30	.90	.30	—.50	1.70	—2.20	—4.40	—6.10
26	—1.90	.20	— .50	.40	.40	.70	.30	—.70	.90	—2.50	—4.60	—6.00
27	—1.90	.20	— .70	.30	.40	.70	.30	—.70	.70	—2.60	—4.70	—5.80
28	—1.80	.20	— .70	.30	.40	.70	.30	—.60	.50	—2.80	—4.80	—5.80
29	—1.80	.....	— .90	.30	.40	.70	.20	+.70	.40	—3.00	—4.80	—5.70
30	—1.70	.....	— .90	.20	.30	.80	.10	1.40	.30	—3.50	—4.90	—6.10
31	—1.70	.....	—1.00	.....	.20	.....	.20	1.30	.....	—3.60	.....	—5.80

Daily gage height, in feet, of Colorado River above Congress Avenue Bridge, at Austin, Texas, for 1898.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	2.10	1.95	2.25	2.00	4.10	1.95	2.55	2.35	1.95	1.90
2	.....	2.20	1.95	2.40	2.00	3.70	2.10	2.45	2.30	1.85	1.85
3	.....	2.15	1.95	2.40	2.00	3.20	2.25	2.55	2.25	1.95	1.90
4	.....	2.00	2.00	2.65	2.05	3.05	2.10	2.35	2.10	1.95	1.85
5	.....	2.00	1.95	2.40	2.05	3.05	2.15	2.45	2.05	1.95	1.75
6	.....	1.95	2.00	2.45	1.95	2.90	2.10	2.40	2.05	1.95	1.85
7	.....	1.90	1.95	3.65	1.95	2.85	1.95	2.30	2.25	1.95	1.90
8	.....	1.90	1.95	4.85	2.45	2.70	1.95	2.20	2.40	1.95	2.05
9	.....	1.95	1.95	3.90	4.00	2.55	2.00	2.10	2.25	2.00	2.00
10	.....	1.90	2.00	3.20	3.65	2.50	2.05	2.05	2.05	1.95	2.05
11	.....	2.00	2.00	2.85	4.10	2.55	2.05	2.05	2.00	2.00	2.05
12	.....	1.95	2.05	2.55	4.30	2.40	2.10	2.05	2.05	1.95	1.95
13	.....	1.95	3.40	7.60	4.50	2.35	2.35	2.00	2.20	1.95	1.85
14	.....	1.90	5.05	5.75	6.30	2.70	2.65	1.95	1.90	1.95	2.05
15	2.00	1.95	3.75	4.00	9.55	2.55	2.55	1.95	1.95	2.00	2.00
16	2.45	2.00	3.35	3.50	10.70	2.45	2.40	1.95	1.95	1.85	1.85
17	2.75	1.95	3.00	3.15	8.80	2.20	2.30	1.90	2.00	1.85	1.95
18	2.55	2.00	3.30	2.90	7.40	2.10	2.20	2.00	2.05	1.85	1.85
19	2.50	1.95	3.25	2.70	10.20	2.15	2.15	2.00	2.05	1.85	1.85
20	2.45	1.95	4.75	2.50	9.60	2.05	2.00	2.00	2.05	1.80	1.90
21	2.35	1.95	4.60	2.40	6.10	2.35	1.95	2.00	2.15	1.85	1.95
22	2.30	2.00	3.80	2.45	5.00	2.60	1.95	2.05	2.00	1.90	1.90
23	2.30	1.95	3.20	2.25	4.10	2.55	2.00	5.25	2.05	1.85	1.85
24	2.20	1.95	2.90	2.15	3.75	2.35	2.05	4.40	2.00	1.95	1.90
25	2.20	2.00	2.50	2.15	3.40	2.30	2.05	4.15	1.85	1.95	1.85
26	2.20	2.00	2.45	2.20	3.15	2.20	2.05	3.60	1.85	1.85	1.90
27	2.10	1.90	2.35	2.30	3.05	2.10	2.15	3.10	1.95	1.85	1.95
28	2.05	2.10	2.35	2.20	3.15	2.15	2.70	2.95	2.00	1.90	2.00
29	.....	2.00	2.30	2.15	3.30	2.00	2.90	2.60	1.50	1.90	1.90
30	.....	2.00	2.30	2.05	3.40	1.95	3.60	2.45	2.20	1.85	1.90
31	.....	1.95	.....	2.00	.....	1.95	2.95	.....	1.95	.....	1.85

Daily gage height, in feet, of Guadalupe River at New Braunfels, Texas, for 1898.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	2.00	2.10	2.00	2.25	2.00	2.20	2.00	2.00	2.00
2	.....	2.00	2.10	2.00	2.40	2.00	2.15	2.00	2.00	2.00
3	.....	2.00	2.10	2.00	2.30	2.00	2.10	2.00	2.00	2.00
4	.....	2.00	2.10	2.00	2.10	2.00	2.05	2.00	2.00	2.00
5	.....	2.00	2.10	2.00	2.10	2.00	2.00	2.00	2.00	2.00
6	.....	2.00	2.10	2.25	2.00	2.00	2.00	2.00	2.00	2.00
7	.....	2.00	2.10	2.10	2.00	2.00	2.00	2.00	2.00	2.00
8	.....	2.00	2.10	2.10	2.00	2.00	2.00	2.00	2.00	2.00
9	.....	2.00	2.10	2.35	2.00	2.00	2.00	2.00	2.00	2.00
10	.....	2.00	2.10	2.30	2.00	2.00	2.00	2.00	2.00	2.00
11	.....	2.00	2.10	2.40	2.00	2.00	2.00	2.00	2.00	2.00
12	.....	2.10	2.10	3.10	2.00	2.00	2.00	2.00	2.00	2.00
13	2.00	2.05	2.10	3.60	2.00	2.00	2.00	2.00	2.00	2.00
14	2.00	2.00	2.10	3.50	2.00	2.00	2.00	2.00	2.00	2.00
15	2.00	2.08	2.10	2.90	2.00	2.00	2.00	2.00	2.00	2.00
16	2.00	2.13	2.10	2.65	2.00	2.00	2.00	2.00	2.00	2.00
17	2.00	2.30	2.10	2.55	2.00	2.00	2.00	2.00	2.00	2.00
18	2.00	2.30	2.10	2.45	2.00	2.00	2.10	2.00	2.00	2.00
19	2.00	2.20	2.10	2.40	2.00	2.00	2.00	2.00	2.00	2.00
20	2.00	2.20	2.10	2.50	2.00	2.05	2.00	2.00	2.00	1.90
21	2.00	2.20	2.10	2.40	2.00	2.00	2.00	2.00	2.00	1.80
22	2.00	2.20	2.25	2.35	2.00	2.00	2.00	2.00	2.00	1.80
23	2.00	2.20	2.10	2.30	2.00	2.00	2.00	2.00	2.00	1.80
24	2.00	2.20	2.10	2.25	2.00	2.00	2.00	2.00	2.00	1.80
25	2.00	2.20	2.10	2.10	2.00	2.00	2.00	2.00	2.00	1.80
26	2.00	2.15	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.80
27	2.00	2.10	2.00	2.00	2.00	2.05	2.00	2.00	2.00	1.80
28	2.00	2.10	2.00	2.05	2.00	2.00	2.00	2.00	2.00	1.80
29	2.00	2.10	2.00	2.15	2.00	2.00	2.00	2.00	2.00	1.80
30	2.00	2.10	2.00	2.00	2.00	2.40	2.00	2.00	2.00	1.80
31	2.00	.....	2.00	.....	2.00	2.25	.....	2.00	.....	1.80

Daily gage height, in feet, of water in flume of Margueretta Canal, over Pecos River, for 1898.

Day.	Jan.	Mar.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.50	1.50	1.50	2.30	1.80	1.70	1.95	2.20
2	1.50	1.50	1.70	2.30	1.80	1.80	1.95	2.20
3	1.50	1.50	1.70	2.30	1.80	1.70	1.95	2.20
4	1.50	1.50	1.70	2.30	1.80	1.70	1.95	2.13
5	1.50	1.50	1.80	2.30	1.80	1.70	1.95	2.10
6	1.50	1.50	1.50	2.30	1.80	1.70	1.95	2.10
7	1.50	1.50	1.80	2.30	1.80	1.75	1.95	2.10
8	1.50	1.50	1.70	2.30	1.80	1.75	2.00	2.10
9	1.50	1.50	1.70	2.20	1.70	1.70	2.00	2.15
10	1.50	1.50	1.70	2.00	1.80	1.70	2.00	2.20
11	1.50	1.50	1.50	2.00	2.10	1.75	2.00	2.10
12	1.50	1.50	1.50	2.00	2.20	1.80	2.00	2.15
13	1.50	1.50	1.70	2.00	2.20	1.80	2.10	2.20
14	1.50	1.50	1.80	2.00	2.20	1.80	2.10	2.20
15	1.50	1.50	1.90	2.00	2.00	1.80	2.15	2.20
16	1.50	1.50	1.80	2.00	2.00	1.80	2.20	2.18
17	1.50	1.50	1.70	2.00	1.80	1.80	2.20	2.15
18	1.50	1.50	1.80	1.90	1.80	1.85	2.20	2.15
19	1.50	1.50	1.80	1.90	1.80	1.85	2.20	2.18
20	1.50	1.50	1.80	1.90	1.80	1.85	2.20	2.15
21	1.50	1.50	1.90	1.90	1.90	1.85	2.15	2.10
22	1.50	1.50	2.10	1.80	1.90	1.90	2.10	2.10
23	1.50	1.50	2.20	1.80	1.60	1.90	2.10	2.10
24	1.50	1.50	2.20	1.80	1.70	1.90	2.10	2.10
25	1.50	1.50	2.10	1.50	1.70	1.90	2.20	2.15
26	1.50	1.50	2.10	1.80	1.70	1.90	2.23	2.20
27	1.50	1.50	2.20	1.70	1.70	1.90	2.20	2.15
28	1.50	1.50	2.30	1.90	1.70	1.90	2.20	2.05
29	1.50	1.50	2.30	1.80	1.70	1.90	2.20	1.95
30	1.50	1.50	2.30	1.90	1.70	1.90	2.20	1.80
31	1.50	1.50	2.30	1.80	.....	1.90	.....	1.80

Daily gage height, in feet, of Pecos River, under flume 6 miles above Pecos, Texas, for 1898.

Day.	Jan.	Mar.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.10	1.00	1.40	4.80	2.40	1.80	1.70	1.80
2	1.00	1.00	1.60	4.70	2.30	1.80	1.70	1.70
3	1.00	1.00	1.50	4.70	2.00	1.80	1.70	1.70
4	1.00	1.00	2.80	4.50	2.00	1.80	1.70	1.65
5	1.20	1.00	5.80	4.50	2.00	1.80	1.70	1.60
6	2.00	1.00	6.00	4.20	2.00	1.80	1.70	1.60
7	2.70	1.00	6.50	4.20	2.50	1.80	1.65	1.60
8	3.00	1.00	8.90	6.30	2.20	1.75	1.70	1.65
9	2.80	1.00	9.90	8.80	2.00	1.80	1.70	1.65
10	2.80	1.00	10.70	6.50	2.00	1.80	1.70	1.65
11	2.80	.80	8.00	5.70	2.40	1.90	1.70	1.50
12	2.70	.70	7.00	5.30	2.30	1.90	1.70	1.60
13	2.70	.80	6.20	5.00	2.40	1.80	1.75	3.10
14	2.30	1.00	8.00	4.50	2.30	1.80	1.75	3.20
15	1.80	1.00	11.20	4.50	2.10	1.75	1.75	3.10
16	1.50	1.00	10.80	4.70	2.00	1.70	1.75	3.05
17	1.50	.90	9.00	4.50	2.00	1.70	1.80	3.00
18	1.70	.90	7.00	4.00	2.00	1.70	1.80	3.10
19	1.80	.80	6.00	3.00	2.00	1.65	1.80	3.10
20	2.00	.80	5.50	2.00	2.00	1.65	1.80	3.15
21	2.30	.70	7.00	1.50	2.00	1.70	1.80	3.80
22	2.20	.70	8.20	2.50	2.00	1.70	1.80	3.80
23	2.10	.70	8.00	2.50	2.00	1.70	1.75	3.70
24	2.00	.60	7.50	2.30	1.90	1.70	1.80	3.60
25	2.00	.60	6.80	2.40	1.90	1.70	1.80	4.30
26	1.90	.60	5.80	2.70	1.90	1.70	1.85	4.60
27	1.90	.60	5.00	2.00	1.90	1.70	1.85	4.60
28	1.90	.60	5.00	2.30	1.90	1.70	1.85	4.05
29	1.90	.60	4.90	2.00	1.90	1.70	1.86	3.75
30	1.90	.60	4.80	2.00	1.90	1.70	1.85	3.10
31	1.90	.60	4.80	2.00	.....	1.70	.....	2.85

Daily gage height, in feet, of Pecos River at High Bridge for 1898.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		1.00	0.70	0.50	1.10	2.20	1.90	0.80	0.60	0.60
2		1.00	.60	.50	1.00	2.10	1.90	.80	.70	.50
3		1.00	.60	.50	1.20	2.80	1.90	.80	.80	.50
4		1.00	.60	.50	1.30	2.40	1.80	.70	.80	
5		1.00	.60	.50	1.30	2.20	1.80	.70	.80	
6		1.00	.60	.60	1.30	1.90	1.70	.60	.80	
7		1.00	.60	.70	1.30	2.10	1.70	.70	.80	
8		1.00	.60	.70	1.20	2.50	1.60	.70	.70	
9		1.00	.60	.90	1.20	2.20	1.50	.80	.70	
10		1.00	.80	.90	1.30	1.90	1.50	.80	.70	
11		1.10	.70	.90	2.10	2.00	1.50	.70	.80	
12		1.00	.70	1.00	2.50	2.40	1.40	.60	.80	
13		1.00	.60	1.10	2.90	2.50	1.30	.60	.80	
14		.90	.60	1.40	2.90	2.80	1.30	.50	.70	
15		1.00	.60	1.70	3.10	3.00	1.30	.50	.70	
16	1.00	1.10	.60	1.30	3.10	3.10	1.20	.50	.60	
17	1.10	.90	.60	3.90	3.20	2.90	1.20	.50	.60	
18	1.10	.90	.70	2.80	3.20	2.80	1.30	.70	.60	
19	1.00	.80	.70	1.30	3.40	2.40	1.30	.70	.60	
20	1.00	.80	.70	1.30	3.40	2.20	1.30	.60	.60	
21	1.00	.70	.70	1.20	3.20	2.10	1.30	.60	.50	
22	1.10	.70	.80	1.10	3.00	2.00	1.30	.60	.50	
23	1.10	.70	.80	1.00	2.80	1.90	1.20	.60	.50	
24	1.00	.70	.70	.90	2.60	1.90	1.10	.60	.60	
25	1.00	.70	.70	.90	2.30	1.90	1.00	.50	.60	
26	1.00	.70	.60	.90	2.00	2.10	1.00	.50	.70	
27	1.00	.70	.60	1.70	1.90	2.40	.90	.40	.70	
28	1.00	.80	.60	1.40	1.90	2.10	.90	.40	.70	
29	1.00	.80	.60	1.20	1.80	2.00	.80	.40	.60	
30	1.10	.80	.60	1.10	1.80	2.00	.80	.60	.60	
31	1.00		.50		2.20	1.90		.60		

Daily gage height, in feet, of Rio Grande at Del Norte, Colorado, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.72			2.48	4.06	4.96	3.56	2.00	1.66	1.48	1.54	2.70
3				2.34	3.52	5.30	3.20	1.98	1.70	1.48	1.46	2.72
5		2.96	2.86	2.38	3.60	4.96	3.28	1.94	1.64	1.48	1.46	
7				2.62	3.48	5.10	3.74	1.98	1.62	1.48	1.48	
8	2.84											
9				2.88	3.52	4.64	3.56	2.00	1.60	2.00	1.44	
10												2.84
11				2.92	3.56	4.28	3.34	1.96	1.64	1.96	1.46	
12		2.80	2.98									
13				3.00	3.60	4.52	3.38	1.88	1.62	1.88	1.50	
14												(a)
15	2.88			3.32	3.68	4.86	3.32	1.84	1.60	1.84	1.66	
17				3.54	3.64	5.20	3.12	1.86	1.60	1.50	2.74	2.84
19		3.00	2.82	3.46	3.58	4.96	2.92	1.84	1.56	1.46	2.46	
21				3.42	3.42	5.00	2.78	1.80	1.54	1.44	2.90	
22	2.90											(a)
23				3.64	3.54	5.06	2.56	1.76	1.52	1.48	2.76	
24												2.78
25				3.72	3.66	4.78	2.46	1.74	1.50	1.50	2.88	
26		2.94	3.26									
27				3.96	4.02	4.28	2.42	1.72	1.50	1.50	2.78	
29	2.86			4.20	4.70	3.84	2.18	1.70	1.50	1.46	2.76	
31			2.64		4.78		2.12	1.68		1.46		2.72

(a) Ice.

Daily gage height, in feet, of Rio Grande at Embudo, New Mexico, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.40	8.00	8.35	8.50	11.05	10.95	10.20	8.95	7.70	7.70	7.75	7.75
2	8.30	8.00	8.30	8.60	11.00	11.00	10.00	8.85	7.70	7.50	7.80	7.80
3	8.30	8.00	8.25	8.60	10.95	11.05	9.90	8.80	7.70	7.50	7.85	7.80
4	8.30	8.00	8.25	8.65	10.70	11.50	9.55	8.60	7.70	7.50	7.90	7.80
5	8.30	8.00	8.35	8.70	10.50	11.70	9.70	8.60	7.70	7.50	7.90	7.80
6	8.30	8.00	8.40	8.80	10.40	11.70	9.55	8.60	7.70	7.50	7.90	7.80
7	8.20	8.00	8.45	8.90	10.35	11.60	9.50	8.60	7.70	7.50	7.90	7.80
8	8.20	8.00	8.50	8.90	10.25	11.60	9.80	8.40	7.70	7.50	7.90	7.80
9	8.20	8.00	8.60	8.95	10.15	11.40	10.20	8.40	7.70	7.80	7.90	7.80
10	8.20	8.00	8.60	9.00	10.00	11.30	10.45	8.30	7.90	7.80	7.90	7.80
11	8.20	8.00	8.70	9.40	9.95	11.25	10.30	8.00	7.90	7.75	7.90	7.80
12	8.30	8.00	8.75	9.80	9.80	11.05	10.35	8.00	7.90	7.70	7.90	7.80
13	8.30	8.00	8.85	9.95	9.70	10.90	11.20	7.90	7.90	7.60	7.90	7.90
14	8.20	8.00	8.80	10.10	9.65	10.60	11.30	8.00	7.90	7.60	7.95	7.90
15	8.30	8.00	8.75	10.40	9.60	10.50	11.10	8.00	7.90	7.60	7.90	7.90
16	8.30	8.00	8.70	10.60	9.60	10.30	11.70	7.90	7.90	7.55	7.95	7.90
17	8.25	8.00	8.60	10.90	9.65	10.30	11.55	7.90	7.90	7.50	8.00	7.90
18	8.00	8.00	8.50	11.00	9.80	10.50	11.90	7.90	7.80	7.50	8.00	7.90
19	8.00	8.05	8.55	11.00	9.70	10.75	11.80	7.90	7.80	7.50	7.90	7.90
20	8.00	8.10	8.60	11.00	9.65	11.10	11.55	7.80	7.80	7.50	7.85	7.90
21	7.95	8.15	8.55	11.05	9.80	11.45	11.50	7.70	7.80	7.50	7.75	7.80
22	7.90	8.20	8.50	11.10	9.70	11.40	11.00	7.70	7.80	7.50	7.70	7.80
23	7.95	8.25	8.50	11.10	9.70	11.30	10.70	7.70	7.80	7.50	7.70	7.75
24	8.00	8.35	8.60	10.85	9.60	11.30	10.40	7.70	7.80	7.50	7.60	7.75
25	8.00	8.40	8.55	10.80	6.55	11.20	10.10	7.70	7.70	7.55	7.60	7.70
26	8.00	8.35	8.55	10.90	9.60	11.20	9.90	7.70	7.70	7.60	7.60	7.60
27	8.00	8.50	8.60	10.95	9.85	11.00	9.55	7.70	7.70	7.60	7.60	7.60
28	8.00	8.50	8.60	10.80	10.20	10.85	9.15	7.70	7.70	7.60	7.70	7.55
29	8.00	.....	8.50	10.80	10.35	10.60	8.95	7.70	7.70	7.60	7.70	7.50
30	8.00	.....	8.50	10.80	10.50	10.35	8.70	7.70	7.70	7.70	7.70	7.50
31	8.00	.....	8.50	.....	10.85	.....	9.10	7.70	.....	7.70	.....	7.50

Daily gage height, in feet, of Rio Grande at Rio Grande, New Mexico, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.95	4.95	5.50	5.25	8.90	7.75	6.35	5.30	4.65	4.50	5.00	6.00
2	4.95	4.95	5.38	5.15	8.20	7.75	6.00	5.30	4.80	4.50	5.00	6.00
3	4.95	4.90	5.30	5.15	8.10	7.65	6.00	5.05	4.90	4.60	5.20	5.80
4	5.10	4.90	5.30	5.30	7.75	7.65	5.85	4.85	5.65	4.60	5.30	5.80
5	5.20	5.00	5.40	5.35	7.65	7.90	5.95	4.80	5.55	4.60	5.40	5.60
6	5.05	5.00	5.45	5.50	7.35	8.10	5.75	4.80	5.50	4.60	5.40	5.55
7	5.10	5.10	5.40	5.70	7.20	7.70	7.15	4.70	4.35	4.60	5.30	5.55
8	5.10	5.15	5.40	5.70	7.20	7.55	7.10	6.70	4.30	4.60	5.40	5.60
9	5.00	5.20	5.45	5.85	7.20	7.55	7.55	6.90	4.30	5.60	5.40	5.50
10	5.00	5.10	5.50	6.20	7.25	7.55	6.75	6.50	5.25	5.50	5.40	5.40
11	5.05	5.05	5.65	6.85	7.25	7.55	6.65	5.95	5.15	5.30	5.40	5.40
12	5.25	5.10	5.70	7.25	7.30	7.50	6.45	5.60	4.95	5.20	5.50	5.40
13	5.15	5.15	5.65	7.70	7.30	7.45	8.05	5.40	4.80	5.00	5.40	5.40
14	4.90	5.08	5.65	7.70	7.45	7.45	8.25	5.25	4.70	5.00	5.30	5.40
15	4.90	5.15	5.45	8.05	7.55	7.25	8.30	5.05	4.70	4.90	5.30	5.40
16	4.80	5.20	5.35	8.10	7.35	6.80	8.70	4.55	4.70	4.90	5.30	5.40
17	4.80	5.25	5.15	8.75	7.25	6.95	8.45	5.25	4.70	5.00	5.30	5.40
18	4.90	5.40	5.25	9.10	7.20	6.95	7.85	5.40	4.70	5.00	5.30	5.55
19	4.80	5.35	5.40	8.80	7.10	7.30	7.75	5.25	4.70	5.00	5.30	5.50
20	4.80	5.30	5.40	8.85	7.00	7.65	7.95	5.15	4.70	4.95	5.30	5.40
21	4.80	5.35	5.30	8.85	6.85	7.80	7.60	5.05	4.70	4.95	5.30	5.55
22	4.80	5.30	5.25	8.80	6.70	7.75	6.95	4.95	4.70	5.00	5.40	5.50
23	4.85	5.30	5.20	8.85	6.80	7.45	6.75	4.90	4.70	5.00	5.40	5.40
24	4.90	5.25	5.10	9.10	6.50	8.00	6.65	4.90	4.70	4.95	5.40	5.40
25	4.90	5.33	5.15	9.20	6.55	7.75	6.35	6.80	4.70	5.00	5.50	5.40
26	5.00	5.38	5.25	9.25	6.60	7.75	6.10	5.20	4.70	5.00	5.70	5.40
27	4.90	5.43	5.20	9.20	6.75	7.35	5.90	4.90	4.70	5.00	5.70	5.40
28	5.00	5.48	5.20	9.30	6.80	7.35	5.75	5.00	4.70	5.00	6.00	5.40
29	5.10	.....	5.10	9.20	6.95	6.95	5.45	4.90	4.60	5.00	6.00	5.40
30	5.20	.....	5.25	9.10	7.30	6.60	5.45	4.70	4.60	5.00	6.05	5.25
31	5.00	.....	5.30	.....	7.50	.....	5.35	4.65	.....	5.00	.....	5.20

Daily gage height, in feet, of Rio Grande at San Marcial, New Mexico, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Nov.	Dec.
1	7.70	7.80	7.80	7.40	9.85	8.20	8.50	6.65	4.40	.....	6.80
2	7.70	8.00	7.80	7.40	9.65	8.15	8.60	6.55	4.30	.....	7.00
3	7.60	7.90	7.90	7.40	9.45	8.50	8.30	6.40	4.00	.....	6.80
4	7.60	7.80	7.80	7.40	9.10	8.40	8.55	6.30	4.00	.....	6.55
5	7.60	7.70	7.80	7.40	8.90	8.40	8.35	6.20	3.80	3.35	6.50
6	7.60	7.70	7.80	7.40	8.80	8.25	8.40	6.00	3.80	3.80	6.60
7	7.70	7.70	7.80	7.60	8.70	8.65	8.35	6.00	3.80	4.00	6.50
8	7.70	7.70	7.70	7.60	8.60	8.50	7.95	6.60	3.80	4.20	6.40
9	7.70	7.80	7.70	7.60	8.60	8.30	7.75	6.00	3.80	4.55	6.30
10	7.70	7.80	7.70	7.70	8.60	8.80	8.25	7.50	5.40	4.85	6.30
11	7.70	7.90	7.80	8.10	8.70	8.60	7.65	7.75	7.55	5.05	6.20
12	7.70	7.90	7.80	8.25	8.60	8.75	7.60	6.90	5.60	5.40	6.30
13	7.70	7.90	7.80	8.35	8.55	8.85	7.40	6.35	4.90	5.70	6.50
14	7.70	7.80	7.80	8.60	8.55	8.70	9.30	6.00	4.65	5.80	6.50
15	7.70	7.80	7.90	8.60	8.65	8.65	8.65	5.85	4.30	5.90	6.50
16	7.70	7.70	7.90	8.80	8.80	8.60	10.40	5.70	4.00	6.00	6.50
17	7.70	7.70	7.80	9.00	8.75	8.45	10.75	5.50	3.80	6.20	6.50
18	7.70	7.60	7.70	9.30	8.60	8.20	10.25	5.50	3.80	6.40	6.70
19	7.70	7.60	7.70	9.60	8.50	8.40	8.35	6.00	3.60	6.20	6.75
20	7.70	7.70	7.70	9.90	8.50	8.30	7.95	6.30	3.60	6.20	7.00
21	7.70	7.70	7.70	9.80	8.40	8.20	7.80	6.10	3.60	6.30	7.60
22	7.70	7.60	7.70	9.50	8.20	8.60	7.70	5.75	3.60	6.40	7.25
23	7.70	7.80	7.70	9.20	8.00	8.50	7.65	5.50	3.60	6.50	6.75
24	7.60	7.90	7.60	9.70	8.00	8.60	7.60	5.25	3.60	6.30	6.50
25	7.50	7.80	7.60	9.70	7.90	8.50	7.50	5.00	.....	6.60	6.25
26	7.35	7.80	7.50	9.75	7.80	8.75	7.40	4.90	.....	6.50	6.00
27	6.80	7.80	7.50	9.65	7.70	8.75	7.30	4.80	.....	6.50	6.40
28	7.00	7.80	7.50	9.70	7.70	8.65	7.20	5.15	.....	6.55	6.40
29	7.45	.....	7.50	9.75	7.70	8.55	7.10	5.10	.....	6.50	6.50
30	7.70	.....	7.50	10.00	7.80	8.40	7.00	4.70	.....	6.60	6.70
31	7.80	.....	7.40	.....	7.90	.....	6.80	4.50	.....	.....	6.90

Sept. 5–9, water standing in pools. Sept. 10–16, water backed up. Sept. 19–24, standing in pools. Sept. 25–Nov. 4, dry.

Daily gage height, in feet, of Rio Grande at El Paso, Texas, for 1898.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.85	7.45	6.30	10.90	7.50	9.50	7.50	5.55	4.20	4.00	4.10
2	7.05	7.35	6.30	11.00	7.50	9.50	7.50	5.40	4.20	4.00	4.40
3	7.30	7.45	6.10	11.30	7.55	9.40	7.30	5.40	4.20	4.00	4.65
4	8.05	7.35	5.95	11.30	7.95	9.45	7.05	5.35	4.20	4.00	4.70
5	8.30	7.55	5.75	10.95	8.20	9.30	7.35	5.30	4.20	4.00	4.95
6	8.05	7.25	5.55	10.70	8.70	10.60	7.15	5.20	4.20	4.00	5.30
7	7.90	7.30	5.40	10.20	9.40	10.60	7.10	5.25	4.20	4.00	5.50
8	8.10	7.20	5.40	9.80	9.25	9.65	7.05	5.25	4.20	4.00	5.60
9	8.10	7.30	5.30	9.55	9.25	9.60	8.05	5.20	4.20	4.00	5.60
10	7.80	7.30	5.30	9.40	9.90	9.75	7.50	5.15	4.20	4.00	5.60
11	7.55	7.50	5.30	9.40	10.10	9.55	7.50	5.20	4.20	4.00	5.60
12	7.50	7.60	5.20	9.35	10.05	10.00	7.10	4.95	4.20	4.00	5.60
13	7.80	7.50	5.10	9.10	9.90	9.60	8.45	4.75	4.20	4.00	5.60
14	7.70	7.45	5.10	8.95	9.80	9.30	7.95	4.55	4.20	4.00	5.70
15	7.65	7.50	5.20	9.00	9.80	9.15	7.55	5.85	4.20	4.00	5.55
16	7.70	7.40	6.75	9.00	9.50	9.05	7.25	5.65	4.20	4.00	5.40
17	7.75	7.55	8.55	9.05	9.35	10.60	7.00	5.45	4.20	4.00	5.30
18	7.55	7.80	8.75	9.10	9.25	11.70	6.65	5.35	4.20	4.00	5.35
19	7.40	7.70	9.15	9.10	9.15	13.55	6.55	5.25	4.20	4.00	5.50
20	7.35	7.45	9.60	9.10	8.85	13.65	6.35	5.10	4.10	4.00	5.40
21	7.30	7.25	9.95	9.05	8.70	13.00	6.15	5.05	4.10	4.00	5.40
22	7.20	7.10	10.40	8.90	8.70	10.95	6.00	4.90	4.10	4.00	5.30
23	7.10	7.00	10.50	8.75	8.80	9.75	6.00	4.80	4.00	4.00	5.30
24	7.10	6.90	10.80	8.65	8.95	9.10	6.00	4.70	4.00	4.00	5.35
25	7.15	6.90	10.70	8.45	9.65	9.05	5.90	4.60	4.00	4.00	5.30
26	7.70	6.75	10.60	8.30	9.80	8.90	5.85	4.55	4.00	4.00	6.15
27	7.65	6.60	10.80	8.25	9.60	8.40	5.70	4.50	4.00	4.10	6.15
28	7.55	6.50	10.70	8.05	9.60	8.30	5.75	4.45	4.00	4.10	5.95
29	.....	6.40	10.70	7.80	9.65	7.95	6.15	4.40	4.00	4.10	5.85
30	.....	6.30	10.75	7.55	9.65	7.90	5.95	4.30	4.00	4.10	5.95
31	.....	6.30	.....	7.50	.....	7.80	5.75	.....	4.00	.....	6.00

List of discharge measurements.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
1898.					
Dec. 30	Trinity River	Dallas, Tex	T. U. Taylor	55.80	48
Sept. 14	Brazos River	Waco, Tex	do	2.70	243
Dec. 26	do	do	do	2.50	142
Dec. 31	do	do	do	2.50	142
Feb. 22	do	Lewis, Tex	do	7.00	1,612
May 20	do	do	do	7.80	2,017
1897.					
Dec. 21	Colorado River	Austin, Tex	do	1.80	290
Dec. 22	do	do	do	1.95	355
Dec. 23	do	do	do	2.00	392
Dec. 24	do	do	do	2.05	408
Dec. 25	do	do	do	1.70	275
Dec. 28	do	do	do	1.70	278
1898.					
Jan. 5	do	do	do	-------	a 226
Jan. 6	do	do	do	-------	a 230
Jan. 7	do	do	do	-------	a 233
Jan. 13	do	do	do	-------	a 234
Jan. 22	do	do	do	1.80	297
Feb. 14	do	do	do	2.00	386
Do.	do	do	do	2.00	382
Feb. 17	do	do	do	2.71	1,080
Feb. 18	do	do	do	2.71	1,087
Feb. 19	do	do	do	2.52	876
Mar. 8	do	do	do	1.90	311
Apr. 28	do	do	do	2.38	581
Sept. 15	do	do	do	1.96	-------
Dec. 16	do	do	do	1.95	343
Dec. 21	do	do	do	-------	a 298
Dec. 22	do	do	do	-------	a 296
Mar. 12	Guadalupe River	New Braunfels, Tex.	do	2.00	350
Dec. 20	do	do	do	1.90	44
Apr. 14	Rio Grande	Del Norte, Colo	P. E. Harroun	3.27	1,966
May 18	do	do	do	3.23	1,802
June 23	do	do	do	5.25	5,181
Aug. 25	do	do	do	1.86	521
Oct. 28	do	do	do	1.48	244
Sept. 18	do	Embudo, N. Mex	do	7.70	271
Oct. 6	do	do	do	7.50	265
Oct. 28	do	do	do	7.60	284
May 19	do	Rio Grande, N. Mex.	do	7.00	2,671
Sept. 17	do	do	do	4.70	269
Oct. 7	do	do	do	4.60	258
Oct. 29	do	do	do	5.00	368
May 16	do	San Marcial, N. Mex.	do	8.80	2,943
Sept. 15	do	do	do	4.30	46

a Gaging made in tailrace at dam.

List of miscellaneous discharge measurements.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
1897.				*Feet.*	*Sec.-feet.*
Dec. 30	San Antonio River	San Antonio, Tex	T. U. Taylor		11
1898.					
Jan. 1	Brazos River	Harlans Ford, Tex.	do		132
Jan. 8	Colorado River	Sulphur Hollow, Tex.	do		227
Jan. 12	Comal River	New Braunfels, Tex.	do	1.40	286
Jan. 14	San Felipe River	Del Rio, Tex	do		43
Do.	Madre Ditch	do	do		25
Jan. 15	Devils River	Southern Pacific railroad bridge, Tex.	do		362
Mar. 17	San Antonio River	Hot Wells, Tex	do		9
Mar. 18	Comal River	New Braunfels, Tex.	do	1.40	312
Mar. 19	San Marcos River	San Marcos, Tex	do		51
Mar. 26	Barton Spring	Austin, Tex	do		20
May 3	do	do	do		30
Do.	do	do	do		31
Sept. 5	Pecos River	Flume 6 miles above Pecos, Tex.	do	2.00	80
Do.	Margueretta Flume	6 miles above Pecos, Tex.	do	1.80	114
Sept. 6	Arroya Flume	Below Lake Avalon, Tex.	do		321
Sept. 7	Pecos River	Eddy, N. Mex	do		157
Sept. 8	Delaware River	Crossing of Pecos Valley Railroad.	do		4
Do.	Pecos River	Redbluff, N. Mex	do		227
Sept. 12	Brazos River	Brazos, Tex	do	3.25	80
Sept. 13	Trinity River	Fort Worth, Tex	do		11
Sept. 16	San Marcos River	Westfield, Tex	do		86
Dec. 23	Barton Spring	Austin, Tex	do		19
Dec. 24	do	do	do		19

Rating tables.

Del Norte.		Embudo.		Rio Grande.		San Marcial.	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*
1.4	194	7.5	265	4.3	230	5.0	5
1.5	260	7.6	285	4.4	240	5.2	21
1.6	328	7.7	310	4.5	250	5.4	37
1.7	398	7.8	345	4.6	260	5.6	53
1.8	468	7.9	385	4.7	270	5.8	69
1.9	540	8.0	425	4.8	290	6.0	85
2.0	614	8.2	515	4.9	320	6.2	101
2.1	692	8.4	605	5.0	360	6.4	120
2.2	772	8.6	725	5.2	450	6.6	170
2.3	856	8.8	875	5.4	560	6.8	270
2.4	942	9.0	1,025	5.6	710	7.0	400
2.5	1,032	9.2	1,175	5.8	880	7.2	580
2.6	1,128	9.4	1,360	6.0	1,090	7.4	850
2.7	1,228	9.6	1,570	6.2	1,330	7.6	1,200
2.8	1,333	9.8	1,790	6.4	1,590	7.8	1,650
2.9	1,442	10.0	2,010	6.6	1,910	8.0	2,150
3.0	1,556	10.2	2,260	6.8	2,250	8.2	2,800
3.2	1,811	10.4	2,540	7.0	2,670	8.4	3,600
3.4	2,120	10.6	2,820	7.2	3,110	8.6	4,450
3.6	2,440	10.8	3,105	7.4	3,550	8.8	5,350
3.8	2,760	11.0	3,395	7.6	3,990	9.0	6,250
4.0	3,080	11.2	3,685	7.8	4,450	9.2	7,150
4.2	3,406	11.4	3,975	8.0	4,910	9.4	8,050
4.4	3,737	11.6	4,265	8.2	5,380	9.6	8,925
4.6	4,076	11.8	4,555	8.4	5,860	9.8	9,850
4.8	4,416	12.0	4,845	8.6	6,340	10.0	10,750
5.0	4,756	-------	-------	8.8	6,820	10.2	11,650
5.2	5,096	-------	-------	9.0	7,300	10.4	12,550
5.4	5,436	-------	-------	9.2	7,780	-------	-------
-------	-------	-------	-------	9.4	8,260	-------	-------

COLORADO RIVER DRAINAGE.

DESCRIPTION OF RIVER STATIONS.

Granger station on Black Fork.—Described on page 134 of Paper No. 16; results for 1897 given on pages 391–393 of the Nineteenth Annual Report, Part IV.

Greenriver station on Green River.—Described on page 135 of Paper No. 16; results for 1897 shown on pages 394–396 of the Nineteenth Annual Report, Part IV.

Blake station on Green River.—Described on page 136 of Paper No. 16; results for 1897 given on pages 396–398 of the Nineteenth Annual Report, Part IV.

Grand Junction station on Grand River.—Described on page 137 of Paper No. 16; results for 1897 given on pages 399–401 of the Nineteenth Annual Report, Part IV.

Fort Crawford station on Uncompahgre River.—Described on page 139 of Paper No. 16; results for 1897 given on pages 402–404 of the Nineteenth Annual Report, Part IV.

Grand Junction station on Gunnison River.—Described on page 141 of Paper No. 16; results for 1897 given on pages 404–406 of the Nineteenth Annual Report, Part IV.

Fallcreek station on San Miguel River.—Described on page 142 of Paper No. 16; results for 1897 given on pages 406–407 of the Nineteenth Annual Report, Part IV.

Mancos station on Mancos River.—This station is located at about the center of the town of Mancos, Colorado, 100 feet below a wagon bridge across the river, and was established April 9, 1898. The gage consists of a vertical 2 by 4 inch by 12 foot timber, marked in tenths, securely wired and spiked to a cottonwood tree on left bank of river. Measurements are usually made by wading, but the wagon bridge may be used at high water, the initial point being on the left side. The banks are not liable to overflow. The channel is in gravel but is not liable to much change. The channel is straight for 100 feet above and 300 feet below. The location of the station is such that the discharge is practically the amount lost to irrigation, most of the ditches being taken out above. The observer is Mrs. K. D. Kelley, who lives about 200 feet from the gage.

Dolores station on Dolores River.—Described on page 143 of Paper No. 16; results for 1897 given on pages 407–409 of the Nineteenth Annual Report, Part IV.

Arboles station on San Juan River.—Described on page 144 of Paper No. 16; results for 1897 given on pages 409–410 of the Nineteenth Annual Report, Part IV. The footbridge was washed out in August. The observer is J. D. Lister.

Arboles station on Piedra River.—Described on page 145 of Paper No. 16; results for 1897 given on pages 411–413 of the Nineteenth Annual Report, Part IV. The observer is J. D. Lister.

Durango station on Animas River.—Described on page 146 of Paper No. 16; results for 1897 given on pages 414–415 of the Nineteenth Annual Report, Part IV.

Queen Creek station on Queen Creek.—Described on page 417 of Nineteenth Annual Report, Part IV. Observations were not begun until July 1, 1898. It is reported that there was water in the creek earlier in the year, probably in January or February, but the quantity was not notably large. From that time the bed was dry until August 8, and again dry from September 2 to December 17; on December 18 a discharge of 20 second-feet was reported, and the creek was again dry from December 19 to 31. From July 1 to September 10 the observer was John Green. His record is given below showing date, height of water, and area of cross section computed by Mr. Cyrus C. Babb, by using the cross section made by Mr. Albert T. Colton on July 15, 1898.

Height of water and area of cross section of Queen Creek.

Date.	Gage height.	Area.
	Feet.	*Sq. feet.*
August 8, night	4.5	121
August 18, afternoon	24.2	100
August 22, afternoon	5.2	220
August 23, afternoon	4.4	113
August 27, afternoon	5.4	200
August 29, 7.30 p. m.	7.0	605
August 30, 5 a. m	(*a*)	(*a*)
August 31, 2 p. m	9.0	691
September 1, 7 a. m	(*b*)	(*b*)
September 1, 2 p. m	4.0	111

a No flow. *b* Rising.

The flood of August 31 modified the channel of the creek to a considerable extent. The area of cross section since that time has been computed from measurements made December 27, 1898. On November 16 Mr. Babb extended the rod, lowering the zero by 3 feet and changing the records made before that time to accord with the new datum. On the same day a sloping rod referred to the same datum was placed 431 feet upstream from the main gage. The creek was dry from September 10 until December 16. The observer, W. E. Holman, reported that water appeared at Hewitt's ranch on the morning of December 17, the quantity being about 10 second-feet and somewhat more at night. This water reached a tank 400 feet above the upper rod or approximately 2 miles below Hewitt's at 3 p. m. December 17; on December 18, at 9 a. m., and again at 4 p. m. the lower gage read 2.0 feet and the upper gage 6.0 feet; the creek was then 25 feet wide and the discharge about 20 second-feet. On December 18 the creek at the gages was again dry. For several days thereafter there was a slight flow at Hewitt's, but this did not reach the gages, being absorbed in the sandy channel. From the facts available Mr. Babb has roughly estimated that the discharge for the creek for the year 1898 was 5,000

acre-feet, not taking into account the quantity which may have flowed during the early part of the year.

Buttes station on the Gila River.—Described on page 147 of Paper No. 16; results for 1897 given on pages 415–417 of the Nineteenth Annual Report, Part IV. The bench mark described in the Annual Report for 1897, consisting of an X chiseled in the face of the rock, has been destroyed and a new one established. This is on a ledge of rock 69.4 feet east of south cable anchor and 4.4 feet above ground. Its elevation is 1,608.45 feet above sea level. The zero of the gage is 1,583 feet or 25.45 feet below this bench mark. Occasional measurements, as shown on page 142, have been made, but systematic observations could not be had until November 25, 1898. Since that date computations of daily discharge have been made.

McDowell station on Salt River.—Described on page 148 of Paper No. 16; results for 1897 given on pages 418–420 of the Nineteenth Annual Report, Part IV.

McDowell station on Verde River.—Described on page 150 of Paper No. 16; results for 1897 given on pages 420–423 of the Nineteenth Annual Report, Part IV. No constant relation between gage height and discharge being discoverable, no rating table was constructed, the daily mean discharges being obtained by approximation.

Yuma station on Colorado River.—Described on page 151 of Paper No. 16.

TABLES OF DAILY GAGE HEIGHT.

Daily gage height, in feet, of Black Fork at Granger, Wyoming, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Oct.	Nov.	Dec.
1	1.10	.....	.....	2.35	2.80	2.80	1.65	0.20	.....	0.20	.....
2	.....	.....	.....	2.50	2.65	2.85	1.55	.15	0.00	.20	.....
3	.....	.....	.....	3.10	2.50	3.00	1.40	.10	.00	.10	.....
4	.....	.....	.....	2.80	2.25	2.85	1.30	.10	.00	.10	.....
5	.....	1.00	2.60	2.10	2.20	2.75	1.25	.10	.00	.10	.....
6	.....	.....	.....	1.90	2.15	2.65	1.20	.10	.05	.00	0.50
7	1.10	.....	.....	2.00	2.20	2.60	1.10	.10	.10	.00	.....
8	.....	.....	.....	2.00	2.25	2.35	1.10	.10	.10	.00	.....
9	.....	.....	.....	2.50	2.35	2.40	1.10	.10	.10	.00	.....
10	.....	.....	.....	2.95	2.20	2.35	1.10	.10	.10	.00	.....
11	.....	.....	.....	2.70	2.25	2.40	1.10	.10	.10	.00	.....
12	.....	1.00	2.00	2.80	2.45	2.45	1.10	.10	.20	.20	.....
13	.....	.....	.....	2.65	2.65	2.50	1.10	.00	.20	.00	.....
14	.....	.....	.....	2.50	3.00	2.80	1.10	.00	.20	.00	.....
15	1.10	.....	.....	2.50	3.05	3.05	1.00	.00	.20	.00	.50
16	.....	.....	.....	2.70	2.95	2.90	.90	.00	.20	.00	.....
17	.....	.....	.....	2.80	2.95	2.95	.80	.00	.20	.00	.....
18	.....	.....	.....	2.95	3.40	3.35	.70	.25	.40	.00	.....
19	.....	2.60	1.90	3.00	3.05	3.25	.60	.50	.30	.20	.....
20	.....	.....	.....	2.70	3.00	2.95	.50	.40	.30	.00	.....
21	.....	.....	.....	2.60	2.65	2.90	.50	.30	.20	.00	.....
22	1.10	.....	.....	2.95	2.40	2.95	.50	.20	.20	.00	.....
23	.....	.....	.....	2.90	2.25	2.75	.50	.10	.20	.00	.50
24	.....	.....	.....	2.50	2.65	3.10	.45	.10	.20	.00	.....
25	.....	.....	.....	2.35	2.90	3.10	.40	.00	.20	.00	.....
26	.....	1.90	1.60	2.35	3.00	2.60	.40	.00	.20	.50	.....
27	.....	.....	.....	2.80	3.00	2.20	.40	.00	.20	.....	.....
28	.....	.....	.....	3.15	2.95	2.05	.30	.00	.20	.....	.....
29	1.10	.....	.....	3.10	3.00	2.00	.30	.00	.20	.....	.....
30	.....	.....	.....	3.00	2.95	1.90	.20	.00	.20	.....	.....
31	.....	.....	2.10	.....	2.75	.....	.20	(a)	.20	.....	.50

a August 31 to October 2, water standing in pools.

Daily gage height, in feet, of Green River at Greenriver, Wyoming, for 1898.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.20	2.60	3.65	4.00	2.00	1.45	0.78	0.80	.....
2	1.25	2.58	3.48	3.85	1.95	1.40	.80	.....	.....
3	1.35	3.53	3.28	3.68	1.93	1.43	.85	.80	.....
4	1.47	2.50	3.30	3.50	1.83	1.45	.85	.....	.....
5	1.53	2.45	3.40	3.43	1.75	1.40	.90	.80	.....
6	1.43	2.40	3.33	3.38	1.75	1.38	.90	.80	.....
7	1.27	2.33	3.23	3.33	1.78	1.33	.85	.80	.....
8	1.45	2.28	3.13	3.23	1.78	1.25	.85	.80	.....
9	1.45	2.13	3.03	3.13	1.75	1.23	.85	.80	.....
10	1.55	2.23	2.95	3.10	1.70	1.18	.90	.70	1.00
11	1.60	2.28	3.00	3.10	1.65	1.15	.90	.75	.....
12	2.10	2.35	3.08	3.13	1.62	1.10	.90	1.50	.....
13	2.98	2.43	3.20	3.20	1.58	1.10	.90	1.40	.....
14	3.13	2.68	3.50	3.25	1.55	1.05	.90	1.20	.....
15	2.95	2.85	3.85	3.23	1.60	1.05	.90	1.00	1.10
16	2.83	2.93	4.05	3.15	1.65	1.03	.90	.90	1.10
17	3.00	2.95	4.23	3.10	1.65	1.00	.85	.60	.....
18	3.23	2.95	4.33	3.05	1.60	1.00	.85	.80	.....
19	3.08	3.03	4.45	2.98	1.55	.95	.85	.90	1.20
20	2.73	3.00	4.63	2.88	1.55	.95	.85	.90	.....
21	2.55	2.98	4.68	2.65	1.55	.90	.85	.90	.....
22	2.48	2.78	4.75	2.45	1.50	.90	.85	.85	.....
23	2.35	2.60	4.83	2.33	1.48	.85	.80	.80	1.30
24	2.45	2.65	4.90	2.30	1.38	.83	.80	.80	.....
25	2.35	2.85	4.98	2.30	1.33	.80	.80	.80	.....
26	2.35	3.43	5.15	2.25	1.25	.80	.80	.85	1.40
27	2.38	3.50	5.23	2.23	1.20	.80	.80	.....	.....
28	2.48	3.50	4.88	2.20	1.15	.80	.80	.....	.....
29	2.60	3.58	4.53	2.15	1.13	.75	.80	.....	.....
30	2.63	3.70	4.25	2.08	1.28	.75	.80	.....	.....
31	.....	3.65	.....	2.03	1.45	.....	.80	.....	1.50

Daily gage height, in feet, of Green River at Blake, Utah, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.35	4.10	4.00	3.20	6.30	6.65	7.05	2.95	2.15	1.50	2.00	1.40
2	1.40	4.00	4.10	3.10	6.30	6.70	6.90	2.90	2.25	1.60	2.10	1.50
3	1.50	3.90	4.15	3.00	6.20	6.85	6.75	2.80	2.25	1.60	2.00	1.30
4	1.75	4.00	4.25	3.00	6.30	7.00	6.55	2.70	2.40	1.60	2.20	1.40
5	1.95	4.10	4.30	2.95	6.20	6.90	6.20	2.65	2.70	1.70	2.10	1.50
6	2.40	4.00	4.20	2.90	6.30	6.80	5.80	2.55	2.60	1.70	2.00	1.60
7	2.70	4.00	4.10	3.00	6.30	6.70	5.40	2.50	2.30	1.70	2.10	1.60
8	3.00	4.10	4.05	3.10	6.60	6.65	5.15	2.50	2.30	1.70	2.00	1.60
9	3.25	3.90	3.95	3.20	6.30	6.60	5.05	2.40	2.25	1.70	2.10	1.60
10	3.45	4.00	3.85	3.30	6.30	6.40	5.00	2.40	2.25	1.80	2.00	1.60
11	3.70	3.95	3.65	3.45	6.30	6.30	5.20	2.40	2.40	1.80	2.10	1.60
12	3.80	3.75	3.45	3.70	6.30	6.35	5.10	2.40	2.30	1.80	2.10	1.60
13	4.00	3.65	3.25	4.10	6.10	6.45	5.00	2.40	2.20	1.90	2.10	1.60
14	3.90	3.55	3.20	4.45	6.30	6.55	5.10	2.40	2.20	1.90	2.05	1.60
15	4.00	3.60	3.20	4.60	6.30	6.65	5.00	2.40	2.10	1.90	1.30	1.60
16	4.10	3.70	3.15	4.90	6.40	6.75	4.90	2.40	2.10	1.90	1.30	1.60
17	3.95	3.80	3.10	5.25	6.50	6.80	5.00	2.40	2.00	1.90	1.40	1.60
18	3.95	3.60	3.05	5.45	6.40	6.90	4.85	2.40	2.00	1.90	1.30	1.60
19	4.10	3.70	3.00	5.65	6.30	6.95	4.55	2.40	2.00	1.90	1.20	1.70
20	4.00	3.70	3.00	5.85	6.30	7.00	4.40	2.50	2.00	1.90	1.30	1.70
21	3.90	3.70	3.00	6.05	6.20	7.10	4.30	2.40	1.90	1.90	1.20	1.70
22	4.00	3.80	3.00	6.20	6.30	7.20	4.20	2.40	1.90	2.00	1.20	1.70
23	4.05	3.80	3.00	6.30	6.40	7.35	4.10	2.40	1.85	2.00	1.20	1.70
24	4.00	3.90	3.00	6.25	6.35	7.60	4.00	2.40	1.80	2.00	1.30	1.70
25	4.10	3.90	3.00	6.15	6.35	7.90	3.90	2.40	1.75	2.00	1.30	1.70
26	3.95	3.90	3.00	6.05	6.40	7.75	3.80	2.40	1.70	2.00	1.30	1.70
27	3.95	3.90	3.05	5.90	6.30	7.55	3.70	2.35	1.55	2.00	1.30	1.70
28	4.10	4.00	3.35	6.00	6.40	7.50	3.50	2.30	1.40	2.00	1.40	1.70
29	3.95	.....	3.50	6.10	6.40	7.40	3.25	2.30	1.40	2.00	1.50	1.70
30	4.00	.....	3.40	6.20	6.45	7.30	3.15	2.30	1.45	2.00	1.50	1.80
31	4.00	.....	3.30	.....	6.55	.....	3.05	2.20	.....	2.00	.....	1.80

Daily gage height, in feet, of Grand River, left channel, rod No. 2, at Grand Junction, Colorado, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.00				6.05	7.70	6.45	3.60	3.20	3.00	3.30	3.40
2				3.60	5.80	7.90	6.40	3.50	3.30	3.00	3.30	3.40
3					5.45	8.30	6.25	3.50	3.30	3.00	3.30	3.30
4					5.30	8.60	6.00	3.40	3.30	3.00	3.30	
5	4.40		3.90		5.30	8.35	5.75	3.30	3.30	3.00	3.30	
6					5.30	7.95	5.60	3.30	3.30	3.00	3.30	
7					5.20	7.80	5.50	3.30	3.30	3.00	3.30	3.10
8	4.70				5.20	7.90	5.40	3.30	3.25	3.00	3.30	
9				4.10	5.20	7.85	5.40	3.30	3.20	3.00	3.30	
10					5.10	7.60	5.40	3.40	3.20	3.10	3.30	2.90
11					5.25	7.70	5.30	3.35	3.20	3.20	3.20	
12	4.10		3.80		5.65	7.85	5.30	3.30	3.20	3.20	3.20	
13					5.85	7.75	5.45	3.30	3.20	3.20	3.20	3.00
14					6.25	7.75	5.75	3.30	3.20	3.15	3.10	
15	4.20				6.45	7.85	5.60	3.30	3.20	3.10	3.10	
16				4.60	6.35	8.15	5.35	3.20	3.20	3.20	3.10	
17					6.30	8.40	5.15	3.20	3.20	3.30	3.10	3.00
18					6.20	8.50	4.95	3.20	3.20	3.30	3.20	
19	4.10	4.50	3.70		6.20	8.60	4.80	3.20	3.15	3.30	3.20	
20					6.20	8.45	4.65	3.20	3.10	3.30	3.20	
21					6.05	8.35	4.45	3.20	3.10	3.30	3.30	3.10
22	4.10				5.90	8.10	4.40	3.20	3.10	3.30	3.40	
23				5.10	5.85	8.15	4.20	3.20	3.10	3.30	3.40	
24					6.20	8.15	4.15	3.20	3.10	3.30	3.30	3.20
25				5.10	6.55	7.90	4.05	3.30	3.10	3.30	3.30	
26	4.00	3.80	3.80		7.05	7.65	4.00	3.40	3.10	3.30	3.30	
27					7.20	7.40	4.00	3.30	3.10	3.30	3.30	3.10
28					7.40	7.10	3.85	3.20	3.10	3.30	3.30	
29					7.70	6.85	3.80	3.20	3.05	3.30	3.30	
30				6.20	7.70	6.65	3.70	3.20	3.00	3.30	3.40	
31					7.60		3.60	3.20		3.30		4.00

Daily gage height, in feet, of Grand River, right channel, rod No. 1, at Grand Junction, Colorado, for 1898.

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1		0.70	0.00	12		0.85		23	0.00	1.15	
2		.90	.00	13		.75		24	.00	1.15	
3		1.30		14		.75		25	.00	.90	
4		1.60		15		.85		26	.10	.65	
5		1.35		16		1.15		27	.20	.30	
6		.95		17		1.40		28	.40	.00	
7		.80		18		1.50		29	.70	.00	
8		.90		19		1.60		30	.70	.00	
9		.85		20		1.45		31	.60	.00	
10		.60		21		1.35					
11		.70		22	0.00	1.15					

Daily gage height, in feet, of Uncompahgre River at Fort Crawford, Colorado, for 1898.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	4.60	4.75	4.95	3.75	3.80	3.70	3.75
2	.....	4.60	5.00	4.95	3.65	3.85	3.70	3.75
3	.....	4.15	5.00	4.95	3.50	3.90	3.70	3.75
4	.....	4.20	4.95	4.85	3.70	3.90	3.70	3.70
5	.....	4.15	4.85	4.90	3.70	3.90	3.70	3.80
6	.....	4.10	4.95	4.95	3.70	3.80	3.70	3.75
7	.....	4.10	5.25	4.95	3.70	3.85	3.70	3.70
8	.....	4.00	5.05	4.85	3.70	3.75	3.70	3.75
9	.....	3.95	5.00	4.85	3.70	3.75	3.70	3.75
10	3.60	3.95	4.95	4.80	3.70	3.65	3.70	3.85
11	3.70	3.90	4.95	4.55	3.70	3.65	3.70	3.70
12	3.35	4.00	4.80	4.95	3.70	3.80	3.70	3.65
13	3.80	3.90	4.55	5.05	3.70	3.85	3.70	3.65
14	4.35	4.05	4.95	5.05	3.70	3.85	3.70	3.65
15	4.40	4.05	5.05	5.55	3.70	3.85	3.70	3.60
16	4.40	4.05	5.05	5.45	3.90	3.85	3.70	3.65
17	4.40	4.00	5.55	4.80	4.05	3.85	3.75	3.65
18	4.25	4.05	5.45	4.55	4.00	3.75	3.80	3.65
19	4.15	4.05	5.45	4.35	4.00	3.70	3.75	3.65
20	4.40	4.05	5.45	4.35	4.10	3.70	3.75	3.65
21	4.35	4.00	5.60	4.35	4.15	3.70	3.80	3.70
22	4.35	4.05	5.55	4.20	4.10	3.70	3.70	3.75
23	4.25	4.30	5.65	4.25	4.00	3.70	3.75	3.70
24	4.15	4.40	5.75	4.05	4.15	3.70	3.75	3.65
25	4.40	4.35	5.70	4.05	4.15	3.70	3.75	3.80
26	4.60	4.45	5.45	3.85	4.25	3.70	3.75	3.90
27	4.65	4.45	4.60	3.95	4.25	3.70	3.85	3.85
28	4.60	4.50	5.00	3.95	4.00	3.70	3.85	3.80
29	4.65	4.60	5.05	3.80	3.90	3.70	3.85	3.70
30	4.45	4.75	5.05	3.85	3.75	3.70	3.80	3.75
31	.....	4.65	.....	3.65	3.65	.....	3.85	.....

Approximated from August 4 to August 14 and from September 21 to October 8, inclusive.

Daily gage height, in feet, of Gunnison River at Grand Junction, Colorado, for 1898.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	4.80	5.40	4.10	1.90	1.50	1.30	1.60
2	4.60	5.40	4.10	1.80	1.50	1.30	1.60
3	4.40	5.80	4.00	1.80	1.50	1.30	1.60
4	4.30	5.90	3.70	1.70	1.50	1.30	1.60
5	4.20	5.70	3.50	1.60	1.50	1.30	1.60
6	4.20	5.40	3.40	1.60	1.50	1.30	1.60
7	4.10	5.40	3.60	1.60	1.50	1.30	1.60
8	4.20	5.50	3.80	1.60	1.40	1.30	1.60
9	4.20	5.50	3.70	1.80	1.40	1.30	1.60
10	4.20	5.30	3.70	1.70	1.40	1.30	1.60
11	4.20	5.20	3.60	1.70	1.40	1.40	1.50
12	4.40	5.20	3.50	1.70	1.40	1.40	1.30
13	4.60	5.20	3.50	1.70	1.40	1.40	1.30
14	4.70	5.30	3.50	1.60	1.40	1.40	1.20
15	4.90	5.30	3.40	1.60	1.40	1.40	1.20
16	4.70	5.30	3.20	1.60	1.40	1.40	1.20
17	4.50	5.60	3.20	1.50	1.40	1.40	1.20
18	4.40	5.80	3.20	1.50	1.40	1.50	1.20
19	4.30	5.90	3.10	1.50	1.40	1.50	1.20
20	4.40	5.70	2.90	1.50	1.40	1.50	1.30
21	4.50	5.70	2.80	1.60	1.30	1.60	1.40
22	4.30	5.50	2.70	1.60	1.30	1.60	1.40
23	4.30	5.40	2.60	1.60	1.30	1.60	1.30
24	4.60	5.60	2.60	1.50	1.30	1.60	1.30
25	4.70	5.50	2.50	1.50	1.30	1.60	1.30
26	4.80	5.20	2.50	1.60	1.30	1.60	1.30
27	4.80	5.00	2.40	1.60	1.30	1.60	1.30
28	5.00	4.60	2.20	1.60	1.30	1.60	1.40
29	5.10	4.20	2.20	1.50	1.30	1.60	1.40
30	5.20	4.20	2.10	1.50	1.30	1.60	1.50
31	5.40	.....	2.00	1.50	.....	1.60	.....

Daily gage height, in feet, of San Miguel River at Fallcreek, Colorado, for 1898.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	3.30	4.15	4.25	2.75	2.70	2.50	2.30
2	.....	3.10	4.25	4.00	2.70	2.70	2.50	2.35
3	.....	3.10	4.20	3.95	2.70	2.70	2.40	2.35
4	.....	3.20	4.25	3.90	2.75	2.70	2.40	2.35
5	.....	3.15	4.15	4.30	2.85	2.70	2.40	2.35
6	.....	3.15	4.20	4.25	2.90	2.70	2.50	2.30
7	.....	3.05	4.40	4.00	3.00	2.75	2.45	2.30
8	.....	3.20	4.40	4.05	3.00	2.70	2.45	2.30
9	.....	3.20	4.15	3.95	2.90	2.70	2.50	2.30
10	.....	3.20	4.10	3.90	2.90	2.70	2.50	2.30
11	3.10	3.30	4.05	3.80	2.90	2.70	2.40	2.40
12	3.25	3.35	4.00	3.85	2.80	2.65	2.40	2.40
13	3.25	3.45	4.05	3.80	2.90	2.60	2.40	2.40
14	3.30	3.45	4.00	3.75	2.90	2.60	2.40	2.40
15	3.30	3.40	4.30	3.70	2.90	2.55	2.40	2.35
16	3.25	3.40	4.55	3.60	2.80	2.55	2.40	2.40
17	3.25	3.30	4.70	3.55	2.80	2.55	2.40	2.30
18	3.05	3.30	4.55	3.35	2.75	2.55	2.40	2.30
19	3.05	3.30	4.65	3.30	2.70	2.55	2.40	2.30
20	3.15	3.20	4.55	3.20	2.75	2.50	2.40	2.30
21	3.20	3.20	4.60	3.20	2.70	2.50	2.40	2.25
22	3.05	3.25	4.85	3.05	2.75	2.55	2.40	2.25
23	3.15	3.45	5.05	3.00	2.80	2.60	2.40	2.30
24	3.20	3.40	4.55	3.00	2.80	2.60	2.40	2.30
25	3.35	3.50	4.55	3.00	2.75	2.55	2.40	2.40
26	3.55	3.40	4.50	3.00	2.70	2.60	2.40	2.40
27	3.75	3.50	4.35	2.90	2.70	2.50	2.40	2.50
28	3.60	3.60	4.30	2.85	2.70	2.50	2.40	2.50
29	3.60	3.80	4.25	2.80	2.70	2.50	2.35	2.50
30	3.40	3.95	4.20	2.80	2.80	2.50	2.35	2.50
31	.....	3.90	.....	2.70	2.70	.....	2.30	.....

Daily gage height, in feet, of Mancos River at Mancos, Colorado, for 1898.

Day.	Apr.	May.	June	July.	Aug.	Sept.	Day.	Apr.	May.	June	July.	Aug.	Sept.
1	.....	2.50	2.45	1.80	1.20	1.20	17	2.70	2.05	2.15	1.90	1.10	1.00
2	.....	2.50	2.45	1.70	1.10	1.10	18	2.70	2.00	2.40	1.70	1.10	1.10
3	.....	2.40	2.50	1.60	1.10	1.10	19	2.70	2.10	2.15	1.60	1.10	1.10
4	.....	2.40	2.35	2.60	1.10	1.10	20	2.55	2.40	2.40	1.60	1.10	1.10
5	.....	2.60	2.40	2.70	1.20	1.10	21	2.55	2.00	2.40	1.60	1.10	1.10
6	.....	2.50	2.40	2.90	1.20	1.10	22	2.50	2.00	2.40	1.60	1.10	1.10
7	.....	2.30	2.35	2.50	1.10	1.10	23	2.40	2.30	2.40	1.60	1.10	1.10
8	.....	2.30	2.30	2.10	1.10	1.10	24	2.60	2.00	2.70	1.40	1.15	1.10
9	.....	2.20	2.30	2.10	1.10	1.00	25	2.70	2.10	2.40	1.20	1.20	.90
10	1.90	2.20	2.25	2.20	1.10	1.00	26	2.70	2.30	2.40	.80	1.20	.90
11	2.00	2.20	2.20	2.10	1.10	1.00	27	2.70	2.30	2.40	.80	1.20	.90
12	2.00	2.30	2.25	2.00	1.10	1.00	28	2.50	2.30	2.30	.70	1.10	.90
13	2.40	2.30	2.20	1.90	1.10	1.00	29	2.75	2.30	2.20	.70	1.10	.80
14	3.10	3.30	2.20	1.80	1.10	1.00	30	2.80	2.50	2.00	.70	1.10	.80
15	2.80	2.30	2.20	1.80	1.10	1.00	31	.....	2.50	.....	1.20	1.20	.....
16	2.70	2.20	2.15	1.90	1.10	1.00							

Daily gage height, in feet, of Dolores River at Dolores, Colorado, for 1898.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	3.00	4.25	4.85	3.50	2.90	2.80	2.50	2.60
2	3.00	4.10	5.10	3.65	2.85	3.15	2.50	2.55
3	3.00	4.15	5.00	3.50	2.85	2.95	2.50	2.50
4	3.00	4.10	4.90	3.50	2.80	2.90	2.50	2.50
5	3.00	4.20	4.80	4.30	2.85	2.80	2.50	2.50
6	3.00	4.15	4.80	4.05	2.80	2.80	2.50	2.50
7	3.05	4.10	4.80	4.05	2.80	2.80	2.50	2.50
8	3.10	4.20	4.80	3.85	2.85	2.80	2.50	2.50
9	3.45	4.10	4.50	3.80	2.85	2.70	2.50	2.55
10	3.75	4.15	4.35	3.75	2.85	2.70	2.50	2.60
11	3.80	4.25	4.55	3.90	2.80	2.70	2.50	2.60
12	4.00	4.25	4.45	3.80	2.80	2.70	2.50	2.60
13	4.25	4.25	4.45	3.65	2.80	2.70	2.50	2.60
14	4.60	4.40	4.50	3.50	2.80	2.70	2.50	2.60
15	4.85	4.25	4.55	3.40	2.85	2.70	2.50	2.60
16	4.90	4.15	4.70	3.35	2.80	2.70	2.50	2.60
17	4.85	4.10	4.90	3.30	2.80	2.70	2.50	2.50
18	4.70	4.05	4.95	3.30	2.80	2.70	2.50	2.50
19	4.60	4.05	4.60	3.20	2.80	2.60	2.50	2.50
20	4.50	4.05	4.60	3.20	2.80	2.60	2.50	2.50
21	4.50	3.95	4.60	3.10	2.90	2.60	2.60	2.50
22	4.30	4.15	4.70	3.00	2.80	2.60	2.60	2.55
23	4.40	4.40	5.00	2.95	2.85	2.60	2.60	2.60
24	4.50	4.35	4.70	3.05	3.00	2.60	2.55	2.70
25	4.75	4.35	4.35	3.05	3.05	2.50	2.50	2.70
26	4.90	4.35	4.10	3.00	2.90	2.50	2.50	2.70
27	5.05	4.45	4.10	3.00	2.90	2.50	2.50	2.70
28	4.80	4.55	4.00	3.00	2.85	2.50	2.50	2.70
29	4.70	4.80	3.95	2.95	2.80	2.50	2.60	2.70
30	4.35	4.95	3.80	2.90	2.80	2.50	2.60	2.70
31	.....	4.80	.....	2.90	2.80	.....	2.60	.....

Daily gage height, in feet, of San Juan River at Arboles, Colorado, for 1898.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	6.15	7.70	8.15	7.05	6.20	6.10	5.80	5.80
2	6.30	7.60	8.45	7.00	6.20	6.00	5.80	5.80
3	6.80	7.45	8.45	6.90	6.20	6.00	5.80	5.80
4	6.75	7.45	8.35	6.65	6.20	6.00	5.80	5.80
5	6.55	7.60	8.15	7.20	6.20	5.90	5.80	5.80
6	6.55	7.80	8.10	7.70	6.20	5.90	5.80	5.80
7	6.65	7.65	8.15	7.70	6.20	5.90	5.80	5.80
8	6.85	7.55	8.10	7.20	6.20	5.90	5.80	5.80
9	6.75	7.60	7.90	7.05	6.20	5.90	6.10	5.80
10	6.85	7.55	7.65	7.00	6.20	5.90	6.00	5.80
11	7.10	7.60	7.60	7.10	6.20	5.90	5.90	5.80
12	7.35	7.75	7.70	7.70	6.20	5.90	5.90	5.80
13	7.25	7.80	7.90	8.10	6.20	5.90	5.90	5.80
14	7.55	7.90	7.85	7.35	6.20	5.90	5.90	5.80
15	7.90	7.75	8.00	7.55	6.20	5.90	5.90	5.80
16	7.80	7.65	8.25	7.30	6.20	5.90	5.90	5.80
17	7.80	7.45	8.35	7.50	6.20	5.90	5.90	5.80
18	7.55	7.25	8.25	7.30	6.20	5.90	5.80	5.80
19	7.50	7.20	8.30	6.95	6.20	5.90	5.80	5.80
20	7.45	7.25	8.20	6.90	6.20	5.90	5.80	5.80
21	7.45	7.15	8.20	6.85	6.15	5.90	5.80	5.80
22	7.45	7.15	8.05	6.70	6.10	5.90	5.80	5.80
23	7.55	7.35	7.95	6.65	6.15	5.90	5.80	5.80
24	7.55	7.55	8.55	6.55	6.40	5.90	5.80	5.80
25	8.90	7.50	7.90	6.50	6.45	5.80	5.80	5.80
26	8.15	7.50	7.65	6.50	6.15	5.80	5.80	5.80
27	8.35	7.80	7.45	6.50	6.00	5.80	5.80	5.80
28	8.25	8.20	7.25	6.45	6.00	5.80	5.80	5.80
29	8.00	8.45	7.15	6.35	5.90	5.80	5.80	5.80
30	7.80	8.35	7.10	6.30	5.90	5.80	5.80	5.80
31	.....	8.15	.....	6.30	6.20	.....	5.80	.....

Daily gage height, in feet, of Piedra River at Arboles, Colorado, for 1898.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	3.55	4.70	5.15	4.00	3.15	3.00	2.60	2.60
2	4.25	4.65	5.40	3.95	3.05	3.00	2.60	2.60
3	4.80	4.45	5.45	3.80	3.00	3.00	2.60	2.60
4	4.10	4.45	5.30	3.60	2.90	2.90	2.60	2.60
5	3.90	4.60	5.15	4.35	2.90	2.80	2.60	2.60
6	3.80	4.70	5.10	4.85	2.90	2.80	2.60	2.60
7	4.00	4.60	5.15	4.75	2.90	2.80	2.60	2.60
8	4.15	4.60	5.10	4.20	2.90	2.80	2.60	2.60
9	3.85	4.60	4.90	4.05	2.90	2.80	3.00	2.60
10	3.95	4.55	4.65	4.00	2.90	2.80	2.90	2.60
11	4.25	4.60	4.60	4.10	2.90	2.70	2.80	2.60
12	4.50	4.75	4.60	4.60	2.90	2.70	2.80	2.60
13	4.60	4.80	4.80	5.20	2.90	2.70	2.80	2.50
14	4.85	4.80	4.85	4.50	2.90	2.70	2.80	2.50
15	5.10	4.70	5.05	4.40	2.90	2.70	2.80	2.50
16	5.00	4.65	5.30	4.30	2.90	2.70	2.70	2.50
17	5.00	4.45	5.35	4.30	2.90	2.70	2.70	2.50
18	4.80	4.25	5.30	4.10	2.90	2.70	2.70	2.50
19	4.80	4.20	5.30	3.90	2.90	2.70	2.60	2.50
20	4.75	4.15	5.00	3.80	2.90	2.70	2.60	2.50
21	4.70	4.05	5.05	3.75	2.85	2.70	2.60	2.50
22	4.65	4.10	4.95	3.55	2.80	2.70	2.60	2.50
23	4.60	4.25	5.20	3.50	2.80	2.70	2.60	2.50
24	4.60	4.40	5.10	3.45	3.10	2.70	2.60	2.50
25	5.00	4.30	4.90	3.40	3.25	2.60	2.60	2.50
26	5.35	4.30	4.65	3.30	3.10	2.60	2.60	2.50
27	5.50	4.60	4.40	3.30	3.00	2.60	2.60	2.50
28	5.40	5.00	4.25	3.30	3.00	2.60	2.60	2.50
29	5.10	5.35	4.15	3.25	2.90	2.60	2.60	2.50
30	4.75	5.45	4.05	3.20	2.90	2.60	2.60	2.50
31	.....	5.10	.....	3.20	3.10	.....	2.60	.....

Daily gage height, in feet, of Animas River at Durango, Colorado, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	5.50	5.30	5.00	5.25	7.05	8.60	7.55	5.40	5.10	4.70	4.70
2	.....	.....	.....	5.35	6.85	9.00	7.35	5.30	5.30	4.70	4.70
3	.....	.....	.....	5.45	6.60	8.90	7.10	5.30	5.25	4.70	4.70
4	5.20	.....	.....	5.45	6.70	8.70	7.00	5.20	5.20	4.70	4.70
5	.....	5.00	5.10	5.40	6.60	8.55	7.80	5.20	5.10	4.70	4.70
6	.....	.....	.....	5.45	6.60	8.65	8.40	5.20	5.10	4.70	4.70
7	.....	.....	.....	5.50	6.80	8.80	7.80	5.20	5.10	4.70	4.70
8	5.00	5.00	5.00	5.60	6.90	9.00	7.65	5.20	5.05	4.70	4.70
9	.....	.....	.....	5.90	6.85	8.35	7.55	5.20	5.05	4.70	4.70
10	.....	.....	.....	6.45	7.00	8.10	7.25	5.20	5.00	4.70	4.70
11	5.30	.....	.....	6.60	7.30	8.00	7.25	5.20	5.00	4.75	4.70
12	.....	4.80	5.00	6.45	7.40	7.95	7.10	5.15	5.00	4.75	4.70
13	.....	.....	.....	6.60	7.45	7.85	6.95	5.15	5.00	4.75	4.70
14	.....	.....	.....	7.30	7.50	8.40	6.70	5.10	5.00	4.70	4.70
15	5.10	4.80	.....	7.65	7.40	8.35	6.75	5.10	4.90	4.70	4.70
16	.....	.....	5.00	7.60	7.15	8.65	6.60	5.10	4.90	4.70	4.70
17	.....	.....	.....	7.55	6.95	9.05	6.50	5.05	4.90	4.70	4.70
18	5.20	.....	.....	7.60	e 65	8.80	6.35	5.10	4.95	4.70	4.65
19	.....	4.90	5.00	7.25	6.60	8.80	6.20	5.05	4.95	4.70	4.60
20	.....	.....	.....	7.05	6.65	8.65	6.10	5.10	4.90	4.70	4.65
21	.....	.....	.....	7.20	6.55	8.55	6.00	5.10	4.80	4.70	4.60
22	5.10	.....	5.10	6.90	6.60	8.65	5.90	5.10	4.90	4.70	4.70
23	.....	4.90	.....	7.15	6.90	9.15	5.75	5.10	4.80	4.70	4.85
24	.....	.....	.....	7.40	7.05	8.90	5.70	5.20	4.80	4.70	4.80
25	5.30	.....	.....	7.60	7.15	8.60	5.70	5.20	4.80	4.70	4.80
26	.....	5.00	5.20	7.85	7.05	8.30	5.70	5.20	4.80	4.70	4.75
27	.....	.....	.....	8.20	7.30	8.10	5.60	5.20	2.80	4.70	4.65
28	.....	.....	.....	8.00	7.80	7.60	5.60	5.20	4.70	4.70	4.60
29	5.30	.....	5.10	7.70	8.35	7.75	5.55	5.10	4.70	4.70	4.60
30	.....	.....	.....	7.25	8.65	7.55	5.40	5.10	4.70	4.70	4.65
31	.....	.....	.....	.....	8.20	.....	5.40	5.10	.....	4.70	.....

Daily gage height, in feet, of Gila River at Buttes, Arizona, for 1898.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1	.....	2.35	9	.....	2.50	17	.....	2.80	25	2.10	.....
2	.....	2.35	10	.....	.....	18	.....	2.85	26	2.20	2.80
3	.....	2.35	11	.....	2.60	19	.....	2.90	27	2.20	2.80
4	.....	2.40	12	.....	2.75	20	.....	2.90	28	2.10	2.85
5	.....	2.40	13	.....	2.50	21	.....	2.90	29	2.25	2.75
6	.....	2.40	14	.....	2.70	22	.....	2.90	30	2.30	2.80
7	.....	2.45	15	.....	2.75	23	.....	2.90	31	.....	2.80
8	.....	2.45	16	.....	2.75	24	.....	2.95			

Daily gage height, in feet, of Salt River at McDowell, Arizona, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	10.10	11.20	11.30	10.80	11.30	10.20	9.90	11.50	12.00	10.35	10.45	10.60
2	10.10	11.00	11.40	10.80	11.30	10.20	9.90	11.30	12.50	10.35	10.45	10.60
3	10.10	10.90	11.50	10.80	11.20	10.20	9.85	10.95	11.90	10.35	10.45	10.60
4	10.10	10.90	11.50	10.80	11.15	10.15	9.85	10.90	11.50	10.35	10.45	10.60
5	10.10	10.95	11.50	10.90	11.10	10.10	9.95	10.90	11.40	10.35	10.45	10.60
6	10.10	10.95	11.35	11.00	11.05	10.10	11.00	10.90	11.50	10.35	10.50	10.60
7	10.10	10.90	11.30	11.00	11.00	10.10	10.60	10.95	11.10	10.35	10.50	10.60
8	10.10	11.00	11.30	11.00	11.00	10.10	11.00	10.90	11.00	10.35	10.50	10.60
9	10.10	11.10	11.30	11.05	10.95	10.05	10.90	10.90	11.00	10.35	10.50	10.65
10	10.15	11.30	11.30	11.40	10.90	10.05	10.40	10.90	10.95	10.35	10.50	10.65
11	10.30	11.35	11.40	11.40	10.80	10.10	10.35	10.90	10.80	10.35	10.50	10.90
12	10.40	11.00	11.70	11.70	10.70	10.05	10.60	10.80	11.10	10.40	10.45	10.80
13	10.40	10.90	11.60	11.80	10.65	10.05	10.90	10.80	11.00	10.40	10.45	10.85
14	10.30	10.80	11.60	11.70	10.60	10.05	11.00	10.80	10.95	10.35	10.50	10.90
15	10.20	10.70	11.50	11.60	10.50	10.10	11.30	10.75	10.85	10.40	10.50	10.80
16	10.20	10.70	11.50	11.60	10.50	10.10	11.75	10.85	10.85	10.35	10.50	10.80
17	10.20	10.75	11.40	11.75	10.50	10.05	11.75	10.70	10.80	10.35	10.50	11.00
18	10.20	10.80	11.30	12.00	10.45	10.05	12.20	10.80	10.70	10.35	10.50	11.00
19	10.20	10.90	11.30	12.10	10.50	10.00	11 50	10.90	10.60	10.35	10.50	11.10
20	10.20	10.90	11.20	12.20	10.50	10.00	12.30	10.80	10.55	10.40	10.50	11.10
21	10.15	11.00	11.20	12.25	10.40	10.00	12.10	10.80	10.55	10.40	10.50	11.05
22	10.15	11.00	11.15	12.10	10.40	10.00	11.80	10.80	10.50	10.40	10.55	11.00
23	10.15	11.00	11.10	12.00	10.40	10.40	11.50	10.80	10.60	10.40	10.55	10.90
24	10.15	10.95	11.00	11.90	10.30	10.30	12.00	10.30	10.60	10.40	10.55	10.90
25	10.15	10.95	11.00	11.80	10.30	10.20	11.80	11.00	10.50	10.40	10.55	10.90
26	10.15	11.40	10.95	11.70	10.20	10.20	11.40	11.40	10.45	10.40	10.60	10.80
27	10.10	11.25	10.90	11.60	10.20	10.10	11.10	13.50	10.40	10.45	10.60	10.85
28	11.00	11.30	10.90	11.50	10.20	10.05	11.10	11.60	10.40	10.40	10.60	10.70
29	11.70	.....	10.90	11.40	10.20	10.00	11.00	11.40	10.35	10.40	10.60	10.70
30	12.30	.....	10.85	11.30	10.15	9.95	10.95	11.30	10.35	10.40	10.60	10.75
31	11.50	.....	10.80	.....	10.20	.....	10.80	11.50	.....	10.45	.....	10.85

Daily gage height, in feet, of Verde River at McDowell, Arizona, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.70	7.50	7.80	7.15	6.80	6.80	6.70	8.30	8.80	6.80	6.80	7.20
2	6.70	7.40	7.90	7.15	6.95	6.80	6.70	7.70	8.50	6.80	6.80	7.20
3	6.75	7.35	8.00	7.20	7.10	6.80	6.70	7.50	8.80	6.80	6.80	7.20
4	6.75	7.30	8.05	7.30	7.10	6.80	6.70	7.30	7.80	6.75	6.80	7.20
5	6.75	7.30	8.05	7.40	7.10	6.80	6.65	7.40	7.60	6.75	6.80	7.20
6	6.75	7.40	7.70	7.35	7.10	6.80	7.15	7.50	7.50	6.80	6.90	7.15
7	6.75	7.35	7.70	7.30	7.15	6.80	6.95	7.80	7.40	6.80	6.95	7.15
8	6.75	7.45	7.70	7.30	7.10	6.80	6.90	7.30	7.35	6.80	6.95	7.15
9	6.75	7.40	7.80	7.30	7.05	6.80	7.20	7.00	7.30	6.80	7.00	7.20
10	6.85	7.55	7.75	7.30	7.00	6.80	7.10	7.00	7.20	6.80	6.90	7.20
11	6.95	7.50	7.80	7.35	7.00	6.85	7.00	6.95	7.10	6.80	6.90	7.40
12	7.05	7.30	8.20	7.30	7.00	6.85	7.05	7.00	7.05	6.80	6.95	7.45
13	7.00	7.20	8.00	7.30	7.00	6.85	7.05	6.90	7.00	6.80	6.95	7.55
14	6.85	7.15	8.00	7.25	6.95	6.85	7.20	6.85	6.95	6.80	7.00	7.50
15	6.90	7.15	8.05	7.25	6.85	6.85	7.25	6.75	7.10	6.80	7.00	7.45
16	6.85	7.20	7.60	7.20	6.95	6.90	9.45	6.85	7.00	6.80	7.00	7.55
17	6.85	7.40	7.00	7.15	6.85	6.90	8.20	6.90	7.00	6.80	7.00	7.50
18	6.85	7.50	7.40	7.15	6.90	6.85	8.35	6.85	7.00	6.80	7.00	7.60
19	6.80	7.50	7.80	7.15	6.90	6.80	7.90	7.00	7.00	6.80	7.05	7.60
20	6.80	7.60	7.40	7.15	6.95	6.85	7.50	7.00	6.90	6.80	7.05	7.50
21	6.85	7.50	7.30	7.15	6.95	6.85	7.30	6.95	6.90	6.80	7.05	7.45
22	6.85	7.50	7.30	7.15	6.95	6.85	7.10	6.95	6.90	6.85	7.10	7.40
23	6.85	7.50	7.20	7.10	6.95	6.85	7.00	7.75	6.90	6.85	7.10	7.40
24	6.85	7.50	7.20	7.10	6.95	6.90	7.00	7.30	6.90	6.90	7.10	7.40
25	6.85	7.60	7.20	7.10	6.90	6.95	7.00	7.20	6.90	6.90	7.15	7.40
26	6.85	7.60	7.15	7.05	6.90	6.95	7.00	7.50	6.90	6.90	7.20	7.40
27	6.85	7.80	7.10	7.05	6.85	6.95	6.95	9.25	6.90	6.90	7.20	7.50
28	7.10	7.80	7.10	7.05	6.85	6.95	6.95	8.50	6.90	6.90	7.15	7.55
29	8.10	.....	7.15	7.00	6.85	6.85	6.80	8.40	6.80	6.90	7.20	7.55
30	8.80	.....	7.15	6.95	6.85	6.80	7.00	7.90	6.80	6.90	7.20	7.45
31	7.80	.....	7.15	.....	6.80	.....	6.80	7.85	.....	6.90	.....	7.40

Daily gage height, in feet, of Colorado River at Yuma, Arizona, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Sept.	Oct.	Nov.	Dec.
1	17.92	18.00	18.92	18.67	21.50	21.58	23.42	19.75	18.00	18.17	18.58
2	17.83	18.00	19.00	18.67	21.42	21.50	23.42	19.75	18.00	18.25	18.50
3	17.75	18.25	19.00	18.58	21.42	21.58	23.17	19.83	18.08	18.33	18.42
4	17.75	18.25	19.00	18.58	21.75	21.75	22.83	19.83	18.00	18.33	18.33
5	17.58	17.92	18.92	18.83	22.00	22.25	22.58	19.75	18.00	18.50	18.33
6	17.58	18.00	18.83	18.67	22.00	22.58	22.25	19.83	18.00	18.58	18.33
7	17.58	17.83	18.75	18.50	22.00	22.75	22.00	19.67	18.00	18.58	18.42
8	17.50	17.75	18.67	18.50	22.00	22.83	21.83	19.42	18.00	18.50	18.42
9	17.50	18.00	18.67	18.67	21.75	22.92	21.67	19.17	18.00	18.58	18.58
10	17.83	18.08	18.75	19.00	21.58	23.17	21.50	19.00	18.00	18.50	18.58
11	17.75	18.33	19.00	19.08	21.33	23.17	21.33	19.08	18.00	18.50	18.58
12	17.75	18.17	19.08	18.92	21.25	23.00	21.25	19.00	18.00	18.50	18.50
13	17.92	18.17	19.25	18.67	21.17	22.92	21.50	18.92	17.92	18.50	18.50
14	18.08	18.17	19.08	18.50	21.17	22.67	21.50	18.83	17.92	18.50	18.50
15	18.42	18.25	18.92	18.75	21.17	22.58	21.42	18.83	17.92	18.50	18.50
16	18.58	18.42	18.75	18.92	21.00	22.50	21.33	18.75	17.92	18.58	18.58
17	18.75	18.50	18.75	18.83	20.83	22.42	21.50	18.67	17.83	18.67	18.75
18	18.75	18.58	18.92	18.92	20.83	22.33	21.33	18.58	17.83	18.75	18.92
19	18.75	18.58	18.92	19.00	20.92	22.42	21.25	18.75	17.83	18.83	19.00
20	18.83	18.50	18.83	20.08	21.17	22.33	21.08	18.75	17.83	18.83	18.83
21	18.83	18.58	18.92	20.17	21.50	22.33	21.08	18.58	17.83	18.92	18.67
22	18.75	18.67	19.17	20.25	21.67	22.50	21.50	18.42	17.83	18.92	18.42
23	18.50	18.92	19.08	21.17	21.75	22.75	22.00	18.42	17.83	18.92	18.17
24	18.42	18.92	19.08	21.08	21.75	23.08	21.92	18.42	17.83	18.75	18.00
25	18.25	18.92	18.83	21.67	21.67	23.25	21.50	18.42	17.83	18.75	17.92
26	18.42	18.92	18.75	21.75	21.83	23.50	21.17	18.42	18.00	18.75	17.75
27	18.50	18.92	18.67	21.58	21.75	23.50	21.00	18.33	18.00	18.75	17.67
28	18.33	18.92	18.67	21.50	21.50	23.50	20.50	18.25	18.08	18.75	17.67
29	18.17	.....	18.67	21.50	21.50	23.50	20.33	18.17	18.17	18.67	17.58
30	18.17	.....	18.75	21.50	21.50	23.42	20.17	18.00	18.17	18.67	17.50
31	18.08	.....	18.67	.....	21.42	.....	20.17	.....	18.17	.....	17.58

Data furnished by United States Commission of Fish and Fisheries.

List of discharge measurements, 1898.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
Apr. 29	Black Fork River	Granger, Wyo.	C. T. Johnston	3.20	1,962
May 21	do	do	do	2.60	1,727
June 18	do	do	do	3.40	2,401
June 29	do	do	do	2.30	1,328
Apr. 29	Green River	Greenriver, Wyo.	do	2.60	3,803
May 21	do	do	do	3.00	a 4,239
Do.	do	do	do	2.95	b 3,966
June 18	do	do	do	4.50	11,696
June 28	do	do	do	5.05	14,252
Apr. 25	Grand River	Grand Junction, Colo.	A. L. Fellows	5.15	4,802
May 23	do	do	do	5.85	6,087
June 27	do	do	do	7.40	11,215
Aug. 27	do	do	do	3.35	1,237
Oct. 15	do	do	do	3.20	949
Apr. 5	Uncompahgre River.	Fort Crawford, Colo.	do	3.55	91
May 9	do	do	do	3.92	203
June 15	do	do	do	5.18	720
Aug. 12	do	do	do	3.80	74
Oct. 16	do	do	do	3.75	56
Apr. 26	Gunnison River	Grand Junction, Colo.	do	4.65	5,932
May 23	do	do	do	4.50	4,647
June 28	do	do	do	4.62	5,274
Aug. 27	do	do	do	1.80	866
Oct. 15	do	do	do	1.50	578
Apr. 7	San Miguel River	Fallcreek, Colo	do	2.50	66
May 11	do	do	do	3.30	270
June 16	do	do	do	4.40	841
Aug. 13	do	do	do	2.80	133
Oct. 17	do	do	do	2.30	30
Apr. 9	Mancos River	Mancos, Colo	do	1.80	102
May 14	do	do	do	2.20	185
June 18	do	do	do	2.00	160
Aug. 20	do	do	do	1.00	5
Oct. 18	do	do	do	.80	3
Apr. 8	Dolores River	Dolores, Colo	do	3.15	325
May 12	do	do	do	4.30	1,163
June 17	do	do	G. H. Matthes	4.80	1,870
Aug. 16	do	do	do	2.80	102
Sept. 11	do	do	do	2.70	72
Sept. 28	do	do	A. L. Fellows	2.55	46
Oct. 21	do	do	do	2.55	40
Apr. 12	San Juan River	Arboles, Colo	do	7.30	1,403
May 17	do	do	do	7.42	1,497
June 21	do	do	do	8.10	2,579
Aug. 8	do	do	G. H. Matthes	6.30	294
Aug. 23	do	do	A. L. Fellows	6.05	213
Oct. 23	do	do	do	5.80	83
Apr. 13	Piedra River	do	do	4.80	1,158
May 16	do	do	do	4.52	937
June 22	do	do	do	5.10	1,315
Aug. 8	do	do	G. H. Matthes	3.10	195
Aug. 24	do	do	A. L. Fellows	3.05	186
Oct. 24	do	do	do	2.60	52
Apr. 11	Animas River	Durango, Colo.	do	6.50	1,356
May 15	do	do	do	7.25	1,797
June 20	do	do	do	8.55	3,475
Aug. 5	do	do	G. H. Matthes	5.20	414
Aug. 22	do	do	A. L. Fellows	5.07	284
Oct. 22	do	do	do	4.70	160
Mar. 7	Gila River	Buttes, Ariz	A. T. Colton	2.30	373
Mar. 29	do	do	do	2.50	606
Apr. 12	do	do	do	2.40	291
Apr. 23	do	do	do	3.25	855
May 17	do	do	do	2.50	182
June 8	do	do	do	2.00	27
June 22	do	do	do	2.10	32
July 6	do	do	do	4.55	2,902
July 19	do	do	do	4.00	2,134
July 29	do	do	do	3.15	799
Aug. 8	do	do	do	2.90	590
Aug. 22	do	do	do	2.70	466
Oct. 10	do	do	do	1.90	59
Nov. 14	do	do	C. C. Babb	1.90	94
Nov. 25	do	do	do	2.10	125
Dec. 14	do	do	do	2.70	305
Dec. 24	do	do	do	2.95	382
Nov. 28	Florence Canal	Bridge 2 miles east of Florence.	do	-------	76
Do.	do	White's ranch near head gate.	do	-------	100

a 5 a. m. b 2 p. m.

List of discharge measurements, 1898—Continued.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
Jan. 8	Salt River	McDowell, Ariz	W. A. Farish	10.10	288
Jan. 30	do	do	do	12.10	1,064
Feb. 27	do	do	do	11.40	545
Mar. 13	do	do	do	11.57	856
Mar. 20	do	do	do	11.20	688
Apr. 10	do	do	do	11.35	768
Apr. 24	do	do	do	11.90	999
May 28	do	do	do	10.20	295
May 29	do	do	do	10.20	257
June 13	do	do	do	10.10	233
June 26	do	do	do	10.10	296
July 18	do	do	do	12.25	1,057
Aug. 7	do	do	do	10.80	398
Aug. 22	do	do	do	10.70	425
Aug. 29	do	do	do	11.40	650
Sept. 28	do	do	do	10.37	195
Sept. 29	do	do	do	10.37	178
Oct. 27	do	do	do	10.40	186
Oct. 28	do	do	do	10.35	196
Nov. 27	do	do	do	10.55	260
Nov. 28	do	do	do	10.60	229
Dec. 25	do	do	do	10.75	287
Dec. 26	do	do	do	10.70	264
Jan. 7	Verde River	do	do	6.75	323
Jan. 30	do	do	do	8.25	1,868
Mar. 13	do	do	do	8.00	956
Mar. 20	do	do	do	7.40	481
Apr. 10	do	do	do	7.30	332
Apr. 24	do	do	do	7.05	234
May 28	do	do	do	6.85	127
May 29	do	do	do	6.85	130
June 13	do	do	do	6.80	142
June 26	do	do	do	7.00	152
July 18	do	do	do	8.30	991
Aug. 7	do	do	do	7.45	258
Aug. 22	do	do	do	7.00	205
Aug. 29	do	do	do	7.40	592
Sept. 28	do	do	do	6.90	142
Sept. 29	do	do	do	6.80	175
Oct. 27	do	do	do	6.95	209
Oct. 28	do	do	do	6.85	220
Nov. 27	do	do	do	7.20	290
Nov. 28	do	do	do	7.15	287
Dec. 25	do	do	do	7.45	281
Dec. 26	do	do	do	7.40	332

List of miscellaneous discharge measurements, 1898.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
Aug. 6	Los Pinos River	6 miles above Ignacio, Colo.	G. H. Matthes		246
Aug. 7	Do	4 miles below Ignacio, Colo.	do		196
Aug. 10	La Plata River	Hesperus, Colo	do		11
Aug. 18	San Juan River	Noland, Utah	do		609
Sept. 14	White River	Meeker, Colo	A. L. Fellows		300
Sept. 15	Williams River	Hamilton, Colo	do		25
Sept. 17	Yampa River	3 miles below Hayden, Colo.	do		111
Do.	Elk River	Near mouth, Trull post-office, Colo.	do		63
Sept. 18	Yampa River	Steamboat Springs, Colo.	do		65
Sept. 19	Snake River	Honnold post-office, Colo.	do		17
Sept. 20	Slater Fork of Snake River.	Slater post-office, Colo.	do		9
Sept. 21	Little Snake River	Dixon, Wyo	do		19
Do.	San Juan River	Noland, Utah	G. H. Matthes		383
Sept. 22	Yampa River	Below Maybell, Colo.	A. L. Fellows		99
Sept. 24	Green River	6 miles below Ladore, Colo.	do		552
Sept. 26	Yampa River	Craig, Colo	do		79

Rating tables.

Granger.		Green river.		Blake.		Grand Junction. *a*		Grand Junction. *b*		Fort Crawford. *c*	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.0	155	0.9	400	1.0	1,000	0.0	0	2.9	464	3.3	47
.1	170	1.0	500	1.2	1,080	.1	15	3.0	561	3.4	62
.2	190	1.1	640	1.4	1,160	.2	33	3.1	755	3.5	81
.3	210	1.2	800	1.6	1,250	.3	50	3.2	949	3.6	105
.4	230	1.3	960	1.8	1,400	.4	70	3.3	1,143	3.7	133
.5	250	1.4	1,120	2.0	1,600	.5	92	3.4	1,337	3.8	163
.6	270	1.5	1,280	2.2	2,020	.6	113	3.5	1,531	3.9	195
.7	290	1.6	1,440	2.4	2,440	.7	137	3.6	1,725	4.0	228
.8	320	1.7	1,600	2.6	2,860	.8	162	3.7	1,919	4.1	263
.9	350	1.8	1,760	2.8	3,280	.9	195	3.8	2,113	4.2	299
1.0	390	1.9	1,920	3.0	3,700	1.0	228	3.9	2,307	4.3	337
1.2	470	2.0	2,080	3.2	4,120	1.1	268	4.0	2,500	4.4	376
1.4	550	2.1	2,240	3.4	4,540	1.2	314	4.2	2,888	4.5	416
1.6	670	2.2	2,400	3.6	4,960	1.3	396	4.4	3,276	4.6	457
1.8	830	2.3	2,600	3.8	5,380	1.4	560	4.6	3,664	4.7	499
2.0	1,000	2.4	2,800	4.0	5,800	1.5	723	4.8	4,052	4.8	543
2.2	1,180	2.5	3,000	4.2	6,220	1.6	887	5.0	4,439	4.9	588
2.4	1,380	2.6	3,200	4.4	6,640	.....	.....	5.2	4,827	5.0	634
2.6	1,625	2.7	3,400	4.6	7,300	.....	.....	5.4	5,215	5.1	681
2.8	1,875	2.8	3,650	4.8	8,100	.....	.....	5.6	5,603	5.2	728
3.0	2,125	2.9	4,000	5.0	9,000	.....	.....	5.8	5,991	5.3	774
3.2	2,375	3.0	4,400	5.2	10,200	.....	.....	6.0	6,398	5.4	821
3.4	2,625	3.2	5,280	5.4	11,800	.....	.....	6.5	7,768	5.5	868
3.6	2,875	3.4	6,240	5.6	13,700	.....	.....	7.0	9,578	5.6	915
3.8	3,125	3.6	7,200	5.8	15,600	.....	.....	7.5	11,645	5.7	962
4.0	3,375	3.8	8,160	6.0	17,500	.....	.....	8.0	13,795	5.8	1,009
4.5	4,000	4.0	9,120	6.5	22,250	.....	.....	8.5	15,945	.....	.....
5.0	4,625	4.5	11,520	7.0	27,000	.....	.....	.....	.....	.....	.....
5.5	5,250	5.0	13,920	7.5	31,750	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	8.0	36,500	.....	.....	.....	.....	.....	.....

a Rating table for rod No. 1 on Grand River.
b Rating table for rod No. 2 on Grand River.
c Applicable from April 9 to June 25, 1898.

Fort Crawford. *a*		Grand Junction. *b*		Fall Creek.		Mancos.		Dolores.	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*
3.5	15	1.2	311	2.3	30	0.7	2	2.0	0
3.6	28	1.3	399	2.4	47	.8	3	2.1	3
3.7	46	1.4	487	2.5	66	.9	4	2.2	8
3.8	74	1.5	578	2.6	87	1.0	6	2.3	14
3.9	110	1.6	672	2.7	109	1.1	8	2.4	23
4.0	157	1.7	768	2.8	133	1.2	12	2.5	34
4.1	204	1.8	866	2.9	157	1.3	19	2.6	50
4.2	251	1.9	968	3.0	183	1.4	29	2.7	72
4.3	298	2.0	1,076	3.1	210	1.5	42	2.8	102
4.4	345	2.2	1,306	3.2	239	1.6	60	2.9	144
4.5	392	2.4	1,544	3.3	270	1.7	81	3.0	198
4.6	449	2.6	1,790	3.4	304	1.8	102	3.1	260
4.7	496	2.8	2,044	3.5	342	1.9	123	3.2	326
4.8	543	3.0	2,306	3.6	382	2.0	144	3.3	395
4.9	588	3.2	2,577	3.7	425	2.1	165	3.4	467
5.0	634	3.4	2,861	3.8	470	2.2	186	3.5	542
5.1	681	3.6	3,158	3.9	519	2.3	207	3.6	620
5.2	728	3.8	3,467	4.0	571	2.4	228	3.7	701
5.3	774	4.0	3,791	4.1	629	2.5	249	3.8	784
5.4	821	4.2	4,158	4.2	692	2.6	270	3.9	869
5.5	868	4.4	4,636	4.3	760	2.7	291	4.0	956
5.6	915	4.6	5,316.	4.4	832	2.8	312	4.1	1,045
5.7	962	4.8	6,168	4.5	907	2.9	333	4.2	1,136
5.8	1,009	5.0	7,104	4.6	984	3.0	354	4.3	1,229
.....	.....	5.2	8,050	4.7	1,062	3.1	375	4.4	1,324
.....	.....	5.4	8,996	4.8	1,140	.....	.....	4.5	1,421
.....	.....	5.6	9,942	4.9	1,218	.....	.....	4.6	1,520
.....	.....	5.8	10,888	5.0	1,296	.....	.....	4.7	1,620
.....	.....	6.0	11,834	5.1	1,374	.....	.....	4.8	1,721
.....	.....	.....	.....	.....	.....	.....	.....	4.9	1,823

a Applicable from June 26 to November 30, 1898.
b Rating table for Gunnison River.

Rating tables—Continued.

Arboles. *a*		Arboles. *b*		Durango.		McDowell. *c*		McDowell. *d*	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*
5.8	83	2.5	27	4.6	125	10.0	215	10.0	30
5.9	124	2.6	52	4.7	160	10.1	255	10.1	66
6.0	169	2.7	78	4.8	195	10.2	296	10.2	102
6.1	216	2.8	106	4.9	234	10.3	336	10.3	137
6.2	266	2.9	135	5.0	278	10.4	377	10.4	173
6.3	319	3.0	165	5.1	328	10.5	417	10.5	209
6.4	376	3.1	196	5.2	383	10.6	458	10.6	244
6.5	440	3.2	229	5.3	442	10.7	498	10.7	280
6.6	510	3.3	264	5.4	502	10.8	539	10.8	316
6.7	590	3.4	301	5.5	562	10.9	579	10.9	351
6.8	680	3.5	340	5.6	624	11.0	620	11.0	387
6.9	795	3.6	382	5.7	686	11.1	660	11.1	423
7.0	935	3.7	430	5.8	748	11.2	701	11.2	458
7.1	1,082	3.8	478	5.9	812	11.3	741	11.3	494
7.2	1,232	3.9	530	6.0	877	11.4	782	11.4	530
7.3	1,382	4.0	585	6.2	1,008	11.5	822	11.5	565
7.4	1,531	4.1	643	6.4	1,146	11.6	863	11.6	601
7.5	1,681	4.2	704	6.6	1,292	11.7	903	11.7	637
7.6	1,830	4.3	768	6.8	1,444	11.8	944	11.8	672
7.7	1,980	4.4	835	7.0	1,608	11.9	984	11.9	708
7.8	2,130	4.5	904	7.2	1,786	12.0	1,025	12.0	744
7.9	2,280	4.6	974	7.4	1,975	12.2	1,106	12.1	780
8.0	2,429	4.7	1,043	7.6	2,176	12.4	1,187	12.2	816
8.1	2,579	4.8	1,112	7.8	2,394	12.6	1,268	12.3	851
8.2	2,729	4.9	1,182	8.0	2,638	12.8	1,349	12.4	887
8.3	2,879	5.0	1,251	8.2	2,910	13.0	1,430	12.5	923
8.4	3,029	5.1	1,321	8.4	3,220	13.2	1,511	12.6	958
8.5	3,180	5.2	1,390	8.6	3,570	13.4	1,592	12.7	994
8.6	3,330	5.3	1,459	8.8	3,952	13.6	1,673	12.8	1,030
		5.4	1,529	9.0	4,358	13.8	1,754	12.9	1,065

a Rating table for San Juan River.
b Rating table for Piedra River.
c Rating table for Salt River; applicable from January 1 to July 5, 1898.
d Rating table for Salt River; applicable from July 6 to December 31, 1898.

INTERIOR BASIN DRAINAGE.

DESCRIPTION OF RIVER STATIONS.

Peko station on North Fork of Humboldt River.—This station is at the Central Pacific Railroad bridge, about 2 miles west of Peko station, Nevada. It was established by Mr. L. H. Taylor, March 25, 1898. The observer is James Courtney, post-office, Halleck, Nevada. The gage consists of a vertical timber, divided to feet and tenths, spiked to the pile support of the railroad bridge. The bench mark is on the stone abutment on the east end of the bridge on the left bank of the stream, 12 feet above the zero of the gage. The initial point for soundings is on the left bank, at the bench mark. The channel above and below the station is curved and the water is moderately swift. A small side channel enters immediately above the bridge and another channel takes water from the main stream at a still higher point during high stages, but during medium and low water it is dry. Measurements are made from the upper side of the bridge. The bed of the stream is of sand and gravel, shifting somewhat during high water.

Elko station on Humboldt River.—Described on page 152 of Paper No. 16; results for 1897 given on pages 424–426 of the Nineteenth

Annual Report, Part IV. The observer was John Garrecht until September 10; since that date, Addit T. Garrecht.

Golconda station on Humboldt River.—Described on page 154 of Paper No. 16; results for 1897 given on pages 427 of the Nineteenth Annual Report, Part IV.

Oreana station on Humboldt River.—Described on page 155 of Paper No. 16; results for 1897 given on pages 428–429 of the Nineteenth Annual Report, Part IV.

Masons Ranch station on South Fork of Humboldt River.—Described on page 156 of Paper No. 16; results for 1897 given on pages 429–430 of the Nineteenth Annual Report, Part IV. The observer for balance of year, after March 12, was Joe Pattain.

Soda Springs station on Bear River.—This station was established May 25, 1896, by Mr. F. J. Mills, State engineer of Idaho. It is located at the wagon bridge, about 1 mile southwest of the town of Soda Springs, Idaho. The cross section is inferior, owing to its being obstructed by four bridge piers. The drainage area at this point is 3,540 square miles.

Battle Creek station on Bear River.—Described on page 157 of Paper No. 16; results for 1897 given on pages 431–433 of the Nineteenth Annual Report, Part IV.

Logan station on Logan River.—Described on page 158 of Paper No. 16; results for 1897 given on pages 433–434 of the Nineteenth Annual Report, Part IV.

Collinston station on Bear River.—Described on page 159 of Paper No. 16; results for 1897 given on pages 434–435 of the Nineteenth Annual Report, Part IV. The observer was F. C. Engelke, after August 13, 1898. Discharge measurements were made in 1898 by J. L. Rhead, Samuel Fortier, and J. S. Baker.

Ogden station on Ogden River.—Described on page 160 of Paper No. 16; results for 1897 given on pages 436–439 of the Nineteenth Annual Report, Part IV. Discharge measurements made in 1898 by J. S. Baker.

Uinta station on Weber River.—Described on page 161 of Paper No. 16; results for 1897 given on pages 440–441 of the Nineteenth Annual Report, Part IV. Discharge measurements in 1898 made by J. S. Baker.

Provo station on Provo River.—Described on page 162 of Paper No. 16; results for 1897 given on pages 441–442 of the Nineteenth Annual Report, Part IV. Discharge measurements made in 1898 by W. B. Dougall and J. S. Baker.

Geneva station on Utah Lake.—Described on page 163 of Paper No. 16; results for 1897 given on page 443 of the Nineteenth Annual Report, Part IV.

TABLES OF DAILY GAGE HEIGHT.

Daily gage height, in feet, of North Fork of Humboldt River at Peko, Nevada, for 1898.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	2.70	3.00	3.20	2.20	1.80	1.45	1.50	1.90	2.40
2	.....	2.70	3.10	3.10	2.10	1.80	1.45	1.80	1.90	2.40
3	.....	2.70	3.20	2.90	2.20	1.80	1.45	1.80	2.00	2.40
4	.....	2.70	2.90	2.95	2.30	1.80	1.45	1.80	2.00	2.30
5	.....	2.70	3.00	2.90	2.30	1.75	1.45	1.80	2.00	2.30
6	.....	2.75	2.90	3.10	2.10	1.80	1.45	1.80	1.90	2.40
7	.....	2.75	3.10	2.95	2.20	1.80	1.50	1.80	1.90	2.40
8	.....	2.70	3.70	3.05	2.10	1.80	1.50	1.80	1.90	2.40
9	.....	2.70	3.70	3.00	2.00	1.85	1.45	1.80	2.00	2.30
10	.....	2.75	3.75	3.10	2.10	1.85	1.45	1.80	2.00	2.30
11	.....	2.75	3.40	3.20	2.10	1.85	1.45	1.80	2.00	2.20
12	.....	3.20	3.00	2.90	2.10	1.80	1.45	1.80	2.00	2.30
13	.....	3.30	3.20	2.80	2.20	1.80	1.45	1.80	2.10	2.30
14	.....	3.50	3.00	2.60	2.10	1.80	1.45	1.80	2.20	2.30
15	.....	3.45	3.00	2.70	2.00	1.80	1.50	1.80	2.20	2.30
16	.....	3.35	3.15	2.80	2.00	1.75	1.45	1.80	2.30	2.40
17	.....	3.30	3.75	2.80	2.00	1.75	1.50	1.80	2.40	2.40
18	.....	3.60	3.75	2.75	2.00	1.75	1.50	1.80	2.40	2.20
19	.....	3.35	3.20	2.00	2.00	1.75	1.50	1.80	2.40	2.20
20	.....	3.00	3.55	2.10	1.90	1.75	1.45	1.80	2.20	2.30
21	.....	3.65	3.15	2.20	1.80	1.70	1.45	1.80	2.20	2.30
22	.....	3.20	3.70	2.45	1.80	1.70	1.45	1.80	2.30	2.30
23	.....	3.20	3.35	3.00	1.90	1.60	1.50	1.90	2.30	2.30
24	.....	3.00	3.70	3.00	1.90	1.60	1.50	1.90	2.20	2.30
25	2.65	3.30	3.75	2.90	1.90	1.50	1.45	1.90	2.20	2.30
26	2.65	3.10	3.00	2.90	2.00	1.50	1.45	1.80	2.20	2.30
27	2.70	2.90	3.10	2.85	2.00	1.45	1.45	1.80	2.20	2.40
28	2.70	2.75	3.70	2.65	2.10	1.45	1.50	1.80	2.20	2.40
29	2.70	2.90	2.90	2.20	2.10	1.45	1.50	1.80	2.30	2.40
30	2.75	2.90	2.95	2.20	2.00	1.50	1.50	1.90	2.40	2.30
31	2.75	.....	3.05	.....	1.90	1.50	.....	1.90	.....	2.30

Daily gage height, in feet, of Humboldt River, at Elko, Nevada, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.40	2.30	4.30	2.80	3.40	4.05	3.00	1.75	1.65	1.80	1.80	2.00
2	2.45	2.30	4.20	2.80	3.65	4.10	3.00	1.75	1.65	1.80	1.85	2.00
3	2.40	2.30	4.00	2.85	3.70	4.10	2.80	1.75	1.65	1.80	1.85	2.00
4	2.40	2.30	4.50	2.90	3.75	4.05	2.80	1.75	1.65	1.85	1.85	2.10
5	2.40	2.30	4.30	3.00	3.80	4.00	2.50	1.75	1.65	1.85	1.85	2.15
6	2.40	2.30	4.00	3.00	3.75	3.90	2.50	1.70	1.65	1.85	1.85	2.10
7	2.40	2.35	4.00	3.00	3.75	3.80	2.50	1.70	1.65	1.85	1.85	2.05
8	2.40	2.40	3.90	3.00	3.70	3.75	2.50	1.70	1.65	1.85	1.85	2.05
9	2.40	2.40	3.90	3.00	3.60	3.70	2.50	1.70	1.65	1.75	1.85	2.05
10	2.35	2.40	3.80	3.00	3.50	3.70	2.45	1.70	1.65	1.75	1.85	2.05
11	2.35	2.40	3.85	3.00	3.60	3.70	2.35	1.70	1.70	1.75	1.90	2.05
12	2.35	2.40	3.80	3.00	3.15	3.70	2.30	1.70	1.70	1.75	1.90	2.05
13	2.40	2.60	3.50	3.10	3.10	3.75	2.30	1.70	1.70	1.75	1.90	2.00
14	2.40	2.75	3.30	3.10	3.10	3.75	2.30	1.70	1.70	1.75	1.90	2.00
15	2.40	2.80	3.20	3.10	3.20	3.80	2.30	1.65	1.70	1.75	1.90	2.00
16	2.30	3.00	3.00	3.15	3.15	3.80	2.30	1.65	1.70	1.75	1.95	2.00
17	2.35	3.50	3.00	3.20	3.25	3.85	2.30	1.65	1.70	1.80	1.90	2.00
18	2.35	3.65	2.90	3.20	3.50	3.90	2.25	1.65	1.70	1.80	1.90	2.00
19	2.35	3.80	2.90	3.20	3.80	3.90	2.20	1.65	1.70	1.80	1.90	2.00
20	2.30	3.50	3.00	3.20	3.95	3.90	2.10	1.65	1.70	1.80	1.90	1.95
21	2.25	3.60	2.90	3.25	4.10	3.90	2.00	1.65	1.70	1.80	1.90	1.95
22	2.25	3.70	2.90	3.30	4.20	3.90	1.95	1.65	1.70	1.80	1.90	1.95
23	2.35	3.70	2.85	3.30	4.20	3.80	1.95	1.65	1.70	1.75	1.95	1.95
24	2.30	3.70	2.80	3.30	4.10	3.80	1.95	1.65	1.70	1.80	1.95	1.95
25	2.30	3.75	2.80	3.35	4.10	3.75	1.95	1.65	1.70	1.80	1.95	1.95
26	2.35	3.80	2.80	3.40	4.10	3.50	1.85	1.65	1.70	1.80	1.95	1.95
27	2.35	4.40	2.80	3.40	4.10	3.40	1.80	1.65	1.70	1.80	1.95	1.95
28	2.30	4.50	2.80	3.40	4.10	3.25	1.80	1.65	1.80	1.80	1.95	1.95
29	2.30	.....	2.80	3.40	4.05	3.10	1.75	1.65	1.80	1.80	2.00	1.95
30	2.45	.....	2.80	3.40	4.00	3.00	1.75	1.65	1.80	1.80	2.00	1.95
31	2.40	.....	2.80	.....	4.05	.....	1.75	1.65	.....	1.80	.....	1.95

Daily gage height, in feet, of Humboldt River at Golconda, Nevada, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.80	2.60	4.20	3.50	1.40	3.50	2.70	1.00	0.30	0.10	0.20	0.20
2	2.80	2.60	4.20	3.50	1.50	3.50	2.60	.90	.30	.10	.20	.20
3	2.80	2.60	4.20	3.40	1.40	3.60	2.60	.80	.30	.10	.20	.20
4	2.80	2.60	4.20	3.30	1.40	3.70	2.60	.80	.30	.10	.20	.20
5	2.80	2.60	4.15	3.20	1.30	3.70	2.60	.70	.20	.10	.20	.20
6	2.80	2.60	4.15	3.20	1.20	3.70	2.60	.70	.20	.10	.20	.20
7	2.85	2.60	4.15	3.10	1.20	3.70	2.50	.70	.20	.10	.20	.20
8	2.75	2.60	4.15	3.10	1.10	3.70	2.50	.70	.20	.10	.20	.20
9	2.75	2.60	4.20	3.00	1.00	3.60	2.50	.70	.20	.10	.20	.20
10	2.75	2.60	4.30	2.90	.95	3.50	2.50	.60	.20	.10	.20	.20
11	2.70	2.60	4.20	2.90	.90	3.30	2.40	.60	.20	.20	.20	.20
12	2.70	2.60	4.20	2.85	1.00	3.20	2.30	.60	.10	.20	.20	.30
13	2.70	2.60	4.30	2.80	1.30	3.00	2.30	.60	.10	.20	.20	.40
14	2.70	2.60	4.40	2.70	1.40	2.90	2.20	.60	.10	.20	.20	.50
15	2.75	2.70	4.50	2.60	1.50	2.80	2.10	.60	.00	.20	.20	.50
16	2.75	2.80	4.50	2.50	1.50	2.70	2.10	.50	.00	.20	.20	.60
17	2.75	3.00	4.50	2.50	1.60	2.70	2.10	.50	.00	.20	.20	.60
18	2.70	3.20	4.50	2.40	1.60	2.60	1.90	.40	.00	.20	.20	.60
19	2.70	3.40	4.20	2.30	1.50	2.50	1.80	.40	.00	.20	.20	.60
20	2.70	3.50	4.00	2.20	1.50	2.50	1.70	.40	.00	.20	.20	.60
21	2.70	3.50	4.00	2.00	1.50	2.50	1.60	.40	.00	.20	.20	.60
22	2.70	3.70	3.90	2.00	1.50	2.50	1.60	.40	.00	.20	.20	.60
23	2.60	3.90	3.90	2.10	1.50	2.50	1.50	.40	.00	.20	.20	.60
24	2.60	4.00	3.90	2.10	1.60	2.50	1.50	.40	.00	.20	.20	.70
25	2.60	4.20	3.85	2.10	2.10	2.50	1.50	.40	.00	.20	.20	.70
26	2.60	4.30	3.85	2.00	2.60	2.60	1.40	.30	.00	.20	.20	.70
27	2.60	4.20	3.80	1.90	2.80	2.60	1.30	.30	.00	.20	.20	.80
28	2.60	4.20	3.80	1.70	3.00	2.60	1.20	.30	.00	.20	.20	.70
29	2.60	.....	3.75	1.50	3.10	2.70	1.10	.30	.00	.20	.20	.70
30	2.60	.....	3.70	1.50	3.40	2.70	1.00	.30	.00	.20	.20	.70
31	2.60	.....	3.60	.....	3.50	.....	1.00	.30	.....	.20	.....	.70

Daily gage height, in feet, of Humboldt River at Oreana, Nevada, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	3.10	3.10	4.10	3.30	1.80	1.30	17	3.20	3.20	3.90	2.50	1.45	1.50
2	3.10	3.10	4.20	3.20	1.70	1.30	18	3.20	3.25	3.80	2.40	1.45	1.41
3	3.10	3.10	4.20	3.20	1.65	1.25	19	3.15	3.30	3.60	2.35	1.45	1.35
4	3.10	3.10	4.30	3.20	1.60	1.25	20	3.15	3.30	3.50	2.30	1.45	1.30
5	3.10	3.10	4.40	3.20	1.60	1.25	21	3.15	3.35	3.40	2.30	1.40	1.30
6	3.15	3.10	4.50	3.10	1.60	1.25	22	3.15	3.40	3.30	2.25	1.40	1.30
7	3.15	3.10	4.50	3.10	1.55	1.25	23	3.10	3.50	3.30	2.20	1.40	1.30
8	3.20	3.10	4.50	3.10	1.55	1.25	24	3.10	3.60	3.20	2.10	1.35	1.30
9	3.15	3.10	4.60	3.00	1.50	1.25	25	3.10	3.80	3.20	2.05	1.35	1.25
10	3.15	3.10	4.60	2.90	1.50	1.25	26	3.10	4.00	3.20	2.00	1.30	1.25
11	3.15	3.10	4.50	2.85	1.50	1.25	27	3.10	4.00	3.20	2.00	1.30	1.25
12	3.10	3.10	4.50	2.85	1.50	1.25	28	3.10	4.00	3.20	1.95	1.30	1.25
13	3.10	3.10	4.45	2.80	1.50	1.25	29	3.10	.....	3.30	1.90	1.30	1.25
14	3.10	3.10	4.40	2.70	1.50	1.30	30	3.10	.....	3.30	1.85	1.30	1.20
15	3.15	3.15	4.20	2.60	1.50	1.40	31	3.10	.....	3.30	.....	1.30	.....
16	3.15	3.15	4.00	2.55	1.50	1.60							

Daily gage height, in feet, of South Fork of Humboldt River at Masons Ranch, Nevada, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.90	1.30	1.50	1.25	2.10	2.45	1.80	0.45	0.30	0.40	0.65	0.90
2	.85	1.30	1.45	1.25	2.00	2.30	1.80	.45	.30	.45	.65	.90
3	.85	1.20	1.45	1.25	2.00	2.35	1.70	.45	.30	.45	.65	.90
4	.85	1.20	1.40	1.25	1.95	2.30	1.60	.45	.35	.45	.65	.80
5	.85	1.20	1.40	1.20	1.90	2.35	1.45	.45	.35	.45	.65	.70
6	.85	1.25	1.35	1.20	1.80	2.20	1.35	.40	.35	.45	.65	.70
7	1.00	1.30	1.35	1.25	1.75	2.15	1.35	.40	.35	.45	.65	.70
8	1.00	1.30	1.35	1.25	1.70	2.25	1.30	.40	.35	.45	.65	.70
9	1.00	.95	1.35	1.20	1.70	2.35	1.30	.40	.35	.50	.65	.70
10	1.10	1.30	1.30	1.20	1.65	2.50	1.30	.40	.35	.50	.65	.70
11	1.50	1.00	1.25	1.25	1.65	2.50	1.20	.40	.30	.50	.65	.65
12	.95	1.25	1.25	1.30	1.90	2.70	1.20	.40	.30	.50	.65	.65
13	1.00	1.50	1.35	1.35	1.95	2.70	1.25	.40	.30	.50	.65	.65
14	1.00	2.20	1.25	1.40	2.10	2.80	1.15	.40	.30	.50	.65	.65
15	1.00	2.55	1.30	1.50	2.15	2.75	1.10	.40	.30	.55	.65	.65

Daily gage height, in feet, of South Fork of Humboldt River at Masons Ranch, Nevada, for 1898—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16	1.05	2.75	1.00	1.60	2.20	2.80	1.05	.40	.30	.55	.65	.65
17	1.10	2.25	1.10	1.70	2.25	2.80	1.00	.35	.30	.55	.65	.65
18	1.05	2.30	1.30	1.70	2.35	2.90	.90	.35	.35	.55	.65	.65
19	1.10	2.30	1.30	1.70	2.75	2.80	.90	.35	.35	.55	.65	.65
20	1.10	2.10	1.30	1.70	2.70	2.70	.90	.35	.40	.55	.65	.65
21	1.05	2.55	1.30	1.90	2.45	2.50	.85	.30	.40	.55	.60	.65
22	1.10	2.30	1.20	1.85	2.40	2.40	.85	.30	.40	.60	.60	.65
23	1.05	1.55	1.25	1.75	2.30	2.40	.80	.30	.40	.60	.60	.65
24	1.00	1.60	1.20	1.70	2.20	2.35	.75	.30	.40	.60	.60	.65
25	1.00	1.50	1.30	1.75	2.10	2.30	.75	.30	.40	.60	.60	.70
26	1.05	1.45	1.30	1.90	2.10	2.30	.65	.30	.40	.60	.60	.80
27	1.10	1.55	1.30	2.10	2.10	2.20	.65	.30	.40	.60	.60	.80
28	1.10	1.60	1.30	2.10	2.50	2.00	.60	.30	.40	.65	.60	.90
29	1.20	.....	1.30	2.10	2.85	2.00	.60	.30	.40	.65	.80	.90
30	1.30	.....	1.30	2.00	2.65	1.85	.55	.30	.40	.65	.90	1.00
31	1.40	.....	1.30	.....	2.55	.....	.50	.30	.....	.65	.....	1.00

Daily gage height, in feet, of Bear River at Soda Springs, Idaho, for 1898.

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1	.....	7.10	6.30	12	.....	6.60	.....	23	6.80	6.60	.....
2	.....	7.10	.....	13	.....	.....	.....	24	6.85	6.60	.....
3	.....	7.10	.....	14	.....	6.55	.....	25	6.90	6.60	.....
4	.....	7.10	.....	15	.....	6.50	.....	26	6.90	6.60	.....
5	.....	7.10	.....	16	.....	6.60	.....	27	6.90	6.50	.....
6	.....	7.00	.....	17	.....	6.60	.....	28	7.20	6.40	.....
7	.....	7.00	.....	18	.....	6.60	.....	29	7.10	6.40	.....
8	.....	6.90	.....	19	.....	6.60	.....	30	7.10	6.40	.....
9	.....	6.90	.....	20	.....	6.60	.....	31	7.10	.....	.....
10	.....	6.90	.....	21	.....	6.60	.....				
11	.....	6.90	.....	22	6.90	6.60	.....				

Discontinued July 1.

Daily gage height in feet, of Bear River at Battle Creek, Idaho, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.90	2.00	1.85	1.90	3.70	3.70	2.70	1.50	1.40	1.40	1.60	1.60
2	1.90	2.00	1.85	1.90	3.70	3.70	2.60	1.50	1.40	1.40	1.60	1.60
3	1.90	2.00	1.90	2.00	3.60	3.60	2.60	1.50	1.40	1.40	1.60	1.30
4	1.90	2.00	1.90	2.00	3.60	3.60	2.50	1.50	1.40	1.40	1.60	1.60
5	1.90	2.05	1.95	2.10	3.60	3.60	2.50	1.40	1.40	1.40	1.60	1.60
6	1.90	1.90	1.95	2.20	3.60	3.50	2.50	1.40	1.40	1.40	1.60	1.60
7	1.90	1.90	1.95	2.40	3.55	3.50	2.40	1.40	1.40	1.40	1.60	1.60
8	1.90	1.90	1.95	2.50	3.50	3.50	2.30	1.40	1.40	1.40	1.60	1.60
9	1.90	1.90	2.00	2.70	3.50	3.40	2.30	1.40	1.40	1.40	1.60	1.60
10	1.90	1.90	2.00	3.00	3.50	3.40	2.20	1.40	1.40	1.40	1.60	1.60
11	1.90	1.90	1.90	3.20	3.45	3.40	2.20	1.40	1.40	1.40	1.60	1.60
12	2.00	1.90	1.90	3.20	3.40	3.40	2.20	1.40	1.40	1.40	1.60	1.60
13	2.10	1.80	1.90	3.20	3.40	3.30	2.10	1.40	1.40	1.40	1.60	1.60
14	2.10	1.70	1.90	3.30	3.35	3.30	2.10	1.40	1.40	1.50	1.60	1.60
15	2.10	1.70	1.90	3.30	3.30	3.30	2.10	1.40	1.40	1.50	1.60	1.60
16	2.10	1.60	1.90	3.40	3.30	3.20	2.10	1.40	1.40	1.50	1.60	1.60
17	2.10	1.60	1.90	3.40	3.35	3.00	2.00	1.40	1.40	1.50	1.60	1.60
18	2.10	1.60	1.90	3.50	3.40	3.00	2.00	1.40	1.40	1.50	1.60	1.60
19	2.10	1.60	1.90	3.60	3.50	3.00	1.90	1.40	1.40	1.50	1.60	1.60
20	2.10	1.60	1.90	3.70	3.50	3.00	1.80	1.40	1.40	1.50	1.60	1.60
21	2.10	1.60	1.90	3.70	3.50	3.00	1.80	1.40	1.40	1.50	1.60	1.60
22	2.10	1.60	1.90	3.80	3.50	3.00	1.80	1.40	1.40	1.50	1.60	1.60
23	2.00	1.60	1.60	3.90	3.40	2.90	1.80	1.40	1.40	1.50	1.60	1.60
24	2.00	1.60	1.60	3.90	3.40	2.90	1.70	1.40	1.40	1.50	1.60	1.60
25	2.00	1.60	1.80	3.90	3.30	2.90	1.70	1.40	1.40	1.50	1.60	1.60
26	2.00	1.70	1.80	3.85	3.40	2.90	1.70	1.40	1.40	1.50	1.60	1.60
27	2.00	1.70	1.70	3.80	3.50	2.90	1.70	1.40	1.40	1.60	1.60	1.60
28	2.00	1.80	1.70	3.80	3.60	2.80	1.60	1.40	1.40	1.60	1.60	1.60
29	2.00	.....	1.80	3.70	3.70	2.70	1.60	1.40	1.40	1.60	1.60	1.60
30	2.00	.....	1.80	3.70	3.70	2.70	1.50	1.40	1.40	1.60	1.60	1.60
31	2.00	.....	1.90	.....	3.70	.....	1.50	1.40	.....	1.60	.....	1.60

Daily gage height, in feet, of Logan River at Logan, Utah, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.50	2.55	2.50	2.50	3.40	3.75	3.35	2.85	2.75	2.60	2.60	2.55
2	2.50	2.55	2.50	2.50	3.30	3.80	3.30	2.85	2.75	2.60	2.60	2.55
3	2.50	2.55	2.50	2.50	3.30	3.80	3.30	2.85	2.75	2.65	2.60	2.50
4	2.55	2.55	2.50	2.50	3.25	3.80	3.25	2.85	2.70	2.65	2.60	2.50
5	2.55	2.55	2.50	2.45	3.25	3.70	3.20	2.80	2.70	2.65	2.60	2.45
6	2.55	2.55	2.50	2.50	3.25	3.70	3.20	2.80	2.70	2.65	2.60	2.45
7	2.55	2.55	2.50	2.55	3.35	3.65	3.15	2.80	2.70	2.65	2.60	2.40
8	2.55	2.55	2.50	2.55	3.35	3.70	3.15	2.80	2.70	2.65	2.60	2.30
9	2.55	2.55	2.55	2.55	3.35	3.75	3.10	2.80	2.65	2.65	2.60	2.70
10	2.55	2.50	2.50	2.65	3.40	3.75	3.10	2.75	2.65	2.65	2.60	2.40
11	2.50	2.50	2.40	2.75	3.70	3.75	3.00	2.75	2.65	2.65	2.60	2.30
12	2.50	2.50	2.45	2.85	3.65	3.75	3.05	2.75	2.65	2.65	2.60	2.35
13	2.50	2.50	2.45	2.85	3.65	3.75	3.05	2.75	2.65	2.60	2.55	2.40
14	2.50	2.50	2.50	2.95	3.65	3.75	3.05	2.75	2.65	2.60	2.50	2.40
15	2.50	2.55	2.50	3.00	3.65	3.75	3.05	2.90	2.65	2.60	2.55	2.45
16	2.55	2.55	2.45	3.15	3.65	3.75	3.00	2.80	2.65	2.60	2.55	2.45
17	2.55	2.50	2.45	3.25	3.65	3.75	3.00	2.75	2.65	2.60	2.55	2.45
18	2.55	2.45	2.45	3.20	3.65	3.75	3.00	2.75	2.65	2.60	2.55	2.45
19	2.55	2.50	2.50	3.15	3.65	3.75	3.00	2.75	2.65	2.60	2.55	2.45
20	2.55	2.50	2.50	3.25	3.60	3.70	3.00	2.75	2.65	2.60	2.55	2.45
21	2.55	2.55	2.50	3.45	3.55	3.65	2.95	2.90	2.60	2.60	2.55	2.45
22	2.55	2.50	2.50	3.30	3.60	3.60	2.95	2.90	2.60	2.60	2.55	2.40
23	2.55	2.45	2.45	3.25	3.60	3.70	2.95	2.90	2.60	2.60	2.55	2.35
24	2.55	2.45	2.45	3.25	3.70	3.65	2.95	2.90	2.60	2.60	2.55	2.35
25	2.55	2.50	2.45	3.30	3.70	3.60	2.90	2.85	2.60	2.60	2.55	2.40
26	2.50	2.55	2.45	3.50	3.65	3.55	2.90	2.80	2.60	2.60	2.55	2.50
27	2.60	2.50	2.45	3.55	3.65	3.50	2.85	2.80	2.60	2.60	2.50	2.55
28	2.60	2.50	2.45	3.50	3.85	3.45	2.85	2.75	2.60	2.60	2.55	2.55
29	2.60	------	2.45	3.45	3.75	3.40	2.80	2.75	2.60	2.60	2.60	2.55
30	2.55	------	2.50	3.40	3.75	3.40	2.80	2.75	2.60	2.60	2.60	2.55
31	2.55	------	2.60	------	3.75	------	2.85	2.75	------	2.60	------	2.55

Daily gage height, in feet, of Bear River at Collinston, Utah, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.00	2.00	2.45	2.35	4.40	4.75	2.55	1.30	1.10	1.30	1.70	1.90
2	2.00	2.00	2.75	2.40	4.35	4.80	2.50	1.30	1.10	1.40	1.70	1.90
3	2.00	2.00	2.75	2.40	4.30	4.80	2.40	1.25	1.10	1.50	1.70	1.90
4	2.25	2.00	2.80	2.40	4.30	4.80	2.30	1.20	1.10	1.50	1.70	1.60
5	1.90	2.00	2.80	2.55	4.20	4.80	2.25	1.20	1.20	1.60	1.70	1.40
6	2.00	2.15	2.80	2.60	4.20	4.75	2.20	1.15	1.20	1.60	1.70	1.40
7	2.00	2.15	2.65	2.60	4.20	4.70	2.15	1.10	1.10	1.60	1.70	1.40
8	2.00	2.15	2.60	2.65	4.20	4.60	2.10	1.10	1.10	1.60	1.70	1.40
9	2.05	2.10	2.60	2.75	4.10	4.55	2.00	1.10	1.10	1,60	1.70	1.40
10	2.00	2.25	2.60	2.90	4.05	4.40	2.00	1.10	1.10	1.60	1.70	1.70
11	2.30	2.15	2.40	3.30	4.00	4.10	2.00	1.10	1.10	1.60	1.70	1.20
12	2.35	2.15	2.30	3.60	3.90	4.00	1.95	1.10	1.10	1.60	1.70	1.20
13	2.45	1.95	2.30	3.85	3.90	3.90	1.85	1.10	1.10	1.60	1.70	1.20
14	2.45	1.90	2.30	4.05	3.95	3.70	1.80	1.10	1.20	1.60	1.70	1.20
15	2.35	1.90	2.30	4.15	3.90	3.55	1.70	1.10	1.20	1.60	1.70	1.20
16	2.30	1.90	2.20	4.20	3.90	3.40	1.70	1.10	1.20	1.60	1.70	1.50
17	2.30	2.20	2.30	4.20	3.95	3.30	1.80	1.10	1.20	1.60	1.70	1.50
18	2.25	2.20	2.30	4.30	4.30	3.20	1.75	1.10	1.20	1.60	1.80	1.50
19	2.05	2.10	2.30	4.30	4.30	3.20	1.70	1.10	1.20	1.60	1.80	1.50
20	2.05	2.05	2.30	4.35	4.40	3.20	1.60	1.10	1.20	1.70	1.90	1.50
21	2.35	2.00	2.30	4.40	4.50	3.20	1.60	1.10	1.20	1.70	1.90	1.50
22	2.20	2.00	2.10	4.45	4.50	3.20	1.55	1.10	1.20	1.70	1.90	1.50
23	2.30	2.00	2.10	4.55	4.50	3.15	1.50	1.10	1.20	1.70	1.70	1.40
24	2.25	2.00	2.10	4.60	4.50	3.10	1.50	1.10	1.30	1.70	1.70	1.40
25	2.35	2.00	2.15	4.60	4.60	3.10	1.45	1.10	1.30	1.70	1.70	1.40
26	2.35	2.00	2.20	4.60	4.60	3.10	1.40	1.10	1.30	1.70	1.70	1.40
27	2.35	2.20	2.10	4.60	4.60	3.10	1.30	1.10	1.30	1.70	1.60	1.40
28	2.20	2.30	2.15	4.50	4.60	3.00	1.30	1.10	1.30	1.70	1.50	1.40
29	2.15	------	2.20	4.50	4.60	2.85	1.30	1.10	1.30	1.70	1.70	1.30
30	2.05	------	2.25	4.50	4.65	2.70	1.30	1.10	1.30	1.70	1.80	1.30
31	2.05	------	2.30	------	4.70	------	1.30	1.10	------	1.70	------	1.30

Daily gage height, in feet, of Ogden River at Ogden, Utah, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.30	2.60	2.80	2.90	3.60	3.70	1.70	1.90	1.40	1.50	1.50	1.50
2	2.60	2.50	2.80	3.10	3.50	3.60	1.70	2.00	1.50	1.60	1.50	1.60
3	2.60	2.60	2.70	3.20	3.50	3.70	1.70	1.70	1.50	1.70	1.50	1.50
4	2.45	2.50	2.70	3.20	3.40	3.50	1.70	1.70	1.50	1.50	1.50	1.50
5	2.60	2.60	2.80	3.20	3.40	3.40	1.80	1.60	1.40	1.60	1.50	1.50
6	2.30	2.60	2.90	3.30	3.40	3.30	1.65	1.70	1.40	1.50	1.50	1.50
7	2.60	2.60	2.90	3.30	3.40	3.10	1.80	1.50	1.40	1.50	1.60	1.40
8	2.30	2.70	2.90	3.30	3.40	3.00	1.70	1.50	1.50	1.50	1.50	1.50
9	2.60	2.70	2.90	3.40	3.40	2.90	1.70	1.60	1.50	1.40	1.50	1.50
10	2.90	2.70	2.80	3.00	3.40	2.80	1.70	1.60	1.50	1.50	1.50	1.50
11	2.70	2.70	2.80	3.10	3.40	2.80	1.70	1.50	1.40	1.50	1.50	1.50
12	2.60	2.70	2.70	3.20	3.40	2.70	1.80	1.40	1.40	1.50	1.50	1.40
13	2.40	2.70	3.00	3.30	3.40	2.70	1.70	1.40	1.50	1.50	1.50	1.40
14	2.40	2.70	2.90	3.40	3.40	2.60	1.70	1.80	1.40	1.50	1.50	1.40
15	2.30	2.70	2.90	3.50	3.30	2.50	1.50	1.60	1.50	1.50	1.50	1.40
16	2.60	2.70	2.80	3.60	3.30	2.20	1.60	1.40	1.50	1.60	1.50	1.40
17	2.30	2.70	2.70	3.70	3.50	2.10	1.60	1.50	1.50	1.55	1.50	1.40
18	2.40	2.70	2.70	3.80	3.70	2.10	1.50	1.90	1.40	1.50	1.70	1.40
19	2.40	2.70	2.80	3.80	4.00	2.00	1.50	1.50	1.50	1.50	1.60	1.40
20	2.30	2.60	2.80	3.80	3.90	1.90	1.60	1.40	1.40	1.50	1.70	1.40
21	2.40	2.70	2.80	4.30	3.80	2.00	1.65	1.50	1.40	1.50	1.60	1.40
22	2.30	2.70	2.80	4.20	3.70	1.70	1.60	1.40	1.40	1.50	1.50	1.50
23	2.50	2.70	2.50	4.00	3.70	2.00	1.50	1.40	1.40	1.50	1.50	1.50
24	2.30	2.80	2.50	3.80	3.90	2.00	1.60	1.40	1.40	1.50	1.50	1.40
25	2.30	2.80	2.80	3.80	4.10	1.90	1.55	1.40	1.50	1.50	1.50	1.40
26	2.60	2.70	2.80	3.80	4.00	2.00	1.65	1.40	1.40	1.50	1.50	1.40
27	2.30	2.60	2.80	3.90	3.90	1.80	1.60	1.40	1.50	1.50	1.50	1.40
28	2.60	2.70	2.80	3.80	4.10	1.80	1.60	1.40	1.40	1.50	1.40	1.40
29	2.30	------	2.70	3.60	4.00	1.80	1.60	1.40	1.50	1.50	1.50	1.50
30	2.60	------	2.80	3.60	3.90	1.80	1.60	1.50	1.50	1.50	1.50	1.50
31	2.30	------	2.80	-------	3.80	-------	1.60	1.50	-------	1.40	-------	1.40

Daily gage height, in feet, of Weber River at Uinta, Utah, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.40	1.40	1.80	1.70	3.55	2.50	2.00	1.15	1.10	1.30	1.70	1.75
2	1.40	1.40	1.80	1.70	3.45	2.50	1.95	1.00	1.10	1.40	1.70	1.70
3	1.40	1.40	1.80	1.85	3.40	2.50	1.75	1.00	1.10	1.40	1.70	1.70
4	1.40	1.40	1.80	2.00	3.40	2.50	1.60	1.00	1.10	1.40	1.70	1.70
5	1.40	1.40	1.80	2.00	3.40	2.50	1.60	1.00	1.10	1.40	1.70	1.70
6	1.40	1.40	1.80	2.15	3.30	2.40	1.50	1.00	1.10	1.40	1.70	1.70
7	1.40	1.40	1.85	2.15	3.25	2.40	1.50	.80	1.10	1.40	1.70	1.70
8	1.40	1.40	1.85	2.40	3.05	2.40	1.50	.80	1.10	1.40	1.70	1.70
9	1.50	1.40	1.75	2.40	2.95	2.40	1.50	.80	1.10	1.40	1.70	1.70
10	1.50	1.40	1.60	2.45	2.85	2.25	1.50	.80	1.10	1.40	1.70	1.70
11	1.50	1.40	1.65	2.55	2.95	2.00	1.40	.80	1.20	1.40	1.70	1.70
12	1.50	1.40	1.55	2.60	3.15	2.00	1.40	.80	1.20	1.40	1.70	1.70
13	1.50	1.40	1.55	2.70	3.35	1.90	1.40	.80	1.20	1.40	1.70	1.70
14	1.50	1.40	1.55	2.70	3.55	1.80	1.40	.95	1.20	1.40	1.70	1.70
15	1.50	1.40	1.55	2.70	3.65	1.65	1.40	1.00	1.20	1.40	1.70	1.70
16	1.40	1.40	1.55	2.75	3.75	1.60	1.40	1.00	1.20	1.50	1.70	1.70
17	1.40	1.40	1.55	2.90	3.65	1.50	1.40	1.00	1.20	1.50	1.70	1.70
18	1.40	1.40	1.55	3.00	3.60	1.50	1.40	1.00	1.30	1.50	1.70	1.70
19	1.40	1.40	1.55	3.15	3.60	1.50	1.40	1.00	1.30	1.50	1.70	1.70
20	1.40	1.55	1.60	3.35	3.60	1.50	1.40	1.00	1.30	1 50	1.70	1.70
21	1.40	1.65	1.60	3.65	3.45	1.70	1.40	1.00	1.30	1.50	1.70	1.70
22	1.40	1.75	1.60	3.80	3.40	2.10	1.40	1.00	1.30	1.50	1.70	1.70
23	1.40	1.80	1.60	3.75	3.25	2.50	1.40	1.00	1.30	1.60	1.70	1.70
24	1.40	1.80	1.60	3.70	3.15	2 80	1.40	1.00	1.30	1.60	1.70	1.70
25	1.40	1.80	1.60	3.70	3.00	2.80	1.40	1.00	1.30	1.60	1.70	1.70
26	1.40	1.80	1.60	3.70	2.95	2.45	1.30	1.00	1.30	1.60	1.70	1.70
27	1.40	1.80	1.60	3.70	2.80	2.40	1.30	1.00	1.30	1.60	1.80	1.70
28	1.40	1.80	1.60	3.70	2.70	2.40	1.30	1.00	1.30	1.60	1.90	1.70
29	1.40	------	1.60	3.70	2.70	2.25	1.30	1.10	1.30	1.60	2.10	1.70
30	1.40	------	1.65	3.70	2.65	2.00	1.30	1.10	1.30	1.70	2.00	1.70
31	1.40	------	1.70	-------	2.55	-------	1.20	1.10	-------	1.70	-------	1.70

Daily gage height, in feet, of Provo River at Provo, Utah, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.30	4.20	4.40	4.40	5.20	5.40	4.20	3.80	3.80	3.80	4.10	4.20
2	4.30	4.20	4.40	4.40	5.20	5.50	4.20	3.80	3.80	3.80	4.10	4.20
3	4.30	4.20	4.40	4.40	5.10	5.50	4.00	3.80	3.80	3.80	4.10	4.20
4	4.30	4.20	4.40	4.40	5.10	5.50	4.00	3.80	3.80	3.80	4.10	4.20
5	4.30	4.20	4.40	4.40	5.00	5.30	4.00	3.80	3.80	3.80	4.10	4.20
6	4.30	4.20	4.40	4.40	5.00	5.20	4.00	3.80	3.80	3.80	4.20	4.20
7	4.30	4.20	4.40	4.40	5.00	5.20	4.00	3.80	3.80	3.80	4.20	4.20
8	4.30	4.20	4.40	4.40	5.10	5.20	4.00	3.80	3.80	3.80	4.20	4.20
9	4.10	4.20	4.40	4.40	5.10	5.20	4.00	3.80	3.80	3.80	4.20	4.20
10	4.10	4.20	4.40	4.40	5.10	5.00	4.00	3.80	3.80	3.80	4.20	4.20
11	4.10	4.20	4.40	4.50	5.10	5.00	4.00	3.80	3.80	3.80	4.20	4.20
12	4.10	4.20	4.40	4.50	5.20	5.10	4.00	3.80	3.80	3.80	4.20	4.20
13	4.10	4.20	4.40	4.60	5.20	5.20	4.00	3.80	3.80	3.80	4.20	4.20
14	4.10	4.20	4.40	4.60	5.20	5.40	4.00	3.80	3.80	3.80	4.20	4.20
15	4.10	4.20	4.40	4.60	5.20	5.40	4.00	3.80	3.80	3.80	4.20	4.20
16	4.10	4.20	4.40	4.70	5.20	5.40	4.00	3.80	3.80	4.10	4.20	4.20
17	4.10	4.20	4.40	4.60	5.20	5.10	3.90	3.80	3.80	4.10	4.20	4.20
18	4.10	4.20	4.40	4.70	5.20	5.00	3.90	3.80	3.80	4.10	4.20	4.10
19	4.10	4.20	4.40	4.80	5.20	4.70	3.90	3.80	3.80	4.10	4.20	4.10
20	4.10	4.20	4.40	4.90	5.20	4.70	3.90	3.80	3.80	4.10	4.20	4.10
21	4.10	4.20	4.40	4.60	5.20	4.70	3.90	3.80	3.80	4.10	4.20	4.10
22	4.10	4.20	4.40	4.60	5.10	4.90	3.90	3.70	3.80	4.10	4.20	4.10
23	4.20	4.30	4.40	4.70	5.00	4.80	3.90	3.70	3.80	4.10	4.20	4.10
24	4.20	4.40	4.40	4.80	5.40	4.70	3.80	3.70	3.80	4.10	4.20	4.10
25	4.20	4.40	4.40	4.90	5.40	4.70	3.80	3.70	3.80	4.10	4.20	4.20
26	4.20	4.40	4.40	5.10	5.30	4.60	3.80	3.70	3.80	4.10	4.20	4.20
27	4.20	4.40	4.40	5.10	5.20	4.60	3.80	3.70	3.80	4.10	4.20	4.20
28	4.20	4.40	4.40	5.10	5.20	4.40	3.80	3.70	3.80	4.10	4.20	4.20
29	4.20	.....	4.40	5.20	5.30	4.40	3.80	3.80	3.80	4.10	4.20	4.20
30	4.20	.....	4.40	5.20	5.30	4.20	3.80	3.80	3.80	4.10	4.20	4.20
31	4.20	.....	4.40	.....	5.40	.....	3.80	3.80	.....	4.10	.....	4.20

Daily gage height, in feet, of Utah Lake at Geneva, Utah, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.40	1.40	.....	.....	2.00	.....	1.00	.....	.....	0.75	.....
2	.....	.....	.....	.....	1.50	.....	1.65	.....	.....	.....	.....	.....
3	1.00	1.40	1.45	.....	.....	.....	.....	.....	0.20	0.65	.75	.....
4	.....	.....	.....	1.55	1.70	2.00	1.60	.90	.....	.....	.....	.....
5	1.05	1.45	1.50	.....	.....	.....	.....	.....	.25	.....	.75	0.55
6	.....	.....	.....	1.50	.....	2.10	.....	.90	.....	.65	.....	.....
7	.....	1.40	1.50	.....	1.65	.....	1.60	.....	.25	.....	.75	.55
8	1.10	.....	.....	.....	.....	2.00	.....	.90	.....	.65	.....	.....
9	.....	1.35	1.50	1.50	1.70	.....	1.55	.....	.....	.....	.....	.....
10	1.10	.....	.....	.....	.....	.....	.....	.80	.40	.65	.75	.55
11	.....	.....	.....	1.45	1.70	1.95	1.55	.....	.....	.....	.....	.....
12	1.10	1.30	1.50	.....	.....	.....	.....	.....	.45	.70	.70	.....
13	.....	.....	.....	.....	.....	2.00	.....	.75	.....	.....	.....	.....
14	.....	1.30	1.50	1.45	1.70	.....	1.55	.....	.....	.....	.70	.....
15	1.15	.....	.....	.....	.....	.....	.....	.80	.40	.70	.....	.....
16	.....	.....	1.50	1.45	1.70	2.00	1.40	.....	.....	.....	.....	.55
17	1.20	1.30	.....	.....	.....	.....	.....	.....	.45	.....	.75	.55
18	.....	.....	.....	1.40	1.75	1.90	1.60	.....	.....	.70	.....	.....
19	.....	1.30	1.55	.....	.....	.....	.....	.....	.45	.....	.80	.50
20	1.25	.....	.....	.....	.....	1.90	.....	.....	.....	.65	.....	.....
21	.....	1.35	1.55	1.40	1.80	.....	1.25	.....	.....	.....	.....	.....
22	1.30	.....	.....	.....	.....	1.90	.....	.....	.50	.70	.....	.....
23	.....	1.35	1.55	1.40	1.90	.....	1.20	.....	.....	.....	.....	.....
24	1.30	.....	.....	.....	.....	.....	.....	.....	.55	.75	.70	.45
25	.....	.....	.....	1.40	.....	1.85	1.15	.50	.....	.....	.....	.....
26	1.35	1.40	1.55	.....	1 95	.....	.....	.50	.60	.....	.75	.40
27	.....	.....	.....	1.40	.....	1.80	.....	.50	.....	.70	.....	.....
28	.....	.....	1.55	.....	2.00	.....	1.10	.....	.....	.....	.65	.....
29	1.35	.....	.....	.....	.....	1.80	.....	.....	.65	.75	.....	.....
30	.....	.....	.....	1.40	2.00	.....	1.10	.....	.65	.....	.60	.....
31	.....	.....	1.55	.....	.....	.....	.....	.....	.....	.....	.....	.40

List of discharge measurements, 1898.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
Mar. 25	North Fork of Humboldt River.	Peko, Nev	L. H. Taylor	2.65	43
Apr. 30	do	do	do	3.20	129
June 26	do	do	do	2.90	71
July 21	do	do	do	1.80	6
Sept. 20	do	do	do	1.45	.3
Feb. 26	Humboldt River	Elko, Nev	do	4.03	423
Mar. 26	do	do	do	2.80	140
Apr. 30	do	do	do	3.40	271
June 26	do	do	do	3.60	316
July 21	do	do	do	2.10	44
Sept. 19	do	do	do	1.70	1
Feb. 28	do	Golconda, Nev	do	4.20	436
Apr. 10	do	do	do	2.90	239
Apr. 18	do	do	do	2.40	162
May 10	do	do	do	.95	24
June 4	do	do	do	3.70	341
July 23	do	do	do	1.50	70
Sept. 25	do	do	do	0.00	.2
Mar. 31	do	Oreana, Nev	do	3.30	324
Apr. 11	do	do	do	2.85	193
May 14	do	do	do	1.50	43
June 9	do	do	do	1.25	21
June 19	do	do	do	1.41	38
Feb. 27	South Fork of Humboldt River.	Masons Ranch, Nev.	do	1.55	159
Apr. 29	do	do	do	2.05	275
June 25	do	do	do	2.30	313
July 22	do	do	do	.85	52
Sept. 19	do	do	do	.35	.7
June 12	Bear River	Soda Springs, Idaho.	F. J. Mills	6.60	2,049
Aug. 25	do	do	C. C. Babb	5.00	290
Oct. 8	do	do	F. S. Shirley	5.15	519
Apr. 30	do	Battle Creek, Idaho.	J. S. Baker	3.65	3,016
May 23	do	do	do	3.40	2,594
June 20	do	do	do	2.98	1,997
Aug. 4	do	do	do	1.45	592
Aug. 24	do	do	do	1.38	508
Do.	do	do	do	1.38	539
Nov. 29	do	do	do	1.67	673
Apr. 11	Logan River	Logan, Utah	do	2.75	229
Apr. 14	do	do	do	2.88	281
May 2	do	do	do	3.35	474
May 9	do	do	do	3.35	475
May 16	do	do	do	3.65	652
May 31	do	do	do	3.75	690
June 10	do	do	do	3.75	723
June 18	do	do	do	3.72	663
Aug. 4	do	do	do	2.82	233
Aug. 24	do	do	do	2.85	204
Do.	do	do	do	2.85	210
Nov. 30	do	do	do	2.57	155
Apr. 16	Bear River	Collinston, Utah	S. Fortier	4.18	4,797
June 17	do	do	J. L. Rhead	3.27	3,419
June 20	do	do	do	3.04	3,136
June 21	do	do	J. S. Baker	3.06	2,724
July 30	do	do	J. L. Rhead	1.20	809
Aug. 19	do	do	do	1.13	732
Sept. 30	do	do	do	1.35	852
June 23	Ogden River	Ogden, Utah	J. S. Baker	2.11	134
Aug. 26	do	do	do	1.45	27
Sept. 10	do	do	do	1.45	36
June 24	Weber River	Uinta, Utah	do	2.90	1,327
Aug. 31	do	do	do	1.05	104
Sept. 3	do	do	do	1.05	104
Sept. 6	do	do	do	1.10	125
May 23	Provo River	Provo, Utah	W. B. Dougall	4.85	704
June 6	do	do	do	5.20	938
Sept. 15	do	do	do	3.85	192

Rating tables.

Elko.		Peko.		Golconda.		Oreana.		Masons Ranch.		Soda Springs.	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.6	0.6	1.4	0.1	0.0	0.2	1.0	13	0.3	0.0	5.0	320
1.7	1.0	1.5	1.0	.1	.4	1.1	17	.4	6.0	5.1	429
1.8	6.0	1.6	2.0	.2	1.0	1.2	22	.5	14.0	5.2	538
1.9	15.0	1.7	4.0	.3	2.0	1.3	28	.6	24.0	5.3	647
2.0	24.0	1.8	6.0	.4	4.0	1.4	34	.7	34.0	5.4	756
2.1	34.0	1.9	8.0	.5	6.0	1.5	41	.8	45.0	5.5	865
2.2	45.0	2.0	11.0	.6	9.0	1.6	48	.9	57.0	5.6	974
2.3	57.0	2.1	14.0	.7	13.0	1.7	56	1.0	70.0	5.7	1,083
2.4	71.0	2.2	18.0	.8	17.0	1.8	64	1.1	84.0	5.8	1,192
2.5	86.0	2.3	23.0	.9	22.0	1.9	73	1.2	99.0	5.9	1,301
2.6	102.0	2.4	28.0	1.0	27.0	2.0	82	1.3	115.0	6.0	1,410
2.7	119.0	2.5	34.0	1.2	40.0	2.1	92	1.4	132.0	6.1	1,519
2.8	137.0	2.6	41.0	1.4	55.0	2.2	103	1.5	150.0	6.2	1,628
2.9	156.0	2.7	50.0	1.6	73.0	2.3	115	1.6	169.0	6.3	1,737
3.0	177.0	2.8	60.0	1.8	93.0	2.4	128	1.7	189.0	6.4	1,846
3.1	199.0	2.9	72.0	2.0	115,0	2.5	142	1.8	210.0	6.5	1,955
3.2	222.0	3.0	86.0	2.2	138.0	2.6	157	1.9	231.0	6.6	2,064
3.3	245.0	3.1	102.0	2.4	163.0	2.7	174	2.0	253.0	6.7	2,173
3.4	269.0	3.2	120.0	2.6	190.0	2.8	192	2.1	276.0	6.8	2,282
3.5	294.0	3.3	141.0	2.8	218.0	2.9	211	2.2	290.0	6.9	2,391
3.6	319.0	3.4	164.0	3.0	246.0	3.0	231	2.3	323.0	7.0	2,500
3.7	344.0	3.5	189.0	3.2	276.0	3.2	274	2.4	347.0	7.1	2,609
3.8	370.0	3.6	215.0	3.4	306.0	3.4	321	2.5	371.0	7.2	2,718
3.9	396.0	3.7	243.0	3.6	336.0	3.6	370	2.6	396.0	7.3	2,827
4.0	423.0	3.8	272.0	3.8	367.0	3.8	421	2.7	421.0	7.4	2,936
4.1	450.0	3.9	302.0	4.0	400.0	4.0	474	2.8	447.0	7.5	3,045
4.2	478.0	4.0	333.0	4.2	434.0	4.2	528	2.9	473.0	.....	.....
4.3	506.0	.....	.....	4.4	468.0	4.4	584	3.0	499.0	.....	.....
4.4	535.0	.....	.....	4.6	502.0	4.6	642	.....	.....	.....	.....
4.5	565.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Battle Creek.		Logan.		Collinston.		Ogden.		Uinta.		Provo.	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.0	344	2.3	108	1.0	660	1.0	23	1.0	95	3 6	128
1.1	386	2.4	125	1.2	775	1.1	25	1.1	125	3.7	146
1.2	432	2.5	142	1.4	920	1.2	26	1.2	165	3.8	167
1.3	482	2.6	167	1.6	1,085	1.3	28	1.3	210	3.9	190
1.4	535	2.7	197	1.8	1,275	1.4	30	1.4	260	4.0	216
1.5	598	2.8	229	2.0	1,490	1.5	32	1.5	310	4.1	250
1.6	660	2.9	264	2.2	1,740	1.6	34	1.6	360	4 2	287
1.7	725	3.0	305	2.4	2,010	1.7	36	1.7	415	4.3	336
1.8	790	3.1	345	2.6	2,280	1.8	39	1.8	475	4.4	390
1.9	870	3.2	392	2.8	2,555	1.9	41	1.9	545	4.5	447
2.0	950	3.3	445	3.0	2,840	2.0	44	2.0	620	4.6	510
2.2	1,125	3.4	500	3.2	3,110	2.1	48	2.2	770	4.7	582
2.4	1,312	3.5	554	3.4	3,385	2.2	52	2.4	920	4.8	652
2.6	1,514	3.6	609	3.6	3,660	2.3	56	2.6	1,080	4.9	732
2.8	1,757	3.7	670	3.8	3,935	2.4	61	2 8	1,240	5.0	812
3.0	2,020	3.8	740	4.0	4,200	2.5	67	3.0	1,410	5.1	892
3.2	2,312	3.9	815	4.2	4,475	2.6	73	3.2	1,580	5.2	972
3.4	2,625	4.0	895	4.4	4,760	2.7	81	3 4	1,750	5.3	1,052
3.6	2,945	4.1	986	4.6	5,025	2.8	90	3.6	1,925	5.4	1,132
3.8	3,306	4.2	1,084	4.8	5,315	2 9	102	3.8	2,118	5.5	1,212
4.0	3,660	4.3	1,194	5.0	5,590	3.0	116	4.0	2,326	5 6	1,292
4.2	4,025	4.4	1,304	5.2	5,875	3.1	134	4.2	2,534	5.7	1,374
4.4	4,417	4.5	1,425	5.4	6,160	3.2	157	4.4	2.742	5.8	1,454
4.6	4,810	4.6	1,555	5 6	6,440	3.3	187	4.6	2.950	5.9	1,535
4.8	5,212	4 7	1,685	5 8	6,725	3.4	220	4.8	3,158	6.0	1,616
5.0	5,620	4.8	1,864	6.0	7,010	3 5	253	5.0	3,366	6.1	1,697
5.2	6,025	4.9	2,034	6 5	7,710	3.6	286	5 5	3,886	6.2	1,780
5.4	6,440	5.0	2,210	7.0	8,445	3.7	319	6.0	4,406	6.3	1,865
5.6	6,860	.....	.....	.....	.....	3.8	352	6.5	4,926	.....	.....
.....	.....	.....	.....	.....	.....	3.9	385	7.0	5,446	.....	.....

COLUMBIA RIVER DRAINAGE.

DESCRIPTION OF RIVER STATIONS.

Pocatello station on Portneuf River.—Described on page 164 of Paper No. 16. Discharge measurements for 1898 made by F. J. Mills and Frank S. Shirley.

Montgomery station on Snake River.—Described on page 165 of Paper No. 16; results for 1897 given on pages 444–448 of the Nineteenth Annual Report, Part IV.

Toponis station on Malad and Little Wood rivers.—Described on page 165 of Paper No. 16; results for 1897 given on pages 448–449 of the Nineteenth Annual Report, Part IV. The observer was Willie Hickman. The bridge over the Malad or Big Wood River has been moved downstream one-half mile.

Grandview station on Bruneau River.—Described on page 167 of Paper No. 16; results for 1897 given on pages 450–451 of the Nineteenth Annual Report, Part IV. Data furnished by Andrew J. Wiley.

Boise station on Boise River.—Described on page 168 of Paper No. 16; results for 1897 given on pages 451–454 of the Nineteenth Annual Report, Part IV.

Weiser station on Weiser River.—Described on page 171 of Paper No. 16; results for 1897 given on pages 456–457 of the Nineteenth Annual Report, Part IV. Gage reset and bolted to a rock, August 22, by C. C. Babb and F. S. Shirley.

Hooper station on Palouse River.—Described on page 172 of Paper No. 16; results for 1897 given on pages 458–459 of the Ninteenth Annual Report, Part IV. Discharge measurements for 1898 were made by Sydney Arnold.

Bonner station on Blackfoot River.—This station is 6 miles east of Missoula and one-half mile west of Bonner, on the wagon bridge across Blackfoot River. It was established by Mr. Cyrus C. Babb, July 7, 1898. The observer is John McCormick, a ranchman, living near the station. Observations are made at about 7 a. m. and 6 p. m. A wire gage is used, the length being 22.90 feet, and the distance from the zero mark on the gage to the farther edge of the pulley is 2 feet. The bench mark is that established by the topographers about 300 yards above on the Northern Pacific Railway bridge. This bench mark has not yet been connected with the river gage. The initial point for soundings is the left end of the plank rail on the lower side of the bridge, about 15 feet from the water. The channel is nearly straight, the right bank low, and the left bank high and rocky. The bed of the stream shifts slightly. The water empties into Missoula River about 500 yards below the bridge.

Blackfoot River receives the water from the portions of Missoula and Deer Lodge counties between the watersheds of the Mission Range and the main range of the Rocky Mountains. The Clearwater Lakes near

the head waters serve as reservoirs, giving the stream a relatively constant flow. The economic importance of the river is great on account of its rapid fall, the volume of water discharged, and its purity. The principal industrial applications are found near the mouth of the river, where power can be obtained and water used upon adjacent lands for irrigation. The measurements, therefore, at Bonner are particularly valuable. The conditions are favorable for accurate measurement, except for the fact that the height of water is influenced by a dam of the Big Blackfoot Milling Company, located about 1,000 yards above, furnishing water for mills and electric-power stations. The opening and closing of the flood gates of the dam causes abrupt changes in the flow of the stream.

Missoula station on Bitterroot River.—This station is on the Buckhouse wagon bridge, on the main road, 6 miles southwest of Missoula. It was established by Mr. Cyrus C. Babb, and observations were begun on July 6, 1898. The observer is Joe Buckhouse, a farmer living one-half mile from the bridge. Observations are made at 7 a. m. A wire gage is used, with a 5-pound sash weight. The length of the gage wire is 22.83 feet, and the pulley distance—that is, the distance from the zero of the gage to the outside edge of the pulley—is 0.50 feet. A bench mark has been established by the topographers. This consists of a nail in the base of the Northern Pacific Railway sign crossing, 120 feet from the west end of the bridge. This nail is at an elevation of 3,127.6 feet above sea level. It is about 20 feet above the floor of the bridge. The initial point for soundings is directly over the inside edge of the cylindrical casement of the abutment of the bridge, on the upper side at the left hand end. The channel is nearly straight; the right bank low and liable to overflow, the left bank high and rocky. The bed of the stream is of gravel, in which an old pier of a former bridge remains near the center of the stream, causing annoyance in measurements when the water is high. The results obtained at the Buckhouse Bridge, which is near the mouth of the river, are of value mainly in giving the total discharge of the stream. On account of the slight fall water can not be diverted for irrigation for a distance of 25 miles or more above this locality. At a point 10 miles above the station the river is 4 feet lower than the valley around Missoula. The total fall from Hamilton to Missoula, a distance of 48 miles, is about 350 feet. The measurements have a high degree of accuracy since the stream is deep, the current relatively slow, and the fluctuations in height are gradual.

Missoula station on Missoula River.—This station is located at the Higgins Avenue Bridge in Missoula, across the river of that name. It was originally established by Mr. Cyrus C. Babb, and observations were begun on July 10, 1898. The observer is E. S. Newton, a carpenter, whose workshop is on the bank of the river. Observations are made at 7 a. m. and 6 p. m. The gage consists of two rods, one fastened to a pile, the other to planking on one of the piers at the north end

of the bridge. The elevation of the zero is 3,156 feet above sea level, as verified by the topographers of the United States Geological Survey. Bench mark No. 1 consists of a nail in the top of a 10-inch by 10-inch post of the old bridge, 2.5 feet above ground and 36 feet northwestward of the rod, its elevation being 3,170.25 feet above sea level, or 14.25 feet above the zero of the rod. The second bench mark consists of a nail in the piling of the bridge to which the gage rod is fastened; it is opposite the 8-foot mark. On August 10 the gage on the pile at the north end of the bridge was out of water, and the second rod was nailed to the pier of the bridge, about 20 feet from the first. All graduations on the first rod and all gage-height readings have been changed to conform to the second rod.

Soundings and discharge measurements are taken from the railroad bridge, about a mile below. The channel is nearly straight, the banks high, and the bed rocky. During high water the left bank is flooded for some distance above the bridge, and a second stream crosses the bars some 400 feet south of the main channel of the stream. The initial point for soundings is on the right end of the bridge at the edge of the abutment.

Missoula River is one of the most important rivers west of the Rocky Mountains. Its drainage area, including that of Blackfoot River, is 5,960 square miles. In its course to the Columbia the stream bears various names, being locally known as the Hellgate, the Missoula, and finally Clarkes Fork of the Columbia. Where measured at Missoula the flow includes that of the Hellgate and Blackfoot rivers. There is a large extent of arable land along the river at and below Missoula to which water may be brought from this stream. The rapid fall will make the river valuable as a source of power wherever suitable dams can be built. The slimes and tailings from the ore concentrators at Butte and Anaconda render the water turbid and unfit for drinking.

It is proposed to construct a dam across the river 2 miles above Missoula for the diversion of water into a large canal covering portions of the Missoula and Grass valleys, within which are thousands of acres of nearly level land at present unproductive from lack of water. By the construction of such a dam sufficient power can probably be obtained to generate electricity for local needs. Measurements made at Missoula give fairly accurate results and are of considerable importance in discussing projects of this nature.

Lakeside station on Lake Chelan.—A gage on this lake was established by Capt. Charles Johnson at the base of the rock pier on the lake shore north of his house and about one-half mile from the steamboat landing at Lakeside. This consists of a timber 2 inches square and 8 feet high, marked to feet and tenths. Observations were maintained from September 1 to October 15, 1897, at which time they were discontinued until January 1, 1898. This gage is located about 400 feet northwest from the permanent bench mark established by Mr. William

T. Griswold in 1897, consisting of the usual iron post with brass cap, the elevation stamped on the top being 1,121 feet above sea level. The iron post is on the west line of East Center street in the town of Lakeside. In the readings given on page 164 the figures 1,100 should be added to give the elevation above tide.

Capt. Charles Johnson, of Lakeside, Washington, writes concerning Lake Chelan as follows:

This lake is fed by mountain streams which have their sources in the glaciers of the Cascade Mountains, furnishing the lake with water as pure as crystal. The Stehekin River, the main tributary of the lake, finds its source on the very summit of the Cascades in glaciers of great extent and magnificence. The foot of the lake is 3 miles from Columbia River, at an elevation of 360 feet above the river, into which the waters flow through Chelan River. From the foot the lake extends in a northwest direction, penetrating the Cascade Mountains almost to their center, affording a panorama of majestic scenery that is rarely found on the shores of any lake.

At the foot of the lake, and for 25 miles up, it is surrounded with low foothills and good soil, well adapted to farming and horticulture. From thence the mountains rise higher and higher, with almost perpendicular granite walls, until at the head of the lake the mountain peaks stand 8,000 to 10,000 feet above sea level. The lake has now four steamers plying its waters, supplying the many mining camps in the uplake region and affording accommodations to tourists and pleasure seekers. The lake is open to navigation for the whole year. This is due to the great depth of the lake and the mild temperature of the region. The average winter temperature is about 27° to 28° F.

North Yakima station on Naches River.—This station, originally established August 14, 1893, and abandoned in February, 1897, was reestablished on February 1, 1898; and the station at Selah, on the Yakima River, described in the Nineteenth Annual Report, Part IV, pages 477–479, 5 miles above the mouth of the Naches, was discontinued. The observer is Pat. Gallagher, section foreman. Since the reestablishment of the Naches station the river channel has been in a condition more favorable for meter observations than formerly. Discharge measurements are made from the lower side of the highway bridge. A new horizontal gage rod, with wire and weight, has been attached to the main span of the Northern Pacific Railway bridge at the mouth of the Naches, a few hundred feet downstream from the highway bridge. The length of the gage wire from index to foot of weight is 30.41 feet. The pulley distance is 5.844 feet. The elevation of top of pulley is 24.57 feet. The bench mark is the top of the north end of east sill of clearance posts, about 150 feet north of Northern Pacific Railway bridge. Elevation, 23.766 feet. On December 27, 1898, Mr. Arnold connected the highway bridge with this bench mark. The top of the northeast concrete pier was found to be at an elevation of 22.09 feet, and the top of the bridge post at the 150-foot mark, at an elevation of 26.76 feet. The distance from top of post to surface of water has been carefully measured at each discharge measurement, so that the exact river height at the highway bridge is known.

Union Gap station on Yakima River.—Described on page 175 of Paper No. 16; results for 1897 given on pages 479–481 of the Nineteenth Annual Report, Part IV. The old bench mark having been obliterated, a new one has been set. It is the highest point of a large rock mound, 25 feet north of gage and 10 feet east of fence; elevation, 17.52 above zero of gage rod.

Kiona station on Yakima River.—Described on page 176 of Paper No. 17; results for 1897 given on pages 482–486 of the Nineteenth Annual Report, Part IV.

Spokane station on Spokane River.—Described on page 177 of Paper No. 16; results for 1897 given on pages 487–489 of the Nineteenth Annual Report, Part IV.

Whitman station on Wallawalla River.—Described on page 179 of Paper No. 16; results for 1898 given on pages 490–492 of the Nineteenth Annual Report, Part IV.

Gibbon station on Umatilla River.—Described on page 180 of Paper No. 16; results for 1897 given on pages 493, 494 of the Nineteenth Annual Report, Part IV.

Moro station on Deschutes River.—Described on page 181 of Paper No. 16. A measurement was made in 1898 by Sydney Arnold. No rating table was constructed, for lack of sufficient data.

Tucker station on Hood River.—Described on page 181 of Paper No. 16; results for 1897 given on pages 498–500 of the Nineteenth Annual Report, Part IV.

TABLES OF DAILY GAGE HEIGHT.

Daily gage height, in feet, of Portneuf River at Pocatella, Idaho, for 1898.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	7.60	7.30	7.40	6.90	6.60	6.70	6.80	7.10	7.10
2	.....	7.60	7.20	7.50	7.00	6.60	6.65	6.80	7.10	7.10
3	.....	7.70	7.20	7.60	7.00	6.60	6.65	6.80	7.10	7.10
4	.....	7.80	7.20	7.60	6.10	6.60	6.65	6.80	7.10	7.20
5	.....	7.80	7.20	7.60	6.10	6.60	6.65	6.85	7.20	7.20
6	.....	7.80	7.20	7.60	6.10	6.60	6.60	6.85	7.20	7.20
7	.....	8.00	7.30	7.70	6.10	6.60	6.65	6.90	7.20	7.20
8	.....	8.00	7.30	7.90	6.10	6.70	6.70	6.90	7.20	7.20
9	.....	8.00	7.30	7.90	6.10	6.70	6.70	6.90	7.20	7.20
10	.....	8.00	7.30	7.90	6.10	6.70	6.65	6.90	7.10	7.20
11	.....	7.90	7.40	8.00	6.10	6.60	6.65	6.90	7.10	7.20
12	.....	7.80	7.40	7.10	6.20	6.70	6.70	6.90	7.10	7.30
13	.....	7.80	7.40	7.20	6.10	6.70	6.70	6.90	7.10	7.20
14	.....	7.70	7.40	7.30	7.10	6.70	6.70	6.90	7.10	7.10
15	.....	7.60	7.40	7.40	7.00	6.70	6.70	6.90	7.20	7.20
16	6.15	7.50	7.40	7.40	7.10	6.70	6.70	6.90	7.20	7.20
17	.....	7.40	7.40	7.40	6.10	6.60	6.70	6.90	7.20	7.20
18	.....	7.40	7.40	7.50	6.10	6.60	6.70	6.90	7.20	7.20
19	.....	7.40	7.30	7.40	6.20	6.70	6.65	6.90	7.30	7.30
20	.....	7.40	7.20	7.40	6.20	6.60	6.70	6.90	7.30	7.30
21	.....	7.40	7.20	7.30	6.30	6.70	6.70	6.90	7.20	7.40
22	.....	7.30	7.20	7.30	6.20	6.70	6.80	6.90	7.20	7.40
23	.....	7.20	7.30	7.20	6.20	6.65	6.80	7.00	7.20	7.50
24	.....	7.20	7.30	7.20	6.20	6.60	6.80	7.10	7.20	7.60
25	.....	7.20	7.30	7.20	6.20	6.60	6.80	7.20	7.20	7.60
26	.....	7.20	7.40	7.10	6.20	6.60	6.80	7.20	7.20	7.60
27	7.60	7.10	7.30	7.10	6.20	6.60	6.80	7.20	7.20	7.60
28	7.40	7.10	7.40	7.00	6.20	6.70	6.80	7.20	7.20	7.60
29	7.40	7.10	7.30	7.00	6.30	6.70	6.80	7.10	7.10	7.60
30	7.60	7.20	7.30	7.00	6.40	6.75	6.80	7.10	7.10	7.60
31	7.50	.....	7.40	.....	6.70	6.70	.....	7.20	.....	7.60

Daily gage height, in feet, of Snake River at Montgomery, Idaho, for 1898.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	2.90	6.85	8.20	6.30	2.80	1.90	2.20	2.80	2.90
2	.....	2.90	6.60	8.15	5.95	2.70	2.00	2.20	2.80	3.00
3	.....	2.90	6.30	7.75	5.70	2.60	2.10	2.30	2.80	3.00
4	.....	2.90	6.20	7.45	5.35	2.60	2.15	2.30	2.80	3.00
5	.....	2.90	6.25	7.25	5.25	2.55	2.20	2.30	2.80	2.90
6	.....	2.90	6.00	7.15	5.05	2.45	2.20	2.30	2.80	2.65
7	.....	2.90	5.70	6.95	4.90	2.35	2.20	2.30	2.80	3.80
8	.....	2.90	5.45	6.70	4.80	2.30	2.20	2.35	2.80	4.70
9	.....	2.90	5.40	6.35	4.75	2.20	2.20	2.40	2.80	4.45
10	.....	2.90	5.40	6.10	4.65	2.20	2.30	2.40	2.80	4.10
11	.....	3.00	5.40	5.90	4.50	2.10	2.30	2.40	2.80	3.75
12	.....	3.00	5.45	5.85	4.50	2.05	2.30	2.40	2.80	3.30
13	3.20	3.00	5.55	5.90	4.45	2.00	2.30	2.40	2.80	2.90
14	3.20	3.15	5.75	6.00	4.65	2.00	2.30	2.40	2.80	2.65
15	3.10	3.25	5.95	6.30	4.75	1.90	2.30	2.40	2.80	2.60
16	3.10	3.60	6.15	6.65	4.75	1.90	2.30	2.50	2.80	2.60
17	3.10	3.85	6.30	6.85	4.60	1.90	2.30	2.50	2.80	2.70
18	3.00	4.10	6.45	7.05	4.45	1.90	2.30	2.60	2.90	2.80
19	3.00	4.50	6.65	7.25	4.40	1.90	2.20	2.60	2.90	2.90
20	3.00	4.80	6.80	7.45	4.35	1.90	2.20	2.60	2.90	3.00
21	3.00	4.90	6.90	7.60	4.20	1.90	2.20	2.60	3.00	3.05
22	3.00	4.90	7.00	7.75	4.00	1.90	2.20	2.65	3.00	3.20
23	2.90	4.90	6.85	7.90	3.80	1.90	2.20	2.70	3.00	3.20
24	2.80	5.05	6.65	7.80	3.65	1.90	2.20	2.70	3.00	3.10
25	2.70	5.25	6.45	7.70	3.45	1.90	2.20	2.70	2.95	3.00
26	2.80	5.50	6.45	7.65	3.35	1.90	2.20	2.80	2.85	3.10
27	2.90	5.80	6.80	7.55	3.25	1.90	2.20	2.80	2.80	3.20
28	2.90	6.20	7.20	7.30	3.20	1.90	2.20	2.80	2.80	3.35
29	2.90	6.50	7.45	7.00	3.10	1.90	2.20	2.80	2.85	3.30
30	2.90	6.85	7.65	6.60	3.00	1.90	2.20	2.80	2.90	3.35
31	2.90	.....	8.00	.....	2.90	1.90	.....	2.80	.....	3.30

Daily gage height, in feet, of Little Wood River at Toponis, Idaho, for 1898.

y .	Mar.	Apr.	Day.	Mar.	Apr.	Day.	Mar.	Apr.	Day.	Mar.	Apr.
1	.....	3.90	9	.....	.....	17	4.20	.....	25	3.90	.....
2	.....	3.90	10	.....	.....	18	4.20	.....	26	3.80	.....
3	.....	3.90	11	.....	.....	19	4.00	.....	27	3.90	.....
4	.....	3.90	12	.....	.....	20	4.00	.....	28	3.90	.....
5	.....	4.10	13	.....	.....	21	4.00	.....	29	3.90	.....
6	.....	4.10	14	.....	.....	22	4.00	.....	30	3.90	.....
7	.....	.....	15	.....	.....	23	4.00	.....	31	3.90	.....
8	.....	.....	16	.....	.....	24	4.00	.....			

Daily gage height, in feet, of Malad River at Toponis, Idaho, for 1898.

Day.	Mar.	Apr.	May.	June	July.	Aug.	Day.	Mar.	Apr.	May.	June	July.	Aug.
1	.....	2.70	4.00	3.90	4.80	1.50	17	2.80	3.90	3.60	4.20	3.00	.....
2	.....	2.70	4.00	4.10	4.80	1.40	18	2.80	3.90	3.60	4.30	3.00	.....
3	.....	2.70	4.00	4.30	4.00	1.40	19	2.70	4.00	3.60	4.60	3.00	.....
4	.....	2.70	4.00	4.40	4.00	1.30	20	2.70	4.20	3.60	4.50	3.00	.....
5	.....	2.70	4.00	4.60	3.90	1.00	21	2.70	4.20	3.60	4.10	2.80	.....
6	.....	2.60	3.80	4.80	3.70	1.00	22	2.70	4.20	3.60	4.30	2.70	.....
7	.....	2.60	3.60	4.50	3.50	.....	23	2.70	4.10	3.70	4.40	2.50	.....
8	.....	2.60	3.40	4.30	3.40	.....	24	2.70	4.20	3.80	4.80	2.40	.....
9	.....	2.60	3.50	4.20	3.30	.....	25	2.70	4.00	3.90	4.40	2.40	.....
10	.....	2.70	3.20	4.00	3.30	.....	26	2.70	4.60	3.90	4.40	2.40	.....
11	.....	3.00	3.40	4.00	3.20	.....	27	2.70	4.20	3.70	4.40	2.00	.....
12	.....	3.60	3.20	4.10	3.20	.....	28	2.70	4.00	3.70	4.40	2.00	.....
13	2.80	3.90	3.40	4.20	3.10	.....	29	2.70	4.00	3.80	4.70	2.00	.....
14	2.80	4.00	3.50	4.20	3.10	.....	30	2.70	4.00	3.90	4.90	1.80	.....
15	2.80	4.00	3.60	4.30	3.00	.....	31	2.70	.....	3.90	.....	1.70	.....
16	2.80	3.90	3.60	4.30	3.00	.....							

Daily gage height, in feet, of Bruneau River at Grandview, Idaho, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.65	1.55	2.20	1.85	3.10	2.75	1.95	1.15	1.10	1.20	1.40	1.70
2	1.65	1.60	2.40	1.85	3.00	2.70	1.95	1.15	1.10	1.20	1.40	1.75
3	1.65	1.65	2.30	1.90	3.00	2.65	1.90	1.15	1.10	1.20	1.45	1.70
4	1.60	1.65	2.10	2.00	2.95	2.65	1.80	1.15	1.10	1.20	1.45	1.70
5	1.60	1.65	2.10	2.10	2.95	2.65	1.80	1.15	1.10	1.30	1.45	1.65
6	1.65	1.70	2.15	2.00	2.80	2.60	1.80	1.15	1.10	1.30	1.45	1.60
7	1.65	1.75	2.25	2.30	2.75	2.50	1.80	1.15	1.10	1.30	1.45	1.60
8	1.65	1.75	2.30	2.50	2.70	2.45	1.75	1.15	1.10	1.30	1.40	1.50
9	1.65	1.75	2.40	2.35	2.65	2.50	1.75	1.15	1.10	1.25	1.40	1.40
10	1.65	1.75	2.50	2.40	2.65	2.60	1.70	1.10	1.10	1.30	1.40	1.40
11	1.65	1.70	2.30	2.90	2.70	2.60	1.75	1.10	1.10	1.35	1.40	1.35
12	1.50	1.75	2.10	3.10	2.80	2.60	1.70	1.10	1.10	1.35	1.40	1.35
13	1.40	1.80	2.00	3.10	2.85	2.60	1.70	1.10	1.05	1.35	1.40	1.30
14	1.45	1.95	2.00	3.15	2.90	2.70	1.65	1.10	1.05	1.35	1.40	1.30
15	1.45	2.00	1.95	3.25	3.00	2.75	1.65	1.10	1.05	1.35	1.40	1.30
16	1.50	3.20	1.95	3.30	3.05	2.70	1.60	1.10	1.05	1.35	1.40	1.30
17	1.80	3.20	1.90	3.35	3.00	2.75	1.55	1.10	1.05	1.35	1.45	1.35
18	1.80	2.55	1.85	3.30	3.00	2.80	1.55	1.10	1.05	1.35	1.55	1.35
19	1.80	2.10	1.85	3.30	3.10	2.80	1.50	1.10	1.05	1.35	1.55	1.40
20	1.80	2.10	1.90	3.20	3.00	2.80	1.50	1.10	1.05	1.35	1.60	1.40
21	1.80	2.00	1.90	3.15	3.00	2.70	1.55	1.10	1.05	1.35	1.60	1.50
22	1.75	1.95	1.85	3.20	2.85	2.60	1.45	1.10	1.05	1.40	1.55	1.50
23	1.75	1.90	1.80	3.20	2.80	2.50	1.30	1.10	1.05	1.40	1.50	1.50
24	1.70	1.90	1.80	3.15	2.80	2.40	1.30	1.10	1.05	1.40	1.50	1.50
25	1.60	1.85	1.80	3.15	2.75	2.35	1.30	1.10	1.10	1.45	1.50	1.40
26	1.60	1.85	1.85	3.15	2.75	2.30	1.25	1.10	1.10	1.50	1.50	1.45
27	1.50	2.00	1.90	3.25	2.75	2.20	1.25	1.10	1.10	1.50	1.45	1.45
28	1.50	2.00	1.80	3.30	2.80	2.10	1.25	1.10	1.10	1.40	1.50	1.50
29	1.50	.....	1.80	3.20	3.00	2.00	1.25	1.10	1.10	1.40	1.60	1.50
30	1.50	.....	1.85	3.20	3.00	2.00	1.25	1.10	1.10	1.40	1.70	1.50
31	1.50	.....	1.90	.....	2.80	.....	1.20	1.10	.....	1.40	.....	1.50

Daily gage height, in feet, of Boise River at Boise, Idaho, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	1.70	1.60	4.30	3.55	2.60	1.20	1.00	1.00	1.25	1.30
2	.....	.....	1.80	1.70	4.20	3.50	2.50	1.30	1.00	1.05	1.25	1.30
3	1.00	1.00	1.80	1.70	4.20	3.50	2.20	1.20	1.05	1.10	1.30	1.30
4	.....	.....	1.80	1.50	3.90	3.30	2.20	1.20	1.05	1.10	1.30	1.30
5	.....	.....	2.00	1.40	3.40	3.20	2.10	1.20	1.05	1.10	1.25	1.60
6	1.00	.....	2.10	1.50	3.20	3.30	2.20	1.20	1.05	1.10	1.25	1.80
7	.....	1.00	2.10	1.70	3.30	3.10	2.10	1.20	1.05	1.10	1.25	2.00
8	.....	.....	2.00	1.60	3.30	3.00	2.10	1.20	1.05	1.10	1.25	2.30
9	.....	.....	2.00	1.60	3.30	3.10	2.20	1.20	1.05	1.10	1.25	2.20
10	1.00	1.30	2.10	1.90	3.50	3.40	2.20	1.20	1.10	1.20	1.25	2.20
11	.....	.....	2.30	2.00	3.50	3.55	2.10	1.20	1.10	1.25	1.25	2.20
12	.....	.....	2.20	2.20	3.50	3.70	2.20	1.15	1.10	1.20	1.10	2.20
13	1.00	.....	2.10	2.90	3.90	3.90	2.00	1.15	1.10	1.20	1.10	2.20
14	.....	1.40	1.80	3.70	3.90	4.00	2.00	1.15	1.10	1.25	1.10	2.10
15	.....	.....	1.90	3.90	4.00	4.20	1.90	1.10	1.10	1.20	1.10	2.10
16	.....	.....	1.80	4.20	3.95	4.20	1.80	1.10	1.10	1.20	1.10	2.30
17	1.00	1.70	1.70	4.40	3.95	4.20	1.70	1.00	1.10	1.20	1.20	2.30
18	.....	.....	1.70	4.40	3.60	4.10	1.65	1.00	1.05	1.20	1.35	2.30
19	.....	.....	1.70	3.90	3.50	4.10	1.60	1.10	1.00	1.20	1.30	2.30
20	1.00	.....	1.70	3.90	3.60	4.00	1.55	1.10	1.00	1.20	1.35	2.30
21	.....	1.50	1.80	4.00	3.60	4.00	1.50	1.10	1.00	1.20	1.30	2.30
22	.....	.....	1.70	4.00	3.55	4.00	1.45	1.10	1.00	1.20	1.30	2.20
23	.....	.....	1.60	4.00	3.55	4.00	1.40	1.00	1.10	1.25	1.20	2.20
24	1.00	.....	1.50	4.00	3.55	3.90	1.35	1.00	1.05	1.25	1.20	2.20
25	.....	1.50	1.50	4.10	3.55	3.70	1.30	1.00	1.10	1.20	1.20	2.20
26	.....	.....	1.50	4.50	3.60	3.40	1.25	1.00	1.05	1.20	1.20	2.40
27	1.00	.....	1.50	4.50	3.60	3.40	1.20	1.00	1.05	1.25	1.20	2.60
28	.....	1.70	1.50	4.50	3.65	3.00	1.20	1.00	1.05	1.25	1.20	2.60
29	.....	.....	1.60	4.40	4.30	2.90	1.20	1.00	1.10	1.25	1.20	2.40
30	1.00	.....	1.70	4.30	4.00	2.70	1.25	1.05	1.10	1.25	1.25	2.40
31	1.00	.....	1.70	.....	3.75	.....	1.20	1.00	.....	1.25	.....	2.30

Daily gage height, in feet, of Weiser River at Weiser, Idaho, for 1898.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.80	3.60	3.30	1.90	0.70	0.60	0.60	0.85	0.95
2	.....	.90	3.50	3.30	1.90	.60	.60	.60	.85	.95
3	.....	.90	3.40	3.20	1.80	.60	.60	.65	.85	1.20
4	.....	.90	3.30	3.10	1.80	.60	.65	.65	.85	1.95
5	.....	2.00	3.20	3.00	1.70	.50	.60	.70	.85	1.90
6	.....	2.30	3.10	2.90	1.70	.50	.50	.75	.85	2.20
7	.....	2.70	3.10	2.90	1.70	.50	.50	.75	.85	2.30
8	.....	2.70	3.00	2.80	1.60	.50	.50	.80	.85	2.20
9	.....	2.60	3.00	2.80	1.60	.40	.40	.80	.85	2.10
10	.....	2.70	3.00	2.80	1.50	.40	.40	.80	.85	2.00
11	.....	3.10	3.10	2.70	1.50	.40	.40	.80	.90	2.00
12	.....	3.20	3.10	2.70	1.40	.30	.40	.80	.90	2.00
13	2.60	3.30	3.10	2.70	1.40	.30	.40	.80	.90	2.00
14	2.50	3.50	3.10	2.60	1.30	.30	.40	.80	.95	2.00
15	2.40	4.00	3.00	2.60	1.30	.30	.40	.80	.95	2.00
16	2.40	4.30	3.00	2.60	1.20	.30	.40	.80	.95	2.00
17	2.30	4.40	3.00	2.50	1.20	.30	.40	.80	1.10	2.00
18	2.20	4.30	3.00	2.50	1.10	.30	.40	.80	1.00	2.00
19	2.10	3.90	3.00	2.50	1.10	.30	.40	.85	.95	2.00
20	2.00	3.80	2.90	2.40	1.10	.30	.40	.85	.95	2.00
21	1.90	3.70	2.80	2.40	1.00	.20	.40	.85	.95	2.00
22	1.80	3.80	2.80	2.40	1.00	.25	.40	.85	.95	2.00
23	1.70	3.90	2.70	2.30	1.00	.40	.40	.85	.95	2.00
24	1.60	4.00	2.70	2.30	.90	.40	.40	.85	.95	2.00
25	1.50	3.90	2.70	2.30	.90	.40	.40	.85	.95	2.00
26	1.30	4.00	2.80	2.20	.90	.45	.45	.85	.95	2.00
27	1.10	4.40	3.00	2.20	.80	.45	.50	.85	.95	2.00
28	1.00	4.20	3.70	2.10	.80	.50	.50	.85	.95	2.00
29	.90	3.90	3.60	2.10	.80	.50	.60	.85	.95	2.00
30	.80	3.80	3.40	2.00	.70	.50	.60	.85	.95	2.00
31	.80	.....	3.30	.....	.70	.50	.....	.85	.....	2.00

Daily gage height, in feet, of Palouse River at Hooper, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.00	4.20	7.25	6.50	5.65	4.40	2.60	1.95	1.70	1.70	2.10	2.30
2	6.45	4.20	7.35	6.45	5.40	4.20	2.60	1.80	1.70	1.70	2.10	2.35
3	6.05	4.35	7.65	6.83	5.15	4.05	2.60	1.60	1.70	1.70	2.10	2.40
4	5.80	4.50	7.65	6.90	4.95	4.00	2.55	1.65	1.70	1.70	2.05	2.45
5	5.50	4.75	8.15	6.75	4.65	3.90	2.50	1.75	1.65	1.70	2.05	2.50
6	5.50	5.45	8.25	6.88	4.75	3.85	2.50	1.80	1.65	1.75	2.05	2.35
7	5.40	6.20	8.15	7.15	4.90	3.70	2.50	1.80	1.65	1.80	2.05	2.35
8	5.40	7.10	7.85	7.70	4.75	3.65	2.45	1.80	1.70	1.85	2.10	2.30
9	5.25	7.20	7.65	7.85	4.70	3.50	2.45	1.70	1.70	1.85	2.15	2.15
10	4.70	6.40	7.65	7.35	4.50	3.40	2.40	1.70	1.70	1.85	2.20	2.10
11	4.60	5.90	7.35	7.05	4.40	3.30	2.40	1.70	1.70	1.85	2.20	2.05
12	4.70	5.80	7.00	7.25	4.35	3.25	2.35	1.70	1.70	1.85	2.10	2.00
13	4.70	11.00	6.55	7.45	4.30	3.15	2.30	1.65	1.70	1.85	2.10	2.00
14	4.70	12.00	6.40	7.15	4.25	3.10	2.25	1.60	1.70	1.85	2.10	2.00
15	4.70	13.00	6.35	7.10	4.25	3.10	2.20	1.60	1.70	1.80	2.05	2.00
16	4.60	13.99	6.30	7.40	4.20	3.05	2.20	1.65	1.70	1.80	2.05	2.00
17	4.60	13.29	6.30	7.80	4.15	3.05	2.20	1.75	1.70	1.80	2.05	1.95
18	4.70	12.54	6.15	7.75	4.05	3.05	2.20	1.80	1.70	1.80	2.10	2.00
19	4.90	10.84	6.00	7.40	3.95	3.00	2.20	1.90	1.70	1.85	2.15	2.00
20	4.70	9.54	5.90	7.00	3.95	3.00	2.20	1.80	1.70	1.90	2.15	2.15
21	4.50	9.14	5.90	6.53	3.90	3.00	2.20	1.80	1.70	1.85	2.20	2.30
22	4.45	8.85	5.85	6.45	3.85	2.95	2.20	1.70	1.70	1.85	2.35	2.20
23	4.35	8.55	5.45	6.45	3.75	2.90	2.20	1.70	1.70	1.85	2.40	2.30
24	4.00	8.15	5.30	6.55	3.70	2.80	2.20	1.70	1.70	1.85	2.50	2.40
25	4.10	7.95	5.40	6.65	3.65	2.75	2.15	1.70	1.70	2.00	2.45	2.30
26	4.15	7.65	5.55	6.55	3.65	2.75	2.15	1.70	1.70	2.00	2.35	2.35
27	4.15	7.35	5.30	6.30	4.05	2.75	2.10	1.70	1.70	2.05	2.30	2.40
28	4.20	7.25	5.30	6.35	4.05	2.70	2.05	1.70	1.70	2.05	2.20	2.50
29	4.10	.....	5.30	6.40	4.00	2.60	2.05	1.70	1.70	2.05	2.20	2.70
30	4.10	.....	5.40	6.10	4.35	2.60	2.00	1.70	1.70	2.05	2.25	2.90
31	4.25	.....	5.70	.....	4.40	.....	1.95	1.70	.....	2.10	.....	2.70

Daily gage height, in feet, of Blackfoot River at Bonner, Montana, for 1898.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	------	1.80	.95	.90	.85	.80	17	2.75	1.30	.95	.85	.85	--------
2	------	1.85	1.15	1.10	.85	.80	18	2.65	1.25	.90	.95	.85	--------
3	------	1.70	1.15	.90	.80	.75	19	2.60	1.30	.95	1.00	.90	--------
4	------	1.60	1.05	.85	.95	.70	20	2.45	1.30	.90	1.25	.80	--------
5	------	1.50	1.05	.95	.90	.75	21	2.40	1.25	.90	1.00	.75	--------
6	------	1.60	1.10	.85	1.25	1.30	22	2.35	1.25	1.00	1.25	.80	--------
7	4.00	1.60	1.05	.70	1.00	.90	23	2.25	1.20	1.05	.85	.75	--------
8	3.65	1.60	1.10	.70	.75	1.40	24	2.25	1.20	1.25	1.25	.80	--------
9	3.50	1.50	1.05	.80	.85	1.40	25	2.20	1.15	1.05	1.20	.85	--------
10	3.45	1.55	1.00	.80	.90	3.40	26	2.15	1.15	1.05	1.40	.85	--------
11	3.35	1.50	.95	.65	.95	(a)	27	2.05	1.20	1.05	1.05	.70	--------
12	3.25	1.70	.95	1.15	.90	(a)	28	1.95	1.20	1.00	1.40	.80	--------
13	3.05	1.40	1.05	.75	.90	(a)	29	1.95	1.05	.95	1.10	.90	--------
14	3.00	1.40	1.05	1.15	.95	(a)	30	1.90	1.05	.85	1.05	.70	--------
15	2.95	1.25	1.15	1.10	.95	(a)	31	1.80	1.05	------	1.35	------	--------
16	2.85	1.30	1.00	.85	.85	--------							

a Ice.

Daily gage height, in feet, of Bitterroot River at Missoula, Montana, for 1898.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	------	2.45	1.40	1.50	1.75	1.60	17	4.00	1.60	1.35	1.85	1.55	--------
2	------	2.30	1.50	1.45	1.75	1.60	18	3.80	1.60	1.30	1.80	1.60	--------
3	------	2.25	1.70	1.45	1.75	1.50	19	3.60	1.60	1.25	1.80	1.75	--------
4	------	2.15	1.70	1.50	1.75	1.40	20	3.40	1.60	1.20	1.75	1.70	--------
5	------	2.10	1.75	1.45	1.80	1.40	21	3.20	1.45	1.15	1.70	1.70	--------
6	5.40	2.00	1.70	1.45	1.80	1.40	22	3.10	1.40	1.20	1.65	1.55	--------
7	5.15	1.95	1.65	1.45	1.85	1.80	23	3.00	1.45	1.35	1.85	1.65	--------
8	4.90	1.90	1.60	1.45	1.85	2.00	24	3.10	1.45	1.35	1.85	1.70	--------
9	4.75	1.85	1.55	1.45	1.85	2.30	25	2.90	1.40	1.40	1.85	1.65	--------
10	4.75	1.85	1.50	1.45	1.80	2.30	26	2.85	1.40	1.45	1.85	1.60	--------
11	4.70	1.75	1.45	1.50	1.75	--------	27	2.80	1.35	1.50	1.85	1.60	--------
12	4.65	1.75	1.45	1.60	1.70	--------	28	2.65	1.35	1.45	1.85	1.60	--------
13	4.65	1.60	1.40	1.55	1.65	--------	29	2.60	1.35	1.45	1.90	1.55	--------
14	4.50	1.60	1.35	1.55	1.65	--------	30	2.55	1.30	1.45	1.80	1.55	--------
15	4.40	1.60	1.35	1.55	1.55	--------	31	2.50	1.35	------	1.80	------	--------
16	4.20	1.60	1.35	1.85	1.55	--------							

Daily gage height, in feet, of Missoula River at Missoula, Montana, for 1898.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	------	3.45	2.75	2.75	2.75	2.65	17	4.53	2.85	2.73	2.75	2.60	--------
2	------	3.40	2.80	2.75	2.75	2.65	18	4.45	2.85	2.70	2.75	2.68	--------
3	------	3.35	2.80	2.75	2.75	2.65	19	4.38	2.85	2.68	2.78	2.70	--------
4	------	3.28	2.80	2.75	2.75	2.65	20	4.23	2.85	2.65	2.80	(a)	--------
5	------	3.23	2.80	2.75	2.78	(a)	21	4.08	2.80	2.65	2.75	(a)	--------
6	------	3.20	2.85	2.75	2.80	(a)	22	3.95	2.80	2.73	2.75	(a)	--------
7	------	3.18	2.80	2.75	2.75	(a)	23	3.95	2.80	2.75	2.78	(a)	--------
8	------	3.13	2.80	2.75	2.75	(a)	24	4.00	2.80	2.75	2.80	2.75	--------
9	------	3.05	2.80	2.75	2.70	(a)	25	3.95	2.78	2.75	2.83	2.75	--------
10	5.28	3.05	2.80	2.75	2.70	(a)	26	3.90	2.75	2.70	2.80	2.75	--------
11	5.13	3.00	2.75	2.90	2.70	--------	27	3.75	2.75	2.70	2.80	2.75	--------
12	4.98	2.95	2.75	2.83	2.65	--------	28	3.68	2.75	2.70	2.80	2.75	--------
13	4.85	2.90	2.75	2.75	2.65	--------	29	3.60	2.70	2.75	2.80	2.75	--------
14	4.80	2.90	2.75	2.75	2.65	--------	30	3.53	2.70	2.75	2.80	2.75	--------
15	4.73	2.88	2.75	2.75	2.60	--------	31	3.50	2.73	------	2.80	------	--------
16	4.63	2.85	2.75	2.75	2.60	--------							

a Ice.

Daily gage height, in feet, of Lake Chelan, Lakeside, Washington, for 1897.

Day.	Sept.	Oct.	Day.	Sept.	Oct.	Day.	Sept.	Oct.	Day.	Sept.	Oct.
1	8.15	7.18	8	7.90	7.05	15	7.40	--------	22	7.33	--------
2	8.10	7.15	9	7.95	7.03	16	7.38	--------	23	7.32	--------
3	8.65	7.15	10	7.90	7.02	17	7.35	--------	24	7.30	--------
4	8.70	7.12	11	7.65	--------	18	7.33	--------	25	7.30	--------
5	8.00	7.10	12	7.55	--------	19	7.35	--------	26	7.28	--------
6	8.10	7.08	13	7.50	7.00	20	7.33	--------	27	7.25	--------
7	8.00	7.07	14	7.45	7.00	21	7.33	--------	30	7.20	--------

Daily gage height, in feet, of Lake Chelan at Lakeside, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.40	6.70	7.35	7.05	8.50	11.35	11.05	9.70	8.40	7.45	7.00	6.65
2	7.40	6.70	7.35	7.05	8.60	11.20	11.00	9.70	8.35	7.40	7.00	6.60
3	7.35	6.75	7.35	7.10	8.75	11.15	10.90	9.65	8.25	7.30	6.95	6.60
4	7.30	6.75	7.40	7.10	8.90	11.00	10.90	9.65	8.15	7.25	6.95	6.60
5	.....	6.75	7.40	7.15	9.05	10.90	10.85	9.65	8.10	7.20	6.90	6.60
6	.....	6.80	7.40	7.15	9.20	10.85	10.80	9.60	8.00	7.15	6.95	6.65
7	7.20	6.80	7.45	7.20	9.40	11.05	10.80	9.60	7.95	7.10	6.95	6.65
8	7.20	6.80	7.45	7.20	9.50	11.25	10.75	9.60	7.90	7.10	7.00	6.70
9	7.15	6.85	7.45	7.25	9.60	11.40	10.70	9.55	7.90	7.15	7.05	6.70
10	7.10	6.85	7.50	7.25	9.65	11.90	10.70	9.50	7.85	7.15	7.00	6.70
11	7.10	6.90	7.50	7.30	9.75	12.00	10.65	9.45	7.80	7.10	7.00	6.75
12	.....	6.90	7.50	7.30	9.80	12.20	10.70	9.40	7.80	7.10	6.95	6.75
13	7.05	6.90	7.45	7.35	9.90	12.30	10.80	9.40	7.85	7.15	6.95	6.75
14	7.00	6.95	7.45	7.40	10.05	12.40	10.85	9.35	7.85	7.20	6.90	6.75
15	7.00	6.95	7.40	7.40	10.25	12.50	10.75	9.30	7.80	7.20	6.90	6.80
16	6.95	7.00	7.40	7.45	10.50	12.40	10.60	9.20	7.75	7.15	6.90	6.80
17	6.90	7.05	7.35	7.55	10.90	12.45	10.50	9.10	7.70	7.15	6.85	6.80
18	.....	7.05	7.35	7.65	11.15	12.30	10.35	9.05	7.70	7.10	6.85	6.80
19	6.85	7.10	7.30	7.75	11.30	12.35	10.25	9.00	7.75	7.10	6.80	6.80
20	6.80	7.10	7.30	7.80	11.30	12.45	10.15	8.95	7.75	7.15	6.80	6.85
21	.....	7.15	7.25	7.85	11.35	12.20	10.05	8.90	7.70	7.15	6.80	6.85
22	.....	7.20	7.25	7.90	11.25	12.20	9.95	8.85	7.70	7.20	6.75	6.85
23	.....	7.20	7.25	7.95	11.20	12.15	9.90	8.80	7.70	7.25	6.75	6.90
24	6.70	7.25	7.20	8.00	11.05	12.05	9.85	8.80	7.65	7.25	6.70	6.90
25	6.65	7.25	7.20	8.10	11.00	10.00	9.85	8.75	7.65	7.20	6.70	6.90
26	6.65	7.25	7.15	8.15	10.95	11.95	9.80	8.70	7.65	7.20	6.75	6.95
27	6.60	7.30	7.15	8.20	11.25	11.90	9.80	8.65	7.60	7.15	6.75	6.95
28	6.60	7.30	7.10	8.25	11.30	11.80	9.75	8.60	7.60	7.10	6.70	7.00
29	6.65	.....	7.10	8.35	11.35	11.50	9.75	8.55	7.55	7.10	6.65	7.05
30	6.65	.....	7.10	8.40	11.45	11.15	9.75	8.55	7.50	7.05	6.65	7.05
31	6.70	.....	7.05	.....	11.45	.....	9.70	8.50	.....	7.05	.....	7.05

Daily gage height, in feet, of Naches River at North Yakima, Washington, for 1898.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.0	5.30	4.70	.....	6.40	5.70	4.70	4.00	3.90	4.00	4.00
2	.....	5.30	4.70	7.10	6.30	5.80	4.70	4.00	.....	4.00	4.00
3	.....	5.30	.....	7.10	6.20	.....	4.70	4.00	3.90	4.10	4.00
4	.....	5.40	4.70	7.10	6.20	5.90	4.60	.....	3.90	4.20	.....
5	.....	5.40	4.80	6.90	.....	5.90	4.60	3.90	3.90	4.30	3.90
6	.....	.....	5.00	6.90	6.70	5.80	4.50	3.90	3.90	.....	3.80
7	4.8	5.50	5.20	6.90	7.00	5.60	.....	3.90	3.90	4.30	3.80
8	.....	5.50	5.20	.....	7.00	5.50	4.40	3.90	3.90	4.20	3.70
9	.....	5.50	5.20	6.90	7.00	5.50	4.40	3.90	.....	4.20	3.70
10	.....	5.40	.....	6.90	7.60	.....	4.40	3.90	3.90	4.20	3.70
11	.....	5.40	5.40	7.40	7.70	5.50	4.40	.....	3.90	4.10	.....
12	.....	5.30	5.60	7.40	.....	5.60	4.40	3.90	4.00	4.10	3.70
13	.....	.....	5.80	7.40	7.20	5.60	4.30	3.90	4.00	.....	3.70
14	.....	5.30	6.20	7.40	7.10	5.50	.....	3.90	4.10	4.00	3.80
15	8.30	5.20	6.50	.....	7.10	5.30	4.30	3.90	4.20	4.00	3.90
16	.....	5.10	6.60	7.40	7.40	5.10	4.20	3.90	.....	4.00	3.90
17	.....	5.10	.....	8.10	7.40	.....	4.10	3.90	4.50	4.00	3.90
18	.....	5.00	6.40	8.10	6.90	5.10	4.10	.....	4.50	4.30	.....
19	.....	5.00	6.30	7.90	.....	5.10	4.10	3.90	4.30	4.40	3.90
20	.....	.....	6.20	7.30	7.00	5.10	4.10	3.90	4.30	.....	3.90
21	.....	4.90	6.20	6.90	6.70	4.90	.....	3.90	4.20	4.40	3.90
22	5.90	4.80	6.20	.....	6.40	4.90	4.10	4.10	4.20	4.30	3.80
23	.....	4.70	6.20	6.50	6.20	4.80	4.00	4.30	.....	4.30	3.80
24	.....	4.60	.....	6.50	6.20	.....	4.00	4.30	4.10	4.20	3.70
25	.....	4.60	6.70	6.60	6.20	4.80	4.00	.....	4.10	4.20	.....
26	.....	4.60	7.20	6.70	.....	4.80	4.00	4.20	4.10	4.20	3.90
27	.....	.....	7.30	6.90	6.10	4.80	4.00	4.10	4.10	.....	4.50
28	.....	4.60	7.30	7.10	5.90	4.80	.....	4.10	4.10	4.20	5.90
29	.....	4.60	7.20	.....	5.80	4.70	4.00	3.90	4.10	4.20	5.90
30	.....	4.60	7.20	6.80	5.70	4.70	4.00	3.90	.....	4.10	5.60
31	.....	4.70	.....	6.50	.....	.....	4.00	.....	4.00	.....	5.10

Daily gage height, in feet, of Yakima River at Union Gap, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.00	5.20	7.00	6.00	8.80	7.80	6.90	5.50	4.40	4.60	4.80	5.20
2	7.70	5.20	7.00	6.00	8.80	8.00	6.80	5.40	4.40	4.60	4.80	5.20
3	7.40	5.20	7.00	6.00	8.80	7.80	6.80	5.30	4.40	4.60	4.90	5.10
4	7.20	5.20	7.10	6.10	9.20	7.60	7.00	5.30	4.40	4.70	5.10	5.10
5	7.00	5.20	7.50	6.10	9.20	7.60	6.70	5.30	4.40	4.60	5.30	5.10
6	6.80	5.80	7.60	6.30	9.20	8.00	6.80	5.20	4.40	4.60	5.30	4.90
7	6.60	6.00	7.60	6.60	9.00	8.60	6.70	5.10	4.30	4.60	5.30	4.80
8	6.50	6.20	7.30	6.60	9.00	9.00	6.60	5.10	4.30	4.60	5.70	4.70
9	6.40	6.10	7.20	6.60	8.00	9.30	6.50	5 10	4.30	4.60	5.70	4.70
10	6.20	6.10	7.10	6.70	8.50	9.50	6.40	5.10	4.30	4.60	5.60	4.60
11	6.10	6.00	7.10	7.10	9.10	9.70	6.50	5.00	4.30	4.60	5.50	4.60
12	6.10	6.00	7.00	7.20	9.20	9.20	6.50	5.00	4.30	4.60	5.40	4.60
13	6 00	5.90	6.90	7.30	9.40	9.10	6.50	4.90	4.30	4.70	5.20	4.70
14	5.90	9.00	6.80	7.80	9.40	9.10	6.50	4.80	4.30	4.20	5.20	4.70
15	5.90	11.10	6.80	7.20	9.70	9.00	6.50	4.80	4.20	4.20	5.20	4.70
16	5.90	10 80	6.70	7.20	10.00	9.10	6.50	4.80	4.20	5.20	5.10	4.80
17	5.80	10.10	6.60	8.20	10.20	8.70	6.20	4.70	4.20	5.20	5.10	4.80
18	5.70	9.30	6.50	8.20	10.40	8.50	6.10	4.70	4.30	5.20	5.60	4.70
19	5.70	8.60	6.40	8.00	10.20	8.50	6.00	4.70	4.30	5.20	5.80	4.70
20	5.60	8.60	6.40	7.90	9.60	8.60	6.00	4.60	4.30	5.20	5.80	4.70
21	5.60	8.10	6.40	7.80	9.10	8.50	5.90	4.60	4.40	5.10	5.70	4.60
22	5.60	7.80	6.30	7.80	9.00	8.30	5.80	4.60	4.40	5.00	5.60	4.60
23	5.50	7.60	6.30	7.80	8.50	7.80	5.70	4.60	4.50	5.00	5.50	4.60
24	5.50	7.40	6.20	8.20	8.20	7.60	5.60	4.50	4.50	5.00	5.40	4.60
25	5.50	7.20	6.20	8.20	8.10	7.60	5.60	4.50	4.50	4.90	5.30	4.60
26	5.40	7.10	6.10	8.80	8.10	7.50	5.50	4.50	4.50	4.90	5.30	4.50
27	5.40	7.00	6.10	9.10	8.10	7.40	5.50	4.50	4.50	4.80	5.20	4.50
28	5.40	7.00	6.00	9.00	8.70	7.30	5.50	4.50	4.50	4.80	5.20	6.80
29	5.30	.....	6.00	8.90	9.00	7.20	5.50	4.40	4.50	4.80	5.30	8.50
30	5.30	.....	5.90	9.00	8.60	7.00	5.50	4.40	4.50	4.80	5.20	7.80
31	5.30	.....	5.90	.....	8.30	.....	5.50	4.40	.....	4.80	.....	7.30

Daily gage height, in feet, of Yakima River at Kiona, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	10.15	5.60	7.72	6.10	10.18	9.10	7.25	5.19	.....	4.18	4.56	5.05
2	9.55	5.50	7.72	6.19	10.10	8.95	7.10	5.20	4.02	4.21	4.51	5.00
3	9.00	5.46	7.73	.....	10.00	8.73	.....	5.14	4.00	4.25	4.56	5.00
4	8.55	5.35	.....	6.15	10.08	8.50	.....	5.10	3.95	4.27	4.68	4.96
5	8.20	5.32	7.85	6.15	10.45	8.38	.....	5.17	3.90	4.30	4.96	4.90
6	7.90	5.60	7.98	.....	10.55	8.61	.....	5.03	3.95	4.31	4.95	4.85
7	7.60	6.05	8.02	6.50	.....	9.23	.....	5.04	3.92	4.33	5.32	4.60
8	7.35	6.72	8.15	6.82	10.23	9.79	7.05	4.90	3.90	4.29	5.40	4.53
9	7.10	6.80	8.18	6.82	9.85	10.19	6.71	4.88	3.87	4.25	5.56	4.20
10	6.90	6.60	7.98	6.76	9.66	10.50	6.67	4.82	3.84	4.20	5.50	4.40
11	6.60	6.60	7.91	6.85	10.08	10.72	.....	4.80	.....	4.22	5.41	4.40
12	6.50	6.70	7.75	6.90	10.51	10.90	6.68	4.75	.....	4.24	5.34	4.35
13	6.50	6.72	7.82	7.00	10.75	10.56	6.66	.....	3.79	4.30	5.24	4.05
14	6.45	6.75	7.75	7.61	10.78	10.13	6.55	.....	3.76	4.35	5.12	4.10
15	6.30	11.25	.....	8.32	10.83	10.02	6.54	.....	3.78	4.35	5.04	4.15
16	6.20	12.45	7.42	8.95	.....	10.17	6.40	4.43	3.78	4.60	4.94	4.40
17	6.12	13.27	7.30	9.20	.....	10.14	6.29	4.34	3.77	4.93	4.95	4.45
18	6.04	13.21	7.15	9.21	12.00	9.76	6.17	4.29	3.74	4.95	4.90	4.64
19	6.00	12.07	6.93	9.05	12.10	9.45	6.05	4.27	3.71	5.00	5.22	4.75
20	5.95	10.92	6.93	8.95	11.85	9.65	6.03	4.26	3.69	5.02	5.50	4.60
21	5.90	10.10	6.82	8.75	10.80	9.50	5.98	.....	3.76	4.93	5.56	4.56
22	5.85	9.62	6.73	8.65	10 20	9.15	5.78	4.20	3.78	4.86	5.60	4.50
23	5.80	9.20	6.64	8.62	9.82	8.60	5.69	4.17	3.80	4.88	5.50	4.45
24	5.75	8.72	6.50	8 82	9.60	8.37	5.67	4.16	3.84	4.72	5.40	4.40
25	5.70	8.46	6.53	9.00	9.36	8.26	5.52	4.17	3.80	4.68	5.25	4.44
26	5.10	8.33	6.47	9.45	9.06	8.20	5.50	4.13	3.84	4.63	5.20	4.45
27	5.20	7.98	6.38	10.20	9.50	7.94	5.46	4.10	3.87	4.60	5.15	4.75
28	5.15	7.76	6.28	10.29	10.02	7.82	5.44	4.10	3.90	4.57	5.10	4.90
29	5.10	.....	6.18	10.23	10.08	7.62	5.42	4.08	4.00	4.53	5.15	7.50
30	5.35	.....	6.14	10.18	9.80	7.42	5.33	4.04	4.10	4.56	5.10	8.50
31	5.52	.....	6.10	.....	9.51	.....	5.24	4.01	.....	4.54	.....	8.15

Daily gage height, in feet, of Spokane River at Spokane, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.60	3.00	6.70	4.35	10.40	9.90	5.85	2.95	2.00	1.75	1.95	2.20
2	5.70	3.00	6.60	4.30	10.40	9.85	5.70	2.90	2.00	1.75	2.00	2.20
3	5.70	2.90	6.50	4.25	10.35	9.80	5.50	2.85	2.00	1.75	2.00	2.20
4	5.65	2.90	6.40	4.20	10.25	9.65	5.40	2.80	1.90	1.75	2.05	2.15
5	5.60	2.95	6.45	4.25	10.10	9.40	5.25	2.75	1.90	1.75	2.10	2.15
6	5.45	2.95	6.55	4.30	10.10	9.25	5.10	2.70	1.85	1.75	2.10	2.15
7	5.35	3.00	6.60	4.45	9.95	9.10	4.95	2.70	1.80	1.75	2.15	2.10
8	5.25	3.20	6.65	4.60	9.90	9.00	4.80	2.65	1.80	1.75	2.15	2.10
9	5.10	3.50	6.70	4.75	9.75	8.85	4.70	2.60	1.80	1.80	2.20	2.10
10	5.00	3.90	6.70	4.90	9.60	8.80	4.55	2.55	1.80	1.75	2.20	2.05
11	4.90	4.10	6.70	5.10	9.40	8.75	4.45	2.50	1.80	1.75	2.25	2.00
12	4.70	4.30	6.65	5.30	9.40	8.65	4.40	2.50	1.80	1.75	2.25	2.00
13	4.60	4.50	6.60	5.50	9.45	8.60	4.30	2.45	1.80	1.75	2.25	2.00
14	4.50	4.65	6.50	5.70	9.55	8.50	4.20	2.40	1.80	1.75	2.25	1.95
15	4.40	5.40	6.40	6.10	9.60	8.45	4.15	2.35	1.80	1.75	2.25	1.95
16	4.30	6.40	6.30	6.50	9.70	8.40	4.00	2.35	1.80	1.80	2.25	1.95
17	4.20	7.10	6.10	7.10	9.80	8.20	3.90	2.30	1.80	1.85	2.20	1.90
18	4.10	7.80	6.00	7.50	9.95	8.00	3.85	2.30	1.80	1.85	2.20	1.90
19	4.00	8.20	5.90	7.70	10.10	7.90	3.80	2.25	1.80	1.85	2.20	1.90
20	4.00	8.20	5.80	7.90	10.20	7.80	3.70	2.20	1.80	1.85	2.20	1.90
21	3.90	8.10	5.50	8.10	10.10	7.60	3.65	2.20	1.80	1.90	2.20	1.90
22	3.80	8.10	5.50	8.20	10.00	7.40	3.55	2.20	1.75	1.90	2.25	1.99
23	3.70	7.80	5.40	8.40	9.80	7.25	3.50	2.20	1.75	1.90	2.25	1.90
24	3.60	7.60	5.20	8.60	9.55	7.05	3.40	2.20	1.75	1.90	2.25	1.90
25	3.50	7.50	5.10	8.75	9.40	6.95	3.30	2.15	1.75	1.90	2.25	1.90
26	3.40	7.30	5.00	8.80	9.20	6.80	3.30	2.10	1.75	1.90	2.25	1.90
27	3.35	7.10	4.90	9.15	9.15	6.60	3.20	2.10	1.75	1.90	2.25	1.90
28	3.30	6.80	4.80	9.60	9.15	6.40	3.15	2.05	1.75	1.90	2.25	1.90
29	3.20	.....	4.65	10.15	9.30	6.15	3.10	2.00	1.75	1.95	2.20	2.00
30	3.15	.....	4.50	10.30	9.60	5.95	3.05	2.00	1.75	1.95	2.20	2.20
31	3.05	.....	4.40	.....	9.80	.....	3.00	2.00	.....	1.95	.....	2.35

Daily gage height, in feet, of Wallawalla River at Whitman, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.85	2.00	2.88	2.50	3.28	2.25	1.20	1.05	1.10	1.30	1.50	1.80
2	2.68	2.00	2.80	2.80	3.23	2.20	1.20	1.05	1.10	1.30	1.50	1.90
3	2.70	2.00	2.75	2.80	3.13	2.20	1.20	1.05	1.10	1.35	1.50	1.90
4	2.63	2.05	2.75	2.80	3.05	2.15	1.20	1.03	1.15	1.35	1.50	1.88
5	2.50	2.10	2.68	3.20	2.98	2.10	1.20	1.00	1.15	1.35	1.50	1.80
6	2.75	2.60	2.60	3.85	2.88	2.05	1.20	1.00	1.20	1.35	1.50	1.65
7	2.90	3.10	2.68	3.63	2.75	2.00	1.15	1.00	1.20	1.40	1.50	1.63
8	2.93	3.80	2.78	3.38	2.70	1.95	1.15	1.00	1.20	1.40	1.50	1.60
9	2.90	3.32	2.68	3.25	2.65	1.88	1.15	1.00	1.20	1.40	1.50	1.60
10	2.73	2.95	2.58	3.60	2.60	1.73	1.15	1.00	1.15	1.40	1.50	1.55
11	2.63	2.80	2.48	3.53	2.63	1.65	1.15	1.00	1.15	1.40	1.50	1.55
12	2.55	2.88	2.45	3.73	2.68	1.65	1.15	1.00	1.15	1.45	1.50	1.50
13	2.50	3.08	2.45	3.80	2.58	1.65	1.15	1.00	1.10	1.45	1.50	1.50
14	2.45	4.23	2.40	3.80	2.50	1.65	1.15	1.00	1.10	1.45	1.50	1.50
15	2.43	4.85	2.35	3.75	2.45	1.65	1.15	1.00	1.10	1.45	1.50	1.50
16	2.40	4.75	2.30	3.63	2.43	1.65	1.15	1.00	1.13	1.45	1.50	1.50
17	2.35	4.00	2.23	3.55	2.40	1.65	1.15	1.00	1.13	1.45	1.55	1.50
18	2.30	4.18	2.20	3.33	2.35	1.63	1.10	1.00	1.13	1.45	1.55	1.50
19	2.30	3.18	2.20	3.20	2.35	1.60	1.10	1.00	1.15	1.45	1.63	1.58
20	2.35	3.00	2.18	3.35	2.30	1.55	1.10	1.00	1.15	1.45	1.75	1.75
21	2.35	3.05	2.10	3.53	2.25	1.50	1.10	1.00	1.15	1.45	1.83	1.75
22	2.38	2.90	2.05	3.65	2.43	1.45	1.10	1.00	1.20	1.45	1.90	1.75
23	2.18	2.70	2.05	3.60	2.33	1.40	1.10	1.00	1.20	1.45	1.90	1.95
24	2.00	2 68	2.10	3.55	2.25	1.35	1.10	1.05	1.20	1.45	1.90	2.13
25	2.00	2.63	2.05	3.55	2.25	1.30	1.10	1.05	1.25	1.45	1.90	2.25
26	2.00	2.55	2.05	4.40	2.28	1.25	1.10	1.10	1.25	1.45	1.80	2.40
27	2.00	2.50	2.05	4.10	2.45	1.20	1.10	1.10	1.25	1.50	1.80	2.78
28	2.00	2.73	2.05	3.83	2.58	1.20	1.10	1.10	1.25	1.50	1.80	3.40
29	2.08	.....	2.05	3.63	2.53	1.20	1.08	1.10	1.25	1.50	1.80	3.73
30	2.00	.....	2.05	3.30	2.43	1.25	1.05	1.10	1.25	1.50	1.80	3.55
31	2.00	.....	2.25	.....	2.33	.....	1.05	1.10	.....	1.50	.....	3.20

Daily gage height, in feet, of Umatilla River at Gibbon, Oregon, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.70	1.10	2.25	1.80	2.85	1.85	0.55	0.30	0.20	0.30	0.45	1.40
2	2.50	1.30	2.35	2.30	2.75	1.70	.55	.25	.20	.30	.45	1.30
3	2.20	1.30	2.35	2.50	2.65	1.60	.55	.25	.20	.30	.45	1.20
4	2.00	1.70	2.50	2.60	2.45	1.50	.55	.25	.20	.30	.55	1.00
5	1.90	2.10	2.55	3.10	2.45	1.45	.50	.25	.20	.30	.50	.90
6	2.10	2.40	2.55	3.15	2.30	1.40	.50	.25	.20	.30	.50	.85
7	2.00	2.30	3.00	3.30	2.25	1.30	.50	.25	.20	.30	.45	.80
8	2.00	2.15	3.10	3.30	2.15	1.30	.50	.25	.20	.30	.45	.70
9	2.00	2.10	3.00	3.20	2.10	1.20	.45	.25	.20	.30	.50	.65
10	1.90	2.10	2.60	3.50	2.10	1.15	.45	.25	.20	.30	.50	.60
11	1.85	2.10	2.40	3.20	2.05	1.10	.45	.25	.20	.35	.50	.60
12	1.80	2.40	2.30	3.30	2.00	1.05	.45	.20	.20	.35	.50	.55
13	1.60	2.65	2.15	3.60	1.95	1.05	.45	.20	.20	.35	.50	.50
14	1.60	5.60	2.05	4.30	1.95	1.00	.45	.20	.20	.35	.55	.50
15	1.50	5.15	1.85	4.30	1.90	1.00	.45	.20	.20	.35	.55	.45
16	1.50	4.70	1.85	4.00	1.95	.95	.45	.20	.20	.35	.55	.50
17	1.45	3.65	1.80	3.65	1.90	.90	.45	.20	.20	.35	.60	.55
18	1.40	2.80	1.75	3.40	1.80	.85	.40	.20	.20	.35	.65	.60
19	1.40	2.55	1.75	3.20	1.65	.85	.40	.20	.20	.35	.80	.70
20	1.40	2.25	1.70	3.20	1.50	.80	.40	.20	.20	.35	.80	.80
21	1.35	2.25	1.65	3.25	1.40	.75	.40	.20	.20	.35	.80	.80
22	1.35	2.15	1.65	3.20	1.60	.70	.40	.20	.20	.35	.80	.80
23	1.35	2.10	1.65	3.40	1.55	.70	.40	.20	.30	.35	.85	.80
24	1.30	2.00	1.60	3.45	1.40	.70	.35	.20	.30	.35	.85	.75
25	1.25	1.90	1.60	4.00	1.30	.65	.35	.20	.25	.35	.80	.85
26	1.25	1.90	1.55	3.80	1.40	.65	.35	.20	.25	.40	.75	.90
27	1.20	1.90	1.55	3.40	1.65	.60	.35	.20	.25	.40	.75	1.60
28	1.15	2.00	1.55	3.10	1.80	.60	.35	.20	.30	.40	.75	3.00
29	1.15	.....	1.55	3.00	2.00	.60	.30	.20	.30	.40	.80	2.40
30	1.10	.....	1.50	2.90	1.90	.55	.30	.20	.30	.45	.90	1.90
31	1.10	.....	1.60	.....	1.90	.....	.30	.20	.....	.45	.....	1.75

Daily gage height, in feet, of Deschutes River at Moro, Oregon, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.90	2.20	2.70	2.00	2.70	2.30	2.00	1.70	1.60	1.60	1.50	1.70
2	2.70	2.20	2.80	2.10	2.70	2.30	2.00	1.70	1.60	1.60	1.50	1.70
3	2.60	2.20	2.80	2.10	2.70	2.20	1.90	1.70	1.60	1.60	1.60	1.60
4	2.60	2.20	2.80	2.10	2.60	2.20	1.90	1.70	1.70	1.60	1.60	1.70
5	2.50	2.30	2.90	2.20	2.60	2.20	2.30	1.60	1.70	1.60	1.70	1.70
6	2.50	2.30	2.90	2.20	2.60	2.10	2.30	1.60	1.70	1.60	1.60	1.60
7	2.40	2.50	2.90	2.30	2.50	2.10	2.00	1.60	1.60	1.60	1.60	1.60
8	2.40	2.70	2.80	2.40	2.50	2.20	2.00	1.60	1.60	1.60	1.60	1.50
9	2.30	2.60	2.80	2.40	2.50	2.20	1.90	1.80	1.60	1.60	1.70	1.50
10	2.30	2.80	2.80	2.40	2.40	2.30	1.90	1.80	1.60	1.60	1.70	1.40
11	2.30	2.70	2.80	2.50	2.40	2.30	1.90	1.70	1.60	1.60	1.70	1.40
12	2.30	2.60	2.70	2.50	2.50	2.30	1.80	1.70	1.60	1.60	1.80	1.40
13	2.30	2.70	2.60	2.60	2.50	2.40	1.80	1.70	1.50	1.50	1.80	1.30
14	2.40	3.10	2.50	2.80	2.50	2.40	1.80	1.60	1.50	1.50	1.90	1.20
15	2.30	3.60	2.40	3.00	2.60	2.50	1.80	1.60	1.50	1.50	1.90	1.20
16	2.30	3.80	2.40	3.10	2.60	2.50	1.70	1.60	1.60	1.50	2.00	1.10
17	2.30	3.70	2.30	3.10	2.50	2.60	1.70	1.60	1.60	1.50	2.10	1.10
18	2.30	3.60	2.30	3.00	2.50	2.60	1.70	1.60	1.60	1.50	2.20	1.10
19	2.40	3.30	2.20	3.00	2.40	2.50	1.70	1.70	1.60	1.50	2.50	1.20
20	2.30	3.10	2.20	2.90	2.40	2.40	1.70	1.70	1.60	1.50	2.20	1.90
21	2.30	3.00	2.20	2.90	2.50	2.30	1.80	1.80	1.60	1.50	2.20	1.80
22	2.30	2.80	2.10	2.80	2.50	2.30	1.80	1.80	1.60	1.50	2.10	1.80
23	2.20	2.80	2.10	2.90	2.40	2.30	2.00	1.70	1.70	1.40	1.90	1.70
24	2.20	2.70	2.10	2.90	2.40	2.20	2.00	1.70	1.70	1.40	1.90	1.70
25	2.20	2.70	2.20	2.90	2.40	2.20	1.90	1.70	1.70	1.40	1.80	1.60
26	2.10	2.60	2.20	2.90	2.30	2.10	1.90	1.70	1.70	1.40	1.80	1.60
27	2.10	2.60	2.10	3.00	2.40	2.10	1.80	1.60	1.70	1.40	1.90	1.70
28	2.10	2.60	2.10	2.90	2.50	2.10	1.70	1.60	1.60	1.40	1.90	1.80
29	2.10	.....	2.00	2.80	2.50	2.00	1.70	1.60	1.60	1.50	1.80	1.90
30	2.10	.....	2.00	2.80	2.40	2.00	1.80	1.60	1.60	1.50	1.80	1.80
31	2.20	.....	2.00	.....	2.40	.....	1.80	1.60	.....	1.50	.....	1.80

Daily gage height, in feet, of Hood River at Tucker, Oregon, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.60	2.60	3.50	2.40	3.50	3.20	2.50	2.40	1.70	2.40	1.60	4.40
2	4.60	2.50	3.50	2.40	3.50	3.10	2.50	2.40	1.60	2.20	1.60	4.20
3	4.00	2.50	3.50	2.40	3.50	2.90	2.60	2.30	1.60	2.20	2.00	4.00
4	3.90	2.70	3.50	2.40	3.40	2.80	2.60	2.20	1.60	2.10	4.00	3.80
5	3.80	3.60	3.40	2.40	3.40	2.90	2.60	2.20	1.60	1.90	3.60	3.60
6	4.00	4.60	3.40	2.40	3.30	3.30	2.50	2.20	1.60	1.90	3.00	3.20
7	3.60	5.60	3.50	2.70	3.30	3.40	2.50	2.20	1.60	1.80	2.80	3.00
8	3.50	4.80	3.50	2.70	3.30	3.40	2.50	2.20	1.60	1.70	2.60	2.80
9	3.40	4.60	3.40	2.60	3.40	3.50	2.50	2.20	1.60	1.80	2.50	2.40
10	3.20	4.00	3.30	2.60	3.40	3.40	2.60	2.30	1.80	2.00	2.30	2.20
11	3.00	3.80	3.20	2.50	3.40	3.40	2.60	2.40	1.80	2.00	2.00	2.20
12	3.00	5.20	3.20	2.60	3.50	3.40	2.60	2.30	1.70	2.00	2.00	2.10
13	3.00	6.00	3.10	3.00	3.50	3.40	2.70	2.20	1.70	2.00	1.90	2.00
14	3.10	8.70	3.00	3.40	3.60	3.40	2.50	2.20	1.70	2.00	1.90	2.00
15	3.20	8.60	3.00	3.50	3.50	3.40	2.40	2.20	1.70	3.30	1.90	2.00
16	3.30	7.60	3.00	3.50	3.40	3.30	2.40	2.10	1.70	2.80	1.90	2.10
17	3.20	6.00	2.80	3.40	3.40	3.20	2.70	2.00	1.70	2.60	4.00	2.10
18	3.20	5.30	2.70	3.20	3.40	3.20	2.50	2.00	1.80	2.50	6.00	2.30
19	4.00	4.50	2.60	3.10	3.40	3.20	2.30	1.90	1.80	2.30	4.80	3.10
20	3.70	4.30	2.60	3.20	3.40	3.10	2.20	1.80	1.80	2.10	4.30	2.70
21	3.30	4.50	2.80	3.20	3.50	3.10	2.20	1.80	2.60	2.00	3.00	2.60
22	3.20	4.10	2.60	3.50	3.60	3.00	2.20	1.90	2.20	1.90	2.90	2.50
23	3.20	4.00	2.60	4.00	3.40	2.90	2.40	1.90	2.60	1.90	2.80	2.30
24	3.00	3.80	2.70	4.00	3.30	2.80	2.30	2.00	1.80	1.80	2.70	2.20
25	3.00	3.50	2.60	4.10	3.30	2.80	2.30	2.00	1.60	1.70	2.60	2.30
26	3.00	3.50	2.50	4.70	3.30	2.80	2.20	2.00	1.60	1.70	2.60	3.30
27	2.90	3.50	2.50	4.30	3.30	2.80	2.20	2.00	1.60	1.70	2.60	3.60
28	2.80	3.50	2.50	4.00	3.20	2.70	2.30	2.00	1.60	1.70	2.10	5.00
29	2.60	.....	2.50	3.90	3.20	2.60	2.30	1.90	2.20	1.70	3.00	4.80
30	2.70	.....	2.50	3.80	3.10	2.50	2.40	1.80	3.20	1.60	3.50	4.50
31	2.70	.....	2.40	.....	3.00	.....	2.50	1.70	.....	1.60	.....	4.30

List of discharge measurements, 1898.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Mar. 16	Portneuf River	Pocatello, Idaho	F. J. Mills	7.85	286
Apr. 28	do	do	do	8.90	562
June 14	do	do	do	7.75	293
July 31	do	do	C. C. Babb	6.40	47
Do.	do	do	do	6.70	87
Oct. 9	do	do	F. S. Shirley	6.90	143
Aug. 26	Snake River	Montgomery, Idaho	C. C. Babb	1.90	2,831
Oct. 11	do	do	F. S. Shirley	2.50	5,110
Mar. 17	Malad River	Toponis, Idaho	F. J. Mills	2.80	72
May 22	do	do	do	3.60	324
Mar. 17	Little Wood River	do	do	4.20	127
Oct. 10	do	do	F. S. Shirley	3.10	63
Apr. 16	Boise River	Boise, Idaho	F. J. Mills	4.20	5,248
June 15	do	do	F. S. Shirley	4.20	6,710
Aug. 3	do	do	C. C. Babb	1.25	872
Aug. 24	do	do	do	1.00	698
Oct. 18	do	do	F. S. Shirley	1.20	845
Apr. 12	Weiser River	Weiser, Idaho	F. J. Mills	3.20	1,914
June 2	do	do	do	3.30	2,305
Aug. 6	do	do	C. C. Babb	.40	42
Oct. 14	do	do	F. S. Shirley	.80	172
Mar. 10	Palouse River	Hooper, Wash	Sydney Arnold	7.50	2,779
June 21	do	do	do	3.00	223
July 7	Blackfoot River	Bonner, Mont	C. C. Babb	4.00	5,518
July 13	do	do	M. J. Elrod	3.10	3,357
July 25	do	do	do	2.20	2,038
Aug. 12	do	do	do	1.50	1,236
Sept. 3	do	do	do	1.10	1,055
Oct. 1	do	do	do	1.00	917
Nov. 5	do	do	Fred. D. Smith	.90	913
July 6	Bitterroot River	Missoula, Mont	C. C. Babb	5.40	7,957
July 13	do	do	M. J. Elrod	4.60	5,456
July 25	do	do	do	2.90	2,579
Aug. 12	do	do	do	1.75	1,100
Sept. 3	do	do	do	1.70	1,280
Oct. 1	do	do	do	1.50	1,061
Nov. 5	do	do	Fred. D. Smith	1.90	1,483

List of discharge measurements, 1898—Continued.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Oct. 29	Bitterroot River	Harlan Bridge, near Como, Mont.	C. C. Babb		333
Dec. 26	do	Hamilton, Mont	H. S. Lord		430
July 5	Missoula River	Missoula, Mont	C. C. Babb	6.15	10,674
July 16	do	do	M. J. Elrod	4.65	5,381
July 30	do	do	do	3.50	3,064
Aug. 19	do	do	do	2.85	1,849
Sept. 15	do	do	do	2.82	1,871
Oct. 22	do	do	do	2.75	1,912
Sept. 8	Yakima River	Union Gap, Wash	C. C. Babb	4.30	786
Sept. 29	do	do	Sydney Arnold	4.50	985
Jan. 31	do	Kiona, Wash	do	5.52	2,409
Apr. 26	do	do	do	9.45	10,585
May 25	do	do	do	9.27	9,548
July 8	do	do	do	7.04	5,207
July 21	do	do	do	6.05	3,308
Aug. 4	do	do	do	5.20	1,815
Aug. 19	do	do	do	4.27	1,011
Sept. 6	Spokane River	Spokane, Wash	do	1.80	2,715
Oct. 8	do	do	C. C. Babb	1.75	2,202
May 7	Umatilla River	Gibbon, Oreg	Sydney Arnold	2.30	981
Oct. 8	do	do	do	.30	83
May 6	Deschutes River	Moro, Oreg	do	2.60	7,582
May 5	Hood River	Tucker, Oreg	do	3.45	1,502

Rating tables.

Pocatello.		Montgomery.		Toponis. *a*		Toponis. *b*		Grandview.		Boise.	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage h'g't.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
6.4	47	2.0	4,400	2.0	0	1.0	0	1.0	10	1.0	550
6.6	80	2.2	4,525	2.1	5	1.2	1	1.1	25	1.1	721
6.8	113	2.4	4,700	2.2	10	1.4	3	1.2	45	1.2	892
7.0	147	2.6	4,900	2.3	15	1.6	5	1.3	55	1.3	1,063
7.2	183	2.8	5,100	2.4	20	1.8	9	1.4	65	1.4	1,234
7.4	219	3.0	5,400	2.5	30	2.0	14	1.5	80	1.5	1,405
7.6	257	3.2	5,800	2.6	45	2.2	19	1.6	100	1.6	1,576
7.8	296	3.4	6,200	2.7	60	2.4	27	1.7	120	1.7	1,747
8.0	336	3.6	6,600	2.8	80	2.6	37	1.8	140	1.8	1,918
8.2	384	3.8	7,000	2.9	100	2.8	47	1.9	170	1.9	2,089
8.4	433	4.0	7,400	3.0	130	3.0	57	2.0	200	2.0	2,260
8.6	484	4.5	8,900	3.2	210	3.2	70	2.1	230	2.2	2,602
8.8	536	5.0	11,000	3.4	320	3.4	87	2.2	270	2.4	2,944
9.0	590	5.5	13,400	3.6	460	3.6	105	2.3	310	2.6	3,286
9.2	650	6.0	15,800	3.8	600	3.8	126	2.4	360	2.8	3,628
9.4	711	6.5	18,200	4.0	740	4.0	150	2.5	410	3.0	3,970
9.6	777	7.0	20,600	4.2	910	4.2	173	2.6	470	3.2	4,312
9.8	848	7.5	23,000	4.4	1,090	4.4	196	2.7	540	3.4	4,654
10.0	920	8.0	25,400	4.6	1,290	4.6	219	2.8	620	3.6	4,996
10.2	988	8.5	27,800	4.8	1,490	4.8	243	2.9	700	3.8	5,338
10.4	1,057	9.0	30,200	5.0	1,700	5.0	266	3.0	780	4.0	5,680
10.6	1,126	9.5	32,600	5.2	1,920	5.2	289	3.1	850	4.2	6,022
10.8	1,194	10.0	35,000	5.4	2,140	5.4	312	3.2	920	4.4	6,364
11.0	1,263	10.5	37,400	5.6	2,360	5.6	335	3.3	1,000	4.6	6,706
11.2	1,331	11.0	39,800	5.8	2,580	5.8	358	3.4	1,080	4.8	7,048
11.4	1,400	11.5	42,200	6.0	2,800	6.0	382	3.5	1,160	5.0	7,390
11.6	1,469	12.0	44,600	6.2	3,020	6.2	405	4.0	1,610	5.2	7,732
11.8	1,537	12.5	47,000	6.4	3,240	6.4	418	5.0	2,300	5.4	8,074
12.0	1,606	13.0	49,400	6.6	3,460	6.6	451	6.0	3,060	5.6	8,416
13.0	1,950			6.8	3,680	6.8	474	7.0	3,850	5.8	8,758

a Rating table for Malad River.

b Rating table for Little Wood River.

Rating tables—Continued.

Weiser.		Hooper.		Bonner.		Missoula.*a*		Missoula.*b*	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.6	80	1.5	10	0.7	850	1.3	950	2.6	1,620
.8	120	1.6	20	.8	875	1.4	1,000	2.7	1,740
1.0	190	1.7	30	.9	900	1.5	1,050	2.8	1,870
1.2	280	1.8	40	1.0	950	1.6	1,100	2.9	2,000
1.4	390	1.9	50	1.1	1,000	1.7	1,150	3.0	2,150
1.6	510	2.0	61	1.2	1,060	1.8	1,230	3.1	2,310
1.8	650	2.2	86	1.3	1,120	1.9	1,325	3.2	2,500
2.0	800	2.4	115	1.4	1,185	2.0	1,425	3.3	2,690
2.2	970	2.6	148	1.5	1,250	2.2	1,625	3.4	2,870
2.4	1,150	2.8	185	1.6	1,340	2.4	1,860	3.5	3,070
2.6	1,340	3.0	226	1.7	1,440	2.6	2,150	3.6	3,260
2.8	1,540	3.5	347	1.8	1,550	2.8	2,450	3.7	3,450
3.0	1,760	4.0	525	1.9	1,675	3.0	2,750	3.8	3,640
3.2	1,995	4.5	800	2.0	1,800	3.2	3,050	3.9	3,830
3.4	2,250	5.0	1,130	2.1	1,925	3.4	3,350	4.0	4,020
3.6	2,525	5.5	1,490	2.2	2,050	3.6	3,650	4.1	4,210
3.8	2,820	6.0	1,790	2.3	2,175	3.8	3,950	4.2	4,410
4.0	3,135	6.5	2,120	2.4	2,305	4.0	4,250	4.3	4,610
4.2	3,435	7.0	2,450	2.5	2,440	4.2	4,580	4.4	4,820
4.4	3,875	7.5	2,780	2.6	2,575	4.4	4,970	4.5	5,030
4.6	4,305	8.0	3,110	2.7	2,715	4.6	5,450	4.6	5,250
4.8	4,775	8.5	3,440	2.8	2,860	4.8	6,070	4.7	5,490
5.0	5,285	9.0	3,770	2.9	3,010	5.0	6,690	4.8	5,740
5.5	6,735	9.5	4,100	3.0	3,180	5.2	7,310	4.9	6,000
6.0	8,400	10.0	4,430	3.2	3,540	5.4	7,930	5.0	6,300
6.5	10,155	10.5	4,760	3.4	3,925	5.6	8,550	5.2	6,950
7.0	11,950	11.0	5,090	3.6	4,400	5.8	9,170	5.4	7,690
7.5	13,785	12.0	5,750	3.8	4,920	6.0	9,810	5.6	8,470
8.0	15,640	13.0	6,410	4.0	5,520	6.2	10,450	5.8	9,250
		14.0	7,070	4.2	6,120			6.0	10,040

a Rating table for Bitterroot River.
b Rating table for Missoula River.

North Yakima.		Union Gap.		Kiona.		Spokane.		Gibbon.	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
4.0	385	4.0	520	3.5	525	1.0	1,341	0.0	56
4.1	445	4.2	685	3.6	566	1.2	1,611	.1	65
4.2	505	4.4	885	3.7	612	1.4	1,897	.2	74
4.3	607	4.6	1,085	3.8	663	1.6	2,199	.3	83
4.4	709	4.8	1,315	3.9	719	1.8	2,517	.4	92
4.5	811	5.0	1,545	4.0	780	2.0	2,851	.5	106
4.6	913	5.2	1,775	4.2	916	2.5	3,754	.6	124
4.7	1,019	5.4	2,028	4.4	1,071	3.0	4,749	.7	146
4.8	1,132	5.6	2,320	4.6	1,245	3.5	5,832	.8	172
4.9	1,252	5.8	2,644	4.8	1,438	4.0	7,000	.9	202
5.0	1,380	6.0	3,000	5.0	1,650	4.5	8,245	1.0	233
5.1	1,515	6.2	3,388	5.2	1,878	5.0	9,565	1.2	298
5.2	1,658	6.4	3,808	5.4	2,122	5.5	10,957	1.4	372
5.3	1,808	6.6	4,258	5.6	2,283	6.0	12,416	1.6	454
5.4	1,966	6.8	4,738	5.8	2,665	6.5	13,941	1.8	544
5.5	2,131	7.0	5,250	6.0	2,965	7.0	15,525	2.0	642
5.6	2,304	7.2	5,793	6.5	3,780	7.5	17,160	2.2	748
5.7	2,484	7.4	6,365	7.0	4,695	8.0	18,845	2.4	862
5.8	2,672	7.6	6,969	7.5	5,708	8.5	20,577	2.6	984
5.9	2,867	7.8	7,605	8.0	6,810	9.0	22,351	2.8	1,114
6.0	3,070	8.0	8,270	8.5	7,998	9.5	24,165	3.0	1,252
6.2	3,490	8.5	10,059	9.0	9,270	10.0	26,012	3.2	1,398
6.4	3,910	9.0	12,030	9.5	10,620	10.5	27,887	3.4	1,552
6.6	4,330	9.5	14,180	10.0	12,045	11.0	29,787	3.6	1,714
6.8	4,750	10.0	16,510	10.5	13,536	11.5	31,712	3.8	1,884
7.0	5,170	10.5	19,015	11.0	15,086	12.0	33,653	4.0	2,061
7.2	5,590	11.0	21,690	12.0	18,036			4.5	2,533
7.4	6,010	11.5	24,536	13.0	21,036			5.0	3,052
7.6	6,430	12.0	27,550	14.0	24,036			5.5	3,613
7.8	6,850							6.0	4,217

NORTHERN PACIFIC COAST DRAINAGE.

In this division are included measurements on streams flowing into the Pacific north of the Columbia River. The river stations so far as established have been located within what is known as the Olympic Peninsula, the work being under the charge of Mr. W. J. Ware, of Port Angeles.

DESCRIPTION OF RIVER STATIONS.

Seattle station on Cedar River.—This station, described on pages 501–502 of the Nineteenth Annual Report, Part IV, was maintained by Mr. T. A. Noble for the Seattle Power Company. A description of the methods employed, with the results of discharge measurements, and diagrams, are published in an article by T. A. Noble, in the transactions of the American Society of Civil Engineers, Volume XLI, June, 1899. The station was discontinued September 30, 1898, and observations begun at Vaughns Bridge, about 3,000 feet below the outlet of Cedar Lake, or 15 miles above the station at Cliffords Bridge.

Seguin station on Dungeness River.—Described on page 182 of Paper No. 16; results given on page 503 of the Nineteenth Annual Report, Part IV. On July 29, 1898, the station was moved to a bridge about 8½ miles downstream, this being about a mile above the mouth. This bridge crosses the river diagonally, its northern end being about 15 degrees upstream from a position perpendicular to the current. The initial point and bench mark is the inner edge or corner of the first post for the covering of bridge on the south end and east side of bridge. The rod is horizontal and the zero is 25.91 feet from the initial point; distance of pulley from zero on rod is 4.90 feet; length of wire from end of ring to end of weight, 26.04 feet. The station was changed from the fact that measurements could be taken at the lower bridge much more accurately. At the upper bridge there was a slough, and the water running through that could not be accounted for. Since the station has been moved Henry McAlmond has been observer.

McDonald station on Elwha River.—Described on page 183 of Paper No. 16; results for 1897 given on page 505 of the Nineteenth Annual Report, Part IV.

Forks station on Calowa River.—Described on page 184 of Paper No. 16. The observer, until August 25, 1898, was George W. Eaton; since that date, Miss Irma Whittier, deputy postmaster at Forks.

Quillayute station on Solduck River.—Described on page 184 of Paper No. 16.

TABLES OF DAILY GAGE HEIGHT.

Daily discharge in cubic feet per second of Cedar River, near Seattle, Washington, for 1895.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1	------	243	150	------	18	174	163	163	836
2	------	250	241	------	19	178	165	155	788
3	------	253	176	------	20	217	161	128	735
4	------	234	160	------	21	200	157	174	695
5	------	221	110	------	22	206	153	155	669
6	------	217	104	------	23	260	152	144	855
7	------	193	97	------	24	356	152	138	802
8	------	188	97	------	25	433	166	125	786
9	------	193	94	------	26	382	152	125	731
10	------	202	168	------	27	337	152	236	1,355
11	------	197	132	------	28	315	146	241	1,355
12	------	193	115	------	29	291	148	152	1,329
13	182	186	115	2,176	30	262	144	180	------
14	184	182	168	2,099	31	------	138	------	------
15	188	178	165	1,687					
16	186	172	168	1,434	Mean	252	181	151	1,160
17	182	166	161	1,386					

Daily discharge in cubic feet per second of Cedar River, near Seattle, Washington, for 1896.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,023	766	1,766	786	1,191	2,002	1,901	315	202	170	745	757
2	892	743	1,381	768	1,265	1,675	1,371	347	197	178	784	1,172
3	828	751	1,256	743	1,163	1,434	1,329	328	195	190	920	2,165
4	828	758	1,079	721	1,144	1,363	1,308	330	193	188	836	3,601
5	1,355	1,228	845	715	1,116	1,371	1,265	320	188	180	790	3,623
6	1,867	1,265	811	684	1,181	1,410	1,219	313	182	170	764	3,395
7	2,034	1,329	792	659	1,107	1,426	1,237	306	180	------	721	3,248
8	2,742	1,265	778	669	1,004	2,219	1,116	296	178	165	1,462	4,189
9	2,932	1,116	774	633	967	2,241	1,041	289	176	168	2,023	3,694
10	2,769	939	766	628	911	2,361	892	284	176	168	2,143	3,400
11	2,252	811	745	638	957	2,203	845	279	180	209	1,890	3,302
12	1,867	836	731	729	939	2,023	790	275	184	182	1,434	3,133
13	1,709	1,172	729	786	1,023	1,844	747	267	182	178	2,241	3,128
14	1,394	1,339	719	1,060	1,023	1,664	723	260	178	172	2,959	2,791
15	1,209	1,355	700	1,311	995	1,443	721	253	180	168	4,695	2,453
16	1,023	1,386	684	1,209	1,013	1,462	717	258	205	163	3,835	2,241
17	794	1,434	654	1,088	939	1,491	705	248	193	158	3,122	2,012
18	807	1,410	628	901	892	1,453	669	243	184	155	2,535	1,687
19	1,097	1,360	608	815	929	1,431	613	241	180	152	2,110	1,551
20	873	1,308	755	766	864	1,423	577	238	174	153	1,878	1,878
21	985	1,228	828	741	911	1,426	541	236	172	163	1,500	1,687
22	1,041	1,153	985	762	1,013	1,415	510	231	172	172	1,366	1,551
23	1,060	1,116	1,116	762	1,308	1,434	485	224	170	160	1,228	1,453
24	815	1,265	1,355	749	1,407	1,423	454	219	170	163	1,125	1,413
25	780	1,664	2,034	794	1,551	1,407	423	214	168	157	976	1,392
26	762	2,469	1,822	1,041	1,585	1,407	397	214	166	153	802	1,358
27	755	2,469	1,462	1,303	1,720	1,608	367	214	165	152	762	1,326
28	749	2,382	1,384	1,316	1,642	1,766	347	212	161	150	749	1,321
29	745	2,372	1,284	1,308	1,743	1,935	337	207	158	195	743	1,311
30	735	------	1,032	1,237	1,901	1,732	330	202	157	212	723	1,265
31	727	------	893	------	2,029	------	320	197	------	221	------	1,228
Mean	1,273	1,334	1,012	877	1,208	1,650	784	260	179	172	1,595	2,217

Daily discharge in cubic feet per second of Cedar River, near Seattle, Washington, for 1897.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,237	1,125	920	892	1,345	1,339	1,172	561	413	325	325	1,386
2	1,172	1,144	845	832	1,334	1,265	1,799	551	403	325	328	1,347
3	1,013	1,153	828	790	1,321	1,125	2,284	541	418	323	323	1,088
4	1,041	1,339	807	845	1,326	948	2,219	526	408	320	328	811
5	1,293	1,350	792	786	1,360	845	2,121	515	397	315	408	2,045
6	1,415	1,345	778	832	1,574	807	2,176	500	403	313	541	2,263
7	1,732	1,324	766	948	1,732	794	2,040	490	377	303	485	2,208
8	1,434	1,265	757	985	1,822	855	1,867	479	392	301	541	2,089
9	1,402	1,181	751	1,023	1,743	819	1,540	469	382	299	633	1,991
10	1,355	1,316	745	1,228	1,519	784	1,392	459	356	299	1,069	1,890
11	1,334	1,363	737	1,339	1,428	811	1,332	449	349	294	1,957	1,890
12	1,324	1,386	731	1,386	1,529	828	1,228	444	344	428	3,155	1,642
13	1,163	1,339	723	1,420	1,912	836	1,069	444	340	433	2,872	2,045
14	1,004	1,350	743	1,551	2,110	780	948	433	347	377	2,442	2,317
15	948	2,415	751	1,822	2,143	823	828	423	342	354	2,078	1,991
16	855	2,094	757	2,176	2,121	1,247	807	413	335	344	1,563	1,453
17	815	1,844	757	2,252	2,110	1,363	819	408	332	335	1,619	1,321
18	873	1,472	762	2,502	2,050	1,397	782	403	330	328	2,747	1,135
19	957	1,368	764	2,752	1,957	1,402	766	397	332	323	3,939	823
20	1,386	1,339	758	2,703	1,811	1,347	753	387	323	325	2,742	768
21	2,812	1,318	749	2,644	1,653	1,308	741	377	320	349	1,394	739
22	2,812	1,172	757	2,448	1,491	1,410	727	367	320	383	1,023	719
23	2,600	1,060	762	2,203	1,410	1,366	719	362	320	362	929	674
24	2,295	957	1,313	2,110	1,368	1,329	705	354	318	367	939	700
25	2,018	873	1,347	1,935	1,324	1,256	679	352	315	354	819	739
26	1,574	823	1,339	1,788	1,256	1,135	659	352	311	356	786	788
27	1,386	855	1,358	1,597	1,172	1,032	638	349	313	349	776	1,324
28	1,366	911	1,366	1,426	1,060	901	618	344	315	344	747	3,166
29	1,355	.....	1,316	1,386	939	828	597	344	320	337	695	3,601
30	1,345	.....	1,172	1,366	1,135	819	592	342	323	332	1,332	3,220
31	1,311	.....	976	.....	1,376	.....	572	392	.....	328	.....	2,622
Mean	1,440	1,303	901	1,599	1,562	1,060	1,135	427	350	340	1,318	1,639

Daily discharge in cubic feet per second of Cedar River, near Seattle, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2,214	449	731	474	1,004	780	510	152	.....
2	1,844	397	735	454	920	751	474	165	.....
3	1,415	423	751	438	957	770	449	168	.....
4	1,363	423	760	413	1,144	741	423	165	.....
5	1,324	721	729	397	1,284	766	397	160	.....
6	1,097	1,957	757	423	1,191	774	372	138	.....
7	1,004	1,529	760	526	1,097	1,004	352	152	.....
8	1,004	1,389	751	561	957	1,097	344	149	.....
9	864	1,376	721	551	828	1,191	323	143	95
10	807	1,191	731	536	794	1,144	315	136	.....
11	780	1,237	705	556	832	1,097	311	141	91
12	764	1,337	679	546	929	1,004	299	145	.....
13	731	1,363	679	613	864	911	291	.....	84
14	577	2,459	705	654	939	807	284	.....	.....
15	721	3,220	602	710	1,041	828	272	.....	78
16	654	3,318	551	715	1,191	794	255	.....	.....
17	679	2,785	474	723	1,350	780	274	.....	73
18	654	2,323	449	731	1,363	751	291	.....	.....
19	731	2,050	423	710	1,324	760	265	.....	71
20	741	1,402	526	679	1,191	770	255	.....	.....
21	751	1,368	500	654	1,004	760	243	.....	117
22	731	1,004	449	735	911	751	236	.....	.....
23	679	1,004	423	753	864	731	226	.....	207
24	628	864	449	770	807	705	219	.....	.....
25	602	760	449	828	790	679	207	.....	184
26	551	751	423	1,116	864	669	200	.....	.....
27	551	721	408	1,350	883	654	188	.....	214
28	526	745	433	1,337	1,004	577	184	.....	.....
29	500	.....	449	1,284	976	526	178	.....	219
30	449	.....	510	1,237	855	485	172	.....	.....
31	423	.....	474	.....	790	.....	165	.....	.....
Mean	850	1,377	587	716	998	802	289	151	130

Daily gage height, in feet, of Dungeness River at Seguin, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.80	4.30	4.80	4.30	5.00	5.20	5.10	4.00	3.05	2.70	2.75	2.55
2	4.80	4.30	4.80	4.30	5.10	5.20	5.30	4.00	3.00	2.75	2.75	2.55
3	4.75	4.30	4.90	4.30	5.15	5.00	5.40	4.00	3.00	2.70	2.80	2.50
4	4.70	4.30	4.90	4.30	5.30	5.00	5.40	3.85	2.90	2.70	2.80	2.50
5	4.70	5.20	4.80	4.35	5.30	5.30	5.30	3.75	2.80	2.65	2.80	2.50
6	4.70	5.30	4.80	4.50	5.20	5.40	5.20	3.80	2.80	2.60	2.85	2.45
7	4.70	5.50	4.70	4.50	5.00	5.60	5.00	3.85	2.75	2.45	2.85	2.45
8	4.70	5.10	4.65	4.40	5.00	5.70	5.00	3.90	2.75	2.40	2.80	2.45
9	4.60	4.90	4.65	4.50	5.00	5.60	5.20	3.85	2.80	2.60	2.75	2.45
10	4.50	4.80	4.60	4.50	5.30	5.60	5.20	3.85	2.80	2.60	2.70	2.40
11	4.50	4.80	4.60	4.40	5.40	5.60	5.25	3.85	2.85	2.60	2.65	2.35
12	4.50	5.00	4.55	4.50	5.20	5.50	5.30	3.85	2.85	2.60	2.60	2.35
13	4.50	5.20	4.50	4.75	5.20	5.50	5.20	3.55	2.85	2.60	2.60	2.35
14	4.50	5.40	4.50	4.80	5.30	5.50	5.20	3.50	2.85	4.70	2.55	2.30
15	4.45	5.55	4.45	4.75	5.50	5.55	5.20	3.45	2.85	4.20	2.60	2.30
16	4.45	5.40	4.40	4.70	5.60	5.50	5.20	3.40	2.80	3.50	2.70	2.30
17	4.45	5.20	4.40	4.70	5.70	5.40	5.10	3.30	2.85	3.40	2.65	2.30
18	4.45	5.00	4.30	4.60	5.45	6.30	5.10	3.35	2.85	3.30	2.60	2.30
19	4.40	4.90	4.30	4.60	5.30	5.00	5.00	3.35	3.00	3.20	2.55	3.50
20	4.40	5.00	4.30	4.65	5.20	5.40	5.00	3.35	3.20	3.15	2.55	2.90
21	4.40	4.90	4.30	4.60	5.40	5.40	5.00	3.30	3.30	3.05	2.50	2.85
22	4.35	4.80	4.30	4.60	5.20	5.35	5.00	3.30	4.05	2.95	2.50	2.80
23	4.35	4.80	4.30	4.65	5.00	5.35	5.00	3.30	3.40	2.90	2.50	2.70
24	4.35	4.75	4.30	4.70	5.00	5.40	5.00	3.30	3.00	2.85	2.55	2.60
25	4.35	4.80	4.30	5.00	4.95	5.40	5.00	3.30	2.90	2.80	2.55	2.70
26	4.35	4.75	4.30	5.20	5.40	5.35	5.00	3.30	2.90	2.80	2.55	3.30
27	4.35	4.75	4.25	4.50	5.40	5.30	5.00	3.30	2.95	2.75	2.60	4.35
28	4.30	4.80	4.20	5.00	5.20	5.20	5.00	3.20	2.90	2.70	2.60	5.20
29	4.30	------	4.20	5.00	5.20	5.20	4.05	3.15	2.85	2.70	2.60	4.45
30	4.30	------	4.30	4.95	5.20	5.15	4.05	3.15	2.75	2.70	2.60	3.90
31	4.30	------	4.30	------	5.20	------	4.15	3.10	------	2.70	------	3.70

Daily gage height, in feet, of Elwha River at McDonald, Washington, for 1898.

Date.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.80	1.90	2.58	1.60	2.55	2.74	3.20	2.25	1.54	1.66	2.44	2.00
2	3.65	1.85	2.57	1.62	2.52	2.66	3.20	2.35	1.54	1.51	2.62	1.92
3	3.52	1.99	2.46	1.65	2.53	2.54	3.41	2.50	1.49	1.40	2.22	1.81
4	3.33	1.93	2.85	1.66	3.15	2.68	3.15	2.47	1.42	1.42	2.23	1.75
5	3.20	4.44	2.80	1.70	3.10	3.02	2.61	2.41	1.39	1.40	2.22	1.75
6	3.20	4.38	2.49	1.72	3.07	3.56	2.54	2.36	1.38	1.40	2.21	1.62
7	3.18	4.45	2.41	1.95	3.01	3.70	2.50	2.30	1.45	1.31	2.12	1.52
8	3.18	4.42	2.35	1.99	2.10	3.91	2.52	2.25	1.46	1.29	1.80	1.52
9	2.61	3.00	2.32	2.48	2.58	4.01	2.60	2.45	1.49	1.26	1.81	1.51
10	2.37	2.96	2.26	2.39	3.00	4.06	2.65	2.47	1.47	1.20	1.78	1.51
11	2.60	4.12	2.15	1.91	2.90	3.68	2.75	2.46	1.47	1.22	1.70	1.47
12	2.32	3.97	2.39	1.88	3.21	3.52	3.18	2.19	1.48	1.35	1.67	1.46
13	2.22	4.26	2.33	2.10	3.00	3.50	2.85	2.17	1.45	3.50	1.64	1.45
14	2.19	4.15	2.29	2.15	3.01	3.42	2.78	2.15	1.42	4.50	1.62	1.46
15	2.20	5.12	2.15	2.17	3.58	3.40	2.65	2.12	1.40	3.10	1.60	1.48
16	2.16	4.91	2.10	2.16	3.78	4.04	2.61	1.98	1.43	2.40	1.75	1.54
17	2.13	3.59	2.02	2.15	3.97	3.74	3.60	1.90	1.44	2.31	1.80	1.59
18	2.20	3.45	1.95	2.00	3.40	4.10	3.10	1.90	1.44	2.10	2.10	1.64
19	2.65	3.17	1.99	1.90	3.31	5.15	2.90	1.87	1.47	2.00	1.98	2.82
20	2.61	3.40	2.00	1.85	2.99	3.80	2.30	1.97	1.63	1.90	1.78	2.45
21	2.60	3.20	1.90	1.80	3.54	3.33	2.15	1.94	2.47	1.90	1.78	1.99
22	2.26	3.15	1.85	2.28	2.15	3.20	2.90	1.92	3.18	1.87	1.77	1.96
23	2.10	3.00	2.00	2.22	2.80	3.15	2.30	1.90	2.12	1.70	1.70	1.92
24	2.08	2.70	1.95	2.24	2.60	3.02	2.35	1.87	1.95	1.65	1.70	1.90
25	1.90	2.60	1.85	3.25	3.84	3.05	2.45	1.90	1.52	1.56	1.79	1.95
26	1.80	2.55	1.80	2.61	3.55	3.00	2.41	1.84	1.43	1.57	1.72	5.20
27	1.75	2.58	1.74	2.52	3.60	3.10	2.40	1.83	1.39	1.59	2.20	4.95
28	1.78	2.60	1.69	2.45	3.50	2.98	2.35	1.58	1.45	1.62	2.24	4.70
29	2.00	------	1.65	2.60	3.05	2.97	2.55	1.84	2.03	1.60	2.12	4.30
30	2.04	------	1.65	2.62	2.95	2.92	2.60	1.82	1.69	1.71	2.50	3.18
31	1.90	------	1.60	------	2.76	------	2.65	1.55	------	1.68	------	3.15

Daily gage height, in feet, of Calowa River at Forks, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.55	2.15	3.60	1.50	1.50	1.65	1.15	0.35	— .10	1.30	4.00	6.05
2	3.10	2.35	3.00	1.45	1.30	1.45	1.05	.30	— .10	1.05	3.40	5.85
3	3.25	2.60	3.85	1.25	1.05	1.15	1.02	1.50	— .10	1.04	5.80	3.65
4	2.90	2.85	3.40	1.10	1.20	.85	1.03	1.10	— .10	1.05	5.00	3.45
5	3.20	9.60	3.00	.80	1.35	1.35	1.00	1.11	— .10	1.00	4.30	3.00
6	3.20	7.80	2.75	.65	1.30	1.15	1.06	1.90	— .10	.90	4.40	2.85
7	3.00	7.65	2.40	1.65	1.15	.95	1.50	.50	— .10	.90	3.45	2.60
8	3.35	5.00	2.25	2.35	1.00	.80	1.20	.15	— .10	.80	3.05	2.40
9	3.00	5.25	2.35	5.30	1.45	.75	1.30	.14	— .10	1.00	2.75	2.25
10	2.70	5.85	1.80	4.25	1.30	.70	.30	.10	— .10	1.00	2.45	2.10
11	2.50	6.00	1.65	3.25	1.25	.65	.10	.13	— .10	1.60	2.20	1.90
12	2.35	6.75	2.35	2.65	1.10	.55	.20	.15	— .10	1.80	2.00	1.65
13	2.50	5.35	2.00	2.10	.90	.60	.10	.12	— .20	5.80	1.80	1.70
14	2.55	6.55	1.80	1.75	.85	.55	.10	.....	— .20	5.35	1.60	1.75
15	2.60	9.00	1.50	1.25	.80	.70	.20	.....	— .40	3.60	1.60	1.80
16	2.70	5.45	1.45	1.45	.70	1.10	.40	.....	— .40	2.70	1.60	1.85
17	2.80	4.35	1.30	1.85	.65	1.35	2.40	.....	— .40	2.45	3.00	1.60
18	3.45	3.80	1.25	1.60	.70	1.50	1.20	.....	— .40	2.20	3.25	1.60
19	5.50	3.35	1.20	1.35	.65	3.55	1.00	.....	— .40	1.85	1.80	5.40
20	5.15	3.10	1.75	1.15	.55	2.60	.80	.....	+2.00	1.80	2.65	4.00
21	3.90	4.40	1.45	1.50	.80	2.15	.60	.....	3.20	1.60	2.70	3.60
22	3.75	4.10	1.30	2.70	1.50	1.90	.30	.....	2.80	1.40	3.00	3.70
23	3.25	3.70	1.50	2.35	1.35	1.55	.10	.....	2.15	1.20	3.85	3.20
24	3.00	3.00	2.35	1.95	1.10	1.70	.45	.....	2.00	1.10	2.85	2.85
25	2.70	3.35	1.70	2.85	.90	1.60	.30	.....	1.40	1.00	3.00	4.85
26	2.00	2.60	1.40	3.10	1.35	1.35	.50	.00	1.00	2.05	3.05	7.90
27	1.85	3.85	1.35	2.65	1.20	1.60	.35	.00	1.20	2.40	4.60	9.20
28	2.00	4.50	1.85	2.25	1.15	1.35	.40	.00	1.80	2.20	4.85	8.00
29	2.30	.....	1.50	1.85	1.65	1.30	.55	—.10	2.20	1.80	5.10	7.20
30	2.55	.....	1.35	1.40	1.50	1.20	.35	.00	2.05	2.00	5.35	6.15
31	2.30	.....	1.20	.....	1.45	.....	.45	—.10	.....	2.00	.....	3.00

Daily gage height, in feet, of Solduck River at Quillayute, Washington, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.90	2.80	3.95	2.45	2.60	2.25	2.25	1.55	1.10	2.45	2.90	5.45
2	4.75	2.70	3.90	2.40	2.55	2.20	2.30	1.50	1.10	2.35	4.10	4.85
3	4.60	2.80	4.30	2.35	2.75	2.20	2.25	1.55	1.05	2.15	5.55	4.35
4	4.25	2.90	4.20	2.35	2.95	2.15	2.20	1.50	1.05	2.05	4.80	4.05
5	4.20	3.75	3.90	2.30	2.80	2.25	2.20	1.45	1.05	1.90	4.60	3.70
6	4.10	6.65	3.60	2.30	2.75	2.35	2.15	1.45	1.05	1.80	4.50	3.55
7	3.90	7.70	3.45	2.40	2.65	2.60	2.10	1.40	1.05	1.70	4.35	3.40
8	4.05	5.75	3.25	2.50	2.50	2.55	2.00	1.40	.95	1.65	3.80	3.25
9	3.75	5.60	3.15	3.95	2.50	2.60	1.95	1.40	.95	1.75	3.45	3.15
10	3.60	5.05	3.05	4.05	2.45	2.65	1.95	1.35	1.00	1.70	3.30	3.10
11	3.50	5.20	2.90	3.45	2.65	2.50	1.95	1.35	.95	2.15	3.10	3.00
12	3.30	6.50	2.95	3.20	2.60	2.40	2.00	1.35	.95	2.55	2.95	2.90
13	3.35	5.70	2.85	3.20	2.50	2.30	2.00	1.35	1.00	3.25	2.80	2.80
14	3.35	6.95	2.80	3.15	2.45	2.35	1.90	1.30	.95	7.45	2.65	2.65
15	3.30	7.40	2.70	3.05	2.60	2.60	1.85	1.25	.95	5.05	2.70	2.70
16	3.25	6.60	2.60	2.90	2.70	2.85	1.90	1.25	.95	3.80	2.90	2.75
17	3.40	5.55	2.50	2.75	2.70	2.50	2.30	1.25	.95	3.45	3.25	2.85
18	3.65	5.20	2.45	2.60	2.75	2.50	2.50	1.25	.95	3.30	4.10	2.80
19	4.50	4.60	2.40	2.50	2.55	3.90	2.30	1.35	1.00	3.10	3.80	5.55
20	4.35	5.80	2.50	2.40	2.70	3.20	1.95	1.30	1.15	2.90	3.55	4.80
21	3.90	5.20	2.40	2.45	2.75	2.85	1.90	1.30	2.05	2.75	3.45	4.25
22	3.95	4.80	2.40	2.80	3.00	2.70	1.80	1.30	2.60	2.60	3.95	4.10
23	3.60	4.60	2.30	2.75	2.70	2.65	1.70	1.25	3.05	2.45	4.05	3.75
24	3.40	4.35	2.65	2.70	2.40	2.65	1.65	1.25	2.40	2.30	3.80	3.55
25	3.25	4.35	2.50	3.20	2.50	2.70	1.65	1.20	1.90	2.25	3.50	3.70
26	3.25	4.25	2.35	3.25	2.55	2.50	1.60	1.20	1.70	2.45	3.75	6.35
27	3.10	4.00	2.50	3.30	2.65	2.40	1.65	1.15	1.60	2.70	4.05	6.85
28	3.05	4.05	2.65	3.10	2.50	2.35	1.60	1.15	1.55	2.80	4.35	7.30
29	2.90	.....	2.60	2.90	2.45	2.30	1.55	1.15	1.95	2.65	4.75	5.50
30	3.10	.....	2.55	2.75	2.40	2.25	1.60	1.15	2.85	2.50	5.10	4.70
31	2.95	.....	2.45	.....	2.30	.....	1.55	1.15	.....	2.65	.....	4.45

List of discharge measurements, 1898.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
Jan. 18	Dungeness River	Seguin, Wash	A. J. Adams	4.45	242
Mar. 3	do	do	do		416
June 25	do	do	do	5.50	617
July 28	do	do	William J. Ware	5.10	336
July 29	do	do	do	4.05	327
Sept. 17	do	do	do	3.30	183
Oct. 15	do	do	do	4.00	453
Nov. 29	do	do	do	2.60	153
Dec. 24	do	do	do	2.60	157
Jan. 30	Elwha River	McDonald, Wash	A. J. Adams	1.74	1,092
Mar. 7	do	do	do	2.45	1,575
June 20	do	do	do	3.80	2,467
July 2	do	do	do	3.20	2,182
Aug. 20	do	do	William J. Ware	1.80	768
Oct. 25	do	do	do	1.56	557
Nov. 8	do	do	do	1.80	857
Dec. 9	do	do	do	1.51	622
June 30	Calowa River	Forks, Wash	A. J. Adams	1.20	467
Aug. 26	do	do	William J. Ware	.00	131
Dec. 19	do	do	do	5.40	3,204
June 29	Solduck River	Quillayute, Wash	A. J. Adams	2.25	823
Aug. 27	do	do	William J. Ware	1.15	289
Dec. 19	do	do	do	5.55	3,160

Rating tables.

Seguin. *a*		Seguin. *b*		Seguin. *c*		McDonald.		Forks.		Quillayute.	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage h'g't.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
4.0	110	4.0	213	2.6	155	1.0	250	—0.4	40	1.0	220
4.1	125	4.1	220	2.7	156	1.1	290	— .2	80	1.2	312
4.2	138	4.2	227	2.8	157	1.2	330	.0	130	1.4	404
4.3	157	4.3	234	2.9	161	1.3	400	.2	180	1.6	500
4.4	177	4.4	241	3.0	165	1.4	470	.4	230	1.8	600
4.5	203	4.5	248	3.1	170	1.5	575	.6	286	2.0	700
4.6	234	4.6	255	3.2	175	1.6	687	.8	348	2.2	810
4.7	285	4.7	262	3.3	183	1.7	799	1.0	410	2.4	920
4.8	361	4.8	273	3.4	194	1.8	911	1.2	474	2.6	1,035
4.9	438	4.9	288	3.5	211	1.9	1,025	1.4	538	2.8	1,155
5.0	515	5.0	310	3.6	233	2.0	1,150	1.6	604	3.0	1,275
5.1	592	5.1	336	3.7	260	2.2	1,337	1.8	672	3.2	1,397
5.2	669	5.2	406	3.8	295	2.4	1,525	2.0	740	3.4	1,519
5.3	746	5.3	476	3.9	330	2.6	1,675	2.2	816	3.6	1,644
5.4	823	5.4	546	4.0	365	2.8	1,825	2.4	892	3.8	1,772
5.5	900	5.5	617	4.1	400	3.0	1,975	2.6	974	4.0	1,900
5.6	979	5.6	687	4.2	435	3.2	2,113	2.8	1,062	4.2	2,046
5.7	1,058	5.7	757	4.3	470	3.4	2,251	3.0	1,150	4.4	2,192
5.8	1,137	5.8	827	4.4	505	3.6	2,383	3.2	1,254	4.6	2,346
5.9	1,216	5.9	897	4.5	540	3.8	2,509	3.4	1,358	4.8	2,508
6.0	1,295	6.0	967	4.6	575	4.0	2,635	3.6	1,472	5.0	2,670
6.2	1,453	6.1	1,037	4.7	610	4.2	2,748	3.8	1,596	5.2	2,846
6.4	1,611	6.2	1,107	4.8	645	4.4	2,861	4.0	1,720	5.4	3,022
6.6	1,769	6.3	1,177	4.9	680	4.6	2,974	4.5	2,110	5.6	3,214
6.8	1,927	6.4	1,247	5.0	715	4.8	3,087	5.0	2,620	5.8	3,422
7.0	2,085	6.5	1,317			5.0	3,200	5.5	3,400	6.0	3,630
7.2	2,243					6.0	3,750	6.0	4,080	6.2	3,838
7.4	2,401					7.0	4,220	7.0	5,440	6.4	4,046
7.6	2,559					8.0	4,625	8.0	6,800	6.6	4,254
7.8	2,717							9.0	8,160	6.8	4,462

a Applicable from July 5 to December 31, 1897.
b Applicable from January 1 to July 28, 1898.
c Applicable from July 29 to December 31, 1898.

SAN FRANCISCO BAY DRAINAGE.

DESCRIPTION OF RIVER STATIONS.

Jelleys Ferry station on Sacramento River.—Described on page 185 of Paper No. 16; results for 1897 given on page 509 of the Nineteenth Annual Report, Part IV. During the year 1898 Mr. Fred Lemstrom has been furnished with a meter and has made at least two measurements a month of the river, or as often as any radical change occurred in the volume of the stream. He was furnished with Price's acoustic meter No. 12, which he used until the 1st of June. This was the only meter available during the first portion of the year for this work; subsequent to the 1st of June he was furnished with a large Price electric meter (No. 67). Observations with the acoustic meter were made, where practicable, at six-tenths depth, to determine the mean velocity of the stream; because of the depth of the river this could not always be done. With the larger meter top, middle, and bottom velocity are always taken. As previously described, the discharge measurements are made from a boat held by the cable. The rating curve for the year 1898 indicates that the river is deepening its bed. A rapid occurs about one-half mile below the gaging station. Observations were taken of river heights twice each day throughout the year. The discharge measurements, shown on page 185, were made in 1898 by Fred Lemstrom.

Oakdale station on Stanislaus River.—Described on page 187 of Paper No. 16, and also on page 510 of the Nineteenth Annual Report, Part IV; was located until July 30, 1898, at the wagon bridge one-half mile north of the town of Oakdale, California. One gage rod is set between the south or left-hand piers of the wagon bridge on the side toward the water, and can be read from the bridge. The datum is 27.92 feet below the top of the southeast iron pier of the wagon bridge. A rod for lowest readings of the river is 125 feet below the wagon bridge on the left bank and referred to the same datum. A secondary gage for determining the slope of the river is attached to the crib abutment of the Southern Pacific railroad bridge, 1,071 feet below the wagon bridge and referred to the same datum as the upper gage. Its zero is 5.92 feet below the top of the cap on the piles of the south crib pier of the railroad bridge. The pier has settled during the last year. The channel of the river is uniform and straight above and below the station, and both banks are high enough to prevent overflow in all except extreme conditions of flood. The bed of the stream at this point is of sand and gravel and changes only slightly.

The observer until May 4 was Walter Beistle; since then J. W. Bell has been observing on the river, and has reported the daily water height of the river at this point. Soundings were taken twice each month to determine the area of the cross section of the

stream, the intention being to determine the relation between the discharge in volume and area of cross section of the stream, and to use these elements in case the relation between the height of water on gage rod and volume discharged was not satisfactory. The point from which the measurements were made up to July, 1898, was the wagon bridge, 1,071 feet above the railroad bridge. This wagon bridge is nearly 60 feet above the surface of the water, consequently measurements were not as satisfactory as desired. On July 30, 1898, a cable was stretched across the river, 1,000 feet below the railroad bridge, at J. W. Bell's ranch house. The section at this point is relatively satisfactory, there being a stretch of straight river for 1,000 feet above and below the cable. Sand bars, however, are a constant objection to all points on the river, shifting their position with the changing seasons. In order to have the gage rod near the house of Mr. Bell, who is the observer, and also because of contemplated repairs on the railroad bridge to which the old gage was attached, on July 30, 1898, the gage was moved from the south pier of the railroad bridge to a point on the left bank of the stream, 250 feet above the cable and at the side of Mr. Bell's peach orchard; subsequent to this date all observations were taken on this gage. Two rating tables are therefore given for this stream, one prior and one subsequent to July 30, 1898.

As has been stated in previous reports, there are many diversions on the Stanislaus River above Oakdale, the principal one of which is by the Stanislaus and San Joaquin Valley Water Company. The water of the river is diverted on the right bank by this company, in a flume at a point 3 miles above Knights Ferry. A straight section of the flume, known as section 3, was selected, and by turning into it varying amounts of water a complete rating was obtained on June 1, 1898. Mr. J. Y. Beveridge, of Knights Ferry, California, who is the superintendent of the canal, has very kindly furnished the Geological Survey, since the 1st of June, with the daily depth of the water in the canal, from which the volume has been determined. A peculiarity about the rating table for this canal is that the gage height given is the distance down from a fixed point to the water surface. The water carries so much silt from the gold stamp mills above that a gage rod becomes quickly covered with slime, preventing an accurate reading of it. In the column marked "Gage heights," the less the difference given the greater is the corresponding discharge. The rating table for the Stanislaus River indicates that the bed is filling and rising, which is what might have been anticipated, because of the large gold-mining operations which are being carried on above. The discharge measurements, given on page 185, were made in 1898 by J. B. Lippincott.

Lagrange station on Tuolumne River.—Described on page 188 of Paper No. 16; results for 1897 on page 512 of the Nineteenth Annual

Report, Part IV; is located at the bridge in the town of Lagrange, California, 32 miles from Modesto. Observations have been taken daily on the vertical gage rod, which is fastened to timbers between the two iron piers on the right bank of the river. The bench mark is a nail driven into the bottom of the west post of the fifth bent south of the south iron cylinder, and is 15.31 feet above the zero of the rod. The channel, both above and below the bridge, is straight for several hundred feet, and the velocity of the stream is quite uniform. Both banks are high and not subject to overflow. The bed is of gravel. The observer was Cleo Pereira until June 11, and has been Anna P. McGinn for the balance of the year. During the past year the Lagrange Ditch and Hydraulic Mining Company's Canal, which is commonly known as the Mining Company's Canal, which diverts water from the left bank 3 miles above the Lagrange dam, has continued carrying water to its full capacity throughout the year. This volume is approximately 1,200 miner's inches or 24 second-feet. Water from this canal is used for ground sluice mining on the left bank of the river. About one-fourth of this amount returns to the river above the bridge, the rest returning below the bridge. In the latter portion of the year the Turlock irrigation district succeeded in running a small volume of water through its irrigation canal, which diverts its supply from the left bank of the stream at the Lagrange Dam. The amount of this water has been very small, and has been used solely for puddling the banks of the canal and for testing the dams at certain reservoirs. The rating curve for this stream has remained the same for the year 1898 as for 1897. The list of discharge measurements, made by J. B. Lippincott, is given on page 185.

Modesto station on Tuolumne River.—Described on page 189 of Paper No. 16; is located one-half mile south of the depot and at the wagon-road bridge at Modesto, California. The observer is J. T. Reed. Daily observations of river heights have been obtained through the courtesy of William Hood, chief engineer of the Southern Pacific Company. They extend only to January 18, at which time the gage was removed and the station discontinued. This station was not satisfactory in establishing the relation between the volumes discharged and the height of water on the gage rod. Daily records of volume are kept at Lagrange, which is on the same stream 32 miles above, and therefore no measurements of volumes were taken at the Modesto station during the past year.

Herndon station on San Joaquin River.—Described on page 190 of Paper No. 16; results for 1897 given on page 514 of the Nineteenth Annual Report, Part IV; located at the wagon bridge about one-half mile north of Herndon and 12 miles north of Fresno, California, on the line of the Southern Pacific Company. The original gage consisted of a vertical rod fastened to the lower side of the south central railroad bridge pier. The water of this stream attacks the paint on the gage

rod to a peculiar extent. To avoid this inconvenience a new rod was placed above the old one and nailed to the upper portion of the bridge. A float acting in a box, by means of a copper wire passing over a roller, actuates an index which points to a gage height corresponding to the datum of the original rod. The bench mark is at the south end of the wagon-bridge trestle, on the west side, on a nail in a post, 0.2 of a foot above the ground, and marked by a B. M. cut in the post. This elevation shows the rod datum is 24.12 feet. A gage on the same datum is also painted on the southwest cylinder. The channel for 900 feet above and 3,000 feet below the bridge is straight and the water has a uniform velocity. The right bank is high, rocky, and steep. The bed of the stream is sandy and gravelly. The observer is G. G. Nelson. Daily observations of river heights have been made at this station throughout the year, and in addition soundings have been taken twice a month to determine the varying areas of cross section of the river. The station for the years 1896 and 1897 was peculiarly satisfactory, but during the year 1898 it has proved erratic. Measurements of volume during the past season indicate that a different rating curve should be used for 1898 than that used in 1897. The measurements taken during the year 1898 agree quite well within themselves, but differ from previous ones. An effort has been made in this case to establish the relation between areas of cross section and volumes discharged. The condition described above may be explained by the forming of sand bars below the gaging station. The rating curve indicates that the bed of the stream is rising. The discharge measurements, given on page 185, were made by J. B. Lippincott.

Red Mountain station on Kings River.—Described on page 191 of Paper No. 16; results for 1897 given on page 518 of the Nineteenth Annual Report, Part IV; located 15 miles east of Sanger, California, southwest of Red Mountain. The station is on what is called the "Lower section of No. 9" of the lumber flume. It is located at the mouth of the Kings River Canyon and above all diversions from the stream. Within a distance of 5 miles below this station the following canals are taken out: On the right bank, the Church Ditch, which has the prior right; the Fowler Switch Canal, and the Kingsburg Canal; and on the left bank the 76 Canal. The bed of the stream is of gravel and bowlders, and it has maintained its section well since the time it was established in 1896. Measurements made during the year 1898 indicate that the rating curve has not changed materially; a slight correction is made in it between the gage heights 6½ feet and 9½ feet. Daily observations of river heights have been taken throughout the past year by Mrs. Alice House, except during a period from September 18 to October 1, for which time values have been estimated. The discharge measurements, given on page 185, were made by J. B. Lippincott.

Kingsburg station on Kings River.—Described on page 192 of Paper

No. 16; results for 1897 given on page 520 of the Nineteenth Annual Report, Part IV; located on the Southern Pacific Company's bridge, approximately 1 mile south of Kingsburg, California. The water is deep and slow. The observer is Alf. Thompson, and daily gage heights during the past year have been furnished through the courtesy of William Hood, chief engineer of the Southern Pacific Company. The repeated efforts to establish some relation between heights of water on the gage and volumes discharged or areas of cross section to volumes discharged has failed. An investigation was made which showed that diversions from the river, which are made at a point about 2 miles below the gaging station, through certain head gates, materially affect the grade and section of the river at the railroad bridge. For these reasons it has been considered advisable to discontinue the effort to give daily tables of volumes discharged and to give only the heights of water on the gage and the individual measurements that have been made. The station is of interest and importance, owing to the extensive litigation over the waters of the stream, the principal diversions from it occurring above the gaging station, and also to the fact that return water from the San Joaquin Valley is beginning to manifest itself in the increased volume of this river between the upper and lower diversions.

As previously stated, the channel of the stream at this station is badly broken by the piers of the railroad bridge and of a wagon bridge which is immediately below. Because the section is so poor at this point, measurements of discharge have been taken during 1898 at a point known as "Clarks Bridge," which is approximately 2 miles above the railroad bridge and crosses with a single span. The water at Clarks Bridge is deep and in the low stages of the stream it has a very slow velocity. During the summer of 1898 this velocity has been so slow that the meter would not act, consequently the stream has been gaged at a point a short distance above the railroad bridge, where the observations of the meter were taken by wading. The rod readings corresponding with the measurements that were taken both at the Kingsburg railroad bridge, at Clarks Bridge, and at the intermediate station where wading occurred, all were taken at the Kingsburg railroad bridge. This station was considered of value because of the series of diversions of the water a short distance below for the irrigation districts around Hanford. As stated above, there is a considerable amount of return water in this Kings River, which in part supplied this lower demand.

"First point of measurement" station on the Kern River.—Continuous observations by means of an automatic recording apparatus have been maintained on this stream by the Kern County Land Company, and in addition measurements of volumes discharged have been made once a week by this company. These records have been furnished by the courtesy of Mr. Walter James, chief engineer.

TABLES OF DAILY GAGE HEIGHT.

Daily gage height, in feet, of Sacramento River at Jellys Ferry, California, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.90	5.70	11.50	6.00	5.90	7.30	5.40	5.10	5.00	5.10	5.10	5.55
2	5.90	5.80	10.00	6.00	5.90	7.50	5.40	5.10	5.00	5.10	5.10	5.40
3	5.90	5.80	9.10	6.00	5.80	7.10	5.30	5.10	5 00	5.30	5.20	5.35
4	5.90	6.00	8.70	6.00	5.80	7.00	5.30	5.00	5.00	5.30	5.20	5.30
5	5.90	6.10	8.30	6.00	5.80	6.70	5.30	5.00	5.00	5.30	5.20	5.30
6	5.95	8.10	8.10	6.05	5.70	6.60	5.30	5.00	5.00	5.30	5.10	5.30
7	6.00	11.50	7.80	6.30	5.60	6.40	5.30	5.00	5.00	5.20	5.10	5.30
8	6.00	12.10	7.70	6.20	5.60	6.30	5.30	5.00	5.00	5.20	5.10	5.20
9	6.00	9.30	7.60	6.20	5.50	6.20	5.30	5.00	5.00	5.20	5.10	5.20
10	5.90	8.40	7.50	6.20	5.50	6.10	5.20	5.00	5.00	5.20	5.10	5.20
11	5.80	8.10	7.30	6.20	5.50	6.10	5.20	5.00	5.00	5.20	5.10	5.20
12	5.80	7.80	7.30	6.10	5.50	6.00	5.20	5.00	5.00	5.10	5.10	5.20
13	5.80	7.50	6.90	6.10	5.50	5.90	5.20	5.00	5.00	5.10	5.10	5.20
14	5.80	7.40	6.90	6.20	5.50	5.90	5.20	5.00	5.00	5.10	5.10	5.25
15	5.80	7.30	6.80	6.30	5.60	5.90	5.20	5.00	5.00	5.10	5.10	5.30
16	5.80	7.40	6.70	6.30	5.80	5.80	5.20	5.00	5.00	5.10	5.10	5.30
17	5.80	7.30	6.60	6.30	5.90	5.80	5.20	5.00	5.00	5.10	5.10	5.30
18	5.80	7.00	6.60	6.30	6.10	5.80	5.20	5.00	5.00	5.10	5.10	5.30
19	5.80	7.00	6.60	6.20	6.00	5.80	5.20	5.00	5.00	5.10	5.30	5.40
20	5.80	6.70	6.50	6.15	5.90	5.70	5.20	5.00	5.00	5.10	5.40	5.75
21	5.80	8.00	6.40	6.15	6.00	5.70	5.10	5.00	5.00	5.10	5.30	5.65
22	5.80	7.30	6.40	6.10	7.60	5.60	5.10	5.00	5.00	5.10	5.30	5.45
23	5.80	7.00	6.30	6.10	6.60	5.60	5.10	5.00	5.00	5.20	5.30	5.40
24	5.80	7.90	6.30	6.10	6.20	5.60	5.10	5.00	5.00	5.30	5.30	5.30
25	5.80	9.70	6.20	6.10	6.20	5.50	5.10	5.00	5.00	5.30	5.20	5.30
26	5.70	8.90	6.20	6.30	6.10	5.50	5.10	5.00	5.00	5.30	5.20	5.30
27	5.70	11.10	6.20	6.20	6.00	5.50	5.10	5.00	5.10	5.20	5.20	5.30
28	5.70	15.20	6.10	6.10	7.60	5.50	5.10	5.00	5.10	5.15	5.35	5.30
29	5.70	.....	6.10	6.00	7.00	5.40	5.10	5.00	5.10	5.10	6.00	5.30
30	5.70	.....	6.10	6.00	6.60	5.40	5.10	5.00	5.10	5.10	6.15	5.30
31	5.70	.....	6.00	.....	6.40	.....	5.10	5.00	.....	5.10	.....	5.30

Daily gage height, in feet, of Stanislaus River at Oakdale, California, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.50	2.50	3.90	3.10	5.60	3.60	2.80	4.30	4.30	4.30	4.30	4.60
2	2.60	2.40	3.80	3.20	5.10	3.60	2.80	4.40	4.30	4.30	4.30	4.60
3	2.50	2.40	3.70	3.20	4.30	3.30	2.70	4.40	4.30	4.40	4.30	4.50
4	2.70	2.30	3.60	3.20	4.30	3.20	2.50	4.40	4.30	4.30	4.30	4.50
5	2.50	2.30	3.50	3.10	4.10	3.20	2.50	4.30	4.20	4.30	4.30	4.50
6	2.60	2.40	3.50	3.20	4.20	3.50	2.50	4.30	4.20	4.30	4.30	4.50
7	2.70	2.80	3.50	3.30	4.20	3.75	2.50	4.30	4.20	4.30	4.30	4.40
8	2.60	3.40	3.40	3.30	4.30	3.40	2.40	4.30	4.20	4.30	4.40	4.40
9	2.50	3.00	3.40	3.20	4.40	3.50	2.40	4.30	4.20	4.30	4.40	4.40
10	2.50	2.90	3.40	3.60	4.50	3.15	2.40	4.30	4.20	4.30	4.30	4.40
11	2.40	2.80	3.30	3.90	4.70	3.30	2.40	4.30	4.20	4.30	4.30	4.40
12	2.60	2.70	3.10	3.80	4.90	3.40	2.40	4.20	4.20	4.30	4.30	4.50
13	2.60	2.70	3.10	4.10	4.80	3.30	2.40	4.30	4.20	4.30	4.30	4.50
14	2.40	2.70	3.10	4.50	4.90	3.20	2.40	4.20	4.20	4.30	4.20	4.40
15	2.30	2.60	3.00	4.70	4.10	3.20	2.30	4.20	4.20	4.30	4.20	4.40
16	2.40	2.60	2.90	5.20	4.10	3.20	2.20	4.10	4.20	4.30	4.20	4.40
17	2.20	2.50	3.00	5.50	4.90	3.50	2.20	4.20	4.20	4.30	4.20	4.40
18	2.20	2.60	2.90	5.90	4.80	3.70	2.20	4.20	4.20	4.30	4.30	4.50
19	2.30	2.70	3.00	6.00	4.80	3.50	2.20	4.20	4.20	4.30	4.30	4.50
20	2.40	2 60	2.90	5.70	4.80	3.20	2.20	4.20	4.20	4.30	4.30	4.60
21	2.20	2.60	2.90	5.30	4.70	3.00	2.20	4.20	4.20	4.30	4.30	4.80
22	2.10	2.50	2.90	5.30	4.50	3.50	2.20	4.20	4.20	4.30	4.30	4.90
23	2.20	2.60	2.80	4.80	4.30	3.30	2.20	4.20	4.20	4.30	4.20	4.70
24	2.20	2.80	2.80	5.90	4.20	3.10	2.20	4.20	4.30	4.40	4.20	4.70
25	2.30	3.50	2.90	6.50	4.10	3.10	2.20	4.20	4.30	4.40	4.30	4.60
26	2.40	3.20	3.00	6.40	4.00	3.10	2.10	4.30	4.30	4.30	4.30	4.60
27	2.50	3.40	3.00	6.60	3.10	3.10	2.10	4.30	4.40	4.30	4.30	4.50
28	2.30	4.40	2.90	6.10	3.10	3.00	2.10	4.30	4.40	4.30	4.30	4.50
29	2.30	.....	2.80	5.90	3.90	3.00	2.10	4.30	4.30	4.30	4.30	4.50
30	2.40	.....	2.70	5.60	3.80	3.00	*a* 4.30	4.30	4.30	4.30	4.30	4.40
31	2.50	.....	3.10	.....	3.70	.....	4.30	4.30	.....	4.30	.....	4.30

a New rod placed July 30, 1898.

Daily gage height, in feet, of Tuolumne River at Lagrange, California, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.80	4.50	5.80	5.50	6.85	5.90	5.00	3.90	3.90	3.65	3.55	4.75
2	4.80	4.50	5.80	5.50	6.70	5.90	4.80	3.90	3.90	3.80	3.50	4.60
3	4.80	4.50	5.60	5.50	6.60	5.80	4.80	3.90	3.80	3.90	3.55	4.25
4	4.80	4.50	5.50	5.40	6.60	5.80	4.80	4.00	3.60	3.80	3.60	4.10
5	4.80	4.60	5.50	5.45	6.40	5.90	4.70	3.90	3.10	3.70	3.55	4.00
6	4.70	4.80	5.50	5.55	6.40	6.20	4.60	3.90	3.10	3.70	3.55	4.00
7	5.00	4.70	5.50	5.85	6.40	6.40	4.50	3.90	3.10	3.70	3.40	3.90
8	4.80	5.70	5.50	5.75	6.60	6.25	4.50	3.90	3.10	3.70	3.25	3.90
9	4.80	5.20	5.50	5.45	6.90	6.10	4.50	3.90	3.00	3.70	3.20	3.80
10	4.80	5.00	5.80	5.80	7.30	6.00	4.50	3.85	3.00	3.70	3.20	3.75
11	4.70	5.00	5.50	6.10	7.50	6.20	4.50	3.90	3.00	3.70	3.20	3.70
12	4.70	5.00	5.30	6.15	7.40	6.20	4.50	3.90	3.00	3.70	3.20	3.65
13	4.70	5.00	5.30	6.50	7.40	6.20	4.40	3.95	3.00	3.70	3.20	3.75
14	4.70	5.00	5.30	6.70	7.40	6.20	4.50	3.90	3.00	3.60	3.30	3.70
15	4.70	5.10	5.20	6.85	7.40	6.20	4.50	3.90	3.00	3.60	3.30	3.65
16	4.70	5.00	5.10	6.85	7.70	6.30	4.40	3.90	3.00	3.60	3.30	3.40
17	4.70	5.20	5.30	7.05	7.30	6.20	4.40	3.90	3.00	3.60	3.35	3.70
18	4.70	5.20	5.20	7.00	7.20	6.10	4.40	3.90	3.00	3.55	3.35	3.75
19	4.70	5.00	5.00	7.05	7.30	6.00	4.30	3.90	3.00	3.50	3.35	3.75
20	4.60	5.00	5.00	7.10	7.20	5.90	4.20	3.85	3.00	3.50	3.35	3.80
21	4.60	5.00	5.00	6.80	7.20	5.80	4.20	3.90	3.10	3.50	3.40	4.55
22	4.60	5.00	5.00	6.65	7.40	5.60	4.10	3.90	3.10	3.50	3.45	5.80
23	4.60	5.00	5.10	6.40	6.20	5.50	4.20	3.90	3.10	3.50	3.50	5.60
24	4.60	5.00	5.10	8.00	6.20	5.40	4.10	3.80	3.10	3.50	3.60	4.50
25	4.50	6.00	5.20	8.00	6.20	5.30	4.10	3.80	3.30	3.45	3.80	4.40
26	4.50	5.50	5.30	8.00	6.80	5.30	4.00	3.80	3.30	3.45	3.85	4.20
27	4.50	5.50	5.40	7.85	6.70	5.30	4.10	3.80	3.40	3.45	3.75	4.20
28	4.50	6.00	5.30	7.70	6.50	5.30	4.00	3.80	3.50	3.40	3.70	4.20
29	4.50	.....	5.30	7.60	6.50	5.10	4.00	3.80	3.60	3.40	3.70	4.10
30	4.50	.....	5.30	6.95	6.10	5.00	4.00	3.80	3.60	3.45	3.70	4.10
31	4.50	.....	5.40	.....	5.90	.....	3.90	3.90	.....	3.50	.....	4.10

Daily gage height, in feet, of San Joaquin River at Herndon, California, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.17	3.08	3.25	3.42	4.96	4.29	4.00	3.00	2.58	3.17	2.58	2.50
2	3.08	3.08	3.33	3.46	4.96	4.79	3.92	3.00	2.58	3.17	2.58	2.83
3	3.08	3.08	3.21	3.50	5.08	4.54	3.58	3.00	2.58	3.08	2.58	2.83
4	3.08	3.08	3.21	3.46	4.71	4.46	3.50	3.00	2.50	3.04	2.58	2.67
5	3.00	2.92	3.17	3.42	4.71	4.42	3.50	3.00	2.50	2.92	2.58	2.58
6	3.00	3.00	3.37	3.46	4.50	4.54	3.50	3.00	2.50	2.92	2.58	2.58
7	3.00	3.25	3.37	3.62	4.46	4.87	3.50	3.00	2.50	2.92	2.58	2.58
8	3.08	3.75	3.42	3.62	4.62	4.96	3.67	2.92	2.50	2.92	2.58	2.58
9	3.08	3.54	3.42	3.58	4.71	4.79	3.58	2.92	2.50	2.92	2.58	2.58
10	3.08	3.33	3.50	3.83	4.83	4.62	3.62	2.83	2.50	2.92	2.50	2.50
11	3.08	3.29	3.62	3.83	5.46	4.42	3.54	2.83	2.42	2.92	2.50	2.50
12	3.00	3.17	3.33	4.21	5.87	4.58	3.50	2.83	2.42	2.83	2.50	2.42
13	2.92	3.17	3.33	4.29	5.71	4.87	3.50	2.83	2.42	2.83	2.50	2.42
14	3.00	3.17	3.25	4.67	5.46	4.87	3.42	2.83	2.42	2.92	2.50	2.42
15	3.00	3.17	3.33	4.96	5.33	4.79	3.42	2.83	2.42	2.83	2.50	2.42
16	3.08	3.17	3.33	5.04	5.25	4.70	3.42	2.83	2.33	2.83	2.50	2.42
17	3.00	3.25	3.33	5.04	4.92	4.96	3.42	2.83	2.33	2.92	2.50	2.42
18	3.00	3.17	3.29	5.17	4.92	5.21	3.30	2.83	2.33	2.92	2.50	2.42
19	3.00	3.17	3.25	5.37	4.92	5.08	3.16	2.83	2.33	2.83	2.50	2.50
20	3.00	3.25	3.25	5.54	4.83	4.96	3.17	2.75	2.33	2.83	2.50	2.50
21	3.00	3.25	3.17	5.58	4.66	4.96	3.08	2.75	2.33	2.83	2.50	2.50
22	3.08	3.17	3.17	4.96	4.50	4.70	3.08	2.75	2.33	2.75	2.50	3.54
23	3.08	3.17	3.17	5.00	4.50	4.58	3.08	2.75	2.33	2.75	2.50	3.17
24	3.08	3.25	3.17	5.25	4.50	4.33	3.00	2.58	2.33	2.75	2.50	2.96
25	3.00	3.33	3.17	5.83	4.50	4.25	3.00	2.58	2.33	2.75	2.50	2.83
26	3.00	3.37	3.25	6.17	4.75	4.25	3.00	2.58	2.33	2.75	2.50	2.75
27	3.00	3.50	3.25	6.13	5.33	4.29	3.00	2.58	2.46	2.67	2.50	2.67
28	3.00	3.25	3.25	6.04	5.25	4.46	3.00	2.58	4.12	2.67	2.50	2.67
29	3.08	.....	3.29	5.62	4.71	4.25	3.00	2.58	3.46	2.67	2.50	2.67
30	3.08	.....	3.33	5.25	4.62	4.00	2.92	2.58	3.37	2.58	2.50	2.67
31	3.08	.....	3.33	.....	4.37	.....	3.00	2.58	.....	2.58	.....	2.67

Daily gage height, in feet, of Kings River at Red Mountain, California, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.60	4.40	5.00	5.40	7.70	7.60	5.80	4.20	3.70	4.90	3.70	3.90
2	4.50	4.50	5.20	5.50	7.30	7.30	5.70	4.20	3.70	4.60	3.80	3.90
3	4.50	4.50	5.10	5.50	7.40	7.00	5.50	4.20	3.70	4.30	3.80	3.90
4	4.50	4.40	5.00	5.50	7.40	7.10	5.30	4.20	3.70	4.40	3.70	3.80
5	4.50	4.40	4.80	5.70	7.00	7.30	5.20	4.20	3.70	4.20	3.70	3.80
6	4.50	5.00	4.90	5.70	7.10	6.80	5.20	4.20	3.70	4.20	3.70	3.80
7	4.60	4.60	5.10	5.70	7.20	6.80	5.10	4.20	3.60	4.10	3.70	3.90
8	4.60	5.60	5.20	5.80	7.50	6.50	5.10	4.10	3.60	4.10	3.70	3.90
9	4.70	5.20	5.20	6.20	8.10	6.50	5.10	4.10	3.60	4.00	3.70	3.90
10	4.60	5.00	5.20	6.60	8.70	6.40	5.10	4.10	3.60	4.10	3.70	3.80
11	4.50	5.00	5.60	6.70	9.00	6.40	5.00	4.10	3.60	3.90	3.70	3.80
12	4.60	4.90	5.60	6.90	9.20	6.40	4.90	4.00	3.50	3.90	3.70	3.60
13	4.50	4.90	5.50	7.10	8.70	6.70	4.90	4.00	3.50	3.90	3.70	3.60
14	4.50	4.90	5.30	7.60	8.10	6.80	4.90	4.00	3.50	3.90	3.70	3.60
15	4.50	4.80	5.30	8.20	7.70	6.80	4.80	4.00	3.50	3.90	3.70	3.70
16	4.50	4.90	5.30	8.30	7.70	7.00	4.70	4.00	3.50	3.90	3.70	3.70
17	4.50	4.90	5.20	8.30	7.70	7.30	4.70	4.00	3.50	3.90	3.70	3.70
18	4.50	4.90	5.20	8.50	8.10	7.30	4.70	4.00	a3.50	3.90	3.70	3.70
19	4.50	4.90	5.00	8.70	7.60	6.80	4.70	4.00	3.50	3.90	3.70	3.70
20	4.40	4.70	4.50	8.70	7.30	6.70	4.50	4.00	3.50	3.90	3.80	3.70
21	4.40	4.70	5.00	7.70	7.20	6.70	4.50	3.90	3.50	3.90	3.90	6.00
22	4.30	4.70	5.00	7.80	7.30	6.50	4.50	3.90	3.50	3.90	3.90	5.00
23	4.40	4.70	5.00	8.40	7.40	6.30	4.40	3.80	3.50	3.80	3.80	4.00
24	4.30	4.60	5.10	8.70	7.30	6.30	4.40	3.80	3.50	3.80	3.80	3.90
25	4.30	5.40	5.20	9.10	7.60	6.10	4.40	3.80	3.50	3.80	3.80	4.00
26	4.30	5.10	5.20	9.40	8.50	6.40	4.30	3.80	3.50	3.80	3.80	4.00
27	4.40	5.00	5.10	9.50	8.10	6.20	4.30	3.70	3.60	3.70	3.70	4.00
28	4.30	5.00	5.20	9.70	7.50	5.90	4.30	3.80	3.90	3.70	3.80	4.00
29	4.30	.....	5.40	8.70	7.10	5.90	4.30	3.80	4.50	3.70	3.80	4.00
30	4.30	.....	5.50	7.70	7.10	5.80	4.30	3.80	5.00	3.70	3.80	3.90
31	4.30	.....	5.50	.....	7.10	.....	4.30	3.80	.....	3.70	.....	3.80

a No observations from September 18 to October 1. Values in table have been estimated.

Daily gage height, in feet, of Kings River at Kingsburg, California, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.70	3.50	2.75	3.83	6.00	5.50	3.12	3.66	3.46	4.21	3.42	4.04
2	4.25	3.50	3.00	3.75	5.58	5.50	3.62	3.50	3.46	4.00	3.38	4.23
3	3.83	3.50	3.04	3.83	5.08	5.08	3.75	3.25	3.46	3.87	3.50	4.17
4	3.87	3.46	3.00	3.83	4.71	4.75	3.46	3.17	3.50	3.75	3.58	4.17
5	3.83	3.42	3.21	3.79	4.37	4.75	3.54	3.17	3.46	3.66	3.67	4.04
6	3.70	3.50	3.17	4.00	3.58	5.17	3.54	3.08	3.46	3.83	3.58	4.04
7	3.70	4.37	3.13	4.12	3.79	4.96	3.79	3.04	3.42	3.83	3.50	4.00
8	3.75	5.83	3.08	4.00	4.42	4.92	4.04	3.08	3.42	3.75	3.48	4.00
9	4.00	4.75	3.17	4.14	4.58	4.50	3.96	3.04	3.42	3.83	3.58	3.98
10	3.75	3.42	3.21	4.04	5.42	4.21	3.92	3.00	3.37	3.75	3.58	4.00
11	3.75	3.00	4.17	4.21	6.00	3.75	3.96	3.00	3.42	3.75	3.58	3.96
12	3.50	2.87	4.00	4.50	6.33	3.46	4.00	3.00	3.33	3.75	3.58	4.00
13	3.08	2.58	3.87	4.54	6.33	4.17	4.00	3.00	3.33	3.75	3.48	3.92
14	3.46	2.75	3.54	4.87	6.08	5.04	4.04	3.00	3.33	3.66	3.42	3.96
15	3.17	2.66	3.50	5.17	5.83	5.08	4.08	3.00	3.33	3.70	3.42	4.00
16	3.50	2.92	3.46	5.47	5.83	5.17	4.00	2.96	3.33	3.83	3.50	3.96
17	3.50	3.12	3.38	5.40	5.50	4.83	4.00	2.92	3.33	3.75	3.50	4.00
18	3.75	3.08	3.29	5.66	5.42	4.58	4.08	2.92	3.42	3.79	3.42	3.98
19	3.54	3.00	3.29	6.14	5.75	4.50	4.17	3.46	3.33	3.77	3.42	4.00
20	3.50	3.00	3.33	6.70	5.33	4.25	4.04	3.38	3.33	3.75	3.62	4.08
21	3.50	3.13	3.37	6.66	4.83	4.75	3.38	3.46	3.33	3.73	3.62	4.08
22	3.50	3.08	3.33	5.91	5.58	4.79	3.17	3.46	3.33	3.60	3.79	6.17
23	3.50	3.00	3.50	5.62	5.92	4.50	3.21	3.50	3.33	3.58	3.75	4.87
24	3.58	2.96	3.50	6.08	6.00	4.12	3.62	3.42	3.33	3.58	3.92	4.25
25	3.66	2.96	3.50	6.75	6.00	3.79	3.75	3.42	3.66	3.56	4.00	3.83
26	3.33	3.00	3.75	7.12	5.75	3.42	3.92	3.42	3.70	3.50	3.96	3.67
27	3.50	2.50	3.75	7.08	6.50	3.42	3.83	3.42	3.91	3.50	3.92	4.00
28	3.50	2.75	3.54	7.00	6.00	3.50	3.83	3.42	6.00	3.50	4.00	3.96
29	3.50	.....	3.66	6.83	5.58	3.25	3.83	3.42	5.08	3.50	4.00	3.92
30	3.50	.....	3.75	6.00	5.92	3.00	3.75	3.42	4.62	3.42	4.00	4.00
31	3.50	.....	3.75	.....	5.67	.....	3.71	3.42	.....	3.42	.....	4.00

List of discharge measurements, 1898.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
Jan. 28	Sacramento River.	Jellys Ferry, Cal..	Fred Lemstrom ...	5.70	5,578
Feb. 21	do	do	do	8.30	13,118
Feb. 28	do	do	do	15.32	37,818
Mar. 13	do	do	do	6.95	9,495
Mar. 28	do	do	do	6.10	7,155
Apr. 13	do	do	do	6.10	7,216
Apr. 27	do	do	do	6.20	7,606
May 13	do	do	do	5.50	5,473
May 28	do	do	do	7.92	12,477
June 3	do	do	J. B. Lippincott ...	7.10	*a* 9,048
June 13	do	do	Fred Lemstrom ...	5.90	6,162
June 28	do	do	do	5.45	5,093
July 13	do	do	do	5.20	4,625
July 28	do	do	do	5.10	4,520
Aug. 13	do	do	do	5.00	4,324
Aug. 27	do	do	do	5.00	4,089
Sept. 13	do	do	do	5.00	4,160
Sept. 28	do	do	do	5.10	4,322
Oct. 13	do	do	do	5.10	4,380
Oct. 28	do	do	do	5.15	4,271
Nov. 28	do	do	do	5.20	4,662
Dec. 13	do	do	do	5.20	4,367
Apr. 17	Stanislaus River...	Oakdale, Cal	J. B. Lippincott ...	5.30	2,203
June 2	do	do	do	3.77	912
July 29	do	do	do	*b* 4.30	73
Oct. 6	do	do	do	4.20	50
Dec. 22	do	do	do	4.97	362
Apr. 18	Tuolumne River...	Lagrange, Cal.....	do	7.18	5,762
May 31	do	do	do	5.90	1,887
July 30	do	do	do	*c* 3.95	103
Sept. 9	do	do	do	3.00	0.00
Oct. 7	do	do	do	3.70	83
Apr. 19	San Joaquin River.	Herndon, Cal	do	5.42	4,162
May 30	do	do	do	4.58	2,235
July 28	do	do	do	3.00	611
Sept. 2	do	do	do	2.52	328
Dec. 20	do	do	do	2.50	287
Apr. 20	Kings River.....	Red Mountain, Cal.	do	8.55	4,943
May 29	do	do	do	7.14	2,672
July 27	do	do	do	4.32	503
Aug. 31	do	do	do	3.77	244
Dec. 21	do	do	do	7.00	2,444
Apr. 21	do	Kingsburg, Cal	do	6.58	*d* 1,658
Apr. 21	do	do	do	6.58	*d* 1,658
May 28	do	do	do	6.19	*e* 1,026
July 26	do	do	do	3.92	*d* 305
Do...	do	do	do	3.92	*e* 305
Aug. 30	do	do	do	3.42	*d* 94

a Using meter No. 67; using meter No. 12 the discharge was 9,290 second-feet.
b New rod; reading on old rod 2.10.
c On September 9 at gage height 3.00 the discharge stopped.
d S. P. R. R. Bridge.
e Clarks Bridge.

List of miscellaneous discharge measurements, 1898.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
June 1	S. and S. J. V. Canal.	Knights Ferry	J. B. Lippincott ...	−2.39	24
Do...	do	do	do	−1.62	44
Do...	do	do	do	−1.12	61
Do...	do	do	do	−3.89	0
Oct. 5	do	do	do	.....	33
July 10	North Fork of Kern River. *a*	"A" Channel	Frank H. Olmsted.	.....	17
Do...	do	"B" Channel.....	do	.....	199
Do...	do	"C" Channel.....	do	.....	107
Do...	do	"D" Channel.....	do	.....	8
Do...	do	Total	do	.....	331
Do...	South Fork *b*.....	.....	do	.....	13

a Above junction with South Fork.
b At a point 700 feet above junction with North Fork.

Rating tables.

Jellys Ferry.		Oakdale. *a*		Oakdale. *b*		Lagrange.		Herndon.		Red Mountain.	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
5.0	4,250	2.1	74	4.2	50	3.0	-------	2.4	240	3.5	145
5.1	4,475	2.2	114	4.3	74	3.1	8	2.5	290	3.6	180
5.2	4,700	2.3	156	4.4	100	3.2	16	2.6	350	3.7	215
5.3	4,925	2.4	198	4.5	130	3.3	24	2.7	410	3.8	250
5.4	5,150	2.5	240	4.6	165	3.4	32	2.8	470	3.9	285
5.6	5,605	2.6	280	4.7	205	3.6	52	2.9	530	4.0	320
5.8	6,065	2.7	336	4.8	255	3.8	76	3.0	610	4.2	400
6.0	6,525	2.8	384	4.9	315	4.0	100	3.1	712	4.4	480
6.2	7,015	2.9	432	5.0	385	4.2	180	3.2	814	4.6	572
6.4	7,505	3.0	480	-------	-------	4.4	260	3.3	916	4.8	676
6.6	8,000	3.2	592	-------	-------	4.6	390	3.4	1,018	5.0	780
6.8	8,500	3.4	704	-------	-------	4.8	570	3.5	1,120	5.2	908
7.0	9,000	3.6	820	-------	-------	5.0	750	3.6	1,242	5.4	1,036
7.2	9,600	3.8	940	-------	-------	5.2	1,010	3.7	1,364	5.6	1,170
7.4	10,200	4.0	1,060	-------	-------	5.4	1,270	3.8	1,486	5.8	1,310
7.6	10,800	4.2	1,216	-------	-------	5.6	1,620	3.9	1,608	6.0	1,450
7.8	11,400	4.4	1,372	-------	-------	5.8	2,060	4.0	1,730	6.2	1,642
8.0	12,000	4.6	1,540	-------	-------	6.0	2,500	4.2	2,034	6.4	1,834
8.2	12,600	4.8	1,720	-------	-------	6.2	3,020	4.4	2,338	6.6	2,034
8.4	13,200	5.0	1,900	-------	-------	6.4	3,540	4.6	2,660	6.8	2,242
8.6	13,800	5.2	2,108	-------	-------	6.6	4,060	4.8	3,000	7.0	2,450
8.8	14,400	5.4	2,316	-------	-------	6.8	4,580	5.0	3,340	7.2	2,718
9.0	15,000	5.6	2,540	-------	-------	7.0	5,100	5.2	3,744	7.4	2,986
9.2	15,600	5.8	2,780	-------	-------	7.2	5,620	5.4	4,148	7.6	3,280
9.4	16,200	6.0	3,020	-------	-------	7.4	6,140	5.6	4,576	7.8	3,600
9.6	16,800	6.2	3,320	-------	-------	7.6	6,680	5.8	5,028	8.0	3,920
9.8	17,400	6.4	3,620	-------	-------	7.8	7,240	6.0	5,480	8.5	4,870
10.0	18,000	-------	-------	-------	-------	8.0	7,800	6.2	5,968	9.0	6,000
10.5	19,500	-------	-------	-------	-------	8.2	8,400	6.4	6,456	9.5	7,300
11.0	21,000	-------	-------	-------	-------	8.4	9,000	6.6	6,944	-------	-------

a Applicable from January 1 to July 29, 1898. Gage heights refer to old gage.
b Applicable from July 30 to December 31, 1898. Gage heights refer to new gage.

SOUTHERN CALIFORNIA DRAINAGE.

The river stations in southern California are under the charge of Mr. J. B. Lippincott, of Los Angeles. The streams are relatively small, and computations of discharge are based largely upon weir measurements and similar methods.

DESCRIPTION OF RIVER STATIONS.

Palmdale station on Littlerock Creek.—Described on page 193 of Paper No. 16; results for 1897 given on page 526 of the Nineteenth Annual Report, Part IV. The stream was dry from June 4 to the end of 1898. All of the water of the stream throughout the year has been diverted into the flume of the South Antelope Valley Irrigation Company at its headworks in the canyon. This water company has kept these records and furnished them without expense through the courtesy of Burt Cole, chief engineer. On January 4, 1898, a float measurement was made during low stage of water in Pallet Creek. The gage height was 0.52 and the discharge 0.78 second-feet. On the same date a measurement was made of Bigrock Creek opposite the dam site near Pallet Creek in Bigrock Creek. At that time the gage height was 5.70 and the discharge 5.27 second-feet. On this date also a current-meter measurement was made in the development tunnel on

Bigrock Creek, showing that the total developed water equals 1.33 second-feet. On February 20 a current-meter measurement was made by Burt Cole at the Littlerock Creek gaging station in the flume. The height of water was 2.76 feet and the discharge 5.11 second-feet. On March 2 a measurement above the head gate of the Littlerock Creek irrigation district showed there was flowing 2.02 second-feet. A float measurement of this water after flowing in the ditch for about a mile gave a discharge of 1.60 second-feet.

Azusa station on San Gabriel River.—Described on page 194 of Paper No. 16; results given on page 528 of the Nineteenth Annual Report, Part IV. No water was flowing from February 24 to March 9, also from March 11 to May 4, from May 6 to May 15, and from May 21 to the end of the year.

Daily observations have been made on the river by H. F. Parkinson, of Azusa, the superintendent in charge of the division of the water of this stream for all the companies diverting water at the mouth of the canyon. The entire output of the stream, practically, has been diverted into the canals of these companies and measured daily over weirs during 1898. A large number of separate diversions occur, and a number of weirs have been used in this computation. While these records have been kept in detail by Mr. Parkinson, it is considered unnecessary and confusing to give rating tables for all the weirs and the volumes diverted over each; herewith are given a table of gage heights and a rating table for the river at the gaging station, and a table showing the combined flow of the ditches for the period September 1 to December 31.

Unusual difficulties have been encountered in obtaining rating tables for the river rod. In 1897 the Vinelead irrigation district constructed a small diversion dam a short distance below the gage, which compelled its removal to a point higher up the stream. The rod was moved, and all readings for the first portion of 1898 were taken on this rod. During the summer of 1898 this rod was destroyed by unknown parties. In the fall of 1898 a final rod was placed at the same place as its immediate predecessor, and readings were taken thereon. Because of the extremely low rainfall there have been very few opportunities to rate these rods. A curve has been platted, in part from measurements and in part from comparative results of measurements on older rods. It is believed that this table is sufficiently accurate to give fairly good results for the small volumes of water that have passed these rods during the past year. A rating table is given for the Slaughter House tunnel on the Azusa Canal. A gage rod is located at the lower end of this tunnel, on the right-hand side of the conduit. During the ordinary low summer stages 0.7 of the entire volume of water supply passes this point, and the total diversions may be obtained from observations here. Prior to the completion of the weirs of the power company, described below, this was the point of measurement for the diverted waters of the stream.

The cable that was used in the past for the measurement of floods having become old and rusty, not being the property of the Geological Survey, and not being favorably situated for the measurements of floods, was abandoned. A new cable has been stretched across the river by the Geological Survey and a new car made at a point near the present gage rod in the main stream. The San Gabriel Electric Company during the past year has constructed a conduit of 4,000 inches capacity, diverting the water of the river at a point about six miles above the mouth of the canyon from the left bank of the stream and discharging it through a power house at the mouth of the canyon at a point below the gage rod in the river. Weirs have been constructed at the power house equal to the 4,000 inches, and if there is any excess water that the canal companies do not desire which is run through the power house by the electric company, it is wasted in the river below the gage; consequently a wholly new condition of affairs will exist during the year 1899 from that which existed during previous years. Arrangements have been made with the electric company by which they give access to their records, which are kept by automatic recording gages, both on the weirs at the power house and the weirs at the point of diversion. Mr. George Newman, chief engineer of this company, has shown the courtesy of offering this data without charge. This will result in a greatly improved record in the future. The discharge measurements shown on page 190 were made by J. B. Lippincott during 1898.

Warmsprings station on Santa Ana River.—Described on page 195 of Paper No. 16; results for 1897 given on page 567 of the Nineteenth Annual Report, Part IV. It is located 5 miles northeast of Mentone, California, three-fourths of a mile below the headworks of the Santa Ana Canal and opposite Warm Springs in the canyon. The gage is an inclined timber, the lower end of which has been set under the projecting edge of a large bowlder and fastened to upright posts at its upper end. On October 16, owing to some local legal conditions, an unusually large volume of water was turned into the Santa Ana Canal by the Bear Valley Company. This water was wasted from the canal at a point below the old gage rod. Every effort has been made to seek cooperation of the Bear Valley Company in perfecting the records of this stream, in order that they may be as accurate as it is possible to get them. This company has, however, declined to cooperate in this work, and refused to give the records of the amount diverted into their various canals. Individual measurements were made of these canals whenever a gaging was made of the stream itself. The only diversion above the gaging station is into the Santa Ana Canal, but it is probable that there was some fluctuation therein between the dates of measurements of its diversions. The above-mentioned conditions necessitated the establishment of a new gaging rod upon this stream at a point below where the waste from the canal

returned into the river. This was done on November 9, 1898, and since that date daily observations have been kept on the lower gage. This new gage is situated where the river flows at the foot of a granite cliff, about 800 feet below the mouth of Warm Springs Canyon and 100 feet above a road crossing the river. A vertical wooden gage rod has been bolted to the rock bluff which forms the left bank of the river. Since November 9, 1898, observations have been made on the new gage rod bolted to the cliff.

Mill Creek.—An effort has been made to obtain the daily records of flow of water in Mill Creek, but local companies have considered it against their interests to furnish these for publication. Individual measurements have been made of the stream at the head of the zanja, each time the Santa Ana was visited, and, owing to the absence of floods and the conditions of low water throughout southern California during the year 1898, these separate measurements may be taken as fairly representing the discharge of the stream.

TABLES OF DAILY GAGE HEIGHT.

Daily gage height, in feet, of Littlerock Creek at Palmdale, California, for 1898. (*a*)

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	0.35	0.40	0.38	0.42	0.31	0.20	17	0.40	0.40	0.39	0.39	0.56	.....
2	.35	.40	.38	.42	.27	.10	18	.40	.40	.38	.38	.53	.....
3	.35	.40	.38	.45	.27	.00	19	.40	.40	.39	.38	.48	.....
4	.35	.40	.38	.45	.25	.....	20	.40	.40	.40	.37	.47	.....
5	.35	.40	.38	.45	.26	.....	21	.40	.38	.40	.36	.41	.....
6	.35	.40	.38	.45	.35	.....	22	.40	.38	.40	.36	.42	.....
7	.35	.50	.38	.45	.33	.....	23	.40	.38	.38	.36	.38	.....
8	.40	.85	.38	.43	.32	.....	24	.40	.35	.38	.32	.37	.....
9	.40	.61	.38	.41	.32	.....	25	.40	.35	.38	.29	.34	.....
10	.40	.50	.40	.40	.28	.....	26	.40	.40	.40	.28	.31	.....
11	.40	.48	.42	.40	.26	.....	27	.40	.40	.40	.28	.29	.....
12	.40	.45	.40	.40	.24	.....	28	.40	.33	.40	.27	.27	.....
13	.40	.42	.38	.40	.22	.....	29	.40	.....	.41	.28	.25	.....
14	.40	.41	.39	.40	.22	.....	30	.40	.....	.42	.29	.22	.....
15	.50	.41	.39	.39	.24	.....	31	.40	.....	.41	.....	.20	.....
16	.40	.41	.39	.39	.72	.....							

a June 4 to December 31, dry.

Daily gage height, in feet, of San Gabriel River at Azusa, California, for 1898. (*a*)

[Below canal diversions.]

Day.	Jan.	Feb.	Mar.	May.	Day.	Jan.	Feb.	Mar.	May.
1	0.0	0.98	.....	.....	17	1.23	1.50	.....	1.03
2	.0	.98	.....	.....	18	1.22	1.05	.....	1.00
3	.0	.98	.....	.....	19	1.20	1.05	.....	1.02
4	.0	.98	.....	.....	20	1.19	1.05	.....	1.00
5	.0	.52	.....	1.08	21	1.18	1.04	.....	.....
6	.0	.52	.....	.0	22	1.18	1.03	.....	.....
7	.0	.52	.....	.0	23	1.17	1.00	.....	.....
8	.0	1.65	.....	.0	24	1.17	.....	.....	.....
9	1.40	1.50	.....	.0	25	1.17	.....	.....	.....
10	1.50	1.40	0.67	.0	26	1.17	.....	.....	.....
11	1.40	1.30	.....	.0	27	1.17	.....	.....	.....
12	1.36	1.15	.....	.0	28	1.17	.....	.....	.....
13	1.35	1.10	.....	.0	29	1.17	.....	.....	.....
14	1.34	1.05	.....	.0	30	1.17	.....	.....	.....
15	1.30	1.00	.....	1.90	31	.98	.....	.....	.....
16	1.28	1.50	.....	1.35					

a River dry from February 24 to March 9, from March 11 to May 4, May 6 to May 15, and from May 21 to end of year.

Daily discharge in cubic feet, per second, of San Gabriel Canals, measured over weirs near Azusa, California, 1898. (River dry.)

[Watershed 222 sq. mi.]

Date.	Sept.	Oct.	Nov.	Dec.	Date.	Sept.	Oct.	Nov.	Dec.
	Sec.-ft.	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*		*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*
1	8.2	9.0	9.0	11.7	18	6.5	8.0	9.0	15.0
2	10.0	9.8	8.5	11.8	19	6.5	8.4	10.1	14.4
3	8.2	10.0	8.5	11.8	20	6.1	8.6	10.5	14.5
4	8.2	10.5	8.0	11.9	21	7.5	7.9	10.5	14.5
5	8.2	9.0	8.5	11.9	22	7.5	8.2	10.5	14.5
6	8.2	9.0	9.0	11.9	23	7.5	9.0	11.2	14.5
7	7.9	8.5	9.0	12.0	24	7.5	10.0	11.2	14.5
8	7.9	8.5	9.0	12.0	25	8.5	9.0	10.5	14.8
9	8.0	8.5	8.5	12.0	26	8.5	9.1	10.5	14.0
10	8.0	9.0	8.7	12.2	27	7.5	9.1	10.5	14.0
11	7.5	8.7	9.0	12.5	28	10.2	8.9	11.0	14.0
12	7.5	8.0	9.8	12.6	29	8.0	8.9	11.5	14.3
13	7.5	8.0	9.8	12.6	30	10.2	8.4	11.5	14.0
14	7.5	7.5	9.2	12.6	31	.....	8.4	.....	14.5
15	7.0	7.5	9.8	18.2					
16	7.0	7.5	9.8	15.2	Mean	7.8	8.7	9.8	13.5
17	6.7	8.0	9.8	15.0					

Daily gage height, in feet, of Santa Ana River at Warmsprings, California, for 1898.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.00	1.05	1.00	1.02	1.10	1.17	1.10	1.10	1.05	1.05	.....	2.1
2	1.00	1.05	1.00	1.02	1.10	1.15	1.12	1.10	1.05	1.00	.....	2.1
3	1.00	1.05	.97	1.00	.90	1.15	1.13	1.10	1.05	.90	.....	2.1
4	1.00	1.05	.95	1.00	.90	1.05	1.10	1.10	1.05	.90	.....	2.1
5	1.00	1.05	.95	1.00	.85	1.05	1.10	1.07	1.05	.90	.....	2.1
6	1.00	1.35	1.00	1.00	.85	1.15	1.10	1.05	.90	.85	.....	2.1
7	1.00	1.35	1.05	1.00	.85	1.15	1.07	1.00	.90	.80	.....	2.1
8	1.00	1.25	1.05	1.00	.85	1.10	1.07	1.10	.92	.80	.....	2.1
9	1.00	1.20	1.05	1.00	.95	1.10	1.07	1.20	1.10	1.00	.....	2.2
10	1.45	1.15	1.05	1.02	.95	1.15	1.15	1.25	1.15	1.00	2 1	2.1
11	1.15	1.15	1.03	1.00	1.40	1.15	1.15	1.25	1.15	.97	2.1	2.1
12	1.15	1.10	1.07	.91	1.40	1.10	1.22	1.22	1.15	.95	2.1	2.1
13	1.15	1.07	1.10	.91	1.30	1.10	1.20	1.20	1.12	.95	2.1	2.1
14	1.15	1.05	1.00	1.00	1.30	1.10	1.15	1.17	1.10	.95	2.1	2.1
15	1.10	1.05	1.03	1.02	1.60	1.05	1.15	1.15	1.05	.95	2.1	2.1
16	1.10	1.05	1.05	1.02	1.40	1.05	1.15	1.12	1.00	(*a*)	2.1	2.1
17	1.10	1.05	1.00	1.02	1.30	1.05	1.07	1.15	.95	.....	2.1	2.1
18	1.10	1.10	.90	.97	1.30	1.05	1.00	1.15	1.03	.....	2.1	2.1
19	1.10	1.05	.90	.97	1.25	1.05	1.00	1.15	1.07	.....	2.1	2.1
20	1.10	1.05	.87	.95	1.25	1.05	1.10	1.15	1.00	.....	2.3	2.1
21	1.10	1.05	1.00	.95	1.25	1.22	1.12	1.05	1.05	.....	2.2	2.1
22	1.15	1.00	.82	.92	1.25	1.25	1.12	1.05	1.05	.....	2.1	2.1
23	1.25	1.00	.82	.92	1.20	1.25	1.12	1.05	1.05	.....	2.1	2.1
24	1.10	1.00	.85	.92	1.20	1.25	1.12	1.00	1.05	.....	2.1	2.1
25	1.00	1.00	.90	.92	1.20	1.25	1.10	1.10	1.05	.....	2.1	2.1
26	1.00	1.00	1.05	.92	1.20	1.25	1.05	1.00	.92	.....	2.1	2.1
27	1.00	1.00	.95	.90	1.25	1.12	1.10	1.10	.95	.....	2.1	2.1
28	1.05	1.00	1.00	.90	1.25	1.12	1.10	1.00	1.00	.....	2.1	2.1
29	1.05	.....	1.00	.90	1.25	1.10	1.10	1.05	1.05	.....	3.1	2.1
30	1.05	.....	1.00	.90	1.25	1.10	1.10	1.05	1.05	.....	2.1	2.1
31	1.05	.....	1.02	.....	1.20	.....	1.10	1.05	.....	.....	.....	2.1

a Weir measurements were made from October 16 to November 9.

List of discharge measurements.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
1898.				*Feet.*	*Sec.-feet.*
Jan. 4	Pallet Creek	Palmdale, Cal	J. B. Lippincott	.....	*a* 0.78
Do.	Bigrock Creek	do	do	.....	*b* 5.27
Do.	do	do	do	.....	*c* 1.33
Feb. 20	Littlerock Creek	do	Burt Cole	0.39	*d* 5.11
Mar. 2	do	do	do	.....	*e* 2.02
Do.	do	do	do	.....	*f* 1.60
Jan. 12	San Gabriel River	Azusa, Cal	J. B. Lippincott	1.36	23.29
Mar. 8	do	do	do	.....	*g* 49.16

a Low stage of water.
b Opposite dam site near where Pallet Creek enters Bigrock Creek.
c In development tunnel, Bigrock Creek.
d Gaging in flume.
e Water above head gate, Littlerock Creek irrigation district, turned into head gate.
f Measurement of above water after traveling in ditch 1 mile.
g Total in canals.

List of discharge measurements—Continued.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
1898.				*Feet.*	*Sec.-feet.*
Apr. 2	San Gabriel River.	Azuza, Cal.	J. B. Lippincott		a41.00
May 17	do	do	do	1.03	15.40
July 21	do	Power Canal head.	do	4.06	13.21
Aug. 8	do	do	do	3.02	8.42
1897.					
Apr. 30	Azusa Canal	Tunnel	J. A. Vogleson	2.70	55.00
Aug. 7	do	do	A. Q. Campbell	1.80	24.00
Sept. 1	do	do	do	1.58	18.00
Sept. 29	do	do	do	1.35	14.00
Nov. 13	do	do	do	1.54	20.00
Nov. 27	do	do	J. B. Lippincott	1.64	21.00
1898.					
Mar. 8	do	do	H. F. Crowe	2.28	37.00
Apr. 2	do	do	J. B. Lippincott	1.95	30.00
May 10	do	do	do	1.70	23.00
May 17	do	do	do	2.10	32.00
July 1	do	do	F. H. Olmsted		11.78
1897.					
Nov. 13	Duarte Canal	Below division box	A. Q. Campbell	.52	5.35
Nov. 27	do	do	J. B. Lippincott	.85	11.80
1898.					
Jan. 12	do	do	do	.675	8.25
Do.	do	do	do	.40	3.45
Do.	do	do	do	.275	1.81
Do.	do	do	do	.92	12.52
Mar. 8	do	do	H. F. Crowe	.79	12.30
Apr. 2	do	do	J. B. Lippincott	.84	11.30
May 17	do	do	do	.92	13.00
Jan. 8	Santa Ana River	Warmsprings, Cal.	do	1.00	25.56
Do.	Santa Ana Canal	do	do		8.72
Mar. 9	Santa Ana River	do	H. F. Crowe	1.05	43.78
Do.	Santa Ana Canal	do	do		7.04
Apr. 11	Santa Ana River	do	J. B. Lippincott	.97	31.61
Do.	Santa Ana Canal	do	do		7.67
Apr. 29	Santa Ana River	do	do	.90	29.67
Do.	Santa Ana Canal	do	do		8.00
June 12	Santa Ana River	do	do	1.10	35.14
Do.	Santa Ana Canal	do	do		3.92
July 23	Santa Ana River	do	do	1.10	42.22
Do.	Santa Ana Canal	do	do		5.34
Sept. 8	Santa Ana River	do	do	1.05	35.01
Do.	Santa Ana Canal	do	do		1.66
Oct. 18	Santa Ana River	do	F. H. Olmsted	.95	22.78
Do.	Santa Ana Canal	do	do		7.92
Nov. 9	Santa Ana River	do	do	b2.10	21.78
Dec. 8	do	do	do	b2.13	24.74

a Total in canals.
b New gage rod established on November 9 below discharge of Santa Ana Canal waste gate.

Rating tables.

Palmdale.		Azusa.		Azusa Canal Tunnel.		Warmsprings. a		Warmsprings. b	
Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*	*Feet.*	*Sec.-feet.*
0.0	0.0	0.4	0.0	1.0	9.0	0.80	25	2.10	22
.1	.5	.5	.2	1.1	10.6	.85	26	2.15	25
.2	2.0	.6	.5	1.2	12.2	.90	28	2.20	28
.3	4.0	.7	1.2	1.3	13.9	.95	30	2.25	31
.4	6.0	.8	3.0	1.4	15.8	1.00	33	2.30	34
.5	9.0	.9	6.0	1.5	17.8	1.05	36	2.35	38
.6	12.0	1.0	9.0	1.6	19.8	1.10	40	2.40	42
.8	19.0	1.1	13.0	1.7	22.0	1.15	45	.....	.....
1.0	27.0	1.2	17.0	1.8	24.3	1.20	51	.....	.....
1.2	35.0	1.3	21.0	1.9	26.9	1.25	58	.....	.....
1.4	44.0	1.4	26.0	2.0	29.5	1.30	66	.....	.....
1.6	54.0	1.5	31.0	2.1	32.5	1.35	76	.....	.....
1.8	64.0	1.6	38.0	2.2	35.6	1.40	87	.....	.....
2.0	75.0	1.7	45.0	2.3	39.0	1.45	99	.....	.....
2.2	86.0	1.8	53.0	2.4	42.8	1.50	112	.....	.....
2.4	96.0	1.9	63.0	2.5	46.6	1.55	129	.....	.....
2.6	108.0	2.0	80.0	2.6	50.8	1.60	149	.....	.....
2.8	120.0	.....	.....	2.7	55.2	.....	.....	.....	.....

a Applicable from January 1 to November 8, 1898.
b Applicable from November 9 to December 31, 1898.

List of miscellaneous discharge measurements (California), 1898.

Date.	Stream.	Locality.	Hydrographer.	Gage height.	Discharge.
				Feet.	*Sec.-feet.*
Aug. 24	San Gabriel River	Developed in Azusa tunnels.	J. B. Lippincott		.52
Do.	do	Pumped by Azusa at canyon mouth.	do		.30
Apr. 12	Mill Creek	Division box	J. B. Lippincott		15.73
Do.	Green Spot pipe line.		do		1.74
Apr. 29	do	Mill Creek	do		2.94
Do.	Mill Creek	Division box	do		b 18.88
Oct. 18	do	Crafton division box.	F. H. Olmsted		b 15.34
Nov. 9	do	Division box	do		15.20
Mar. 9	Santa Ana River	Weir at head of Highlands Canal.	H. F. Crowe		b 10.76
Do.	do	Flume near pressure box, Redlands Canal.	do		22.00
Apr. 29	Santa Ana Canal	Headworks	J. B. Lippincott		b 12.66
June 20	Santa Ana, south channel.	Narrows below Riverside.	F. H. Olmsted		37.00
Do.	Santa Ana, north channel.	do	do		11.00
	Total				48.00
Aug. 28	Santa Ana River	400 feet below Riverside Bridge.	do		3.85
Do.	do	Near head Roubidoux Ditch.	do		8.50
Aug. 29	do	Below Riverside, at Narrows.	do		8.06
Do.	do	do	do		31.00
Do.	do	Rincon Narrows	do		63.00
Aug. 30	do	Postierra Ditch	do		4.15
Oct. 18	do	Redlands Canal	do	.34	7.26
Do.	do	Head Highlands Ditch.	do		b 9.85
Do.	Head Green Spot pipe line.	Santa Ana	do		1.36
Nov. 9	Santa Ana River	Head Santa Ana Canal.	do		b 19.50
Do.	do	Redlands Canal in flume.	do		b 10.20
Do.	do	Head Green Spot pipe line.	do		.50
Do.	do	Head Highlands Ditch.	do		b 8.12
Dec. 8	do	Head Green Spot pipe line.	do		.50
Do.	do	Head Santa Ana Canal.	do		20.60
June 28	Los Angeles River	Bridge No. 2	J. B. Lippincott	.92	42.00
Do.	do	Main Supply Ditch	do	2.35	18.00
Apr. 29	Highland Canal, north fork.	Headworks	do		b 17.00
Do.	Redlands Canal	do	do		13.00
June 10	Lytle Creek	do	do		b 13.39
Do.	Rialto Canal	Weir	do		12.50
Do.	Grapeland Canal		do		.89
June 20	Narrows Ditch		F. H. Olmsted		3.75
July 23	Green Spot pipe line.	Headworks	J. B. Lippincott		2.20
Aug. 12	Castaic	Near mouth	F. H. Olmsted		(a)
Do.	Pacoima	Submerged dam	do		.20
Do.	Little Tejunga River.	Mouth	do		.05
Aug. 30	Chino Creek	Mains Rancho	do		4.95
Aug. 21	Tulare Lake	Tulare County	do		(a)

a Dry. b Weir.

LOW-WATER MEASUREMENTS.

The summer of 1898 has been one of very great drought throughout the State of California. Not only has the seasonal rainfall been very slight, but it is a culmination of a number of unusually dry years. During the past eight years the annual rainfall with but one exception has been below the average. Because of this shortage of water crop special efforts have been made during the months of August and September of 1898 to take measurements of the low water in numerous streams throughout the State upon which ordinarily no observations have been taken. These measurements can be accepted as representing the minimum flow of the streams upon which they were taken. The following is a list of the midsummer measurements:

Measurements of low-water stage in California during June, July, August, September, and October, 1898, by the United States Geological Survey.

Date.	Stream.	Locality.	Area of section.	Mean velocity.	Discharge.
			Sq. feet.		*Sec.-feet.*
June 2	Sacramento River.	Jellys Ferry	2,547.00	3.552	9,048.00
Sept. 13	....do	....do	1,802.00	2.3	4,152.00
Oct. 7	Yuba River	Dry, except for water from reservoir.			
Oct. 7	American River	North and Middle Fork, at head of North Fork Ditch.			16.00
Sept.—	....do	At Folsom			34.50
June 1	Stanislaus River	Oakdale	486.00	1.875	911.50
June 2	....do	Flume No. 3, Stanislaus and San Joaquin Canal.	24.10	3.00	72.35
July 29	....do	Oakdale	167.00	.435	72.80
Do.	....do	Stanislaus and San Joaquin Canal at Knights Ferry.			42.00
Oct. 6	....do	Oakdale	145.20	.342	49.60
Oct. 5	....do	Stanislaus and San Joaquin Canal.			33.40
Oct. 6	....do	....do			32.70
July 30	Tuolumne River	Lagrange	445.00	.232	103.20
Do.	....do	Mining Company Ditch			24.00
Oct. 7	....do	Lagrange	72.00	1.15	82.70
Do.	....do	Mining Ditch			24.00
Do.	....do	Turlock flume			30.00
	Total flow				136.70
July 28	San Joaquin River.	Herndon	665.00	.92	611.00
Sept. 2	....do	....do	520.00	.631	328.00
July 26	Kings River	Clarks Bridge	1,088.00	.28	305.00
July 25	....do	Kingsburg Railroad bridge	1,290.00	.236	305.00
July 27	....do	Red Mountain	452.00	1.13	503.00
Aug. 30	....do	Kingsburg Railroad bridge	191.70	.492	94.10
Aug. 31	....do	Red Mountain	333.50	.731	243.80
Do.	....do	Church Ditch, check near Trimmer Spring road.	104.40	1.58	164.30
Do.	....do	The 76 Ditch at mouth of canyon.			(a)
Do.	....do	Fowler Switch Canal at mouth of canyon.			(a)
Do.	....do	Kingsburg Ditch at mouth of canyon.			(a)
Sept. 1	Kaweah River	One-half mile above power company's headworks.	28.4	1.24	35.30
Do.	....do	Iron bridge	34.2	.523	17.90
Do.	....do	Irrigation and power ditch			8.50
Do.	....do	Pogues Ditch			4.50
Do.	....do	South Fork Kaweah, at junction.			(a)
Do.	....do	North Fork Kaweah, at junction.			.30
Do.	Tule River	Headworks Pioneer Ditch (estimated).			6.00

a Dry.

Measurements of low-water stage in California during June, July, August, September, and October, 1893, etc.—Continued.

Date.	Stream.	Locality.	Area of section.	Mean velocity.	Discharge.
			Sq. feet.		*Sec.-feet.*
June 20	Warm Creek	Meek and Daily Ditch headworks.	(*a*)		8.42
Do.	do	Stout Ditch, lot 4, block 60, San Bernardino Rancho.			2.30
Do.	do	McKensie Ditch	2.90	.87	2.54
Do.	do	Rabel Ditch, lot 2, block 60	(*a*)		5.67
Do.	do	Beam Ditch			.67
June 7	do	Haws & Talmage first ditch, one-half mile west of Harlem.	.9	1.00	.90
June 30	do	Upper canal, Riverside Water Company, at old Colton Mill.	(*a*)		69.46
Sept. 21	do	do	(*a*)		61.34
Do.	do	Daily flume			.63
Do.	do	McKensie Ditch			2.16
Do.	do	Hays & Talmage			(*b*)
Do.	do	Rabel Ditch, at headworks			3.07
Sept. 22	do	Shay Ditch			2.08
June 10	Lytle Creek	Rialto Canal, Anglo-American division, Canaigre Company.	5.292	2.027	10.73
	do	McIntyre Ditch			.28
	do	San Bernardino Domestic Reservoir.			1.95
June 29	do	Whitings Ditch			.30
June 27	do	800 feet below Mount Vernon Bridge.	(*a*)		.28
Aug. 27	do	Gatehouse, Canaigre Company.	(*a*)		10.01
Sept. 22	do	Whitings Ditch			.10
Do.	do	McIntyre Ditch			.04
Do.	do	Carter Ditch			.003
June 11	West Twin Creek	Tollhouse, Waterman Canyon	.92	2.31	2.12
Sept. 9	do	Estimated			.38
June 11	East Twin Creek	K. C. Syndicate, flume	2.33	.83	1.95
Do.	do	K. C. Syndicate, developed			.11
		Total			2.06
Sept. 7	do	K. C. Syndicate			.73
June 11	City Creek	Headworks in canyon	2.295	1.32	3.03
June 29	do	Longsden & Farrell Ditch	.878	.82	.723
Do.	do	Whitlock Ditch	.209	1.16	.244
Do.	do	Daley Ditch across City Creek	.396	1.56	.62
Sept. 9	do	Headworks in canyon	.36	.20	.07
Sept. 21	do	Longsden & Farrell Ditch			.63
June 12	Plunge Creek	Headworks	1.565	1.446	2.26
Sept. 9	do	Estimated			.20
June 12	Santa Ana River	Warm Springs	18.25	1.923	35.14
Do.	do	Head Santa Ana Canal			3.92
	do	Total at mouth of canyon			39.06
Do.	do	Head North Fork Canal	(*a*)		11.37
Do.	do	Green Spot pipe line			.63
Do.	do	Bolen Tunnel	.32		1.24
Do.	do	Head Redlands Canal			18.40
Do.	do	Morton Canyon			.12
July 23	do	River at Warm Spring	21.57	1.96	42.22
Do.	do	Santa Ana Canal	(*a*)		5.34
	do	Total at mouth of canyon			47.56
Do.	do	Green Spot pipe line	(*a*)		2.2
Do.	do	Redlands Canal			15.0
June 29	do	Head Gage Canal in Santa Ana River.	(*a*)		1.16
Do.	do	Timber Ditch			(*b*)
June 30	do	Rice & Thorn flume, artesian			11.09
Do.	do	Below Ward & Warren Ditch			7.84
Do.	do	Diverted into W. & W. Ditch			.72
June 17	do	"A" + 1, one-half mile below S. C. R. bridge, Riverside to Colton.	6.19	1.57	9.742

a Weir. *b* Dry.

Measurements of low-water stage in California during June, July, August, September, and October, 1898, etc.—Continued.

Date.	Stream.	Locality.	Area of section.	Mean velocity.	Discharge.
			Sq. feet.		*Sec.-feet.*
June 17	Santa Ana River	Riverside Water Co. Ditch, left bank, 2 miles below S. C. R. bridge, Riverside to Colton, 4 p. m.	2.773	3.35	9.27
Do.	do	Same station, 10 a. m.	2.905	3.88	11.27
June 18	do	Jurupa Ditch at Agua Mansa	6.39	2.16	13.83
June 19	do	Spring Brook "D," below Roubidoux hill.	1.10	2.65	2.92
Do.	do	"E" Ditch, right bank, one-half mile below Riverside bridge.	4.72	1.21	5.68
Do.	do	Roubidoux Ditch, near division "F."	4.28	2.08	8.94
Do.	do	River in Narrows, 4 miles below Riverside.	31.91	1.49	47.63
Do.	do	"H" Ditch, 5 miles below bridge, right bank.	3.04	1.23	3.75
Do.	do	"J" Griffith's place, right bank.	8.35	1.20	9.99
June 20	do	Ditch near bridge, Carona to Fullers.	5.87	.82	4.80
Do.	do	"K" Bridge, Carona to Fullers.	35.92	1.53	55.15
June 21	do	"N," 2 miles below Rincon, left bank.	2.05	1.55	3.18
Do.	do	"M," river in narrows 2 miles below Rincon.	46.54	1.71	79.81
June 22	do	Division gate S. A. V. Irrigation Co. and Anaheim Union Co.	40.52	1.66	67.47
Do.	do	5 miles below division box A. U. W. Co.	19.01	1.82	34.74
Do.	do	S. A. V. Irrigation Co. ditch near bridge to Yorba.	19.47	1.49	28.99
June 30	do	Gage Canal, Palm avenue	(*a*)		27.42
July 1	do	Jurupa Ditch			5.60
Sept. 8	do	River at Warm Springs	21.83	1.602	35.01
Do.	do	Santa Ana Canal			1.66
	do	Total at mouth of canyon			36.67
Do.	do	Bolen Tunnel			1.24
Do.	do	Green Spot pipe line			(*b*)
Do.	do	Head Highlands Canal			13.29
Do.	do	Alessandro, water in S. A. Canal.			1.66
Do.	do	Redlands Canal			15.40
Aug. 30	do	Total flow river, division box U. A. and S. A. V. Co.	28.33	1.86	52.89
Do.	do	Cement ditch S. A. V. I. Co.	16.54	1.49	24.62
Aug. 27	do	Jurupa Ditch	5.39	1.85	10.18
Do.	do	Total flow river 1½ miles below Riverside Water Co., lowest canal division.	.53	.94	.50
Do.	do	Head lower canal, Riverside	3.71	1.98	7.35
Aug. 28	do	Roubidoux Ditch, "C"	6.79	1.25	10.18
Do.	do	Ditch to Chinese garden	5.56	.88	4.87
Do.	do	Spring Brook	3.83	.37	1.27
Do.	do	River in narrows below Riverside.	27.16	1.44	39.05
Do.	do	River in Rincon Narrows	40.45	1.65	66.82
Sept. 22	do	Gage Canal, total flow	(*a*)		26.24
Do.	do	Davis Ditch			.37
June 12	Mill Creek	McIntosh water at road crossing.	.14	2.00	.28
Do.	do	Crafton Canal, total flow of creek.	1.92	9.42	18.10
July 23	do	do	(*a*)		11.82
Sept. 8	do	Crafton Canal, total flow of creek.	1.23	10.62	13.07
Do.	do	McIntosh water at road crossing.	.14	2.00	.28
June 24	Los Angeles River	In creek below Macy street			*c* .50
Do.	do	Diversion below Zanja No. 7	4.96	.013	.64
Do.	do	Zanja No. 7	4.05	1.38	5.59
Aug. 10	do	New bridge	(*a*)		1.28

a Weir. *b* Dry. *c* Approximate.

Measurements of low-water stage in California during June, July, August, September, and October, 1898, etc.—Continued.

Date.	Stream.	Locality.	Area of section.	Mean velocity.	Discharge.
			Sq. feet.		*Sec.-feet.*
Aug. 10	Los Angeles River.	San Fernando road crossing..	(a)	.....	4.84
Do.	.....do.....	North Cahuenga road.....	(a)	.....	9.74
Do.	.....do.....	Old bridge No. 4.....	(a)	.....	14.45
Do.	.....do.....	Tajunga Creek at junction....	(a)	.....	.87
Aug. 15	.....do.....	Bridge No. 2 at narrows.....	20.90	1.85	38.74
Do.	.....do.....	Main supply ditch	11.08	1.48	16.42
Do.	.....do.....	Total river at Crystal Springs	.....	.....	55.14
July 1	San Gabriel River.	Duarte water.....	.....	.....	3.59
Do.	.....do.....	Azusa water.....	.....	.....	11.78
June 21	.....do.....	Headworks in canyon.....	(a)	.....	13.21
July 3	.....do.....	Temple Ditch	3.19	2.84	9.06
Do.	.....do.....	Baldwins Ranch house road, first channel.	6.30	1.39	8.79
Do.	.....do.....	Original channel of river	6.61	.93	6.18
Do.	.....do.....	Camper's station No. 11.....	4.06	.83	3.36
Do.	.....do.....	Puente Ditch.....	.....	.....	2.44
Do.	.....do.....	Old Mission Bridge	13.94	2.14	29.79
Do.	.....do.....	Total flow at Puente Narrows	.....	.....	61.63
Do.	.....do.....	Whittier Ditch	.88	2.86	2.52
Aug. 16	.....do.....	Headworks in canyon.....	(a)	.....	5.16
Aug. 31	.....do.....	Flume Whittier Ditch	3.62	.50	1.80
Do.	.....do.....	Temple Ditch	2.67	2.57	6.88
Do.	.....do.....	Old channel	5.39	1.45	7.81
Do.	.....do.....	No. 10, No. 11.....	9.16	.67	6.17
Do.	.....do.....	Old Mission Bridge.....	13.61	2.05	27.91
Aug. 16	.....do.....	Total flow at Puente Narrows	.....	.....	52.60
Aug. 23	.....do.....	Headworks weir in canyon...	.....	.....	8.42
Do.	.....do.....	Mouth East Fork.....	4.50	1.58	7.11
Do.	.....do.....	Mouth West Fork.....	3.47	.77	2.67
Do.	.....do.....	Azusa flume, lower tunnel developed water.	.356	.146	.52
July 1	.....do.....	Monrovia Canyon.....	1.36	.98	1.33
June 18	Santa Clara River.	Camulos Ranch.....	9.57	2.15	25.74
Aug. 11	.....do.....	2 miles east Camulos	9.23	1.88	17.36
Aug. 9	.....do.....	Flume one-half mile above San Francisquito Creek.	9.00	1.20	10.83
July 10 to July 17	Kern River.....	South Fork, 700 feet above junction.	8.03	1.61	12.94
	.....do.....	South Fork, near old engineer camp.	27.60	.65	17.85
	.....do.....	South Fork, sec. 6, T. 22 S., R. 36 E., M. D. M.	11.82	.85	10.05
	.....do.....	South Fork, Monache Meadows.	5.11	1.04	5.31
	.....do.....	North Fork, near junction ...	.....	.....	330.50
Aug. 29	.....do.....	First point of measurement, Bakersfield.	72.53	1.585	115.62
July 2	.....do.....	Monrovia Canyon	1.36	.98	1.33
Do.	San Antonio River.	In canyon.....	(a)	.....	7.59
Do.	.....do.....	Ontario water, near division box.	.347	1.036	.36
Do.	.....do.....	Ontario water, below division box.	2.24	1.72	3.87
Do.	.....do.....	Pomona water at Pierces Camp.	1.97	1.70	3.36
Aug. 26	.....do.....	In canyon.....	(a)	.....	10.01
Aug. 11	Sespe River.....	Division point	2.66	.92	2.46
Do.	Piru Creek.....	French House	1.46	.53	.92
Do.	San Francisquito Creek.	.....	1.84	1.12	2.07
Do.	Little Tejunga River.	.....	.....	.....	.05
Aug. 26	Cucamonga River.	.....	.78	1.33	1.04
Sept. 16	Arroyo Seco	Total flow into Orange Grove avenue reservoir.	.318	1.88	.598
Do.	.....do.....	Flume pumped from Sheep Corral Springs.	2.32	.73	1.69
Do.	.....do.....	Marengo Improvement Co. reservoir.	.155	9.50	1.47
Do.	.....do.....	Reservoir No. 1 P. and L. V. L. and W. Co.	2.64	1.36	3.605
Do.	.....do.....	Tunnel junction Devils Gate, main supply.	2.70	1.02	2.75
Oct. 14	.....do.....	Reservoir No. 1.....	.....	.....	(b)
Sept. 7	Whitewater River.	Above Palm Valley Water Co. headworks.	4.14	2.26	9.35

a Weir. *b* Dry.

INDEX TO PAPERS NOS. 27 AND 28.

1895.

Sixteenth Annual Report of the United States Geological Survey, 1894–95, Part II, Papers of an economic character, 1895; octavo, 598 pp.

Contains a paper on the public lands and their water supply, by F. H. Newell, illustrated by a large map showing the relative extent and location of the vacant public lands; also a report on the water resources of a portion of the Great Plains, by Robert Hay.

A geological reconnoissance of northwestern Wyoming, by George H. Eldridge, 1894; octavo, 72 pp. Bulletin No. 119 of the United States Geological Survey; price, 10 cents.

Contains a description of the geologic structure of portions of the Bighorn Range and Bighorn Basin, especially with reference to the coal fields, and remarks upon the water supply and agricultural possibilities.

Report of progress of the division of hydrography for the calendar years 1893 and 1894, by F. H. Newell, 1895; octavo, 176 pp. Bulletin No. 131 of the United States Geological Survey; price, 15 cents.

Contains results of stream measurements at various points, mainly within the arid region, and records of wells in a number of counties in western Nebraska, western Kansas, and eastern Colorado.

1896.

Seventeenth Annual Report of the United States Geological Survey, 1895–96, Part II, Economic geology and hydrography, 1896; octavo, 864 pp.

Contains papers on "The underground water of the Arkansas Valley in eastern Colorado," by G. K. Gilbert; "The water resources of Illinois," by Frank Leverett, and "Preliminary report on the artesian areas of a portion of the Dakotas," by N. H. Darton.

Artesian-well prospects in the Atlantic Coastal Plain region, by N. H. Darton, 1896; octavo, 230 pp., 19 plates. Bulletin No. 138 of the United States Geological Survey; price, 20 cents.

Gives a description of the geologic conditions of the coastal region from Long Island, N. Y., to Georgia, and contains data relating to many of the deep wells.

Report of progress of the division of hydrography for the calendar year 1895, by F. H. Newell, hydrographer in charge, 1896; octavo, 356 pp. Bulletin No. 140 of the United States Geological Survey; price, 25 cents.

Contains a description of the instruments and methods employed in measuring streams and the results of hydrographic investigations in various parts of the United States.

1897.

Eighteenth Annual Report of the United States Geological Survey, 1896–97, Part IV, Hydrography, 1897; octavo, 756 pp.

Contains a "Report of progress of stream measurements for the calendar year 1896," by Arthur P. Davis; "The water resources of Indiana and Ohio," by Frank Leverett; "New developments in well boring and irrigation in South Dakota," by N. H. Darton, and "Reservoirs for irrigation," by J. D. Schuyler.

1898.

Nineteenth Annual Report of the United States Geological Survey, 1897–98, Part IV, Hydrography, 1899; octavo, 814 pp.

Contains a "Report of progress of stream measurements for the calendar year 1898," by F. H. Newell and others; "The rock waters of Ohio," by Edward Orton, and "Preliminary report on the geology and water resources of Nebraska west of the one hundred and third meridian," by N. H. Darton.

WATER-SUPPLY AND IRRIGATION PAPERS, 1896–1899.

This series of papers is designed to present in pamphlet form the results of stream measurements and of special investigations. A list of these, with other information, is given on the outside (or fourth) page of this cover.

Survey bulletins can be obtained only by prepayment of cost, as noted above. Postage stamps, checks, and drafts can not be accepted. Money should be transmitted by postal money order or express order, made payable to the Director of the United States Geological Survey. Correspondence relating to the publications of the Survey should be addressed to **The Director, United States Geological Survey, Washington, D. C.**

WATER-SUPPLY AND IRRIGATION PAPERS.

1. Pumping water for irrigation, by Herbert M. Wilson, 1896.
2. Irrigation near Phœnix, Arizona, by Arthur P. Davis, 1897.
3. Sewage irrigation, by George W. Rafter, 1897.
4. A reconnoissance in southeastern Washington, by Israel C. Russell, 1897.
5. Irrigation practice on the Great Plains, by E. B. Cowgill, 1897.
6. Underground waters of southwestern Kansas, by Erasmus Haworth, 1897.
7. Seepage waters of northern Utah, by Samuel Fortier, 1897.
8. Windmills for irrigation, by E. C. Murphy, 1897.
9. Irrigation near Greeley, Colorado, by David Boyd, 1897.
10. Irrigation in Mesilla Valley, New Mexico, by F. C. Barker, 1898.
11. River heights for 1896, by Arthur P. Davis, 1897.
12. Water resources of southeastern Nebraska, by Nelson Horatio Darton, 1898.
13. Irrigation systems in Texas, by W. F. Hutson, 1898.
14. New tests of pumps and water lifts used in irrigation, by O. P. Hood, 1898.
15. Operations at river stations, 1897, Part I, 1898.
16. Operations at river stations, 1897, Part II, 1898.
17. Irrigation near Bakersfield, California, by C. E. Grunsky, 1898.
18. Irrigation near Fresno, California, by C. E. Grunsky, 1898.
19. Irrigation near Merced, California, by C. E. Grunsky, 1899.
20. Experiments with windmills, by Thomas O. Perry, 1899.
21. Wells of northern Indiana, by Frank Leverett, 1899.
22. Sewage irrigation, Part II, by George W. Rafter, 1899.
23. Water-right problems of Bighorn Mountains, by Elwood Mead, 1899.
24. Water resources of the State of New York, Part I, by George W. Rafter, 1899.
25. Water resources of the State of New York, Part II, by George W. Rafter, 1899.
26. Wells of southern Indiana (continuation of No. 21), by Frank Leverett, 1899.
27. Operations at river stations, 1898, Part I, 1899.
28. Operations at river stations, 1898, Part II, 1899.

In addition to the above, there are in various stages of preparation other papers relating to the measurement of streams, the storage of water, the amount available from underground sources, the efficiency of windmills, the cost of pumping, and other details relating to the methods of utilizing the water resources of the country. Provision has been made for printing these by the following clause in the sundry civil act making appropriations for the year 1896–97:

Provided, That hereafter the reports of the Geological Survey in relation to the gauging of streams and to the methods of utilizing the water resources may be printed in octavo form, not to exceed 100 pages in length and 5,000 copies in number; 1,000 copies of which shall be for the official use of the Geological Survey, 1,500 copies shall be delivered to the Senate, and 2,500 copies shall be delivered to the House of Representatives, for distribution. (Approved, June 11, 1896; Stat. L., vol. 29, p. 453.)

The maximum number of copies available for the use of the Geological Survey is 1,000. This quantity falls far short of the demand, so that it is impossible to supply all requests. Attempts are made to send these pamphlets to persons who have rendered assistance in their preparation through replies to schedules or who have furnished data. Requests made for a certain paper and stating a reason for asking for it are granted whenever practicable, but it is impossible to comply with general demands, such as to have all of the series sent indiscriminately.

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