DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

WATER-SUPPLY PAPER 290

SURFACE WATER SUPPLY OF THE UNITED STATES

1910

PART X. THE GREAT BASIN

PREPARED UNDER THE DIRECTION OF M. O. LEIGHTON

BY

E. C. LA RUE, F. F. HENSHAW, AND
E. A. PORTER

WASHINGTON
GOVERNMENT PRINTING OFFICE
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SURFACE WATER SUPPLY OF THE GREAT BASIN, 1910.

By E. C. La Rue, F. F. Henshaw, and E. A. Porter.

INTRODUCTION.

AUTHORITY FOR INVESTIGATIONS.

This volume contains results of measurements of the flow of certain streams in the United States. The work was performed by the United States Geological Survey, either independently or in cooperation with private or State organizations. The organic law of the Geological Survey (Stat. L., vol. 20, p. 394) contains the following paragraph:

Provided, That this officer [the Director] shall have the direction of the geological survey and the classification of public lands and examination of the geological structure, mineral resources, and products of the national domain.

As water is the most abundant and most valuable of the minerals the investigation of water resources is authorized under the provision for examining mineral resources. The work has been supported since the fiscal year ending June 30, 1895, by appropriations in successive sundry civil bills passed by Congress under the following item:

For gaging the streams and determining the water supply of the United States, and for the investigation of underground currents and artesian wells, and for the preparation of reports upon the best methods of utilizing the water resources.

The various appropriations that have been made for this purpose are as follows:

Annual appropriations for the fiscal year ending June 30—

1895	$12,500
1896	20,000
1897 to 1900, inclusive	50,000
1901 to 1902, inclusive	100,000
1903 to 1906, inclusive	200,000
1907	150,000
1908 to 1910, inclusive	100,000
1911	150,000

SCOPE OF INVESTIGATIONS.

These investigations are not complete nor are they inclusive of all the streams that might purposefully be studied. The scope of the work is limited by the appropriations available. The field covered is the widest and the character of the work is believed to be the best possible under the controlling conditions. The work would undoubtedly have greater scientific importance and ultimately be of more practical value if the money now expended for wide areas were concentrated on a few small drainage basins; but such a course is impossible because general appropriations made by Congress are applicable to all parts of the country. Each part demands its proportionate share of the benefits.

It is essential that records of stream flow shall be kept during a period of years long enough to determine within reasonable limits the entire range of flow from the absolute maximum to the absolute minimum. The length of such a period manifestly differs for different streams. Experience has shown that the records for some streams should cover 5 to 10 years, and those for other streams 20 years, or even more, the limit being determined by the relative importance of the stream and the interdependence of the results with other long-time records on adjacent streams.

In the performance of this work an effort is made to reach the highest degree of precision possible with a rational expenditure of time and a judicious expenditure of a small amount of money. In all engineering work there is a point beyond which refinement is needless and wasteful, and this statement applies with especial force to stream-flow measurements. It is confidently believed that the stream-flow data presented in the publications of the Survey are in general sufficiently accurate for all practical purposes. Many of the records are, however, of insufficient length, owing to the unforeseen reduction of appropriations and consequent abandonment of stations. All persons are cautioned to exercise the greatest care in using such incomplete records.

Records have been obtained at nearly 2,000 different points in the United States. The surface water supply of small areas in Seward Peninsula and Yukon-Tanana region, Alaska, and in Hawaii has also been investigated. During 1910 regular gaging stations were maintained by the Survey and cooperating organizations at about 1,100 points in the United States, and many discharge measurements were made at other points. Data were also obtained in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country, and will be made available in the regular surface water-supply papers and in special papers from time to time.

PUBLICATIONS.

The data on stream flow collected by the United States Geological Survey have appeared in the annual reports, bulletins, and water-supply papers. Owing to natural processes of evolution and to changes in governmental requirements the character of the work and the territory covered by these different publications have varied greatly. For the purpose of uniformity in the presentation of reports a general plan has been agreed upon by the United States Reclamation Service, the United States Forest Service, the United States Weather Bureau, and the United States Geological Survey, according to which the area of the United States has been divided into 12 parts, whose boundaries coincide with certain natural drainage lines. The areas so described are indicated by the following list of papers on surface-water supply for 1910. The dividing line between the north Atlantic and south Atlantic drainage areas lies between York and James rivers.

Papers on surface-water supply of the United States, 1910.

Part.	No.	Title.
I	281	North Atlantic coast.
II	282	South Atlantic coast and eastern Gulf of Mexico.
III	283	Ohio River basin.
IV	284	St. Lawrence River basin.
V	285	Upper Mississippi River and Hudson Bay basins.
VI	286	Missouri River basin.
VII	287	Lower Mississippi River basin.
VIII	288	Western Gulf of Mexico.
IX	289	Colorado River basin.
X	290	Great Basin.
XI	291	Pacific coast, California.
XII	292	North Pacific coast.

The following table gives the character of data regarding stream flow at regular stations to be found in the various publications of the United States Geological Survey, exclusive of special papers:

Stream-flow data in reports of the United States Geological Survey.

[A=Annual Report; B=Bulletin; WS=Water-Supply Paper.]

Report.	Character of data.	Year.
10th A, pt. 2	Descriptive information only	
11th A, pt. 2	Monthly discharge	1884 to Sept., 1890.
12th A, pt. 2	do	1884 to June 30, 1891.
13th A, pt. 3	Mean discharge in second-feet	1884 to Dec. 31, 1892.
14th A, pt. 2	Monthly discharge (long-time records, 1871 to 1893)	1888 to Dec. 31, 1893.
B 131	Descriptions, measurements, gage heights, and ratings	1893 and 1894.
16th A, pt. 2	Descriptive information only	
B 140	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).	1895.
WS 11	Gage heights (also gage heights for earlier years)	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also similar data for earlier years).	1895 and 1896.
WS 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
WS 16	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).	1897.
WS 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
WS 28	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.
20th A, pt. 4	Monthly discharge (also for many earlier years)	1898.
WS 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A, pt. 4	Monthly discharge	1899.
WS 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A, pt. 4	Monthly discharge	1900.
WS 65, 66	Descriptions, measurements, gage heights, and ratings	1901.
WS 75	Monthly discharge	1901.
WS 82 to 85	Complete data	1902.
WS 97 to 100	do	1903.
WS 124 to 135	do	1904.
WS 165 to 178	do	1905.
WS 201 to 214	Complete data, except descriptions	1906.
WS 241 to 252	Complete data	1907–8.
WS 261 to 272	do	1909.
WS 281 to 292	do	1910.

NOTE.—No data regarding stream flow are given in the fifteenth and seventeenth annual reports.

The records at most of the stations discussed in these reports extend over a series of years. An index of the reports containing records prior to 1904 has been published in Water-Supply Paper 119.

The first table which follows gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1910. Wherever the data for a drainage basin appear in two papers the number of one is placed in parentheses, and the portion of the basin covered by that paper is indicated in the second table. For example, in 1904 the data for Missouri River were published in Water-Supply Papers 130 and 131, and the portion of the records contained in Water-Supply Paper 131, as indicated by the second table, is that relating to Platte and Kansas rivers.

Numbers of water-supply papers containing results of stream measurements, 1899–1910.

	1899[1]	1900[2]	1901	1902	1903
Atlantic coast and eastern Gulf of Mexico:					
New England rivers	35	47	65,75	82	97
Hudson River to Delaware River, inclusive	35	47,(48)	65,75	82	97
Susquehanna River to York River, inclusive	35	48	65,75	82	97
James River to Yadkin River, inclusive	(35),36	48	65,75	(82),83	(97),98
Santee River to Pearl River, inclusive	36	48	65,75	83	98
St. Lawrence River	36	49	65,75	(82),83	97
Hudson Bay			66,75	85	100
Mississippi River:					
Ohio River	36	48,(49)	65,75	83	98
Upper Mississippi River	36	49	65,75	83	98,(99)
Missouri River	(36),37	49,(50)	66,75	84	99
Lower Mississippi River	37	50	(65), 66,75	(83),84	(98),99
Western Gulf of Mexico	37	50	66,75	84	99
Pacific coast and Great Basin:					
Colorado River	(37),38	50	66,75	85	100
Great Basin	38,(39)	51	66,75	85	100
South Pacific coast to Klamath River, inclusive	(38),39	51	66,75	85	100
North Pacific coast	38	51	66,75	85	100

	1904	1905	1906	1907–8	1909	1910
Atlantic coast and eastern Gulf of Mexico:						
New England rivers	124	165	201	241	261	281
Hudson River to Delaware River, inclusive	125	166	202	241	261	281
Susquehanna River to York River, inclusive	126	167	203	241	261	281
James River to Yadkin River, inclusive	126	167	203	242	262	282
Santee River to Pearl River, inclusive	127	168	204	242	262	282
St. Lawrence River	129	170	206	244	264	284
Hudson Bay	130	171	207	245	265	285
Mississippi River:						
Ohio River	128	169	205	243	263	283
Upper Mississippi River	128, (130)	171	207	245	265	285
Missouri River	130, (131)	172	208	246	266	286
Lower Mississippi River	(128), 131	(169), 173	(205), 209	247	267	287
Western Gulf of Mexico	132	174	210	248	268	288
Pacific coast and Great Basin:						
Colorado River	133, (134)	175, (177)	211, (213)	249, (251)	269, (271)	289
Great Basin	133, (134)	176, (177)	212, (213)	250, (251)	270, (271)	290
South Pacific coast to Klamath River, inclusive	134	177	213	251	271	291
North Pacific coast	135	(177), 178	214	252	272	292

[1] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39.
[2] Rating tables and index to Water-Supply Papers 47–52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52.

Numbers of water-supply papers containing data covering portions of drainage basins.

No.	River basin.	Tributaries included.
35	James	
36	Missouri	Gallatin.
37	Colorado	Green, Gunnison, Grand above junction with Gunnison.
38	Sacramento	Except Kings and Kern.
39	Great Basin	Mohave.
48	Delaware	Wissahickon and Schuylkill.
49	Ohio	Scioto.
50	Missouri	Loup and Platte near Columbus, Nebr. All tributaries below junction with Platte.
65	Lower Mississippi	Yazoo.
82	James	
	St. Lawrence	Lake Ontario, tributaries to St. Lawrence River proper.
83	Lower Mississippi	Yazoo.
97	James	
98	Lower Mississippi	Yazoo.
99	Upper Mississippi	Tributaries from the west.
128	Lower Mississippi	Yazoo.
130	Upper Mississippi	Tributaries from the west.
131	Missouri	Platte, Kans.
134	Colorado	Data near Yuma, Ariz., repeated.
	Great Basin	Susan, Owens, Mohave.
169	Lower Mississippi	Yazoo.
177	Colorado	Below junction with Gila.
	Great Basin	Susan repeated, Owens, Mohave.
	North Pacific coast	Rogue, Umpqua, Siletz.
205	Lower Mississippi	Yazoo, Homochitto.
213	Colorado	Data at Hardyville repeated; at Yuma, Salton Sea.
	Great Basin	Owens, Mohave.
251	Colorado	Yuma and Salton Sea stations repeated.
271	Great Basin	Owens River basin.

The order of treatment of stations in any basin in these papers is downstream. The main stem of any river is determined by measuring or estimating the drainage area; that is, the headwater stream having the largest drainage area is considered the continuation of the main stream, and local changes in name and lake surface are disregarded. Records for all stations from the source to the mouth of the main stem of the river are presented first, and records for the tributaries in regular order from source to mouth follow, all records in each tributary basin being given before those of the next basin below.

The exceptions to this rule occur in the records for Mississippi River, which are given in four parts, as indicated above, and in the records for large lakes, where it is simpler to take up the streams in regular order around the rim of the lake than to cross back and forth over the lake surface.

DEFINITION OF TERMS.

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups—(1) those which represent a rate of flow, as second-feet, gallons per minute, miner's inches, and run-off in second-feet per square mile, and (2) those which represent the actual quantity of water, as run-off in depth in inches and acre-feet. The units used in this series of reports are second-feet, second-feet per square mile, and run-off in inches and acre-feet. They may be defined as follows:

"Second-foot" is an abbreviation for cubic foot per second and is the rate of discharge of water flowing in a stream 1 foot wide, 1 foot deep, at a rate of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the following table of equivalents.

"Second-feet per square mile" is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

"Run-off in inches" is the depth to which the drainage area would be covered if all the water flowing from it in a given period were conserved and uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth in inches.

"Acre-foot" is equivalent to 43,560 cubic feet, and is the quantity required to cover an acre to the depth of 1 foot. It is commonly used in connection with storage for irrigation work.

CONVENIENT EQUIVALENTS.

The following is a list of convenient equivalents for use in hydraulic computations:

1 second-foot equals 40 California miner's inches (law of Mar. 23, 1901).
1 second-foot equals 38.4 Colorado miner's inches.
1 second-foot equals 40 Arizona miner's inches.
1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.
1 second-foot equals 6.23 British imperial gallons per second.
1 second-foot for one year covers 1 square mile 1.131 feet or 13.572 inches deep.
1 second-foot for one year equals 31,536,000 cubic feet.
1 second-foot equals about 1 acre-inch per hour.
1 second-foot for one day covers 1 square mile 0.03719 inch deep.
1 second-foot for one 28-day month covers 1 square mile 1.041 inches deep.
1 second-foot for one 29-day month covers 1 square mile 1.079 inches deep.
1 second-foot for one 30-day month covers 1 square mile 1.116 inches deep.
1 second-foot for one 31-day month covers 1 square mile 1.153 inches deep.
1 second-foot for one day equals 1.983 acre-feet.
1 second-foot for one 28-day month equals 55.54 acre-feet.
1 second-foot for one 29-day month equals 57.52 acre-feet.
1 second-foot for one 30-day month equals 59.50 acre-feet.
1 second-foot for one 31-day month equals 61.49 acre-feet.
100 California miner's inches equals 18.7 United States gallons per second.
100 California miner's inches equals 96.0 Colorado miner's inches.
100 California miner's inches for one day equals 4.96 acre-feet.
100 Colorado miner's inches equals 2.60 second-feet.
100 Colorado miner's inches equals 19.5 United States gallons per second.
100 Colorado miner's inches equals 104 California miner's inches.
100 Colorado miner's inches for one day equals 5.17 acre-feet.
100 United States gallons per minute equals 0.223 second-foot.
100 United States gallons per minute for one day equals 0.442 acre-foot.

1,000,000 United States gallons per day equals 1.55 second-feet.
1,000,000 United States gallons equals 3.07 acre-feet.
1,000,000 cubic feet equals 22.95 acre-feet.
1 acre-foot equals 325,850 gallons.
1 inch deep on 1 square mile equals 2,323,200 cubic feet.
1 inch deep on 1 square mile equals 0.0737 second-foot per year.
1 foot equals 0.3048 meter.
1 mile equals 1.60935 kilometers.
1 mile equals 5,280 feet.
1 acre equals 0.4047 hectare.
1 acre equals 43,560 square feet.
1 acre equals 209 feet square, nearly.
1 square mile equals 2.59 square kilometers.
1 cubic foot equals 0.0283 cubic meter.
1 cubic foot equals 7.48 gallons.
1 cubic foot of water weighs 62.5 pounds.
1 cubic meter per minute equals 0.5886 second-foot.
1 horsepower equals 550 foot-pounds per second.
1 horsepower equals 76.0 kilogram-meters per second.
1 horsepower equals 746 watts.
1 horsepower equals 1 second-foot falling 8.80 feet.
1½ horsepower equals about 1 kilowatt.

To calculate water power quickly: $\frac{\text{Sec.-ft.} \times \text{fall in feet}}{11}$ = net horsepower on water wheel realizing 80 per cent of theoretical power.

EXPLANATION OF DATA.

For each drainage basin there is given a brief general description covering such items as area, source, tributaries, topography, geology, forestation, rainfall, irrigation, storage, power, and other interesting or important facts.

For each regular current-meter gaging station the following data, so far as available, are given: Description of station, list of discharge measurements, table of daily gage heights, table of daily discharges, table of monthly and yearly discharges, and run-off. For stations located at weirs or dams the gage-height table is omitted.

In addition to statements regarding the location and installation of current-meter stations, the descriptions give information in regard to any conditions which may affect the constancy of the relation of gage height to discharge, covering such points as ice, logging, shifting channels, and backwater; also information regarding diversions which decrease the total flow at the measuring section. Statements are also made regarding the accuracy and reliability of the data.

The discharge-measurement table gives the results of the discharge measurements made during the year, including the date, name of hydrographer, width and area of cross section, gage height, and discharge in second-feet.

The table of daily gage heights records the daily fluctuations of the surface of the river as found from the mean of the gage readings

taken each day. At most stations the gage is read in the morning and in the evening. The gage height given in the table represents the elevation of the surface of the water above the zero of the gage. All gage heights affected by the presence of ice in the streams or by backwater from obstructions are published as recorded, with suitable footnotes. The rating table is not applicable for such periods unless the proper corrections to the gage heights are known and applied. Attention is called to the fact that the zero of the gage is placed at an arbitrary datum and has no relation to zero flow or the bottom of the river. In general the zero is located somewhat below the lowest known flow, so that negative readings shall not occur.

The discharge measurements and gage heights are the base data from which rating tables, daily discharge tables, and monthly discharge tables are computed.

The rating table gives, either directly or by interpolation, the discharge in second-feet corresponding to every stage of the river recorded during the period for which it is applicable. It is not published in this report, but can be determined from the daily gage heights and daily discharges for the purpose of verifying the published results as follows:

First plot the discharge measurements for the current and earlier years on cross-section paper, with gage heights in feet as ordinates and discharge in second-feet as abscissas. Then tabulate a number of gage heights taken from the daily gage-height table for the complete range of stage given and the corresponding discharges for the days selected from the daily discharge table and plot the values on cross-section paper. The last points plotted will define the rating curve used and will lie among the plotted discharge measurements. After drawing the rating curve, a table can be developed by scaling off the discharge in second-feet for each tenth foot of gage height. These values should be so adjusted that the first differences shall always be increasing or constant, except for known backwater periods.

The table of daily discharges gives the discharges in second-feet corresponding to the observed gage heights as determined from the rating tables.

In the table of monthly discharge the column headed "Maximum" gives the mean flow, as determined from the rating table, for the day when the mean gage height was highest. As the gage height is the mean for the day, it does not indicate correctly the stage when the water surface was at crest height and the corresponding discharge was consequently larger than given in the maximum column. Likewise, in the column of "Minimum" the quantity given is the mean flow for the day when the mean gage height was lowest. The

column headed "Mean" is the average flow in cubic feet for each second during the month. On this the computations for the remaining columns, which are defined on page 12, are based.

The field methods used in the collection of the data presented in this series of reports are described in the introductory sections of Water-Supply Papers 261 to 272, inclusive, "Surface water supply of the United States, 1909." Plate I shows typical gaging stations, indicating the method of suspending the current meter; Plate II shows the various types of current meters [1] used in the work.

ACCURACY AND RELIABILITY OF FIELD DATA AND COMPARATVE RESULTS.

The accuracy of stream-flow data depends primarily on the natural conditions at the gaging station and on the methods and care with which the data are collected. Errors of the first group depend on the degree of permanency of channel and of permanency of the relation between discharge and stage.

Errors of the second class are due, first, to errors in observation of stage; second, to errors in measurements of flow; and, third, to errors due to misinterpretation of stage and flow data.

Practically all discharge measurements made under fair conditions are well within 5 per cent of the true discharge at the time of observation. Inasmuch as the errors of meter measurements are largely compensating, the mean rating curve, when well defined, is much more accurate than the individual measurements. Numerous experiments made to test the accuracy of current-meter work show that it compares very favorably with the results from standard weirs and, owing to simplicity of methods, usually gives results that are much more reliable than those from stations at dams, where the coefficient may be uncertain and conditions of flow are complicated.

The work is, of course, dependent on the reliability of the gage observers. With relatively few exceptions the observers perform their work honestly. The records are, however, closely watched, and the cause of any discrepancy is investigated. It is obvious that one gage reading a day does not always give the mean height for that day. As an almost invariable rule, however, errors from this source are compensating and virtually negligible in a period of one month, although a single day's reading may, when taken by itself, be considerably in error.

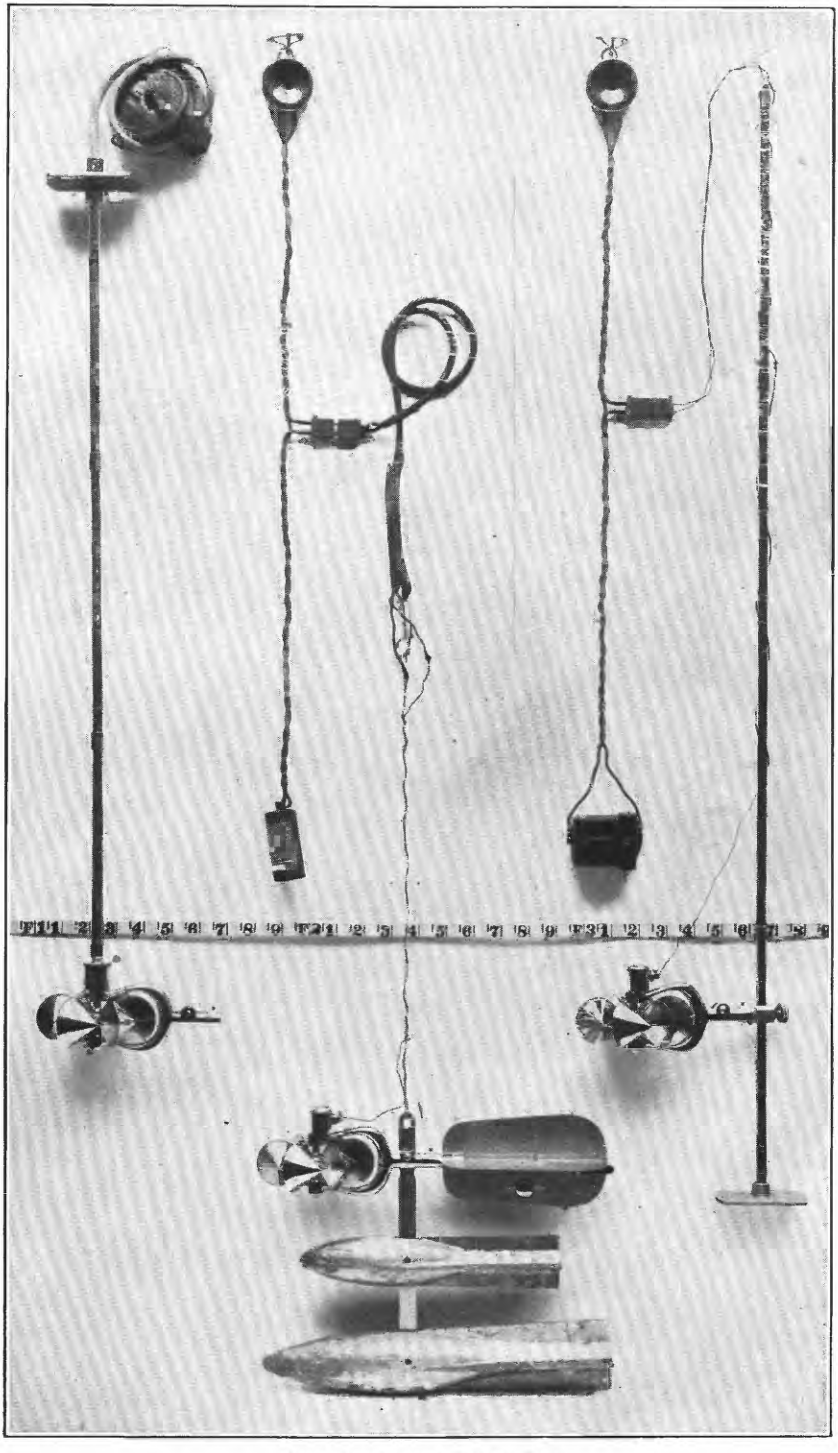
An effort is made to visit every station at least once each year for the purpose of making a measurement to determine the constancy of conditions of flow since the last measurement made in the preceding year, and also to check the elevation of the gage. On account of lack

[1] See Hoyt, J. C., and others, Use and care of current meter as practiced by the United States Geological Survey: Trans. Am. Soc. Civil Eng., vol. 66, 1910, p. 70.

A. FOR BRIDGE MEASUREMENT.

B. FOR WADING MEASUREMENT.

TYPICAL GAGING STATIONS.



SMALL PRICE CURRENT METERS.

of funds or for other causes some stations were not visited during the current year. If conditions of flow have been reasonably permanent up to the time of the last preceding measurements, it is considered best to publish estimates of discharge based on the latest verified rating curve rather than to omit them altogether, although it should be distinctly understood that such records are at times subject to considerable error. This is also true, although to a less degree, of the period of records since the date of the last measurement of the current year. As a rule, the accuracy notes are based on the assumption that the rating curve used is strictly applicable to the current year.

In order to give engineers and others information regarding the probable accuracy of the computed results, footnotes are added to the daily discharge tables, stating the probable accuracy of the rating tables used, and an accuracy column is inserted in the monthly discharge table. For the rating tables "well defined" indicates, in general, that the rating is probably accurate within 5 per cent; "fairly well defined," within 10 per cent; "poorly defined" or "approximate," within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

The accuracy column in the monthly discharge table does not apply to the maximum or minimum nor to any individual day, but to the monthly mean. It is based on the accuracy of the rating, the probable reliability of the observer, and knowledge of local conditions. In this column A indicates that the mean monthly flow is probably accurate within 5 per cent; B, within 10 per cent; C, within 15 per cent; D, within 25 per cent. Special conditions are covered by footnotes.

In general, the base data which are collected in the field each year by the Survey engineers are published, not only to comply with the law but also for the express purpose of giving to any engineer the opportunity of examining the computed results and of changing and adjusting them as may seem best to him. Although it is believed that the rating tables and computed monthly discharges are as good as the base data up to and including the current year will warrant, it should always be borne in mind that the additional data collected at each station from year to year nearly always throw new light on data already collected and published, and hence allow more or less improvement in the computed results of earlier years. It is therefore expected that the engineer who makes serious use of the figures presented in these papers will verify all ratings and make such adjustments for earlier years as may seem necessary. The work of compiling, studying, revising, and republishing data for different drainage basins for 5 or 10 year periods or more is carried on by the

United States Geological Survey so far as the funds for such work are available.

The estimates in the table of monthly discharge are so arranged as to give only a general idea of the conditions of flow at the station, and it is not expected that they will be used for other than preliminary estimates.

The daily discharges are published to allow a more detailed study of the variation in flow and to determine the periods of deficient flow.

COOPERATIVE DATA.

Cooperative data of various kinds and data regarding the run-off at many stations maintained wholly by private funds are incorporated in the surface water-supply reports of the United States Geological Survey.

Many stations throughout the country are maintained for specific purposes by private parties who supply the records gratuitously to the United States Geological Survey for publication. When such records are furnished by responsible parties and appear to be reasonably accurate, they are verified, so far as possible, and estimated values of accuracy are given. Records clearly worthless or misleading are not published. As it is, however, impossible to completely verify all such records furnished—because of lack of funds or for other causes—they are published for what they are worth, as they are of value as a matter of record and afford at least approximate information regarding stream flow at the particular localities. The Survey does not, however, assume any responsibility for inaccuracies found in such records, although most of them are believed to be reasonably good.

COOPERATION AND ACKNOWLEDGMENTS.

The stream-gaging work in the Great Basin in 1910 has been carried on by the Survey in cooperation with the States of Utah, Nevada, California, Oregon, and Idaho, and with the United States Reclamation Service. Cooperation with the States is effected under contracts which are made between the Director of the Federal Survey and the State engineers or other officials and are authorized by legislative acts appropriating moneys. The State contracts are essentially of the same order, the principal provisions being substantially as follows:

1. The United States Geological Survey retains direct supervision of the field work and the preparation of the data for publication.

2. The Federal Survey retains possession of all material collected—field notes, maps, etc.—but this material is open at all times to inspection by the State officials and if not satisfactory the agreements can be terminated at any time.

3. The salaries of gage observers and the salaries and traveling and field expenses of the engineers are divided between the two parties in some manner agreed upon, the accounts being rendered monthly in accordance with the regulations of the Federal Survey.

4. The streams and localities in which investigations shall be made are determined by conference between the State officials and the representatives of the United States Geological Survey.

5. The cost of publication is borne entirely by the Federal Survey.

The work in Utah is done under a legislative act passed in 1909, providing an annual appropriation of $2,000, contingent on the allotment of an equal amount by the United States Geological Survey, to be expended within the State for the investigation of its water resources.

The legislative act directing the State engineer of Idaho to obtain data on the flow of the streams of the State was also passed in 1909. To carry out the provisions of this act the State engineer was authorized by the State land board to expend the sum of $2,000 on the work if an equal amount was allotted for expenditure by the Federal Survey. The contract made between the Federal Survey and the State in 1909 was renewed for the fiscal year 1910, each party agreeing to allot $5,000 to the work.

State investigation of the water resources of Oregon was authorized by the State legislature in 1905, by an act providing an annual appropriation of $2,500, contingent on the allotment of an equal amount by the United States Geological Survey for similar investigations. A full statement of the method of handling the work and distributing the expenses is published in Water-Supply Paper 292.

The United States Reclamation Service, having under consideration the possibility of developing in the future some irrigation projects in central Oregon, has paid one-half the cost of maintenance of certain stations in the Great Basin for the first half of 1910; for the last half of the year the cost of this work was borne by the Federal Survey and the State.

Special acknowledgments are due to Mr. Caleb Tanner, State engineer of Utah, and to Mr. D. G. Martin, State engineer of Idaho, for assistance rendered the engineers of the Geological Survey.

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has furnished records of discharge measurements on streams in the Truckee and Carson River drainage areas; to the Warner Lake Irrigation Co., which has collected and furnished to the Survey data regarding Twentymile Creek and Deep and Honey creeks and their tributaries in Oregon; to the William Hanley Co., which has supplied gage heights on Donner und Blitzen River; to the Silver Valley Irrigation Co., which has cooperated in the maintenance of gaging stations in Harney Valley, Oregon; to G. F. McGonagle, city engineer of Salt Lake City; to the officials of the Telluride Power Co., the Utah Light & Railway Co., the Pacific Reclamation Co., the Vineyard Land & Stock Co., the Muddy Valley Irrigation Co., and other corporations and individuals who have furnished data, cooperated in the maintenance of stations, and rendered valuable assistance in collecting and preparing for publication the data in this volume.

DIVISION OF WORK.

Field data for the Great Basin in Utah, Nevada, and Idaho were collected under the direction of E. C. La Rue, district engineer, assisted by G. C. Baldwin, E. S. Fuller, O. W. Hartwell, A. B. Purton, E. A. Porter, J. C. Dort, G. H. Canfield, and L. Crandall.

Field work in western Nevada was carried on under the direction of W. B. Clapp, district engineer, by T. W. Norcross and H. D. McGlashan; and by F. C. Schafer and D. S. Stuver, under the direction of the project engineer of the United States Reclamation Service. The gage-height records of the Truckee River at Reno were furnished by the United States Weather Bureau, through Mr. H. F. Alps, section director.

Field work in California, except in the Klamath River basin, was carried on under the direction of W. B. Clapp, district engineer, by J. E. Stewart, W. V. Hardy, R. E. Haines, F. G. Wood, G. T. Peekema, H. J. Tompkins, T. W. Norcross, and H. D. McGlashan. Field work in the Klamath River basin was carried on under the direction of W. W. Patch, project engineer, United States Reclamation Service, by G. C. Yadon and Leland Moser.

Field data for the Great Basin in Oregon were collected under the direction of J. C. Stevens and Fred F. Henshaw, district engineers, by L. R. Allen and R. W. Davenport.

The rating curves, special estimates, and studies of the completed data for Nevada stations were made by Fred F. Henshaw and H. D. McGlashan; those for California stations were made by W. B. Clapp and Messrs. Henshaw and McGlashan; those for Oregon were made by Fred F. Henshaw, assisted by E. S. Fuller, F. B. Storey, Howard Kimble, R. W. Davenport, and Charles Leidl.

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Stevens, R. C. Rice, J. G. Mathers, H. D. Padgett, H. J. Dean, A. H. Tuttle, P. S. Monk, and M. I. Walters.

The entire report was edited by Mrs. B. D. Wood.

GENERAL FEATURES OF THE GREAT BASIN.

The following description of the Great Basin forms part of the introduction to a report on Lake Bonneville, by G. K. Gilbert:[1]

INTERIOR BASINS.

In physical geography the terms "basin" and "drainage district" are synonymous and are used to indicate any area which is a unit as to drainage. The basin of a stream is the tract of country it drains, whether the stream is a great river or the most insignificant tributary to a river. We thus speak of the basin of the Ohio and of the basin of the Mississippi, and say that the latter includes the former. And it may be said in general that the basin of any branching stream includes the basins of all its tributaries.

The basin of a lake is the tract of country of which it receives the drainage, and it includes not only the basins of all affluent streams, but the area of the lake itself. The term "lake basin" is also applied to the depression occupied by the water of a lake and limited by its shores, and where confusion might arise from the double use, the wider sense is usually indicated by the adjective "hydrographic" or its equivalent. If the lake has an outlet its basin is a part of the basin of the effluent stream, but if it has no outlet its basin is complete in itself and is wholly encircled by a line of water parting. In such case it is called a *continental* or *interior* or *closed* or *shut* or *drainless* basin.

If an interior basin exists in a climate so arid that the superficial flow of water, which constitutes drainage, is only potential and not actual, or else is occasional only and not continuous, it contains no perennial lake and is called a dry basin.

The boundaries separating basins are water partings or divides, and these are of all characters, from the acute crests of mountain ranges to low rolls of the plain scarcely discernible by the eye. Interior basins are completely encircled by lines of water parting.

The existence of interior basins depends on two conditions: A suitable topographic configuration and a suitable climate. The ordinary process of land sculpture by running water does not produce cup-like basins, but tends on the contrary to abolish them. Wherever a topographic cup exists the streams flowing toward it deposit within it their loads of detritus, and if they are antagonized by no other agent eventually fill it. If the cup contains a lake, with outlet the outflowing stream erodes the rim of the basin, and eventually the lake is completely drained.

The work of streams occasionally produces topographic cups by the rapid formation of alluvial deposits where two streams meet. If the power of one stream to deposit is greatly increased, or if the power of the other stream to erode is greatly diminished, the one may build a dam athwart the course of the other, and thus produce a lake basin.

The great agent in the production of lake basins, or the agent which has produced most of the large basins, is diastrophism,[2] and in a majority of the cases in which

[1] Gilbert, G. K., Lake Bonneville: Mon. U. S. Geol. Survey, vol. 1, 1890, pp. 2–12; Pl. II. This report is now out of print, but it may be consulted in the libraries of most of the larger cities.

[2] I find it advantageous to follow J. W. Powell in the use of *diastrophism* as a general term for the process or processes of deformation of the earth's crust. The products of diastrophism are continents, plateaus and mountains, ocean beds and valleys, faults and folds. Diastrophism is coordinate with volcanism, and is the synonym of *displacement* and *dislocation* in the more general of the two geologic meanings acquired by each of those words. Its adjective is *diastrophic*.

basins are partitioned off by the alluvial process just described, the change in the relative power of the streams is brought about by diastrophism.

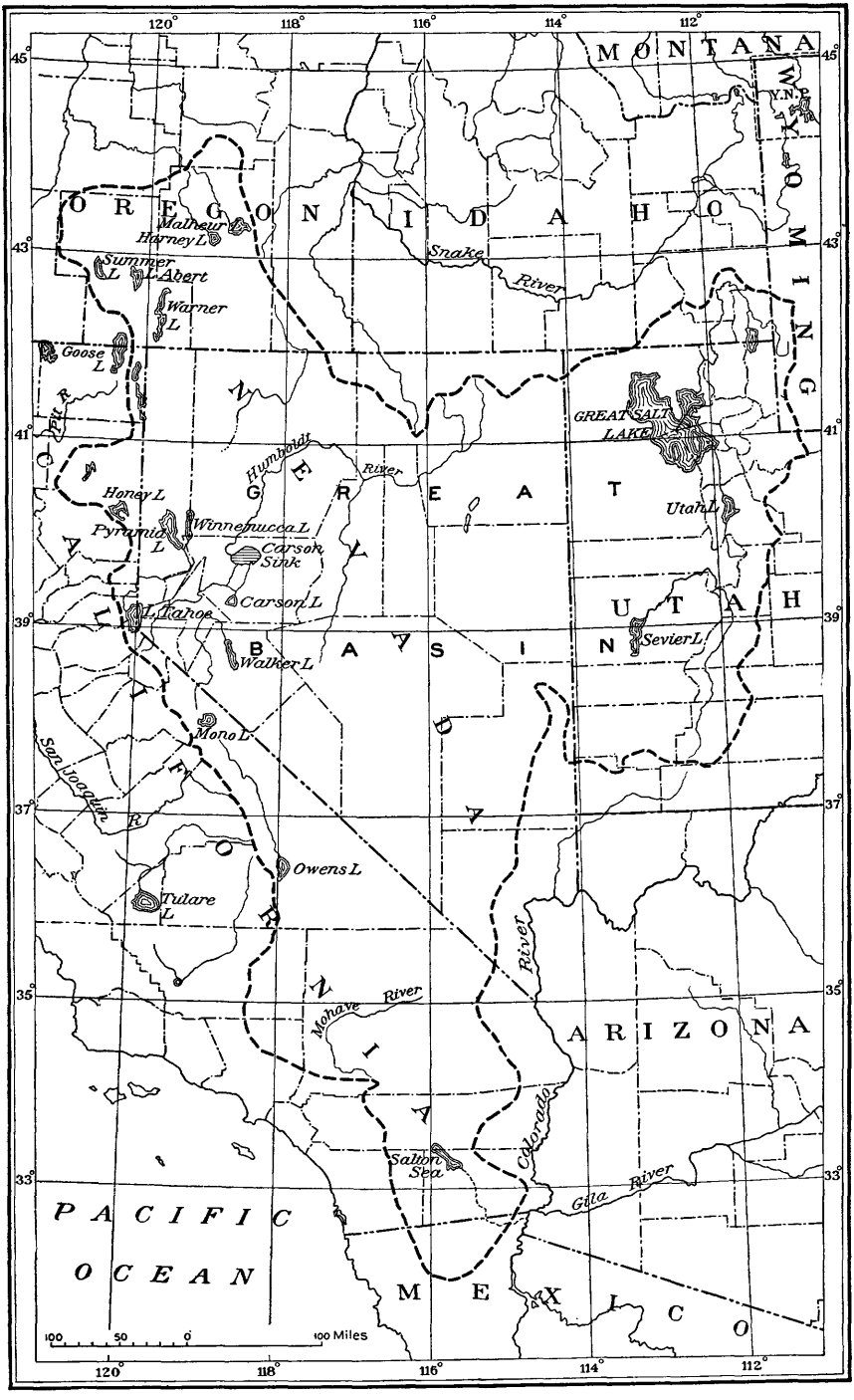
Other basin-forming agencies are volcanic eruption, limestone sinks, wind waves, dunes, landslides, and glaciers. By far the greatest number of topographic cups are due to glaciers; but with these we are not now concerned.

The basins of ordinary lakes are distinguished from interior basins by overflow, and that depends on climate. The rainfall of each basin is or may be disposed of by three processes—first, evaporation from the soil and from the vegetation supported by it; second, evaporation from a lake surface; third, outflow. If the rainfall is sufficiently small, it is all returned to the air by evaporation from the soil and vegetation, and the basin is dry. If it is somewhat larger, the portion not directly evaporated accumulates in the lowest depression, forming a lake, from the surface of which evaporation is more rapid. The area of the lake surface is determined by the area of the basin, the rainfall, and the local rates of evaporation. The basin is closed so long as a lake sufficient for the purpose of evaporation does not require such an extent as to cause it to discharge at the lowest point of the rim. The area inclosed by a contour passing through the lowest point of the rim, the total area of the basin, and the local climate are the three factors which determine whether a given topographic cup shall constitute an interior basin. If the area of a topographic cup and the area of the maximum lake it can contain are nearly identical, it may constitute an interior basin in a region of humid climate. If the contour through the lowest point of the rim incloses an area very small in comparison with the entire basin, the maintenance of an outlet is not inconsistent with an arid climate.

If there were no erosion and sedimentation, unchecked upheaval and subsidence would greatly multiply the number of basins. On the contrary, if all displacement should cease and the foundations of the earth become stable, erosion and sedimentation would merge all basins into one. The actual state of the earth's surface is therefore at once the result and the index of the continuous conflict between subterranean forces on the one hand and atmospheric on the other. The two processes which destroy basins are conditioned by climate. In an arid basin the inwashing of detritus is slow and there is no outflow to corrade the rim; but with abundant rainfall the accumulation of detritus is rapid and corrasion conspires with it to diminish the inequality between center and rim. In arid regions, therefore, the formative subterranean forces are usually victorious in their conflict with the destructive atmospheric forces, and as a result closed basins abound; in humid regions the destructive agencies prevail and lake basins are rare. In the present geologic age it is necessary to restrict this generalization to lands in the lower latitudes, because the glaciation of the last geologic period created an immense number of lake basins in humid regions of high latitude, and running water has as yet made little progress in their destruction.

THE GREAT BASIN.

The major part of the North American continent is drained by streams flowing to the ocean, but there are a few restricted areas having no outward drainage. The largest of these was called by Fremont, who first achieved an adequate conception of its character and extent, the "Great Basin," and is still universally known by that name. It is not, as the title might suggest, a single cup-shaped depression gathering its waters at a common center, but a broad area of varied surface, naturally divided into a large number of independent drainage districts. It lies near the western margin of the continent and is embraced by rivers tributary to the Pacific Ocean. On the north it is bounded by the drainage basin of the Columbia, on the east by that of the Colorado of the West, and on the west by the basins of the San Joaquin, the Sacramento, and numerous minor streams. The central portion of the western water parting is the crest of the Sierra Nevada, one of the greatest mountain masses of the United States, and farther south high mountains constitute much of the



SKETCH MAP OF THE GREAT BASIN.

boundary. The northern half of the eastern boundary is likewise high, winding through the region of the High Plateaus. The remainder of the boundary does not follow any continuous line of upland, but crosses mountain ranges and the intervening valleys without being itself marked by any conspicuous elevations. It is defined only through a study of the drainage. The general form of the area [Pl. III] is rudely triangular, with the most acute angle southward. The extreme length in a direction somewhat west of north and east of south is about 880 miles, the extreme breadth from east to west, in latitude 40° 30′, is 572 miles, and the total area is approximately 210,000 square miles. Of political divisions it includes nearly the whole of Nevada, the western half of Utah, a strip along the eastern border of California and a large area in the southern part of the State, another large area in southeastern Oregon, and smaller portions of southeastern Idaho and southwestern Wyoming. The southern apex extends into the territory of Mexico at the head of the peninsula of Lower California.

The region is occupied by a number of mountain ridges which betray system by their parallelism and by their agreement in a peculiar structure. Their general trend is northerly, inclining eastward in the northern part of the basin and westward at the south. The individual ridges are usually not of great length, and they are so disposed en échelon that the traveler winding among them may traverse the basin from east to west without crossing a mountain pass. The type of structure is that of the faulted monocline, in which the mountain ridge is produced by the uptilting of an orogenic block from one side of a line of fracture, and it has been named (from the region) the Basin Range type. Its distribution, however, does not coincide perfectly with the district of interior drainage. On the one hand the Great Basin includes along its eastern margin a portion of the Plateau province, with its peculiar structural type, and on the other the Basin Range province extends southward through Arizona to New Mexico and Mexico.

Between the ranges are smooth valleys, whose alluvial slopes and floors are built of the débris washed through many ages from the mountains. In general they are troughlike, but in places they coalesce and assume the character of plains. The plains occupy in general the less elevated regions, where an exceptional amount of detritus has been accumulated. In local terminology they are called deserts. The largest are the Great Salt Lake and Carson deserts at the north and the Mojave and Colorado deserts at the south. The Escalante, the Sevier, the Amargosa, and the Ralston are of subordinate importance.

Where the basin is broadest, the general elevation of its lowlands is about 5,000 feet, but they are somewhat higher midway between the eastern and western margins, so as to separate two areas of relative depression, the eastern marked by the Great Salt Lake and Sevier deserts, and the western by the Carson Desert. Southward there is a gradual and irregular descent to about sea level, and limited areas in Death Valley and Coahuila Valley lie lower than the surface of the ocean.

The aridity of the region is shown instrumentally by the records of rainfall and atmospheric humidity. On the broad plain bounded east and west by the Appalachian Mountains and the Mississippi River, 43 inches of rain falls in a year. On the lowlands of the Great Basin there falls but 7 inches. In the former region the average moisture content of the air is 69 per cent of that necessary for saturation; in the lowlands of the Great Basin it is 45 per cent.[1] From the surface of Lake Michigan evaporation removes each year a layer of water 22 inches deep.[2] The writer has estimated that

[1] These figures and those in the preceding sentences are based on data compiled by the United States Signal Service. Through the courtesy of Gen. A. W. Greely, Chief Signal Officer, the writer has had access to manuscript as well as printed data.

[2] D. Farrand Henry, in a report on the meteorology of the Laurentian lakes (Rept. Chief Eng. for 1868, Washington, 1869, p. 980).

80 inches are yearly thus removed from Great Salt Lake,[1] and Mr. Thomas Russell has computed from annual means of temperature, vapor tension, and wind velocity that in the lowlands of the Great Basin the annual rate of evaporation from water surfaces ranges from 60 inches at the north to 150 inches at the south.[2]

The variation with latitude exhibited by the evaporation is found also, inversely, in the rainfall, but it is not clearly apparent in the humidity. In the southern third of the Basin the lowland rainfall ranges from 2 to 5 inches. On the line of the Central Pacific Railroad, between the fortieth and forty-second parallels, it averages 7 inches; on the Oregonian arm at the north, 15 inches. The average lowland precipitation for the whole area is between 6 and 7 inches. With the relative humidity approximately constant, the evaporation rate varies directly and the rainfall inversely with the temperature, and both latitude and altitude here make the lowland temperature fall toward the north. The sympathy of rainfall with temperature is likewise shown in the greater precipitation of the mountains as compared with adjacent valleys. Mountain stations proper are wanting, but rain-gage records on the flanks and in the passes of mountains show a marked advantage over those in neighboring lowlands. An estimate based on these, on the records at high points in the Sierra Nevada, and on approximate knowledge of the heights and areas of the mountains and plateaus of the Great Basin, places the average precipitation for the whole district at 10 inches.

The story of climate is more eloquently told by the hydrography and the vegetation. In the valleys of the northwestern arm of the basin there are numerous lakes, drainless and of varying extent, but fed by streams from mountain ranges of moderate size. In the middle region the only perennial lakes are associated with mountain masses of the first rank. The great Sierra forming the western wall of the Basin receives each winter a heavy coating of snow—the greater part on the side of the great California valley, but enough east of the water parting to maintain a line of lakes in the marginal valleys of the Great Basin. The Wasatch Range and its associated plateaus, overlooking the Basin from the east, are less favored than the Sierra, but still receive an important precipitation, and by gathering the drainage from a large area support Great Salt Lake, the largest of the Basin's water sheets. The East Humboldt Range, standing midway, and one of the largest mountain masses within the Basin area, catches enough moisture to feed at one base two small lakes and at the other the Humboldt River. The neighboring and smaller mountains are whitened every winter by snow, a large share of which either evaporates without melting or, if melted, is absorbed by the soil, to be returned to the thirsty air without gathering in drainage ways. Many of them are without perennial streams; some even lack springs; and of the mountain creeks few are strong enough to reach the valleys before succumbing to the ravenous desert air. The Humboldt itself, though fairly entitled to the name of river, dwindles as it goes, so that its remnant after a course of 200 miles is able to sustain an evaporation lake barely 25 square miles in extent. Most of the small closed basins are without permanent creek or lake, containing at the lowest point a playa or "alkali flat"—a bare, level floor or fine saline earth, or perhaps of salt, over which a few inches of water gather in times of storm.

In the southern half of the Basin there are no lakes dependent for their water on the interior ranges. At the east the most southerly lake is Sevier, in latitude 39°; the last of the lakes sustained by the Sierra is Owens, between the thirty-sixth and thirty-seventh parallels. Then for 300 miles evaporation is supreme. Playas abound, streams are almost unknown, and springs are rare. Death Valley, with its floor of salt spread lower than the surface of the ocean, is overlooked on either side by mountains from 5,000 to 10,000 feet high, but they yield it no flowing stream, and more than one traveler has perished from thirst while endeavoring to pass from spring to spring.

[1] Report on the lands of the arid region, * * * J. W. Powell, 2d ed., Washington, 1879, p. 73.
[2] Manuscript report to the Chief Signal Officer.

The Mojave "river" is 100 miles long, but it preserves its life only by concealment, creeping through the gravel of the desert and betraying its existence only where ledges of rock athwart its course force it to the surface.

As in other desert regions, precipitation here results only from cyclonic disturbance, either broad or local, is extremely irregular, and is often violent. Sooner or later the "cloud-burst" visits every tract, and when it comes the local drainage way discharges in a few hours more water than is yielded to it by the ordinary precipitation of many years. The deluge scours out a channel which is far too deep and broad for ordinary needs and which centuries may not suffice to efface. The abundance of these trenches, in various stages of obliteration but all manifestly unsuited to the every-day conditions of the country, has naturally led many to believe that an age of excessive rainfall has but just ceased—an opinion not rarely advanced by travelers in other arid regions. So far as may be judged from the size of the channels draining small catchment basins, the rare, brief, paroxysmal precipitation of the desert is at least equal while it lasts to the rainfall of the fertile plain.

A line of cottonwoods marks the course of each living stream, but otherwise the lowlands are treeless. So are most of the alluvial foot slopes and some of the smaller mountains, especially at the south. Except on the high plateaus in central Utah, there is little that may be called forest. The greater mountains have much timber in their recesses, but are not clothed with trees. The growth is so irregular and interrupted that the idea of a tree limit could not have originated here, but it may be said that only the straggling bush-like cedar passes below 6,000 feet at the north or 7,000 feet at the south. Only conifers are of such size and abundance as to have economic importance. Oak and maple grow commonly as bushes, forming low thickets, but occasionally rank as small trees, along with the rarer box elder, ash, locust, and hackberry. The characteristic covering of the lowlands is a sparse growth of low bushes, between which the earth is bare, excepting scattered tufts of grass. Toward the north, and especially on the higher plains, the grass is naturally more abundant and the bushes occupy less space, but the introduction of domestic herds favors the ascendency of the bushes. At the south the bushes are partly of different species, and they are partially replaced by cactuses and other thorny plants. The playas are bare of all vegetation and are usually margined by a growth of salt-loving shrubs and grasses. A single southern bush bears leaves of deep green, but with this exception the desert plants are grey, like the desert soil. These, and the persistent haze whose grey veil deadens all the landscape, weary the eye with their monotony, so that the vivid green marking the distant spring is welcome for its own sake as well as for the promise of refreshment to the thirsty traveler.

The causes of this arid climate lie in the general circulation of the atmosphere, in the currents of the Pacific Ocean, and in the configuration of the land. There is a slow aerial drift from west to east, so that the air coming to the Basin has previously traversed a portion of the Pacific, to which its temperature and humidity have become adjusted. Off the west coast of the United States there is a southward current believed to be the chief branch of the Kuro Siwa. Prof. George Davidson[1] estimates its width at about 300 miles, and finds that its temperature rises with southward advance only 1° Fahrenheit for each degree of latitude. Being derived from a north-moving current, it reaches our coast with a temperature higher than that normal to the latitude, while at the south its temperature is below the normal. As pointed out by Dutton,[2] the air passing from it to the land at the north is cooled by the land and precipitates moisture, while the similar air current at the south is warmed by the land and converted to a drying wind. The Great Basin falls within the influence of the drying

[1] Letter to the writer.

[2] Dutton, C. E., Cause of the arid climate of the western portion of the United States: Am. Jour. Sci., 3d ser., vol. 22, p. 249.

wind, its southern part being more affected than its northern. At the extreme south and the extreme north the mountains between the ocean and the Basin do not greatly interfere with the eastward flow of air, but between latitudes 35° and 41° the Sierra Nevada forms a continuous wall rarely less than 10,000 feet high. In rising to pass this obstruction the air loses much of its stored moisture, especially in winter, and it descends to the Basin with diminished humidity. The Basin is further influenced by deviations of the air currents from the eastward direction, and its southern part falls in summer within the zone of calms theoretically due to a descending current at the margin of the northern trade wind; but observational data are too meager for the discussion of these factors.

OTHER INTERIOR BASINS.

The southern portions of Arizona and New Mexico and the western part of Texas resemble the Great Basin in climate, and they contain a number of small interior basins. These are not so fully determined in extent as the Great Basin, but several of them may be approximately indicated. One of the largest lies between the Rio Grande and its eastern branch, the Pecos, extending from latitude 35° in central New Mexico to latitude 31° in western Texas. In its broadest part it is bounded on the west by the San Andreas and Organ Mountains, and on the east by the Sacramento and Guadalupe. Its area, of which two-thirds lies in New Mexico, is about 12,500 square miles. Southwest of the Rio Grande, in Mexico, there is a larger tract of interior drainage, containing a number of saline lakes, and to one of these, Lake Guzman, the valley of the Mimbres River of New Mexico descends. Other basins adjacent on either side to that of the Mimbres are believed to bear the same relation to Lake Guzman, sloping gently toward it but contributing no water unless during periods of rare and exceptional storm. Yet other basins without exterior drainage are contiguous to these, and unite to form in southwestern New Mexico an arm of the Mexican district of interior drainage, the area within New Mexico probably falling between 7,000 and 7,500 square miles. North of this, and intersected centrally by the one hundred and third meridian and the thirty-fourth parallel, lies a smaller basin, including the plain of San Augustin. Its area is about 1,800 square miles. In southeastern Arizona a slightly smaller basin lies between the Caliyuro and Dragoon Mountains on the west and the Pinaleño and Chiricahua Mountains on the east, including the Playa de los Pimas. Another and still smaller basin is known to exist in the Hualpai Valley of northwestern Arizona, and it is probable that others occur in the western part of the Territory, both north and south of the Gila River. When all have been determined and measured, it is estimated that the total area of the interior basins of the United States, additional to the Great Basin, will be found to equal 25,000 square miles, making the grand total for the United States about 232,000 square miles—the thirteenth part of our territory. Mexico contains other inland districts besides the one mentioned above, and the total area in that country may be one-third as great as ours. It is probable that the remainder of the continent drains to the ocean.

Large as are these districts, it is nevertheless true that North America, as compared with other continents, is not characterized by interior drainage. According to data compiled by Murray, the closed basins in Australia aggregate 52 per cent of its area, those of Africa 31 per cent, of Eurasia 28 per cent, of South America 7.2 per cent, of North America 3.2 per cent.[1] The Great Basin is great only in comparison with similar districts of our own continent. The interior district of the Argentine Republic and Bolivia is half as large again, and that of central Australia exceeds the Great Basin seven times; Sahara exceeds it sixteen times, and the interior district of Asia twenty-three times.

[1] Murray, John, The total annual rainfall of the land of the globe, and the relation of rainfall to the annual discharge of rivers: Scottish Geog. Mag., vol. 3, pp. 65-77.

GREAT SALT LAKE BASIN.

GENERAL FEATURES.[1]

Great Salt Lake, the largest inland body of water in the United States, is situated in the north-central part of Utah, in the eastern part of the Great Basin, near the west base of the Wasatch Mountains. Its hydrographic basin, 54,000 square miles in area, shows two widely contrasted topographic types. The eastern portion is mountainous and contains peaks rising 12,000 feet above sea level or 8,000 feet above the lake; the western portion is composed of desert valleys, elevated but little above the lake surface, and separated from adjacent valleys by narrow, abrupt, desert ranges one to two thousand feet or more higher than the intervening plains.

The shores of the lake are low, except at a point on the north, where a projecting mountain spur forms a rocky promontory, and for a short distance along the south shore, where it touches the north end of the Oquirrh Mountains. Its surface is broken by several islands, two of which rise, rugged and precipitous, more than a thousand feet above the water and are made up of the short mountain ranges of the type so characteristic of the Great Basin. The saline and alkaline shores are mud plains, either naked and frequently white with drifting salts or scantily clothed with desert shrubs. The monotony caused by the absence of conspicuous flowers is in many places relieved by broad areas covered with a peculiar plant known as Salicornia, which grows in fleshy stems, without leaves, and looks not unlike branching coral, a resemblance that is heightened by its many shades of red, pink, and yellow.

The streams feeding the lake, of which Bear, Weber, and Jordan rivers are the most important, rise in the high mountains to the east and carry water so clear and sweet that only chemical tests reveal the presence of the mineral matter it has dissolved from the rocks and soils. About the lake or rising beneath its surface are a number of fissure springs, some of which supply hot water and contain more saline matter in solution than is usually found in surface streams, but with a single known exception none of the small springs are markedly saline. The salts they contain are acquired largely during the upward passage of the water through the sediment of former lakes, and their influence on the chemistry of the present lake water is important. It is believed, however, that the combined volumes of the streams and springs now tributary to the lake, if not concentrated by evaporation, would form a water body in which no trace of saline matter would be perceptible to the taste.

The waters of the lake during recent low stages have become nearly saturated with sodium chloride and sodium sulphate, and under cer-

[1] Abstracted from Russell, I. C., Lakes of North America, Boston, 1895, pp. 77–83.

tain conditions these salts are precipitated. Along the margin of the lake, where the water is only a few inches deep, it becomes so concentrated by evaporation that common salt crystallizes and forms brilliant white layers on the bottom. The quantity of common salt held in the water of the lake is estimated at 400,000,000 tons and the sodium sulphate at 30,000,000 tons. The separation of the common salt forms an important industry. The solubility of sodium sulphate is controlled largely by temperature. In Great Salt Lake in summer it is all dissolved and the waters are clear, but as cold weather approaches it separates and renders the waters opalescent and somewhat milky in color. In the depth of winter, when the temperature falls below zero of the Fahrenheit scale, as it does at times for many days together, this salt separates and is thrown to the shore by the waves in hundreds of tons, forming a slushlike mass on the beach looking like soft snow. On such occasions it can be gathered in practically unlimited quantities, but it is soon redissolved when the temperature rises. The brine of the lake is so concentrated that fish can not live in it, but it furnishes a congenial home for small crustaceans known as brine shrimps and for the larvæ of dipterous insects.

The area of the lake and the elevation of its surface vary somewhat from year to year and from season to season, partly as a result of climatic changes and partly because of human interference with the flow of the streams that supply the water. A map made from surveys under Lieut. Stansbury, in 1850, represents it as having an area of about 1,750 square miles. A second map, made in connection with the Fortieth Parallel Survey, in charge of Clarence King, in 1869, shows an area of 2,170 square miles. Its present area (1912) is about 1,800 square miles. In 1850 the maximum depth of the water was about 36 feet and the average depth about 13 feet; in 1869 the maximum depth was 49 feet, and the average about 19 feet; its present maximum depth is estimated at 40 feet.

The annual high-water stage of the lake occurs in June and is due to the melting of the snow on the Wasatch and Uinta Mountains. The annual and secular fluctuations of the lake have been carefully recorded since 1875.[1]

BEAR RIVER BASIN.

GENERAL FEATURES.

Bear River rises on the northern slope of the Uinta Mountains, in the northeastern part of Utah, and after a circuitous course—in which it leaves Utah and enters Wyoming, reenters Utah, appears again in Wyoming, and makes a long detour in Idaho—it returns to

[1] The records of these changes to 1890 and their significance are discussed by G. K. Gilbert in Mon. U. S. Geol. Survey, vol. 1, 1890.

Utah and finally discharges its waters to Great Salt Lake. The maximum elevation of the upper rim of the basin is 13,000 feet above sea level.

The upper part of the basin comprises a rough, broken country, well drained by numerous short streams, most of which are confined to steep, narrow canyons. The streams are fed by many small springs and by the melting of the snow which forms the greater part of the precipitation. The rocks of the extreme headwater region are chiefly sandstones and quartzites and are covered with a thin layer of soil which supports scattered groves of fir and aspen. A few small lakes lie near the head of the river.

Just below Dingle the main stream passes through the north end of Bear Lake valley in a well-defined channel, and from this point to Preston it occupies a steep-walled canyon, broken here and there by short, narrow valleys containing irrigated farms. The tributaries in this stretch are few, the most important being Mink and Cottonwood creeks. About 10 miles below Dingle the river receives the outlet of Bear Lake, a small, crooked, sluggish stream that discharges but little water at any time, though it is the only visible outlet of a water body about 144 square miles in area. There is no storage on the main stream, but on Mink Creek a number of small storage reservoirs are contemplated or in process of construction, the water to be diverted for the irrigation of lands in the northwest end of Cache Valley.

Between Preston and the lower end of Cache Valley the Bear flows sluggishly along the west side of its basin in a well-defined channel, and during extreme floods it overflows slightly and covers a very narrow strip immediately along the river. The principal tributaries in this stretch are Cub Creek and Logan River.

Cub Creek rises in the Bear River Range and flows through a steep, narrow canyon in a rough limestone country until it reaches Cache Valley, which it crosses in a winding but well-defined channel to its junction with the Bear.

Logan River rises on the west slope of the Bear River Range, flows southwest and then northwest, and unites with the Bear near Benson, Utah. Its basin is rough and rugged, elevations ranging from 4,500 to 9,000 feet above sea level and the river being confined largely to a steep, rough channel in a comparatively narrow canyon. Probably three-fourths of the precipitation in this basin is snow, the melting of which supplies the principal part of the spring and summer flow; the late summer and winter flow is derived chiefly from springs which are well distributed over the basin. In its upper course the Logan receives many short, swift tributaries. Temple Fork and South Fork, which enter, respectively, 10 miles and 15 miles above Logan, are perennial streams and furnish one-third to one-fourth of the total flow. Blacksmith Fork comes in below Logan. The entire flow of

this river, after being used to develop power at two electric plants near the mouth of the canyon, is diverted for irrigation. None of the run-off is stored at present.

Practically the only inflow to the Bear in Cache Valley is from seepage and springs. The lower portions of the valley form an artesian basin containing numerous small, flowing wells. The water table lies very near the surface, and during the early spring the lower lands are largely swamp.

The Bear River Canal Co. diverts practically the entire summer flow of the stream above Collinston to agricultural lands lying on both sides of the river below Bear River canyon. This system has a capacity of 1,000 second-feet, and during the winter and flood seasons a part of the water is used to develop electric power at a point about one-fourth mile above the Collinston station and is returned to the river at Collinston. From 10 to 30 second-feet reaches the stream through leaks and as seepage from the diversion canals.

Owing to the complete control of the stream by irrigation works, the discharge is liable to extreme variation at any period.

Within the periods for which records are available the wettest year was 1907, the run-off at Collinston in the year being 2,680,000 acre-feet; in 1890, 1894, 1897, 1899, and 1909 the run-off was also high, the total for each of these years exceeding 2,000,000 acre-feet. The driest year was 1905, when the run-off at Collinston, Utah, was only 701,000 acre-feet.

BEAR RIVER AT DINGLE, IDAHO.

This station, which is located in a cut-off built by the Oregon Short Line Railroad Co., one-fourth mile east of Dingle railroad station, about 10 miles above the outlet of Bear Lake, below the proposed intake of the diversion canal to the lake, was established May 9, 1903. Some water is diverted for irrigation above this point.

The gage is an inclined staff, and its datum has remained unchanged since the station was established.

Discharge measurements are made from a car and cable near the gage.

The records at this station are not affected by artificial control of flow above or below. The river is usually frozen over from December to March, the ice reaching a thickness of 14 to 15 inches. The ice cover is, however, smooth, no anchor or needle ice ever having been known to form.

Conditions during the open-water season favor the accurate determination of discharge at this station; and as approximate estimates of the flow under ice have been made, the records as a whole may be considered good.

Discharge measurements of Bear River at Dingle, Idaho, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 22	O. W. Hartwell	119	493	6.05	1,440
Sept. 1	L. Crandall	105	175	3.32	109
23	do	107	185	3.43	134
23	do	107	185	3.43	135

Daily gage height, in feet, of Bear River at Dingle, Idaho, for 1910.

[M. K. Hopkins, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.9			5.55	6.85	4.9	3.7				3.6	
2		4.9	5.0		6.8			3.35	3.3	3.55		3.7
3	5.0			5.5		4.9	3.65				3.6	
4		4.8	5.7	5.45	6.7				3.35	3.55		3.8
5	5.15		6.2	5.4	6.55	4.95	3.7				3.6	
6		4.8	6.7	5.4				3.25		3.6	3.6	4.1
7			6.15	5.4	6.2		3.65		3.35	3.55		
8	5.1			5.4	6.1	5.0		3.2	3.35		3.6	
9		4.8	7.3	5.4			3.6			3.55		
10	5.15			5.5	6.0	4.85					3.6	3.7
11			9.2	5.6		4.8		3.2	3.35	3.6		
12	5.15	4.8		5.65	6.1	4.8	3.6			3.5	3.7	3.7
13		4.8	8.7	5.7	6.1	4.75		3.2			3.7	
14			8.3	5.8	6.1	4.7	3.6	3.2	3.4	3.6	3.7	
15	5.0		7.7	5.9	6.15		3.6					3.65
16	5.0	4.8	6.7	5.9			3.6	3.15		3.6	3.7	
17			6.6	5.85	6.2	4.4	3.6	3.1	3.4			3.6
18	5.1		6.5	5.8				3.1	3.5	3.65	3.6	3.9
19		4.8	6.5	5.8	5.9	4.3	3.55					
20	5.1		6.5	5.85				3.1	3.5	3.7	3.65	
21		4.8	6.6		5.4	4.15						
22	5.1		6.6	6.05	5.2		3.6	3.15			3.65	4.1
23		4.8	6.6	6.15		3.9				3.6		
24	5.15		6.6	6.3	5.1		3.55	3.1	3.4		3.8	3.7
25		4.8	6.4	6.45		3.9	3.5	3.1	3.4	3.6		3.7
26					5.0				3.4		3.75	
27	5.0	4.8	6.2	6.6	5.0	3.8		3.1		3.6	3.75	3.6
28			6.0	6.65			3.5	3.2				
29	5.0		5.8	6.75	4.9	3.8		3.3	3.5	3.6		3.7
30			5.7	6.85		3.7	3.45		3.5	3.6	3.8	
31	4.9		5.6				3.4	3.3				3.6

NOTE.—Relation of gage height to discharge affected by ice Jan. 1 to about Mar. 15 and during the greater part of December. Ice gorge about Mar. 11 to 15.

Daily discharge, in second-feet, of Bear River at Dingle, Idaho, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	1,060	2,150	690	200	122	106	156	174	.....
2	.....	.....	.....	1,040	2,100	690	194	117	106	162	174	.....
3	.....	.....	.....	1,020	2,050	690	187	112	112	162	174	.....
4	.....	.....	.....	990	2,000	700	194	106	117	162	174	.....
5	.....	.....	.....	960	1,860	715	200	101	117	168	174	.....
6	.....	.....	.....	960	1,700	725	194	96	117	174	174	.....
7	.....	.....	.....	960	1,550	735	187	91	117	162	174	.....
8	.....	.....	.....	960	1,470	740	180	86	117	162	174	.....
9	.....	.....	.....	960	1,430	700	174	86	117	162	174	.....
10	.....	.....	.....	1,020	1,390	665	174	86	117	168	174	.....
11	.....	.....	.....	1,090	1,430	640	174	86	117	174	186	.....
12	.....	.....	.....	1,120	1,470	640	174	86	120	150	200	.....
13	.....	.....	.....	1,160	1,470	617	174	86	124	162	200	.....
14	.....	.....	.....	1,230	1,470	594	174	86	128	174	200	.....
15	.....	.....	.....	1,310	1,510	482	174	81	128	174	200	.....
16	.....	.....	2,000	1,310	1,530	468	174	76	128	174	200	.....
17	.....	.....	1,910	1,270	1,550	456	174	66	128	180	186	.....
18	.....	.....	1,820	1,230	1,430	430	168	66	150	187	174	.....
19	.....	.....	1,820	1,230	1,310	414	162	66	150	194	180	.....
20	.....	.....	1,820	1,270	1,140	384	166	66	150	200	187	.....
21	.....	.....	1,910	1,350	960	355	170	71	145	192	187	.....
22	.....	.....	1,910	1,430	840	310	174	76	138	182	187	.....
23	.....	.....	1,910	1,510	815	264	168	71	134	174	208	.....
24	.....	.....	1,910	1,640	790	264	162	66	128	174	230	.....
25	.....	.....	1,730	1,780	765	264	150	66	128	174	222	.....
26	.....	.....	1,640	1,840	740	247	150	66	128	174	215	.....
27	.....	.....	1,550	1,910	740	230	150	66	135	174	215	.....
28	.....	.....	1,390	1,960	715	230	150	86	142	174	220	.....
29	.....	.....	1,230	2,050	690	230	144	106	150	174	225	.....
30	.....	.....	1,160	2,150	690	200	139	106	150	174	230	.....
31	.....	.....	1,090	.....	690	.....	128	106	.....	174	.....	.....

NOTE.—Daily discharge determined from a discharge rating curve well defined above 100 second-feet. Discharge interpolated for days for which gage heights are missing during the period of open water.

Monthly discharge of Bear River at Dingle, Idaho, for 1910.

[Drainage area, 2,890 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	.....	.....	250	0.087	0.10	14,900	D.
February	.....	.....	210	.073	.08	11,700	D.
March	.....	.....	1,380	.478	.55	84,800	C.
April	2,150	960	1,330	.460	.51	76,500	A.
May	2,150	690	1,300	.450	.52	77,400	A.
June	740	200	493	.171	.19	28,400	B.
July	200	128	172	.060	.07	10,200	A.
August	122	66	86	.030	.03	5,120	B.
September	150	106	128	.044	.05	7,360	A.
October	200	150	172	.060	.07	10,200	A.
November	230	174	193	.067	.07	11,100	A.
December	.....	.....	190	.066	.08	11,300	C.
The period	.....	66	494	.171	2.32	349,000	

NOTE.—Discharge Jan. 1 to Mar. 15 and Dec. 1 to 31 estimated from the discharge at Preston, climatological records, and observer's notes in regard to ice. A heavy rainstorm in Idaho during the early part of March caused premature melting of the accumulated snows in the mountains and high run-off. Mean discharge Mar. 1 to 15 estimated at 1,060 second-feet.

BEAR RIVER NEAR PRESTON, IDAHO.

This station, which is located just below the wagon bridge on the road from Preston to Battle Creek, at a point about 4½ miles northwest of Preston, Idaho, and about 10 miles north of the Idaho-Utah State line, was established October 11, 1889. The records show practically the amount of water passing from Idaho into Utah and will be of value in the final adjudication of water rights.

No important tributaries enter above the station; Battle Creek comes in a few hundred feet below the station. Although the river passes through large areas of irrigable land, no important diversions are at present made above this point.

The river freezes over at the section and the flow is affected by slush ice. On December 10, 1909, a heavy landslide obstructed the channel, and the relation of gage height to discharge from that date to about the end of March, 1910, is uncertain. From the latter part of March to the end of 1910 the conditions of flow were very stable.

A new gage was installed April 3, 1909, at a point about 200 feet below the old gage; it reads 0.05 foot lower than the old gage. The new curve was found to be parallel to the old curve, and the gage heights taken during 1909 previous to the establishment of the new gage were referred to the new gage datum.

Discharge measurements are made from a cable and car above the new gage and about 300 feet below the bridge.

Discharge measurements of Bear River near Preston, Idaho, 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 23	O. W. Hartwell	207	601	3.89	2,900
May 31	do	133	458	2.89	1,540
July 29	do	125	264	1.46	317
29	do	125	264	1.47	333
Sept. 3	L. Crandall	127	289	1.59	387
Dec. 9	J. C. Dort	129	343	2.10	699

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Daily gage height, in feet, of Bear River near Preston, Idaho, for 1910.

[O. M. Seamons, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.0	2.0	2.25	4.0	4.2	2.8	1.5	1.45	1.5	1.8	2.05	2.2
2	2.85	2.0	2.55	3.9	4 2	2.75	1.45	1.45	1.5	1.85	2.0	2.2
3	2.55	2.0	2.7	3.85	4.2	2.7	1.45	1.4	1.55	1 95	2.1	2.25
4	2.35	2.0	2.8	3.8	4.2	2.7	1.45	1.4	1.7	1.9	2.1	2.2
5	2.5	2.05	2.95	3.7	4.1	2.65	1.4	1.4	1.7	1.9	2.1	2.2
6	2.7	2.1	2.9	3.7	4.2	2.6	1.4	1.4	1.7	1.9	2 1	2 2
7	2.8	2.0	3.1	3.7	4.1	2.6	1.4	1.4	1.7	1.9	2.0	2.15
8	2.85	2.0	3.15	3.7	4.0	2.6	1.4	1.35	1.7	1.9	2.0	2.15
9	2.85	2.0	3.3	3.7	4.0	2.55	1.4	1.3	1.7	1.9	2.0	2.15
10	2.9	2.0	3.3	3.7	4.0	2.5	1.35	1.3	1.7	1.9	2.0	2.2
11	2.9	2.0	3.5	3.7	4.0	2.5	1.35	1.35	1.7	1.9	2.0	2.2
12	2.9	2.0	3.9	3.8	4.0	2.45	1.3	1.5	1.7	1.9	2.0	2.2
13	2.9	2.0	4.5	3.75	3.95	2.4	1.3	1.5	1.7	1.9	2.05	2.2
14	2.95	2.0	5.5	3.75	3.9	2.4	1.3	1.45	1.7	1.9	2.05	2.15
15	2.55	2.0	5.9	3.75	3.85	2.4	1.3	1.4	1.7	2.0	2.05	2.05
16	2.2	2.0	5.85	3.75	3.8	2.4	1.3	1.4	1.7	2.0	2.05	2.0
17	2.2	2.0	5.75	3.8	3.7	2.35	1.4	1.4	1.75	2.1	2.1	2.0
18	2.2	2.0	5.45	3.8	3.7	2.3	1.45	1.5	1.75	2.15	2.1	2.0
19	2.2	2.0	5.15	3.85	3.65	2.25	1.4	1.5	1.75	2.2	2.1	2.0
20	2.2	2.0	5.05	3.85	3.6	2.2	1.4	1.4	1.75	2.0	2.1	2.0
21	2.2	2.0	4.9	3.9	3.55	2.1	1.4	1.4	1.75	2.05	2.1	2.1
22	2.2	2.0	4.85	3.9	3.5	1.95	1.4	1.45	1.75	2.0	2.1	2.1
23	2.1	2.0	4.7	3.9	3.45	1.9	1.4	1.45	1.7	2.0	2.15	2.1
24	2.1	2.0	4.6	3.9	3.4	1.85	1.4	1.45	1.7	2.0	2.15	2.1
25	2.1	2.0	4.6	3.9	3.35	1.8	1.45	1.45	1.75	2.0	2.2	2.1
26	2.1	2.0	4.5	4.0	3.2	1.75	1.45	1.45	1.8	2.0	2 2	2.0
27	2.1	2.0	4.4	4.05	3.1	1.7	1.45	1.45	1.75	2.0	2.2	2.05
28	2.1	2.05	4.4	4.1	3.0	1.65	1.45	1.5	1.75	2.0	2.2	2.1
29	2.1	.....	4.3	4.15	2.95	1.6	1.45	1.5	1.8	2.0	2.2	2.0
30	2.0	.....	4.2	4.2	2.9	1.5	1.45	1.5	1.8	2.0	2.2	2.0
31	2.0	.....	4.1	.....	2.8	.....	1.45	1.4	.....	2.0	.....	2.0

NOTE.—Relation of gage height to discharge affected by ice Jan. 1 to Feb. 12. Probably no backwater from ice during December.

Daily discharge, in second-feet, of Bear River near Preston, Idaho, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	845	3,070	3,370	1,430	340	320	340	500	670	800
2	.....	.....	1,040	2,920	3,370	1,370	320	320	340	530	630	800
3	.....	.....	1,310	2,840	3,370	1,310	320	300	360	595	710	845
4	.....	.....	1,430	2,770	3,370	1,310	320	300	440	560	710	800
5	.....	.....	1,610	2,620	3,220	1,260	300	300	440	560	710	800
6	.....	.....	1,550	2,620	3,370	1,200	300	300	440	560	710	800
7	.....	.....	1,800	2,620	3,220	1,200	300	300	440	560	630	755
8	.....	.....	1,860	2,620	3,070	1,200	300	280	440	560	630	755
9	.....	.....	2,060	2,620	3,070	1,140	300	260	440	560	630	755
10	.....	.....	2,060	2,620	3,070	1,090	280	260	440	560	630	800
11	.....	.....	2,340	2,620	3,070	1,090	280	280	440	560	630	800
12	.....	.....	2,920	2,770	3,070	1,040	260	340	440	560	630	800
13	.....	630	3,840	2,700	3,000	980	260	340	440	560	670	800
14	.....	630	5,620	2,700	2,920	980	260	320	440	560	670	755
15	.....	630	6,380	2,700	2,840	980	260	300	440	630	670	670
16	.....	630	6,280	2,700	2,770	980	260	300	440	630	670	630
17	.....	630	6,080	2,770	2,620	935	300	300	470	710	710	630
18	.....	630	5,530	2,770	2,620	890	320	340	470	755	710	630
19	.....	630	4,990	2,840	2,550	845	300	340	470	800	710	630
20	.....	630	4,810	2,840	2,480	800	300	300	470	630	710	630
21	.....	630	4,540	2,920	2,410	710	300	300	470	670	710	710
22	.....	630	4,450	2,920	2,340	595	300	320	470	630	710	710
23	.....	630	4,180	2,920	2,270	560	300	320	440	630	755	710
24	.....	630	4,000	2,920	2,200	530	300	320	440	630	755	710
25	.....	630	4,000	2,920	2,130	500	320	320	470	630	800	710
26	.....	630	3,840	3,070	1,930	470	320	320	500	630	800	630
27	.....	630	3,680	3,140	1,800	440	320	320	470	630	800	670
28	.....	670	3,680	3,220	1,670	410	320	340	470	630	800	710
29	.....	.....	3,520	3,300	1,610	380	320	340	500	630	800	630
30	.....	.....	3,370	3,370	1,550	340	320	340	500	630	800	630
31	.....	.....	3,220	.....	1,430	.....	320	300	.....	630	.....	630

NOTE.—Daily discharge determined from a discharge rating curve well defined below 3,500 second-feet.

Monthly discharge of Bear River near Preston, Idaho, for 1910.

[Drainage area, 4,500 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	.....	.....	677	0.150	0.17	41,600	D.
February	670	.....	569	.126	.13	31,600	D.
March	6,380	845	3,450	.767	.88	212,000	B.
April	3,370	2,620	2,850	.633	.71	170,000	A.
May	3,370	1,430	2,640	.587	.68	162,000	A.
June	1,430	340	899	.200	.22	53,500	A.
July	340	260	301	.067	.08	18,500	A.
August	340	260	311	.069	.08	19,100	A.
September	500	340	446	.099	.11	26,500	A.
October	800	500	610	.136	.16	37,500	A.
November	800	630	706	.157	.18	42,000	A.
December	845	630	720	.160	.18	44,300	A.
The year	.....	.....	1,190	.264	3.58	859,000	

NOTE.—Discharge Jan. 1 to Feb. 12 estimated from climatologic records and observer's notes in regard to ice. Mean discharge Feb. 1 to 12 estimated at 483 second-feet.

BEAR RIVER NEAR COLLINSTON, UTAH.

This station, which is located at the lower end of Bear River canyon, about one-fourth mile below the Utah Sugar Co.'s power plant and about 4 miles north of the Collinston railroad station, was established July 1, 1889. The records show practically the amount of unappropriated water below all diversions.

The principal tributaries above are Cub Creek and Logan River; the only tributary below is Malade River, which enters 18 or 20 miles below the station. Most of the normal low-water flow of the river at this point is appropriated by the Bear River Canal Co., which diverts water at a point about 2 miles above the station. The Utah Sugar Co. also diverts water about 2 miles above the station for power development, but returns it to the river above the station.

The gage is an inclined staff; its datum has not been changed since the station was established.

The channel is fairly permanent and the conditions favor accurate determination of discharge.

Measurements are made from a car and cable.

The records are not affected by artificial control below, but some variations in daily flow may be caused by manipulation of gates on the dam 2 miles above the station. A little shore ice occasionally forms at the station, but the effect on the discharge is very slight.

Discharge measurements of Bear River near Collinston, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Aug. 3	G. H. Canfield	221	296	1.15	343
3	do	220	295	1.15	336
Sept. 8	do	233	324	1.31	474
8	do	233	320	1.30	457
Oct. 6	do	271	501	1.94	989
Dec. 12	J. C. Dort	270	612	2.44	1,520

Daily gage height, in feet, of Bear River near Collinston, Utah, for 1910.

[R. A. Johnson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	2.6	2.8	5.7	5.3	2.9	1.0	1.1	1.0	1.7	2.2	2.3
2	3.2	2.7	2.4	5.4	5.2	2.8	1.1	1.1	1.0	1.7	2.1	2.3
3	3.2	2.9	4.0	5.3	5.2	2.7	1.0	1.1	1.0	1.8	2.1	2.3
4	3.2	2.5	4.5	5.4	5.1	2.6	1.0	1.1	1.0	1.8	2.1	2.4
5	3.2	2.5	4.6	5.6	5.0	2.6	.....	1.1	1.0	1.9	2.2	2.4
6	3.2	2.4	4.7	5.6	5.0	2.5	.....	1.1	1.0	2.0	2.1	2.4
7	3.0	2.6	4.9	5.4	4.9	2.4	.....	1.1	1.0	2.0	2.1	2.4
8	3.0	2.6	5.0	5.2	4.8	2.4	.....	1.1	1.0	2.0	2.2	2.3
9	3.0	2.6	5.0	5.1	4.8	2.3	.....	1.1	1.0	2.0	2.1	2.3
10	3.0	2.7	5.0	4.9	4.7	2.3	.....	1.1	1.0	2.0	2.1	2.3
11	3.0	2.7	4.9	4.7	4.7	2.3	.....	1.1	1.0	2.0	2.1	2.3
12	3.0	2.8	4.7	4.6	4.6	2.2	.....	1.0	1.2	2.0	2.1	2.4
13	3.0	2.7	4.8	4.6	4.6	2.2	.....	1.0	1.3	2.0	2.1	2.4
14	3.0	2.6	4.9	4.7	4.6	2.2	.....	1.1	1.4	2.0	2.1	2.4
15	3.0	2.7	5.3	4.8	4.5	2.1	.....	1.0	1.5	2.0	2.1	2.3
16	3.0	2.6	5.8	4.9	4.5	2.1	.....	1.0	1.5	2.0	2.2	2.3
17	2.9	2.4	6.1	5.0	4.4	2.0	.....	1.0	1.6	2.0	2.1	2.3
18	2.8	2.6	6.2	4.9	4.3	1.9	.....	1.0	1.6	2.0	2.1	2.3
19	2.8	2.7	6.4	4.8	4.2	1.9	.....	1.0	1.6	2.1	2.1	2.2
20	2.8	2.7	6.4	4.8	4.1	1.8	.....	1.0	1.7	2.1	2.2	2.2
21	2.8	2.6	6.4	4.8	4.0	1.7	.....	1.0	1.6	2.2	2.2	2.1
22	2.9	2.6	6.3	4.9	3.9	1.6	.....	1.0	1.6	2.2	2.2	2.1
23	2.9	2.6	6.3	4.9	3.8	1.4	.....	1.0	1.7	2.2	2.3	2.2
24	2.8	2.7	6.2	4.9	3.7	1.2	.....	1.0	1.6	2.2	2.3	2.2
25	2.8	2.7	6.2	4.9	3.6	1.1	1.0	1.0	1.6	2.1	2.3	2.2
26	2.7	2.8	6.1	4.9	3.4	1.0	1.1	1.0	1.6	2.1	2.3	2.2
27	2.7	2.7	6.0	4.8	3.3	1.0	1.1	1.0	1.6	2.2	2.3	2.2
28	2.7	2.7	5.9	4.9	3.2	1.0	1.1	0.8	1.7	2.3	2.3	2.2
29	2.7	.....	5.7	5.1	3.1	1.0	1.1	0.8	1.7	2.3	2.2	2.2
30	2.6	.....	5.5	5.3	3.0	1.1	1.1	0.8	1.7	2.2	2.3	2.2
31	2.5	.....	5.4	.....	2.9	.....	1.1	0.8	.....	2.2	.....	2.2

NOTE.—July 5-14, water below gage, which ends at 1 foot. July 15-24, water below gage except from 4 p. m. to 12 p. m. each day while the power plant was in operation. Gage read 1 foot while the power plant was in operation. Aug. 28-31, water from 1 inch to 4 inches below gage; gage heights estimated. Gage heights probably not affected by ice during 1910.

Daily discharge, in second-feet, of Bear River near Collinston, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,830	2,080	2,300	6,200	5,520	2,000	250	310	250	780	1,250	1,350
2	2,830	2,190	1,860	5,690	5,350	1,890	310	310	250	780	1,150	1,350
3	2,830	2,420	3,980	5,520	5,350	1,780	250	310	250	870	1,150	1,350
4	2,830	1,970	4,790	5,690	5,180	1,670	250	310	250	870	1,150	1,450
5	2,830	1,970	4,960	6,030	5,010	1,670	.....	310	250	960	1,250	1,450
6	2,830	1,860	5,130	6,030	5,010	1,560	.....	310	250	1,050	1,150	1,450
7	2,550	2,080	5,470	5,690	4,840	1,450	.....	310	250	1,050	1,150	1,450
8	2,550	2,080	5,640	5,350	4,670	1,450	.....	310	250	1,050	1,250	1,350
9	2,550	2,080	5,640	5,180	4,670	1,350	.....	310	250	1,050	1,150	1,350
10	2,550	2,190	5,640	4,840	4,510	1,350	.....	310	250	1,050	1,150	1,350
11	2,550	2,190	5,470	4,510	4,510	1,350	.....	310	250	1,050	1,150	1,350
12	2,550	2,300	5,130	4,350	4,350	1,250	.....	250	380	1,050	1,150	1,450
13	2,550	2,190	5,300	4,350	4,350	1,250	.....	250	450	1,050	1,150	1,450
14	2,550	2,080	5,470	4,510	4,350	1,250	.....	310	530	1,050	1,150	1,450
15	2,550	2,190	6,150	4,670	4,200	1,150	.....	250	610	1,050	1,150	1,350
16	2,550	2,080	7,040	4,840	4,200	1,150	.....	250	610	1,050	1,250	1,350
17	2,420	1,860	7,600	5,010	4,050	1,050	.....	250	690	1,050	1,150	1,350
18	2,300	2,080	7,800	4,840	3,900	960	.....	250	690	1,050	1,150	1,350
19	2,300	2,190	7,500	4,670	3,750	960	.....	250	690	1,150	1,150	1,250
20	2,300	2,190	7,500	4,670	3,600	870	.....	250	780	1,150	1,250	1,250
21	2,300	2,080	7,500	4,670	3,450	780	.....	250	690	1,250	1,250	1,150
22	2,420	2,080	7,300	4,840	3,300	690	.....	250	690	1,250	1,250	1,150
23	2,420	2,080	7,300	4,840	3,160	530	.....	250	780	1,250	1,350	1,250
24	2,300	2,190	7,100	4,840	3,020	380	.....	250	690	1,250	1,350	1,250
25	2,300	2,190	7,100	4,840	2,890	310	250	250	690	1,150	1,350	1,250
26	2,190	2,300	6,910	4,840	2,630	250	310	250	690	1,150	1,350	1,250
27	2,190	2,190	6,720	4,670	2,500	250	310	250	690	1,250	1,350	1,250
28	2,190	2,190	6,540	4,840	2,370	250	310	160	780	1,350	1,350	1,250
29	2,190	.....	6,200	5,180	2,240	250	310	160	780	1,350	1,250	1,250
30	2,080	.....	5,860	5,520	2,120	310	310	160	780	1,250	1,350	1,250
31	1,970	.....	5,690	.....	2,000	.....	310	160	.....	1,250	.....	1,250

NOTE.—Daily discharge determined as follows: Jan. 1 to Mar. 18, from the 1909 discharge rating curve, which is well defined; Mar. 19 to Dec. 31, from a curve well defined below 6,000 second-feet. Warm rains and rapid melting of the snow at the head of the river during March caused a sudden rise at the gaging station.

Monthly discharge of Bear River near Collinston, Utah, for 1910.

[Drainage area, 6,000 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	2,830	1,970	2,460	0.410	0.47	151,000	A.
February	2,420	1,860	2,130	.355	.37	118,000	A.
March	7,800	1,860	5,950	.992	1.14	366,000	B.
April	6,200	4,350	5,060	.843	.94	301,000	A.
May	5,520	2,000	3,900	.650	.75	240,000	A.
June	2,000	250	1,050	.175	.20	62,500	A.
July	310	20	141	.024	.03	8,670	D.
August	310	160	262	.044	.05	16,100	C.
September	780	250	515	.086	.10	30,600	B.
October	1,350	780	1,100	.183	.21	67,600	A.
November	1,350	1,150	1,220	.203	.23	72,600	A.
December	1,450	1,150	1,320	.220	.25	81,200	A.
The year	7,800	20	2,090	.348	4.74	1,520,000	

NOTE.—Discharge July 5 to 24 estimated from information regarding the operation of the power plant. Mean discharge July 5 to 24 estimated at 60 second-feet.

LOGAN RIVER NEAR LOGAN, UTAH.

This station, which is located near the mouth of the canyon, about one-fourth mile below the Hercules power house and about 2 miles east of Logan, Utah, was established June 1, 1896, discontinued July 18, 1903, and reestablished April 13, 1904.

The only tributaries below the station are Blacksmith Fork and Cache River, which enter at distances of 5 and 10 miles, respectively. Above the station water is diverted to develop power, but is returned to the river. Water is also diverted above the station to the Logan, Hyde Park, and Smithfield canal, and the discharge of this canal should be added to that of the river at the gaging section to determine the total run-off from the drainage area at this point. Below the station practically all the normal low-water flow is diverted for irrigation.

The gage is an inclined staff; its datum has remained unchanged since January 1, 1906.

Discharge measurements are made by means of a car and cable.

The flow past the gage is not affected by artificial control or by ice, but the velocity of the current is so high that the stream bed is likely to shift greatly at high and medium stages and conditions for accurately determining the discharge are therefore rather unfavorable. Although the results are liable to some error during the first part of 1910 the records may be considered good during the later part of the year.

Discharge measurements of Logan River near Logan, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. feet.*	*Feet.*	*Sec.-feet.*
Apr. 19	E. S. Fuller	59	146	3.35	683
Aug. 4	G. H. Canfield	44	89	2.17	218
Sept. 3	do	44	79	2.06	175
Oct. 5	do	46	84	2.11	186
Dec. 13	Dort and Palmer	42	65	1.90	122

Daily gage height, in feet, of Logan River near Logan, Utah, for 1910.

[S. G. Palmer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.3	2.2	2.15	2.75	3.7	3.45	.....	2.3	2.05	2.1	2.1	1.95
2	2.3	2.2	2.2	2.85	3.6	3.4	2.55	2.3	2.05	2.15	2.05	1.95
3	2.25	2.2	2.3	2.9	3.5	3.4	2.55	2.3	2.05	2.1	2.05	1.95
4	2.25	2.2	2.3	2.9	3.45	3.3	2.5	2.25	2.05	2.2	2.05	1.95
5	2.2	2.2	2.4	2.85	3.45	3.3	2.45	2.15	2.0	2.15	2.0	1.9
6	2.2	2.2	2.4	2.8	3.3	3.25	2.45	2.2	2.05	2.1	2.0	1.9
7	2.2	2.1	2.4	2.85	3.25	3.2	2.45	2.2	2.05	2.1	2.0	1.95
8	2.2	2.1	2.5	2.9	3.25	3.15	2.45	2.2	2.05	2.1	2.0	1.9
9	2.2	2.1	2.45	3.0	3.45	3.1	2.45	2.2	2.05	2.1	2.0	1.95
10	2.2	2.1	2.4	3.1	3.7	3.1	2.45	2.2	2.1	2.1	2.0	1.95
11	2.2	2.1	2.4	3.3	3.75	3.15	2.4	2.2	2.1	2.1	2.0	1.95
12	2.2	2.2	2.4	3.25	3.8	3.05	2.4	2.2	2.1	2.15	2.0	1.95
13	2.2	2.2	2.45	3.3	3.85	3.05	2.4	2.2	2.1	2.1	2.0	1.9
14	2.2	2.2	2.5	3.25	3.75	3.05	2.35	2.2	2.1	2.1	2.0	2.0
15	2.2	2.1	2.6	3.15	3.65	3.0	2.4	2.2	2.1	2.1	2.0	1.95
16	2.2	2.1	2.6	3.15	3.5	3.0	2.4	2.2	2.15	2.0	2.0	1.95
17	2.2	2.1	2.65	3.1	3.4	2.9	2.4	2.15	2.2	2.05	2.0	1.95
18	2.2	2.1	2.75	3.25	3.4	2.9	2.35	2.2	2.15	2.1	1.95	1.95
19	2.2	2.1	2.8	3.3	3.4	2.85	2.3	2.2	2.1	2.05	2.0	1.9
20	2.2	2.15	2.85	3.3	3.35	2.8	2.25	2.15	2.1	2.0	1.9	1.9
21	2.2	2.1	3.0	3.4	3.35	2.75	2.3	2.15	2.1	2.0	2.0	1.9
22	2.1	2.1	3.15	3.5	3.4	2.75	2.3	2.15	2.1	2.0	2.0	1.9
23	2.1	2.1	3.1	3.6	3.5	2.7	2.25	2.15	2.1	2.0	1.9	1.9
24	2.1	2.1	3.0	3.7	3.55	2.65	2.25	2.15	2.1	2.0	1.95	1.95
25	2.2	2.1	2.9	3.8	3.6	2.7	2.3	2.1	2.1	2.05	2.0	1.95
26	2.2	2.1	3.1	3.95	3.6	2.65	2.25	2.1	2.1	2.05	2.0	1.9
27	2.2	2.1	2.85	4.0	3.5	2.65	2.2	2.1	2.1	2.05	1.9	1.85
28	2.2	2.1	2.85	4.0	3.5	.....	2.3	2.1	2.1	2.1	1.9	1.85
29	2.2	.....	2.8	4.1	3.45	.....	2.35	2.0	2.1	2.1	1.9	1.90
30	2.2	.....	2.7	4.0	3.45	.....	2.3	2.05	2.1	2.1	1.9	1.85
31	2.2	.....	2.75	.....	3.4	.....	2.3	2.05	.....	2.05	.....	1.80

Daily discharge, in second-feet, of Logan River near Logan, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	133	103	90	322	1,320	1,110	430	275	172	190	190	138
2	133	103	103	372	1,240	1,060	418	275	172	210	172	138
3	118	103	133	398	1,150	1,060	418	275	172	190	172	138
4	118	103	133	398	1,110	980	385	252	172	230	172	138
5	103	103	168	372	1,110	980	356	210	154	210	154	122
6	103	103	168	346	980	940	356	230	172	190	154	122
7	103	76	168	372	940	900	356	230	172	190	154	138
8	103	76	207	398	940	860	356	230	172	190	154	122
9	103	76	188	455	1,110	820	356	230	172	190	154	138
10	103	76	168	517	1,320	820	356	230	190	190	154	138
11	103	76	168	655	1,360	860	327	230	190	190	154	138
12	103	103	168	620	1,410	780	327	230	190	210	154	138
13	103	103	188	655	1,460	780	327	230	190	190	154	122
14	103	103	207	620	1,360	780	301	230	190	190	154	154
15	103	76	250	551	1,280	740	327	230	190	190	154	138
16	103	76	250	551	1,150	740	327	230	210	154	154	138
17	103	76	274	517	1,060	660	327	210	230	172	154	138
18	103	76	322	620	1,060	660	301	230	210	190	138	138
19	103	76	346	655	1,060	622	275	230	190	172	154	122
20	103	90	372	655	1,020	585	252	210	190	154	122	122
21	103	76	455	727	1,020	550	275	210	190	154	154	122
22	76	76	551	800	1,060	550	275	210	190	154	154	122
23	76	76	517	874	1,150	515	252	210	190	154	122	122
24	76	76	455	950	1,190	482	252	210	190	154	138	138
25	103	76	398	1,030	1,240	515	275	190	190	172	154	138
26	103	76	517	1,150	1,240	482	252	190	190	172	154	122
27	103	76	372	1,200	1,150	482	230	190	190	172	122	108
28	103	76	372	1,200	1,150	468	275	190	190	190	122	108
29	103	.....	346	1,280	1,110	455	301	154	190	190	122	122
30	103	.....	298	1,200	1,110	442	275	172	190	190	122	108
31	103	.....	322	.....	1,060	.....	275	172	.....	172	.....	94

NOTE.—Daily discharge determined as follows: Jan. 1 to Apr. 30, from a discharge rating curve fairly well defined between 500 and 800 second-feet; May 1 to Dec. 31, from a curve well defined below 300 second-feet. Discharge interpolated June 28 to July 1.

Monthly discharge of Logan River near Logan, Utah, for 1910.

[Drainage area, 218 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	133	76	113	0.518	0.60	6,950	C.
February	103	76	85.2	.391	.41	4,730	C.
March	551	90	280	1.28	1.48	17,200	C.
April	1,280	322	682	3.13	3.49	40,600	B.
May	1,460	940	1,160	5.32	6.13	71,300	C.
June	1,110	442	723	3.32	3.70	43,000	C.
July	430	230	317	1.45	1.67	19,500	B.
August	275	154	219	1.00	1.15	13,500	A.
September	230	154	187	.858	.96	11,100	A.
October	230	154	183	.840	.97	11,300	A.
November	190	122	150	.688	.77	8,930	A.
December	154	94	128	.587	.68	7,870	A.
The year	1,460	76	353	1.62	22.01	256,000	

NOTE.—Discharge of Logan, Hyde Park, and Smithfield Canal excluded for lack of sufficient data. For information regarding the probable effect of this omission from month to month see table of monthly discharge of Logan River at Logan for 1909, Water-Supply Paper No. 270, p. 43.

BLACKSMITH FORK NEAR HYRUM, UTAH.

Blacksmith Fork rises on the western slope of the Bear River Range and flows southwest and then northwest into Logan River. The drainage basin of the tributary is in every way similar to that of the main stream. Only the flood and winter discharge, however, reaches the Logan, the entire spring and summer flow being used for irrigation on the tillable lands below the gaging station.

The gaging station, which is located at the mouth of the canyon, about 10 miles southeast of Logan and about 5 miles from Hyrum, the nearest railway and post office point, was established July 19, 1900, discontinued December 31, 1902, and reestablished May 16, 1904. The original station was above the intake of the power canal; the present station is about 500 feet below the intake of the power canal and about 800 feet above the Hyrum city power plant. The flow of the power plant canal plus that passing the station represents the total amount of water available for irrigation in the valley below and for power development above.

The gage is a vertical staff. Its datum has not been changed since the new stations were established, in 1904.

Discharge measurements are made by means of a car and cable.

The flow is not affected by artificial control above or below the station or by ice at the gage. The velocity of the current is very high, and a slight shifting of the channel renders the determinations of discharge somewhat liable to error during high water. The results, however, may be considered fairly good.

Discharge measurements of Blacksmith Fork near Hyrum, Utah, 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 19	E. S. Fuller	49	84	4.80	435
Dec. 13	J. C. Dort	45	37	3.65	76

Daily gage height, in feet, of Blacksmith Fork near Hyrum, Utah, for 1910.

[Uriah Benson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.1	3.8	4.1	4.8	4.8	4.2	4.2	3.8	3.7	3.7	3.7	3.7
2	4.1	3.8	4.1	4.7	4.8	4.2	4.2	3.8	3.7	3.7	3.7	3.7
3	3.9	3.8	4.1	4.7	4.8	4.2	4.1	3.8	3.7	3.7	3.7	3.7
4	3.9	3.8	4.1	4.7	4.8	4.2	4.1	3.7	3.7	3.7	3.7	3.7
5	3.9	3.8	4.1	4.7	4.8	4.2	4.1	3.7	3.7	3.7	3.7	3.7
6	3.9	3.8	4.1	4.7	4.8	4.2	4.1	3.7	3.7	3.7	3.7	3.7
7	3.9	3.8	4.1	4.7	4.8	4.2	4.1	3.7	3.7	3.7	3.7	3.7
8	3.9	3.8	4.1	4.9	4.7	4.2	4.1	3.7	3.7	3.7	3.7	3.7
9	3.9	3.8	4.1	5.1	4.7	4.2	4.1	3.7	3.7	3.7	3.7	3.7
10	3.9	3.8	4.1	5.1	4.6	4.2	4.1	3.7	3.7	3.7	3.7	3.7
11	3.9	3.8	4.1	5.1	4.6	4.2	4.1	3.7	3.7	3.7	3.7	3.65
12	3.9	3.8	4.1	5.1	4.5	4.2	4.1	3.7	3.7	3.7	3.7	3.65
13	3.9	3.8	4.1	4.9	4.5	4.2	4.1	3.7	3.7	3.7	3.7	3.65
14	3.9	3.8	4.1	4.9	4.5	4.2	4.1	3.7	3.7	3.7	3.7	3.65
15	3.9	3.8	4.1	4.8	4.5	4.2	4.1	3.7	3.7	3.7	3.7	3.65
16	3.9	3.8	4.1	4.8	4.5	4.2	4.1	3.7	3.7	3.7	3.7	3.65
17	3.8	3.8	4.3	4.8	4.4	4.1	4.0	3.7	3.7	3.7	3.7	3.65
18	3.8	3.8	4.4	4.8	4.4	4.1	4.0	3.7	3.7	3.7	3.7	3.65
19	3.8	3.8	4.5	4.8	4.4	4.1	3.9	3.7	3.7	3.7	3.7	3.65
20	3.8	3.8	4.5	4.8	4.4	4.1	3.9	3.7	3.7	3.7	3.7	3.65
21	3.8	3.9	4.7	4.8	4.4	4.1	3.9	3.7	3.7	3.7	3.7	3.65
22	3.8	3.9	4.8	4.8	4.4	4.2	3.8	3.7	3.7	3.7	3.7	3.65
23	3.8	3.9	4.9	4.8	4.4	4.2	3.8	3.7	3.7	3.7	3.7	3.65
24	3.8	3.9	4.9	4.8	4.3	4.2	3.8	3.7	3.7	3.7	3.7	3.65
25	3.8	3.9	4.9	4.8	4.3	4.2	3.8	3.7	3.7	3.7	3.7	3.65
26	3.8	3.9	4.9	4.8	4.3	4.2	3.8	3.7	3.7	3.7	3.7	3.65
27	3.8	4.1	4.9	4.8	4.3	4.2	3.8	3.7	3.7	3.7	3.7	3.65
28	3.8	4.1	4.9	4.8	4.3	4.2	3.8	3.7	3.7	3.7	3.7	3.5
29	3.8	.....	4.9	4.8	4.3	4.2	3.8	3.7	3.7	3.7	3.7	3.5
30	3.8	.....	4.9	4.8	4.3	4.2	3.8	3.7	3.7	3.7	3.7	3.5
31	3.8	.....	4.9	.....	4.3	.....	3.8	3.7	.....	3.7	.....	3.5

Daily discharge, in second-feet, of Blacksmith Fork near Hyrum, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	184	107	184	427	427	214	214	107	86	86	86	86
2	184	107	184	385	427	214	214	107	86	86	86	86
3	130	107	184	385	427	214	184	107	86	86	86	86
4	130	107	184	385	427	214	184	86	86	88	86	86
5	130	107	184	385	427	214	184	86	86	86	86	86
6	130	107	184	385	427	214	184	86	86	86	86	86
7	130	107	184	385	427	214	184	86	86	86	86	86
8	130	107	184	471	385	214	184	86	86	86	85	86
9	130	107	184	566	385	214	184	85	86	86	86	86
10	130	107	184	566	346	214	184	86	86	86	86	86
11	130	107	184	566	346	214	184	86	86	86	86	76
12	130	107	184	566	310	214	184	86	86	86	86	76
13	130	107	184	471	310	214	184	86	86	86	86	76
14	130	107	184	471	310	214	184	86	86	86	86	76
15	130	107	184	427	310	214	184	86	86	86	86	76
16	130	107	184	427	310	214	184	86	86	86	86	76
17	107	107	244	427	276	184	156	86	86	86	86	76
18	107	107	276	427	276	184	156	86	86	86	86	76
19	107	107	310	427	276	184	130	86	86	86	86	76
20	107	107	310	427	276	184	130	86	86	86	86	76
21	107	130	385	427	276	184	130	86	86	86	86	76
22	107	130	427	427	276	214	107	86	86	86	86	76
23	107	130	471	427	276	214	107	86	86	86	86	76
24	107	130	471	427	244	214	107	86	86	86	86	76
25	107	130	471	427	244	214	107	86	86	86	86	76
26	107	130	471	427	244	214	107	86	86	86	86	76
27	107	184	471	427	244	214	107	86	86	86	86	76
28	107	184	471	427	244	214	107	86	86	86	86	53
29	107	.....	471	427	244	214	107	86	86	86	86	53
30	107	.....	471	427	244	214	107	86	86	86	86	53
31	107	.....	471	.....	244	.....	107	86	.....	86	.....	53

NOTE.—Daily discharge determined from a fairly well defined discharge rating curve.

Daily combined discharge, in second-feet, of Blacksmith Fork and power-plant race near Hyrum, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	265	188	265	513	535	295	295	215	194	194	194	176
2	265	188	265	471	535	295	295	215	194	194	194	176
3	202	188	265	471	535	295	265	215	194	194	194	176
4	202	188	265	471	535	295	265	194	194	194	194	176
5	202	188	265	471	535	295	265	194	194	194	194	176
6	202	188	265	471	535	295	265	194	194	194	176	176
7	202	188	265	471	535	295	265	194	194	194	176	176
8	202	188	265	557	484	295	265	194	194	194	176	176
9	202	188	265	652	484	295	265	194	194	194	176	176
10	202	188	265	652	445	295	265	194	194	194	176	176
11	202	188	265	652	445	295	265	194	194	194	176	166
12	202	188	265	652	409	295	265	194	194	194	176	166
13	211	188	265	557	391	295	265	194	194	194	176	166
14	211	188	265	557	391	295	265	194	194	194	176	166
15	211	188	265	493	391	295	265	194	194	194	176	166
16	211	188	265	493	391	295	265	194	194	194	176	166
17	188	188	325	545	357	265	264	194	194	194	176	166
18	188	188	357	545	357	265	264	194	194	194	176	166
19	188	188	391	545	257	265	238	194	194	194	176	166
20	188	188	391	545	357	265	238	194	194	194	176	166
21	188	211	466	545	357	265	238	194	194	194	176	166
22	188	211	508	545	357	295	215	194	194	194	176	166
23	188	211	557	545	357	295	215	194	194	194	176	166
24	188	211	557	535	325	295	215	194	194	194	176	166
25	188	211	557	535	325	295	215	194	194	194	176	166
26	188	211	557	535	325	295	215	194	194	194	176	166
27	188	265	557	535	325	295	215	194	194	194	176	166
28	188	265	557	535	325	295	215	194	194	194	176	143
29	188	.....	557	535	325	295	215	194	194	194	176	143
30	188	.....	557	535	325	295	215	194	194	194	176	143
31	188	.....	557	.....	325	.....	215	194	.....	194	.....	143

Combined monthly discharge of Blacksmith Fork and power-plant race near Hyrum, Utah, for 1910.

[Drainage area, 286 square miles.]

Month.	Discharge in second-feet.						Run-off.		Accuracy.
	Maximum.	Minimum.	Blacksmith Fork, mean.	Power-plant race, mean.	Total mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	265	188	122	78.1	200	0.699	0.81	12,300	B.
February	265	188	117	81.0	198	.692	.72	11,000	B.
March	557	265	295	82.5	378	1.32	1.52	23,200	B.
April	652	471	442	98.6	540	1.89	2.11	32,100	B.
May	535	325	319	90.0	409	1.43	1.65	25,100	B.
June	295	265	209	81.0	290	1.01	1.13	17,300	B.
July	295	215	154	94.1	248	.867	1.00	15,200	B.
August	215	194	88.0	108	196	.685	.79	12,100	A.
September	194	194	86.0	108	194	.678	.76	11,500	A.
October	194	194	86.0	108	194	.678	.78	11,900	A.
November	194	176	86.0	93.0	179	.626	.70	10,700	B.
December	176	143	76.3	90.0	166	.581	.67	10,200	B.
The year	652	143	173	92.8	266	.930	12.64	193,000	

NOTE.—Computations based on combined run-off of Blacksmith Fork and the power-plant race. Total run-off for the year 1910 at the Blacksmith Fork gaging station, 126,000 acre-feet; in the power-plant race, 67,000 acre feet.

BLACKSMITH FORK POWER-PLANT RACE NEAR HYRUM, UTAH.

This station, which is located 200 feet below the head of the Blacksmith Fork power-plant race, was established May 16, 1904.

The records derived from observations at this station indicate the amount of water used by the Hyrum City power plant and the amount of water being carried around the Blacksmith Fork station by the canal.

The flow at this station should be added to that of Blacksmith Fork after May 16, 1904, to give the total run-off of that river. For monthly discharge at this station see table above.

The gage consists of a vertical staff. The channel is practically permanent.

Discharge measurements are made from a 3 by 16 inch plank laid across the canal.

The variation in stage is very small, and although the rating curve is short the record may be considered good.

Discharge measurements of power-plant race near Hyrum, Utah, 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 19	E. S. Fuller	18	28	5.30	118
Sept. 4	G. H. Canfield	14	30	5.20	108
Dec. 13	J. C. Dort	14	25	4.97	74

Daily gage heights, in feet, of Blacksmith Fork power-plant race near Hyrum, Utah, for 1910.

[Uriah Benson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.9	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0
2	4.9	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0
3	4.8	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0
4	4.8	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0
5	4.8	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0
6	4.8	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.0	5.0
7	4.8	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.0	5.0
8	4.8	4.9	4.9	4.95	5.1	4.9	4.9	5.2	5.2	5.2	5.0	5.0
9	4.8	4.9	4.9	4.95	5.1	4.9	4.9	5.2	5.2	5.2	5.0	5.0
10	4.8	4.9	4.9	4.95	5.1	4.9	4.9	5.2	5.2	5.2	5.0	5.0
11	4.8	4.9	4.9	4.95	5.1	4.9	4.9	5.2	5.2	5.2	5.0	5.0
12	4.8	4.9	4.9	4.95	5.1	4.9	4.9	5.2	5.2	5.2	5.0	5.0
13	4.9	4.9	4.9	4.95	4.9	4.9	4.9	5.2	5.2	5.2	7.0	5.0
14	4.9	4.9	4.9	4.95	4.9	4.9	4.9	5.2	5.2	3.2	5.0	5.0
15	4.9	4.9	4.9	4.95	4.9	4.9	4.9	5.2	5.2	5.2	5.0	5.0
16	4.9	4.9	4.9	4.95	4.9	4.9	4.9	5.2	5.2	5.2	5.0	5.0
17	4.9	4.9	4.9	5.3	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
18	4.9	4.9	4.9	5.3	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
19	4.9	4.9	4.9	5.3	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
20	4.9	4.9	4.9	5.3	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
21	4.9	4.9	4.9	5.3	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
22	4.9	4.9	4.9	5.3	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
23	4.9	4.9	4.95	5.3	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
24	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
25	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
26	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
27	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
28	4.9	4.9	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
29	4.9	.....	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
30	4.9	.....	4.95	5.2	4.9	4.9	5.2	5.2	5.2	5.2	5.0	5.0
31	4.9	.....	4.95	.....	4.9	.....	5.2	5.2	.....	5.2	.....	5.0

Daily discharge, in second-feet, of Blacksmith Fork power-plant race near Hyrum, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	81	81	81	86	108	81	81	108	108	108	108	90
2	81	81	81	86	108	81	81	108	108	108	108	90
3	72	81	81	86	108	81	81	108	108	108	108	90
4	72	81	81	86	108	81	81	108	108	108	108	90
5	72	81	81	86	108	81	81	108	108	108	108	90
6	72	81	81	86	108	81	81	108	108	108	90	90
7	72	81	81	86	108	81	81	108	108	108	90	90
8	72	81	81	86	99	81	81	108	108	108	90	90
9	72	81	81	86	99	81	81	108	108	108	90	90
10	72	81	81	86	99	81	81	108	108	108	90	90
11	72	81	81	86	99	81	81	108	108	108	90	90
12	72	81	81	86	99	81	81	108	108	108	90	90
13	81	81	81	86	81	81	81	108	108	108	90	90
14	81	81	81	86	81	81	81	108	108	108	90	90
15	81	81	81	86	81	81	81	108	108	108	90	90
16	81	81	81	86	81	81	81	108	108	108	90	90
17	81	81	81	118	81	81	108	108	108	108	90	90
18	81	81	81	118	81	81	108	108	108	108	90	90
19	81	81	81	118	81	81	108	108	108	108	90	90
20	81	81	81	118	81	81	108	108	108	108	90	90
21	81	81	81	118	81	81	108	108	108	108	90	90
22	81	81	81	118	81	81	108	108	108	108	90	90
23	81	81	86	118	81	81	108	108	108	108	90	90
24	81	81	86	108	81	81	108	108	108	108	90	90
25	81	81	86	108	81	81	108	108	108	108	90	90
26	81	81	86	108	81	81	108	108	108	108	90	90
27	81	81	86	108	81	81	108	108	108	108	90	90
28	81	81	86	108	81	81	108	108	108	108	90	90
29	81	.....	86	108	81	81	108	108	108	108	90	90
30	81	.....	86	108	81	81	108	108	108	108	90	90
31	81	.....	86	.....	81	.....	108	108	.....	108	.....	90

NOTE.—Daily discharge determined from a fairly well-defined discharge rating curve.

BOX ELDER CREEK AT BRIGHAM, UTAH.

Box Elder Creek is tributary to Box Elder Lake about 3 miles northwest of Brigham, Utah. At high stages water from this lake may reach Bear River.

The gaging station, which is located about three-fourths mile northwest of Brigham City, Utah, on the Third West Street Bridge, about half a mile above the Oregon Short Line Railroad crossing, was established May 20, 1909.

A vertical gage is attached to the northwest corner of the bridge. It was lowered 2 feet on February 24, 1910, in order to obviate negative readings.

The relation between gage height and discharge at this point is not greatly affected by ice, but it is affected by artificial control above the station.

The gage heights for 1909 were not published in the report for that year (Water-Supply Paper 270) as they were considered unreliable. The inaccuracy, however, can not be definitely proved and the records are here presented. These records and also those for January 1 to March 31, 1910, which are also questionable, are at best only approximate, and computations based on them should be used with great caution. The record beginning April 8, 1910, when a new observer was engaged, is considered reliable.

Discharge measurements of Box Elder Creek at Brigham, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 24	E. A. Porter	15	10	3.35	17
Apr. 8	E. S. Fuller	16	16	4.20	55
Dec. 8	J. C. Dort	13	5.6	3.32	14.6
27	.....do	10.5	6.4	3.38	14.5

NOTE.—All gage heights refer to the new datum established Feb. 24, 1910.

Daily gage height, in feet, and discharge, in second-feet, of Box Elder Creek at Brigham Utah, for 1909.

Day.	May.		June.		September.		October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	.....	.....	1.85	37	.....	0	0.75	2	1.65	28	1.65	.....
2	.....	.....	.95	5	.....	0	.75	2	1.65	28	1.65	.....
3	.....	.....	1.00	6	.....	0	.75	2	1.65	28	1.65	.....
4	.....	.....	1.35	16	.....	0	.75	2	1.65	28	1.65	.....
5	.....	.....	.90	4	0.75	2	.75	2	1.65	28	1.65	.....
6	.....	.....	1.00	6	.80	2	.75	2	1.65	28	1.65	.....
7	.....	.....	.90	4	.65	1	.75	2	1.65	28	1.65	.....
8	.....	.....	1.15	10	.65	1	.75	2	1.80	35	1.65	.....
9	.....	.....	1.85	37	.70	1	.75	2	1.80	35	1.65	.....
10	.....	.....	.70	34	.70	1	.75	2	1.80	35	1.65	.....
11	.....	.....	.65	31	.65	1	.75	2	1.80	35	1.65	.....
12	.....	.....	.30	28	.80	2	.75	2	1.65	28	1.65	.....
13	.....	.....	.20	25	.80	2	.75	2	1.65	28	1.65	.....
14	.....	.....	.30	23	.80	2	.75	2	1.65	28	1.65	.....
15	.....	.....	.30	20	.90	4	.75	2	1.65	28	1.65	.....
16	.....	.....	.10	17	.95	6	.75	2	1.65	28	1.65	.....
17	.....	.....	.25	14	.90	4	.70	1	1.65	28	1.65	.....
18	.....	.....	.10	11	.85	4	.70	1	1.65	28	1.65	.....
19	.....	.....	.20	9	.80	2	.70	1	1.65	28	1.65	.....
20	1.95	58	.20	7	.75	2	.70	1	2.10	50	1.65	.....
21	2.15	77	.20	5	.75	2	.70	1	2.15	52	1.65	.....
22	2.20	82	.20	2	.75	2	.70	1	2.15	52	1.65	.....
23	1.75	42	.....	0	.75	2	.70	1	1.85	38	1.65	.....
24	2.35	98	.....	0	.75	2	.70	1	1.85	38	1.65	.....
25	2.00	63	.....	0	.75	2	.70	1	1.70	30	1.65	.....
26	1.90	40	.....	0	.75	2	.70	1	1.70	30	1.65	.....
27	1.95	42	.....	0	.75	2	.70	1	1.70	30	1.65	.....
28	2.00	45	.....	0	.75	2	.70	1	1.70	30	1.65	.....
29	1.95	42	.....	0	.75	2	.75	2	1.65	28	1.65	.....
30	1.35	17	.....	0	.75	2	.80	2	1.65	28	1.65	.....
31	1.40	18	.....	.....	.....	.....	.75	2	.....	.....	1.65	.....

NOTE.—Gage heights June 10 to 22 questionable; not considered true indices of discharge. No water in creek June 23 to Sept. 4. The sudden increase in gage height on Nov. 1 suggests that the records from Sept. 5 to Oct. 31 may be unreliable, but the increase might have been caused by the closing of the headgates to the diversion canals above the gaging station. Gage heights for November and December thought to be fairly reliable, but the relation of gage height to discharge was probably affected by ice during December. See description.

Daily discharge determined from two fairly well defined discharge rating curves, one applicable from May 20 to 25 and the other from May 26 to Dec. 31. Discharge June 10 to 22 estimated as falling from discharge on June 9 to zero discharge June 23. Discharge Sept. 5 to Oct. 31 taken as a true index of gage heights, but may be much too small. See description.

Daily gage height, in feet, and discharge, in second-feet, of Box Elder Creek at Brigham, Utah, for 1910.

[Serell Nelson, observer.]

Day.	January.		February.		March.		April.		May.		June.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	3.65	.....	3.65	28	3.70	30	.....	85	3.7	30	3.0	6
2	3.65	.....	3.65	28	3.70	30	.....	82	3.7	30	3.1	9
3	3.65	.....	3.65	28	3.70	30	.....	79	3.7	30	3.1	9
4	3.65	.....	3.65	28	3.70	30	.....	75	3.7	30	3.1	9
5	3.65	.....	3.65	28	3.70	30	.....	72	3.7	30	3.1	9
6	3.65	.....	3.65	28	.....	.....	.....	68	3.8	35	3.0	6
7	3.65	.....	3.65	28	.....	.....	.....	60	3.8	35	3.0	6
8	3.65	.....	3.65	28	.....	.....	4.2	55	3.7	30	3.0	6
9	3.65	.....	3.65	28	.....	.....	4.3	61	3.7	30	3.0	6
10	3.65	.....	3.65	28	.....	.....	4.6	79	3.7	30	2.9	4
11	3.65	.....	3.65	28	.....	.....	4.5	73	3.6	26	2.9	4
12	3.65	.....	3.65	28	.....	.....	4.3	61	3.6	26	.....	0
13	3.65	.....	3.65	28	.....	.....	4.3	61	3.6	26	.....	0
14	3.65	.....	3.65	28	.....	.....	4.1	50	3.6	26	.....	0
15	3.65	.....	3.65	28	.....	.....	4.1	50	3.5	22	.....	0
16	3.65	.....	3.65	28	.....	.....	4.2	55	3.4	18	.....	0
17	3.65	.....	3.65	28	.....	.....	4.0	45	3.4	18	.....	0
18	3.65	.....	3.65	28	.....	.....	4.0	45	3.4	18	.....	0
19	3.65	.....	3.65	28	.....	.....	4.0	45	3.4	18	.....	0
20	3.65	.....	3.55	24	.....	.....	4.0	45	3.4	18	.....	0
21	3.65	.....	3.55	24	.....	.....	4.0	45	3.4	18	.....	0
22	3.65	.....	3.50	22	.....	.....	3.9	40	3.3	15	.....	0
23	3.65	.....	3.50	22	.....	.....	3.9	40	3.3	15	.....	0
24	3.65	.....	3.50	22	.....	.....	4.0	45	3.2	12	.....	0
25	3.65	.....	3.50	22	.....	.....	4.0	45	3.2	12	.....	0
26	3.65	.....	3.50	22	3.25	14	3.9	40	3.2	12	.....	0
27	3.65	.....	3.70	30	3.25	14	3.6	26	3.2	12	.....	0
28	3.65	.....	3.70	30	3.95	42	3.7	30	3.1	9	.....	0
29	3.65	.....	.....	.....	4.45	70	3.7	30	3.0	6	.....	0
30	3.65	.....	.....	.....	4.45	70	3.7	30	3.0	6	.....	0
31	3.65	.....	.....	.....	4.75	88	.....	.....	3.0	6	.....	.....

NOTE.—Relation between gage height and discharge probably affected by ice during January.

Gage lowered 2 feet on Feb. 24; all gage heights from Jan. 1 to Feb. 24 corrected to refer to new datum. The uniformity of the record from Feb. 1 to Mar. 5 would seem to indicate that the reading of the gage was neglected except at scattered dates. Gage heights Mar. 6 to 25 have been discarded as worthless. No record Apr. 1 to 7. Gage heights Apr. 8 to June 11 considered reliable, as a new observer was employed during this period. Creek dry June 12 to Aug. 31. No record Sept. 1 to Dec. 31.

Daily discharge determined from a discharge rating curve that is fairly well defined. Discharge interpolated Apr. 1 to 7.

Monthly discharge of Box Elder Creek at Brigham, Utah, for 1909 and 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1909.					
May 20–31	98	17	52	1,240	C.
June	37	0	12	714	C.
July	0	0	0	0	
August	0	0	0	0	
September	6	0	2	119	C.
October	2	1	2	123	C.
November	52	28	32	1,900	C.
December [a]			20	1,230	C.
The period				5,330	
1910.					
January [a]			20	1,230	C.
February	30	22	27	1,500	C.
March	88	14	31	1,910	C.
April	85	26	54	3,210	C.
May	35	6	21	1,290	C.
June	9	0	2	119	C.
July	0	0	0	0	
August	0	0	0	0	
September [a]			10	595	C.
October [a]			15	922	C.
November [a]			15	893	C.
December [a]			15	922	C.
The year				12,600	

[a] Estimated for month.

NOTE.—Discharge Mar. 6–25, 1910, estimated at 25 second-feet.

WEBER RIVER BASIN.

GENERAL FEATURES.

Weber River rises on the northern slope of the Uinta Mountains and flows in a tortuous course northwestward into Great Salt Lake.

The upper part of the basin is very rough. The highest peaks, reaching an elevation of about 13,000 feet above sea level, are barren masses of sandstone and quartzite, covered with snow for almost the entire year. The basin contains no extensive forests, meadows, or marshes. The greater part of the precipitation is in the form of snow, the melting of which is the chief source of the spring flood and early summer flow. A large part of the normal flow is derived from springs, which are well distributed over the area.

Between Oakley and Croyden the river traverses a very narrow valley given over to irrigated farms. The chief tributaries in this stretch are Beaver Creek, which enters from the south about 6 miles below Oakley and drains an area about 71 square miles in extent; Chalk Creek, from the east, which drains an area comprising about 428 square miles and enters 15 miles above Croyden; and Lost Creek, which comes in from the east at a point about one-half mile above the Devils Slide gaging station and drains 205 square miles of the basin.

Between Croyden and the Ogden Valley the stream flows through a comparatively narrow, steep canyon, broken here and there by stretches of valley containing irrigated farms. East Creek, which enters near Morgan, discharges but little water to the river, as its flow is completely controlled by a storage reservoir about 5 miles above its mouth, the water being used for irrigation in Morgan Valley, through which the Weber flows.

Ogden River, which joins the Weber about 8 miles above Plain City, drains a rugged limestone area, 363 square miles in extent, on the western slopes of the Wasatch Range. The main stream and its numerous small tributaries are confined to steep, narrow canyons. The entire normal flow of the stream is diverted for irrigation near the foot of the canyon about 3 miles above the mouth of the river, after being used for the development of power by the Utah Light & Railway Co. The flood and winter flow, therefore, is all that reaches the Weber, except for a small amount of seepage from the irrigated district. The city of Ogden also derives its water supply from Ogden River.

At present no storage reservoirs are used on the Weber, but a number of sites are available.

The wettest year since records have been kept was 1909, when 1,290,000 acre-feet wasted into Great Salt Lake from the Weber basin, as shown by the records at the Plain City station. The year 1905 was by far the driest year, when only 298,000 acre-feet wasted into Great Salt Lake.

WEBER RIVER NEAR OAKLEY, UTAH.

This station, which is located near the mouth of the canyon above Kamas Prairie, about 3 miles above Oakley, Utah, was established October 22, 1904. The records show the total amount of water available for diversion through Kamas Pass into Provo River in connection with the proposed Weber River project.

The station is below South Fork and above Kamas Creek and is above all diversions to the Kamas Prairie region.

The gage is an inclined staff; its datum has remained unchanged since the station was established.

Discharge measurements are made from a cable and car.

The bed of the stream is permanent. The river freezes over at the station at times during the winter season, but as the winter flow is fairly constant good results are obtained by interpolating between periods when the river is known to be open.

43926°—WSP 290—12——4

Discharge measurements of Weber River near Oakley, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Aug. 5	G. H. Canfield	43	54	4.07	96
Dec. 6	J. C. Dort	45	50	4.10	85

Daily gage height, in feet, of Weber River near Oakley, Utah, for 1910.

[John Fransan, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	4.5	.....	6.9	4.45	4.2	4.0	.....	4.0	.....
2	.....	.....	.....	4.55	5.5	6.8	4.4	4.1	4.0	4.0	4.0	3.95
3	.....	4.7	4.1	4.6	5.3	6.4	4.4	4.1	4.0	4.05	.....	3.95
4	.....	.....	.....	4.55	5.3	.....	.....	4.1	4.0	4.05	3.95	3.95
5	5.5	.....	.....	4.6	5.3	6.0	4.35	4.1	4.0	4.05	3.95	4.0
6	.....	.....	.....	4.6	5.35	5.8	4.35	4.1	3.95	4.0	3.95	4.1
7	.....	.....	4.25	4.6	5.4	5.8	4.35	4.05	3.95	4.0	3.95	.....
8	.....	.....	.....	4.7	5.5	5.7	4.35	4.05	.....	4.0	3.95	3.95
9	.....	.....	.....	4.8	5.8	5.65	4.3	4.0	3.95	.....	3.95	3.95
10	.....	4.5	4.2	4.9	6.1	5.6	4.3	4.0	3.95	4.0	3.95	3.95
11	5.3	.....	.....	5.0	6.4	5.4	4.3	4.0	3.95	4.0	3.95	4.0
12	.....	.....	.....	5.1	6.4	5.4	4.3	4.15	3.95	4.0	.....	4.0
13	.....	.....	.....	5.2	6.3	5.3	4.25	4.0	3.95	4.05	3.95	4.05
14	.....	.....	4.3	5.0	6.3	5.2	4.25	4.0	3.95	4.05	3.95	4.1
15	.....	.....	.....	4.9	6.3	5.1	4.35	4.0	3.95	4.0	3.95	.....
16	.....	.....	4.3	4.85	6.0	5.05	4.3	4.0	4.0	4.05	3.95	4.3
17	.....	4.4	.....	.....	.....	5.0	4.3	4.0	.....	4.1	.....	4.5
18	.....	.....	.....	5.0	5.6	4.95	4.25	4.0	4.05	4.1	3.95	4.3
19	.....	.....	4.4	5.1	5.7	4.9	4.25	4.0	4.05	4.1	3.95	4.3
20	4.5	.....	4.45	5.15	5.7	4.85	4.45	4.0	4.0	4.05	4.0	4.5
21	.....	.....	4.8	5.2	5.6	4.8	4.3	4.0	4.0	4.05	4.0	4.6
22	.....	.....	5.0	5.3	5.5	4.75	4.25	4.0	4.0	4.05	4.0	5.1
23	.....	.....	4.9	5.5	5.6	4.7	4.2	4.0	.....	4.05	4.0	5.1
24	.....	.....	4.8	5.6	5.7	4.65	4.2	4.0	4.0	4.05	4.0	.....
25	.....	4.0	4.7	5.8	6.0	4.6	4.15	4.0	4.0	4.05	.....	5.1
26	.....	.....	4.6	6.0	6.0	4.55	4.15	4.0	4.0	4.0	4.0	5.5
27	4.6	.....	4.6	6.1	5.9	4.5	4.15	4.0	4.0	4.0	4.0	5.6
28	.....	.....	4.55	6.1	6.0	4.45	4.15	4.0	4.0	4.0	3.95	5.4
29	.....	.....	4.5	6.0	6.6	4.45	4.2	4.0	4.0	4.0	3.95	5.8
30	.....	.....	4.45	6.0	6.7	4.45	4.15	4.0	4.0	4.0	3.95	5.3
31	.....	.....	4.4	.....	6.7	.....	4.1	4.0	.....	4.0	.....	5.1

NOTE.—Relation of gage height to discharge probably affected by ice during January and February and from Dec. 15 to 31; stream filled with ice after Dec. 15.

Daily discharge, in second-feet, of Weber River near Oakley, Utah, for 1910.

[Drainage area, 163 square miles.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	80	205	855	1,790	190	120	74	74	74	65
2	.....	.....	85	222	685	1,690	174	96	74	74	74	65
3	.....	.....	96	240	568	1,330	174	96	74	85	70	65
4	.....	.....	105	222	568	1,180	165	96	74	85	65	65
5	.....	.....	114	240	568	1,020	160	96	74	85	65	74
6	.....	.....	124	240	596	878	160	96	65	74	65	96
7	.....	.....	133	240	625	878	160	85	65	74	65	80
8	.....	.....	130	278	685	811	160	85	65	74	65	65
9	.....	.....	125	320	878	779	146	74	65	74	65	65
10	.....	.....	120	364	1,090	747	146	74	65	74	65	65
11	.....	.....	126	412	1,330	625	146	74	65	74	65	.....
12	.....	.....	132	462	1,330	625	146	108	65	74	65	.....
13	.....	.....	138	514	1,250	568	133	74	65	85	65	.....
14	.....	.....	146	412	1,250	514	133	74	65	85	65	.....
15	.....	.....	146	364	1,250	462	160	74	65	74	65	.....
16	.....	.....	146	344	1,020	437	146	74	74	85	65	.....
17	.....	.....	155	375	885	412	146	74	80	96	65	.....
18	.....	.....	165	412	747	388	133	74	85	96	65	.....
19	.....	.....	174	462	811	364	133	74	85	96	65	.....
20	.....	.....	190	488	811	342	190	74	74	85	74	.....
21	.....	.....	320	514	747	320	146	74	74	85	74	.....
22	.....	.....	412	568	685	299	133	74	74	85	74	.....
23	.....	.....	364	685	747	278	120	74	74	85	74	.....
24	.....	.....	320	747	811	259	120	74	74	85	74	.....
25	.....	.....	278	878	1,020	240	108	74	74	85	74	.....
26	.....	.....	240	1,020	1,020	222	108	74	74	74	74	.....
27	.....	.....	240	1,090	948	205	108	74	74	74	74	.....
28	.....	.....	222	1,090	1,020	190	108	74	74	74	65	.....
29	.....	.....	205	1,020	1,510	190	120	74	74	74	65	.....
30	.....	.....	190	1,020	1,600	190	108	74	74	74	65	.....
31	.....	.....	174	.....	1,600	.....	96	74	.....	74	.....	.....

NOTE.—Daily discharge determined from a discharge rating curve that is fairly well defined. Discharge interpolated for days of missing gage heights during open season.

Monthly discharge of Weber River near Oakley, Utah, for 1910.

[Drainage area, 163 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	.....	.....	85	0.521	0.60	5,230	D.
February	.....	.....	75	.460	.48	4,160	D.
March	412	a 80	180	1.10	1.27	11,100	C.
April	1,090	205	515	3.16	3.53	30,600	B.
May	1,600	568	952	5.84	6.73	58,500	B.
June	1,790	190	608	3.73	4.16	36,200	B.
July	190	96	141	.865	1.00	8,670	A.
August	120	74	80.8	.496	.57	4,970	A.
September	85	65	71.9	.441	.49	4,280	A.
October	96	74	80.4	.493	.57	4,940	A.
November	74	65	68.2	.418	.47	4,060	A.
December	96	a 50	58.2	.357	.41	3,580	C.
The year	1,790	a50	244	1.50	20.28	176,000	

a Estimated.

NOTE.—Discharge for periods during which ice was present estimated from climatologic records and observer's notes in regard to ice. Mean discharge Dec. 11 to 31 estimated at 50 second-feet.

WEBER RIVER AT DEVILS SLIDE, UTAH.[1]

This station, which is located one-fourth mile upstream from the Oregon Short Line Railroad bridge at the town of Devils Slide, about 1½ miles west of Croyden and 10 miles below Echo, Utah, was established February 1, 1905, to determine the amount of water available for storage in the Henefer basin, about 2 miles above, in connection with the proposed Weber River project.

Lost Creek enters the Weber about one-fourth mile above the station and Chalk Creek about 15 miles above. Water is diverted above the station only for irrigation in the narrow valleys and in Kamas Prairie.

The gage is a staff; its datum has remained unchanged since the station was established.

Discharge measurements are made from a cable and car.

The river never freezes over at the station, and the relation between gage height and discharge is not seriously affected by the slush ice that runs at times. The channel shifts somewhat, but the conditions under which observations are made are fairly good. The flow is not affected by artificial control above or below the station, and the records may be considered good.

Discharge measurements of Weber River at Devils Slide, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq.ft.*	*Feet.*	*Sec.-ft.*
Aug. 6	G. H. Canfield	92	77	2.17	126
6	do	94	77	2.17	124
Sept. 6	do	92	62	2.04	89
Oct. 7	do	94	79	2.21	142
Dec. 7	J. C. Dort	102	94	2.40	192

[1] Station formerly described as "Weber River near Croyden."

Doily gage height, in feet, for Weber River at Devils Slide, Utah, for 1910.

[E. T. Crouch, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.3	2.3	3.1	3.8	4.9	4.0	2.3	2.3	2.2	2.2	2.4	2.4
2	2.3	2.3	3.4	3.8	4.9	3.9	2.3	2.3	2.2	2.2	2.4	2.4
3	2.3	2.3	3.6	3.9	4.6	3.9	2.3	2.3	2.2	2.2	2.4	2.4
4	2.3	2.3	3.8	3.9	4.5	3.9	2.3	2.3	2.1	2.2	2.4	2.4
5	2.3	2.3	4.0	4.0	4.2	3.9	2.3	2.2	2.1	2.2	2.4	2.4
6	2.3	2.4	4.0	4.0	4.2	3.8	2.3	2.2	2.1	2.2	2.4	2.4
7	2.3	2.4	4.0	4.1	4.3	3.6	2.3	2.2	2.1	2.2	2.4	2.4
8	2.3	2.4	3.9	4.2	4.5	3.6	2.3	2.2	2.1	2.2	2.4	2.4
9	2.3	2.4	3.9	4.2	4.5	3.4	2.3	2.2	2.1	2.3	2.4	2.4
10	2.3	2.4	3.9	4.5	4.7	3.2	2.3	2.2	2.1	2.3	2.4	2.5
11	2.3	2.4	3.9	4.5	4.7	3.2	2.3	2.2	2.1	2.3	2.4	2.6
12	2.3	2.4	3.9	4.8	4.8	3.1	2.3	2.2	2.1	2.3	2.4	2.6
13	2.3	2.4	4.0	5.0	4.8	3.0	2.3	2.2	2.1	2.3	2.4	2.5
14	2.3	2.4	4.0	5.0	4.8	2.9	2.3	2.2	2.1	2.3	2.4	2.5
15	2.3	2.4	4.1	5.0	4.0	2.9	2.3	2.2	2.1	2.3	2.4	2.4
16	2.3	2.4	4.2	5.1	4.0	2.9	2.3	2 2	2 1	2.4	2.4	2.4
17	2.3	2.4	4.2	4.8	3.9	2.8	2.3	2.2	2.1	2.4	2.4	2.4
18	2.3	2.4	4.2	4.8	3.8	2.8	2.3	2.2	2.2	2.4	2.4	2.4
19	2.3	2.4	4.2	4.6	3.6	2.8	2.3	2.2	2.2	2.4	2.4	2.4
20	2.4	2.4	4.2	4.6	3.6	2.5	2.3	2.2	2.2	2.4	2.4	2.4
21	2.4	2.4	4.2	4.7	3.5	2.4	2.3	2.2	2.2	2.4	2.4	2.4
22	2.4	2.5	4.0	4.7	3.4	2.4	2.3	2.2	2.2	2.4	2.4	2.4
23	2.4	2.5	4.0	4.7	3.5	2.4	2.3	2.2	2.2	2.4	2.4	2.4
24	2.4	2.5	4.0	4.9	3.5	2.4	2.3	2.2	2.2	2.4	2.4	2.4
25	2.4	2.4	3.9	4.9	3.6	2.4	2.3	2.2	2.2	2.4	2.4	2.4
26	2.4	2.4	3.9	5.0	3.6	2.4	2.3	2.2	2.2	2.4	2.4	2.4
27	2.4	2.4	3.9	5.1	3.7	2.4	2.3	2.2	2.2	2.4	2.4	2.4
28	2.4	2.5	3.9	5.2	3.9	2.3	2.3	2.2	2.2	2.4	2.4	2.4
29	2.4	.....	3.8	5.1	4.0	2.3	2.3	2.2	2.2	2.4	2.4	2.4
30	2.3	.....	3.8	5.0	4.0	2.3	2.3	2.2	2.2	2.4	2.4	2.4
31	2.3	.....	3.8	.....	4.0	.....	2.3	2.2	.....	2.4	.....	2.4

Daily discharge, in second-feet, for Weber River at Devils Slide, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	305	305	713	1,210	1,890	1,100	160	160	132	132	190	190
2	305	305	905	1,210	1,890	1,020	160	160	132	132	190	190
3	305	305	1,050	1,300	1,610	1,020	160	160	132	132	190	190
4	305	305	1,210	1,300	1,520	1,020	160	160	106	132	190	190
5	305	305	1,380	1,380	1,260	1,020	160	132	106	132	190	190
6	305	349	1,380	1,380	1,260	950	160	132	106	132	190	190
7	305	349	1,380	1,470	1,340	810	160	132	106	132	190	190
8	305	349	1,300	1,550	1,520	810	160	132	106	132	190	190
9	305	349	1,300	1,550	1,520	680	160	132	106	160	190	190
10	305	349	1,300	1,830	1,700	560	160	132	106	160	190	225
11	305	349	1,300	1,830	1,700	560	160	132	106	160	190	265
12	305	349	1,300	2,110	1,790	500	160	132	106	160	190	265
13	305	349	1,380	2,320	1,790	450	160	132	106	160	190	225
14	305	349	1,380	2,320	1,790	400	160	132	106	160	190	225
15	305	349	1,470	2,320	1,100	400	160	132	106	160	190	190
16	305	349	1,550	2,440	1,100	400	160	132	106	190	190	190
17	305	349	1,550	2,110	1,020	350	160	132	106	190	190	190
18	305	349	1,550	2,110	950	350	160	132	132	190	190	190
19	305	349	1,550	1,920	810	350	160	132	132	190	190	190
20	349	349	1,550	1,920	810	225	160	132	132	190	190	190
21	349	349	1,550	2,020	740	190	160	132	132	190	190	190
22	349	395	1,380	2,020	680	190	160	132	132	190	190	190
23	349	395	1,380	2,020	740	190	160	132	132	190	190	190
24	349	395	1,380	2,220	740	190	160	132	132	190	190	190
25	349	349	1,300	2,220	810	190	160	132	132	190	190	190
26	349	349	1,300	2,320	810	190	160	132	132	190	190	190
27	349	349	1,300	2,440	880	190	160	132	132	190	190	190
28	349	395	1,300	2,550	1,020	160	160	132	132	190	190	190
29	349	.....	1,210	2,090	1,100	160	160	132	132	190	190	190
30	305	.....	1,210	1,990	1,100	160	160	132	132	190	190	190
31	305	.....	1,210	.....	1,100	.....	160	132	.....	190	.....	190

NOTE.—Daily discharge determined from two fairly well-defined discharge rating curves, one applicable from Jan. 1, 1909, to Apr. 27, 1910, and the other applicable from Apr. 28 to Dec. 31, 1910.

Monthly discharge of Weber River at Devils Slide, Utah, for 1910.

[Drainage area, 1,090 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	349	305	319	0.293	0.34	19,600	B.
February	395	305	348	.319	.33	19,300	B.
March	1,550	713	1,320	1 21	1.40	81,200	B.
April	2,550	1,210	1,920	1.76	1.96	114,000	B.
May	1,890	740	1,230	1.13	1.30	75,600	B.
June	1,100	160	493	.452	.50	29,300	A.
July	160	160	160	.147	.17	9,840	A.
August	160	132	136	.125	.14	8,360	A.
September	132	106	120	.110	.12	7,140	A.
October	190	132	168	.154	.18	10,300	A.
November	190	190	190	.174	.19	11,300	A.
December	265	190	198	.182	.21	12,200	A.
The year	2,550	106	550	.505	6.84	398,000	

NOTE.—Accuracy somewhat uncertain from about January to May, 1910, as no discharge measurements were made between July, 1909, and August, 1910.

WEBER RIVER NEAR PLAIN CITY, UTAH.

This station, which is located at the highway bridge on the main road to Plain City and West Weber, about 10 miles northwest of Ogden, Utah, and about 6 miles above the mouth of the river, was established in 1903 under the direction of the State engineer and was maintained by the State until May 14, 1905, when it was taken over by the United States Geological Survey, by whom it has since been maintained in cooperation with the State.

As the station is below all diversions and all tributaries—Ogden River entering about 8 miles above—the records show the total amount of water discharged into Great Salt Lake and will be valuable in the adjudication of water rights on the Ogden and Weber rivers.

Discharge measurements are made from the bridge. The upstream face of the center bridge pier is graduated, marked with white paint, and forms the gage.

The records are very little affected by ice, although the river freezes at times near the station. There is no effect from artificial control above or below the station, and as the bed of the stream changes only slightly the records may be considered excellent.

Discharge measurements of Weber River near Plain City, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 27[a]	E. S. Fuller			2.40	16
Dec. 10	J. C. Dort	114	272	4.96	480

[a] Wading measurement about 300 feet below the bridge.

Daily gage height, in feet, of Weber River near Plain City, Utah, for 1910.

[W. E. Davies, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.2	6.0	7.4	11.1	.....	8.0	2.4	2.2	2.1	3.8	4.5	4.8
2	14.0	6.0	8.9	11.7	.....	7.5	2.4	2.2	2.1	4 1	4.5	4.8
3	10.2	6.2	11.9	12.3	.....	7.7	2.3	2.2	2.1	4.1	4.5	4.8
4	10.0	6.3	12.5	12.1	.....	7.8	2.3	2.2	2.1	4.1	4.7	4.7
5	9.7	6.5	14.1	11.5	11.6	6.9	2.3	2.2	2.1	4.3	4.7	4.8
6	9.5	6.7	13.5	11.9	12.2	6.7	2.3	2.2	2.1	4.6	4.4	4.8
7	9.1	6.6	13.1	12.4	11.6	6.6	2.3	2.2	2.1	4.5	4.4	4.7
8	8.2	6.6	12.8	12.7	11.0	6.1	2.3	2.2	2.5	3.9	4.3	4.7
9	8.5	6.4	13.0	13.1	11.0	6.0	2.3	2.2	2.5	3.9	4.5	4.7
10	8.4	6.2	12.3	13.7	11.2	5.9	2.3	2.2	2.5	4.1	4.6	5.1
11	8.1	6.1	11.8	13.4	12.0	5.4	2.3	2.2	2.5	3.9	4.6	5.1
12	8.0	6.0	11.3	13.4	11.9	5.1	2.3	2.2	2.5	4.0	4.6	5.5
13	7.7	6.0	11.6	13.1	12.0	4.8	2.3	2.2	2.3	4.0	4.5	5.3
14	7.4	6.0	12.1	13.1	11.8	4.0	2.3	2.2	2.3	4.0	4.5	4.9
15	7.2	5.9	12.3	13.0	11.6	3.5	2.3	2.2	2.3	4.0	4.5	4.8
16	6.9	5.9	12.8	13.1	11.2	3.3	2.3	2.2	2.3	4.1	4.6	4.6
17	6.8	5.8	13.3	13.1	10.4	3.3	2.3	2.2	2.3	4.1	4.7	4.6
18	6.7	5.8	13.6	13.0	8.6	3.0	2.3	2.2	2.3	4.2	4.7	4.6
19	6.7	5.7	14.2	12.8	8.4	3.1	2.3	2.1	2.5	4.5	4.8	4.8
20	6.6	5.6	15.1	12.9	8.0	3.0	2.3	2.1	2.5	4.6	4.7	4.8
21	6.5	5.6	15.7	13.2	7.8	2.9	2.3	2.1	2.6	4.6	4.7	4.7
22	6.4	5.5	16.2	13.7	7.7	2.7	2.3	2.1	3.0	4.6	4.7	4.6
23	6.4	5.5	16.9	13.9	7.6	2.6	2.2	2.1	3.3	4.6	4.8	4.6
24	6.3	5.4	16.3	14.1	7.3	2.6	2.2	2.1	3.4	4.5	4.8	4.8
25	6.3	5.6	15.1	14.5	7.0	2.5	2.2	2.1	3.3	4.5	4.8	4.6
26	6.2	5.8	14.3	14.7	7.3	2.5	2.2	2.1	3.2	4.5	4.8	4.5
27	6.2	6.1	13.9	14.9	7.0	2.5	2.2	2.1	3.2	4.5	4.8	4.5
28	6.2	6.7	13.3	15.2	7.0	2.4	2.2	2.1	3.4	4.5	4.8	4.5
29	6.1	.....	12.9	15.8	7.1	2.4	2.2	2.1	3.6	4.5	4.7	4.6
30	6.1	.....	11.6	15.9	7.7	2.4	2.2	2.1	3.8	4.5	4.7	4.3
31	6.0	.....	11.3	.....	7.9	.....	2.2	2.1	.....	4.5	.....	4.5

Daily discharge, in second-feet, of Weber River near Plain City, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,310	628	1,040	2,420	4,160	1,400	16	8	5	226	370	438
2	3,690	628	1,560	2,660	3,820	1,220	16	8	5	286	370	438
3	2,060	680	2,750	2,920	3,480	1,290	12	8	5	286	370	438
4	1,980	707	3,000	2,830	3,140	1,330	12	8	5	286	414	414
5	1,860	762	3,690	2,580	2,810	1,020	12	8	5	326	414	438
6	1,780	820	3,430	2,750	3,060	956	12	8	5	392	348	438
7	1,640	790	3,250	2,960	2,810	926	12	8	5	370	348	414
8	1,310	790	3,130	3,080	2,560	778	12	8	22	246	326	414
9	1,420	734	3,210	3,250	2,560	750	12	8	22	246	370	414
10	1,380	680	2,920	3,520	2,640	722	12	8	22	286	392	512
11	1,280	654	2,710	3,390	2,980	590	12	8	22	246	392	512
12	1,240	628	2,500	3,390	2,940	512	12	8	22	266	392	616
13	1,140	628	2,620	3,250	2,980	438	12	8	12	266	370	564
14	1,040	628	2,830	3,250	2,900	266	12	8	12	266	370	462
15	974	602	2,920	3,210	2,810	172	12	8	12	266	370	438
16	880	602	3,130	3,250	2,640	136	12	8	12	286	392	392
17	850	576	3,340	3,250	2,320	136	12	8	12	286	414	392
18	820	576	3,470	3,210	1,620	88	12	8	12	306	414	392
19	820	550	3,740	3,130	1,540	104	12	5	22	370	438	438
20	790	525	4,130	3,170	1,400	88	12	5	22	392	414	438
21	762	525	4,400	3,300	1,330	72	12	5	32	392	414	414
22	734	500	4,660	3,520	1,290	44	12	5	88	392	414	392
23	734	500	5,130	3,610	1,260	32	8	5	136	392	438	392
24	707	475	4,720	3,690	1,150	32	8	5	154	370	438	438
25	707	525	4,130	3,870	1,050	22	8	5	136	370	438	392
26	680	576	3,780	3,960	1,150	22	8	5	120	370	438	370
27	680	654	3,610	4,050	1,050	22	8	5	120	370	438	370
28	680	820	3,340	4,180	1,050	16	8	5	154	370	438	370
29	654	.....	3,170	4,450	1,080	16	8	5	190	370	414	392
30	654	.....	2,620	4,500	1,290	16	8	5	226	370	414	326
31	628	.....	2,500	.....	1,360	.....	8	5	.....	370	.....	370

NOTE.—Daily discharge determined from two well-defined discharge rating curves, one applicable from June 1, 1909, to Apr. 30, 1910, and the other from May 1 to Dec. 31, 1910. Discharge May 1 to 4 interpolated.

Monthly discharge of Weber River near Plain City, Utah, for 1910.

[Drainage area, 2,060 square miles.]

Months.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	3,690	628	1,160.	0.563	0.65	71,300	B.
February	820	475	634.	.308	.32	35,200	B.
March	5,130	1,040	3,270.	1.59	1.83	201,000	B.
April	4,500	2,420	3,350.	1.63	1.82	199,000	B.
May	4,160	1,050	2,200.	1.07	1.23	135,000	A.
June	1,400	16	441.	.214	.24	26,200	A.
July	16	8	11.1	.0054	.006	682	C.
August	8	5	6.7	.0033	.004	412	D.
September	226	5	53.9	.026	.03	3,210	B.
October	392	226	324.	.157	.18	19,900	A.
November	438	326	399.	.194	.22	23,700	A.
December	616	326	427.	.207	.24	26,300	A.
The year	5,130	5	1,030.	.500	6.77	742,000	

OGDEN RIVER NEAR OGDEN, UTAH.

This station, which is located at the dam of the Utah Light & Power Co., 2½ miles above the terminus of the Ogden Canyon Electric Railway and about 8 miles from Ogden post office, in the NW. ¼ SW. ¼ sec. 16, T. 6 N., R. 1 E., Salt Lake base and meridian, was established by the Utah Light & Railway Co. in January, 1904.

The discharge is measured by a weir consisting of eleven 5-foot openings, each opening crested as a separate weir. The Francis weir formula is used in the computations. The water diverted through the power plant is measured by two Venturi meters, each having a 24-inch throat. At the mouth of the canyon is a waste pipe, the capacity of which is taken into consideration in the company's records.

The height of the water surface above the crest of the weir openings is determined by a hook gage; an automatic gage is used in connection with the two Venturi meters, located in the pipe line just above the power house.

Records are furnished by Mr. Frank Carr, of the Utah Light & Railway Co. The few minor changes in the figures showing monthly discharge have been made by engineers of the United States Geological Survey.

Daily discharge, in second-feet, of Ogden River near Ogden, Utah, for 1904–1909.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904.												
1	48.9	54.4	236.6	490.2	1,184.5	558.6	129.9	55.4	59.6	52.0	65.1	61.0
2	49.4	55.3	289.7	490.5	1,105.8	616.9	122.4	57.8	58.9	51.3	67.0	61.5
3	47.4	58.0	227.0	573.9	1,288.0	598.9	114.5	55.8	59.3	51.4	66.3	57.2
4	47.1	58.0	252.1	580.5	1,425.5	544.9	112.0	53.5	52.2	54.3	65.9	51.1
5	48.0	58.0	221.5	685.8	1,205.8	500.5	109.2	50.4	54.7	57.0	66.2	48.0
6	50.8	62.9	231.1	666.0	1,496.0	471.6	108.0	52.6	47.6	58.9	65.7	48.2
7	52.8	65.2	302.5	626.8	1,758.4	450.8	107.4	50.4	41.7	59.7	65.2	49.2
8	52.0	63.4	383.1	583.1	1,413.1	403.8	107.6	50.3	41.0	57.0	65.6	50.4
9	50.6	60.8	421.9	603.3	1,287.9	403.3	107.1	49.1	40.3	57.0	64.1	51.2
10	51.4	58.9	401.2	693.7	1,454.1	361.4	95.8	49.9	41.4	61.1	64.1	57.6
11	54.4	65.1	416.1	804.6	1,536.2	330.2	86.1	62.7	39.3	60.0	63.6	58.7
12	57.6	65.4	308.8	1,005.1	1,406.3	294.4	89.7	63.3	45.7	67.9	63.3	58.0
13	56.2	65.5	301.4	1,111.1	1,425.5	256.2	95.5	72.4	46.5	65.5	60.9	89.2
14	55.6	65.4	308.8	1,215.1	1,473.6	245.0	86.7	62.8	47.7	62.7	60.4	61.1
15	56.1	69.3	399.7	1,418.3	1,829.9	244.5	86.8	59.0	48.6	61.8	60.2	56.2
16	55.5	77.3	396.2	1,373.7	1,477.9	236.3	85.3	56.5	47.3	71.1	61.0	55.0
17	52.0	79.8	337.8	1,200.2	1,403.6	226.7	81.6	67.4	49.0	70.0	60.9	52.2
18	51.0	68.3	458.7	1,123.1	1,370.5	216.8	80.3	63.2	49.3	70.0	60.6	57.5
19	57.9	70.0	629.7	1,214.5	1,417.4	197.8	78.0	74.6	47.9	66.4	60.6	59.9
20	54.6	73.3	643.3	1,435.4	1,304.3	203.1	80.2	48.5	48.8	67.1	59.1	59.3
21	56.8	74.8	592.6	1,380.3	1,252.3	201.0	78.4	52.6	48.0	67.7	59.5	58.8
22	61.0	152.6	495.4	1,158.1	1,217.8	179.2	74.1	54.9	45.6	67.9	59.2	61.8
23	57.7	285.5	532.6	1,116.6	1,218.2	167.3	71.0	73.0	45.9	64.5	58.8	63.3
24	55.2	350.5	540.6	822.4	1,203.3	158.6	68.5	68.3	45.3	67.4	59.3	63.2
25	55.3	468.0	447.7	793.1	1,260.8	163.1	65.3	64.7	42.1	69.1	59.3	57.3
26	55.8	602.7	375.4	856.5	1,105.9	160.6	56.0	66.1	45.0	68.3	59.3	50.9
27	56.0	375.5	374.3	1,084.8	966.1	146.2	55.5	69.7	45.1	67.9	59.3	42.7
28	55.3	255.5	394.7	1,257.6	890.0	134.8	54.1	61.7	47.7	68.4	59.5	48.4
29	55.8	243.6	691.8	1,186.0	783.0	127.3	60.6	65.7	50.2	68.0	59.9	52.2
30	56.8	.....	647.5	1,141.8	701.2	122.7	56.0	59.2	53.9	65.6	59.9	52.7
31	56.8	.....	569.0	.....	717.5	.....	55.4	62.5	.....	64.4	.....	56.1
1905.												
1	52.0	85.7	78.1	160.9	681.5	335.6	82.6	49.7	50.7	50.7	49.9	50.1
2	47.1	92.0	80.3	159.4	762.2	294.4	81.4	49.2	50.2	50.2	50.5	50.1
3	44.2	86.4	86.3	156.7	695.2	267.5	82.8	48.9	50.0	50.0	50.7	49.4
4	43.5	82.5	93.6	153.9	603.8	252.9	75.0	49.0	50.8	50.8	50.6	47.3
5	42.9	76.2	95.3	153.6	549.9	233.7	73.0	51.6	50.9	50.9	49.3	42.3
6	42.5	73.1	100.8	157.4	513.7	185.1	72.6	52.0	50.0	50.0	48.9	41.7
7	42.5	70.0	121.5	174.6	498.1	159.4	71.5	50.7	49.5	49.5	49.3	40.7
8	42.9	69.3	121.4	208.2	540.5	130.4	73.6	50.3	48.6	48.6	49.0	40.5
9	42.0	70.1	121.9	239.6	602.8	116.9	74.5	50.9	48.9	48.9	49.8	40.4
10	41.5	70.2	124.1	293.1	536.9	116.9	79.5	49.8	48.2	48.2	49.7	40.2
11	42.1	70.0	126.5	255.2	516.8	113.4	68.4	48.6	47.5	47.5	48.2	40.1
12	43.4	57.2	127.5	218.6	513.9	111.1	68.1	47.7	45.6	45.6	47.8	40.6
13	43.1	59.1	129.5	212.5	513.9	108.4	67.3	46.8	44.3	44.3	48.1	40.2
14	44.5	60.9	135.6	231.6	535.8	105.0	71.9	46.2	42.2	42.2	48.5	40.0
15	45.9	61.4	136.0	242.2	541.6	104.2	82.7	45.8	42.9	42.9	48.7	39.8
16	49.7	62.4	137.2	368.0	553.5	103.5	71.6	44.9	45.4	45.4	48.8	39.9
17	62.6	62.4	132.1	332.1	679.2	125.2	71.0	47.3	45.9	45.9	50.7	40.2
18	63.7	59.4	127.2	312.9	785.2	134.2	68.5	48.9	47.8	47.8	50.6	42.0
19	64.4	59.0	162.1	353.6	766.2	126.4	66.0	50.0	48.7	48.7	50.1	43.5
20	65.7	60.8	159.1	397.5	783.1	108.2	66.4	50.7	48.3	48.3	51.8	43.7
21	67.5	64.1	153.0	368.9	779.9	101.5	63.6	45.6	47.4	47.4	53.9	44.0
22	69.6	67.3	144.6	354.8	718.9	96.6	63.0	50.7	46.9	46.9	52.0	43.2
23	70.3	69.6	138.1	379.2	679.5	94.2	61.9	53.3	46.9	46.9	52.0	42.5
24	70.0	70.0	154.5	442.6	612.6	93.5	60.2	55.8	47.0	47.0	52.0	43.0
25	68.8	70.1	155.3	489.6	600.7	90.0	56.2	58.6	48.1	48.1	51.6	43.1
26	68.0	70.8	160.4	585.3	585.1	85.6	54.8	72.9	50.6	50.6	52.3	44.0
27	68.9	74.1	199.2	594.1	551.8	81.0	52.8	57.0	49.1	49.1	52.6	44.6
28	67.5	78.4	180.2	606.6	531.0	81.8	54.1	67.4	49.2	49.2	52.3	45.2
29	67.0	.....	178.5	579.4	449.5	81.8	53.1	57.8	49.5	49.5	51.5	46.1
30	67.5	.....	175.4	573.5	398.0	81.8	52.3	63.5	49.1	49.1	51.2	45.6
31	76.5	.....	168.3	.....	367.0	.....	52.0	60.0	.....	49.7	.....	45.7

Daily discharge, in second-feet, of Ogden River near Ogden, Utah, for 1904–1909—Contd.

Days.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	45.2	50.0	73.7	759.3	675.5	1,307.7	.....	.....	114.3	64.3	79.8	53.1
2	45.0	50.1	77.2	610.8	616.0	1,141.1	.....	.....	110.0	62.2	74.9	52.2
3	45.0	49.8	73.0	472.7	585.5	1,115.0	.....	.....	96.0	62.6	77.4	69.0
4	45.4	48.4	71.7	408.7	1,039.6	1,035.4	.....	.....	90.2	76.9	78.4	83.5
5	45.4	48.9	69.6	384.7	1,075.1	998.4	.....	.....	97.4	65.9	78.4	79.7
6	45.3	48.5	69.0	390.9	1,000.2	1,093.4	.....	.....	92.4	70.2	83.7	77.6
7	44.2	48.2	69.0	468.2	1,017.0	1,085.9	.....	.....	86.8	70.4	78.5	71.9
8	44.1	49.1	69.2	545.3	934.0	951.6	.....	.....	90.7	70.2	79.6	77.0
9	44.3	50.5	77.1	623.7	941.4	863.3	.....	.....	84.2	67.	80.8	78.7
10	44.3	51.7	90.6	705.6	1,071.0	799.3	.....	.....	89.4	65.7	75.0	68.9
11	45.6	52.5	101.8	700.2	1,066.0	792.4	.....	.....	83.4	66.3	74.0	65.5
12	46.0	53.5	132.4	592.9	1,103.0	729.9	.....	.....	76.7	68.5	78.4	96.7
13	46.5	55.5	225.5	512.0	1,067.0	692.4	.....	.....	88.5	68.4	78.7	86.1
14	56.7	57.9	182.1	512.2	964.2	610.9	.....	.....	92.5	66.9	80.2	69.7
15	48.9	62.1	151.0	570.0	1,060.6	535.9	.....	.....	98.2	69.7	78.9	70.8
16	47.7	63.2	121.8	637.6	844.0	487.8	.....	.....	90.6	69.4	80.5	63.4
17	50.0	63.2	117.5	746.0	684.5	443.3	.....	.....	89.9	69.9	81.0	66.7
18	56.2	63.3	114.6	831.5	709.3	398.0	.....	.....	85.5	70.2	74.2	73.8
19	76.0	64.0	106.4	844.1	659.8	350.7	.....	.....	81.4	70.8	72.6	73.3
20	68.9	66.2	109.3	852.4	679.2	274.6	.....	.....	75.7	71.0	75.2	80.0
21	57.3	68.7	113.7	903.9	745.9	250.3	.....	.....	77.6	70.7	63.8	76.3
22	55.5	70.7	128.2	970.7	745.6	236.8	.....	.....	78.6	72.4	62.4	75.9
23	53.8	65.0	148.3	1,006.3	717.3	233.7	.....	.....	76.5	71.2	57.8	75.9
24	53.0	61.0	299.7	1,050.8	689.6	208.8	.....	.....	77.3	70.4	56.7	75.3
25	52.8	63.4	726.2	929.3	597.6	180.5	.....	.....	77.0	70.3	56.7	70.8
26	53.6	65.2	803.2	787.4	685.1	184.5	.....	.....	74.3	70.1	73.8	92.6
27	55.2	67.1	785.0	679.2	857.4	170.0	.....	.....	75.2	71.8	67.3	78.7
28	55.8	71.7	647.4	637.3	1,113.5	309.1	.....	.....	73.9	70.7	66.3	86.7
29	53.0	.....	596.1	640.2	1,124.6	239.4	.....	.....	76.9	72.2	69.1	92.2
30	52.2	.....	574.2	642.4	1,349.5	198.9	.....	.....	69.3	71.8	56.7	93.0
31	51.2	.....	667.0	.....	1,316.7	.....	.....	.....	.....	75.2	.....	90.6
1907.												
1	81.3	105.3	330.1	704.4	1,414.7	1,227.7	284.5	105.6	91.9	84.8	93.4	84.6
2	80.9	129.6	356.5	854.9	1,463.5	1,251.0	280.9	107.1	85.4	84.8	93.2	84.2
3	81.3	319.5	337.6	1,461.0	1,270.8	1,521.7	288.0	111.9	85.5	84.8	90.5	83.4
4	83.4	1,169.3	299.0	1,423.2	1,262.0	1,334.7	271.2	103.9	87.7	84.8	81.3	82.3
5	87.2	3,257.2	291.5	1,812.3	1,171.8	1,329.2	261.2	110.3	97.7	84.8	78.1	82.0
6	83.9	2,313.3	317.0	1,675.3	1,048.4	1,335.5	253.3	93.1	85.1	84.8	83.8	88.8
7	80.2	1,055.0	390.2	1,793.6	1,045.9	1,385.1	262.1	109.9	84.8	77.8	90.7	94.2
8	76.1	630.3	374.6	1,727.6	1,096.0	1,441.8	247.4	96.3	84.8	74.6	89.4	116.3
9	67.8	454.1	361.4	1,591.2	1,366.8	1,300.0	246.9	87.1	84.7	73.9	87.3	86.2
10	70.1	375.6	352.7	1,744.0	1,462.0	1,098.9	242.7	86.9	84.7	69.0	91.5	83.8
11	76.7	291.5	322.5	1,976.6	2,251.3	1,057.1	238.6	96.6	90.3	72.3	93.3	94.5
12	87.9	304.0	336.1	2,134.8	2,013.2	1,076.8	246.6	88.6	92.3	76.0	99.4	86.9
13	84.9	266.9	286.5	2,134.8	1,533.5	1,038.6	213.4	89.7	91.1	77.8	100.0	89.5
14	88.4	257.9	257.1	2,566.4	1,304.1	995.1	200.3	85.3	87.2	107.0	98.8	89.5
15	83.7	253.3	227.7	2,835.4	1,148.2	817.6	191.5	89.5	87.6	87.2	105.8	77.5
16	85.3	268.8	241.3	2,631.0	1,272.8	767.4	187.2	89.0	80.7	86.2	96.8	77.5
17	86.7	277.7	384.3	2,361.0	1,317.8	737.9	185.1	91.9	80.1	85.5	91.2	76.8
18	83.2	296.8	588.0	2,253.8	1,709.2	663.7	188.4	92.1	82.5	92.1	88.0	72.9
19	77.2	289.0	1,136.0	1,831.8	1,905.5	658.6	169.6	87.3	82.9	92.7	85.0	73.1
20	74.6	338.5	2,298.8	1,579.7	2,183.8	599.3	167.0	76.4	81.5	85.6	89.8	66.1
21	72.9	345.9	2,862.8	1,337.8	2,155.7	590.1	150.9	81.2	86.9	87.2	94.9	67.2
22	72.8	454.9	2,292.9	1,197.4	1,945.2	587.7	148.9	80.2	89.6	80.7	101.4	66.1
23	70.2	966.5	1,749.9	1,197.4	1,771.0	550.6	138.3	81.2	91.0	77.3	92.5	81.8
24	70.5	748.3	1,475.4	1,197.4	1,763.8	515.3	136.7	95.1	90.3	76.9	85.3	88.3
25	69.8	562.3	1,262.4	1,197.4	1,554.1	484.1	133.4	112.9	91.7	96.8	84.5	84.3
26	70.7	573.5	1,193.5	1,243.5	1,257.7	415.3	128.2	92.8	84.8	107.6	85.9	122.6
27	86.1	466.5	1,025.8	1,407.6	1,080.3	388.0	117.1	92.1	84.8	107.7	82.8	102.7
28	87.9	372.1	851.3	1,553.2	1,008.3	352.4	110.0	89.0	84.8	98.3	85.8	100.9
29	90.6	.....	773.9	1,545.5	1,007.6	317.4	97.5	96.7	84.8	88.2	85.6	71.2
30	89.9	.....	754.8	1,481.4	934.3	299.6	97.0	115.5	84.8	85.4	86.4	98.0
31	93.3	.....	655.2	.....	1,030.0	.....	109.5	119.5	.....	106.6	.....	88.7

NOTE.—Daily discharge for July and August, 1906, not determined, but an estimate of the monthly mean discharge has been made by the Utah Light & Ry. Co.

Daily discharge, in second-feet, of Ogden River near Ogden, Utah, for 1904–1909—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	80.0	65.8	81.4	122.9	293.2	626.8	164.2	79.5	68.7	66.2	82.1	75.7
2	79.1	70.0	82.1	127.5	303.5	447.4	153.3	73.2	66.5	74.0	83.6	74.5
3	79.0	70.2	86.2	133.6	337.3	662.6	138.4	71.9	67.9	83.2	78.8	79.0
4	64.7	72.7	92.2	136.1	406.4	634.3	113.6	66.8	60.9	103.2	79.3	84.8
5	61.9	75.2	88.0	143.4	352.5	935.4	117.8	72.0	59.6	115.5	81.8	87.6
6	67.4	78.9	89.7	151.7	339.0	827.7	119.0	78.7	57.9	82.4	83.7	82.1
7	64.9	79.2	86.0	155.0	326.6	768.2	117.2	75.4	57.4	71.9	81.8	80.5
8	66.5	75.7	75.1	153.1	348.8	757.3	117.6	69.0	68.3	68.7	82.7	78.2
9	66.5	72.2	78.9	154.4	350.6	783.1	114.5	75.0	65.1	64.1	84.2	86.3
10	66.5	69.2	84.7	176.7	328.4	779.2	99.3	90.3	59.7	64.7	84.3	86.7
11	77.9	75.7	79.3	180.3	312.2	745.3	108.7	85.1	61.4	63.2	82.9	82.9
12	77.8	76.2	80.9	217.0	295.9	717.9	101.3	89.8	71.5	62.3	82.3	85.5
13	75.0	76.3	96.2	259.5	336.6	643.0	106.4	94.5	61.9	57.1	82.3	89.5
14	75.7	74.6	123.6	318.9	300.8	620.1	101.3	86.9	62.6	61.9	82.7	83.6
15	79.2	75.3	169.2	305.0	279.2	750.2	98.7	63.4	58.4	71.6	81.0	82.3
16	80.4	73.5	244.3	347.0	237.3	680.5	89.9	69.6	61.8	102.0	81.1	83.0
17	77.7	75.9	341.5	361.0	233.2	663.5	96.5	83.6	67.2	89.3	79.9	79.4
18	74.6	75.3	269.1	359.1	239.5	776.7	100.9	81.9	65.6	83.3	80.4	63.6
19	78.1	72.9	193.5	356.8	250.7	636.4	97.7	77.1	66.2	71.2	83.2	69.9
20	78.8	76.7	179.0	403.7	409.5	625.6	103.3	83.1	62.9	83.2	80.6	62.1
21	74.8	74.4	193.7	431.0	373.8	613.9	102.4	78.5	60.3	71.5	80.0	58.5
22	72.3	72.1	144.4	507.0	355.4	589.5	95.0	67.9	57.1	83.2	88.9	62.2
23	74.5	73.5	159.2	482.3	348.5	537.3	90.8	61.3	55.6	80.0	86.5	62.4
24	72.0	73.5	145.0	452.0	352.8	470.6	78.0	61.3	83.4	73.9	90.4	62.2
25	71.1	72.0	148.3	437.5	338.8	424.9	83.8	59.7	108.9	74.6	87.8	63.7
26	68.0	71.2	146.0	378.5	322.6	390.6	83.8	58.3	77.0	84.4	73.9	57.9
27	68.5	71.1	148.8	323.7	461.5	330.3	83.1	71.2	74.8	81.7	83.6	59.5
28	74.4	73.4	143.5	305.0	421.6	272.4	89.0	68.6	66.2	74.0	83.7	56.5
29	72.7	79.2	120.5	285.0	393.4	257.9	96.6	68.2	59.8	77.6	79.4	55.6
30	76.5	.....	126.6	297.2	404.1	186.8	96.9	68.0	68.7	77.6	79.7	62.5
31	67.9	.....	122.8	.....	423.2	.....	69.4	67.2	.....	83.5	.....	61.9
1909.												
1	60.8	267.5	177.9	680.1	1,197.1	1,703.0	251.3	104.2	112.0	89.4	97.6	269.4
2	72.0	292.9	174.0	793.1	1,111.5	1,849.5	257.9	108.9	105.3	89.6	97.1	309.9
3	63.8	314.9	177.0	953.0	1,188.7	1,904.8	253.4	98.1	101.0	84.5	95.0	253.8
4	70.8	265.5	215.7	1,059.4	1,559.6	1,920.7	322.0	93.8	92.3	90.1	95.9	213.8
5	91.7	262.2	258.1	816.2	1,954.4	1,939.1	272.1	94.1	110.4	106.6	93.6	203.3
6	533.4	177.2	281.5	765.5	1,777.6	1,738.4	251.4	88.8	94.9	95.2	97.8	216.5
7	463.4	204.5	275.7	699.6	1,336.6	1,707.5	242.7	85.4	112.9	98.7	94.3	209.2
8	285.3	267.3	316.3	621.1	1,869.8	1,611.5	227.8	91.0	96.0	95.4	95.6	196.2
9	283.0	254.3	260.0	630.2	1,969.5	1,283.2	212.1	101.6	102.2	95.3	101.7	197.4
10	217.2	205.0	255.6	706.4	1,782.0	970.0	205.7	110.6	104.2	93.4	125.3	197.8
11	143.6	221.6	250.6	739.9	2,033.0	917.1	186.2	108.3	107.0	95.8	104.1	190.5
12	120.6	191.6	224.1	678.3	1,733.0	782.1	150.2	91.1	101.6	95.8	103.6	171.0
13	147.0	330.4	239.7	677.0	1,513.1	752.3	159.5	91.8	106.4	95.4	99.0	178.7
14	731.1	286.4	258.5	671.4	1,525.0	756.1	152.5	89.6	91.0	95.5	95.4	175.7
15	1,169.7	232.6	262.2	804.8	1,849.8	719.4	147.4	89.6	91.7	101.1	100.1	140.4
16	1,249.9	227.9	307.2	1,038.3	1,969.5	652.7	152.5	91.0	90.5	103.7	99.3	120.8
17	968.8	277.9	381.8	1,291.1	1,690.5	568.0	153.1	93.2	84.9	92.2	92.0	107.1
18	771.1	282.8	571.1	1,601.2	1,364.9	527.3	119.2	91.7	88.2	94.7	95.9	115.7
19	850.0	253.4	433.2	1,643.8	1,531.1	492.2	130.6	95.6	86.2	98.6	90.5	99.9
20	1,000.0	219.1	478.9	1,648.3	1,709.1	493.4	136.2	95.4	87.1	101.8	336.3	99.4
21	1,165.7	226.4	406.4	1,294.0	1,977.3	465.3	129.1	95.2	86.9	95.7	601.6	99.8
22	850.0	197.5	390.2	1,318.5	2,036.4	449.0	118.5	85.7	83.6	95.2	423.8	99.5
23	700.0	206.7	341.0	1,305.8	2,165.6	382.4	122.2	84.7	80.2	101.4	745.9	101.6
24	589.8	165.4	425.7	1,427.4	1,854.4	390.2	124.4	85.9	89.0	93.2	683.4	104.3
25	549.1	174.4	526.9	1,426.8	1,630.6	386.1	117.2	85.2	86.3	93.0	393.1	101.6
26	461.2	176.9	548.1	1,583.9	1,708.8	363.0	121.5	93.5	89.7	98.0	509.8	97.9
27	375.8	179.9	552.2	1,843.0	1,945.5	336.4	129.3	80.8	87.3	93.2	467.5	102.1
28	323.8	174.2	1,285.4	2,252.4	2,215.7	315.1	113.9	81.5	82.9	91.1	329.9	102.6
29	242.5	.....	852.1	2,094.1	1,968.9	300.4	117.0	85.0	100.5	91.6	315.1	99.3
30	198.0	.....	741.4	1,453.8	1,510.9	266.5	117.0	79.5	89.0	102.9	277.1	103.8
31	278.3	.....	767.6	.....	1,457.1	.....	111.5	88.1	.....	98.8	.....	114.6

NOTE.—Determinations of daily discharge, Jan. 19, 20, 22, and 23, omitted from original notes, have been interpolated by engineers of United States Geological Survey, in order to complete the record for the year

Daily discharge, in second-feet, of Ogden River at dam, for 1910.

[Frank Carr, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	529.3	142.9	224.2	730.8	968.6	.....	.....	.....	56.9	41.0	70.4	66.1
2	799.2	155.4	306.4	785.8	825.2	.....	.....	69.7	50.6	59.4	68.6	63.4
3	559.8	116.3	366.4	948.2	715.4	.....	.....	65.7	52.2	48.7	65.4	69.9
4	413.8	104.6	462.3	879.4	.....	.....	.....	66.5	54.2	51.0	64.3	73.4
5	250.2	104.9	541.4	796.8	.....	.....	.....	64.4	53.0	45.8	69.2	60.6
6	205.6	87.9	569.0	705.7	.....	.....	.....	48.6	53.7	51.1	59.9	64.4
7	189.0	99.5	727.9	750.6	.....	.....	.....	56.1	46.4	53.8	60.0	65.4
8	202.8	103.2	787.0	839.0	.....	.....	.....	54.1	48.1	55.2	61.6	59.2
9	215.0	118.9	810.6	938.1	.....	.....	.....	58.7	50.2	50.4	64.3	80.5
10	176.2	113.9	771.6	1,056.4	.....	.....	.....	57.9	49.5	50.3	62.4	82.0
11	174.0	123.7	741.9	1,293.6	.....	.....	.....	55.0	48.0	57.4	64.5	93.9
12	171.2	112.3	761.6	1,317.0	.....	.....	.....	60.1	46.3	58.5	64.3	79.0
13	179.2	118.4	797.0	1,398.2	.....	.....	.....	57.8	50.8	67.0	66.2	76.0
14	187.5	141.0	878.3	1,323.9	.....	.....	.....	58.3	49.7	58.2	58.3	67.0
15	188.1	118.4	938.9	1,017.6	.....	.....	79.1	55.3	46.9	61.4	68.8	80.9
16	182.6	115.2	1,034.9	970.8	.....	.....	80.7	51.0	53.8	48.2	65.3	68.1
17	182.3	112.8	1,071.3	941.8	.....	.....	68.6	51.7	54.0	51.9	64.1	76.0
18	178.9	116.9	1,178.1	993.8	.....	.....	62.3	52.4	47.8	73.2	65.7	52.6
19	149.5	116.6	1,264.6	900.7	.....	.....	69.7	52.0	48.9	61.7	72.6	64.2
20	151.2	126.0	1,363.9	1,226.0	.....	.....	71.2	58.5	47.9	63.6	63.4	70.9
21	149.9	122.7	1,585.5	1,224.5	.....	.....	69.3	52.8	48.0	65.4	58.3	63.5
22	150.8	115.0	1,811.0	1,141.9	.....	.....	61.0	54.8	50.4	69.0	64.7	70.0
23	150.1	113.5	1,917.8	1,185.3	.....	.....	64.8	54.1	44.5	63.6	75.9	68.0
24	147.2	111.9	1,752.6	1,238.6	.....	.....	59.7	51.0	47.6	58.8	66.0	68.0
25	152.0	123.5	1,203.0	1,238.9	.....	.....	58.2	51.6	47.1	61.8	57.4	67.0
26	156.5	124.9	1,232.1	1,400.8	.....	.....	63.1	56.6	51.5	67.2	68.5	53.1
27	144.5	121.2	1,095.4	1,248.5	.....	.....	68.4	56.7	42.8	66.0	66.9	52.2
28	145.0	150.1	1,032.7	1,243.0	.....	.....	68.3	53.8	53.0	65.7	54.4	59.5
29	149.7	.....	952.4	1,245.1	.....	.....	65.9	45.6	50.3	67.2	64.7	66.8
30	131.6	.....	783.6	922.0	.....	.....	58.2	53.3	49.6	63.9	60.1	67.0
31	138.7	.....	759.8	.....	.....	.....	60.8	53.2	.....	65.8	.....	70.3

NOTE.—Records May 4 to July 14, 1910, not available. Discharge Oct. 27 interpolated.

Monthly discharge of Ogden River near Ogden, Utah, for 1904–1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1904.				
January	61.0	47.1	53.9	3,314
February	602.7	54.4	141.5	8,139
March	691.8	221.5	410.6	25,247
April	1,435.4	490.2	955.5	56,856
May	1,829.9	701.2	1,287.2	79,147
June	616.9	122.7	297.4	17,697
July	129.9	54.1	85.8	5,276
August	74.6	48.5	59.8	3,677
September	59.6	39.3	47.8	2,844
October	71.1	51.3	63.3	3,892
November	67.0	58.8	62.0	3,689
December	89.2	42.7	56.4	3,468
The year	1,829.9	39.3	293.8	213,200
1905.				
January	76.5	41.5	55.7	3,425
February	92.0	57.2	69.7	3,871
March	199.2	78.1	135.6	8,338
April	606.6	153.6	325.2	19,351
May	785.2	367.0	595.1	36,591
June	335.6	81.0	137.3	8,170
July	82.6	52.0	67.5	4,150
August	72.9	44.9	52.3	3,216
September	50.9	42.2	48.0	2,856
October	50.9	42.2	48.1	2,958
November	53.9	47.8	50.4	2,999
December	50.1	39.8	43.2	2,656
The year	785.2	39.8	134.8	98,600

Monthly discharge of Ogden River near Ogden, Utah, for 1904–1910—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1906.				
January	76.0	44.1	51.4	3,160
February	71.7	48.2	58.2	3,232
March	803.2	69.0	244.9	15,058
April	1,050.8	384.7	680.2	40,480
May	1,349.5	585.5	894.7	55,013
June	1,307.7	170.7	597.3	35,542
July	.....	.....	131.0	8,055
August	.....	.....	91.0	5,595
September	114.3	69.3	85.7	5,100
October	76.9	62.2	69.4	4,267
November	83.7	56.7	73.0	4,344
December	96.7	52.2	76.3	4,692
The year	1,345.9	44.1	254.9	185,000
1907.				
January	93.3	67.8	80.5	4,950
February	3,257.2	105.3	612.3	34,005
March	2,862.8	227.7	786.7	48,371
April	2,835.4	704.4	1,681.7	100,068
May	2,251.3	934.3	1,443.6	88,764
June	1,521.7	299.6	871.3	51,846
July	288.0	97.0	193.3	11,886
August	119.5	76.4	95.3	5,860
September	97.8	80.1	86.7	5,159
October	107.7	69.0	86.3	5,306
November	105.8	78.1	90.4	5,379
December	122.6	66.1	85.9	5,282
The year	3,257.2	66.1	506.8	366,877
1908.				
January	80.0	61.9	72.9	4,482
February	79.2	65.8	73.8	4,245
March	341.5	75.1	136.1	8,368
April	507.0	122.9	281.0	16,721
May	423.2	233.2	338.6	20,820
June	935.4	186.8	605.2	36,012
July	164.2	69.4	104.1	6,401
August	89.8	61.3	74.1	4,556
September	108.9	55.6	66.1	3,933
October	115.5	57.1	77.5	4,765
November	90.4	73.9	82.4	4,903
December	89.5	55.6	72.9	4,482
The year	935.4	55.6	164.9	119,688
1909.				
January	1,249.9	60.8	484.8	29,803
February	330.4	165.4	237.0	13,162
March	1,285.4	174.0	407.4	25,050
April	2,252.4	621.1	1,150.6	68,465
May	2,215.7	1,111.5	1,714.1	105,396
June	1,939.1	266.5	898.1	53,441
July	322.0	111.5	171.1	10,520
August	110.6	79.5	92.2	5,669
September	112.9	80.2	94.7	5,635
October	106.6	84.5	95.7	5,884
November	745.9	92.0	231.9	13,799
December	309.9	97.9	154.6	9,506
The year	2,252.4	60.8	478.3	346,336
1910.				
January	799.2	131.6	222.6	13,687
February	155.4	87.9	119.0	6,609
March	1,917.8	224.2	958.8	58,959
April	1,400.8	705.7	1,063.4	63,270
July (15–31)	80.7	58.2	66.4	2,238
August	69.7	45.6	55.9	3,437
September	56.9	42.8	49.8	2,963
October	73.2	41.0	58.5	3,597
November	75.9	54.4	64.5	3,838
December	93.9	52.2	68.4	4,206
The period	.....	.....	.....	162,804

NOTE.—Monthly means for July and August, 1906, estimated by Utah Light & Ry. Co.

JORDAN RIVER BASIN.

GENERAL FEATURES.[1]

Jordan River drains an area in north-central Utah in the extreme eastern part of the Great Basin. The eastern limit of this area is the lofty Wasatch Range; its western limit is defined by relatively low basin ranges—the Oquirrh, Lake, and East Tintic mountains. It is crossed from east to west by the Traverse Range, whose slopes constitute a dam for Utah Lake, which drains through the Jordan to Great Salt Lake. The area comprises 3,300 square miles, of which 2,600 are tributary to Utah Lake and 700 to the Jordan north of Traverse Mountains. About 2,000 square miles of the area are in the Wasatch Mountains.

Utah Lake is a body of shallow water about 21 miles long and 7 miles wide, covering a maximum area of 93,000 acres, and ranging in depth from less than 8 feet over much of its extent to about 13 feet in the main body of the lake. In its northwestern part, however, soundings have discovered several deep holes caused by springs. The shore line of the lake changes with the varying relations of evaporation, precipitation, and inflow, and the margins are characteristically swampy. Two large, shallow bays extend eastward and southward from the main body of the lake, one south of Provo and the other north of Goshen. West of the lake the Pelican Hills approach close to the shore and the region is barren, but on the north, east, and south the land rises gently toward the base of the mountains and is dotted with flourishing settlements which are supported by irrigation.

The principal streams tributary to Utah Lake are Dry, American Fork, Battle, and Grove creeks, Provo River, Hobble Creek, Spanish Fork and Peteetneet, Santaquin, and Currant creeks.

Provo River is the largest of the tributaries, is approximately 70 miles long and drains an area 640 square miles in extent. It rises in the Uintah Mountains near the sources of Weber, Bear, and Du Chesne rivers, flows westward and southward through Kamas and Provo valleys, and passes through the Wasatch Mountains in the deep canyon. On entering Utah Lake Valley Provo River flows almost due south for 5 miles, skirting the great Provo delta, and thence westward, entering Utah Lake about 3 miles west of Provo.

Hobble Creek rises on the western slope of the Wasatch Mountains and flows in a general southwesterly direction to Utah Lake. The steep, narrow canyon in which the stream flows is broken here and there by narrow openings or flats, covered with a shallow deposit of bowlders and soil. As these tracts lie along the banks of the creek,

[1] Abstracted from Richardson, G. B., Underground water in the valleys of Utah Lake and Jordan River, Utah: Water-Supply Paper U. S. Geol. Survey No. 157, 1906, pp. 5–7.

a large part of the water used in irrigation of the farms is returned to the stream as seepage. The creek has no important tributaries, but short intermittent streams which flow in steep, narrow canyons enter all along the course.

Spanish Fork drains an area about equal to that of Provo River, but carries less water. It rises near Soldier Summit, and, after receiving two main tributaries, North and Thistle Creeks, flows in a canyon through the main ridge of the Wasatch Mountains and enters Utah Lake Valley at the head of the large embayment that extends between Payson and Springville.

Salt Creek rises in the southern Wasatch Mountains, on the eastern slope of Mount Nebo, and, after crossing the border of the plateau region, emerges into the broad valley at the southwestern base of the Wasatch Mountains, where, in summer, it ceases to flow at the surface. The drainage way continues, in a narrow canyon, through Long Ridge, which partially connects the East Tintic and the Wasatch Mountains, and enters the southern end of Utah Lake in Goshen Valley, where the stream, which is fed largely by seepage, is known as Currant Creek.

The other tributaries of Utah Lake are relatively small. The chief ones rise in the Wasatch Mountains and occupy canyons in their mountain courses, where they maintain perennial flows. At the mouths of the canyons canals divert the water and distribute it over the valley, so that in the irrigation season practically all the available supply is thus used and the beds of the streams in Utah Lake Valley are commonly dry; but in the late spring and early summer, during the period of melting snow, large volumes are discharged directly into the lake.

Jordan River itself heads at the northern end of Utah Lake and flows northward in a meandering course of about 40 miles to Great Salt Lake. For the first 5 miles the river flows sluggishly in a broad valley, and in that distance falls only 10 feet. Below the "narrows" the valley spreads out and at its greatest width is about 18 miles wide. The country rises gradually toward the adjacent highlands to the base of the terraces that mark the shore lines of glacial Lake Bonneville, whence the ascent is by successive steps. Between Salt Lake City and Great Salt Lake the country is almost flat, and a number of small lakes of shifting outline occupy local depressions. This area west of Salt Lake City in general is barren and desolate and the surface in many places is white with alkali. On the uplands, away from the lake, alkali is scarce, but the western part of the valley, because of the lack of water, suffers in comparison with the cultivated eastern part, which is supplied by streams from the Wasatch Mountains.

North of the Traverse Mountains the principal tributaries of Jordan River are City, Red Butte, Emigration, Parleys, Mill, Big Cottonwood, Little Cottonwood, Dry Cottonwood, and Willow Creeks, all of which rise on the main crest of the Wasatch and drain small areas. In their mountain courses these creeks generally occupy narrow canyons from which they emerge on the lowlands and flow in broad, open valleys to the Jordan. Within the mountains they are all perennial streams, but at the mouths of the canyons their flow is largely diverted by irrigation ditches, so that in the driest part of the year their lower courses are generally dry. Big Cottonwood Creek, draining about 48 square miles, is the largest. This stream rises at the base of Clayton Peak, is fed by a number of small lakes, and discharges a considerable quantity of water through a narrow canyon.

The vegetation is scanty. The valleys in their natural state are occupied by sagebrush, greasewood, and kindred desert plants, but wherever water is available there is a marked contrast, and the irrigated areas of these valleys rival in productiveness any in the country. Sugar beets are grown in quantity; alfalfa, potatoes, corn, etc., are common crops; and on the bench lands a variety of fruits are successfully cultivated. The mountains on the western border are generally barren; sagebrush and occasional cacti are the chief growths on the slopes, while scrub oak and stunted spruce and pine here and there grow in patches; the summits are usually bare.

The Wasatch Mountains areas are more favored, but they do not support a heavy growth of trees. At the heads of the valleys pine, juniper, mountain mahogany, and quaking aspen grow scatteringly, and cottonwood, birch, and maple are found in many places near the stream beds. The slopes are commonly covered with underbrush in varying degrees of thickness, sagebrush and scrub oak being prominent.

UTAH LAKE TRIBUTARIES.

SUMMIT CREEK NEAR SANTAQUIN, UTAH.

This station, which is located at the power house of the Knight Development Co., near Santaquin, Utah, was established March 8, 1910.

Water is diverted for irrigation and domestic uses below the power house.

The discharge is determined by means of two weirs at the power house. One is a 5-foot, rectangular, sharp-crested weir with complete end contractions, in the main creek above the entrance of the tailrace; the other, a similar weir with a 4-foot crest, in the tailrace, is used during low-water season when the entire flow is taken through the power house. The head on tailrace weir is obtained by means of a standard hook gage installed by the power company. During

1910 the weir in the river above the point of entrance of the tailrace was not used.

A vertical rod gage, fastened to the roots of a cottonwood tree on the left bank about 250 yards above the power house, was used when the flow was greater than the capacity of the weir in the tailrace.

Discharge measurements are made by wading at various sections.

Discharge measurements of Summit Creek near Santaquin, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 8	A. B. Purton	9	7	1.22	13.5
22	....do	9	8	1.42	25.2
May 10	....do	9	14	1.70	68.0
July 9	....do	9	6	1.25	12.2
Sept. 13	....do	9	6	1.16	7.6

Daily gage height, in feet, of Summit Creek near Santaquin, Utah, for 1910.

[Lonsdale Allen, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	1.3	1.6	1.6	1.3	0.9	0.8	0.749	0.723	0.679
2	.....	.....	.....	1.3	1.6	1.6	1.3	.9	.8	.993	.723	.679
3	.....	.....	.....	1.3	1.6	1.4	1.3	.9	.8	.766	.722	.679
4	.....	.....	.....	1.3	1.6	1.4	1.3	.9	.8	.736	.721	.679
5	.....	.....	.....	1.4	1.7	1.4	1.3	.9	.8	.745	.721	.679
6	.....	.....	.....	1.4	1.7	1.4	1.3	.9	.8	.752	.721	.679
7	.....	.....	.....	1.4	1.7	1.4	1.3	.9	.8	.714	.721	.679
8	.....	.....	.....	1.4	1.7	1.4	1.3	.9	.8	.708	.721	.679
9	.....	.....	1.2	1.4	1.8	1.4	1.3	.9	.8	.749	.721	.679
10	.....	.....	1.2	1.4	2.0	1.4	1.3	.9	.8	.744	.692	.679
11	.....	.....	1.2	1.5	1.9	1.4	1.3	.9	.8	.742	.692	.679
12	.....	.....	1.2	1.5	1.8	1.4	.9	.9	1.2	.743	.692	.679
13	.....	.....	1.2	1.6	1.9	1.4	.9	.9	1.3	.747	.678	.679
14	.....	.....	1.2	1.6	1.8	1.3	.9	.8	1.2	.748	.678	.652
15	.....	.....	1.2	1.6	1.8	1.3	.9	.8	1.2	.751	.675	.652
16	.....	.....	1.3	1.6	1.7	1.3	.9	.8	1.2	.763	.675	.652
17	.....	.....	1.3	1.6	1.6	1.3	.9	.8	1.2	.932	.675	.652
18	.....	.....	1.3	1.7	1.6	1.3	.9	.8	1.2	.993	.675	.652
19	.....	.....	1.3	1.7	1.6	1.3	.9	.8	1.049	.847	.686	.633
20	.....	.....	1.4	1.7	1.6	1.3	.9	.8	.814	.809	.686	.633
21	.....	.....	1.4	1.7	1.6	1.3	.9	.8	.807	.791	.686	.633
22	.....	.....	1.5	1.7	1.6	1.3	.9	.8	.742	.774	.686	.604
23	.....	.....	1.4	1.7	1.6	1.3	.9	.8	.711	.734	.686	.604
24	.....	.....	1.4	1.8	1.6	1.3	.9	.8	.681	.732	.685	.604
25	.....	.....	1.3	1.8	1.6	1.3	.9	.8	.754	.731	.685	.604
26	.....	.....	1.4	1.9	1.6	1.3	.9	.8	.768	.729	.685	.604
27	.....	.....	1.3	1.8	1.6	1.3	.9	.8	.762	.728	.685	.534
28	.....	.....	1.3	1.7	1.6	1.3	.9	.8	.751	.726	.679	.534
29	.....	.....	1.3	1.7	1.6	1.3	.9	.8	.749	.725	.679	.534
30	.....	.....	1.3	1.7	1.6	1.3	.9	.8	.723	.723	.679	.585
31	.....	.....	1.3	.....	1.6	.....	.9	.8	.....	.723	.....	.591

NOTE.—Gage heights Mar. 8 to July 11 and Sept. 12 to 18 read on staff gage above the power house; from July 12 to Sept. 11 and Sept. 19 to Dec. 31 the head on the weir in the tailrace was read.

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Daily discharge, in second-feet, of Summit Creek near Santaquin, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	17	48	48	16	11	9.5	8.7	8.3	7.5
2	.....	.....	.....	17	48	48	16	11	9.5	13	8.3	7.5
3	.....	.....	.....	17	48	24	16	11	9.5	8.9	8.3	7.5
4	.....	.....	.....	17	48	24	16	11	9.5	8.4	8.3	7.5
5	.....	.....	.....	24	68	24	16	11	9.5	8.6	8.3	7.5
6	.....	.....	.....	24	68	24	16	11	9.5	8.7	8.3	7.5
7	.....	.....	.....	24	68	24	16	11	9.5	8.0	8.3	7.5
8	.....	.....	.....	24	68	24	16	11	9.5	7.9	8.3	7.5
9	.....	.....	12	24	92	24	16	11	9.5	8.7	8.3	7.5
10	.....	.....	12	24	154	24	16	11	9.5	8.6	7.7	7.5
11	.....	.....	12	34	121	24	16	11	9.5	8.5	7.7	7.5
12	.....	.....	12	34	92	24	11	11	10	8.5	7.7	7.5
13	.....	.....	12	48	121	24	11	11	16	8.6	7.6	7.5
14	.....	.....	12	48	92	16	11	9.5	10	8.6	7.6	7.1
15	.....	.....	12	48	92	16	11	9.5	10	8.7	7.5	7.1
16	.....	.....	17	48	68	16	11	9.5	10	8.9	7.5	7.1
17	.....	.....	17	48	48	16	11	9.5	10	12	7.5	7.1
18	.....	.....	17	68	48	16	11	9.5	10	13	7.5	7.1
19	.....	.....	17	68	48	16	11	9.5	14	10.4	7.6	6.7
20	.....	.....	24	68	48	16	11	9.5	9.7	9.7	7.6	6.7
21	.....	.....	24	68	48	16	11	9.5	9.7	9.4	7.6	6.7
22	.....	.....	34	68	48	16	11	9.5	8.5	9.1	7.6	6.3
23	.....	.....	24	68	48	16	11	9.5	8.0	8.4	7.6	6.3
24	.....	.....	24	92	48	16	11	9.5	7.5	8.4	7.6	6.3
25	.....	.....	17	92	48	16	11	9.5	8.7	8.3	7.6	6.3
26	.....	.....	24	121	48	16	11	9.5	9.0	8.3	7.6	6.3
27	.....	.....	17	92	48	16	11	9.5	8.9	8.3	7.6	5.2
28	.....	.....	17	68	48	16	11	9.5	8.7	8.3	7.5	5.2
29	.....	.....	17	68	48	16	11	9.5	8.7	8.3	7.5	5.2
30	.....	.....	17	68	48	16	11	9.5	8.3	8.3	7.5	6.0
31	.....	.....	17	.....	48	.....	11	9.5	.....	8.3	.....	6.1

NOTE.—Daily discharge Mar. 8 to July 11 and Sept. 12 to 18 determined from two discharge rating curves well defined. Daily discharge July 12 to Sept. 11 and Sept. 19 to Dec. 31 computed from readings of head on the weir in tailrace and the use of weir formula, $Q=3.33\ LH^{3/2}$. This formula gives values a few per cent higher than one which allows for end contractions. This is considered justifiable, however, owing to probable high velocity of approach in the tailrace.

Monthly discharge of Summit Creek near Santaquin, Utah, for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
Mar. 9 to 31	.....	.....	17.7	805
April	121	17	51.0	3,030
May	154	48	65.0	4,000
June	48	16	21.1	1,260
July	16	11	12.8	787
August	11	9.5	10.1	621
September	16	8.0	9.67	575
October	13	8.3	9.03	555
November	8.3	7.5	7.80	464
December	7.5	5.2	6.85	421
The period	.....	.....	.....	12,500

PETEETNEET CREEK[1] NEAR PAYSON, UTAH.

Peteetneet Creek rises to the south of Spanish Fork, at an elevation of about 7,000 feet above sea level, and flows northwestward to Utah Lake.

[1] Called Payson Creek in Water-Supply Paper U. S. Geol. Survey No. 270.

The gaging station, which is located in the SE. ¼ SW. ¼ sec. 29, T. 9 S., R. 2 E., Salt Lake base and meridian, about 3 miles from Payson and half a mile above the power-canal intake, was established August 1, 1910, replacing a station established at the power plant April 8, 1908, and abandoned because the weirs used were poorly constructed and the records were very unsatisfactory. No estimates of daily discharge can be made for 1908–9.

Above the station the city of Payson has constructed several reservoirs which impound a considerable amount of the spring run-off and maintain a summer flow for power and irrigation. The records derived from observations at this point indicate the amount of water available for the Payson power house and for the water supply of the Strawberry Valley project from this creek.

The gage is an inclined rod spiked to posts driven in the left bank.

At ordinary stages discharge measurements can be made by wading; flood-stage measurements are made from a foot bridge constructed for the purpose.

Discharge measurements of Peteetneet Creek near Payson, Utah, in 1910.

Date.	Hydrographers.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Aug. 5	A. F. Richards	8.6	4.6	1.55	9.7
5	A. B. Purton	8.6	4.4	1.55	9.2
24	Larson and Richards	3.5	3.5	1.60	10.0

NOTE.—See also miscellaneous measurements, page 251.

Daily gage height, in feet, and discharge, in second-feet, for Peteetneet Creek near Payson, Utah, for 1910.

[Edwin Cushing, observer.]

Day.	August.		September.		October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	1.60	10.0	.....	10.0	.....	10.5	1.56	9.6	1.57	9.7
2	.....	10.6	1.61	10.1	1.68	11.0	.....	9.6	.....	9.8
3	1.70	11.3	.....	10.1	.....	10.5	1.56	9.6	1.58	9.8
4	.....	11.0	1.61	10.1	1.60	10.0	.....	9.6	.....	9.8
5	1.65	10.6	.....	10.1	.....	10.0	1.57	9.7	1.59	9.9
6	.....	10.3	1.61	10.1	1.60	10.0	.....	9.8	.....	9.8
7	1.60	10.0	.....	10.0	.....	9.9	1.59	9.9	1.57	9.7
8	.....	10.3	1.60	10.0	1.58	9.8	.....	9.8	.....	9.6
9	1.65	10.6	.....	10.0	.....	9.7	1.57	9.7	1.56	9.6
10	.....	10.3	1.59	9.9	1.56	9.6	.....	9.8	.....	9.6
11	1.60	10.0	.....	10.0	.....	9.6	1.58	9.8	1.56	9.6
12	.....	10.0	1.60	10.0	1.56	9.6	.....	9.8	.....	9.8
13	1.60	10.0	.....	10.0	.....	9.6	1.57	9.7	1.60	10.0
14	.....	10.3	1.60	10.0	1.57	9.7	.....	9.6	.....	9.9
15	1.65	10.6	.....	10.0	1.57	9.7	1.56	9.6	1.58	9.8
16	.....	10.4	1.60	10.0	.....	9.9	.....	9.7	.....	9.8
17	1.61	10.1	.....	10.0	.....	10.1	1.58	9.8	1.57	9.7
18	.....	10.2	1.61	10.1	1.62	10.3	.....	10.4	.....	9.7
19	1.62	10.3	.....	10.0	.....	10.0	1.67	10.9	1.57	9.7
20	.....	10.2	1.60	10.0	1.58	9.8	.....	10.4	.....	9.8

Daily gage height, in feet, and discharge, in second-feet, for Peteetneet Creek near Payson, Utah, for 1910—Continued.

Day.	August.		September.		October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
21	1.61	10.1	.....	10.0	.....	9.8	1.59	9.9	1.58	9.8
22	.....	10.2	1.59	9.9	1.57	9.7	.....	9.8	.....	9.7
23	1.62	10.3	.....	9.8	.....	9.6	1.58	9.8	1.56	9.6
24	.....	10.2	1.58	9.8	1.56	9.6	.....	9.8	.....	9.2
25	1.61	10.1	.....	9.8	.....	9.6	1.58	9.8	1.50	8.9
26	.....	10.0	1.59	9.9	1.55	9.5	.....	9.9	.....	9.0
27	1.60	10.0	.....	10.0	.....	9.5	1.60	10.0	1.51	9.0
28	.....	10.2	1.60	10.0	1.55	9.5	.....	9.9	.....	9.1
29	1.62	10.3	.....	10.0	.....	9.5	1.58	9.8	1.52	9.2
30	.....	10.2	1.59	9.9	1.55	9.5	.....	9.8	.....	9.3
31	1.60	10.0	.....	.....	.....	9.6	.....	.....	1.54	9.4

NOTE.—Range of stage very small. Daily discharge determined from a fairly well-defined discharge-rating curve based on three measurements. Discharge interpolated for days on which gage was not read.

Monthly discharge of Peteetneet Creek near Payson, Utah, for 1910.

[Drainage area, 28 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
August	11.3	10.0	10.3	0.368	0.42	633	A.
September	10.1	9.8	9.99	.357	.40	595	A.
October	11.0	9.5	9.83	.351	.40	604	A.
November	10.9	9.6	9.84	.351	.39	586	A.
December	10.0	8.9	9.59	.342	.39	590	A.
The period	.....	.....	.....	.....	.....	.....	

SPANISH FORK AT THISTLE, UTAH.

This station, which is located about half a mile below Thistle, a station on the Denver & Rio Grande Railroad, was established December 3, 1907, to determine the amount of water available for irrigation and power development in connection with the Strawberry Valley project of the United States Reclamation Service.

Thistle Creek and Soldier Fork unite above the station to form Spanish Fork, and Diamond Fork comes in about 2 miles below. Diversion ditches above the station are unimportant.

The gage is a vertical staff; its datum has remained unchanged since the station was established.

Discharge measurements are made from a car and cable.

The river usually freezes over at the station during two or three months in the winter, but as the winter flow is fairly constant good estimates may be made. The accuracy of the records is not affected by artificial control.

The section shifts badly at high stages, but many measurements have been made and the results may be considered fairly good.

Discharge measurements of Spanish Fork at Thistle, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 2	A. B. Purton	34	37	2.80	93
21	do	37	64	3.55	254
Apr. 29	do	39	93	4.05	464
June 21	do	34	36	2.90	82
July 23	do	33	31	2.78	64.4
Aug. 9	do	29	28	2.59	43.3
Sept. 19	do	29	32	2.70	59

Daily gage height, in feet, of Spanish Fork at Thistle, Utah, for 1910.

[E. T. Cluff, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	2.8	3.35	4.0	3.4	2.8	2.8	.....	2.6	.....	2.7
2	.....	.....	2.8	3.35	3.9	3.4	2.8	2.8	2.5	.....	2.7	.....
3	.....	.....	2.8	.....	3.9	3.4	.....	2.75	.....	2.5	.....	2.7
4	.....	.....	2.8	3.35	3.8	3.4	.....	2.75	2.5	.....	2.7	.....
5	.....	.....	2.85	3.35	3.8	.....	2.8	2.7	.....	2.5	2.7	2.7
6	.....	.....	2.9	3.35	3.7	3.3	2.8	2.7	2.5	.....	.....	.....
7	.....	.....	2.95	3.35	3.7	3.25	2.8	2.7	.....	2.5	2.7	2.7
8	.....	.....	3.0	3.4	3.7	3.2	2.8	2.7	2.5	2.5	.....	.....
9	.....	.....	3.1	3.4	3.8	3.2	2.8	2.7	.....	.....	2.7	2.7
10	.....	.....	3.2	.....	3.9	3.15	.....	2.7	2.5	.....	.....	2.7
11	.....	.....	3.15	3.6	3.9	3.1	2.8	2.7	.....	2.5	2.7	.....
12	.....	.....	3.1	3.7	3.95	3.05	2.8	2.7	2.5	.....	2.7	2.7
13	.....	.....	3.1	3.7	3.9	3.0	2.8	2.7	.....	2.5	.....	.....
14	.....	.....	3.2	3.6	3.8	2.95	2.8	2.7	2.5	2.6	2.7	2.7
15	.....	.....	3.3	3.6	.....	2.9	2.8	2.7	.....	.....	.....	.....
16	.....	.....	3.4	3.6	3.8	2.9	2.8	2.6	2.5	2.75	2.7	2.7
17	.....	.....	3.5	.....	3.7	2.9	2.8	2.6	2.6	.....	.....	2.7
18	.....	.....	3.4	3.7	3.7	2.9	2.8	2.6	2.7	2.8	2.7	.....
19	.....	.....	3.5	3.7	3.6	2.9	2.8	2.6	2.7	.....	2.7	2.7
20	.....	.....	.....	3.7	3.6	2.9	2.8	2.6	.....	.....	.....	.....
21	.....	.....	3.6	3.9	3.6	2.9	2 8	.....	2.6	2.65	2.7	2.7
22	.....	.....	3.7	3.9	.....	2.9	2.8	2.6	.....	.....	.....	.....
23	.....	.....	3.75	3.9	3.5	2.9	2.8	2.6	2.6	2.7	2.7	2.7
24	.....	.....	3.55	.....	3.45	2.85	2.8	2.6	2.55	.....	.....	2.7
25	.....	.....	3.45	3.8	3.4	2.8	2.7	2.6	.....	2.65	2.7	.....
26	.....	.....	3.45	4.0	3.4	2.8	2.8	2.6	2.6	2.7	2.7	2.7
27	.....	.....	.....	4.1	3.4	2.8	2.8	2.6	2.55	.....	.....	.....
28	.....	.....	3.35	4.1	3.45	2.9	2.8	.....	2.5	2.7	2.7	2.65
29	.....	.....	3.35	4.1	3.45	2.95	2.85	2.5	.....	2.7	.....	.....
30	.....	.....	3.35	4.0	3.45	2.95	2.85	.....	2.6	.....	2.7	2.65
31	.....	.....	3.35	.....	3.4	.....	.....	2.5	.....	2.7	.....	2.65

NOTE.—Gage not read during January or February, as the stream was probably frozen over. Relation between gage heights and discharge probably unaffected by ice during March and December.

Daily discharge, in second-feet, of Spanish Fork at Thistle, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1			92	206	440	1.95	69	69	34	44	56	56
2			92	206	400	1.95	69	69	34	39	56	56
3			92	206	395	1.95	69	62	34	34	56	56
4			92	206	360	1.95	69	62	34	34	56	56
5			101	206	355	1.80	69	56	34	34	56	56
6			110	206	325	170	69	56	34	34	56	56
7			120	206	320	160	69	56	34	34	56	56
8			130	218	320	145	69	56	34	34	56	56
9			150	218	345	145	69	56	34	34	56	56
10			172	243	375	155	69	56	34	34	56	56
11			161	268	365	125	69	56	34	34	56	56
12			150	294	370	110	69	56	34	34	56	56
13			150	294	350	100	69	56	34	34	56	56
14			172	268	320	90	69	56	34	44	56	56
15			194	268	320	83	69	56	34	53	56	56
16			218	268	320	83	69	44	34	62	56	56
17			242	284	290	83	69	44	44	66	56	56
18			218	300	290	83	69	44	56	69	56	56
19			242	305	260	83	69	44	56	62	56	56
20			255	310	260	83	69	44	50	56	56	56
21			268	380	260	83	69	44	44	50	56	56
22			294	385	240	83	69	44	44	53	56	56
23			307	390	225	83	69	44	44	56	56	56
24			255	375	215	76	69	44	39	53	56	56
25			230	365	205	69	56	44	39	50	56	56
26			230	435	205	69	69	44	44	56	56	56
27			218	480	205	69	69	44	39	56	56	53
28			206	480	210	83	69	39	34	56	56	50
29			206	485	210	90	76	34	39	56	56	50
30			206	445	210	90	76	34	44	56	56	50
31			206		200		72	34		56		50

NOTE.—Daily discharge determined as follows: Mar. 1 to Apr. 16, and June 14 to Dec. 31, from two well-defined discharge rating curves; Apr. 17 to June 13, indirect method for shifting channels used.

Monthly discharge of Spanish Fork at Thistle, Utah, for 1910.

[Drainage area, 480 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January			95	0.198	0.23	5,840	C.
February			90	.188	.20	5,000	C.
March	307	92	186	.388	.45	11,400	A.
April	485	206	307	.640	.71	18,300	B.
May	440	200	296	.617	.71	18,200	C.
June	195	69	114	.238	.27	6,780	B.
July	76	56	69.1	.144	.17	4,250	A.
August	69	34	49.9	.104	.12	3,070	A.
September	56	34	38.7	.081	.09	2,300	A.
October	69	34	47.3	.099	.11	2,910	A.
November	56	56	56.0	.117	.13	3,330	A.
December	56	50	55.1	.115	.13	3,390	B.
The year	485	34	117	.244	3.32	84,800	

NOTE.—Discharge for January and February estimated from flow of river at mouth of canyon and the run-off of the drainage area of Diamond Fork near Thistle, allowing a small gain below the mouth of Diamond Fork.

SPANISH FORK NEAR SPANISH FORK, UTAH.

This station, which is located in the mouth of the canyon, about 600 feet above the diversion dam of the East Bench Irrigation Co. and about 5 miles southeast of Spanish Fork, Utah, was established May 23, 1900, discontinued November 30, 1901, and reestablished March 26, 1903, to determine the total water available from Spanish Fork for irrigation near Utah Lake.

The station is below all tributaries and above all important ditches except the Reclamation Service power canal, which diverts water at a point about a mile above the station. The water thus diverted is used to develop power, after which a part of the water is returned to the river, the remainder being turned into the Salem canal and used for irrigation. The entire low-water flow of the river below the station is used for irrigation. The amount of water diverted is measured and added to the estimated discharge of the river.

The datum of the staff gage has remained unchanged since the station was originally established.

Measurements are made from a cable and car during high stages and by wading at low stages.

The relation between gage height and discharge is little affected by ice and not at all by artificial control below. Variations in daily gage heights are caused by manipulation of gates on the Reclamation Service diversion dam above.

Although the section is somewhat shifting, numerous measurements have been made, and the results obtained are good.

Discharge measurements of Spanish Fork near Spanish Fork, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 3	A. B. Purton	33	25	—0.1	55
23	do	38	82	1.58	414
June 11	do	37	39	0.35	122
21	do	35	60	0.15	101
Aug. 11	do	16	12	— .24	24.6
Sept. 2	do	14	9	— .38	13.5
20	do	19	16	— .10	39.1

Daily gage height, in feet, of Spanish Fork near Spanish Fork, Utah, for 1910.

[Geo. H. Lewis, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	−0.20	−0.20	−0.20	0.70	2.40	0.60	0.08	−0.18	−0.36	−0.34	−0.30	−0.46
2	−.20	−.20	−.20	.70	2.10	.59	.00	−.22	−.34	−.06	−.32	−.46
3	−.20	−.30	.00	.70	2.00	.58	.00	−.20	−.30	−.10	−.32	−.44
4	−.20	−.30	.10	.70	1.90	.54	.00	−.20	−.31	−.16	−.34	−.44
5	−.20	−.25	.10	.70	1.90	.51	.00	−.20	−.33	−.16	−.36	−.48
6	−.20	−.25	.10	.80	1.85	.46	.00	−.20	−.37	−.16	−.38	−.49
7	−.20	−.25	.20	.80	1.80	.44	.00	−.20	−.36	−.19	−.40	−.49
8	−.20	−.20	.40	.90	1.80	.39	−.01	−.21	−.36	−.22	−.40	−.49
9	−.20	−.20	.50	1.05	1.90	.38	−.02	−.25	−.40	−.22	−.42	−.48
10	−.20	−.20	.40	1.20	2.00	.37	−.04	−.25	−.40	−.24	−.41	−.45
11	−.20	−.20	.60	1.40	2.00	.35	−.06	−.28	−.41	−.30	−.39	−.42
12	−.20	−.20	.70	1.55	2.00	.34	−.07	−.28	−.40	−.30	−.35	−.41
13	−.25	−.20	.65	1.60	2.00	.33	−.08	−.32	−.35	−.30	−.37	−.50
14	−.20	−.20	.95	1.45	1.80	.28	−.08	−.34	−.30	−.29	−.36	−.49
15	−.20	−.20	.95	1.30	1.70	.24	−.07	−.34	−.22	−.27	−.36	−.50
16	−.20	−.30	1.00	1.30	1.60	.22	−.03	−.31	−.20	−.18	−.40	−.50
17	−.20	−.30	.90	1.30	1.50	.21	−.03	−.30	−.20	−.18	−.35	−.49
18	−.25	−.25	.90	1.30	1.40	.20	−.04	−.32	−.14	−.16	−.40	−.50
19	−.25	−.25	1.00	1.70	1.35	.20	−.08	−.31	−.06	−.16	−.25	−.50
20	−.25	−.25	1.20	1.90	1.25	.17	−.09	−.28	−.11	−.20	−.30	−.49
21	−.20	−.25	1.40	2.00	1.20	.14	−.10	−.32	−.18	−.24	−.36	−.45
22	−.20	−.20	1.55	2.00	1.10	.12	−.10	−.32	−.22	−.24	−.32	−.50
23	−.20	−.20	1.70	2.05	1.00	.10	−.10	−.34	−.22	−.24	−.28	−.50
24	−.20	−.25	1.10	2.10	.85	.10	−.11	−.34	−.22	−.26	−.34	−.50
25	−.20	−.20	1.00	2.35	.85	.10	−.12	−.34	−.28	−.26	−.36	−.50
26	−.20	−.20	.90	2.50	.85	.07	−.12	−.33	−.23	−.26	Dry.	−.50
27	−.20	−.20	1.00	2.60	.80	.04	−.13	−.33	−.28	−.25	−.45	−.50
28	−.25	−.20	.80	2.60	.80	.01	−.14	−.31	−.24	−.27	−.48	−.50
29	−.20	.....	.80	2.60	.70	.10	−.16	−.30	−.29	−.26	−.44	−.50
30	−.30	.....	.70	2.50	.65	.15	−.18	−.34	−.32	−.28	−.43	−.50
31	−.25	.....	.70	.....	.65	.....	−.20	−.33	.....	−.30	.....	−.50

Daily discharge, in second-feet, of Spanish Fork near Spanish Fork, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	47	47	47	197	647	176	76	31	15	16	19	8.4
2	47	47	47	197	557	174	64	28	16	44	18	8.4
3	47	37	72	197	528	172	64	29	19	39	18	9.6
4	47	37	86	197	499	165	63	29	18	32	16	9.6
5	47	42	86	197	499	159	63	28	17	32	15	7.2
6	47	42	86	218	485	149	62	28	14	32	13	6.6
7	47	42	102	218	471	146	62	27	15	29	12	6.6
8	47	47	138	240	471	136	60	26	15	26	12	6.6
9	47	47	157	274	499	134	58	23	12	26	11	7.2
10	47	47	138	310	528	133	54	23	12	24	11	9.0
11	47	47	176	361	528	129	51	21	11	19	13	11
12	47	47	197	402	528	127	50	21	12	19	16	11
13	42	47	186	415	528	125	49	18	16	19	14	6.0
14	47	47	252	374	471	116	48	16	19	20	15	6.6
15	47	47	252	335	443	109	48	16	26	22	15	6.0
16	47	37	263	335	415	106	52	18	28	30	12	6.0
17	47	37	240	335	388	104	52	19	28	30	16	6.6
18	42	42	240	335	361	102	50	18	35	32	12	6.0
19	42	42	263	443	348	102	46	18	44	32	24	6.0
20	42	42	310	499	322	97	44	21	38	28	19	6.6
21	47	42	361	528	310	92	43	18	30	24	15	9.0
22	47	47	402	528	286	89	42	18	26	24	18	6.0
23	47	47	443	542	263	84	42	16	26	24	21	6.0
24	47	42	286	557	229	84	40	16	26	23	16	6.0
25	47	47	263	632	229	83	39	16	21	23	15	6.0
26	47	47	240	677	229	78	38	17	25	23	0	6.0
27	47	47	263	708	218	73	37	17	21	24	9.0	6.0
28	42	47	218	708	218	68	36	18	24	22	7.2	6.0
29	47	.....	218	708	197	82	34	19	20	23	9.6	6.0
30	37	.....	197	677	186	88	32	16	18	21	10	6.0
31	42	.....	197	.....	186	.....	30	17	.....	19	.....	6.0

NOTE.—Daily discharges determined as follows: Jan. 1 to June 21, from a discharge rating curve that is fairly well defined; June 22 to Aug. 10, by indirect method for shftiing channels; Aug. 11 to Dec. 31, from a well-defined curve.

Monthly discharge of Spanish Fork near Spanish Fork, Utah, for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	47	37	45.7	2,810	B.
February	47	37	44.1	2,450	B.
March	443	47	207	12,700	B.
April	708	197	411	24,500	A.
May	647	186	389	23,900	A.
June	176	68	116	6,900	B.
July	76	30	49.3	3,030	B.
August	31	16	20.8	1,280	B.
September	44	11	21.6	1,290	A.
October	44	16	25.8	1,590	A.
November	24	0	14.1	839	B.
December	11	6	7.1	437	B.
The year	708	0	113	81,700	

Combined monthly discharge of Spanish Fork and power canal near Spanish Fork, Utah, for 1910.

[Drainage area, 670 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	162	130	151	0.225	0.26	9,280	B.
February	162	109	147	.219	.23	8,160	B.
March	554	162	318	.475	.55	19,600	B.
April	777	300	502	.749	.84	29,900	A.
May	707	249	456	.681	.79	28,000	A.
June	245	142	183	.273	.30	10,900	B.
July	155	112	131	.196	.23	8,060	B.
August	122	78	89.8	.134	.15	5,520	B.
September	118	79.2	91.5	.137	.15	5,440	A.
October	131	86.1	95.2	.142	.16	5,850	A.
November	103	86.4	94.9	.142	.16	5,650	B.
December	103	71	88.7	.132	.15	5,450	B.
The year	777	71	196	.293	3.97	142,000	

UNITED STATES RECLAMATION SERVICE POWER CANAL NEAR SPANISH FORK, UTAH.

This station, which is located in the mouth of the canyon at a point about half a mile below the canal head gates and about 5 miles southeast of Spanish Fork, Utah, was established January 1, 1909, to determine the amount of water diverted by the Reclamation Service for power in connection with the Strawberry Valley project.

The station is located in the middle of a long tangent on the canal, which is smoothly lined with concrete. A good rating curve has been obtained and the records may be considered excellent. The gage datum has remained unchanged since the station was established.

The discharge of this canal has been added to that of the river at the station near Spanish Fork, just below, to give the total discharge of Spanish Fork above the diversions.

The following discharge measurement was made by A. B. Purton:

March 3, 1910: Width, 10 feet; area, 20 square feet; gage height, 2.85 feet; discharge, 109 second-feet.

Daily gage height, in feet, of United States Reclamation Service power canal near Spanish Fork, Utah, for 1910.

[George H. Lewis, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.8	2.6	2.9	2.8	2.1	2.25	2.40	2.48	2.26	2.39	2.32	2.51
2	2.9	2.8	2.9	2.8	2.05	2.2	2.31	2.62	2.18	2.52	2.34	2.50
3	2.9	2.7	2.9	2.9	2.05	2.2	2.38	2.29	2.15	2.05	2.36	2.54
4	2.9	2.55	2.95	2.75	2.0	2.15	2.40	2.28	2.26	2.05	2.39	2.58
5	2.85	2.65	2.9	2.75	2.1	2.14	2.50	2.25	2.26	2.02	2.36	2.38
6	2.65	2.65	2.9	2.9	2.1	2.19	2.50	2.24	2.31	2.05	2.42	2.38
7	2.9	2.65	3.0	2.8	2.2	2.16	2.46	2.2	2.23	2.08	2.48	2.50
8	2.8	2.8	2.95	2.8	2.2	2.22	2.49	2.24	2.21	2.10	2.52	2.48
9	2.9	2.75	3.05	2.8	2.2	2.22	2.49	2.21	2.26	2.12	2.46	2.50
10	2.85	2.75	3.1	2.85	2.1	2.20	2.49	2.25	2.22	2.15	2.46	2.55
11	2.85	2.75	1.28	2.8	2.1	2.18	2.44	2.23	2.30	2.25	2.48	2.56
12	2.9	2.75	1.4	2.8	2.05	2.20	2.44	2.30	2.22	2.25	2.40	2.59
13	2.8	2.75	2.65	2.75	2.1	2.20	2.44	2.34	2.21	2.28	2.42	2.54
14	2.8	2.75	2.7	3.0	2.2	2.20	2.42	2.25	2.24	2.28	2.46	2.53
15	2.8	2.7	2.7	2.85	2.25	2.16	2.48	2.26	2.29	2.26	2.42	2.46
16	2.8	2.7	2.75	2.9	2.3	2.16	2.46	2.21	2.32	2.34	2.4	2.45
17	2.8	2.3	2.75	2.9	2.2	2.15	2.39	2.18	2.38	2.34	2.4	2.45
18	2.75	2.8	2.8	2.45	2.3	2.15	2.51	2.2	2.31	2.44	2.35	2.40
19	2.6	2.75	2.9	2.1	2.25	2.19	2.50	2.1	2.32	2.34	2.4	2.42
20	2.7	2.75	2.8	2.25	2.2	2.19	2.46	2.2	2.26	2.31	2.38	2.46
21	2.75	2.8	2.85	2.25	2.25	2.21	2.45	2.22	2.22	2.25	2.39	2.52
22	2.75	2.85	3.0	2.15	2.3	2.18	2.46	2.22	2.22	2.24	2.46	2.39
23	2.85	2.8	2.85	2.15	2.35	2.22	2.41	2.21	2.19	2.28	2.52	2.24
24	2.75	2.85	2.9	2.15	2.3	2.22	2.38	2.19	2.21	2.26	2.49	2.38
25	2.7	2.85	2.9	2.15	2.3	2.16	2.38	2.21	2.29	2.26	2.48	2.42
26	2.75	2.9	3.0	2.15	2.4	2.30	2.42	2.20	2.19	2.26	2.65	2.32
27	2.7	2.85	2.85	2.05	2.4	2.24	2.44	2.20	2.31	2.29	2.38	2.18
28	2.6	2.9	2.95	2.25	2.4	2.32	2.45	2.20	2.26	2.30	2.42	2.44
29	2.85	.....	2.8	2.0	2.3	2.4	2.41	2.20	2.37	2.33	2.48	2.28
30	2.6	.....	2.65	2.25	2.15	2.36	2.42	2.22	2.4	2.32	2.45	2.35
31	2.6	.....	2.75	.....	2.15	.....	2.45	2.21	.....	2.35	.....	2.38

Daily discharge, in second-feet, of United States Reclamation Service power canal near Spanish Fork, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	107	92.5	115	107	60.1	69.1	78.7	84.1	69.7	78.0	73.5	86.2
2	115	107	115	107	57.3	66	72.8	93.9	64.8	86.9	74.8	85.5
3	115	99.7	115	115	57.3	66	77.4	71.6	63.0	57.3	76.1	88.3
4	115	89	119	103	54.5	63	78.7	71.0	69.7	57.3	78.0	91.1
5	111	96.1	115	103	60.1	62.5	85.5	69.1	69.7	55.6	76.1	77.4
6	96.1	96.1	115	115	60.1	65.4	85.5	68.5	72.8	57.3	80.1	77.4
7	115	96.1	123	107	66.0	63.6	82.8	66.0	69.7	59.0	84.1	85.5
8	107	107	119	107	66.0	67.2	84.8	68.5	66.6	60.1	86.9	84.1
9	115	103	127	107	66.0	67.2	84.8	66.6	69.7	61.3	82.8	85.5
10	111	103	131	111	60.1	66	84.8	69.1	67.2	63.0	82.8	89.0
11	111	103	107	107	60.1	64.8	81.4	67.9	72.2	69.1	84.1	89.7
12	115	103	78.7	107	57.3	66	81.4	72.2	67.2	69.1	78.7	91.8
13	107	103	96.1	111	60.1	66	81.4	74.8	66.6	71.0	80.1	88.3
14	107	103	99.7	123	66.0	66	80.1	69.1	68.5	71.0	82.8	87.6
15	107	99.7	99.7	111	69.1	63.6	84.1	69.7	71.6	69.7	80.1	82.8
16	107	99.7	103	115	72.2	63.6	82.8	66.6	73.5	74.8	78.7	82.1
17	107	72.2	103	115	66.0	63	78.0	64.8	77.4	74.8	78.7	82.1
18	103	107	107	82.1	72.2	63	86.2	66.0	72.8	81.4	75.4	78.7
19	92.5	103	115	60.1	69.1	65.4	85.5	60.1	73.5	74.8	78.7	80.1
20	99.7	103	107	69.1	66.0	65.4	82.8	66.0	69.7	72.8	77.4	82.8
21	103	107	111	69.1	69.1	66.6	82.1	67.2	67.2	69.1	78.0	86.9
22	103	111	123	63	72.2	64.8	82.8	67.2	67.2	68.5	82.8	78.0
23	111	107	111	63	75.4	67.2	79.4	66.6	65.4	71.0	86.9	68.5
24	103	111	115	63	72.2	67.2	77.4	65.4	66.6	69.7	84.8	77.4
25	99.7	111	115	63	72.2	63.6	77.4	66.6	71.6	69.7	84.1	80.1
26	103	115	123	63	78.7	72.2	80.1	66.0	65.4	69.7	96.1	73.5
27	99.7	111	111	57.3	78.7	68.5	81.4	66.0	72.8	71.6	77.4	64.8
28	92.5	115	119	69.1	78.7	73.5	82.1	66.0	69.7	72.2	80.1	81.4
29	111	.....	107	54.5	72.2	78.7	79.4	66.0	76.8	74.2	84.1	71.0
30	92.5	.....	96.1	69.1	63.0	76.1	80.1	67.2	78.7	73.5	82.1	75.4
31	92.5	.....	103	.....	63.0	.....	82.1	66.6	.....	75.4	.....	77.4

NOTE.—Daily discharge determined from a well-defined discharge rating curve.

Monthly discharge of United States Reclamation Service power canal near Spanish Fork, Utah, for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	115	92.5	106	6,520	A.
February	115	72.2	103	5,720	A.
March	131	78.7	111	6,820	A.
April	123	54.5	90.5	5,390	A.
May	78.7	54.5	66.5	4,090	A.
June	78.7	62.5	66.7	3,970	A.
July	86.2	72.8	81.4	5,000	A.
August	93.9	60.1	68.9	4,240	A.
September	78.7	63.0	69.9	4,160	A.
October	86.9	55.6	69.3	4,260	A.
November	96.1	73.5	80.9	4,810	A.
December	91.8	64.8	81.6	5,020	A.
The year	131	54.5	83.8	60,000	

SPANISH FORK NEAR LAKE SHORE, UTAH.

This station, which is located about 3 miles west of Spanish Fork, Utah, 1 mile east of Lake Shore, and about 3 miles above the mouth of the river, was established December 10, 1903, discontinued July 10, 1907, and reestablished March 10, 1909, to determine the amount of water wasted into Utah Lake.

The station is below all tributaries and diversion ditches. The original location was about 800 feet above the wagon bridge on the road from Spanish Fork to Lake Shore, but as the section was very unsatisfactory the station was relocated at a point about one-half mile farther downstream, where conditions for measuring are excellent.

The gage is a staff; its datum has remained unchanged since the station was reestablished.

Discharge measurements are made from a cable and car.

The relation between gage height and discharge is not affected by ice or artificial control below. The bed of the stream is probably permanent at the station. A good rating curve has been obtained and the records for 1910 may be considered excellent.

Discharge measurements of Spanish Fork near Lake Shore, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 1	O. W. Hartwell	24	63	4.03	133
Mar. 4	A. B. Purton	28	89	5.11	206
July 26[a]	do	5.4	2	1.21	1.45
Sept. 1[a]	do	5.8	2	1.20	1.18

[a] Measurement on July 26 and Sept. 1 made by wading.

Daily gage height, in feet, of Spanish Fork near Lake Shore, Utah, for 1910.

[G. J. Hansen, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	6.35	7.4	1.30	1.25	1.21	.....	.....	.....	.....
2	.....	3.75	4.20	6.70	6.95	.....	.....	.....	1.20	.....	2.25	3.15
3	3.75	.....	4.60	6.80	6.0	1.25	.....	1.21	.....	1.37	.....	.....
4	.....	3.70	5.10	7.0	5.65	.....	1.25	.....	.....	.....	2.25	.....
5	3.80	.....	5.25	7.0	5.55	.....	.....	1.25	1.20	1.3	.....	3.2
6	.....	.....	5.30	7.1	5.10	1.25	1.25	.....	.....	.....	.....	.....
7	3.85	3.70	5.75	7.0	4.8	.....	.....	.....	1.20	1.3	2.9	3.1
8	.....	.....	6.50	7.15	4.8	1.25	1.20	1.21	.....	.....	.....	.....
9	.....	3.40	6.70	7.60	4.2	.....	.....	.....	1.25	.....	3.05	3.2
10	3.75	.....	6.40	8.05	3.85	1.25	.....	1.21	.....	1.3	.....	.....
11	.....	3.60	6.35	8.60	5.10	.....	1.20	.....	.....	.....	2.22	3.3
12	3.90	.....	6.55	9.15	5.0	.....	.....	1.21	1.30	1.3	.....	.....
13	.....	.....	6.70	9.0	4.7	1.25	1.20	.....	.....	.....	.....	3.3
14	3.90	3.75	7.45	9.0	4.5	.....	.....	.....	1.30	1.41	2.65	.....
15	.....	.....	7.40	8.6	4.1	1.25	1.20	1.21	.....	.....	.....	3.3
16	.....	3.60	7.80	8.3	3.7	.....	.....	.....	1.30	.....	2.4	.....
17	4.0	.....	7.45	8.2	3.35	1.25	.....	1.21	.....	2.25	.....	3.2
18	.....	3.50	7.50	8.3	2.90	.....	1.20	.....	.....	.....	2.32	3.1
19	3.45	.....	7.80	8.3	2.80	.....	.....	1.21	1.29	2.60	.....	.....
20	.....	.....	8.20	8.6	2.35	1.25	1.20	.....	.....	.....	.....	.....
21	3.50	3.60	8.90	8.35	2.15	.....	.....	.....	1.28	2.5	2.9	3.25
22	.....	.....	9.65	8.70	1.95	1.25	1.20	1.21	.....	.....	.....	.....
23	.....	3.75	10.25	8.55	1.70	.....	.....	.....	1.25	.....	3.0	2.8
24	3.90	.....	8.25	8.75	1.50	1.25	.....	1.21	.....	2.5	.....	.....
25	.....	3.80	7.85	8.95	1.40	.....	1.20	.....	.....	.....	3.0	.....
26	3.60	.....	7.60	9.15	1.35	.....	1.21	1.20	1.25	2.48	.....	3.2
27	.....	.....	7.40	9.25	1.35	1.25	1.21	.....	.....	.....	.....	.....
28	3.65	3.90	7.0	8.75	1.35	.....	.....	.....	1.25	2.48	3.1	3.0
29	.....	.....	6.65	8.7	.....	1.25	1.21	1.20	.....	.....	.....	.....
30	.....	.....	6.50	8.1	1.30	.....	.....	.....	1.25	.....	3.05	3.05
31	3.30	.....	6.45	.....	.....	.....	.....	1.20	.....	2.85	.....	.....

Daily discharge, in second-feet, of Spanish Fork near Lake Shore, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	133	92	126	306	401	2.0	1.5	1.1	1.0	1.9	40	67
2	119	105	136	338	360	1.8	1.5	1.1	1.0	2.3	27	70
3	105	104	164	347	275	1.5	1.5	1.1	1.0	2.7	27	70
4	106	102	203	365	247	1.5	1.5	1.3	1.0	2.4	27	71
5	108	102	215	365	239	1.5	1.5	1.5	1.0	2.0	37	72
6	110	102	219	374	203	1.5	1.5	1.4	1.0	2.0	47	70
7	112	102	255	365	179	1.5	1.2	1.2	1.0	2.0	57	67
8	110	93	320	378	179	1.5	1.0	1.1	1.2	2.0	60	70
9	108	84	338	419	136	1.5	1.0	1.1	1.5	2.0	64	72
10	105	90	311	460	112	1.5	1.0	1.1	1.6	2.0	45	75
11	110	96	306	510	203	1.5	1.0	1.1	1.8	2.0	26	78
12	115	99	324	565	195	1.5	1.0	1.1	2.0	2.0	32	78
13	115	102	338	550	171	1.5	1.0	1.1	2.0	2.6	38	78
14	115	105	406	550	157	1.5	1.0	1.1	2.0	3.1	44	78
15	117	100	401	510	129	1.5	1.0	1.1	2.0	11	39	78
16	120	96	437	482	102	1.5	1.0	1.1	2.0	19	33	75
17	122	93	406	473	81	1.5	1.0	1.1	2.0	27	31	72
18	104	90	410	482	57	1.5	1.0	1.1	1.9	34	30	67
19	87	92	437	482	52	1.5	1.0	1.1	1.9	42	39	69
20	88	94	473	510	31	1.5	1.0	1.1	1.9	40	48	72
21	90	96	540	486	23	1.5	1.0	1.1	1.8	37	57	75
22	98	100	615	520	16	1.5	1.0	1.1	1.6	37	60	63
23	106	105	675	505	9.0	1.5	1.0	1.1	1.5	37	62	52
24	115	106	478	525	4.0	1.5	1.0	1.1	1.5	37	62	58
25	106	108	442	545	3.0	1.5	1.0	1.1	1.5	36	62	65
26	96	110	419	565	2.5	1.5	1.1	1.0	1.5	36	63	72
27	98	112	401	575	2.5	1.5	1.1	1.0	1.5	36	65	67
28	99	115	365	525	2.5	1.5	1.1	1.0	1.5	36	67	62
29	92	.....	334	520	2.2	1.5	1.1	1.0	1.5	42	65	63
30	85	.....	320	464	2.0	1.5	1.1	1.0	1.5	48	64	64
31	78	.....	316	.....	2.0	.....	1.1	1.0	.....	54	.....	65

NOTE.—Daily discharge determined from well-defined discharge rating curve.

Monthly discharge of Spanish Fork near Lake Shore, Utah, for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	133	78	106	6,520	A.
February	115	84	99.8	5,540	A.
March	675	126	359	22,100	A.
April	575	306	469	27,900	A.
May	401	2.0	115	7,070	A.
June	2.0	1.5	1.53	91.0	D.
July	1.5	1.0	1.12	68.9	D.
August	1.5	1.0	1.11	68.2	D.
September	2.0	1.0	1.54	91.6	D.
October	54	1.9	20.6	1,270	B.
November	67	26	47.3	2,810	B.
December	78	52	69.5	4,270	B.
The year	675	1.0	107	77,800	

DIAMOND FORK NEAR THISTLE, UTAH.

This station, which is located at a foot bridge about 2½ miles below Thistle, Utah, and about 200 yards above the mouth of the river, was established December 2, 1907, to determine the amount of water available for irrigation and power development in connection with the Strawberry Valley project of the United States Reclamation Service.

As no important ditches take out above or below, the records show the total run-off from the Diamond Fork drainage area.

The gage is an inclined staff near the bridge; its datum has remained unchanged since the station was established.

Discharge measurements are made from the bridge.

The river freezes over during extreme cold periods, but as the winter flow is fairly constant good estimates may be made. The relation between gage height and discharge is unaffected by artificial control. Although the section shifts a great deal throughout the year, many measurements were made in 1910 and the records may be considered fairly good.

Discharge measurements of Diamond Fork near Thistle, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 2	A. B. Purton	20	20	2.28	30.0
21	do	21	40	3.15	163
Apr. 29	do	21	48	3.40	240
May 21	do	20	34	2.85	121
June 21	do	20	34	2.38	44.5
July 23[a]	do	21	18	2.01	22
Aug. 9	do	21	18	2.01	19.9
Sept. 19	do	20	18	2.11	25.3

[a] Wading measurement.

Daily gage height, in feet, of Diamond Fork near Thistle, Utah, for 1910.

[E. T. Cluff, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.3	2.8	.....	2.4	2.2	2.0	.....	2.05	.....	2.05
2	2.3	2.8	3.4	2.4	2.2	2.0	2.0	.....	2.05	.....
3	2.3	.....	3.3	2.4	.....	2.0	.....	2.05	.....	2.05
4	2.3	2.9	3.3	2.4	.....	2.0	2.0	.....	2.05	.....
5	2.35	2.9	3.2	.....	2.2	2.0	.....	2.05	2.05	2.05
6	2.4	2.9	3.1	2.4	2.15	2.0	2.0	.....	.....	.....
7	2.4	2.95	3.1	2.4	2.15	2.0	.....	2.05	2.05	2.05
8	2.4	3.05	.....	2.4	2.15	2.0	2.0	2.05	.....	.....
9	2.45	3.15	3.1	2.4	2.1	2.0	.....	.....	2.05	2.05
10	2.45	.....	3.2	2.4	.....	2.0	2.0	2.05	.....	2.05
11	2.4	3.4	3.2	2.4	2.1	2.0	.....	2.05	2.05	.....
12	2.4	3.6	3.2	2.4	2.1	2.0	2.0	.....	2.05	2.05
13	2.45	3.5	3.1	2.4	2.1	2.0	.....	2.05	.....	.....
14	2.45	3.3	3.1	2.4	2.1	.....	2.0	2.05	2.05	2.05
15	2.45	3.4	.....	2.3	2.1	2.0	.....	2.05	.....	.....
16	2.55	3.4	3.1	2.3	2.1	2.0	2.0	.....	2.05	2.05
17	2.7	.....	3.0	2.3	2.1	2.0	2.1	2.1	.....	2.05
18	3.0	3.5	2.9	2.3	2.1	2.0	.....	.....	2.05	.....
19	3.2	3.45	2.9	2.3	2.1	2.0	2.1	2.05	2.05	2.05
20	3.25	3.4	2.85	2.25	2.1	2.0	.....	.....	.....	.....
21	3.35	3.55	2.85	2.25	2.1	.....	2.1	2.05	2.1	2.05
22	3.4	3.5	.....	2.25	2.1	2.0	2.1	.....	.....	.....
23	3.35	3.4	2.8	2.25	2.1	2.0	2.1	2.05	2.1	2.05
24	3.35	.....	2.7	2.2	.....	2.0	2.05	.....	.....	2.05
25	3.3	3.4	2.7	2.2	2.1	2.0	.....	.....	2.05	.....
26	3.2	3.4	2.6	.....	2.1	2.0	2.05	2.05	2.05	2.05
27	.....	3.4	2.6	2.2	2.1	2.0	2.05	.....	.....	.....
28	3.0	3.5	2.6	2.2	2.1	.....	2.05	2.05	2.05	2.0
29	3.0	3.5	2.55	2.2	2.1	2.0	2.05	2.05	.....	.....
30	2.85	3.5	2.5	2.2	2.1	.....	2.05	.....	2.05	2.0
31	2.85	.....	2.4	.....	.....	2.0	.....	2.05	.....	1.95

NOTE.—Stream frozen over during January and February. Relation between gage heights and discharge probably unaffected by ice during March and December.

Daily discharge, in second-feet, of Diamond Fork near Thistle, Utah, for 1910.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	33	100	250	60	38	20	20	24	24	24
2	33	100	238	60	38	20	20	24	24	24
3	33	108	214	60	38	20	20	24	24	24
4	33	117	214	60	38	20	20	24	24	24
5	38	117	192	60	38	20	20	24	24	24
6	43	117	170	60	33	20	20	24	24	24
7	43	126	170	60	33	20	20	24	24	24
8	43	145	170	60	33	20	20	24	24	24
9	49	165	170	60	28	20	20	24	24	24
10	49	200	192	60	28	20	20	24	24	24
11	43	238	192	60	28	20	20	24	24	24
12	43	286	192	60	28	20	20	24	24	24
13	49	262	170	60	28	20	20	24	24	24
14	49	214	170	60	28	20	20	24	24	24
15	49	238	170	48	28	20	20	24	24	24
16	62	238	170	48	28	20	20	26	24	24
17	84	250	150	48	28	20	28	28	24	24
18	135	262	132	48	28	20	28	26	24	24
19	175	250	132	48	28	20	28	24	24	24
20	185	238	124	43	28	20	28	24	26	24
21	206	274	124	43	28	20	28	24	28	24
22	217	262	120	43	28	20	28	24	28	24
23	206	238	116	43	28	20	28	24	28	24
24	206	238	100	38	28	20	24	24	26	24
25	195	238	100	38	28	20	24	24	24	24
26	175	238	86	38	28	20	24	24	24	24
27	155	238	86	38	28	20	24	24	24	22
28	135	262	86	38	28	20	24	24	24	20
29	135	262	79	38	28	20	24	24	24	20
30	108	262	72	38	28	20	24	24	24	20
31	108	.....	60	.....	24	20	.....	24	.....	16

NOTE.—Daily discharge determined from two well-defined discharge rating curves, one applicable Mar. 1 to Apr. 10, the other Apr. 11 to Dec. 31. Discharge interpolated for days on which gage was not read.

Monthly discharge of Diamond Fork near Thistle, Utah, for 1910.

[Drainage area, 157 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	.....	.....	50	0.318	0.37	3,070	D.
February	.....	.....	50	.318	.33	2,780	D.
March	217	33	100	.637	.73	6,150	A.
April	286	100	209	1.33	1.48	12,400	B.
May	250	60	149	.949	1.09	9,160	A.
June	60	38	50.6	.322	.36	3,010	B.
July	38	24	30.0	.191	.22	1,840	A.
August	20	20	20.0	.127	.15	1,230	A.
September	28	20	22.8	.145	.16	1,360	A.
October	28	24	24.3	.155	.18	1,490	A.
November	28	24	24.5	.156	.17	1,460	A.
December	24	16	23.3	.148	.17	1,430	A.
The year	286	16	62.8	.400	5.41	45,400	

NOTE.—Monthly means for January and February estimated by comparison with run-off records of Spanish Fork at Thistle and at mouth of canyon.

HOBBLE CREEK NEAR SPRINGVILLE, UTAH.

This station, which is located at a point about 1 mile above the mouth of the canyon, 4 miles southeast of Springville, Utah, and just below the Springville electric power plant, was established March 23, 1904, to determine the amount of water available for irrigation in Utah Valley in connection with the Strawberry Valley project of the United States Reclamation Service. The station is above all diversion ditches and below all tributaries.

Practically no ice forms at the station, the winter flow being largely from springs.

In May, 1909, a flood tore out the old gage and changed the section to such an extent that it was found advisable to change the location of the station. A new vertical staff gage was therefore installed at a point about 1,000 feet upstream from the old gage and about 200 feet below the power plant. All gage heights since June 1, 1909, refer to the new gage.

Measurements are made from a cable and car or by wading.

The bed of the stream at the new section is more nearly permanent than at the old station. A good rating curve has been obtained, and the records at the new station may be considered excellent.

Discharge measurements of Hobble Creek near Springville, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 4	A. B. Purton	14	19	3.60	44.9
July 13	.....do	12	16	3.45	29.2
Sept. 7	.....do	11	14	3.35	23.1

Daily gage height, in feet, of Hobble Creek near Springville, Utah, for 1910.

[E. P. Noe and W. O. Packard, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.45	.....	3.50	4.30	.....	4.00	3.50	3.40	3.30	3.30	3.35	3.35
2	.....	.....	.....	4.30	.....	.....	3.50	.....	.....	3.35	3.35	3.35
3	.....	3.40	.....	.....	.....	.....	.....	3.40	.....	3.35	3.35	3.40
4	.....	.....	3.60	4.30	.....	.....	.....	.....	.....	3.35	3.35	3.35
5	.....	3.35	.....	4.40	4.30	.....	3.40	.....	.....	3.35	3.35	3.35
6	.....	.....	.....	.....	4.30	3.90	3.40	3.40	.....	3.35	3.35	3.35
7	.....	3.40	3.70	4.40	4.20	3.90	.....	.....	3.35	3.35	3.35	3.35
8	.....	.....	.....	4.45	.....	3.90	3.40	3.35	3.35	3.35	3.35	3.35
9	.....	.....	.....	4.50	4.10	3.90	3.40	.....	3.30	3.30	3.35	3.35
10	3.45	.....	3.75	.....	4.10	3.90	.....	3.35	3.25	3.30	3.35	3.40
11	.....	.....	.....	5.00	4.10	3.90	3.40	3.30	3.30	3.30	3.35	3.40
12	.....	3.45	4.00	5.00	4.10	.....	.....	3.30	3.30	3.30	3.35	3.40
13	.....	.....	.....	5.00	4.10	3.90	3.40	3.30	3.30	3.30	3.35	3.40
14	.....	3.45	4.20	4.80	.....	3.90	3.40	.....	3.30	3.35	3.35	3.35
15	3.45	.....	4.30	4.70	.....	.....	.....	3.30	3.35	3.35	3.35	3.30
16	.....	.....	4.50	4.60	4.10	3.90	3.40	.....	3.35	3.35	3.35	3.30
17	3.45	.....	4.50	.....	4.10	3.90	.....	3.30	3.35	3.35	3.35	3.30
18	.....	.....	4.70	4.60	4.10	3.90	3.40	.....	3.35	3.35	3.35	3.30
19	.....	3.45	4.80	4.80	4.10	.....	.....	3.30	3.35	3.35	3.40	3.30
20	.....	.....	.....	5.00	4.10	3.80	3.40	3.30	3.45	3.40	3.40	3.30
21	.....	3.45	5.00	5.20	4.10	3.75	3.40	.....	3.40	3.40	3.35	3.30
22	3.45	.....	5.40	5.10	.....	3.70	.....	3.25	3.40	3.35	3.35	3.30
23	.....	.....	5.40	5.10	4.10	3.60	3.40	3.25	3.35	3.35	3.40	3.30
24	3.45	.....	5.00	.....	.....	3.60	.....	3.30	3.35	3.35	3.35	3.30
25	.....	.....	.....	5.10	4.00	3.50	.....	3.20	3.30	3.35	3.35	3.30
26	.....	.....	4.80	5.10	4.00	.....	.....	.....	3.30	3.35	3.40	3.30
27	.....	.....	.....	.....	.....	3.50	.....	3.30	3.35	3.35	3.35	3.30
28	.....	3.45	4.50	5.10	4.00	3.50	.....	.....	3.35	3.35	3.35	3.30
29	3.45	.....	4.40	5.00	.....	3.50	.....	.....	3.35	3.35	3.35	3.30
30	.....	.....	.....	5.00	4.00	3.50	.....	.....	3.30	3.35	3.35	3.30
31	.....	.....	4.30	.....	4.00	.....	.....	.....	.....	3.35	.....	3.30

Daily discharge, in second-feet, of Hobble Creek near Springville, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	30	28	35	130	228	88	35	26	18	18	22	22
2	30	27	38	130	204	86	35	26	18	22	22	22
3	30	26	42	130	180	84	32	26	18	22	22	26
4	30	24	45	130	155	81	29	26	20	22	22	22
5	30	22	48	145	130	78	26	26	20	22	22	22
6	30	24	52	145	130	76	26	26	20	22	22	22
7	30	26	55	145	115	76	26	24	22	22	22	22
8	30	27	56	153	108	76	26	22	22	22	22	22
9	30	28	58	161	101	76	26	22	18	18	22	22
10	30	28	60	207	101	76	26	22	14	18	22	26
11	30	29	74	253	101	76	26	18	18	18	22	26
12	30	30	88	253	101	76	26	18	18	18	22	26
13	30	30	102	253	101	76	26	18	18	18	22	26
14	30	30	115	214	101	76	26	18	18	22	22	22
15	30	30	130	196	101	76	26	18	22	22	22	18
16	30	30	161	178	101	76	26	18	22	22	22	18
17	30	30	161	178	101	76	26	18	22	22	22	18
18	30	30	196	178	101	76	26	18	22	22	22	18
19	30	30	214	214	101	70	26	18	22	22	26	18
20	30	30	234	253	101	65	26	18	30	26	26	18
21	30	30	253	296	101	60	26	16	26	26	22	18
22	30	30	343	274	101	55	26	14	26	22	22	18
23	30	30	343	274	101	45	26	14	22	22	26	18
24	30	30	253	274	94	45	26	18	22	22	22	18
25	30	30	234	274	88	35	26	11	18	22	22	18
26	30	30	214	274	88	35	26	14	18	22	26	18
27	30	30	188	274	88	35	26	18	22	22	22	18
28	30	30	161	274	88	35	26	18	22	22	22	18
29	30	.....	145	253	88	35	26	18	22	22	22	18
30	30	.....	138	253	88	35	26	18	18	22	22	18
31	30	.....	130	.....	88	.....	26	18	.....	22	.....	18

NOTE.—Daily discharge determined from a well-defined discharge rating curve. Discharge interpolated or days on which gage height was not read.

Monthly discharge of Hobble Creek near Springville, Utah, for 1910.

[Drainage area, 120 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	30	30	30.0	0.250	0.29	1,840	B.
February	30	22	28.5	.238	.25	1,580	B.
March	343	35	141	1.18	1.36	8,670	A.
April	296	130	212	1.77	1.98	12,600	A.
May	228	88	112	.933	1.08	6,890	A.
June	88	35	65.2	.543	.61	3,880	A.
July	35	26	26.9	.224	.26	1,650	A.
August	26	11	19.5	.162	.19	1,200	A.
September	30	14	20.6	.172	.19	1,230	A.
October	26	18	21.5	.179	.21	1,320	A.
November	26	22	22.5	.188	.21	1,340	A.
December	26	18	20.5	.171	.20	1,260	A.
The year	343	11	60.1	.500	6.83	43,500	

MAPLE CREEK NEAR SPRINGVILLE, UTAH.

This station, which is located about half a mile above the mouth of Maple Creek canyon and about 4 miles southeast of Springfield post office, in the NE. ¼ NW. ¼ sec. 13, T. 8 S., R. 3 E., Salt Lake base and meridian, was established November 10, 1910.

The drainage area at this point is approximately 6,880 acres. A staff gage is fastened to the side of a flume 3.8 feet wide on the inside and about 3½ feet high.

Discharge measurements at low and moderate stages are made by wading at the upper end of the flume; flood measurements are made from a board across the flume.

The creek is frozen during the winter.

The following discharge measurement was made by E. C. La Rue:

November 10, 1910: Width, 3.6 feet; area of section, 1.28 square feet; gage height, 1.43 feet; discharge, 1.39 second-feet.

Daily gage height, in feet, of Maple Creek near Springville, Utah, for 1910.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		1.45	11	1.43	1.50	21	1.30	1.48
2		1.45	12	1.43	1.50	22	1.48	1.48
3		1.49	13	1.43	1.50	23	1.46	1.48
4		1.48	14	1.43	1.49	24	1.44	1.48
5		1.48	15	1.43	1.48	25	1.44	1.46
6		1.48	16	1.44	1 48	26	1.45	1.34
7		1.48	17	1.44	1.48	27	1.45	1.34
8		1.48	18	1.44	1.48	28	1.46	1.46
9		1.48	19	1.47	1.48	29	1.46	1.46
10	1.43	1.49	20	1.45	1.48	30	1.45	1.48
						31		1.48

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PROVO RIVER ABOVE TELLURIDE POWER CO.'S DAM NEAR PROVO, UTAH.

This station, which is located about 1 mile above the Telluride Power Co.'s dam and about 4 miles above the mouth of the canyon, and about 11 miles from Provo, was established February 1, 1905, to determine the amount of water available for irrigation in Utah Valley.

The station is below all tributaries, South Fork entering one-fourth mile above the station. Some water is diverted above the station for irrigation in Heber Valley, and all the normal low-water flow is diverted for irrigation below the station. The Telluride Power Co. diverts water about a mile below the station for power development, but returns it to the river at the mouth of the canyon.

The equipment consists of a cable and car and an inclined staff gage. The gage datum was changed July 24, 1908, when the station was established at a point one-fourth mile above the old site.

The relation between gage height and discharge is not affected by ice or by artificial control above.

The most recent information regarding conditions at this station indicates that there is no backwater from the dam below, but that the channel has become very unstable, requiring the use of many discharge rating curves. Results obtained at this station for 1909–10 are not good.

Discharge measurements of Provo River at Telluride Power Co.'s dam, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 9	E. S. Fuller	78	181	3.10	695
17	C. C. Jacobs	72	184	3.25	704
July 18	Fuller and Canfield	74	87.9	2.00	244

Daily gage height, in feet, of Provo River near Provo, Utah, for 1910.

[Frank Dusenberry, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.2	2.3	2.3	3.0	4.25	3.8	1.95	2.1	1.9	2.1	2.1	2.25
2	3.7	2.35	2.8	3.0	4.0	3.7	2.0	2.0	1.9	2.1	2.1	2.2
3	2.85	1.8	3.1	3.1	3.65	3.6	2.0	2.0	1.9	2.05	2.15	2.2
4	2.65	1.9	3.3	3.0	3.75	3.45	1.95	2.0	1.9	2.05	2.15	2.25
5	2.4	2.0	3.3	3.5	3.6	3.3	2.0	2.05	1.9	2.05	2.15	2.25
6	2.3	2.15	3.3	3.1	3.5	3.5	2.0	2.05	1.9	2.05	2.15	2.25
7	2.5	2.0	3.0	2.9	3.25	3.85	2.0	1.95	1.9	2.1	2.1	2.2
8	2.55	2.25	2.9	3.0	3.55	2.7	1.9	1.95	1.9	2.05	2.15	2.2
9	2.6	2.25	3.0	3.15	3.65	2.55	1.9	1.9	1.9	2.05	2.2	2.2
10	2.5	2.35	2.8	3.2	3.95	2.35	1.9	1.95	1.9	2.05	2.15	2.25
11	2.55	2.35	2.7	3.45	4.65	2.35	2.0	1.9	1.9	2.1	2.15	2.4
12	2.5	2.25	2.65	3.55	4.6	2.3	1.9	1.95	1.9	2.1	2.15	2.4
13	2.4	2.4	2.7	3.5	4.5	2.35	2.05	1.9	1.9	2.1	2.15	2.3
14	2.7	2.4	3.0	3.5	4.6	2.4	2.0	1.9	2.0	2.1	2.15	2.2
15	2.6	2.9	3.15	3.45	4.5	2.35	2.0	1.9	2.0	2.1	2.2	2.15
16	2.45	2.4	3.25	3.3	4.0	2.3	2.0	1.9	2.05	2.1	2.2	2.2
17	2.3	2.2	3.3	3.2	3.95	2.2	2.05	1.9	2.1	2.1	2.15	2.3
18	2.2	2.4	3.2	3.3	3.6	2.15	2.0	1.9	2.1	2.15	2.2	2.25
19	2.15	2.3	3.4	3.5	3.5	2.2	2.0	1.85	2.1	2.2	2.25	2.25
20	2.4	2.3	3.3	3.65	3.25	2.1	2.0	1.85	2.1	2.2	2.2	2.3
21	2.45	2.4	3.5	3.95	3.35	2.0	2.0	1.85	2.05	2.2	2.2	2.25
22	2.45	2.45	3.65	3.95	3.35	2.1	1.95	1.9	2.05	2.15	2.25	2.2
23	2.55	2.4	4.0	3.8	3.3	2.1	1.95	1.85	2.05	2.15	2.3	2.15
24	2.55	2.5	3.6	3.9	3.35	1.95	2.0	1.8	2.05	2.1	2.3	2.15
25	2.65	2.5	3.5	4.15	3.35	2.0	1.95	1.9	2.05	2.1	2.25	2.3
26	2.35	2.3	3.4	4.45	3.7	1.95	1.85	1.9	2.05	2.15	2.25	2.2
27	2.3	2.4	3.35	4.65	3.6	2.0	1.8	1.9	2.1	2.1	2.25	2.2
28	2.35	2.4	3.4	4.7	3.5	1.95	1.9	1.9	2.1	2.1	2.25	2.2
29	2.3	.....	3.45	4.6	3.65	2.0	2.0	1.9	2.05	2.1	2.25	2.15
30	2.1	.....	3.2	4.4	4.0	1.95	2.0	1.9	2.05	2.1	2.25	2.15
31	2.25	.....	3.0	.....	3.8	.....	2.0	1.9	.....	2.1	.....	2.2

Daily discharge, in second-feet, of Provo River near Provo, Utah, for 1909–10.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1	240	285	285	470	1,000	1,650	1,570	250	640	450	410	430
2	240	300	285	530	850	1,830	1,460	290	515	430	370	570
3	240	300	300	620	900	2,310	1,460	275	490	450	335	410
4	240	318	300	670	1,100	2,850	1,510	275	450	450	335	370
5	270	318	335	550	1,325	3,410	1,410	250	515	470	410	352
6	760	240	335	510	1,325	3,550	1,360	305	490	430	410	300
7	670	240	352	450	1,400	3,620	1,210	322	490	450	390	335
8	375	352	352	450	1,500	3,280	1,010	290	490	410	390	410
9	375	270	300	470	1,500	2,590	910	275	515	430	370	470
10	375	270	255	490	1,770	2,530	860	275	450	410	530	370
11	910	285	240	490	1,890	2,470	810	290	450	410	410	335
12	495	370	240	490	1,600	2,350	715	305	450	430	370	352
13	455	370	240	510	1,450	2,290	535	275	450	370	352	410
14	1,310	335	240	530	1,400	2,290	375	275	450	390	410	370
15	1,500	318	370	670	1,425	2,110	340	250	450	410	370	300
16	760	335	352	785	1,450	2,110	358	340	450	370	390	270
17	620	335	370	900	1,350	2,170	322	275	450	390	390	185
18	570	318	430	1,175	1,300	2,110	322	290	450	370	370	240
19	530	335	430	1,350	1,350	2,350	305	305	340	370	410	300
20	670	335	430	1,275	1,475	2,110	322	290	322	370	470	300
21	710	335	390	975	1,550	1,930	322	290	305	370	318	285
22	710	300	370	830	1,650	1,750	305	410	305	370	530	335
23	670	300	370	810	1,650	1,750	290	340	392	370	470	335
24	530	335	410	900	1,600	1,810	305	322	340	370	470	352
25	410	318	410	850	1,450	1,750	290	340	375	352	470	370
26	410	300	430	900	1,400	1,870	305	340	490	352	470	335
27	370	270	410	1,150	1,550	1,720	275	358	470	370	470	335
28	300	285	450	1,225	1,800	1,750	275	340	390	352	370	335
29	300	.....	450	1,200	1,710	1,690	275	322	450	335	352	300
30	300	.....	470	1,000	1,680	1,630	260	392	490	335	410	335
31	335	.....	450	.....	1,710	.....	275	375	.....	410	.....	300
1910.												
1	1,200	335	335	615	1,225	995	225	270	210	270	270	318
2	950	352	530	615	1,100	950	240	240	210	270	270	300
3	550	180	665	665	922	895	240	240	210	255	285	300
4	470	210	755	615	972	828	225	240	210	255	285	318
5	370	240	755	850	895	755	240	255	210	255	285	318
6	335	285	755	665	850	850	240	255	210	255	285	318
7	410	240	615	570	732	1,025	240	225	210	270	270	300
8	430	318	570	615	872	490	210	225	210	255	285	300
9	450	318	615	688	922	430	210	210	210	255	300	300
10	410	352	530	710	1,080	352	210	225	210	255	285	318
11	430	352	490	828	1,425	352	240	210	210	270	285	370
12	410	318	470	872	1,400	335	210	225	210	270	285	370
13	370	370	490	850	1,350	352	255	210	210	270	285	335
14	490	370	615	850	1,400	370	240	210	240	270	285	300
15	450	570	688	828	1,350	352	240	210	240	270	300	285
16	390	370	732	755	1,100	335	240	210	255	270	300	300
17	335	300	755	710	1,080	300	255	210	270	270	285	335
18	300	370	710	755	895	285	240	210	270	285	300	318
19	285	335	805	850	850	300	240	195	270	300	318	318
20	370	335	755	922	732	270	240	195	270	300	300	335
21	390	370	850	1,080	780	240	240	195	255	300	300	318
22	390	390	922	1,080	780	270	225	210	255	285	318	300
23	430	370	1,100	995	755	270	225	195	255	285	335	285
24	430	410	895	1,050	780	225	240	180	255	270	335	285
25	470	410	850	1,175	780	240	225	210	255	270	318	335
26	352	335	805	1,325	950	225	195	210	255	285	318	300
27	335	370	780	1,425	895	240	180	210	270	270	318	300
28	352	370	805	1,450	850	225	210	210	270	270	318	300
29	335	.....	828	1,400	922	240	240	210	255	270	318	285
30	270	.....	710	1,300	1,100	225	240	210	255	270	318	285
31	318	.....	615	.....	995	.....	240	210	.....	270	.....	300

NOTE.—Daily discharge during 1909 and 1910 determined from a set of 3 parallel curves drawn through discharge measurements made during 1909–10 and 1911; curve 1, used Jan. 1 to 14, 1909, and June 8 to July 13, 1909; curve 2, used Jan. 15 to June 7, 1909, and Oct. 25 to Dec. 31, 1909; curve 3, used Jan. 1 to Dec. 31, 1910. July 14 to Oct. 24, 1909, indirect method used.

Monthly discharge of Provo River near Provo, Utah, for 1909–1910.

[Drainage area, 640 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1909.							
January	1,500	240	537	0.839	0.97	33,000	D.
February	370	240	310	.484	.50	17,200	D.
March	470	240	356	.556	.64	21,900	D.
April	1,350	450	774	1.21	1.35	46,100	C.
May	1,890	850	1,460	2.28	2.63	89,800	C.
June	3,620	1,630	2,250	3.52	3.93	134,000	C.
July	1,570	260	656	1.02	1.18	40,300	C.
August	410	250	307	.480	.55	18,900	C.
September	640	305	444	.694	.77	26,400	C.
October	470	335	395	.617	.71	24,300	B.
November	530	318	407	.636	.71	24,200	C.
December	570	185	345	.539	.62	21,200	C.
The year	3,620	185	687	1.07	14.56	497,000	
1910.							
January	1,200	270	435	0.680	0.78	26,700	C.
February	570	180	341	.533	.56	18,900	C.
March	1,100	335	703	1.10	1.27	43,200	C.
April	1,450	570	904	1.41	1.57	53,800	B.
May	1,425	732	992	1.55	1.79	61,000	C.
June	1,025	225	441	.690	.77	26,200	C.
July	255	180	230	.359	.41	14,100	B.
August	270	180	217	.339	.39	13,300	C.
September	270	210	238	.372	.42	14,200	C.
October	300	255	271	.423	.49	16,700	C.
November	335	270	299	.467	.52	17,800	C.
December	370	285	311	.486	.56	19,100	C.
The year	1,450	180	449	.702	9.53	325,000	

TRIBUTARIES OF THE JORDAN.

LITTLE COTTONWOOD CREEK NEAR SALT LAKE CITY, UTAH.

Little Cottonwood Creek is the most southern of the streams tributary to Jordan River on which records have been obtained.

The flow is measured over two 15-foot Cippoletti weirs located near the mouth of the canyon.

Daily discharge, in second-feet, of Little Cottonwood Creek near Salt Lake City, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	Aug.	Sept.	Oct.	Nov.	Dec.
1	21.3	19.4	18.5	55.0	.....	14.2	17.6	18.5	13.0
2	23.2	19.4	19.4	57.5	.....	15.0	18.5	18.5	12.6
3	24.1	20.4	21.3	60.2	.....	15.0	19.4	18.5	12.6
4	21.3	20.4	23.2	62.9	15.0	15.0	21.3	17.6	12.6
5	21.3	20.4	25.2	62.9	15.9	15.9	20.4	17.6	11.9
6	19.4	19.4	25.2	65.6	15.0	15.0	a20.1	17.6	11.1
7	21.3	19.4	26.1	65.6	15.0	15.0	a19.7	17.6	16.8
8	24.1	18.5	28.2	68.4	15.0	15.0	19.4	17.6	15.9
9	23.2	14.2	27.2	71.2	14.2	14.2	19.4	17.6	15.9
10	23.2	14.2	27.2	76.8	14.2	14.2	18.4	17.6	a15.9
11	23.2	15.9	29.2	104.0	14.2	14.2	17.6	15.9	15.9
12	22.3	17.6	31.3	110.0	13.4	13.4	15.9	15.9	15.9
13	22.3	17.6	35.7	.....	14.2	14.2	17.6	17.6	14.2
14	23.2	15.9	40.3	.....	14.2	14.2	17.6	17.6	14.2
15	22.3	15.9	45.0	.....	15.0	15.0	18.5	17.6	13.4
16	21.3	15.9	49.9	.....	15.9	15.9	19.4	17.6	13.4
17	21.3	15.0	57.5	.....	17.6	17.6	20.4	14.2	12.6
18	23.2	14.2	65.6	.....	17.6	17.6	20.4	14.2	12.6
19	21.3	15.0	71.2	.....	18.5	18.5	21.3	15.9	11.9
20	23.2	15.9	73.9	.....	20.4	20.4	24.1	15.9	11.1
21	21.3	15.0	88.7	.....	20.4	20.4	24.1	17.6	9.6
22	21.3	17.6	88.7	.....	20.4	20.4	25.2	15.0	9.6
23	20.4	17.6	94.7	.....	21.3	21.3	22.3	17.6	8.9
24	19.4	15.9	88.7	.....	21.3	21.3	21.3	15.9	8.9
25	19.4	15.9	71.2	.....	21.3	21.3	19.4	15.9	8.9
26	20.4	18.5	68.4	.....	19.4	19.4	19.4	15.9	8.9
27	21.3	17.6	65.6	.....	14.2	16.8	19.4	14.2	8.9
28	20.4	17.6	62.9	.....	14.2	16.8	19.4	14.2	8.2
29	19.4	.....	56.3	.....	14.2	17.6	20.4	14.2	8.2
30	20.4	.....	60.2	.....	13.4	17.6	19.4	13.4	9.6
31	19.4	.....	52.4	.....	15.0	.....	19.4	.....	9.6

a Interpolated by engineers of United States Geological Survey to complete record for month.

Monthly discharge of Little Cottonwood Creek near Salt Lake City, Utah, for 1910.

[Drainage area, 12.7 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	24.1	19.4	21.6	1.70	1.96	1,330
February	20.4	14.2	17.2	1.35	1.41	955
March	94.7	18.5	49.6	3.91	4.51	3,050
Apr. 1–12	110	55.0	71.7	5.69	2.54	1,710
Aug. 4–31	21.3	13.4	16.4	1.29	1.34	911
September	21.3	13.4	16.7	1.31	1.46	994
October	25.2	15.9	19.9	1.57	1.81	1,220
November	18.5	13.4	16.5	1.30	1.45	982
December	16.8	8.2	12.0	.945	1.09	738
The period	.....	.....	.....	.....	.....	11,900

BIG COTTONWOOD CREEK NEAR SALT LAKE CITY, UTAH.

Big Cottonwood Creek, the largest tributary of Jordan River, rises near Clayton Peak, which reaches an elevation of over 12,000 feet. Its headwaters are very mountainous and heavily timbered.

The discharge is measured near the mouth of the canyon by means of a compound weir, which serves not only to measure the water, but

to distribute it among the various claimants. The weir is just below the power plant of the Utah Power Co., the operation of which causes a diurnal fluctuation in the discharge.

Daily discharge, in second-feet, of Big Cottonwood Creek near Salt Lake City, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	61.7	50.5	50.5	99.5	275	383	120	82.0	54.2	46.9	48.1	42.3
2	61.7	55.4	49.3	103	234	390	120	77.8	52.9	69.6	48.1	43.5
3	59.2	44.6	50.5	107	212	383	104	76.4	52.9	55.4	48.1	43.5
4	66.9	46.9	57.9	107	216	332	117	75.0	55.4	54.2	46.9	43.5
5	57.9	45.8	64.3	106	199	305	117	75.0	51.7	52.9	42.3	40.1
6	59.2	48.1	66.9	104	182	307	115	73.6	52.9	51.7	43.5	41.2
7	59.2	51.7	79.2	106	195	301	86.2	72.3	51.7	50.5	48.1	40.1
8	59.2	49.3	83.4	115	206	292	93.5	69.6	51.7	49.3	46.9	42.3
9	59.2	46.9	82.0	121	254	260	101	63.0	50.5	48.1	48.1	41.2
10	51.7	48.1	83.4	138	310	254	93.5	63.0	50.5	49.3	48.1	41.2
11	56.6	46.9	80.6	155	355	250	87.7	61.7	48.1	49.3	44.6	41.2
12	56.6	45.8	77.8	175	371	250	84.8	61.7	51.7	55.4	44.6	49.3
13	56.6	43.5	77.8	173	387	242	93.5	64.3	50.5	56.6	44.6	44.6
14	57.9	45.8	83.4	167	376	240	83.4	63.0	50.5	52.9	44.6	45.8
15	57.9	45.8	87.7	150	341	220	70.9	64.3	51.7	51.7	46.9	44.6
16	57.9	44.6	89.1	141	279	204	93.5	61.7	55.4	49.3	45.8	42.3
17	56.6	44.6	96.5	133	242	204	83.4	60.4	55.4	56.6	a 43.0	43.5
18	64.3	48.1	103	141	269	197	79.2	59.2	52.9	50.5	40.1	41.2
19	54.2	50.5	107	167	277	197	79.2	59.2	51.7	66.9	42.3	41.2
20	51.7	46.9	107	197	281	171	80.6	59.2	52.9	54.2	42.3	44.6
21	51.7	48.1	120	206	258	171	77.8	55.4	50.5	55.4	41.2	43.5
22	55.4	50.5	146	204	224	167	77.8	56.6	50.5	52.9	42.3	37.9
23	46.9	49.3	150	224	265	166	76.4	56.6	49.3	54.2	49.3	40.1
24	51.7	46.9	136	a244	318	160	70.9	56.6	50.5	52.9	a 48.1	41.2
25	56.6	50.5	126	a264	327	336	72.3	57.9	49.3	51.7	a 46.9	40.1
26	51.7	48.1	113	a284	303	146	72.3	55.4	48.1	51.7	45.8	44.6
27	50.5	46.9	109	a304	307	145	76.4	54.2	48.1	52.9	36.8	44.6
28	50.5	46.9	107	a324	307	131	80.6	56.6	48.1	50.5	40.1	44.6
29	56.6	.....	99.5	343	336	128	77.8	51.7	48.1	49.3	40.1	36.8
30	51.7	.....	95.0	323	355	125	75.0	52.9	46.9	49.3	42.3	41.2
31	50.5	.....	93.5	.....	380	.....	69.6	54.2	.....	50.5	.....	36.8

a Interpolated by engineers of United States Geological Survey to complete record for month.

Monthly discharge of Big Cottonwood Creek near Salt Lake City, Utah, for 1910.

[Drainage area, 48.5 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	66.9	50.5	56.1	1.16	1.34	3,450
February	55.4	43.5	47.8	.986	1.03	2,650
March	150	49.3	92.7	1.91	2.20	5,700
April	343	99.5	181	3.73	4.16	10,800
May	387	182	285	5.88	6.78	17,500
June	390	125	235	4.85	5.41	14,000
July	120	69.6	88.1	1.82	2.10	5,420
August	82	51.7	62.9	1.30	1.50	3,870
September	55.4	46.9	51.2	1.06	1.18	3,050
October	69.6	46.9	53.0	1.09	1.26	3,260
November	49.3	36.8	44.7	.922	1.03	2,660
December	49.3	36.8	42.2	.870	1.00	2,590
The year	390	36.8	103.5	2.13	28.99	75,000

MILL CREEK NEAR SALT LAKE CITY, UTAH.

Mill Creek drains a narrow basin extending to the crest of the Wasatch Range. Measurements are made by means of a 12.5-foot Cippoletti weir, located near the mouth of the canyon.

Daily discharge, in second-feet, of Mill Creek near Salt Lake City, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	16.8	14.9	14.9	22.9	39.5	44.8	27.3	18.7	16.8	15.3	15.3	13.0
2	16.8	14.9	14.9	22.9	39.5	44.8	22.9	18.7	16.8	15.3	15.3	13.0
3	16.8	14.9	14.9	25.1	39.5	44.8	22.9	18.7	16.8	15.3	15.3	13.0
4	16.8	14.9	14.9	27.3	34.4	32.0	22.9	18.7	16.8	15.3	15.3	13.0
5	13.0	14.9	18.7	27.3	34.4	32.0	22.9	[a] 18.7	16.8	15.3	15.3	13.0
6	8.1	14.9	18.7	27.3	34.4	32.0	22.9	18.7	16.8	15.3	15.3	13.0
7	16.8	14.9	18.7	27.3	34.4	32.0	22.9	18.7	16.8	15.3	15.3	13.0
8	16.8	14.9	18.7	27.3	34.4	32.0	22.9	18.7	16.8	15.3	15.3	13.0
9	16.8	14.9	18.7	29.7	34.4	32.0	22.9	18.7	16.8	15.3	15.3	13.0
10	16.8	14.9	18.7	29.7	42.1	32.0	22.9	18.7	16.8	15.3	15.3	16.8
11	16.8	14.9	18.7	29.7	44.8	32.0	22.9	18.7	16.8	15.3	15.3	16.8
12	16.8	15.3	22.9	29.7	44.8	32.0	22.9	18.7	16.8	15.3	15.3	16.8
13	16.8	15.3	22.9	29.7	44.8	32.0	22.9	18.7	16.8	14.9	15.3	16.8
14	16.8	15.3	22.9	34.4	32.0	32.0	22.9	18.7	16.8	14.9	15.3	16.8
15	15.3	15.3	25.1	34.4	32.0	29.7	22.9	18.7	16.8	14.9	15.3	16.8
16	15.3	15.3	25.1	34.4	32.0	29.7	22.9	18.7	16.8	14.9	15.3	16.8
17	15.3	15.3	25.1	37.0	32.0	29.7	22.9	18.7	16.8	14.9	15.3	16.8
18	14.9	15.3	25.1	37.0	32.0	27.3	20.8	18.7	16.8	14.9	15.3	16.8
19	14.9	15.3	25.1	37.0	32.0	27.3	20.8	18.7	15.3	14.9	15.3	16.8
20	14.9	15.3	25.1	37.0	32.0	27.3	20.8	18.7	15.3	14.9	15.3	16.8
21	14.9	15.3	25.1	37.0	42.1	27.3	20.8	18.7	15.3	14.9	15.3	16.8
22	14.9	15.3	25.1	37.0	42.1	27.3	20.8	18.7	15.3	14.9	15.3	16.8
23	14.9	15.3	22.9	37.0	42.1	27.3	20.8	18.7	15.3	14.9	15.3	16.8
24	14.9	15.3	22.9	37.0	42.1	27.3	20.8	18.7	15.3	14.9	15.3	14.9
25	14.9	15.3	22.9	37.0	42.1	27.3	20.8	18.7	15.3	14.9	15.3	14.9
26	14.9	14.9	22.9	37.0	42.1	27.3	20.8	16.8	15.3	14.9	14.9	14.9
27	14.9	14.9	22.9	37.0	42.1	27.3	20.8	16.8	15.3	14.9	14.9	14.9
28	14.9	14.9	22.9	42.1	42.1	27.3	20.8	16.8	15.3	14.9	14.9	14.9
29	14.9	.....	22.9	42.1	42.1	27.3	20.8	16.8	15.3	14.9	14.9	14.9
30	14.9	.....	22.9	39.5	42.1	27.3	20.8	16.8	15.3	15.3	14.9	14.9
31	14.9	.....	22.9	.....	44.8	.....	20.8	16.8	.....	15.3	.....	14.9

[a] Estimated.

Monthly discharge of Mill Creek near Salt Lake City, Utah, for 1910.

[Drainage area, 21.3 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	16.8	8.1	15.4	0.723	0.83	947
February	15.3	14.9	15.1	.709	.74	839
March	25.1	14.9	21.5	1.01	1.16	1,320
April	42.1	22.9	33.0	1.55	1.73	1,960
May	44.8	32.0	38.4	1.80	2.08	2,360
June	44.8	27.3	31.0	1.46	1.63	1,840
July	27.3	20.8	22.1	1.04	1.20	1,360
August	18.7	16.8	18.3	.859	.99	1,130
September	16.8	15.3	16.2	.761	.85	964
October	15.3	14.9	15.1	.709	.82	928
November	15.3	14.9	15.2	.714	.80	904
December	16.8	13.0	15.2	.714	.82	935
The year	44.8	8.1	21.4	1.00	13.65	15,500

NOTE.—Discharge Aug. 5 has been interpolated by United States Geological Survey to complete month.

PARLEYS CREEK NEAR SALT LAKE CITY, UTAH.

Parleys Creek is formed by the junction of two forks, which together drain nearly 8 miles of the crest of the Wasatch Range, and empties into Jordan River near the southern limits of Salt Lake City.

Measurements are made by means of two 10-foot Cippoletti weirs, located above the intakes of the city waterworks.

Daily discharge, in second-feet, of Parleys Creek near Salt Lake City, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	32.1	18.3	19.6	70.4	.....	47.3	27.5	19.0	a 13.2	12.2	12.2	10.5
2	27.5	15.2	21.0	75.6	.....	45.5	27.5	19.0	a 13.0	19.6	12.2	10.5
3	24.5	8.9	30.5	83.0	.....	44.6	26.7	19.0	a 12.8	15.2	11.6	10.5
4	22.4	7.4	36.9	76.6	.....	42.9	26.7	19.0	a 12.6	14.5	11.6	10.5
5	12.8	8.9	60.4	79.8	.....	40.3	26.0	19.0	a 12.3	14.5	11.6	10.5
6	13.9	11.6	66.3	.....	.....	39.4	23.8	18.3	a 12.0	14.5	11.6	10.5
7	16.4	16.4	a 64.7	.....	.....	39.4	23.1	17.7	a 11.7	14.5	11.6	10.5
8	19.7	15.8	a 63.1	.....	.....	38.6	21.7	17.0	a 11.4	13.9	11.6	10.5
9	19.7	16.4	a 61.6	.....	.....	37.8	21.1	16.4	11.1	13.9	11.6	10.5
10	19.7	16.4	a 60.0	.....	.....	33.7	21.7	16.4	11.6	13.9	11.6	11.1
11	20.3	16.4	58.4	.....	.....	33.7	22.4	16.4	12.2	13.9	11.6	12.2
12	19.6	17.0	58.4	.....	.....	33.7	23.1	16.4	12.2	15.2	11.6	12.8
13	19.0	17.0	62.4	.....	.....	33.7	22.4	16.4	11.6	13.4	11.6	12.2
14	19.6	18.3	69.4	.....	.....	32.9	23.1	16.4	12.2	13.4	11.6	12.2
15	19.0	17.0	74.5	.....	.....	32.1	23.1	15.8	12.2	13.4	11.6	10.5
16	17.7	10.5	76.6	.....	.....	31.3	23.1	15.8	11.1	12.8	11.6	10.5
17	16.4	13.4	78.7	.....	.....	29.7	22.4	15.2	13.4	13.4	11.6	10.5
18	16.4	15.8	86.3	.....	.....	29.0	26.7	15.2	12.8	15.8	11.6	10.5
19	16.4	15.8	90.7	.....	.....	27.5	26.7	14.5	12.2	14.5	12.8	10.5
20	16.4	15.8	97.5	.....	62.4	27.5	26.0	14.5	12.2	14.5	11.1	10.5
21	16.4	17.0	103	.....	62.4	26.7	24.5	13.9	12.2	13.4	11.6	10.5
22	17.0	15.8	108	.....	61.4	26.7	22.4	13.9	12.2	13.4	11.6	5.6
23	17.0	15.8	115	.....	60.4	26.0	22.4	13.4	12.2	13.4	11.6	5.6
24	17.7	17.0	98.6	.....	59.4	26.0	19.0	13.4	12.2	12.8	12.2	6.5
25	16.4	18.3	87.4	.....	59.4	26.0	15.8	13.4	12.2	12.8	12.2	6.5
26	17.0	18.3	89.6	.....	56.5	26.0	16.4	13.4	12.2	12.2	12.2	5.6
27	12.2	19.7	79.8	.....	52.8	26.0	20.3	13.4	12.2	12.2	8.4	5.6
28	14.5	17.0	84.1	.....	51.8	26.7	20.3	13.4	12.2	12.2	10.8	7.4
29	18.3	.....	79.8	.....	50.0	28.8	20.3	13.4	12.2	12.2	10.5	8.9
30	18.3	.....	75.6	.....	49.1	28.2	19.6	13.4	12.2	12.2	10.5	10.0
31	18.3	.....	70.4	.....	49.1	.....	19.0	13.4	.....	12.2	.....	11.6

a Discharge interpolated by engineers of United States Geological Survey to complete record for months.

Monthly discharge of Parleys Creek near Salt Lake City, Utah, for 1910.

[Drainage area, 50.1 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	32.1	12.2	18.6	0.371	0.43	1,140
February	19.7	7.4	15.4	.307	.32	855
March	115	19.6	71.9	1.44	1.66	4,420
June	47.3	26.0	32.9	.659	.74	1,960
July	27.5	19.0	22.7	.453	.52	1,400
August	19.0	13.4	15.7	.313	.36	965
September	13.2	11.1	12.2	.244	.27	726
October	19.6	12.2	13.7	.273	.31	842
November	12.8	8.4	11.5	.230	.26	684
December	12.8	5.6	9.74	.194	.22	599
The period	.....	.....	.....	.....	.....	13,600

EMIGRATION CREEK NEAR SALT LAKE CITY, UTAH.

Emigration Creek is tributary to Parleys Creek just below the mountain front. Its waters are used for the water supply of Salt Lake City.

Discharge is total flow over two Cippoletti weirs, 2.5 and 5 feet in length, respectively, located 600 feet below the dam at the mouth of the canyon.

Daily discharge, in second-feet, of Emigration Creek near Salt Lake City, Utah, for 1909–10.

Day.	Jan.	Feb.	Mar.	Nov.	Dec.	Day.	Jan.	Feb.	Mar.	Nov.	Dec.
1909.						1909.					
1	2.40			5.40		16					
2						17		5.80		5.10	
3	2.40					18					
4		5.80				19					
5						20					3.15
6						21				5.80	
7	4.85			5.10		22		5.80			
8		5.80	5.80		4.86	23					
9						24					
10						25					
11						26					3.15
12		5.80				27					
13	2.40					28					
14	5.80		7.83			29	4.85			3.99	
15					3.15	30					
						31	5.80				

NOTE.—Probably no record kept April to October.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	11.2							3.16				2.39
2										8.94		
3	4.86							2.97				
4		3.99					4.86		3.16			
5								2.97				
6		3.99									2.97	
7	3.99											
8												
9	4.86	3.99								3.16		
10							4.86					
11		3.99							2.39			
12	4.86											
13							4.86					2.39
14		4.86						3.16			2.97	
15							4.86					
16										3.57		
17	3.99						4.86	2.39				
18							3.99		3.16			
19	3.99						3.99	1.72				2.39
20											2.39	
21						5.79						
22	3.99						3.57	1.72				
23	3.99									3.99		
24												
25							3.16		3.16			
26						6.81						
27							3.16				2.39	2.39
28	4.86					5.79		1.72				
29							3.16					
30										3.16		
31												

NOTE.—No record March, April, and May.

SEVIER LAKE BASIN.[1]

GENERAL FEATURES.

The lowest depression of the Sevier Desert has probably been occupied by a lake from the date of the earliest exploration nearly to the present time, but precise information in regard to it dates from 1872, when its form and extent and its relation to Sevier River were determined by Lieut. R. L. Hoxie, in charge of one of the field parties of the Wheeler Survey. In 1872 the lake was about 28 miles long and its water surface measured 188 square miles; its maximum depth at that time is said to have been about 15 feet, the northern part being deeper than the southern.

In January, 1880, the bed of the lake was nearly dry and was explored by Willard D. Johnson, who was able to travel on foot across a bed of salt where the water had before been deepest. The only direct feeder of the lake is Sevier River.

The desiccation of this lake is to be ascribed to human agency. The water of its sole tributary flows for nearly 200 miles through valleys containing more or less arable land and has gradually been monopolized by the agriculturist for the purpose of irrigation. The water that still reaches the lake during the spring freshets, caused by the melting of snow on the plateaus and mountains, represents an economic loss that should as far as possible be stopped. In 1880, and several preceding years, the water of the river was so nearly all utilized by the irrigators that the lake dried up; since that time, in spite of probable increased use for irrigation, the surplus has again accumulated. In the autumns of 1908 and 1909 a lake existed, but its margin was separated from the shore line of 1872 by a flat, miry belt.

The water of the lake is too saline to be used as a supply for live stock.

Sevier River is formed by the junction of its South and East forks, which rise in Garfield and Kane counties, in southern Utah, and meet near Junction. The river flows northeastward to a point near Gunnison, northwestward nearly to Leamington, then turns sharply to southwest toward Sevier Lake; it is more than 200 miles long, measured by general course, and drains an area about 5,000 square miles in extent, above the lower end of Sevier Valley. In any ordinary region the Sevier would not be designated by the name of river; nevertheless, it is the largest stream between Great Salt Lake and the Colorado.

The river occupies a long, narrow basin and receives few tributaries, San Pitch River and Salina Creek being the most important.

[1] Abstracted from Gilbert, G. K., Lake Bonneville: Mon. U. S. Geol. Survey, vol. 1, 1890, pp. 224–228; and Meinzer, O. E., Ground water in Juab, Millard and Iron counties, Utah: Water-Supply Paper U. S. Geol. Survey No. 277, 1911, pp. 119–120.

Salina Creek, which enters about 15 miles above Gunnison, is characterized by rapid run-off and during flood season carries an immense amount of sediment.

The San Pitch joins the Sevier near Gunnison below the gaging station on the main stream. Its flow is controlled by a storage reservoir about 15 miles above the mouth and is used for irrigating small tracts along the river. Manti Creek, its principal tributary, which enters above the reservoir, drains a barren area and has a rapid run-off.

Beaver River is nominally a part of the Sevier Lake drainage basin. This stream with its tributaries, North, South, and Indian creeks, rises on the western slope of the Tushar Mountains in the southwestern part of Utah, flows westward to Minersville, and thence northward until its waters are lost in the sands a few miles north of Milford. Only a small portion of the highest floods ever reaches Sevier Lake. The upper part of its drainage basin is rough and mountainous, some of the peaks rising to elevations of over 12,000 feet. In this part of the basin the flow is regulated both by snow and by the soil, which absorbs and holds back moisture. The lower part of the area consists of a high plateau, most of which is desert.

SEVIER RIVER NEAR MARYSVALE, UTAH.

This station, which is located about 6 miles above Marysvale, Utah, about 3 miles below the site of the proposed State dam on Sevier River, and about 10 miles below the junction of South and East forks, was established February 18, 1906, to determine the amount of water available for irrigation and storage in the upper valley of Sevier River.

The gage is a vertical staff; its datum has remained unchanged since the station was established.

Discharge measurements are made from a cable and car.

The relation between gage height and discharge is somewhat affected by ice during very cold weather, and also by the manipulation of gates at storage reservoirs on the South and East forks. The flow is not affected by artificial control below the station.

The bed of the stream is somewhat shifting, but the results may be considered good.

Discharge measurements of Sevier River near Marysvale, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 12	E. S. Fuller	60	276	5.70	889
19	do	56	220	4.70	620
Aug. 20	G. H. Canfield	52	133	3.25	303
Sept. 14	do	53	140	3.43	334
23	do	53	133	3.05	319
Oct. 20	do	53	115	2.98	254

Daily gage height, in feet, of Sevier River near Marysvale, Utah, for 1910.

[Martha Pitts, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	4.1	5.6	3.4	.....	3.8	3.5	2.75	3.35	.....
2	.....	.....	.....	4.15	5.7	3.4	.....	3.95	3.5	2.8	3.3	.....
3	.....	.....	.....	4.1	5.7	3.4	.....	3.9	3.55	2.8	3.0	.....
4	.....	.....	5.3	4.0	5.6	3.35	.....	3.6	3.75	2.75	2.9	.....
5	.....	.....	.....	3.85	5.6	3.2	.....	3.5	3.8	2.6	2.9	.....
6	.....	.....	.....	4.0	5.65	3.3	.....	3.4	3.85	2.6	2.8	.....
7	.....	.....	.....	4.0	5.65	3.3	.....	3.25	3.6	2.6	.....	.....
8	.....	.....	.....	4.0	5.6	2.4	.....	3.1	3.6	2.6	2.8	.....
9	.....	.....	.....	4.05	5.6	2.1	.....	3.1	3.5	2.5	2.8	.....
10	.....	.....	.....	4.05	5.6	2.25	.....	3.0	3.5	2.5	.....	.....
11	.....	.....	.....	.....	5.6	3.0	3.5	3.05	3.45	2.4	2.8	.....
12	.....	.....	.....	.....	5.6	3.2	3.5	3.2	3.4	2.4	2.8	2.6
13	.....	.....	4.8	.....	5.4	3.3	3.5	3.2	3.4	2.4	2.9	3.3
14	.....	.....	4.9	4.25	.....	3.55	3.5	3.5	3.4	2.4	2.9	3.3
15	.....	.....	5.0	4.25	4.7	3.8	3.5	3.45	3.5	2.4	2.9	3.3
16	.....	.....	5.0	.....	4.7	3.8	3.5	3.4	3.7	3.35	3.0	3.3
17	.....	2.3	5.1	.....	4.7	3.8	3.5	3.35	3.8	3.6	2.9	3.2
18	.....	.....	5.2	.....	4.7	3.8	3.5	3.2	4.0	3.3	2.9	3.2
19	2.5	.....	5.3	.....	4.7	3.8	3.45	3.25	3.95	3.0	.....	3.7
20	.....	.....	5.6	4.9	4.7	3.75	3.45	3.25	3.9	.....	.....	3.7
21	.....	.....	5.9	5.0	3.6	3.75	3.4	3.25	4.0	.....	2.8	3.6
22	.....	.....	6.0	5.1	3.55	3.8	3.35	3.25	3.8	.....	2.8	3.4
23	.....	.....	5.3	5.1	3.55	3.75	3.3	3.25	3.45	.....	2.8	.....
24	.....	.....	5.0	5.1	3.5	3.9	.....	3.3	3.2	.....	2.8	.....
25	2.1	.....	4.9	5.2	3.5	3.85	3.25	3.25	3.1	.....	2.7	.....
26	2.1	3.5	4.8	5.3	3.5	3.8	3.3	3.2	3.0	.....	2.75	2.8
27	.....	3.6	4.5	5.35	3.5	3.8	3.3	3.25	3.0	3.7	2.8	2.9
28	.....	.....	4.4	5.4	3.45	3.9	3.3	3.2	2.9	3.4	.....	2.9
29	.....	.....	4.2	5.5	3.45	3.85	3.4	3.7	2.8	3.4	.....	3.1
30	.....	.....	4.0	5.65	3.45	3.8	3.5	3.6	2.8	3.35	.....	3.1
31	.....	.....	4.0	.....	3.45	.....	3.55	3.5	.....	3.35	.....	2.7

NOTE.—Relation of gage height to discharge probably affected by ice during January and greater part of February. On Feb. 25 a sudden rise undoubtedly removed all ice, and gage heights were unaffected during the balance of the year. Water below gage Dec. 1 to 11.

Daily discharge, in second-feet, of Sevier River near Marysvale, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	500	478	860	331	407	412	351	212	322	50
2	.....	.....	600	489	890	331	401	445	351	220	312	50
3	.....	.....	700	478	890	331	395	434	361	220	256	50
4	.....	.....	777	456	860	322	389	371	402	212	238	50
5	.....	.....	763	423	860	293	383	351	412	190	238	50
6	.....	.....	749	456	875	312	377	331	423	190	220	50
7	.....	.....	735	456	875	312	371	302	371	190	220	50
8	.....	.....	720	456	860	170	366	274	371	190	220	50
9	.....	.....	705	467	860	137	361	274	351	175	220	50
10	.....	.....	690	467	860	176	356	256	351	175	220	50
11	.....	.....	675	478	860	257	351	266	341	160	220	50
12	.....	.....	660	489	860	293	351	293	331	160	220	190
13	.....	.....	645	500	804	312	351	293	331	160	238	312
14	.....	.....	671	512	712	361	351	351	331	160	238	312
15	.....	.....	697	512	620	412	351	341	351	160	238	312
16	.....	.....	697	543	620	412	351	331	391	322	256	312
17	.....	.....	723	575	620	412	351	322	412	371	238	293
18	.....	.....	750	607	620	412	351	293	456	312	238	293
19	.....	.....	777	639	620	412	341	302	445	256	232	391
20	.....	.....	860	671	620	402	341	302	434	273	226	391
21	.....	.....	950	697	371	402	331	302	456	290	220	371
22	.....	.....	980	723	361	412	322	302	412	307	220	331
23	.....	.....	777	723	361	402	312	302	341	324	220	300
24	.....	.....	697	723	351	434	307	312	293	342	220	275
25	.....	250	671	750	351	423	302	302	274	360	205	250
26	.....	351	645	777	351	412	312	293	256	378	212	220
27	.....	371	570	790	351	412	312	302	256	391	220	238
28	.....	375	546	804	341	434	312	293	238	331	220	238
29	.....	.....	500	832	341	423	331	391	220	331	220	274
30	.....	.....	456	875	341	412	351	371	220	322	220	274
31	.....	.....	456	.....	341	.....	361	351	.....	322	.....	205

NOTE.—Daily discharge determined from a well-defined discharge rating curve. Discharge interpolated for days on which gage was not read, except Mar. 1 to 3, for which it was estimated, and Dec. 1 to 11, for which period discharge was estimated at 50 second-feet.

Monthly discharge of Sevier River near Marysvale, Utah, for 1910.

[Drainage area, 2,560 miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	.....	.....	150	0.059	0.07	9,220	D.
February	375	.....	185	.072	.08	10,300	D.
March	980	456	688	.269	.31	42,300	C.
April	875	423	595	.232	.26	35,400	B.
May	890	341	629	.246	.28	38,700	A.
June	434	137	352	.138	.15	20,900	A.
July	407	302	350	.137	.16	21,500	B.
August	445	266	325	.127	.15	20,000	A.
September	456	220	351	.137	.15	20,900	A.
October	391	160	258	.101	.12	15,900	A.
November	322	205	233	.091	.10	13,900	B.
December	391	50	203	.079	.09	12,500	C.
The year period	980	50	361	.141	1.92	262,000	

NOTE.—Mean discharge for January and for Feb. 1 to 24 determined by gage heights scattered through period and decreased to a small extent on account of ice obstruction. Mean discharge Feb. 1 to 24 estimated at 160 second-feet.

SEVIER RIVER NEAR GUNNISON, UTAH.

This station, which is located at the highway bridge on the road to Westview precinct, about 4 miles west of Gunnison, Utah, was established June 29, 1900.

It is about three-fourths of a mile above the mouth of San Pitch River and below all other important tributaries.

An inclined staff gage is located just below the bridge; its datum remained unchanged until September 24, 1910, when a new gage was established at a datum 1 foot higher than that of the old gage.

Discharge measurements are made from the bridge or by wading.

The relation between gage height and discharge is occasionally slightly affected by ice. The bed of the stream shifts somewhat during floods, but on the whole the records may be considered good.

Discharge measurements of Sevier River near Gunnison, Utah, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Aug. 21	G. H. Canfield	.....	50	1.48	70
Sept. 24	do	.....	138	3.68	390
24	do	79	137	3.68	404
Oct. 21	do	78	97	3.14	223
Dec. 13	do	79	104	3.22	258

NOTE.—Gage height of measurement Aug. 21 referred to old datum; add 1 foot to reduce to new datum. Gage heights of measurements Sept. 24 to Dec. 13 referred to new datum; subtract 1 foot to reduce to old datum.

Daily gage height, in feet, of Sevier River near Gunnison, Utah, for 1910.

[L. H. Lund, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.9	3.05	3.5	3.85	3.05	1.6	1.2	1.8	1.3	2.3	2.9	2.5
2	3.7	3.1	3.5	3.8	3.2	1.6	1.2	1.8	1.3	2.25	3.5	2.5
3	3.65	3.15	3.7	3.75	3.1	1.65	1.2	2.0	1.3	2.2	3.1	2.5
4	3.7	3.1	3.9	3.7	2.9	1.6	1.2	1.95	1.5	2.15	2.8	2.5
5	3.65	3.1	4.35	3.5	2.95	1.6	1.2	1.8	1.55	2.1	2.75	2.5
6	3.65	2.9	4.4	3.6	2.9	1.6	1.2	1.7	1.55	2.05	2.75	2.5
7	3.5	2.9	4.9	3.5	2.8	1.5	1.2	1.7	1.7	2.05	2.6	2.4
8	3.5	2.9	4.85	3.4	2.9	1.5	1.2	1.7	1.7	2.05	2.55	2.4
9	3.45	2.9	4.8	3.4	2.7	1.45	1.2	1.6	1.85	2.05	2.5	2.4
10	3.4	.....	4.7	3.35	2.8	1.4	1.2	1.7	1.85	2.15	2.5	2.35
11	3.4	2.95	4.7	3.2	2.9	1.4	1.2	1.6	1.9	2.15	2.5	2.2
12	.....	3.0	4.55	3.0	2.7	1.4	1.2	2.45	1.95	2.15	2.45	2.2
13	3.2	3.0	4.5	2.95	2.65	1.4	1.2	1.9	1.85	2.2	2.45	2.2
14	3.2	3.0	4.5	2.9	2.7	1.4	1.2	1.7	1.85	2.2	2.45	2.2
15	3.1	3.0	4.5	2.9	2.6	1.35	1.2	1.7	1.85	2.25	2.45	2.2
16	3.5	2.9	4.5	2.8	2.5	1.4	1.2	1.7	1.85	2.3	2.45	2.2
17	3.1	3.0	4.5	2.8	2.7	1.3	1.2	1.6	1.8	2.35	2.45	2.5
18	3.1	3.0	4.5	2.75	2.4	1.3	1.2	1.55	1.8	2.35	2.4	2.65
19	3.1	3.1	4.45	2.75	2.45	1.3	1.3	1.55	1.95	2.4	2.45	2.65
20	3.1	3.1	4.4	2.75	2.4	1.3	1.25	1.55	2.3	2.4	2.4	2.65
21	3.05	3.15	4.4	2.9	2.45	1.3	1.4	1.5	2.8	2.4	2.45	2.65
22	3.05	3.2	4.45	2.85	2.3	1.3	1.4	1.5	2.8	2.45	2.4	2.75
23	.....	3.2	4.5	2.7	2.3	1.3	1.4	1.45	2.7	2.45	2.4	2.8
24	3.05	3.2	4.5	2.75	2.05	1.3	1.4	1.45	2.7*	2.45	2.4	2.85
25	3.0	3.2	4.5	2.8	1.4	1.3	1.4	1.4	2.7	2.5	2.4	2.75
26	3.0	3.25	4.6	2.8	1.6	1.25	1.65	1.4	2.7	2.5	2.4	2.75
27	2.9	3.3	4.45	2.85	2.0	1.2	1.65	1.4	2.6	2.65	2.45	2.8
28	2.9	3.3	4.1	2.85	1.7	1.2	1.65	1.35	2.5	2.6	2.45	2.8
29	.....	.....	4.1	2.85	1.6	1.2	1.7	1.35	2.45	2.7	2.45	2.8
30	2.7	.....	4.0	2.9	1.6	1.2	1.7	1.35	2.35	2.7	2.5	2.8
31	3.0	.....	4.0	.....	1.6	.....	1.7	1.3	.....	2.7	.....	2.75

NOTE.—A new gage was established Sept. 24, 1910, at a different datum, and subsequent gage heights have been reduced to the old datum.

The relation of gage height to discharge was probably unaffected by ice during January and February. Ice present Dec. 22 to 31.

Daily discharge, in second-feet, of Sevier River near Gunnison, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	470	530	715	875	530	100	30	140	44	270	470	330
2	805	550	715	850	590	100	30	140	44	255	715	330
3	782	570	805	828	550	110	30	190	44	240	550	330
4	805	550	900	805	470	100	30	178	80	228	435	330
5	782	550	1,120	715	490	100	30	140	90	215	418	330
6	782	470	1,150	760	470	100	30	120	90	202	418	330
7	715	470	1,410	715	435	80	30	120	120	202	365	300
8	715	470	1,380	670	470	80	30	120	120	202	348	300
9	692	470	1,350	670	400	70	30	100	152	202	330	300
10	670	480	1,300	650	435	60	30	120	152	228	330	285
11	670	490	1,300	590	470	60	30	100	165	228	330	240
12	630	510	1,220	510	400	60	30	315	178	228	315	240
13	590	510	1,200	490	382	60	30	165	152	240	315	240
14	590	510	1,200	470	400	60	30	120	152	240	315	255
15	550	510	1,200	470	365	52	30	120	152	255	315	240
16	715	470	1,200	435	330	60	30	120	152	270	315	240
17	550	510	1,200	435	400	44	30	100	140	285	315	330
18	550	510	1,200	418	300	44	30	90	140	285	300	382
19	550	550	1,180	418	315	44	44	90	178	300	315	382
20	550	550	1,150	418	300	44	37	90	270	300	300	382
21	530	570	1,150	470	315	44	60	80	435	300	315	382
22	530	590	1,180	452	270	44	60	80	435	315	300	380
23	530	590	1,200	400	270	44	60	70	400	315	300	380
24	530	590	1,200	418	202	44	60	70	400	315	300	370
25	510	590	1,200	435	60	44	60	60	400	330	300	370
26	510	610	1,250	435	100	37	110	60	400	330	300	360
27	470	630	1,180	452	190	30	110	60	365	382	315	360
28	470	630	1,000	452	120	30	110	52	330	365	315	360
29	435	.....	1,000	452	100	30	120	52	315	400	315	350
30	400	.....	950	470	100	30	120	52	285	400	330	350
31	510	.....	950	.....	100	.....	120	44	.....	400	.....	350

NOTE.—Daily discharge determined from discharge rating curve fairly well defined. Discharge interpolated for days on which gage was not read. Discharge Dec. 22 to 31 estimated.

Monthly discharge of Sevier River near Gunnison, Utah, for 1910.

[Drainage area, 3,990 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	805	400	600	0.150	0.17	36,900	B.
February	630	470	537	.135	.14	29,800	B.
March	1,410	715	1,130	.283	.33	69,500	B.
April	875	400	554	.139	.16	33,000	B.
May	590	60	333	.083	.10	20,500	B.
June	110	30	60.2	.015	.02	3,580	B.
July	120	30	52	.013	.01	3,200	B.
August	315	44	108	.027	.03	6,640	A.
September	435	44	213	.053	.06	12,700	A.
October	400	202	282	.071	.08	17,300	A.
November	715	300	353	.088	.10	21,000	A.
December	382	240	326	.082	.09	20,000	B.
The year	1,410	30	379	.095	1.29	274,000	

BEAVER RIVER AT MINERSVILLE, UTAH.

This station, which is located about half a mile below the Beaver County bridge and about three-fourths of a mile northwest of Minersville, Utah, was established April 13, 1909.

The station is below all tributaries, Indian Creek, North Creek, and South Creek entering 10, 12, and 15 miles, respectively, above the station. The Minersville canal diverts all the normal low-water flow at a point about 2 miles above the station, at which the river is usually dry during several months in the summer.

Discharge measurements are made from a footbridge built for the purpose. An inclined staff gage is located just above the bridge. The gage datum has remained unchanged since the station was established.

The relation between gage height and discharge is not affected by ice nor by artificial control below. The section is fairly permanent, and the records may be considered good.

The following discharge measurement was made by G. C. Baldwin:

December 16, 1910: Width, 26 feet; area, 27 square feet; gage height, 2.25 feet; discharge, 34 second-feet.

Daily gage height, in feet, of Beaver Creek at Minersville, Utah, for 1910.

[Tus Gillins, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.0	2.4	2.4	2.3	2.6	.....	.....	.....	.....	.....	2.05	2.3
2	4.7	2.4	2.4	2.3	2.5	.....	.....	.....	.....	.....	2.05	2.3
3	2.9	2.4	2.5	2.3	2.5	.....	.....	.....	.....	.....	2.05	2.3
4	2.6	2.45	2.5	2.3	2.2	.....	.....	.....	.....	.....	2.15	2.3
5	2.6	2.4	2.5	2.2	2.15	.....	.....	.....	.....	.....	2.15	2.3
6	2.6	2.4	2.45	2.2	2.0	.....	.....	.....	.....	.....	2.15	2.3
7	2.9	2.45	2.45	2.3	1.6	.....	.....	.....	.....	.....	2.15	2.3
8	2.85	2.4	2.5	2.2	1.0	.....	.....	.....	.....	.....	2.15	2.3
9	3.1	2.45	2.5	2.2	0.6	.....	.....	.....	.....	.....	2.15	2.3
10	3.1	2.25	2.6	2.2	.....	.....	.....	.....	.....	.....	2.15	2.3
11	2.8	2.2	2.5	2.1	0.9	.....	.....	.....	.....	.....	2.15	2.3
12	2.55	2.2	2.8	2.2	1.4	.....	.....	.....	.....	.....	2.15	2.3
13	2.5	2.2	2.65	2.45	1.5	.....	.....	.....	.....	.....	2.2	2.3
14	2.6	2.2	2.65	2.4	1.3	.....	.....	.....	2.2	.....	2.2	2.3
15	2.6	2.3	1.45	2.3	0.6	.....	.....	.....	1.1	.....	2.2	2.3
16	3.0	2.2	2.15	2.3	.....	.....	.....	.....	.....	.....	2.2	2.3
17	3.15	2.3	1.0	2.3	.....	.....	.....	.....	.....	1.75	2.2	2.3
18	2.6	2.25	1.4	2.2	.....	.....	.....	.....	.....	1.55	2.2	2.3
19	2.6	2.2	1.25	2.2	.....	.....	.....	.....	1.9	1.55	2.2	2.3
20	2.5	2.2	2.45	2.2	.....	.....	.....	.....	.....	1.55	2.2	2.3
21	2.5	2.25	2.6	2.2	.....	.....	.....	.....	.....	1.85	2.2	2.3
22	2.5	2.25	2.7	2.2	.....	.....	.....	.....	.....	1.85	2.2	2.3
23	2.7	2.35	2.8	2.25	.....	.....	.....	.....	.....	1.85	2.2	2.3
24	2.65	2.3	2.7	2.4	.....	.....	.....	.....	.....	2.05	2.2	2.3
25	2.7	2.3	2.75	2.5	.....	.....	.....	.....	.....	2.05	2.2	2.3
26	2.6	2.35	2.8	2.6	.....	.....	.....	.....	.....	2.05	2.2	2.3
27	2.4	2.4	2.65	2.6	.....	.....	.....	.....	.....	2.15	2.3	2.3
28	2.4	2.35	2.85	2.7	.....	.....	.....	.....	.....	2.15	2.3	2.3
29	2.4	.....	2.55	2.9	.....	.....	.....	.....	.....	2.15	2.3	2.3
30	2.4	.....	2.4	2.7	.....	.....	.....	.....	.....	2.05	2.3	2.3
31	2.4	.....	2.35	.....	.....	.....	.....	.....	.....	2.05	.....	2.3

NOTE.—Channel dry May 16 to Oct. 16, with the exception of Sept. 14, 15, and 19.

Daily discharge, in second-feet, of Beaver Creek at Minersville, Utah, for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	358	47	47	38	68	.....	.....	.....	.....	.....	20	38
2	608	47	47	38	57	.....	.....	.....	.....	.....	20	38
3	107	47	57	38	57	.....	.....	.....	.....	.....	20	38
4	68	52	57	38	30	.....	.....	.....	.....	.....	26	38
5	68	47	57	30	26	.....	.....	.....	.....	.....	26	38
6	68	47	52	30	17	.....	.....	.....	.....	.....	26	38
7	107	52	52	38	.....	.....	.....	.....	.....	.....	26	38
8	100	47	57	30	.....	.....	.....	.....	.....	.....	26	38
9	138	52	57	30	.....	.....	.....	.....	.....	.....	26	38
10	138	34	68	30	.....	.....	.....	.....	.....	.....	26	38
11	93	30	57	23	.....	.....	.....	.....	.....	.....	26	38
12	62	30	93	30	.....	.....	.....	.....	.....	.....	26	38
13	57	30	74	52	.....	.....	.....	.....	.....	.....	30	38
14	68	30	74	47	.....	.....	.....	.....	30	.....	30	38
15	68	38	0	38	.....	.....	.....	.....	0	.....	30	38
16	122	30	26	38	.....	.....	.....	.....	.....	.....	30	38
17	146	38	0	38	.....	.....	.....	.....	.....	4.0	30	38
18	68	34	0	30	.....	.....	.....	.....	.....	.0	30	38
19	68	30	0	30	.....	.....	.....	.....	11	.0	30	38
20	57	30	52	30	.....	.....	.....	.....	.....	.0	30	38
21	57	34	68	30	.....	.....	.....	.....	.....	8.5	30	38
22	57	34	80	30	.....	.....	.....	.....	.....	8.5	30	38
23	80	42	93	34	.....	.....	.....	.....	.....	8.5	30	38
24	74	38	80	47	.....	.....	.....	.....	.....	20	30	38
25	80	38	86	57	.....	.....	.....	.....	.....	20	30	38
26	68	42	93	68	.....	.....	.....	.....	.....	20	30	38
27	47	47	74	68	.....	.....	.....	.....	.....	26	38	38
28	47	42	100	80	.....	.....	.....	.....	.....	26	38	38
29	47	.....	62	107	.....	.....	.....	.....	.....	26	38	38
30	47	.....	47	80	.....	.....	.....	.....	.....	20	38	38
31	47	.....	42	.....	.....	.....	.....	.....	.....	20	.....	38

NOTE.—Daily discharge determined from a discharge rating curve fairly well defined. No discharge May 16 to Oct. 16, except on Sept. 14, 15, and 19.

Monthly discharge of Beaver Creek at Minersville, Utah, for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	608	47	104	6,400	B.
February	52	30	39.6	2,200	A.
March	100	0	56.5	3,470	A.
April	107	23	43.2	2,570	A.
May	68	0	8.2	504	D.
June	.....	.....	.0	.....	
July	.....	.....	.0	.....	
August	.....	.....	.0	.....	
September	30	0	1.4	82	D.
October	26	0	6.7	412	D.
November	38	20	28.8	1,710	B.
December	38	38	38.0	2,340	B.
The year	608	0	27.2	19,700	

THOUSAND SPRINGS CREEK BASIN.

THOUSAND SPRINGS CREEK NEAR TECOMA, NEV.

Thousand Springs Creek rises in the northeastern part of Elko County, Nev., in a range of mountains trending northeast to southwest, flows northeastward to its junction with Rock Springs Creek,

then turns abruptly and flows southeastward approximately 25 miles, sinking into the sand west of Tecoma.

The main source of water supply for the creek is the snow that falls on the mountainous upper part of the drainage area. Occasionally a thaw during the winter or early spring causes flood stages in the creek, but the snow melts gradually, the dry soil absorbs the water, and little reaches the creek channel over the surface.

At the confluence of Thousand Springs Creek and Rock Springs Creek is a reservoir site which could be used to store water to irrigate some very good land.

The gaging station, which is located below the entrance of the canyon, three-fourths mile below the mouth of Rock Springs Creek, in the northwest corner of sec. 31, T. 42 N., R. 68 E., was established November 1, 1910.

Some of the spring flow is used for irrigation above the station, but most of the water returns to the creek.

An inclined staff gage fastened on the left bank was used until November 20, 1911, when a Friez automatic gage was installed at the same point.

Discharge measurements are made from a cable and car just below the gage; low-stage measurements are made by wading.

The relation between gage height and discharge is not affected by artificial control, but the water in the creek freezes during the winter, sometimes even to the stream bed.

The section is fairly permanent. No high-water measurements have yet been made.

The following discharge measurement was made by G. H. Canfield:

November 1, 1910: Width, 3.5 feet; area, 0.63 square feet, gage height, 0.90 feet; discharge, 0.52 second-feet.

Daily gage height, in feet, of Thousand Springs Creek near Tecoma, Nev., for 1910.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		0.9	11	0.8		21	0.7	
2			12		0.95	22		
3			13			23		0.7
4			14	.85		24		
5			15			25	.85	
6		.7	16		.7	26		.7
7		.6	17			27		
8			18	.8		28	.8	
9			19			29		
10		.95	20		.7	30		.6
						31		

SALTON SINK.

SALTON SEA NEAR SALTON, CAL.

Salton Sink originally formed a part of the Colorado Desert, which extends northwestward almost 100 miles from the California-Mexico boundary line and comprises an area of nearly 2,000 square miles.

This desert comprises two fertile valleys, one to the northwest of the sink, in Riverside County, known as the Coachella Valley, and the other to the southeast of the sink, in Imperial County, called the Imperial Valley. Salton Sea, which now partly fills the sink, lies between the two valleys, being partly in Riverside County and partly in Imperial County. It is about 160 miles southeast of Los Angeles, 90 miles northwest of Yuma, and 50 miles north of Calexico. The longer diameter of the sea trends northwest and southeast. On December 31, 1908, its surface was 206 feet below mean sea level, its length was nearly 45 miles, its maximum width about 15 miles, its minimum width 9.5 miles, its maximum depth 67.5 feet, and its superficial area about 443 square miles.

During the high water of the summer of 1891 the Colorado overflowed into Salton Sink to such an extent as to endanger the Southern Pacific Railroad at its lowest point. In the summer of 1905, after a succession of winter and spring floods in Gila River followed by an exceptionally heavy summer flow in the Colorado, the flood into the sink was repeated on a much larger scale. The old river channel occupied by Alamo River was transformed into a deep, wide gorge, and another channel, now called New River, was formed. The flood did great damage to the tracks of the Southern Pacific Railroad, to the plant of the New Liverpool Salt Co. below Mecca, and to the ranches in the vicinity.

Gage-height records kept by the New Liverpool Salt Co. from November, 1904, to February 26, 1906, show the actual depth of the water above the lowest portion of the sink. February 23, 1906, the Government installed a gage at the same datum, about half a mile west of Salton railroad station and 3 miles southeast of the old Salton station. This gage was destroyed by waves. The Southern Pacific Co. had graduated a trestle bent across Salt Creek about 2½ miles east of Salton, using the company's datum; the zero of this gage is 273.5 feet below mean sea level as determined from United States Geological Survey bench marks, or at an elevation of 280.3 feet below sea level according to the Southern Pacific Co.

Practically all the water received by Salton Sea enters through Alamo and New rivers, but chiefly through the former. These rivers run through Imperial Valley and are the drainage channels for the excess and waste water from the irrigation system and from the power plants.

The values in the following table have been reduced from the observed gage heights to show the depth of the Salton Sea above the zero of the gage.

Daily depth, in feet, of Salton Sea near Salton, Cal., for 1910.

[Benjamin C. Kadel, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	63.4	63.4	63.2	62.95	62.65	62.15	61.5	61.05	60.4	59.7	59.15	58.85
2	63.4	63.4	63.2	62.95	62.65	62.15	61.5	61.05	60.4	59.65	59.15	58.8
3	63.4	63.4	63.2	62.95	62.65	62.1	61.45	61.05	60.35	59.65	59.15	58.8
4	63.45	63.35	63.2	62.95	62.6	62.1	61.45	61.0	60.3	59.6	59.1	58.8
5	63.4	63.35	63.2	62.9	62.55	62.1	61.45	61.0	60.25	59.6	59.1	58.8
6	63.4	63.3	63.2	62.95	62.55	62.1	61.4	60.95	60.2	59.6	59.1	58.75
7	63.4	63.3	63.2	62.85	62.5	62.05	61.4	60.95	60.15	59.55	59.1	58.75
8	63.4	63.3	63.2	62.9	62.5	62.05	61.35	60.9	60.05	59.55	59.05	58.75
9	63.4	63.3	63.15	62.9	62.55	62.05	61.35	60.85	60.0	59.5	59.05	58.7
10	63.4	63.3	63.15	62.9	62.5	62.05	61.35	60.85	59.95	59.5	59.05	58.7
11	63.4	63.3	63.15	62.85	62.45	62.0	61.35	60.8	59.9	59.5	59.0	58.7
12	63.4	63.3	63.1	62.8	62.45	61.95	61.3	60.85	59.9	59.45	59.0	58.7
13	63.4	63.3	63.15	62.85	62.45	61.95	61.3	60.8	59.9	59.45	59.0	58.7
14	63.4	63.3	63.1	62.85	62.45	61.9	61.25	60.7	59.85	59.45	59.0	58.7
15	63.4	63.3	63.15	62.85	62.4	61.8	61.25	60.7	59.85	59.4	59.0	58.65
16	63.4	63.25	63.1	62.8	62.35	61.75	61.25	60.7	59.8	59.4	59.0	58.65
17	63.4	63.25	63.1	62.8	62.35	61.75	61.25	60.65	59.8	59.35	59.0	58.65
18	63.4	63.25	63.1	62.8	62.35	61.75	61.2	60.6	59.8	59.35	59.0	58.65
19	63.4	63.25	63.1	62.8	62.35	61.75	61.25	60.55	59.8	59.3	58.95	58.65
20	63.4	63.25	63.1	62.8	62.35	61.75	61.25	60.55	59.8	59.3	58.95	58.65
21	63.4	63.25	63.1	62.8	62.25	61.75	61.25	60.55	59.75	59.3	58.95	58.6
22	63.4	63.25	63.1	62.75	62.25	61.7	61.2	60.5	59.75	59.25	58.95	58.6
23	63.4	63.25	63.1	62.75	62.25	61.65	61.25	60.5	59.75	59.25	58.95	58.6
24	63.4	63.15	63.1	62.75	62.25	61.6	61.2	60.5	59.75	59.25	58.9	58.55
25	63.4	63.15	63.1	62.75	62.25	61.65	61.15	60.45	59.75	59.25	58.9	58.55
26	63.4	63.2	63.05	62.75	62.25	61.55	61.15	60.45	59.75	59.2	58.9	58.55
27	63.4	63.25	63.05	62.7	62.25	61.55	61.15	60.45	59.75	59.2	58.9	58.5
28	63.4	63.2	63.05	62.7	62.2	61.55	61.1	60.45	59.7	59.2	58.9	58.5
29	63.4	.....	63.05	62.7	62.2	61.55	61.1	60.4	59.7	59.2	58.85	58.5
30	63.4	.....	62.95	62.65	62.2	61.5	61.05	60.4	59.7	59.2	58.85	58.45
31	63.4	.....	62.95	.....	62.15	.....	61.05	60.4	.....	59.15	.....	58.45

Monthly rise of Salton Sea near Salton, Cal., for 1904–1910.

Month.	Monthly rise.	Total rise.	Month.	Monthly rise.	Total rise.	Month.	Monthly rise.	Total rise.
1904.	*Feet.*	*Feet.*	1907.	*Feet.*	*Feet.*	1909.	*Feet.*	*Feet.*
November	0.6	.....	January	2.8	75.3	January	0.0	67.4
December	.2	0.8	February	.7	76.0	February	— .15	67.25
1905.			March	— .1	75.9	March	— .25	67.0
January	1.4	2.2	April	— .3	75.6	April	— .3	66.7
February	1.6	3.8	May	— .5	75.1	May	— .4	66.3
March	.8	4.6	June	— .4	74.7	June	— .4	65.9
April	1.2	5.8	July	— .2	74.5	July	— .6	65.3
May	1.0	6.8	August	— .3	74.2	August	— .05	65.25
June	2.2	9.0	September	— .7	73.5	September	— .5	64.75
July	4.4	13.4	October	— .4	73.1	October	— .55	64.2
August	2.2	15.6	November	— .5	72.6	November	— .55	63.65
September	1.2	16.8	December	— .3	72.3	December	— .25	63.4
October	1.4	18.2	1908.			1910.		
November	1.6	19.8	January	.0	72.3	January	.0	63.4
December	2.9	22.7	February	— .1	72.2	February	— .2	63.2
1906.			March	— .2	72.0	March	— .25	62.95
January	1.1	23.8	April	— .4	71.6	April	— .3	62.65
February	1.8	25.6	May	— .6	71.0	May	— .5	62.15
March	2.7	28.3	June	— .5	70.5	June	— .65	61.5
April	5.6	33.9	July	— .5	70.0	July	— .45	61.05
May	8.6	42.5	August	— .6	69.4	August	— .65	60.4
June	15.4	57.9	September	— .8	68.6	September	— .7	59.7
July	8.6	66.5	October	— .7	67.9	October	— .55	59.15
August	2.9	69.4	November	— .3	67.6	November	— .3	58.85
September	.9	70.3	December	— .2	67.4	December	— .4	58.45
October	1.2	71.5						
November	— .2	71.3						
December	1.2	72.5						

ALAMO RIVER NEAR BRAWLEY, CAL.

During 1908 discharge measurements were made on Alamo River at a highway bridge 3½ miles east of Brawley, Cal., in sec. 31, T. 13 S., R. 15 E., by H. R. Edwards, engineer for the New Liverpool Salt Co.[1] During 1909 measurements were made by engineers of the United States Geological Survey. On June 24, 1909, a continuous record of gage heights was commenced at this point. The staff gage is spiked vertically to a pile in the left abutment of the bridge. The datum of the gage has remained the same during the maintenance of the station. All discharge measurements prior to May 3, 1910, were made from the bridge. Beginning May 3, 1912, discharge measurements were made from a car and cable 100 feet below the bridge.

The data obtained at this station, together with those obtained on New River, show the amount of waste water reaching Salton Sea and are of value in connection with experiments being made by the United States Weather Bureau for determining the evaporation from Salton Sea.

Conditions for obtaining accurate discharge data are poor. The channel is constantly scouring or filling as the stage fluctuates. Both banks are high and well above overflow.

This station is maintained in cooperation with P. L. Sherman, jr., of Los Angeles, Cal.

Discharge measurements of Alamo River near Brawley, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Jan. 9	A. H. Koebig, jr	68	256	7.10	1,030
Feb. 5	W. B. Clapp	46	67	4.00	98
May 3[a]	G. C. Noble	34	50	4.30	95
Sept. 16[a]	N. T. Shaw	40	132	5.80	395
Oct. 16[a]	P. L. Sherman, jr	43	134	5.80	436
Dec. 18[a]	do	30	103	5.30	288

[a] Measurement made from cable.

[1] These measurements were published in Water-Supply Paper U. S. Geol. Survey No. 249, p. 52, and No. 251, p. 46.

Daily gage height, in feet, of Alamo River near Brawley, Cal., for 1910.

[Mrs. Flora Helman, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.9	4.35	3.25	3.85	4.45	4.1	4.3	.....	4.15	5.1	6.0	5.2
2	4.9	4.5	3.2	3.8	4.5	4.25	4.15	.....	4.15	5.0	6.0	5.1
3	4.75	4.4	3.2	3.9	4.4	4.2	4.05	.....	3.85	5.15	6.1	5.2
4	6.55	4.35	3.2	3.95	4.35	4.05	4.2	.....	3.9	5.65	6.3	5.2
5	6.9	3.95	3.2	3.8	4.0	4.0	4.35	.....	4.25	5.55	6.6	5.1
6	7.0	3.75	3.2	3.7	3.9	4.2	4.2	.....	4.35	5.4	6.1	5.4
7	7.25	3.7	3.25	3.65	4.25	3.9	4.1	.....	4.85	5.1	6.5	5.1
8	7.1	4.25	3.4	3.75	4.5	3.8	4.3	.....	4.75	5.45	6.6	4.9
9	7.05	3.8	3.25	3.7	4.4	3.95	4.2	.....	4.5	5.8	6.0	4.8
10	6.55	3.6	3.25	3.9	4.25	3.8	4.15	.....	3.95	5.65	6.2	5.1
11	6.4	3.5	3.3	4.1	4.25	4.0	4.1	.....	4.6	5.6	6.3	5.0
12	6.45	3.5	3.4	3.9	4.1	4.25	3.95	.....	4.65	5.6	6.2	4.9
13	5.9	3.4	3.5	3.9	4.15	4.0	3.95	.....	5.05	6.15	6.2	5.0
14	5.25	3.45	3.35	3.7	4.0	4.05	4.05	.....	5.3	6.55	7.0	4.8
15	5.15	3.35	3.25	3.85	4.3	3.8	3.95	.....	5.65	5.65	7.0	5.2
16	4.75	3.4	3.3	3.95	4.4	3.8	4.0	.....	5.9	5.7	7.0	5.2
17	4.45	3.4	3.35	3.85	4.25	3.85	4.0	.....	5.75	6.0	7.0	5.5
18	4.35	3.4	3.4	4.0	4.1	3.75	3.8	.....	6.15	6.05	6.6	5.2
19	4.25	3.4	3.45	3.75	4.15	4.0	3.85	.....	5.75	6.2	6.3	5.1
20	4.4	3.35	3.4	4.05	4.15	4.05	3.85	.....	5.55	6.5	6.4	5.5
21	4.55	3.3	3.35	3.8	4.0	3.9	3.9	.....	5.9	6.1	5.8	5.1
22	4.65	3.3	3.4	4.0	4.1	3.85	3.95	.....	5.8	5.8	5.4	5.3
23	4.95	3.3	3.45	3.8	4.25	3.85	3.9	.....	5.55	6.0	4.9	5.5
24	4.85	3.3	3.6	3.85	4.25	4.0	3.8	.....	5.25	6.1	4.8	5.4
25	4.95	3.3	3.5	4.0	4.0	4.3	3.7	4.3	5.2	5.9	5.2	5.5
26	4.8	3.3	3.55	4.0	4.1	4.3	3.65	.....	5.2	5.9	5.3	5.4
27	4.45	3.2	3.8	3.85	4.0	4.55	3.35	.....	5.1	5.5	5.3	5.5
28	4.45	3.25	3.65	3.85	4.2	4.7	3.3	3.85	5.4	5.3	5.0	5.4
29	4.45	.....	3.8	4.0	4.3	4.85	.....	4.15	5.2	5.0	5.2	5.5
30	4.5	.....	3.85	4.35	4.35	4.2	.....	3.95	5.15	5.7	5.1	5.2
31	4.45	.....	3.8	.....	4.0	.....	.....	4.0	.....	6.1	.....	5.4

NOTE.—From July 29 to August 24 the water level was below gage. On August 18 the observer stated that the gage height was about 3.5 feet.

Daily discharge, in second-feet, of Alamo River near Brawley, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	192	117	38	74	128	93	112	.....	98	230	484	252
2	192	134	36	71	134	107	98	.....	98	210	484	230
3	168	122	36	78	122	102	89	.....	74	241	521	252
4	716	117	36	82	117	89	102	.....	78	370	604	252
5	910	82	36	71	85	85	117	.....	107	341	740	230
6	972	68	36	64	78	102	102	.....	117	301	521	301
7	1,150	64	38	61	107	78	93	.....	184	230	691	230
8	1,040	107	46	68	134	71	112	.....	168	314	740	192
9	1,000	71	38	64	122	82	102	.....	134	417	484	175
10	716	58	38	78	107	71	98	.....	82	370	561	230
11	647	52	41	93	107	85	93	.....	146	355	604	210
12	669	52	46	78	93	107	82	.....	153	355	561	192
13	450	46	52	78	98	85	82	.....	220	541	561	210
14	264	49	44	64	85	89	89	.....	276	716	972	175
15	241	44	38	74	112	71	82	.....	370	370	972	252
16	168	46	41	82	122	71	85	.....	450	385	972	252
17	128	46	44	74	107	74	85	.....	401	484	972	327
18	117	46	46	85	93	68	71	.....	541	502	740	252
19	107	46	49	68	98	85	74	.....	401	561	604	230
20	122	44	46	89	98	89	74	.....	341	691	647	327
21	140	41	44	71	85	78	78	.....	450	521	417	230
22	153	41	46	85	93	74	82	.....	417	417	301	276
23	201	41	49	71	107	74	78	.....	341	484	192	327
24	184	41	58	74	107	85	71	.....	264	521	175	301
25	201	41	52	85	85	112	64	112	252	450	252	327
26	175	41	55	85	93	112	61	.....	252	450	276	301
27	128	36	71	74	85	140	44	.....	230	327	276	327
28	128	38	61	74	102	160	41	74	301	276	210	301
29	128	.....	71	85	112	184	.....	98	252	210	252	327
30	134	.....	74	117	117	102	.....	82	241	385	230	252
31	128	.....	71	.....	85	.....	.....	85	.....	521	.....	301

Monthly discharge of Alamo River near Brawley, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	1,150	107	376	23,100	B.
February	134	36	61.8	3,430	C.
March	74	36	47.6	2,930	C.
April	117	61	77.2	4,590	C.
May	134	78	104	6,400	B.
June	184	68	94.2	5,610	B.
July	117	.....	80.1	4,930	C.
August	.....	.....	63.5	3,900	D.
September	541	74	248	14,800	B.
October	716	210	405	24,900	B.
November	972	175	534	31,800	B.
December	327	175	259	15,900	B.
The period	1,150	.....	197	143,000	

NOTE.—Discharge estimated July 29 to August 24 and August 26 to 27, to complete the annual discharge.

NEW RIVER NEAR BRAWLEY, CAL.

During 1908 discharge measurements were made at a wagon bridge over New River, 1½ miles west of Brawley, Cal., and in sec. 31, T. 13 S., R. 14 E., by H. R. Edwards, engineer for the New Liverpool Salt Co. During 1909 measurements were made by engineers of the United States Geological Survey. On June 24, 1909, a continuous record of gage heights was begun at this point. The staff gage is spiked vertically to the third bridge pile from the right bank. The datum of the gage has remained the same during the maintenance of the station. At high stages discharge measurements are made from the bridge, but at medium and low stages measurements. During the later part of August, 1909, heavy rains in Imperial Valley caused a rise of New River which washed out the earth approaches to the bridge where measurements are made and completely changed the channel. Sufficient measurements have not since been made to define a rating curve, and no estimates of flow have therefore been made.

This station is maintained in cooperation with P. L. Sherman, jr., of Los Angeles, Cal.

The data obtained at this station, together with those obtained on Alamo River, show the amount of waste water reaching Salton Sea and are of value in connection with experiments being made by the United States Weather Bureau to determine the evaporation from Salton Sea.

The following discharge measurement was made by wading 100 feet above gage, by W. B. Clapp:

February 4, 1910: Width, 34 feet; area, 32 square feet; gage height, 4.80 feet; discharge, 40 second-feet.

Daily gage height, in feet, of New River near Brawley, Cal., for 1910.

[Herschell Darnell, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.1	4.7	4.65	4.75	5.3	5.2	5.3	4.8	4.9	5.25	5.2	5.5
2	5.0	4.7	4.75	4.8	5.1	5.1	5.3	4.8	4.9	5.35	5.1	5.4
3	5.0	4.7	4.7	5.4	5.1	5.0	5.3	4.7	5.0	5.4	5.0	5.8
4	5.0	4.75	4.7	5.5	5.3	5.3	5.45	4.7	4.9	5.4	5.3	5.6
5	4.9	4.75	4.7	5.0	5.35	5.25	5.35	4.7	4.8	5.3	5.3	5.7
6	4.8	4.65	4.7	5.1	5.65	5.0	5.2	4.8	4.8	5.3	5.3	5.7
7	4.9	4.75	4.7	4.9	5.9	5.15	5.35	4.8	4.8	5.3	5.3	5.7
8	4.9	4.8	4.7	4.8	5.9	5.25	5.2	4.7	4.8	5.2	5.3	5.5
9	4.9	4.8	4.7	4.8	5.7	5.35	5.3	4.7	4.8	5.2	5.2	5.4
10	4.8	4.8	4.7	4.7	5.3	5.45	5.15	4.7	5.05	5.2	5.3	5.3
11	4.95	4.8	4.75	4.7	5.35	5.45	4.8	4.7	5.4	5.0	5.3	5.3
12	4.95	4.7	4.7	4.7	5.3	5.4	4.8	4.7	5.5	4.9	5.3	5.2
13	4.9	4.8	4.7	4.8	5.4	5.4	4.8	4.7	5.55	4.9	5.3	5.2
14	4.9	4.75	4.7	4.85	5.8	5.3	4.8	4.7	5.65	4.9	5.4	5.2
15	4.9	4.7	4.7	4.7	5.9	5.3	4.8	4.7	5.55	5.0	5.3	5.2
16	4.9	4.6	4.7	4.8	5.45	5.5	4.9	4.7	5.45	4.9	5.3	5.3
17	4.9	4.6	4.8	4.7	5.3	5.85	4.9	4.7	5.4	4.9	5.5	5.3
18	4.8	4.7	4.8	4.8	5.1	6.0	4.9	4.7	5.4	4.8	5.5	5.4
19	4.85	4.7	4.7	4.85	4.8	5.85	4.9	4.7	5.4	4.9	5.5	5.6
20	4.85	4.7	4.8	5.0	4.7	5.65	4.9	4.7	5.4	4.9	5.6	5.4
21	4.8	4.75	4.75	5.0	4.7	5.45	4.9	4.75	5.4	4.9	5.5	5.3
22	4.9	4.8	4.8	5.4	4.8	5.25	4.8	4.8	5.4	4.9	5.5	5.2
23	4.9	4.7	4.7	4.9	5.0	5.35	4.7	4.8	5.4	4.9	5.6	5.2
24	4.9	4.65	4.8	4.7	5.2	5.25	4.7	4.8	5.25	4.9	5.6	5.3
25	4.8	4.7	4.8	4.7	5.5	5.4	4.7	4.8	5.25	4.9	5.6	5.3
26	4.8	4.7	4.8	4.9	5.5	5.3	4.7	4.8	5.3	4.9	5.5	5.4
27	4.8	4.7	4.8	5.0	5.35	5.2	4.7	4.7	5.3	4.9	5.5	5.4
28	4.8	4.7	4.8	4.95	5.2	5.15	4.8	4.8	5.3	4.9	5.4	5.5
29	4.7	.....	4.8	5.3	5.35	5.1	4.7	4.9	5.3	5.0	5.4	5.6
30	4.8	.....	4.85	5.3	5.25	5.3	4.7	4.8	5.3	5.1	5.4	5.5
31	4.7	.....	4.75	.....	5.3	.....	4.8	4.8	.....	5.2	.....	5.5

OWENS LAKE BASIN.

GENERAL FEATURES.

Owens Lake is a saline body of water in the central part of Inyo County; its area comprises about 75 square miles. Like Mono Lake, which lies 125 miles farther north and about 3,000 feet higher, it derives its water from the vicinity of Mount Lyell.

The lake is fed by Owens River, which rises among the high peaks of the Sierra east of Mount Lyell and directly opposite the headwaters of the San Joaquin, at an altitude of nearly 12,000 feet above sea level. It flows eastward into Long Valley, thence southeastward through Owens River canyon into Owens Valley, thence eastward and southward through the trough of the valley to Owens Lake, about 20 miles southeast of Mount Whitney. The total length of the river is about 125 miles—45 miles above the lower end of the canyon and 80 miles in Owens Valley.

The basin is long and comparatively narrow and its topography is varied. It comprises a rough east-side mountain slope 5 or 6 miles wide, a valley floor about 6 miles wide, and a west-side slope ranging from 6 to 10 miles or more in width. The west-side area is made up of a very rugged and precipitous mountain slope 4 or 5 miles wide,

and a sloping alluvial plain composed of delta-fan surfaces ranging from 1 to 5 miles in width and lying at the foot of the mountains and west of the western margin of the valley. Owens Valley is smooth and ranges in altitude from 3,600 feet at the south end to about 4,100 feet at the north end. The crest of the east-side range of mountains averages about 6,000 feet higher than the valley floor. The west-side plain consists of a porous granitic alluvium of considerable depth, and ranges in altitude from about 4,000 feet at the western valley margin to about 6,000 feet at the foot of the mountains. It has a fairly uniform slope of 400 to 600 feet to the mile. The eastern slope of the Sierra is very steep and rugged, and ranges in altitude from about 6,000 feet at the foot to 13,000 or 14,000 feet at the crest. The geologic formation is granitic.

The basin is rather poorly forested. The eastern slope is practically barren of vegetation, except in places a scanty desert growth. The western slope has a very slight soil covering and only a sparse timber growth, found chiefly along the watercourses. All the western slope, a large part of the eastern slope, and the central part of Owens Valley are included in national forests.

The only precipitation records available indicate that the mean annual precipitation in the valley is about 5 inches. On the Sierra slope precipitation probably increases northward, and certainly increases with increase in altitude. On the higher slopes it may be 40 inches or more and occurs almost entirely as snow.

Owens River has many tributaries. More than 40 lateral streams, many of them, however, comparatively small, drain a part of the eastern slope of the Sierra and enter the main stream from the west. The principal tributaries, from north to south, are as follows: Rock, Pine, Horton, McGee, Birch, and Bishop creeks, opposite the San Joaquin basin; Coyote, Baker, Big Pine, Birch, Tinemaha, Taboose, Goodale, Division, Sawmill (Eightmile), Thibaut, Oak, Pine, and Symmes creeks, opposite Kings River basin; and Shepard, Bairs (Moffett), George, Hogback, Lone Pine, Tuttle, Richter, Cottonwood, and Ash creeks, opposite Kern River basin. No drainage enters Owens River from the east except during the rare, exceptionally heavy rainstorms.

Nearly all the streams rise in glacial lakelets and marshes which lie near the crest of the Sierra and serve to a certain extent as storage reservoirs in regulating the flow.

The streams emerge from the mouths of their canyons upon the porous alluvial plain at the base of the Sierra, which is 1 to 5 miles in width and several hundred feet deep, and across which they flow to the Owens River channel in the trough of the valley. This belt of débris is the source of a large and important loss, part of which appears in numerous springs throughout the valley. Perhaps stronger

evidence of the great loss by seepage is afforded by the broad belt of wet and somewhat boggy land which extends over a large part of the trough of the basin. Undoubtedly large quantities of water can be obtained by sinking wells within this area. Several artesian wells which have been sunk in the vicinity of Independence yield a strong flow and give convincing evidence of an artesian belt in the valley. With a view to the greatest ultimate utilization of the valley's water supply, the city of Los Angeles is conducting special investigations to determine the depth to and fluctuations in the ground-water plane and the rate of evaporation from free water surface and saturated gravels near Independence;[1] also to determine the amount of precipitation on the alluvial plain at the base of the Sierra between the 4,000 and 6,000 foot contours and the seepage losses of creeks crossing it.

Owens Valley is extensively cultivated and particularly adapted to stock raising. Numerous diversions are made for irrigation at different points on Owens River and tributaries, particularly in the upper part of the valley. Considerable water is also used for irrigating meadow lands in Long Valley north of Owens River canyon, but it is returned to the river above the head of Owens Valley.

The basin affords many opportunities for power development. The fall is so great and the minimum flow of the stream is so large and so reliably constant that many thousands of horsepower could be developed. It is estimated that a minimum of more than 100,000 horsepower could be obtained without storage, and this amount could be considerably more than doubled by utilizing all the possible storage. The Los Angeles Aqueduct, when completed, will have a capacity of 400 second-feet and a total fall of more than 3,000 feet from its intake in Owens Valley to its outfall in San Fernando Valley near the city, and will generate more than 100,000 horsepower. A full development of all the power opportunities in Owens River basin would probably yield more than 300,000 horsepower continuously.

The longest run-off record in Owens River basin extends back to 1903, when stations were established on the main stream and on Rock and Pine creeks near Round Valley, and Bishop Creek near Bishop. The wettest year since that time was 1906 or 1907, and the driest 1905. The total flow during the wettest year was nearly double that during the driest.

In the fall of 1903 stations were established on five or six of the principal streams in Owens Valley and on numerous diversion canals used for irrigation. After the city of Los Angeles had acquired its extensive holdings in the valley and had taken active steps to utilize the flow of Owens River and tributaries for a municipal water supply, many other stations were established at the request of and in coopera-

[1] See Water-Supply Paper U. S. Geol. Survey No. 294, 1912.

tion with the city. Since that time all stations in Owens Valley have been maintained in cooperation with the city of Los Angeles, the city paying all field and maintenance expenses and the National Government furnishing and paying an engineer to do the work.

All stations in Owens Valley except those on Owens River are located near the western margin of the valley, and most of them are below the delta fans which extend eastward from the mouths of the canyons and are above all diversions. Almost without exception measurements are made from footbridges or by wading. The current is swift at almost every station, and the channel is subject to more or less change.

OWENS RIVER NEAR ROUND VALLEY, CAL.

This station, which is located 600 feet above the junction of Owens River and Rock Creek, in sec. 10, T. 6 S., R. 31 E., Mount Diablo base and meridian, was established August 3, 1903, at a footbridge 100 feet above the present site, to which it was removed May 27, 1907, as the original station had been destroyed on March 19 of that year.

No important streams enter above and Rock Creek is the first tributary below the station. No ditches take water above the gage, but several divert from the main river and its tributaries below the station, the first one being the Owens River canal, which heads 3 miles below the mouth of Rock Creek. The drainage area above the station is approximately 450 square miles.

The gage, which is a vertical staff on the left bank, was not referred to the datum of the original gage.

Discharge measurements are made from a car and cable at the gage.

The channel is composed of rock and lava bowlders and changes little.

Discharge measurements of Owens River near Round Valley, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 9	R. E. Haines	34	86	2.56	352
30	.....do	34	73	2.12	218
Apr. 21	.....do	34	73	2.20	242
May 11	.....do	35	81	2.40	300
June 24	C. H. Lee	35	88	2.53	348
July 11	.....do	35	87	2.43	312
Aug. 2	.....do	35	83	2.32	288
24	F. G. Wood	34	71	2.07	201
Sept. 17	G. T. Peekema	34	69	2.02	175
Oct. 22	.....do	34	72	2.02	183
Nov. 18	.....do	34	71	2.03	189
Dec. 21	.....do	34	70	1.98	164

Daily gage height, in feet, of Owens River near Round Valley, Cal., for 1910.

[L. L. Roberts, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.6	.....	2.15	2.1	2.4	3.2	2.5	.....	2.0	1.95	2.0	1.9
2	.....	2.1	.....	.....	.....	.....	.....	2.35	.....	.....	.....	.....
3	2.5	.....	2.2	2.15	2.35	3.3	2.4	.....	2.15	1.95	2.1	1.9
4	.....	2.0	2.2	.....	.....	3.4	.....	2.3	2.1	.....	.....	2.0
5	2.4	2.1	.....	2.1	2.4	3.2	2.45	2.3	.....	2.0	2.0	.....
6	.....	.....	2.2	2.15	.....	3.25	2.4	.....	2.1	.....	2.05	1.9
7	2.3	2.0	2.2	.....	2.4	.....	.....	2.2	.....	2.0	.....	.....
8	.....	.....	2.25	2.1	2.45	3.2	2.45	.....	2.0	.....	2.0	1.95
9	2.1	2.1	.....	.....	.....	.....	.....	2.1	.....	2.1	.....	.....
10	.....	.....	2.2	2.15	2.5	3.3	2.4	.....	2.05	.....	2.05	1.85
11	2.0	2.0	2.25	2.2	2.55	.....	.....	2.1	2.0	2.05	.....	1.85
12	.....	.....	.....	.....	.....	3.15	2.4	2.0	.....	.....	2.0	.....
13	2.0	2.1	2.2	2.15	2.5	.....	.....	.....	2.0	2.1	.....	1.9
14	.....	.....	.....	.....	.....	3.2	2.4	2.2	.....	2.1	2.05	.....
15	2.0	2.1	2.2	2.2	2.6	.....	.....	.....	2.0	.....	.....	1.95
16	.....	.....	.....	2.1	2.6	3.1	2.45	2.15	.....	2.15	1.95	.....
17	2.0	2.1	2.2	2.2	2.6	3.15	2.4	.....	2.05	.....	1.9	1.95
18	.....	2.1	.....	.....	2.6	3.0	.....	2.1	.....	2.05	.....	2.0
19	2.0	.....	2.2	2.15	.....	3.0	2.45	.....	2.0	.....	1.85	.....
20	.....	2.1	.....	2.2	2.7	.....	.....	2.0	.....	2.1	.....	2.0
21	2.1	2.1	2.1	.....	.....	2.9	2.4	.....	2.05	2.0	1.9	.....
22	.....	.....	.....	2.15	2.7	2.9	.....	2.1	.....	.....	.....	2.0
23	2.1	2.1	2.15	.....	.....	2.7	2.45	.....	2.0	2.0	1.8	.....
24	.....	.....	.....	2.3	2.8	2.6	.....	2.0	.....	.....	.....	1.95
25	2.1	2.15	2.1	2.3	.....	.....	2.4	.....	2.05	2.05	1.85	.....
26	.....	.....	.....	2.4	2.8	2.55	.....	2.1	.....	2.1	.....	2.0
27	2.1	2.1	2.1	2.35	2.85	2.5	2.5	.....	2.0	2.1	.....	.....
28	.....	2.1	.....	2.4	.....	.....	2.6	2.0	.....	.....	1.8	1.95
29	2.1	.....	2.1	.....	2.8	2.5	.....	.....	1.9	2.1	1.85	1.95
30	.....	.....	.....	2.35	.....	.....	2.5	2.1	1.85	2.0	.....	.....
31	2.0	.....	2.1	.....	3.0	.....	2.35	.....	.....	2.1	.....	2.0

Daily discharge, in second-feet, of Owens River near Round Valley, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	370	192	221	206	301	596	335	284	177	164	177	151
2	352	206	228	214	292	616	318	284	199	164	192	151
3	335	192	236	221	284	636	301	276	221	164	206	151
4	318	177	236	214	292	676	310	268	206	170	192	177
5	301	206	236	206	301	596	318	268	206	177	177	164
6	284	192	236	221	301	616	301	252	206	177	192	151
7	268	177	236	214	301	606	310	236	192	177	184	158
8	247	192	252	206	318	596	318	221	177	192	177	164
9	206	206	244	214	326	616	310	206	184	206	184	151
10	192	192	236	221	335	636	301	206	192	199	192	139
11	177	177	252	236	352	606	301	206	177	192	184	139
12	177	192	244	228	344	576	301	177	177	199	177	145
13	177	206	236	221	335	586	301	206	177	206	184	151
14	177	206	236	228	352	596	301	236	177	206	192	158
15	177	206	236	236	370	576	310	228	177	214	177	164
16	177	206	236	206	370	556	318	221	184	221	164	164
17	177	206	236	236	370	576	301	214	192	206	151	164
18	177	206	236	228	370	517	310	206	184	192	145	177
19	177	206	236	221	388	517	318	192	177	199	139	177
20	192	206	221	236	405	498	310	177	184	206	145	177
21	206	206	206	228	405	478	301	192	192	177	151	177
22	206	206	214	221	405	478	310	206	184	177	139	177
23	206	206	221	244	423	405	318	192	177	177	127	170
24	206	214	214	268	441	370	310	177	184	184	133	164
25	206	221	206	268	441	361	301	192	192	192	139	170
26	206	214	206	301	441	352	318	206	184	206	135	177
27	206	206	206	284	460	335	335	192	177	206	131	170
28	206	206	206	301	450	335	370	177	164	206	127	164
29	206	.....	206	292	441	335	352	192	151	206	139	164
30	192	.....	206	284	478	335	335	206	139	177	145	170
31	177	.....	206	.....	517	.....	284	192	.....	206	.....	177

NOTE.—Daily discharge determined from a discharge rating curve well-defined above 180 second-feet and fairly well defined below. Discharge interpolated for days on which gage was not read.

Monthly discharge of Owens River near Round Valley, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	370	177	222	13,600	B.
February	221	177	201	11,200	B.
March	252	206	227	14,000	A.
April	301	206	237	14,100	A.
May	517	284	374	23,000	A.
June	676	335	519	30,900	A.
July	370	284	314	19,300	A.
August	284	177	216	13,300	A.
September	221	139	184	10,900	B.
October	221	164	192	11,800	B.
November	206	127	163	9,700	B.
December	177	139	163	10,000	B.
The year	676	127	250	182,000	

OWENS RIVER NEAR TINEMAHA, CAL.

This station, which is located at a basaltic knoll known as Charlies Butte, in the floor of the valley about 7 miles south of Tinemaha, in sec. 2, T. 11 S., R. 34 E., Mount Diablo base and meridian, was regularly established September 20, 1906, but the city of Los Angeles had made frequent measurements since the beginning of 1906.

No water is diverted for some distance above and below this station. Tinemaha Creek is the first tributary above and Taboose the next below the station.

The gage is a vertical staff on the left bank; its datum has not been changed since the station was established.

Discharge measurements are made from a car and cable at the gage. When the discharge exceeds 1,800 second-feet, the river overflows the left bank and the station is inaccessible. At such times measurements are made from the county bridge near Citrus.

The channel is composed of sand and gravel and is somewhat shifting.

The record may be considered good.

Discharge measurements of Owens River near Tinemaha, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 11	R. E. Haines	89	243	3.10	620
Apr. 2	do	85	154	1.99	313
19	do	53	66	.62	99
May 13	do	57	80	.93	152
June 26	C. H. Lee	86	133	1.58	265
July 14	do	56	93	1.09	185
Aug. 4	do	58	90	1.21	168
25[a]	F. G. Wood	47	63	.63	94
Sept. 19[a]	G. T. Peekema	46	66	.68	107
Oct. 24	do	87	158	2.16	347
Nov. 2	do	87	181	2.38	379
Dec. 23	do	88	206	2.64	448

[a] Measurements made by wading.

Daily gage height, in feet, of Owens River near Tinemaha, Cal., for 1910.

Ray Bowers, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.4	2.9	2.75	1.95	0.8	3.0	1.5	1.55	0.65	0.8	2.25	2.55
2	5.1	2.75	2.8	1.9	.8	3.3	1.5	1.45	.65	.85	2.25	2.55
3	5.75	2.7	2.85	1.8	.75	3.3	1.4	1.35	.65	1.0	2.25	2.6
4	4.5	2.6	2.85	1.7	.75	3.3	1.3	1.25	.65	1.1	2.25	2.65
5	3.55	2.75	2.8	1.6	.7	3.35	1.25	1.15	.65	1.15	2.3	2.7
6	3.5	2.9	2.85	1.45	.7	3.0	1.25	1.1	.6	1.2	2.3	2.7
7	3.55	2.9	2.9	1.3	.7	3.0	1.25	1.1	.6	1.25	2.3	2.7
8	3.4	2.9	2.95	1.15	.8	2.9	1.2	1.05	.6	1.3	2.35	2.7
9	3.35	2.9	3.0	1.0	.95	2.75	1.15	1.0	.6	1.35	2.4	2.7
10	3.25	2.85	3.0	.95	1.0	2.65	1.0	.95	.6	1.35	2.4	2.7
11	3.2	2.85	3.1	.9	1.0	2.55	1.0	.9	.55	1.35	2.4	2.7
12	3.2	2.9	3.2	1.0	.95	2.45	1.05	.85	.55	1.3	2.4	2.7
13	3.15	2.85	3.2	1.1	1.0	2.45	1.05	.8	.55	1.5	2.4	2.75
14	3.1	2.8	3.2	1.0	1.0	2.5	1.1	.75	.55	1.6	2.5	2.7
15	3.15	2.75	3.15	.9	1.1	2.5	1.05	.75	.75	1.9	2.5	2.65
16	3.2	2.7	3.1	.75	1.25	2.55	1.0	.75	.65	2.05	2.5	2.55
17	3.2	2.65	3.15	.7	1.6	2.65	1.0	.75	.6	2.15	2.45	2.55
18	3.2	2.7	3.2	.65	1.9	2.5	1.35	.7	.7	2.2	2.45	2.55
19	3.15	2.7	3.25	.6	2.0	2.4	1.85	.7	.7	2.1	2.45	2.6
20	3.1	2.7	3.2	.7	1.9	2.3	2.25	.7	.7	2.05	2.4	2.6
21	3.05	2.7	2.9	.7	2.0	2.2	2.45	.65	.7	2.1	2.4	2.65
22	3.0	2.7	2.6	.7	1.95	2.0	2.3	.55	.75	2.15	2.4	2.7
23	3.05	2.7	2.5	.75	1.95	1.85	2.8	.5	.75	2.2	2.45	2.65
24	3.1	2.7	2.45	.7	2.0	1.75	2.85	.55	.75	2.2	2.45	2.6
25	3.1	2.7	2.4	.65	2.2	1.65	2.5	.65	.8	2.15	2.5	2.6
26	3.05	2.7	2.35	.7	2.4	1.5	2.25	1.2	.8	2.15	2.5	2.6
27	3.0	2.7	2.35	.75	2.3	1.5	2.1	1.0	.75	2.2	2.45	2.55
28	3.0	2.7	2.4	.75	2.3	1.5	2.0	.75	.75	2.2	2.4	2.6
29	3.0	.....	2.25	.7	2.5	1.5	2.1	.7	.75	2.25	2.4	2.5
30	3.0	.....	2.1	.7	2.65	1.5	1.9	.7	.8	2.25	2.5	2.55
31	3.0	.....	2.0	.....	2.8	.....	1.7	.65	.....	2.25	.....	2.5

Daily discharge, in second-feet, of Owens River near Tinemaha, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	910	524	491	324	125	547	241	250	102	125	384	447
2	1,120	491	502	315	125	618	241	232	102	132	384	447
3	1,320	480	513	296	118	618	223	214	102	155	384	458
4	989	458	513	277	118	618	205	196	102	171	384	469
5	679	491	502	259	110	630	196	180	102	180	394	480
6	666	524	513	232	110	547	196	171	95	188	394	480
7	679	524	524	205	110	547	196	171	95	196	394	480
8	642	524	536	180	125	524	188	163	95	205	404	480
9	630	524	547	155	148	491	180	155	95	214	415	480
10	606	513	547	148	155	469	155	148	95	214	415	480
11	594	513	570	140	155	447	155	140	88	214	415	480
12	594	524	594	155	148	426	163	132	88	205	415	480
13	582	513	594	171	155	426	163	125	88	241	415	491
14	570	502	594	155	155	436	171	118	88	259	436	480
15	582	491	582	140	171	436	163	118	118	315	436	468
16	594	480	570	118	196	447	155	118	102	344	436	447
17	594	469	582	110	259	469	155	118	95	363	426	447
18	594	480	594	102	315	436	214	110	110	373	426	447
19	582	480	606	95	334	415	306	110	110	353	426	458
20	570	480	594	110	315	394	384	110	110	344	415	458
21	558	480	524	110	334	373	426	102	110	353	415	469
22	547	480	458	110	324	334	394	88	118	363	415	480
23	558	480	436	118	324	306	502	82	118	373	426	469
24	570	480	426	110	334	286	513	88	118	373	426	458
25	570	480	415	102	373	268	436	102	125	363	436	458
26	558	480	396	110	415	241	384	188	125	363	436	458
27	547	480	396	118	394	241	353	155	118	373	426	447
28	547	480	415	118	394	241	334	118	118	373	415	458
29	547	.....	384	110	436	241	353	110	118	384	415	436
30	547	.....	353	110	469	241	315	110	125	384	436	447
31	547	.....	334	.....	502	.....	277	102	.....	384	.....	436

NOTE.—Daily discharge determined from a fairly well-defined discharge rating curve.

Monthly discharge of Owens River near Tinemaha, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	1,320	547	650	40,000	B.
February	524	458	494	27,400	B.
March	606	334	503	30,900	B.
April	324	95	160	9,520	B.
May	502	110	250	15,400	B.
June	630	241	424	25,200	B.
July	513	155	269	16,500	B.
August	250	82	139	8,550	B.
September	125	88	106	6,310	B.
October	384	125	286	17,600	B.
November	436	384	415	24,700	B.
December	491	436	464	28,500	B.
The year	1,320	82	346	251,000	

OWENS RIVER NEAR LONE PINE, CAL.

This station, which is located at the highway bridge on the road from Lone Pine to the Mount Whitney station on the Nevada & California Railroad, 2½ miles northeast of Lone Pine, in sec. 23, T. 15 S., R. 36 E., Mount Diablo base and meridian, was established June 12, 1908.

No water is diverted in the vicinity of the station, and no important tributaries enter the stream for some distance above the bridge.

The gage is a vertical staff attached to the bridge; its datum has not been changed since the station was established.

Discharge measurements are made from the bridge.

Both banks are low and overflow at flood stages. The channel is sandy but fairly permanent. The record may be considered good.

Discharge measurements of Owens River near Lone Pine, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 2	R. E. Haines	79	273	6.35	608
22	do	79	295	6.50	637
Apr. 12	do	53	97	4.25	175
May 5	do	52	76	3.90	129
24	do	72	156	4.85	306
June 28	C. H. Lee	58	115	4.53	217
July 21	do	59	149	4.92	285
Aug. 16	F. G. Wood	56	61	3.68	87
26[a]	G. T. Peekema	55	49	3.53	76
26	do	73	67	3.52	69
Sept. 3[a]	F. G. Wood	53	56	3.69	85
22[a]	G. T. Peekema	55	59	3.70	91
Oct. 27	do	78	202	5.25	325
Nov. 30	do	81	231	5.70	392

[a] Measurement made by wading.

Daily gage height, in feet, of Owens River near Lone Pine, Cal., for 1910.

[G. F. Marsh, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.5	6.1	5.95	5.1	3.9	5.5	4.45	4.4	3.7	3.8	5.35	5.7
2	7.7	5.9	6.0	5.0	3.9	5.8	4.45	4.35	3.7	3.8	5.35	5.7
3	8.5	6.0	6.0	5.0	3.85	6.0	4.45	4.35	3.75	3.85	5.35	5.75
4	9.1	6.2	6.1	5.1	3.8	6.1	4.5	4.4	3.7	3.8	5.4	5.85
5	10.2	6.3	6.15	5.0	3.85	6.2	4.5	4.35	3.7	3.85	5.4	5.9
6	8.7	6.4	6.2	5.0	3.95	6.5	4.5	4.1	3.7	4.0	5.45	5.95
7	8.2	6.5	6.2	4.9	3.95	6.4	4.55	4.1	3.7	4.05	5.5	6.0
8	8.1	6.5	6.3	4.8	4.0	6.2	4.5	4.0	3.7	4.2	5.55	6.0
9	7.3	6.4	6.35	4.7	4.0	6.0	4.45	3.9	3.65	4.25	5.6	6.0
10	7.3	6.1	6.4	4.5	4.85	5.4	4.45	3.95	3.7	4.3	5.6	6.0
11	7.3	6.0	6.45	4.5	4.1	5.6	4.4	3.8	3.7	4.35	5.65	6.0
12	7.2	6.1	6.45	4.3	4.05	5.5	4.4	3.85	3.65	4.4	5.65	6.0
13	7.1	6.1	6.45	4.1	4.0	5.45	4.2	3.55	3.6	4.45	5.7	6.0
14	7.0	6.2	6.5	4.1	4.0	5.4	4.1	3.6	3.65	4.5	5.7	6.0
15	7.0	6.3	6.5	4.1	4.0	5.4	4.0	3.65	3.75	4.5	5.75	6.0
16	7.0	6.5	6.5	4.05	3.95	5.4	4.0	3.6	3.65	4.9	5.75	6.0
17	7.05	6.5	6.5	4.05	4.0	5.5	4.0	3.6	3.65	5.05	5.7	6.0
18	7.1	6.5	6.55	4.0	4.1	5.5	3.95	3.55	3.6	5.1	5.7	5.95
19	7.05	6.4	6.5	4.0	4.2	5.4	4.1	3.6	3.65	5.2	5.7	5.95
20	7.0	6.3	6.5	4.0	4.6	5.4	4.2	3.65	3.7	5.3	5.7	5.95
21	7.0	6.2	6.5	4.0	4.9	5.6	4.5	3.6	3.75	5.35	5.7	5.95
22	7.0	6.1	6.5	4.0	4.9	5.2	4.9	3.65	3.7	5.4	5.7	6.0
23	6.95	6.1	6.2	3.9	4.95	5.0	5.0	3.6	3.75	5.35	5.7	6.05
24	6.9	6.1	5.0	3.9	4.9	4.8	5.2	3.55	3.75	5.3	5.7	6.05
25	6.9	6.05	5.9	3.9	5.0	4.7	5.4	3.55	3.75	5.3	5.7	6.05
26	6.85	6.0	5.8	3.9	5.0	4.5	5.6	3.6	3.8	5.3	5.7	6.05
27	6.85	6.0	5.8	3.9	5.1	4.5	5.0	3.6	3.8	5.25	5.7	6.0
28	6.8	6.0	5.8	3.9	5.1	4.45	5.0	3.6	3.8	5.3	5.7	6.0
29	6.8	.....	5.8	3.9	5.2	4.4	4.9	3.6	3.75	5.35	5.7	5.95
30	6.7	.....	5.6	3.9	5.3	4.4	4.5	3.65	3.8	5.35	5.7	5.95
31	6.7	.....	5.4	.....	5.4	.....	4.45	3.7	.....	5.35	.....	5.9

Daily discharge, in second-feet, of Owens River near Lone Pine, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	812	500	472	314	121	386	205	197	93	107	359	424
2	861	462	481	297	121	443	205	188	93	107	359	424
3	1,070	481	481	297	114	481	205	188	100	114	359	434
4	1,260	520	500	314	107	500	213	197	93	107	368	452
5	1,770	540	510	297	114	520	213	188	93	114	368	462
6	1,130	561	520	297	128	582	213	150	93	135	377	472
7	989	582	520	280	128	561	221	150	93	142	386	481
8	963	582	540	263	135	520	213	135	93	165	396	481
9	764	561	550	246	135	481	205	121	86	173	405	481
10	764	500	561	213	172	368	205	128	93	181	405	481
11	764	481	572	213	150	405	197	107	93	189	414	481
12	741	500	572	181	142	386	197	114	86	197	414	481
13	718	500	572	150	135	377	165	74	80	205	424	481
14	695	520	582	150	135	368	150	80	86	213	424	481
15	695	540	582	150	135	368	135	86	100	213	434	481
16	695	582	582	142	128	368	135	80	86	280	434	481
17	706	582	582	142	135	386	135	80	86	306	424	481
18	718	582	593	135	150	386	128	74	80	314	424	472
19	706	561	582	135	165	368	150	80	86	332	424	472
20	695	540	582	135	229	368	165	86	93	350	424	472
21	695	520	582	135	280	405	213	80	100	359	424	472
22	695	500	582	135	280	332	280	86	93	368	424	481
23	684	500	520	121	288	297	297	80	100	359	424	490
24	672	500	297	121	280	263	332	74	100	350	424	490
25	672	490	462	121	297	246	368	74	100	350	424	490
26	660	481	443	121	297	213	405	80	107	350	424	490
27	660	481	443	121	314	213	297	80	107	341	424	481
28	649	481	443	121	314	205	297	80	107	350	424	481
29	649	.....	443	121	332	197	280	80	100	359	424	472
30	626	.....	405	121	350	197	213	86	107	359	424	472
31	626	.....	368	.....	368	.....	205	93	.....	359	.....	462

NOTE.—Daily discharge determined from a well-defined discharge rating curve.

Monthly discharge of Owens River near Lone Pine, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	1,770	626	800	49,200	A.
February	582	462	522	29,000	A.
March	593	297	514	31,600	B.
April	314	121	186	11,100	A.
May	368	107	199	12,200	B.
June	582	197	373	22,200	A.
July	405	128	221	13,600	A.
August	197	74	110	6,760	A.
September	107	80	94.2	5,610	A.
October	368	107	253	15,600	A.
November	434	359	409	24,300	A.
December	490	424	473	29,100	B.
The year	1,770	74	346	250,000	

ROCK CREEK NEAR ROUND VALLEY, CAL.

This station, which is located at a footbridge on the Bishop and Long Valley road about two-thirds mile above the mouth of the creek, in sec. 9, T. 6 S., R. 31 E., Mount Diablo base and meridian, was established August 3, 1903, at the wagon bridge 400 feet farther upstream, and was removed to the present site in July, 1906.

Pine Creek, the principal tributary of Rock Creek, enters below the station. A number of small ditches divert water above the station. The drainage area above the mouth of Rock Creek canyon is approximately 46 square miles.

The gage is a vertical staff on the left bank.

Discharge measurements are made from the footbridge.

The channel is composed of sand and cobblestones and shifts somewhat. The record may be considered good up to October 14; after this date the discharge was computed by the indirect method for shifting channels and the record is fair.

Discharge measurements of Rock Creek near Round Valley, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 9	R. E. Haines	15	16	1.27	31
30	do	14	14	1.08	23
Apr. 21	do	15	16	1.18	28
May 11	do	16	23	1.69	52
June 25	C. H. Lee	16	25	1.80	58
July 11	do	16	25	1.78	56
Aug. 3	do	16	22	1.60	43
24	F. G. Wood	15	19	1.42	37
Sept. 18	G. T. Peekema	15	15	1.13	25
Oct. 22	do	16	21	1.52	35
Nov. 18	do	16	18	1.38	29
Dec. 31	do	16	18	1.33	30

Daily gage height, in feet, of Rock Creek near Round Valley, Cal., for 1910.

[L. L. Roberts, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.9	.....	1.35	1.1	1.3	2.2	2.3	.....	1.35	1.15	1.4	1.35
2	.....	1.65	.....	.....	.....	.....	.....	1.55	.....	.....	.....	.....
3	1.9	.....	1.4	1.15	1.3	2.3	2.1	.....	1.35	1.2	1.45	1.35
4	.....	1.6	1.4	.....	.....	2.4	.....	1.5	1.25	.....	.....	1.4
5	1.8	1.65	.....	1.1	1.35	2.3	2.15	1.5	.....	1.2	1.4	.....
6	.....	.....	1.35	1.15	.....	2.2	2.0	.....	1.2	.....	1.4	1.4
7	1.6	1.7	1.3	.....	1.35	.....	.....	1.4	.....	1.2	.....	.....
8	.....	.....	1.3	1.1	1.4	2.2	2.0	.....	1.1	.....	1.35	1.45
9	1.5	1.7	.....	.....	.....	.....	.....	1.35	.....	1.2	.....	.....
10	.....	.....	1.25	1.15	1.35	2.2	1.8	.....	1.15	.....	1.4	1.4
11	1.4	1.65	1.2	1.15	1.45	.....	.....	1.4	1.1	1.2	.....	1.45
12	.....	.....	.....	.....	.....	2.15	1.75	1.4	.....	.....	1.45	.....
13	1.4	1.6	1.2	1.1	1.4	.....	.....	.....	1.15	1.3	.....	1.4
14	.....	.....	.....	.....	.....	2.1	1.65	1.3	.....	1.4	1.4	.....
15	1.4	1.5	1.25	1.15	1.5	.....	.....	.....	1.15	.....	.....	1.4
16	.....	.....	.....	1.1	1.5	2.0	1.65	1.3	.....	1.5	1.35	.....
17	1.4	1.4	1.2	1.2	1.55	2.1	1.65	.....	1.15	.....	1.35	1.35
18	.....	1.4	.....	.....	.....	1.9	.....	1.4	.....	1.45	.....	1.35
19	1.5	.....	1.2	1.2	1.5	1.9	1.65	.....	1.1	.....	1.3	.....
20	.....	1.3	.....	.....	1.6	.....	.....	1.4	.....	1.5	.....	1.3
21	1.5	1.3	1.2	1.25	.....	1.7	1.6	.....	1.1	1.4	1.35	.....
22	.....	.....	.....	1.2	1.6	1.7	.....	1.4	.....	.....	.....	1.35
23	1.55	1.3	1.2	.....	.....	1.5	1.65	.....	1.0	1.45	1.3	.....
24	.....	.....	.....	1.3	1.7	1.4	.....	1.5	.....	.....	.....	1.35
25	1.6	1.3	1.2	1.35	.....	.....	1.6	.....	1.05	1.45	1.35	.....
26	.....	.....	.....	1.4	1.7	1.4	.....	1.4	.....	1.5	.....	1.4
27	1.55	1.3	1.2	1.35	1.8	1.45	1.65	.....	1.0	1.5	.....	.....
28	.....	1.35	.....	1.35	.....	.....	1.6	1.35	.....	.....	1.3	1.35
29	1.6	.....	1.2	.....	1.8	1.4	.....	.....	1.1	1.5	1.35	1.35
30	.....	.....	.....	1.3	.....	.....	1.65	1.35	1.1	1.5	.....	.....
31	1.65	.....	1.2	.....	1.9	.....	1.5	.....	.....	1.5	.....	1.4

Daily discharge, in second-feet, of Rock Creek near Round Valley, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	63	49	34	23	32	81	87	42	34	25	30	29
2	63	49	35	24	32	84	80	43	34	26	31	29
3	63	47	36	25	32	87	74	42	34	27	32	29
4	60	46	36	24	33	94	76	41	29	27	31	31
5	57	49	35	23	34	87	78	41	28	27	30	31
6	52	50	34	25	34	81	68	38	27	27	30	31
7	46	51	32	24	34	81	68	36	25	27	29	32
8	44	51	32	23	36	81	68	35	23	27	28	34
9	41	51	30	24	35	81	62	34	24	27	29	33
10	38	50	29	25	34	81	57	35	25	27	30	32
11	36	49	27	25	38	80	56	36	23	27	31	34
12	36	48	27	24	37	78	54	36	24	30	32	33
13	36	46	27	23	36	76	52	34	25	32	31	32
14	36	44	28	24	38	74	49	32	25	36	30	32
15	36	41	29	25	41	71	49	32	25	38	29	32
16	36	38	28	23	41	68	49	32	25	40	28	31
17	36	36	27	27	43	74	49	34	25	37	28	30
18	38	36	27	27	42	63	49	36	24	35	29	30
19	41	34	27	27	41	63	49	36	23	36	26	29
20	41	32	27	28	46	57	47	36	23	36	27	28
21	41	32	27	29	46	51	46	36	23	30	28	29
22	42	32	27	27	46	51	48	36	21	35	27	30
23	43	32	27	30	48	41	49	38	19	32	26	30
24	44	32	27	32	51	36	47	41	20	32	27	30
25	46	32	27	34	51	36	46	39	21	32	28	32
26	45	32	27	36	51	36	48	36	20	34	27	33
27	43	32	27	34	57	38	49	35	19	34	27	32
28	44	34	27	34	57	37	46	34	21	34	26	31
29	46	.....	27	33	57	36	47	34	23	34	28	31
30	48	.....	27	32	60	62	49	34	23	34	28	32
31	49	.....	27	.....	63	.....	41	34	.....	34	.....	33

NOTE.—Daily discharge Jan. 1 to Oct. 14 determined from a well-defined discharge rating curve; Oct. 15 to Dec. 31 indirect method for shifting channels used. Discharge interpolated for days on which gage was not read.

Monthly discharge of Rock Creek near Round Valley, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	63	36	44.8	2,750	B.
February	51	32	41.2	2,290	B.
March	36	27	29.2	1,800	B.
April	36	23	27.1	1,610	B.
May	63	32	42.8	2,630	B.
June	94	36	65.5	3,900	B.
July	87	41	56.0	3,440	B.
August	43	32	36.4	2,240	B.
September	34	19	25.3	1,510	B.
October	40	25	31.6	1,940	B.
November	32	26	28.8	1,710	C.
December	34	28	31.1	1,910	C.
The year	94	19	38.3	27,700	

PINE CREEK NEAR ROUND VALLEY, CAL.

This station, which is located at a footbridge about 300 feet above the highway bridge on the road from Bishop to Long Valley, in sec. 9, T. 6 S., R. 31 E., Mount Diablo base and meridian, was originally established August 3, 1903, at a point about 100 feet above the mouth of the creek and 150 feet below the bridge, and was reestablished at the new site May 13, 1908.

Considerable water is diverted from the creek above the gaging station, and the water which passes the station is that which flows directly into Rock Creek. The drainage area above the mouth of Bercluin Canyon is approximately 32 square miles.

The present gage is a vertical staff on the left bank. The original gage datum has not been maintained.

Discharge measurements are made from the footbridge. The daily variation in stage of this creek during high water is large, owing to the effect of warm days and cool nights on the snow in the headwater region, but an attempt was made to record gage heights representing the mean for the day.

The channel is composed of lava rock and sand and is fairly permanent.

The discharge rating curve is fairly well defined, and the record may be considered fair.

Discharge measurements of Pine Creek near Round Valley, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. feet.*	*Feet.*	*Sec.-ft.*
Mar. 9	R. E. Haines	9.6	12.8	3.58	4.3
30	....do	9.8	13.2	3.60	4.9
Apr. 21	....do	10	15	3.81	13
May 11	....do	10	14.4	3.72	9.2
June 25	C. H. Lee	12	25	4.50	65
Aug. 3	....do	11	16	3.95	20
24	F. G. Wood	10	14	3.80	11
July 11	C. H. Lee	12	21	4.20	42
Sept. 18	G. T. Peekema	10	12.7	3.60	4.9
Oct. 22	....do	10	13	3.60	4.9
Nov. 18	....do	10	13.2	3.63	5.4
Dec. 21	....do	10	13	3.60	4.7

Daily gage height, in feet, of Pine Creek near Round Valley, Cal., for 1910.

[L. L. Roberts, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.9	.....	3.6	3.4	3.75	5.6	4.4	.....	3.7	3.45	3.5	3.6
2	.....	3.6	.....	.....	.....	.....	.....	3.95	.....	.....	.....	.....
3	3.9	.....	3.65	3.45	3.75	5.7	4.2	.....	3.65	3.4	3.5	3.65
4	.....	3.6	3.6	.....	.....	5.8	.....	3.9	3.6	.....	.....	3.65
5	3.7	3.65	.....	3.4	3.85	5.7	4.3	3.8	.....	3.5	3.4	.....
6	.....	.....	3.6	3.4	.....	5.6	4.15	.....	3.6	.....	3.4	3.55
7	3.7	3.7	3.55	.....	3.85	.....	.....	3.6	.....	3.45	.....	.....
8	.....	.....	3.6	3.4	3.9	5.5	4.15	.....	3.6	.....	3.35	3.6
9	3.7	3.7	3.58	.....	.....	.....	.....	3.55	.....	3.5	.....	.....
10	.....	.....	3.55	3.45	4.0	5.6	4.1	.....	3.65	.....	3.45	3.55
11	3.7	3.7	3.55	3.55	4.2	.....	4.2	3.65	3.6	3.45	.....	3.65
12	.....	.....	.....	.....	.....	5.5	4.1	3.7	.....	.....	3.4	.....
13	3.7	3.7	3.55	3.5	4.3	.....	.....	.....	3.6	3.55	.....	3.55
14	.....	.....	.....	.....	.....	5.7	4.1	3.7	.....	3.5	3.5	.....
15	3.7	3.7	3.6	3.55	4.4	.....	.....	.....	3.5	.....	.....	3.6
16	.....	.....	.....	3.7	4.4	5.6	4.15	3.65	.....	3.55	3.55	.....
17	3.7	3.6	3.5	3.8	4.5	5.7	4.15	.....	3.5	.....	3.6	3.55
18	.....	3.6	.....	.....	.....	5.4	.....	3.6	.....	3.55	.....	3.6
19	3.6	.....	3.55	3.7	4.45	5.4	4.15	.....	3.45	.....	3.55	.....
20	.....	3.6	.....	3.8	4.6	.....	.....	3.6	.....	3.6	.....	3.55
21	3.65	3.65	3.5	3.81	.....	5.2	4.15	.....	3.45	3.55	3.6	.....
22	.....	.....	.....	3.65	4.7	5.2	.....	3.65	.....	.....	.....	3.6
23	3.6	3.6	3.55	.....	.....	5.0	4.2	.....	3.4	3.55	3.6	.....
24	.....	.....	.....	3.7	4.8	4.8	.....	3.7	.....	.....	.....	3.6
25	3.7	3.6	3.5	3.75	.....	4.5	4.2	.....	3.45	3.6	3.6	.....
26	.....	.....	.....	3.8	4.8	4.7	.....	3.7	.....	3.65	.....	3.6
27	3.7	3.6	3.5	3.9	4.9	4.7	4.25	.....	3.4	3.6	.....	.....
28	.....	3.6	.....	4.0	.....	.....	4.2	3.65	.....	.....	.....	3.6
29	3.65	.....	3.4	.....	5.0	4.6	.....	.....	3.45	3.6	3.55	3.6
30	.....	.....	3.6	3.8	.....	.....	3.95	3.7	3.4	3.55	3.6	.....
31	3.7	.....	3.4	.....	5.3	.....	3.9	.....	.....	3.6	.....	3.6

Daily discharge, in second-feet, of Pine Creek near Round Valley, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	17	6.4	4.8	1.5	10	239	57	18	8	2.2	2.8	4.8
2	17	4.8	5.6	1.8	10	248	47	20	7.2	1.8	2.8	5.6
3	17	4.8	6.4	2.2	10	258	39	18	6.4	1.5	2.8	6.4
4	12	4.8	4.8	1.8	12	277	43	17	4.8	2.2	2.2	6.4
5	8	6.4	4.8	1.5	14	258	47	12	4.8	2.8	1.5	4.8
6	8	7.2	4.8	1.5	14	239	35	8	4.8	2.5	1.5	3.8
7	8	8	3.8	1.5	14	230	35	4.8	4.8	2.2	1.4	4.3
8	8	8	4.8	1.5	17	220	35	4.3	4.8	2.5	1.2	4.8
9	8	8	4.4	1.8	20	230	33	3.8	5.6	2.8	1.5	4.3
10	8	8	3.8	2.2	24	239	31	4.8	6.4	2.5	2.2	3.8
11	8	8	3.8	3.8	39	230	39	6.4	4.8	2.2	1.8	6.4
12	8	8	3.8	3.3	43	220	31	8	4.8	2.8	1.5	4.8
13	8	8	3.8	2.8	47	239	31	8	4.8	3.8	2.2	3.8
14	8	8	4.3	3.3	52	258	31	8	3.8	2.8	2.8	4.3
15	8	8	4.8	3.8	57	248	33	7.2	2.8	3.3	3.3	4.8
16	8	6.4	3.8	8	57	239	35	6.4	2.8	3.8	3.8	4.3
17	8	4.8	2.8	12	68	258	35	5.6	2.8	3.8	4.8	3.8
18	6.4	4.8	3.3	10	65	201	35	4.8	2.5	3.8	4.3	4.8
19	4.8	4.8	3.8	8	62	201	35	4.8	2.2	4.3	3.8	4.3
20	5.6	4.8	3.3	12	80	182	35	4.8	2.2	4.8	4.3	3.8
21	6.4	6.4	2.8	12	86	164	35	5.6	2.2	3.8	4.8	4.3
22	5.6	5.6	3.3	6.4	92	164	37	6.4	1.8	3.8	4.8	4.8
23	4.8	4.8	3.8	7.2	98	132	39	7.2	1.5	3.8	4.8	4.8
24	6.4	4.8	3.3	8	105	105	39	8	1.8	4.3	4.8	4.8
25	8	4.8	2.8	10	105	68	39	8	2.2	4.8	4.8	4.8
26	8	4.8	2.8	12	105	92	41	8	1.8	6.4	5.0	4.8
27	8	4.8	2.8	17	118	92	43	7.2	1.5	4.8	5.3	4.8
28	7.2	4.8	2.2	24	125	86	39	6.4	1.8	4.8	5.5	4.8
29	6.4	.....	1.5	17	132	80	30	7.2	2.2	4.8	3.8	4.8
30	7.2	.....	4.8	12	156	68	20	8	1.5	3.8	4.8	4.8
31	8	.....	1.5	.....	182	.....	17	8	.....	4.8	.....	4.8

NOTE.—Daily discharge determined from a discharge rating curve well defined between 5 and 240 second-feet. Discharge interpolated for days on which gage was not read.

Monthly discharge of Pine Creek near Round Valley, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	17	4.8	8.38	515	C.
February	8	4.8	6.17	343	C.
March	6.4	1.5	3.78	232	C.
April	24	1.5	7.00	417	C.
May	182	10	65.1	4,000	C.
June	277	68	192	11,400	C.
July	57	17	36.2	2,230	C.
August	20	3.8	8.22	505	C.
September	8	1.5	3.65	217	C.
October	6.4	1.5	3.49	215	C.
November	5.5	1.2	3.36	200	C.
December	6.4	3.8	4.72	290	C.
The year	277	1.2	28.4	20,600	

BISHOP CREEK NEAR BISHOP, CAL.

This station, which is located at the wagon bridge on the Bishop road, about 4 miles southeast of Bishop and 2 miles below the mouth of Bishop Creek canyon, in sec. 9, T. 7 S., R. 32 E., Mount Diablo base and meridian, was established August 10, 1903.

The North Hillside, South Hillside, and Power canals head above the station. The amount of water in these canals, which is included

in the total discharge given in the list of discharge measurements, is dependent on the stage of the creek. No attempt has been made to estimate the amount diverted by the canals. The drainage area above the mouth of Bishop Creek canyon is approximately 63 square miles.

The gage is a vertical staff on the right bank at the bridge.

Discharge measurements are made from the bridge at the gage.

On June 25, 1909, the Nevada-California Power Co.'s equalizing dam at intake No. 2 went out and the bridge was carried away. The gage was left intact, but it was removed August 15, 1909, in building a new bridge. The bridge was completed August 23, and a new gage put in August 31 at approximately the original datum.

Both banks of the stream are high and the current is swift. The channel is rocky and is fairly permanent.

The 1910 discharge rating curve is fairly well defined and the results may be considered good.

Discharge measurements of Bishop Creek and canals near Bishop, Cal., in 1910.

Date.	Hydrographer.	Gage height.	Discharge.		
			Creek.	Canals.	Total.
		Feet.	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*
Mar. 8	R. E. Haines	2.22	118	2.9	121
29	....do	1.74	56	11	67
Apr. 20	....do	2.30	130	4	134
May 10	....do	2.55	168	13	181
June 24	C. H. Lee	2.10	97	32	129
July 11	....do	2.30	112	51	163
Aug. 2	Lee and Wood	1.98	86	46	132
23	F. G. Wood	2.00	88	33	121
Sept. 17	G. T. Peekema	1.60	43	22	65
Oct. 21	....do	2.00	90	13	103
Nov. 17	....do	1.72	58	9.5	68
Dec. 20	....do	1.72	47	14	61

Daily gage height, in feet, of Bishop Creek near Bishop, Cal., for 1910.

[C. R. Beal, A. F. Kirkpatrick, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.1	1.9	2.25	1.9	2.4	2.75	2.4	2.1	2.0	1.55	1.7	1.75
2	2.05	1.85	2.1	2.0	2.3	2.65	2.4	2.0	1.4	1.35	1.6	1.8
3	2.1	1.9	2.3	1.8	2.2	2.65	2.6	2.0	1.2	1.4	1.8	1.8
4	2.1	2.0	2.3	1.85	2.0	2.4	2.65	2.0	1.8	1.8	1.7	1.45
5	2.2	2.0	2.2	1.6	1.8	2.5	2.35	2.0	1.7	1.45	1.7	1.8
6	2.15	1.9	2.3	1.85	2.1	2.5	2.1	2.1	1.8	1.85	1.4	1.8
7	2.05	1.95	2.3	1.75	2.15	2.5	2.2	2.0	1.75	1.7	1.7	1.8
8	2.1	1.75	2.3	1.85	2.1	2.2	2.2	1.9	2.0	1.75	1.55	1.8
9	2.0	1.95	2.3	1.8	2.3	2.55	2.25	1.7	2.0	1.8	1.75	1.75
10	2.1	1.9	2.2	1.95	2.5	2.5	2.25	1.9	1.6	1.8	1.6	1.45
11	2.0	1.95	2.5	1.9	2.3	2.2	2.3	2.25	1.5	1.7	1.95	1.8
12	2.0	1.85	2.25	1.75	2.55	2.4	2.2	2.1	1.4	1.7	1.8	1.6
13	2.0	1.9	2.4	1.55	2.0	2.2	2.2	2.0	1.75	1.35	1.75	1.75
14	2.05	1.8	2.3	1.85	2.3	2.0	2.05	2.15	1.5	1.6	1.8	1.8
15	1.95	2.0	2.5	1.8	3.5	2.3	2.15	2.0	1.7	1.65	1.75	1.85
16	1.9	1.85	2.4	1.8	3.2	1.8	2.0	1.8	1.7	1.75	1.65	1.8
17	1.9	1.9	2.5	1.85	2.9	2.1	2.1	1.95	1.2	1.55	1.75	1.6
18	1.9	1.85	2.4	2.15	3.25	2.1	2.0	1.95	1.8	1.7	1.6	1.85
19	1.95	2.0	2.5	1.95	3.5	1.95	2.2	1.95	1.7	1.65	1.8	1.6
20	2.0	1.9	2.4	2.05	3.3	2.1	2.2	2.0	1.5	1.7	1.6	1.9
21	1.9	2.0	2.4	2.1	2.6	2.25	2.7	2.0	1.4	1.75	1.8	1.8
22	2.0	1.9	2.3	2.35	3.25	1.85	4.0	2.0	1.55	1.85	1.6	1.9
23	1.9	2.1	2.4	2.5	3.2	2.0	3.9	2.0	1.6	1.65	1.8	1.85
24	1.9	1.9	2.3	2.25	3.0	2.1	2.2	3.9	1.5	1.7	1.5	1.5
25	1.9	2.0	2.35	1.95	3.1	2.2	2.1	2.2	1.6	1.65	1.8	1.6
26	1.9	2.1	2.3	2.55	2.5	2.2	1.95	2.2	1.4	1.7	1.65	1.75
27	1.9	2.1	2.3	2.5	2.4	2.45	1.8	1.8	1.65	1.75	1.8	1.3
28	1.9	2.0	2.1	2.35	2.7	2.4	2.2	2.0	1.4	1.85	1.75	1.8
29	1.9	.....	2.0	1.8	2.6	2.5	2.1	2.0	1.75	1.7	1.8	1.75
30	1.9	.....	1.9	2.25	2.8	2.4	1.9	1.95	1.75	1.7	1.55	1.8
31	1.9	.....	2.0	.....	2.6	.....	1.8	2.1	.....	1.65	.....	1.6

Daily discharge, in second-feet, of Bishop Creek near Bishop, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	97	73	117	73	138	198	138	97	85	39	52	57
2	91	68	97	85	124	180	138	85	28	25	43	62
3	97	73	124	62	110	180	171	85	17	28	62	62
4	97	85	124	68	85	138	180	85	62	62	52	32
5	110	85	110	43	62	154	131	85	52	32	52	62
6	117	73	124	68	97	154	97	97	62	68	28	62
7	91	79	124	57	104	154	110	85	57	52	52	62
8	97	57	124	68	97	110	110	73	85	57	39	62
9	85	79	124	62	124	162	117	52	85	62	57	57
10	97	73	110	79	154	154	117	73	43	62	43	32
11	85	79	154	73	124	110	124	117	35	52	79	62
12	85	68	117	57	162	138	110	97	28	52	62	43
13	85	73	138	39	85	110	110	85	57	25	57	57
14	91	62	124	68	124	85	91	104	35	43	62	62
15	79	85	154	62	359	124	104	85	52	48	57	68
16	73	68	138	62	291	62	85	62	52	57	48	62
17	73	73	154	68	228	97	97	79	17	39	57	43
18	73	68	138	104	302	97	89	79	62	52	43	68
19	79	85	154	79	359	79	110	79	52	48	62	43
20	85	73	138	91	313	97	110	85	35	52	43	73
21	73	85	138	97	171	117	189	85	28	57	62	62
22	85	73	124	131	302	68	477	85	39	68	43	73
23	73	97	138	154	291	85	453	85	43	48	62	68
24	73	73	124	117	248	97	110	453	35	52	35	35
25	73	85	131	79	269	110	97	110	43	48	62	43
26	73	97	124	162	154	110	79	110	28	52	48	57
27	73	97	124	154	138	144	62	62	48	57	62	22
28	73	85	97	131	189	138	110	85	28	68	57	62
29	73	.....	85	62	171	154	97	85	57	52	62	57
30	73	.....	73	117	208	138	73	79	57	52	39	62
31	73	.....	85	.....	171	.....	62	97	.....	48	.....	43

NOTE.—Daily discharge determined from a discharge rating curve fairly well defined between 40 and 170 second-feet. Curve not well defined above 200 second-feet.

Monthly discharge of Bishop Creek near Bishop, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	117	73	83.9	5,160	B.
February	97	57	77.5	4,300	B.
March	154	73	124	7,620	B.
April	162	39	85.7	5,100	B.
May	359	62	186	11,400	C.
June	198	62	125	7,440	B.
July	477	62	134	8,240	C.
August	453	52	97.6	6,000	C.
September	85	17	46.9	2,790	B.
October	68	25	50.2	3,090	B.
November	79	28	52.7	3,140	B.
December	73	22	55.3	3,400	B.
The year	477	17	93.4	67,700	

NOTE.—Estimates do not include the amounts diverted by irrigating canals above the station.

BAKER CREEK NEAR BIG PINE, CAL.

This station, which is located at a point about 150 feet below the bridge on Millpond road and about 3 miles west of the town of Big Pine, was established February 20, 1908.

No observations of gage heights were made during 1910.

The staff gage is at the footbridge from which the following discharge measurements were made during 1910:

Discharge measurements of Baker Creek near Big Pine, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 10	R. E. Haines	3.6	4.0	0.05	11
Apr. 1	do	3.7	3.8	.00	9.1
22	do	4.6	6.6	.60	25
May 12	do	3.6	3.9	.00	9.9
June 25[a]	C. H. Lee	5.0	4.9	.....	7.9
Aug. 3[a]	Lee and Wood	5.3	3.5	.....	2.9

[a] Made at road crossing above diversion.

BIG PINE CREEK NEAR BIG PINE, CAL.

This station, which is located at a footbridge about 2 miles southwest of Big Pine, in sec. 26, T. 9 S., R. 33 E., Mount Diablo base and meridian, was originally established December 5, 1903, at a point about 3 miles southwest of Big Pine, where the creek issues from the foothills, and was moved to the present site about half a mile farther east on October 29, 1907. No record of gage heights was kept from January 1, 1906, to May 22, 1908.

Water is diverted both above and below the station for irrigation. The drainage area above the mouth of the canyon is about 27 square miles.

The gage is a vertical staff on the right bank.

Discharge measurements are made from the footbridge near the gage.

The channel, which is composed of gravel and bowlders, is somewhat shifting.

The 1910 discharge rating curve is fairly well defined and the record may be considered good.

Discharge measurements of Big Pine Creek near Big Pine, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 10	R. E. Haines	10	23	2.72	20
Apr. 1	do	10	22	2.67	18
22	do	10	26	2.98	33
May 12	do	11	29	3.23	50
June 23	C. H. Lee	12	32	3.42	69
July 13	do	14	38	3.82	106
Aug. 1	Wood and Lee	15	36	3.77	100
22	F. G. Wood	12	29	3.50	73
Sept. 16	G. T. Peekema	11	26	3.03	41
Oct. 21	do	11	22	2.80	25
Nov. 19	do	11	19	2.63	16
Dec. 22	do	11	19	2.50	12

Daily gage height, in feet, of Big Pine Creek near Big Pine, Cal., for 1910.

[Mrs. M. L. Gaylord and Hugh Fisher, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		2.7	2.6			3.9		3.7			2.7	2.5
2				2.7	3.1		3.7		3.25	2.9		
3		2.7	2.6			4.2		3.7			2.6	2.6
4	3.0				3.1				3.2	2.9		
5		2.6	2.7	2.7			3.4	3.8			2.65	2.5
6	3.0				3.1	3.6			3.1	2.9		
7		2.6		2.7			3.6	3.7			2.6	2.5
8	3.0		2.7		3.1	3.6			3.1	2.9		
9		2.6		2.7			3.8			2.9	2.6	2.5
10	3.0		2.7		3.2	3.8		3.7	3.1			
11		2.6								2.85	2.65	2.5
12	3.0		2.7	2.8	3.2		3.8	3.6	3.1			
13						4.0				2.9	2.6	2.45
14		2.7		2.8	3.2		3.9	3.5	3.05			
15	2.7		2.7			3.7				2.9	2.7	2.5
16		2.7		2.8	3.2		3.7		3.05			
17			2.7		3.4	3.4		3.5		2.85	2.65	2.4
18	2.7	2.7							2.9			
19			2.7	2.9	3.4		4.8	3.3		2.8	2.6	2.5
20	2.7								2.8			
21		2.7		2.9	3.4	3.4	3.9	3.6		2.85	2.55	2.45
22	2.6		2.7						2.9			
23		2.7		3.0	4.0	3.6	3.8	3.6		2.85	2.5	2.5
24			2.7						2.95			
25	2.7	2.6			4.0	3.6		3.6		2.8	2.5	2.5
26			2.7	3.2			4.2		3.0			
27	2.7					3.4		3.5		2.7	2.5	2.5
28		2.6	2.7	3.2	4.0		3.9		2.9			
29	2.7					3.6		3.4		2.75	2.5	2.5
30			2.7	3.3	4.0		3.8		2.9			
31								3.3				2.55

Daily discharge, in second-feet, of Big Pine Creek near Big Pine, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	35	20	16	20	49	115	91	94	55	29	20	13
2	35	20	16	20	42	134	94	94	53	29	18	14
3	35	20	16	20	42	154	84	94	51	29	16	16
4	35	18	18	20	42	131	75	99	49	29	17	14
5	35	16	20	20	42	107	66	104	46	29	18	13
6	35	16	20	20	42	84	75	99	42	29	17	13
7	35	16	20	20	42	84	84	94	42	29	16	13
8	35	16	20	20	42	84	94	94	42	29	16	13
9	35	16	20	20	46	94	104	94	42	29	16	13
10	35	16	20	21	49	104	104	94	42	28	17	13
11	35	16	20	23	49	112	104	89	42	26	18	13
12	35	17	20	24	49	120	104	84	42	28	17	12
13	30	19	20	24	49	127	110	88	40	29	16	11
14	25	20	20	24	49	110	115	75	38	29	18	12
15	20	20	20	24	49	94	104	75	38	29	20	13
16	20	20	20	24	49	80	94	75	38	28	19	11
17	20	20	20	26	66	66	147	75	34	26	18	10
18	20	20	20	27	66	66	199	66	29	25	17	11
19	20	20	20	29	66	66	252	57	26	24	16	13
20	20	20	20	29	66	66	184	70	24	25	15	12
21	18	20	20	29	66	66	115	84	26	26	14	11
22	16	20	20	32	96	75	110	84	29	26	14	12
23	17	20	20	35	127	84	104	84	30	26	13	13
24	19	18	20	40	127	84	120	84	32	25	13	13
25	20	16	20	44	127	84	138	84	34	24	13	13
26	20	16	20	49	127	75	154	80	35	22	13	13
27	20	16	20	49	127	66	134	75	32	20	13	13
28	20	16	20	49	127	75	115	70	29	21	13	13
29	20	.....	20	53	127	84	110	66	29	22	13	13
30	20	.....	20	57	127	87	104	62	29	21	13	14
31	20	.....	20	.....	121	.....	99	57	.....	20	.....	14

NOTE.—Daily discharge determined from a discharge rating curve well defined below 120 second-feet and fairly well defined above. Discharge interpolated for days on which gage was not read.

Monthly discharge of Big Pine Creek near Big Pine, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	35	16	26.0	1,600	B.
February	20	16	18.1	1,010	B.
March	20	16	19.5	1,200	B.
April	57	20	29.7	1,770	A.
May	127	42	74.0	4,550	A.
June	154	66	92.6	5,510	A.
July	252	66	116	7,130	B.
August	104	57	82.1	5,050	A.
September	55	24	37.3	2,220	B.
October	29	20	26.2	1,610	B.
November	20	13	15.9	946	B.
December	16	10	12.7	781	B.
The year	252	10	46.1	33,400	

BIRCH CREEK NEAR TINEMAHA, CAL.

This station, which is located at a point near Peterson's ranch house, about 1 mile west of Fish Springs schoolhouse, and about 8 miles south of Big Pine, in sec. 16, T. 10 S., R. 34 E., Mount Diablo base and meridian, was established June 14, 1905, discontinued December 9, 1905, and reestablished December 7, 1906.

No water is diverted above or near the station. The drainage area above the mouth of the canyon is approximately 7 square miles.

The gage is a vertical staff on the left bank.

Discharge measurements are made from the footbridge at the gage.

The bed of the stream consists of coarse gravel and sand and shifts somewhat. Both banks are low but not subject to overflow. The current is swift at all stages.

The estimates of daily discharge for 1910 were prepared by the indirect method for shifting channels and from rating tables covering short periods. The record may be considered fair.

Discharge measurements of Birch Creek near Tinemaha, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 7	R. E. Haines	4.6	3.7	0.28	5.3
28	do	4.8	3.8	.27	4.9
Apr. 23	do	5.0	4.2	.36	8.4
May 9	do	4.6	4.0	.33	6.9
June 23	C. H. Lee	5.5	4.6	.46	12
July 13	do	5.5	6.2	.62	21
Aug. 1	Lee and Wood	5.5	5.4	.58	19
22	F. G. Wood	5.3	5.1	.52	13
Sept. 16	G. T. Peekema	5.2	4.4	.36	5.7
Oct. 20	do	5.6	3.8	.30	3.4
Nov. 16	do	5.4	3.9	.30	3.4
Dec. 19	do	5.4	4.0	.33	3.7

Daily gage height, in feet, of Birch Creek near Tinemaha, Cal., for 1910.

[Jessie Burdick and A. Clendenen, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.8	0.4	0.4	.....	0.4	0.8	0.6	0.6	0.44	0.3	0.4	0.3
2	.7	.4	.3	.....	.4	.8	.5	.6	.45	.3	.3	.3
3	.7	.5	.4	0.3	.4	.8	.6	.6	.45	.3	.3	.3
4	.4	.4	.4	.3	.4	.7	.5	.6	.35	.3	.3	.4
5	.4	.4	.4	.3	.3	.7	.5	.6	.40	.3	.3	.4
6	.4	.5	.3	.4	.4	.6	.5	.6	.37	.3	.3	.3
7	.6	.4	.3	.3	.4	.6	.6	.6	.41	.3	.3	.3
8	.4	.3	.3	.3	.4	.6	.5	.6	.34	.3	.3	.3
9	.4	.3	.4	.4	.4	.6	.6	.6	.38	.3	.3	.3
10	.3	.3	.3	.4	.4	.7	.5	.6	.32	.3	.3	.3
11	.4	.3	.3	.5	.4	.7	.6	.6	.30	.3	.3	.35
12	.4	.4	.3	.5	.4	.7	.6	.6	.30	.3	.3	.3
13	.4	.4	.3	.4	.5	.6	.7	.6	.35	.3	.3	.3
14	.5	.3	.4	.4	.5	.6	.6	.5	.30	.3	.3	.3
15	.5	.3	.3	.3	.5	.6	.6	.5	.40	.45	.3	.3
16	.5	.4	.3	.3	.5	.6	.6	.5	.40	.4	.3	.3
17	.5	.4	.4	.4	.4	.6	.6	.5	.40	.3	.3	.3
18	.5	.3	.4	.3	.4	.6	1.05	.3	.30	.3	.3	.35
19	.4	.4	.3	.4	.4	.6	1.1	.5	.30	.3	.3	.3
20	.4	.3	.3	.4	.4	.6	.8	.5	.31	.3	.3	.3
21	.5	.3	.3	.5	.4	.5	1.0	.5	.30	.3	.3	.3
22	.4	.3	.3	.4	.5	.5	.6	.5	.10	.3	.3	.3
23	.5	.3	.4	.4	.5	.5	.7	.51	.30	.3	.3	.3
24	.4	.3	.4	.4	.5	.5	.6	.65	.30	.3	.3	.3
25	.4	.4	.3	.4	.5	.6	.7	.54	.30	.3	.3	.4
26	.3	.4	.3	.3	.5	.5	.6	.50	.10	.3	.3	.35
27	.4	.3	.3	.4	.5	.6	.7	.50	.30	.3	.3	.3
28	.4	.4	.3	.3	.6	.6	.6	.60	.11	.3	.3	.3
29	.3	.....	.4	.4	.7	.7	.7	.55	.25	.3	.3	.3
30	.4	.....	.3	.4	.8	.6	.6	.45	.30	.3	.3	.35
31	.4	.....	.3	.....	.9	.....	.6	.45	.....	.3	.....	.3

Daily discharge, in second-feet, of Birch Creek near Tinemaha, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	33	9.5	9.5	6	9.5	33	20	19	9	3.5	7	3.5
2	26	9.5	6	6	9.5	33	14	19	9.5	3.5	3.5	3.5
3	26	14	9.5	6	9.5	33	20	19	9.5	3.5	3.5	3.5
4	9.5	9.5	9.5	6	9.5	26	14	19	5.2	3.5	3.5	7
5	9.5	9.5	9.5	6	6	26	14	19	7	3.5	3.5	7
6	9.5	14	6	9.5	9.5	20	14	18	5.9	3.5	3.5	3.5
7	20	9.5	6	6	9.5	20	20	18	7.5	3.5	3.5	3.5
8	9.5	6	6	6	9.5	20	14	18	4.9	3.5	3.5	3.5
9	9.5	6	9.5	9.5	9.5	20	20	18	6.3	3.5	3.5	3.5
10	6	6	6	9.5	9.5	26	14	18	4.2	3.5	3.5	3.5
11	9.5	6	6	14	9.5	26	20	17	3.5	3.5	3.5	5.2
12	9.5	9.5	6	14	9.5	26	20	17	3.5	3.5	3.5	3.5
13	9.5	9.5	6	9.5	14	20	26	17	5.2	3.5	3.5	3.5
14	14	6	9.5	9.5	14	20	20	14	3.5	3.5	3.5	3.5
15	14	6	6	6	14	20	20	14	7	9.5	3.5	3.5
16	14	9.5	6	6	14	20	20	14	7	7	3.5	3.5
17	14	9.5	9.5	9.5	9.5	20	20	14	7	3.5	3.5	3.5
18	14	6	9.5	6	9.5	20	50	5	3.5	3.5	3.5	5.2
19	9.5	9.5	6	9.5	9.5	20	54	13	3.5	3.5	3.5	3.5
20	9.5	6	6	9.5	9.5	20	33	13	3.8	3.5	3.5	3.5
21	14	6	6	14	9.5	14	47	13	3.5	3.5	3.5	3.5
22	9.5	6	6	9.5	14	14	20	13	.5	3.5	3.5	3.5
23	14	6	9.5	9.5	14	14	26	13	3.5	3.5	3.5	3.5
24	9.5	6	9.5	9.5	14	14	20	21	3.5	3.5	3.5	3.5
25	9.5	9.5	6	9.5	14	20	26	14	3.5	3.5	3.5	7
26	6	9.5	6	6	14	14	20	12	.5	3.5	3.5	5.2
27	9.5	6	6	9.5	14	20	26	12	3.5	3.5	3.5	3.5
28	9.5	9.5	6	6	20	20	20	18	.6	3.5	3.5	3.5
29	6	.....	9.5	9.5	26	26	26	15	2.5	3.5	3.5	3.5
30	9.5	.....	6	9.5	33	20	20	9.5	3.5	3.5	3.5	5.2
31	9.5	.....	6	.....	40	.....	20	9.5	.....	3.5	.....	3.5

NOTE.—Daily discharge determined as follows: Jan. 1 to Aug. 1, from a discharge rating curve well defined below 45 second-feet; Aug. 2 to 21, by indirect method for shifting channels; Aug. 22 to Dec. 31, from a rating curve fairly well defined between 3 and 17 second-feet.

Monthly discharge of Birch Creek near Tinemaha, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	33	6	12.3	756	B.
February	14	6	8.20	455	B.
March	9.5	6	7.24	445	B.
April	14	6	8.55	509	B.
May	40	6	13.5	830	B.
June	33	14	21.5	1,280	B.
July	54	14	23.2	1,430	B.
August	21	5	15.3	941	B.
September	9.5	.5	4.72	281	C.
October	9.5	3.5	3.81	234	C.
November	7	3.5	3.62	215	C.
December	7	3.5	4.06	250	C.
The year	54	.5	10.5	7,630	

TINEMAHA CREEK NEAR TINEMAHA, CAL.

This station, which is located at a point near Peterson's ranch house, about 1 mile west of Fish Springs schoolhouse and 8 miles south of Big Pine, in sec. 21, T. 10 S., R. 34 E., Mount Diablo base and meridian, was established December 7, 1906.

No water is diverted above or near the station. The drainage area above the mouth of the canyon is approximately 5.2 square miles.

The gage is a vertical staff on the right bank.

Discharge measurements are made from the footbridge at the gage.

The channel is composed of gravel and shifts somewhat.

The estimates of daily discharge for 1910 were prepared by the indirect method for shifting channels. The record may be considered fair.

Discharge measurements of Tinemaha Creek near Tinemaha, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 7	R. E. Haines	9	4.4	0.75	6.1
28	.....do	5.5	7	.72	4.8
Apr. 23	.....do	5.8	6.7	.72	4.4
May 9	.....do	6.5	8.5	.86	8.5
June 23	.....do	10	7.8	1.10	18
July 13	C. H. Lee	10	9.6	1.20	24
Aug. 1	.....do	10	8	1.18	19
22	F. G. Wood	9.7	6.4	1.03	13
Sept. 16	G. T. Peekema	8.8	4.9	.84	7.9
Oct. 20	.....do	8.8	4.1	.73	5.4
Nov. 16	.....do	8.5	4	.68	5
Dec. 19	.....do	8.5	3.8	.70	4.5

Daily gage height, in feet, of Tinemaha Creek near Tinemaha, Cal., for 1910.

[Jessie Burdick and C. A. Clendenen, observers.]

Day	Jan.	Feb.	Mar.	Apr.	May	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.2	0.8	0.9	.....	0.9	1.7	1.3	1.2	1.05	0.8	0.7	0.7
2	1.0	.9	.8	.....	.8	1.7	1.2	1.2	1.0	.8	.7	.7
3	.9	1.0	.9	0.7	.8	1.6	1.2	1.2	1.05	.75	.7	.7
4	.8	.9	.9	.7	.8	1.6	1.1	1.3	.85	.8	.7	.75
5	.8	.9	.8	.7	.8	1.5	1.1	1.1	1.0	.8	.65	.75
6	.8	.8	.8	.8	.8	1.4	1.0	1.2	.9	.75	.7	.7
7	.9	.8	.8	.7	.8	1.3	1.1	1.1	1.05	.8	.65	.7
8	.8	.9	.8	.7	.9	1.3	1.1	1.1	.85	.75	.7	.7
9	.9	.8	.9	.8	.9	1.3	1.2	1.1	1.0	.8	.7	.7
10	.8	.8	.8	.8	1.0	1.4	1.1	1.1	1.0	.75	.7	.7
11	.9	.8	.8	.9	1.0	1.5	1.2	1.1	.9	.7	.7	.7
12	.9	.9	.8	1.0	1.0	1.5	1.2	1.1	.8	.8	.7	.7
13	.9	.8	.8	.9	1.0	1.4	1.3	1.1	.85	.8	.7	.7
14	.9	.8	.8	.8	1.0	1.3	1.2	1.1	.8	.7	.7	.65
15	1.0	.8	.7	.8	1.0	1.3	1.2	1.1	.9	.85	.7	.65
16	.9	.9	.7	.7	1.0	1.2	1.2	1.1	.9	.8	.7	.65
17	1.0	.9	.8	.8	1.0	1.2	1.2	1.1	.9	.75	.7	.65
18	.9	.8	.9	.9	1.0	1.2	1.75	1.1	.85	.7	.7	.65
19	.9	.9	.8	.8	1.0	1.2	1.7	1.1	.8	.7	.7	.65
20	.8	.8	.8	.9	1.0	1.2	1.5	1.1	.8	.7	.7	.65
21	.9	.8	.8	.8	1.0	1.1	1.7	1.0	.8	.7	.7	.65
22	.9	.8	.8	.9	1.0	1.1	1.4	1.1	.8	.75	.7	.65
23	.8	.8	.8	.8	1.1	1.1	1.4	1.05	.8	.7	.7	.65
24	.9	.9	.9	.8	1.2	1.1	1.3	1.11	.8	.7	.7	.65
25	.9	.8	.8	.9	1.2	1.2	1.4	1.0	.8	.7	.7	.8
26	.8	.9	.8	.8	1.2	1.2	1.2	1.1	.8	.75	.7	.75
27	.9	.8	.8	.8	1.2	1.3	1.3	1.15	.8	.7	.7	.8
28	.9	.9	.8	.7	1.3	1.2	1.2	1.2	.8	.7	.7	.8
29	.8	.....	.7	.8	1.4	1.3	1.3	1.0	.8	.7	.7	.85
30	.9	.....	.7	.8	1.5	1.2	1.2	1.05	.8	.75	.7	.9
31	.9	.....	.7	.....	1.7	.....	1.3	1.05	.....	.7	.....	.85

Daily discharge, in second-feet, of Tinemaha Creek near Tinemaha, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	22.4	7.6	10.9	4.3	9.7	45	27.8	19.8	14.4	7.0	5.1	5.0
2	14.5	10.9	7.6	4.2	6.6	45	23.2	19.8	12.5	7.0	5.1	5.0
3	10.9	14.5	10.9	4.2	6.6	39.4	23.2	19.8	14.5	5.6	5.2	5.0
4	7.6	10.9	10.9	4.2	6.6	39.4	18.8	24.0	7.7	7.0	5.2	6.3
5	7.6	10.9	7.6	4.2	6.7	34.8	19.0	15.7	12.8	7.0	3.9	6.3
6	7.6	7.6	7.6	6.8	6.7	30.3	15.0	19.8	9.4	5.6	5.2	4.9
7	10.9	7.6	7.6	4.2	6.7	25.8	19.2	15.7	14.7	7.0	3.9	4.9
8	7.6	10.9	7.6	4.2	9.8	25.8	19.3	15.7	7.8	5.6	5.3	4.9
9	10.9	7.6	10.8	6.8	9.8	25.8	23.6	15.7	13.0	7.0	5.3	4.9
10	7.6	7.6	7.6	6.8	13.3	30.5	19.6	15.7	13.0	5.7	5.3	4.8
11	10.9	7.6	7.6	9.8	13.3	35.2	23.8	15.7	9.6	4.4	5.4	4.8
12	10.9	10.9	7.4	13.3	13.3	35.2	24.0	15.7	6.5	7.1	5.4	4.8
13	10.9	7.6	7.4	9.8	13.4	30.6	28.4	15.7	8.0	7.1	5.4	4.8
14	10.9	7.6	7.4	6.7	13.4	26.2	23.7	15.7	6.7	4.5	5.5	3.5
15	14.5	7.6	4.6	6.7	13.4	26.2	23.6	15.7	9.8	8.2	5.5	3.5
16	10.9	10.9	4.6	4.1	13.5	22.0	23.4	15.7	9.8	7.3	5.5	3.5
17	14.5	10.9	7.4	6.7	13.5	22.0	23.2	15.7	9.8	5.9	5.5	3.4
18	10.9	7.6	10.6	9.8	13.5	22.0	48.6	15.7	8.3	4.6	5.5	3.4
19	10.9	10.9	7.2	6.6	13.5	22.0	46.4	15.7	6.8	4.7	5.4	3.4
20	7.6	7.6	7.2	9.7	13.6	22.0	35.6	15.7	6.8	4.7	5.4	3.4
21	10.9	7.6	7.2	6.6	13.6	18.0	45.0	12.0	6.8	4.7	5.3	3.4
22	10.9	7.6	7.2	9.6	13.6	18.0	30.3	15.7	6.9	6.1	5.3	3.4
23	7.6	7.6	7.2	6.5	17.5	18.0	29.8	13.7	6.9	4.7	5.3	3.4
24	10.9	10.9	10.4	6.5	21.6	18.0	25.2	15.7	6.9	4.8	5.2	3.4
25	10.9	7.6	7.0	9.7	21.6	22.2	29.5	12.1	6.9	4.8	5.2	7.0
26	7.6	10.9	7.0	6.5	21.6	22.2	20.7	15.8	7.0	6.2	5.2	5.6
27	10.9	7.6	7.0	6.5	21.6	27.0	24.8	17.9	7.0	4.9	5.2	7.0
28	10.9	10.9	7.0	4.0	25.8	22.4	20.4	20.0	7.0	4.9	5.1	7.0
29	7.6	.....	4.3	6.6	30.3	27.4	24.6	12.3	7.0	5.0	5.1	8.6
30	10.9	.....	4.3	6.6	34.8	22.8	20.2	14.3	7.0	6.4	5.1	10.2
31	10.9	.....	4.3	.....	45	.....	24.4	14.3	.....	5.0	.....	8.6

NOTE.—Daily discharge determined by indirect method for shifting channels.

Monthly discharge of Tinemaha Creek near Tinemaha, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	22.4	7.6	10.7	658	C.
February	14.5	7.6	9.14	508	C.
March	10.9	4.3	7.53	463	C.
April	13.3	4.0	6.74	401	C.
May	45	6.6	15.6	959	B.
June	45	18	27.4	1,630	B.
July	48.6	15	25.9	1,590	B.
August	24.0	12.0	16.2	996	B.
September	14.7	6.5	9.04	538	C.
October	8.2	4.4	5.82	358	C.
November	5.5	3.9	5.20	309	C.
December	10.2	3.4	5.10	314	C.
The year	48.6	3.4	12.1	8,720	

TABOOSE CREEK NEAR ABERDEEN,[1] CAL.

This station, which is located at a point on the crossing of the upper main highway about 4 miles northwest of Aberdeen, in sec. 16, T. 11 S., R. 34 E., Mount Diablo base and meridian, was established August 20, 1906, about one-half mile west of the point of crossing of the lower main highway 2 miles northwest of Aberdeen railway station and about 15 miles north of Independence. It was removed to the present site on February 25, 1907. Discharge measurements had been made at the original site from the first of 1906.

[1] Formerly known as Tibbetts.

No water is diverted above or near the station. The drainage area above the mouth of the canyon is about 7 square miles.

The gage is a vertical staff on the left bank. On March 7, 1910, its datum was lowered 1 foot. All gage heights for 1910 are referred to the new datum.

The channel is composed of shifting sand.

The estimates of daily discharge for 1910 were prepared by the indirect method for shifting channels and from rating curves covering short periods of time.

Discharge measurements of Taboose Creek near Aberdeen, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 7	R. E. Haines	6.5	3.0	0.90	2.2
28	.....do	6.5	3.4	.95	3.6
Apr. 23	.....do	6.9	4.1	1.05	4.7
May 9	.....do	7.0	4.4	1.16	5.3
June 23	C. H. Lee	7.0	4.8	1.11	9.0
July 13	.....do	7.0	5.4	1.19	11
Aug. 1	.....do	7.0	4.2	1.10	8.3
22	F. G. Wood	7.0	4.4	.98	5.8
Sept. 16	G. T. Peekema	6.6	3.1	.81	3.8
Oct. 20	.....do	6.8	3.1	.86	2.9
Nov. 16	.....do	6.1	2.6	.79	3.0
Dec. 19	.....do	6.4	2.8	.79	3.0

NOTE.—All gage heights refer to datum 1 foot lower than that previously maintained.

Daily gage height, in feet, of Taboose Creek near Aberdeen, Cal., for 1910.

[Ray Bowers, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1				0.95				1.2				
2					1.1				0.9			0.8
3	0.95					1.35	1.15			0.8		
4		0.9	0.9	.95							0.8	
5								1.1	.85			.8
6					1.1	1.4						
7	1.9	.9	1.0				1.1			.8	.8	
8				.95				1.1				
9					1.15				.8			.8
10	.95					1.25				.8		
11		.9	1.0	1.00			1.15				.8	
12								1.05	.8			.8
13					1.1	1.3						
14	.95	.9	1.0							.9	.8	
15				.98			1.2	1.0				
16					1.2				.8			.8
17	.95					1.2				.85		
18		.95	1.0	.98			1.2				.8	
19								.95	.8			.8
20					1.15	1.2						
21	.9	.9	1.0							.9	.8	
22				1.00			1.3	1.0				
23					1.25				.8			.8
24	.9					1.15				.85		
25		.9	1.0	1.10			1.2				.8	
26								.95	.8			.8
27					1.25	1.2						
28	.9	.9	.95							.8	.8	
29				1.10			1.2	.95				
30						1.2			.8			.8
31	.9				1.4					.8		

NOTE.—Gage datum lowered 1 foot Mar. 7. All gage heights for 1910 are referred to new datum.

Daily discharge, in second-feet, of Taboose Creek near Aberdeen, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3	2	2	3	5	15	11	11	4	3	3	3
2	3	2	2	3	5	14	10	11	4	3	3	3
3	3	2	2	3	5	13	10	10	4	3	3	3
4	5	2	2	3	5	14	10	9	4	3	3	3
5	10	2	3	3	4	14	9	8	4	3	3	3
6	15	2	3	3	4	15	8	8	4	3	3	3
7	30	2	4	3	4	14	8	8	4	3	3	3
8	15	2	4	3	5	13	8	8	3	3	3	3
9	5	2	4	3	5	12	9	8	3	3	3	3
10	3	2	4	4	5	11	10	8	3	3	3	3
11	3	2	4	4	5	11	10	7	3	3	3	3
12	3	2	4	4	5	12	10	7	3	3	3	3
13	3	2	4	4	5	13	11	7	3	4	3	3
14	3	2	4	4	5	13	11	6	3	4	3	3
15	3	2	4	4	6	12	11	6	3	4	3	3
16	3	2	4	4	7	11	11	6	3	4	3	3
17	3	3	4	4	7	11	11	6	3	4	3	3
18	3	3	4	4	7	11	11	6	3	4	3	3
19	3	3	4	4	6	11	11	6	3	3	3	3
20	2	2	4	4	6	11	12	6	3	3	3	3
21	2	2	4	4	7	10	13	6	3	4	3	3
22	2	2	4	4	8	10	14	6	3	4	3	3
23	2	2	4	5	9	9	13	6	3	4	3	3
24	2	2	4	5	9	10	12	6	3	4	3	3
25	2	2	4	5	9	10	11	6	3	4	3	3
26	2	2	4	5	10	11	11	6	3	3	3	3
27	2	2	3	5	10	11	11	6	3	3	3	3
28	2	2	3	5	11	11	11	6	3	3	3	3
29	2	.....	3	5	12	11	11	6	3	3	3	3
30	2	.....	3	5	13	11	11	5	3	3	3	3
31	2	.....	3	.....	15	.....	11	5	.....	3	.....	3

NOTE.—Daily discharges determined as follows: Jan. 1 to Apr. 24, from a poorly defined discharge rating curve; Apr. 25 to June 22, by indirect method for shifting channels; June 23 to Dec. 31, from a fairly well defined curve; discharge interpolated for days on which gage was not read.

Monthly discharge of Taboose Creek near Aberdeen, Cal., for 1910.

[Drainage area, 13.9 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	30	2	4.61	0.332	0.38	283
February	3	2	2.11	.152	.16	117
March	4	2	3.52	.253	.29	216
April	5	3	3.97	.286	.32	236
May	15	4	7.06	.508	.59	434
June	15	9	11.8	.849	.95	702
July	14	8	10.7	.770	.89	658
August	11	5	6.97	.501	.58	429
September	4	3	3.23	.232	.26	192
October	4	3	3.35	.241	.28	206
November	3	3	3.0	.216	.24	179
December	3	3	3.0	.216	.25	184
The year	30	2	5.30	.381	5.19	3,840

NOTE.—Estimates only approximate. It has been stated that about half the discharge of Taboose Creek at the mouth of the canyon is lost by seepage between the canyon and the gaging station. Hence discharge per square mile and run-off depth in inches do not apply uniformly to the basin as a whole.

43926°—WSP 290—12——9

GOODALE CREEK NEAR ABERDEEN,[1] CAL.

This station, which is located at the point where the stream leaves the foothills, about 13 miles north of Independence, 4 miles west of Aberdeen railway station, and one-fourth mile west of the upper road crossing in sec. 16, T. 11 S., R. 34 E., Mount Diablo base and meridian, was established September 20, 1906.

No water is diverted above or near the station. The drainage area above the mouth of Goodale Creek canyon is about 5 square miles.

The gage is a vertical staff on the left bank. On March 7, 1910, the datum was lowered 1 foot; all gage heights for 1910 are referred to the new datum.

Discharge measurements are made from the footbridge at the gage.

The channel is composed of sand and shifts somewhat. There is but one channel at all stages and the current is swift.

The two discharge rating curves used for 1910 are fairly well defined and the record may be considered fairly good.

Discharge measurements of Goodale Creek near Aberdeen, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 7	R. E. Haines	6.2	2.8	1.10	4.0
28	do	5.2	3.2	1.02	3.3
Apr. 23	do	5.6	3.8	1.18	6.0
May 9	do	5.9	4.0	1.19	6.8
June 23	C. H. Lee	6.0	3.6	1.20	8.5
July 13	do	5.5	3.4	1.20	9.5
Aug. 1	Lee and Wood	5.8	3.0	1.10	5.5
22	F. G. Wood	5.3	2.3	1.02	4.1
Sept. 16	G. T. Peekema	5.5	2.4	.99	3.7
Oct. 20	do	5.4	2.2	.97	3.2
Nov. 16	do	5.4	2.2	.95	3.1
Dec. 19	do	5.7	2.2	.94	2.9

NOTE.—All gage heights refer to a datum 1 foot lower than that previously maintained.

Daily gage height, in feet, of Goodale Creek near Aberdeen, Cal., for 1910.

[Ray Bowers, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1				1.0				1.1				
2					1.2				1.0			0.95
3	1.1					1.3	1.15			1.0		
4		1.0	1.05	1.0							0.95	
5								1.1	1.0			.95
6					1.15	1.3						
7	1.2	1.0	1.1				1.1			1.0	.95	
8				1.0				1.1				
9					1.15				.95			.95
10	1.05					1.25				1.0		
11		1.0	1.1	1.05			1.2				.95	
12								1.05	1.0			.95
13					1.2	1.3	1.2					
14	1.05	1.0	1.1							1.0	.95	
15				1.05			1.2	1.05				

[1] Formerly known as Tibbetts.

Daily gage height, in feet, of Goodale Creek near Aberdeen, Cal., for 1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16					1.25				1.0		.95	.95
17	1.0					1.2				1.0		
18		1.0	1.1	1.1			1.2				.95	
19								1.0	1.0			.95
20					1.2	1.2				.97		
21	1.0	1.0	1.1							1.0	.95	
22				1.15			1.2	1.0				
23				1.18	1.25	1.2			1.0			.95
24	1.0					1.2				.95		
25		1.0	1.0	1.2			1.15				.95	
26								1.0	1.0			.95
27					1.25	1.2						
28	1.0	1.0	1.0								.95	
29				1.2			1.15	1.0		.95		
30						1.2			1.0			.95
31	1.0				1.3					.95		

NOTE.—Gage datum lowered 1 foot on Mar. 7. All 1910 gage heights refer to new datum.

Daily discharge, in second-feet, of Goodale Creek near Aberdeen, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.2	3.1	3.2	3.1	6.9	18.5	8.4	5.6	3.7	3.7	3.1	3.1
2	4.2	3.1	3.3	3.1	6.9	13.5	7.9	5.6	3.7	3.7	3.1	3.1
3	4.2	3.1	3.5	3.1	6.6	13.5	7.3	5.6	3.7	3.7	3.1	3.1
4	4.9	3.1	3.6	3.1	6.2	13.5	6.9	5.6	3.7	3.7	3.1	3.1
5	5.6	3.1	3.8	3.1	5.9	13.5	6.4	5.6	3.7	3.7	3.1	3.1
6	6.2	3.1	4.0	3.1	5.6	13.5	6.0	5.6	3.6	3.7	3.1	3.1
7	6.9	3.1	4.2	3.1	5.6	12.9	5.6	5.6	3.4	3.7	3.1	3.1
8	5.8	3.1	4.2	3.1	5.6	12.4	6.4	5.6	3.2	3.7	3.1	3.1
9	4.7	3.1	4.2	3.3	5.6	11.8	7.3	5.6	3.1	3.7	3.1	3.1
10	3.6	3.1	4.2	3.5	5.9	11.2	8.2	5.2	3.3	3.7	3.1	3.1
11	3.6	3.1	4.2	3.6	6.2	12.0	9.0	4.9	3.5	3.7	3.1	3.1
12	3.6	3.1	4.2	3.6	6.6	12.7	9.0	4.6	3.7	3.7	3.1	3.1
13	3.6	3.1	4.2	3.6	6.9	13.5	9.0	4.6	3.7	3.7	3.1	3.1
14	3.6	3.1	4.2	3.6	7.9	12.4	9.0	4.6	3.7	3.7	3.1	3.1
15	3.4	3.1	4.2	3.6	8.9	11.3	9.0	4.6	3.7	3.7	3.1	3.1
16	3.2	3.1	4.2	3.8	10.0	10.2	9.0	4.3	3.7	3.7	3.1	3.1
17	3.1	3.1	4.2	4.0	9.2	9.0	9.0	4.1	3.7	3.7	3.1	3.1
18	3.1	3.1	4.2	4.2	8.4	9.0	9.0	3.9	3.7	3.6	3.1	3.1
19	3.1	3.1	4.2	4.6	7.7	9.0	9.0	3.7	3.7	3.4	3.1	3.1
20	3.1	3.1	4.2	4.9	6.9	9.0	9.0	3.7	3.7	3.3	3.1	3.1
21	3.1	3.1	4.2	5.2	7.9	9.0	9.0	3.7	3.7	3.7	3.1	3.1
22	3.1	3.1	3.9	5.6	8.9	9.0	9.0	3.7	3.7	3.5	3.1	3.1
23	3.1	3.1	3.6	6.4	10.0	9.0	8.4	3.7	3.7	3.3	3.1	3.1
24	3.1	3.1	3.4	6.6	10.0	9.0	7.9	3.7	3.7	3.1	3.1	3.1
25	3.1	3.1	3.1	6.9	10.0	9.0	7.3	3.7	3.7	3.1	3.1	3.1
26	3.1	3.1	3.1	6.9	10.0	9.0	7.3	3.7	3.7	3.1	3.1	3.1
27	3.1	3.1	3.1	6.9	10.0	9.0	7.3	3.7	3.7	3.1	3.1	3.1
28	3.1	3.1	3.1	6.9	10.9	9.0	7.3	3.7	3.7	3.1	3.1	3.1
29	3.1	.....	3.1	6.9	11.8	9.0	7.3	3.7	3.7	3.1	3.1	3.1
30	3.1	.....	3.1	6.9	12.6	9.0	6.7	3.7	3.7	3.1	3.1	3.1
31	3.1	.....	3.1	.....	13.5	.....	6.2	3.7	.....	3.1	.....	3.1

NOTE.—Daily discharge determined from two fairly well-defined discharge rating curves, one applicable Jan. 1 to May 30 and the other June 1 to Dec. 31. Discharge interpolated for days on which gage was not read.

Monthly discharge of Goodale Creek near Aberdeen, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	6.9	3.1	3.80	234	B.
February	3.1	3.1	3.10	172	B.
March	4.2	3.1	3.77	232	B.
April	6.9	3.1	4.54	271	B.
May	13.5	5.6	8.02	493	B.
June	13.5	9.0	10.9	649	B.
July	9.0	5.6	7.87	484	B.
August	5.6	3.7	4.49	276	B.
September	3.7	3.1	3.63	216	B.
October	3.7	3.1	3.50	215	B.
November	3.1	3.1	3.10	184	B.
December	3.1	3.1	3.10	191	B.
The year	13.5	3.1	4.99	3,620	

DIVISION CREEK NEAR INDEPENDENCE, CAL.

This station, which is located at a point about 200 feet above the lower intake of the power canal of the Los Angeles Aqueduct, in secs. 4 and 5, T. 12 S., R. 34 E., Mount Diablo base and meridian, was originally established January 10, 1906, at a point on the upper road crossing, about 1½ miles west of the Rickey ranch house and about 10 miles north of Independence, and was removed to its present site May 9, 1908.

When the upper aqueduct power plant was put into operation in April, 1909, gage-height observations were discontinued on account of the variable amount of water diverted, and discharge measurements were made during periods of steady load.

Discharge measurements of Division Creek near Independence, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Discharge.
		Feet.	*Sq. ft.*	*Sec.-ft.*
Feb. 24	R. E. Haines	6.1	5.5	9.5
Mar. 16	....do	.....	.....	[a] 7.7
Apr. 6	....do	6.0	5.1	8.8
27	....do	6.0	4.9	8.2
May 18	....do	6.0	5.5	9.0
June 26[b]	C. H. Lee	5.5	4.6	7.1
July 13[b]	....do	5.5	3.9	6.8
Aug. 1[b]	Lee and Wood	5.5	4.0	6.9
25[b]	F. G. Wood	5.8	4.6	7.6
Sept. 16	G. T. Peekema	5.9	4.2	6.9
Oct. 20[c]	....do	7.5	3.9	7.2
Nov. 16[d]	....do	6.0	5.6	9.1
Dec. 30[e]	....do	7.0	3.3	5.6

[a] Owing to change in load at power house 2.6 second-feet had to be added to measurement. The 7.7 second-feet represents normal conditions on this date.
[b] Made at Los Angeles Aqueduct power house No. 2.
[c] Made by wading 300 feet below power plant No. 1; plant running.
[d] Made 100 feet below power plant No. 2; plant running.
[e] Made at road crossing near lower power house; plant running.

SAWMILL CREEK[1] NEAR INDEPENDENCE, CAL.

This station, which is located at a point on the upper road crossing about 300 feet beyond the Eightmile ranch and about 8 miles north of Independence, in sec. 9, T. 12 S., R. 34 E., Mount Diablo base and meridan, and above all diversions, was established September 20, 1906.

The gage was destroyed in the early part of 1907 and was not replaced.

The following discharge measurements were made during 1910:

Discharge measurements of Sawmill Creek near Independence, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Discharge.
		Feet.	*Sq. ft.*	*Sec.-ft.*
Feb. 24[a]	R. E. Haines	6.0	3.6	6.1
Mar. 16	do	7.0	3.6	6.6
Apr. 6[a]	do	4.4	3.0	4.5
27	do	6.0	3.6	5.7
May 18	do	6.0	3.2	5.5
July 14	F. G. Wood	6.5	3.2	5.8
Aug. 12	do	6.0	2.8	4.2
Sept. 6	do	6.0	2.8	4.9
Oct. 10[b]	G. T. Peekema	5.4	3.8	4.6
Nov. 11[c]	do	4.0	2.7	5.0
Dec. 9[c]	do	4.3	2.6	4.2
30[c]	do	4.5	2.7	4.3

[a] Made near mouth of canyon.
[b] Made ½ mile below mouth of canyon.
[c] Made 2 miles above Eightmile ranch.

NOTE.—Except as indicated, all measurements were made at regular location.

OAK CREEK NEAR INDEPENDENCE, CAL.

This station, which is located above and about three-fourths of a mile west of Bell's flour mill in sec. 2, T. 13 S., R. 34 E., Mount Diablo base and meridian, was originally established June 15, 1905, about 1 mile west of Old Fort Independence. On October 1, 1906, the station was removed to Bell's flour mill, about 4 miles northwest of Independence, and this site was in turn abandoned, in favor of that now in use, on April 19, 1907.

No water is diverted above or near the station. The drainage area above the mouth of the canyon is approximately 15.4 square miles.

The gage is a vertical staff on the right bank.

Discharge measurements are made from the footbridge at the gage.

The channel is composed of sand and gravel and shifts somewhat.

The 1910 rating curve is fairly well defined and the record may be considered fairly good.

[1] Called Eightmile Creek in the 1906 report.

Discharge measurements of Oak Creek near Independence, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 26	R. E. Haines	14	9.7	0.61	11
Mar. 17	do	15	9.9	.61	11
Apr. 7	do	15	11	.64	11
28	do	16	14	.84	24
May 19	do	15	13	.85	25
June 22	C. H. Lee	16	14	.88	26
July 14	do	16	14	.83	23
19	do	16'	17	1.03	49
Aug. 8	do	16	12	.71	14
Sept. 7	F. G. Wood	15	9.3	.61	11
28	G. T. Peekema	15	8.9	.57	7.6
Oct. 12	do	15	9.3	.60	8.7
Nov. 10	do	15	8.5	.58	7.2
Dec. 8	do	15	9.3	.58	8.0

Daily gage height, in feet, of Oak Creek near Independence, Cal., for 1910.

[A. N. Bell, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						1.08			0.62		0.60	
2		0.65	0.60	0.63			0.90	0.80				
3	0.65				0.80				.62		.58	0.60
4		.65	.60	.63		1.02		.79		0.56		
5	.65			.63	.75		.89		.61		.60	.60
6		.65	.65			.92		.75		.55		
7	.65			.65	.78		.90		.60			.57
8					.79			.71		.58	.60	
9	.65	.65	.65	.68		.95	.82		.59			
10					.87			.70			.58	.60
11	.65	.65	.65	.70		.98				.59		
12					.83		.89	.70	.58		.60	.58
13		.65								.60		
14	.65		.65	.70		.98		.69	.58			.54
15		.60			.90		.82			.62	.60	
16	.65		.63	.70		.95			.60	.60		
17			.61		.87	.90	.87	.68			.58	.52
18	.65	.60	.65	.71			1.15			.58		
19					.87			.65	.60		.60	.56
20		.60	.65	.73			1.05					
21	.65				.90	.85			.59	.58	.59	.52
22				.73		.88		.67				
23	.65	.60	.65			.87			.60	.58	.55	
24				.75	.93		.90	.65				.57
25		.60			.90	.85				.60		
26	.65	.61	.65	.82		.85	.85	.65	.58		.58	
27		.60			.95					.59		.58
28			.65	.84			.84		.60		.59	
29	.65			.82	1.00	.85						.55
30			.65				.82	.64	.58	.58	.56	
31	.65				1.05							.60

Daily discharge, in second-feet, of Oak Creek near Independence, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	12.2	12.2	10	11.7	22	58	28	22	9.7	7.5	8.7	7.6
2	12.2	12.2	10	11.4	21	55	30	21	9.7	7.4	8.3	8.1
3	12.2	12.2	10	11.4	21	51	30	20	9.7	7.2	7.9	8.7
4	12.2	12.2	10	11.4	19	48	29	20.3	9.4	7.1	8.3	8.7
5	12.2	12.2	11.1	11.4	17.4	40	29	18	9.2	6.9	8.7	8.7
6	12.2	12.2	12.2	11.8	18	33	29	17	9.0	6.7	8.7	8.1
7	12.2	12.2	12.2	12.2	19.6	34	30	16	8.7	7.3	8.7	7.5
8	12.2	12.2	12.2	12.9	20.3	36	27	14.6	8.5	7.9	8.7	7.9
9	12.2	12.2	12.2	13.6	24	37	23	14.2	8.3	8.0	8.3	8.3
10	12.2	12.2	12.2	14.0	27	39	25	13.9	8.2	8.1	7.9	8.7
11	12.2	12.2	12.2	14.5	26	41	27	13.9	8.1	8.3	8.3	8.3
12	12.2	12.2	12.2	14.5	24	41	29	13.9	7.9	8.5	8.7	7.9
13	12.2	12.2	12.2	14.5	26	41	27	13.6	7.9	8.7	8.7	7.1
14	12.2	11.1	12.2	14.5	28	41	25	13.4	7.9	9.2	8.7	6.3
15	12.2	10	11.8	14.5	30	39	23	13.2	8.3	9.7	8.7	6.0
16	12.2	10	11.4	14.5	28	37	25	13.0	8.7	8.7	8.3	5.7
17	12.2	10	10.4	14.8	27	30	27	12.9	8.7	8.3	7.9	5.5
18	12.2	10	12.2	15.2	27	29	74	12.1	8.7	7.9	8.3	6.3
19	12.2	10	12.2	15.8	27	28	64	11.3	8.7	7.9	8.7	7.1
20	12.2	10	12.2	16.4	28	27	53	11.6	8.5	7.9	8.5	6.3
21	12.2	10	12.2	16.4	30	26	47	12.0	8.3	7.9	8.3	5.5
22	12.2	10	12.2	16.4	31	28	41	12.3	8.5	7.9	7.5	6.2
23	12.2	10	12.2	17.1	33	27	35	11.8	8.7	7.9	6.7	6.8
24	12.2	10	12.2	17.8	34	26	30	11.3	8.4	8.3	7.1	7.5
25	12.2	10	12.2	20.4	30	26	28	11.3	8.1	8.7	7.5	7.6
26	12.2	10.4	12.2	23	34	26	26	11.3	7.9	8.5	7.9	7.8
27	12.2	10	12.2	24	37	26	25	11.2	8.3	8.3	8.1	7.9
28	12.2	10	12.2	25	40	26	25	11.1	8.7	8.1	8.3	7.3
29	12.2	.....	12.2	23	44	26	24	11.0	8.3	8.0	7.7	6.7
30	12.2	.....	12.2	22	48	26	23	10.8	7.9	7.9	7.1	7.7
31	12.2	.....	11.9	.....	53	.....	22	10.2	.....	8.3	.....	8.7

NOTE.—Daily discharge determined from two fairly well-defined discharge rating curves, one applicable Jan. 1 to Apr. 26, and the other Apr. 28 to Dec. 31. Discharge interpolated for days on which gage was not read.

Monthly discharge of Oak Creek near Independence, Cal., for 1910.

[Drainage area, 26.9 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	12.2	12.2	12.2	0.454	0.52	750	B.
February	12.2	10.0	11.1	.413	.43	616	B.
March	12.2	10.0	11.8	.439	.51	726	B.
April	25	11.4	16.3	.606	.68	970	B.
May	53	17.4	28.8	1.07	1.23	1,770	B.
June	58	26	34.9	1.30	1.45	2,080	B.
July	74	22	31.6	1.18	1.36	1,940	B.
August	22	10.2	13.9	.517	.60	855	B.
September	9.7	7.9	8.56	.318	.35	509	B.
October	9.7	6.7	8.03	.299	.34	494	B.
November	8.7	6.7	8.17	.304	.34	486	B.
December	8.7	5.5	7.37	.273	.31	453	B.
The year	74	5.5	16.1	.596	8.12	11,600	

LITTLE PINE CREEK[1] NEAR INDEPENDENCE, CAL.

This station, which is located about 300 feet above the city waterworks and 1 mile west of Independence, in sec. 18, T. 13 S., R. 35 E., Mount Diablo base and meridian, was established August 20, 1906, replacing the station at the city waterworks which was established June 15, 1905, and destroyed in June, 1906.

No water is diverted above the gage. The town of Independence diverts about 0.5 second-foot of water 100 feet below the station. The drainage area above the mouth of the canyon is approximately 8.4 square miles.

The gage is a vertical staff on the left bank at the footbridge from which discharge measurements are made.

Both banks are high and rocky and not likely to overflow. The bed of the stream is rough and the current is swift. The channel, which is composed of bowlders and gravel, shifts somewhat.

The discharge rating curves for 1910 are well defined and the records may be considered good.

Discharge measurements of Little Pine Creek near Independence, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 26	R. E. Haines	10	5.4	0.18	4.6
Mar. 18	do	12	6.2	.25	6.2
Apr. 8	do	12	6.6	.27	6.7
29	do	12	10	.53	22
May 20	do	12	12	.68	32
June 21	C. H. Lee	12	12	.68	32
July 14	do	13	11	.65	25
18	do	13	17	1.10	71
Aug. 8	do	12	9	.51	15
Sept. 7	F. G. Wood	11	6.1	.33	6.8
28	G. T. Peekema	12	5.6	.28	4.9
Oct. 19	do	12	6.4	.29	5.8
Nov. 12	do	12	6.2	.28	4.9
Dec. 8	do	12	6.0	.25	4.0

[1] Locally known as Independence Creek.

Daily gage height, in feet, of Little Pine Creek near Independence, Cal., for 1910.

[Le Roy Roeper, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.4	.....	0.25	.....	0.55	.....	0.75	.....	0.38	0.3	.....	.....
2	.....	.....	.....	0.25	.....	0.95	.....	0.6	.....	.....	0.25	0.25
3	.4	0.25	.25	.....	.55	.....	.75	.....	.44	.25	.....	.....
4	.....	.....	.....	.25	.....	.95	.....	.6	.....	.....	.3	.25
5	.35	.3	.25	.....	.55	.....	.7	.....	.36	.25	.....	.....
6	.....	.....	.....	.35	.....	.95	.....	.6	.....	.....	.3	.25
7	.35	.3	.25	.....	.55	.....	.55	.....	.40	.25	.....	.....
8	.....	.....	.....	.35	.....	.95	.....	.51	.....	.....	.3	.25
9	.35	.25	.25	.....	.6	.....	.65	.....	.32	.3	.....	.....
10	.....	.....	.....	.35	.....	.95	.....	.50	.....	.....	.25	.25
11	.35	.25	.25	.....	.65	.....	.65	.50	.32	.3	.....	.....
12	.....	.....	.....	.35	.....	.95	.....	.48	.....	.....	.25	.25
13	.35	.25	.25	.....	.65	.....	.65	.48	.30	.3	.....	.....
14	.....	.....	.....	.35	.....	.95	.65	.....	.....	.....	.3	.2
15	.35	.25	.25	.....	.65	.....	.65	.46	.40	.35	.....	.....
16	.....	.....	.....	.35	.....	.85	.....	.....	.....	.....	.25	.25
17	.25	.3	.3	.....	.65	.....	.65	.....	.32	.3	.....	.....
18	.....	.....	.25	.35	.....	.8	1.10	.44	.....	.....	.3	.25
19	.25	.25	.25	.....	.65	.....	1.0	.43	.33	.3	.....	.....
20	.....	.....	.....	.45	.68	.75	.....	.....	.....	.....	.25	.25
21	.25	.3	.25	.....	.7	.68	.85	.....	.29	.3	.....	.....
22	.....	.....	.....	.55	.....	.7	.....	.48	.....	.....	.3	.2
23	.25	.3	.25	.....	.75	.....	.85	.44	.31	.....	.....	.....
24	.....	.....	.....	.55	.....	.65	.....	.....	.....	.3	.3	.25
25	.25	.3	.25	.....	.8	.....	.75	.....	.28	.3	.....	.....
26	.....	.18	.....	.55	.....	.65	.....	.....	.....	.....	.25	.3
27	.25	.35	.25	.....	.85	.....	.75	.42	.30	.3	.....	.....
28	.....	.....	.....	.55	.....	.75	.....	.41	.28	.....	.25	.2
29	.25	.....	.25	.53	.85	.....	.7	.....	.26	.25	.....	.....
30	.....	.....	.....	.55	.....	.8	.....	.42	.....	.....	.25	.25
31	.25	.....	.25	.....	.9	.....	.65	.....	.....	.3	.....	.....

Daily discharge, in second-feet, of Little Pine Creek near Independence, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	13	6.5	6.5	6.5	22	54	38	23	8.7	5.5	4.8	4.0
2	13	6.5	6.5	6.5	22	56	38	21	10.1	4.8	4.0	4.0
3	13	6.5	6.5	6.5	22	56	38	21	11.5	4.0	4.8	4.0
4	12	7.2	6.5	6.5	22	56	36	21	9.7	4.0	5.5	4.0
5	10	8.0	6.5	8.0	22	56	34	21	7.9	4.0	5.5	4.0
6	10	8.0	6.5	10	22	56	28	21	8.7	4.0	5.5	4.0
7	10	8.0	6.5	10	22	56	22	18	9.5	4.0	5.5	4.0
8	10	7.2	6.5	10	24	56	26	15	7.9	4.8	5.5	4.0
9	10	6.5	6.5	10	26	56	30	15	6.3	5.5	4.8	4.0
10	10	6.5	6.5	10	28	56	30	14.5	6.3	5.5	4.0	4.0
11	10	6.5	6.5	10	30	56	30	14.5	6.3	5.5	4.0	4.0
12	10	6.5	6.5	10	30	56	30	13.5	5.9	5.5	4.0	4.0
13	10	6.5	6.5	10	30	56	30	13.5	5.5	5.5	4.8	3.2
14	10	6.5	6.5	10	30	56	30	13.0	7.5	6.5	5.5	2.5
15	10	6.5	6.5	10	30	52	30	12.5	9.5	7.5	4.8	3.2
16	8	7.2	7.2	10	30	48	30	12.2	7.9	6.5	4.0	4.0
17	6.5	8.0	8.0	10	30	45	30	11.8	6.3	5.5	4.8	4.0
18	6.5	7.2	6.5	10	30	43	71	11.5	6.5	5.5	5.5	4.0
19	6.5	6.5	6.5	13	30	41	59	11.0	6.7	5.5	4.8	4.0
20	6.5	7.2	6.5	16	32	38	52	11.8	6.0	5.5	4.0	4.0
21	6.5	8.0	6.5	19	34	32	44	12.7	5.2	5.5	4.8	3.2
22	6.5	8.0	6.5	22	36	34	44	13.5	5.6	5.5	5.5	2.5
23	6.5	8.0	6.5	22	38	32	44	11.5	5.9	5.5	5.5	3.2
24	6.5	8.0	6.5	22	41	30	39	11.2	5.4	5.5	5.5	4.0
25	6.5	8.0	6.5	22	43	30	34	11.0	4.9	5.5	4.8	4.8
26	6.5	4.6	6.5	22	45	30	34	10.8	5.2	5.5	4.0	5.5
27	6.5	10.0	6.5	22	48	34	34	10.5	5.5	5.5	4.0	4.0
28	6.5	8.0	6.5	22	48	38	32	10.0	4.9	4.8	4.0	2.5
29	6.5	.....	6.5	21	48	40	30	10.2	4.3	4.0	4.0	8.2
30	6.5	.....	6.5	22	50	43	28	10.5	4.9	4.8	4.0	4.0
31	6.5	.....	6.5	.....	52	.....	26	9.5	.....	5.5	.....	4.0

NOTE.—Daily discharge determined from two fairly well-defined discharge rating curves, one applicable from Jan. 1 to July 18, and the other from July 19 to Dec. 31. Discharge interpolated for days of missing gage heights.

Monthly discharge of Little Pine Creek near Independence, Cal., for 1910.

[Drainage area, 21.4 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	13	6.5	8.60	0.402	0.46	529	B.
February	10	4.6	7.22	.337	.35	401	B.
March	8	6.5	6.57	.307	.36	404	A.
April	22	6.5	13.6	.635	.71	809	A.
May	52	22	32.8	1.53	1.76	2,020	B.
June	56	30	46.4	2.17	2.42	2,760	B.
July	71	22	35.5	1.66	1.91	2,180	B.
August	23	9.5	14.1	.659	.76	867	A.
September	11.5	4.3	6.88	.321	.36	409	A.
October	7.5	4.0	5.25	.245	.28	323	A.
November	5.5	4.0	4.74	.221	.25	282	A.
December	5.5	2.5	3.80	.178	.21	234	A.
The year	71	2.5	15.5	.724	9.83	11,200	

SHEPARD CREEK NEAR THEBE, CAL.[1]

No regular gaging station has been maintained on Shepard Creek. All measurements were made at a point about 3 miles east of the mouth of the canyon, in sec. 9, T. 14 S., R. 35 E., Mount Diablo base and meridian, and above all diversions.

Discharge measurements of Shepard Creek near Thebe, Cal., in 1910.

Date.	Hydrographer.	North Branch discharge.	South Branch discharge.	Total Shepard Creek discharge.
		Sec.-ft.	*Sec.-ft.*	*Sec.-ft.*
Feb. 25	R. E. Haines	1.7	0	1.7
Mar. 15	do	2.1	0	2.1
Apr. 5	do	0	2.5	2.5
26	do	1.4	5.2	6.6
May 17	do	6.9	4.5	11.4
June 21	C. H. Lee	9.6	3.3	12.9
July 16	F. G. Wood	3.7	15.2	18.9
Aug. 11	do	3.6	8.6	12.2
29	G. T. Peekema	.8	7.2	8.0
Sept. 30	do	2.1	1.4	3.5
Oct. 31	do	2.0	1.8	3.8
Dec. 7	do	1.2	1.3	2.5

NOTE.—The discharge past the regular gaging station was determined by adding together the measured discharge of the North and South Branches. Measurements on these were made at several sections.

BAIRS CREEK[2] NEAR THEBE, CAL.

No regular gaging station has been maintained on Bairs Creek. All measurements were made at a point about 3 miles east of the mouth of the canyon, in sec. 16, T. 14 S., R. 35 E., Mount Diablo base and meridian, and above all diversions.

[1] Described in the 1906 report as near Independence.

[2] Called Moffett Creek in the 1906 report.

Discharge measurements of Bairs Creek near Thebe, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Discharge.
		Feet.	*Sq. ft.*	*Sec.-ft.*
Feb. 25	R. E. Haines	1.9	1.3	0.14
Mar. 15	do	2.0	1.3	.26
Apr. 5	do	1.9	1.2	.12
26	do	5.5	3.6	1.9
May 17	do	8.0	7.0	8.6
June 21	C. H. Lee	5.6	4.1	4.8
July 16	do	6.2	3.4	3.3
Aug. 11	F. G. Wood	6.1	2.7	1.6
29	do	5.6	2.3	1.0
Sept. 30	G. T. Peekema	2.0	.95	.38
Oct. 31	do	2.2	.92	.35
Dec. 7	do	3.5	1.4	.61

NOTE.—Measurements made by wading at various sections.

GEORGE CREEK NEAR THEBE, CAL.[1]

A gage has been placed on George Creek at a point about 1 mile west of the road from Independence to Lone Pine, in sec. 27, T. 14 S., R. 35 E., Mount Diablo base and meridian.

No water is diverted above the gage.

No gage height record is available, but the following discharge measurements were made near the gage during 1910.

Discharge measurements of George Creek near Thebe, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 25	R. E. Haines	7.8	3.3	0.53	1.1
Mar. 15	do	7.8	4.5	.65	3.0
Apr. 5	do	7.9	4.1	.61	2.4
26	do	9.0	6.9	.94	11
May 17	do	10	8.2	1.00	16
June 21	C. H. Lee	9.0	7.4	1.00	13
July 16	F. G. Wood	9.0	7.0	.95	11
Aug. 11	do	9.0	5.8	.....	6.4
29	do	8.8	6.0	.76	5.6
Sept. 30	G. T. Peekema	8.8	4.7	.68	3.2
Oct. 31	do	9.0	5.4	.83	4.9
Dec. 7	do	8.5	4.2	.70	2.6

LONE PINE CREEK NEAR LONE PINE, CAL.

This station, which is located at a point about three-fourths of a mile west of the town of Lone Pine and about 500 feet above the division boxes on the creek, in sec. 29, T. 15 S., R. 36 E., Mount Diablo base and meridian, was established September 25, 1906.

No water is diverted above the station.

The gage is a vertical staff on the left bank at the footbridge, from which discharge measurements are made.

The drainage area above the mouth of the canyon is about 12 square miles.

[1] Described in the 1906 report as near Independence.

Both banks are high and rocky and not subject to overflow. The channel is composed of gravel and bowlders and shifts somewhat at high stages. The records may be considered good.

Discharge measurements of Lone Pine Creek near Lone Pine, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 2	R. E. Haines	7.2	6.3	1.90	5.5
22	do	7.2	6.8	1.94	6.5
Apr. 12	do	7.3	7.2	2.03	8.2
May 3	do	7.3	9.3	2.32	15
24	do	8.0	13	2.72	30
June 28	C. H. Lee	8.0	13	2.68	30
July 21	do	9.4	16	3.10	47
Aug. 16	F. G. Wood	7.8	10	2.50	18
Sept. 3	do	7.6	9.5	2.39	14
22	G. T. Peekema	7.9	10	2.42	15
Oct. 27	do	7.3	8.9	2.23	9.3
Nov. 30	do	7.2	6.8	2.01	5.8

Daily gage height, in feet, of Lone Pine Creek near Lone Pine, Cal., for 1910.

[S. A. Gallaher, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.0			1.9					2.35	2.2		
2			1.9			3.0	2.6	2.75				
3		2.1			2.3						2.1	2.0
4	2.0			1.9					2.35	2.2		
5			1.9			2.95	2.5	2.7				
6		2.1			2.35						2.05	2.0
7	2.0			2.0					2.3	2.2		
8			1.9			2.95	2.6	2.65				
9		2.1			2.35						2.0	2.0
10	1.9			2.0					2.2	2.1		
11			1.9			2.9	2.6	2.6				
12		2.2			2.5						2.0	2.0
13	1.9			2.05					2.2	2.35		
14			2.0			2.75	2.65	2.6				
15		2.1			2.5						2.0	2.0
16	1.9			2.05					2.75	2.2		
17			2.0			2.6	2.65	2.5				
18		1.9		2.1	2.6						2.0	2.1
19	1.9								2.6	2.2		
20			2.0			2.6		2.45				
21		1.9		2.2	2.65		3.05				2.0	2.1
22	2.0								2.45	2.2		
23			1.9			2.6		2.5				
24		1.9		2.3	2.65		2.95				2.0	2.1
25	1.9								2.3	2.25		
26			1.9			2.6		2.5				
27		1.9		2.4	2.65		3.0	2.5			2.0	2.0
28	1.9								2.25	2.3		
29			1.9			2.6	2.8	2.55				
30				2.3	3.1			2.55			2.0	2.0
31	1.9									2.2		

Daily discharge, in second-feet, of Lone Pine Creek near Lone Pine, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.5	7.0	5.8	5.8	15.0	44	26	30	12.8	8.7	8.0	5.5
2	7.5	8.2	5.8	5.8	15.0	42	26	29	12.8	8.7	7.4	5.5
3	7.5	9.5	5.8	5.8	15.0	41	25	28	12.8	8.7	6.8	5.5
4	7.5	9.5	5.8	5.8	15.6	40	23	27	12.8	8.7	6.6	5.5
5	7.5	9.5	5.8	6.3	16.2	40	22	26	12.2	8.7	6.4	5.5
6	7.5	9.5	5.8	6.9	16.8	40	23	25	11.6	8.7	6.2	5.5
7	7.5	9.5	5.8	7.5	16.8	40	25	25	11.0	8.7	5.9	5.5
8	6.9	9.5	5.8	7.5	16.8	40	26	24	10.2	8.0	5.7	5.5
9	6.3	9.5	5.8	7.5	16.8	39	26	23	9.4	7.4	5.5	5.5
10	5.8	10.3	5.8	7.5	18.5	39	26	23	8.7	6.8	5.5	5.5
11	5.8	11.1	5.8	7.8	20	38	26	22	8.7	8.8	5.5	5.5
12	5.8	12.0	6.3	8.1	22	36	27	22	8.7	10.8	5.5	5.5
13	5.8	11.1	6.9	8.5	22	34	27	22	8.7	12.8	5.5	5.5
14	5.8	10.3	7.5	8.5	22	32	28	22	15.4	11.4	5.5	5.5
15	5.8	9.5	7.5	8.5	22	30	28	21	22	10.0	5.5	5.5
16	5.8	8.2	7.5	8.5	23	28	28	19	29	8.7	5.5	5.9
17	5.8	7.0	7.5	9.0	25	26	28	18.0	26	8.7	5.5	6.3
18	5.8	5.8	7.5	9.5	26	26	32	17.4	24	8.7	5.5	6.8
19	5.8	5.8	7.5	10.3	26	26	36	16.8	22	8.7	5.5	6.8
20	6.3	5.8	7.5	11.1	28	26	40	16.2	20	8.7	5.5	6.8
21	6.9	5.8	6.9	12.0	28	26	45	16.8	18.1	8.7	5.5	6.8
22	7.5	5.8	6.3	13.0	28	26	43	17.4	16.2	8.7	5.5	6.8
23	6.9	5.8	5.8	14.0	28	26	41	18.0	14.4	9.0	5.5	6.8
24	6.3	5.8	5.8	15.0	28	26	39	18.0	12.7	9.4	5.5	6.8
25	5.8	5.8	5.8	16.2	28	26	40	18.0	11.0	9.8	5.5	6.3
26	5.8	5.8	5.8	17.3	28	26	41	18.0	10.6	10.2	5.5	5.9
27	5.8	5.8	5.8	18.5	28	26	42	18.0	10.2	10.6	5.5	5.5
28	5.8	5.8	5.8	17.3	34	26	37	19.0	9.8	11.0	5.5	5.5
29	5.8	.....	5.8	16.2	40	26	32	20	9.4	10.2	5.5	5.5
30	5.8	.....	5.8	15.0	47	26	31	20	9.0	9.4	5.5	5.5
31	5.8	.....	5.8	.....	45	.....	30	16.4	.....	8.7	.....	5.5

NOTE.—Daily discharge determined from two discharge rating curves both fairly well defined, one applicable from Jan. 1 to July 21 and the other from July 22 to Dec. 31. Discharge interpolated for days on which the gage was not read.

Monthly discharge of Lone Pine Creek near Lone Pine, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	7.5	5.8	6.39	393	C.
February	12.0	5.8	8.04	447	C.
March	7.5	5.8	6.29	387	B.
April	18.5	5.8	10.4	619	B.
May	47	15	24.5	1,510	B.
June	44	26	32.2	1,920	B.
July	45	22	31.3	1,920	B.
August	30	16.2	21.2	1,300	B.
September	29	8.7	14.0	833	B.
October	12.8	6.8	9.23	568	B.
November	8.0	5.5	5.80	345	B.
December	6.8	5.5	5.87	361	C.
The year	47	5.5	14.6	10,600	

TUTTLE CREEK NEAR LONE PINE, CAL.

This station, which is located about 2 miles southwest of Lone Pine, in sec. 32, T. 15 S., R. 36 E., Mount Diablo base and meridian, at the point where the stream leaves the foothills and enters the valley, was established January 1, 1906.

The gage is a vertical staff on the right bank at the footbridge 50 feet above the division box which controls the water diverted from this stream.

Discharge measurements are made from the footbridge.

The drainage area above the mouth of the canyon is approximately 7.8 square miles.

As the channel is continually shifting, the estimates for 1910 have been prepared by the indirect method. The record is rated as approximate.

Discharge measurements of Tuttle Creek near Lone Pine, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 2	R. E. Haines	9	4.2	1.10	5.5
22	do	9	4.2	1.09	5.3
Apr. 22	do	9	4.2	1.09	5.6
May 3	do	9	5.2	1.22	6.1
24	do	9	5.9	1.29	8.7
June 28	C. H. Lee	9	6.2	1.33	11
July 21	do	9	7.3	1.41	13
Aug. 16	F. G. Wood	9	5.6	1.32	8.8
Sept. 3	do	9	4.9	1.33	8.5
22	G. T. Peekema	9	6.6	1.33	10
Oct. 27	do	9	5.1	1.30	6.4
Nov. 30	do	9	4.7	1.29	6.8

Daily gage height, in feet, of Tuttle Creek near Lone Pine, Cal., for 1910.

[S. A. Gallaher, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.1			1.2					1.35	1.3		
2			1.1			1.4	1.3	1.4				
3		1.4			1.2						1.3	1.3
4	1.2			1.3					1.3	1.3		
5			1.1			1.4	1.3	1.4				
6		1.4			1.2						1.3	1.3
7	1.3			1.3					1.3	1.3		
8			1.0			1.4	1.3	1.35				
9		1.4			1.2						1.3	1.3
10	1.2			1.3					1.3	1.3		
11			1.0			1.4	1.3	1.35				
12		1.5			1.2						1.3	1.3
13	1.2			1.1					1.3	1.3		
14			1.1			1.4	1.35	1.35				
15		1.4			1.2						1.3	1.3
16	1.2			1.0					1.4	1.3		
17			1.1			1.35	1.35	1.3				
18		1.3		1.0	1.3						1.3	1.3
19	1.3								1.35	1.3		
20			1.2			1.35		1.3				
21		1.1		1.4	1.3		1.4				1.3	1.3
22	1.4								1.35	1.3		
23			1.2			1.3		1.3				
24		1.1		1.4	1.3		1.4				1.3	1.3
25	1.4								1.3	1.3		
26			1.1			1.3		1.3				
27		1.1		1.2	1.3		1.6				1.3	1.3
28	1.3								1.3	1.3		
29			1.2			1.3		1.3				
30				1.3	1.4		1.4				1.3	1.3
31	1.3									1.3		

Daily discharge, in second-feet, of Tuttle Creek near Lone Pine, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6	13	6	8	8	13	10	12	9	8	6	7
2	7	14	6	9	7	13	10	12	8	8	6	7
3	7	16	6	10	6	13	10	12	8	8	6	7
4	8	16	6	12	6	13	10	12	8	8	6	7
5	9	16	6	12	6	13	10	12	8	8	7	7
6	10	16	5	12	6	13	10	11	8	8	7	7
7	12	16	5	12	6	13	10	11	8	8	7	7
8	11	16	4	12	6	13	10	10	8	8	7	7
9	9	16	4	12	6	13	10	10	8	8	7	7
10	8	18	4	12	6	13	9	10	8	8	7	7
11	8	19	4	10	6	13	9	10	8	8	7	7
12	8	20	5	8	6	13	10	10	8	8	7	7
13	8	19	5	6	6	13	10	10	8	8	7	7
14	8	17	6	5	6	13	11	10	9	8	7	7
15	8	16	6	5	6	13	11	10	10	7	7	7
16	8	15	6	4	7	12	11	9	12	7	7	7
17	9	14	6	4	8	12	11	8	11	7	7	7
18	10	12	7	4	9	12	11	8	11	7	7	7
19	12	10	7	8	9	12	12	8	10	7	7	7
20	13	8	8	12	9	12	13	8	10	7	7	6
21	15	6	7	16	9	11	13	8	10	7	7	6
22	16	6	5	6	9	11	13	8	10	7	7	6
23	16	6	8	11	9	10	12	8	10	7	7	6
24	16	6	7	16	9	10	12	8	9	7	7	6
25	16	6	7	13	9	10	15	8	9	7	7	6
26	14	6	6	10	9	10	18	8	9	7	7	6
27	13	6	7	7	9	10	21	8	8	6	7	6
28	12	6	7	8	10	11	18	8	8	6	7	6
29	12	.....	8	8	12	10	15	8	8	6	7	6
30	12	.....	8	9	13	10	12	8	8	6	7	6
31	12	.....	8	.....	13	.....	12	8	.....	6	.....	6

NOTE.—Daily discharge determined by the indirect method for shifting channels. Discharge interpolated for days on which gage heights were not recorded.

Monthly discharge of Tuttle Creek near Lone Pine, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January	16	6	10.7	658
February	20	6	12.7	705
March	8	4	6.13	377
April	16	4	8.97	534
May	13	6	7.94	488
June	13	10	11.9	708
July	21	9	11.9	732
August	12	8	9.39	577
September	12	8	8.90	530
October	8	6	7.29	448
November	7	6	6.87	409
December	7	6	6.61	406
The year	21	4	9.08	6,570

NOTE.—Estimates only approximate.

COTTONWOOD CREEK NEAR OLANCHA, CAL.

Cottonwood Creek discharges into Owens Lake.

The gaging station, which is located at a point 100 feet above the head of the diversion pipe of the Los Angeles Aqueduct, in sec. 21, T. 17 S., R. 36 E., Mount Diablo base and meridian, was established September 9, 1908, replacing the station established September 26, 1906, at a point about one-fourth mile above the crossing of the Los Angeles Aqueduct and about 15 miles south of Lone Pine.

No water is diverted above the station; just below the station the Los Angeles Aqueduct diverts water for the development of power. The drainage area above the mouth of the canyon is about 42 square miles.

The gage is a vertical staff on the right bank 500 feet below the footbridge from which discharge measurements are made.

The channel is composed of sand and gravel and is somewhat shifting. Both banks are high and rocky and the current is swift at all stages.

The discharge rating curve is fairly well defined and the record may be considered good.

Discharge measurements of Cottonwood Creek near Olancha, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 3	R. E. Haines	11	13	1.53	13
23	do	11	15	1.80	22
Apr. 13	do	15	19	2.00	30
May 4	do	16	30	2.58	73
25	do	17	32	2.50	67
June 29	C. H. Lee	15	21	1.85	27
July 22	Lee and Wood	15	18	1.79	20
Aug. 17	F. G. Wood	13	14	1.52	13
Sept. 2	do	14	14	1.43	12
20	G. T. Peekema	16	16	1.57	15
Oct. 28	do	15	16	1.50	14
Dec. 1	do	17	16	1.41	11

Daily gage height, in feet, of Cottonwood Creek near Olancha, Cal., for 1910.

[Sam Robinson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.7	1.5	1.45	1.65	2.7	2.5	1.8	1.75	1.45	1.5	1.5	1.4
2	1.6	1.4	1.5	1.7	2.7	2.5	1.8	1.7	1.4	1.5	1.45	1.35
3	1.5	1.4	1.5	1.7	2.6	2.5	1.8	1.7	1.4	1.5	1.45	1.4
4	1.6	1.4	1.55	1.75	2.35	2.5	1.75	1.7	1.4	1.5	1.5	1.3
5	1.6	1.5	1.6	1.8	2.3	2.5	1.75	1.7	1.4	1.45	1.5	1.4
6	1.7	1.5	1.6	1.8	2.5	2.5	1.75	1.65	1.4	1.45	1.4	1.5
7	1.7	1.5	1.6	1.8	2.6	2.5	1.7	1.65	1.4	1.45	1.3	1.5
8	1.6	1.5	1.65	1.85	2.6	2.4	1.7	1.6	1.35	1.45	1.4	1.5
9	1.6	1.5	1.7	1.85	2.6	2.3	1.7	1.6	1.35	1.45	1.4	1.4
10	1.6	1.45	1.7	1.9	2.6	2.3	1.7	1.6	1.35	1.4	1.4	1.5
11	1.6	1.45	1.7	2.0	2.6	2.25	1.7	1.55	1.3	1.45	1.4	1.5
12	1.6	1.45	1.7	2.0	2.6	2.2	1.7	1.55	1.3	1.3	1.4	1.3
13	1.6	1.45	1.7	2.0	2.6	2.2	1.7	1.55	1.3	1.4	1.5	1.3
14	1.6	1.45	1.75	2.0	2.6	2.2	1.65	1.5	1.3	1.3	1.5	1.3
15	1.6	1.45	1.7	2.0	2.6	2.2	1.65	1.5	3.0	1.5	1.4	1.3
16	1.6	1.4	1.75	2.1	2.6	2.2	1.65	1.5	1.9	1.5	1.3	1.3
17	1.5	1.4	1.75	2.2	2.5	2.2	1.65	1.5	1.7	1.6	1.3	1.3
18	1.5	1.4	1.75	2.25	2.5	2.1	2.0	1.5	1.65	1.7	1.5	1.4
19	1.5	1.4	1.75	2.3	2.5	2.0	1.9	1.5	1.6	1.5	1.15	1.4
20	1.5	1.4	1.8	2.4	2.5	2.0	1.8	1.5	1.55	1.5	1.3	1.5
21	1.5	1.45	1.8	2.5	2.45	2.0	1.8	1.5	1.55	1.6	1.4	1.5
22	1.5	1.45	1.75	2.5	2.45	2.0	1.8	1.5	1.55	1.6	1.4	1.5
23	1.5	1.45	1.65	2.6	2.45	2.0	1.75	1.5	1.55	1.5	1.4	1.5
24	1.5	1.45	1.65	2.65	2.45	1.9	1.7	1.5	1.5	1.5	1.3	1.5
25	1.4	1.45	1.7	2.7	2.4	1.9	1.7	1.5	1.5	1.5	1.35	1.5
26	1.5	1.45	1.55	2.75	2.4	1.9	1.7	1.5	1.5	1.5	1.3	1.5
27	1.5	1.45	1.7	2.8	2.4	1.85	1.85	1.5	1.5	1.5	1.3	1.45
28	1.5	1.45	1.7	2.8	2.4	1.85	2.1	1.5	1.5	1.5	1.3	1.4
29	1.5	.....	1.7	2.7	2.4	1.85	1.9	1.5	1.5	1.5	1.3	1.4
30	1.5	.....	1.7	2.7	2.4	1.85	1.85	1.45	1.5	1.5	1.3	1.4
31	1.5	.....	1.6	.....	2.4	.....	1.8	1.45	.....	1.5	.....	1.4

Daily discharge, in second-feet, of Cottonwood Creek near Olancha, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	18	13	12	16	86	65	21	20	12	13	13	11
2	15	11	13	18	86	65	21	18	11	13	12	10
3	13	11	13	18	75	65	21	18	11	13	12	11
4	15	11	14	20	53	65	20	18	11	13	13	9
5	15	13	15	21	49	65	20	18	11	12	13	11
6	18	13	15	21	65	65	20	16	11	12	11	13
7	18	13	15	21	75	65	18	16	11	12	9	13
8	15	13	16	23	75	57	18	15	10	12	11	13
9	15	13	18	23	75	49	18	15	10	12	11	11
10	15	12	18	25	75	49	18	15	10	11	11	13
11	15	12	18	30	75	46	18	14	9	12	11	13
12	15	12	18	30	75	42	18	14	9	9	11	9
13	15	12	18	30	75	42	18	14	9	11	13	9
14	15	12	20	30	75	42	16	13	9	9	13	9
15	15	12	18	30	75	42	16	13	121	13	11	9
16	15	11	20	36	75	42	16	13	25	13	9	9
17	13	11	20	42	65	42	16	13	18	15	9	9
18	13	11	20	46	65	36	30	13	16	18	13	11
19	13	11	20	49	65	30	25	13	15	13	6	11
20	13	11	21	57	65	30	21	13	14	13	9	13
21	13	12	21	65	61	30	21	13	14	15	11	13
22	13	12	20	65	61	30	21	13	14	15	11	13
23	13	12	16	75	61	30	20	13	14	13	11	13
24	13	12	16	80	61	25	18	13	13	13	9	13
25	11	12	18	86	57	25	18	13	13	13	10	13
26	13	12	14	92	57	25	18	13	13	13	9	13
27	13	12	18	97	57	23	23	13	13	13	9	12
28	13	12	18	97	57	23	36	13	13	13	9	11
29	13	.....	18	86	57	23	25	13	13	13	9	11
30	13	.....	18	86	57	23	23	12	13	13	9	11
31	13	.....	15	.....	57	.....	21	12	.....	13	.....	11

NOTE.—Daily discharges determined from a discharge rating curve well defined above 10 second-feet.

Monthly discharge of Cottonwood Creek near Olancha, Cal., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	18	11		873	B.
February	13	11	11.9	661	B.
March	21	12	17.2	1,060	B.
April	97	16	47.2	2,810	B.
May	86	49	66.7	4,100	B.
June	65	23	42.0	2,500	B.
July	36	16	20.4	1,250	B.
August	20	12	14.3	879	B.
September	121	9	16.2	964	B.
October	18	9	12.8	787	B.
November	13	6	10.6	631	B.
December	13	9	11.3	695	B.
The year	121	6	23.8	15,800	

ASH CREEK NEAR OLANCHA, CAL.

Ash Creek discharges into Owens Lake.

The gaging station, which is located at a point just above the forks of the creek near the mouth of the canyon, about 16 miles south of Lone Pine, in sec. 11, T. 17 S., R. 36 E., Mount Diablo base and meridian, was established April 15, 1907.

No water is diverted above or near the station. Observations of gage heights have been discontinued, but discharge measurements were made during 1910.

Discharge measurements of Ash Creek near Olancha, Cal., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 3	R. E. Haines	6.1	4.1	1.38	3.5
23	do	6.7	4.6	1.40	4.0
Apr. 13	do	7.3	7.7	1.87	4.7
May 4	do	9.0	13	2.40	16
25[a]	do	7.3	6.4	2.15	11
June 29	C. H. Lee	6.5	3.9	1.66	2.9
July 22[b]	Lee and Wood	7.1	6.5	2.01	1.9
Aug. 17	F. G. Wood	6.6	5.1	1.92	1.5
Sept. 2	do	6.8	4.5	1.80	1.2
21	G. T. Peekema	7.1	5.6	1.90	1.9
Oct. 28	do	7.2	6.7	2.09	1.9
Dec. 1[c]	do	6.3	3.7	1.61	1.7

[a] Made by wadng 20 feet above footbridge.
[b] Possible backiater effect from débris lodged below gage section during high water of July 18–19, 1910.
[c] Brush dam jw below measuring section removed.

MONO LAKE BASIN.[1]

GENERAL FEATURES.

Mono Lake lies at the eastern base of the Sierra Nevada in east-central California, within a few miles of the California-Nevada boundary. The western rim of its drainage area, formed by the crest line of

[1] Abstracted from Russell, I. C., Quaternary history of Mono Valley, Cal.; Eighth Ann. Rept. U. S. Geol. Survey, pt. 1, 1889, pp. 269–270, 287–288.

the Sierra, coincides for 36 miles with the western margin of the Great Basin.

The lake is 6,412 feet above the sea. The lowest pass in the serrate mountain crest along its western border is 3,000 feet above its surface. The highest peaks that overshadow it rise more than 6,000 feet above the level of the lake. The eastern portion of the basin partakes of the character of the arid region of interior drainage, and includes valleys covered with sagebrush and rugged mountain slopes, but scantily clothed with cedar and piñon. Over this portion no running water can be found during the greater part of the year. That it is not really a desert is shown by the fact that among the clumps of sagebrush it produces nutritious bunch grass in sufficient abundance to afford pasturage for a few cattle and horses.

The southwestern border of the basin includes magnificent mountains that are clothed in favored places with forests of pine. The highest peaks reach far above the timber line and bear a varied and beautiful alpine flora.

The lake derives the principal portion of its water supply from the creeks that descend the eastern slope of the Sierra and empty into it from the south and west. Supplementing the surface drainage are a number of springs, some of which are of considerable size.

The creeks tributary to Lake Mono are of clear water and flow through channels excavated for the most part in granite and metamorphosed sediments, but near their mouths they have eroded small gorges through material deposited during previous high-water stages of the lake. No chemical analyses of these waters have been made, but they undoubtedly hold a small percentage of mineral matter in solution which is left when evaporation takes place.

Most of the springs of the basin are either in the bottom of the lake or near its shores, and they are most numerous near the base of the mountains, which lie close to the western shore. Only three of those that rise on the land have a temperature noticeably above the normal. The character of most of those rising in the bottom of the lake is uncertain. Some of them reveal their presence in cold weather by the vapor to be seen on the lake surface above them, and are thus known to be thermal. None of the springs of the basin are highly charged with mineral matter, but, on the contrary, some of the more copious are remarkable for their purity.

RUSH CREEK NEAR MONO LAKE, CAL.

Rush Creek rises on the east slope of Mount Lyell (altitude, 13,090 feet above sea level), and flows in general northeastward into Mono Lake. To the south, on the opposite side of the Sierra Nevada divide, lie the headwaters of the North and Middle forks

of San Joaquin River; to the west and north are the headwaters of Merced and Tuolumne rivers.

Lakes are numerous in this basin, the more important being Marie Lake (altitude, 10,750 feet), Gem Lake (altitude, 9,030 feet), Silver Lake (altitude, 7,212 feet), Grant Lake (altitude, 7,060 feet), June Lake (altitude, 7,631 feet), Alger Lake (altitude, 10,500 feet), and Walker Lake (altitude, 7,926 feet). Gem, Silver, and Grant lakes lie in the course of the stream. At several of these lakes considerable storage could be developed, but no work has yet been done.

The principal tributaries, Reversed, Parker, and Walker creeks, are small streams and of little value without storage. No water power has been developed on this stream. In a distance of less than one-half mile above the mouth of Reversed Creek there is a total fall of 1,100 feet. The drainage area above is small, but storage could be developed at Gem Lake.

The rocks throughout the basin are principally granite and blue schist. The forest is thin and contains only a small amount of merchantable timber, chiefly yellow pine. The uncultivated valley land is covered with sagebrush. The soil is composed of volcanic ash and sand and requires a large amount of water for irrigation. As the tillable area lies 6,500 to 7,000 feet above sea level the growing season is short and the crops are restricted to the hardier grains and hay. About 300 acres are now irrigated from the main stream and its tributaries.

Gold, silver, and copper have been found in this area, but not in paying quantities.

The gaging station, which is located in the NE.¼ sec. 13, T. 1 N., R. 26 E., Mount Diablo base and meridian, at the highway bridge 8 miles southeast of Mono Lake post office, one-fourth mile above the mouth of the creek, was established November 16, 1910.

The gage is a vertical staff fastened to a cottonwood tree on the right bank 3 feet above the bridge from which discharge measurements are made.

The channel is composed of sand and gravel and may shift at high stages.

The station is maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. D. McGlashan by wading 15 feet below bridge:

November 16, 1910: Width, 26 feet; area, 23 square feet; gage height, 2.82 feet; discharge, 41 second-feet.

Daily gage height, in feet, of Rush Creek near Mono Lake, Cal., for 1910.

[J. B. Anderson, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1			11			21		2.98
2			12		2.92	22		
3			13			23		2.80
4			14		2.95	24		
5			15			25		2.75
6		2.90	16	2.82	3.00	26		
7			17		3.00	27		2.75
8		2.90	18			28		
9			19		2.90	29		2.75
10		2.85	20			30		
						31		2.80

LEEVINING CREEK NEAR MONO LAKE, CAL.

Leevining Creek has its source at the glacier on the east slope of Conness Mountain (altitude, 12,556 feet above sea level), and flows in general easterly to Mono Lake. Rush Creek drains the adjoining area on the south. The basin, like that of Rush Creek, contains several lakes at which excellent storage reservoirs may be developed. The most important of these is Saddlebag Lake, 10,051 feet above sea level. Below are Tioga and Ellery lakes.

No water power has been developed on the stream except near the mouth, where a small plant furnishes power for domestic uses. Several power sites, however, have been filed upon. Immediately below Ellery Lake the creek falls a thousand feet in a distance of half a mile.

Throughout the basin there is good merchantable timber with little underbrush.

Agriculture is practically restricted to the land adjacent to Mono Lake. The soil is composed of volcanic ash and sand and requires a large amount of water for irrigation.

The gaging station, which is located 4 miles south of Mono Lake post office, at the ranger's camp in the SE. ¼ SE ¼ sec. 17, T. 1 N., R. 26 E., Mount Diablo base and meridian, Mono Lake National Forest, was established November 17, 1910.

Warren Creek, the most important tributary, enters about 5½ miles above the station and 8½ miles above Mono Lake. Less than 100 acres are irrigated in the small valley above the ranger's camp. Practically the entire low-water flow is used for irrigation near the mouth of the creek.

The gage is a vertical staff fastened to a Cottonwood tree on the left bank, 250 feet below the ranger's camp.

Discharge measurements are made by wading.

The channel is composed of gravel and small bowlders. Both banks are high and will not overflow.

This station is maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. D. McGlashan by wading 500 feet above gage:

November 17, 1910: Width, 22 feet; area, 25 square feet; gage height, 2.16 feet; discharge, 22 second-feet.

Daily gage height, in feet, of Leevining Creek near Mono Lake, Cal., for 1910.

[William J. Clarke, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		2.13	11		2.22	21	2.16	2.15
2		2.12	12		2.21	22	2.12	2.16
3		2.11	13		2.15	23	2.15	2.16
4		2.12	14		2.20	24		2.15
5		2.22	15		2.18	25	2.11	2.13
6		2.20	16		2.15	26	2.15	2.15
7		2.20	17	2.16	2.11	27	2.15	2.61
8		2.19	18	2.16	2.15	28	2.12	2.90
9		2.18	19	2.11	2.21	29	2.13	2.70
10		2.21	20	2.13	2.11	30	2.13	2.11
						31		2.60

NOTE.—Nov. 26, creek full of slush ice. Relation of gage height to discharge affected by ice Dec. 19, 27-30.

WALKER LAKE BASIN.

GENERAL FEATURES.

Walker Lake, which next to Pyramid Lake is the most picturesque and attractive of the desert lakes of Nevada, lies in the northern part of Esmeralda County. It is supplied entirely by Walker River, which enters at its north end.

As one of the lakes of the region occupied by glacial lake Lahontan, it was described by Russell[1] as follows:

The lake is 25.6 miles in its longer, or north and south axis, and has an average width of between 4.5 and 5 miles. Its area is 95 square miles. * * * Over a large area in the central and western portions it has a remarkably uniform depth of 224 feet; but as a rule the depth increases as one approaches the western shore, which is overshadowed by rugged mountains. The bottom throughout the central portions is composed of fine tenacious mud, which in many places is black in color and has the odor of hydrogen sulphide. Coarser deposits, consisting of sand and gravel, mingled with the empty shells of Pyrgula and Pompholyx, etc., were found only in the immediate neighborhood of the shore. * * *

As in the case of the other lakes in the Great Basin situated at an elevation of less than 5,000 feet, the shores of Walker Lake are totally lacking in arboreal vegetation except at the river mouth and are clothed only with desert shrubs. At the northern end, and following the immediate shores of Walker River for many miles, are luxuriant cottonwood groves, together with willow banks and meadow lands. * * *

The waters at a distance from the river mouth are of a clear deep blue, changing to a bright green tint near the shore, as in Pyramid Lake. They are charged with saline matter to such an extent that carbonate of lime is now being deposited.

[1] Russell, I. C., Geological history of Lake Lahontan, a Quaternary lake of northwestern Nevada: Mon. U. S. Geol. Survey, vol. 11, 1885, pp. 69-70.

Walker River, the inflowing stream, rises on the eastern slope of the Sierra Nevada in two main branches whose basins are separated by a group of mountains known as the Sweetwater Range. The East Fork of Walker River receives the drainage from the eastern slope of the Sweetwater Range and from the western slope of the Walker River Range; the West Fork flows at the base of the main range of the Sierra Nevada. From the union of the forks, near Yerington, the river flows sluggishly northward, passing through the fertile Yerington Valley (Mason Valley) to a point east of Wabuska, where it turns to the east and southeast, and 50 miles beyond the forks enters Walker Lake; length of the river from Walker Lake to the junction of Virginia and Green creeks, which form the East Walker, 120 miles, in which distance the total fall is 2,400 feet; fall in the 50 miles below the junction of the East and West Walker, about 400 feet.

The basin contains but three important valleys—Antelope Valley on the West Fork; Smith Valley, a fertile tableland presenting ample opportunity for reclamation, also under the West Fork; and Yerington Valley, which takes its water from the two forks. Only recently have the water rights in this last-named valley been adjusted. The minimum flow is not sufficient to supply the demand during the summer months, although excellent reservoir sites near the headwaters of the forks are available for storing the flood waters for use during the dry season. The snowfall in the winter months is very heavy, giving assurance of an ample supply for reservoirs.

No irrigation projects are at present being constructed, but surveys have been made by the Reclamation Service to show the feasibility of such projects. A line of levels run by the Reclamation Service from a point above Yerington to Carson River near Towle's ranch shows that water can be easily diverted by gravitation from the Walker River to the Carson River. The opportunities for power development afforded by both forks are as yet undeveloped by private companies because of the small demand for power near the rivers. Power development from the main stream is not feasible.

EAST WALKER RIVER NEAR MASON, NEV.

This station, which is located at the highway bridge, 7 miles above Mason, in the S. ½ NE. ¼ sec. 26, T. 12 N., R. 25 E., Mount Diablo base and meridian, was established November 21, 1910.

The East Walker unites with the West Walker about 2½ miles below the gage. Practically the entire low-water flow is used for irrigation above the station.

The vertical staff gage is on the left bank. Discharge measurements are made from the bridge 100 feet above the gage.

Both banks are high and will not overflow. The bed of the stream is composed of sand and fine gravel and will shift somewhat.

The following discharge measurement was made by H. D. McGlashan:

November 21, 1910: Width, 43 feet; area, 47 square feet; gage height, 3.94 feet; discharge, 96 second-feet.

Daily gage height, in feet, of East Walker River near Mason, Nev., for 1910.

[Mrs. J. H. Hillbun, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		3.7	11		3.9	21	3.94	4.05
2		3.72	12		4.05	22	3.95	4.0
3		3.75	13		4.0	23	3.95	3.95
4		3.8	14		3.95	24	3.90	3.95
5		4.1	15		3.9	25	3.90	4.15
6		4.0	16		3.9	26	3.85	4.15
7		4.0	17		3.8	27	[a] 3.64	[b] 3.8
8		4.0	18		3.8	28	3.62	3.65
9		3.95	19		3.7	29	3.64	3.65
10		3.9	20		3.8	30	3.65	3.6
						31		3.65

[a] Water turned into canal just above station. [b] Freezing.

WALKER RIVER AT MASON, NEV.

This station, which is located at the highway bridge at Mason, in the SW. ¼ sec. 33, T. 13 N., R. 25 E., Mount Diablo base and meridian, about 4½ miles below the junction of the East and West Walker rivers, was established November 21, 1910, to determine the amount of water available for irrigation in Mason Valley.

The gage is a vertical staff fastened to the second pile bent from the right end of the bridge.

Discharge measurements are made from the bridge.

The channel, which is composed of sand and fine gravel, is straight for some distance above and below the station. The bed is constantly shifting, but it is believed that the flow is fairly well controlled. The banks are of equal height and will not overflow except during exceptional floods.

The following discharge measurement was made by H. D. McGlashan:

November 21, 1910: Width, 101 feet; area, 134 square feet; gage height, 4.44 feet, discharge, 240 second-feet.

Daily gage height, in feet, of Walker River at Mason, Nev., for 1910.

[T. T. Kelley, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		4.4	11		4.5	21	4.44	4.3
2		4.4	12		4.5	22	4.44	4.3
3		4.4	13		4.5	23	4.45	4.3
4		4.45	14		4.4	24	4.45	4.3
5		4.6	15		4.3	25	4.4	4.35
6		4.5	16		4.3	26	4.45	4.4
7		4.5	17		4.3	27	4.4	4.3
8		4.5	18		4.3	28	4.3	4.3
9		4.5	19		4.3	29	4.3	4.15
10		4.5	20		4.25	30	4.4	4.0
						31		4.1

NOTE.—Ice along bank of river Dec. 16–18 and 27–31.

ROBINSON CREEK NEAR BRIDGEPORT, CAL.

Robinson Creek rises on the eastern slope of the Sierra in Mono County, Cal., and flows northeastward, passing through Twin Lakes to its junction with the East Fork of Walker River 2 miles north of Bridgeport. Its principal tributary is Buckeye Creek.

This station, which is located at the mouth of the canyon, 5½ miles southwest of Bridgeport, in the SW. ¼ NW. ¼ sec. 15, T. 4 N., R. 24 E., Mount Diablo base and meridian, in the Mono National Forest, was established November 18, 1910.

Lower Twin Lake is about 3 miles above the station and the junction with Buckeye Creek is 5 miles below. No water is diverted above the gage. The low-water flow is entirely used for irrigation in Bridgeport Valley. Twin Lakes is an excellent reservoir site. At the present time this storage is only partly developed.

The gage is a vertical staff fastened to a pine tree on the left bank near the site of an old sawmill.

Discharge measurements are made by wading near the gage.

Both banks are high and will not overflow. The channel is composed of gravel and small bowlders.

The station is maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. D. McGlashan by wading 150 feet above gage:

November 18, 1910:[1] Width, 8 feet; area, 6.1 square feet; gage height, 2.28 feet; discharge, 6.1 second-feet.

[1] Water undoubtedly being stored at Twin Lakes.

Daily gage height, in feet, of Robinson Creek near Bridgeport, Cal., for 1910.

[Henry W. Atcheson, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1			11			21		2.20
2			12			22		
3		2.33	13			23	2.25	
4			14		2.29	24		
5			15			25		
6			16			26	2.31	
7		2.28	17		2.25	27		
8			18	2.28		28		
9			19			29		
10		2.30	20			30	2.22	
						31		2.25

NOTE.—Slight ice noted by observer Nov. 26 and 30 and Dec. 21 and 31.

BUCKEYE CREEK NEAR BRIDGEPORT, CAL.

This station, which is located at the mouth of the canyon, one-half mile below Hot Springs, 4½ miles southwest of Bridgeport, in the SE. ¼ NW. ¼ sec. 3, T. 4 N., R. 24 E., Mount Diablo base and meridian, in the Mono National Forest, was established November 18, 1910.

Eagle Creek enters about 1 mile above and Buckeye Creek joins Robinson Creek about 4 miles below the station. This stream is largely used for irrigation, but no water is diverted above the station.

The gage is a vertical staff fastened to a large cottonwood tree on the left bank about one-half mile above the mouth of the canyon.

Discharge measurements are made by wading near the gage.

The right bank is high, but the river overflows the left bank for a short distance at flood stages. The channel, which is composed of gravel and bowlders, is rough. The current is swift at medium and high stages.

This station is maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. D. McGlashan by wading about 25 feet above the gage:

November 18, 1910: Width, 21 feet; area, 20 square feet; gage height, 2.79 feet; discharge, 27 second-feet.

Daily gage height, in feet, of Buckeye Creek at Bridgeport, Cal., for 1910.

[Henry W. Atcheson, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1			11			21		2.82
2			12			22		
3		2.88	13			23	2.82	
4			14		2.60	24		
5			15			25		
6			16			26	2.85	
7		2.80	17		2.72	27		
8			18	2.79		28		
9			19			29		
10		2.90	20			30	2.71	
						31		2.90

NOTE.—Nov. 26, thin ice near shore, slush ice flowing; Nov. 30 and Dec. 21, some ice present; Dec. 31, heavy slush ice flowing.

CARSON SINK BASIN.

GENERAL FEATURES.

Carson Sink lies in Churchill County, Nev., in the northern part of Carson Desert. During the winter and spring it receives a considerable supply of water from both Humboldt and Carson rivers and becomes a shallow, playa lake from 20 to 25 miles long and 14 miles broad. In arid summers the water supply fails and the lake evaporates to dryness, and as desiccation becomes more intense the salts impregnating the lake beds are brought to the surface and form an efflorescence several inches in thickness. In October, 1881, the sink was a broad, mud-colored plain, covered in places with a white alkaline crust that looked like patches of snow. In 1908 Carson Sink was mapped by the topographers of the United States Geological Survey as a permanent water body, 12 miles long by 12 miles miles broad, receiving Carson River on the south. The drainage line from Humboldt Lake to the sink was marked as an intermittent river.

CARSON RIVER BASIN.

GENERAL FEATURES.

Carson River is formed by its East[1] and West forks, which rise in the extreme eastern part of California and flow northeastward to their union near the town of Gardnerville, Nev. From this point the river flows northward to Empire, Nev., where it turns to the east and finally disappears into Carson Sink. It is about 160 miles long to the head of the East Fork, and its total fall is about 6,400 feet. In the 108 miles below the forks the fall is about 900 feet.

The principal tributaries of the East Carson are Silver King, Wolf, Silver, Markleeville, and Leviathan creeks. These streams drain a rough, mountainous country, ranging in altitude from 5,000 to 11,000 feet above sea level. Good storage sites exist on all the important tributaries. The reservoir sites in Pleasant Valley and on Silver Creek have been partly developed.

The area drained by the West Carson is not so large as that of the East Carson and its altitudes are, in general, lower. By constructing a reservoir at Hope Valley a large amount of power may be developed in the West Carson Canyon.

The soil throughout the Carson and Dayton valleys is very porous and its irrigation requires a large amount of water. The low-water flow is sufficient to reclaim only a small portion of the land. The irrigated acreage may, however, be greatly increased by constructing reservoirs on the headwaters to store the spring floods.

[1] Called East Carson River above mouth of Markleeville Creek.

EAST CARSON RIVER NEAR MARKLEEVILLE, CAL.

This station, which is located at Hangman's Bridge, 2 miles east of Markleeville, in the NE. ¼ sec. 27, T. 10 N., R. 20 E., Mount Diablo base and meridian, was established November 13, 1910.

Indian Creek enters 100 feet above and Markleeville Creek 1¼ miles below the station. All water diverted above Hangman's Bridge is used for power development. The discharge, as measured at this station, represents the natural run-off, except that the low-water flow during the irrigation season is augmented by a small amount of water stored on Silver Creek. Practically the entire low-water flow of the East and West Carson is used for the irrigation of Carson Valley.

The gage is a vertical staff bolted to the solid rock on the right bank 75 feet below the bridge.

At low and medium stages discharge measurements are made by wading; high-stage measurements are made from a car and cable about 3 miles above the gage.

The channel is composed of gravel and small bowlders and appears permanent. Both banks are high and will not overflow.

This station is maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. D. McGlashan by wading about 150 feet below Hangmans Bridge:

October 11, 1910. Width, 47 feet; area, 59 square feet; gage height,[1] 2.59 feet; discharge, 59 second-feet.

Daily gage height, in feet, of East Carson River near Markleeville, Cal., for 1910.

[H. W. Jones, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		2.55	11		2.90	21	2.60	2.51
2		2.58	12		2.80	22	2.60	2.56
3		3.18	13	2.60	2.70	23	2.61	2.60
4		2.60	14	2.62	2.51	24	2.67	2.64
5		2.50	15	2.60	2.50	25	2.62	
6		2.70	16	2.58	2.45	26	2.40	2.47
7		2.72	17	2.58	2.51	27	2.55	2.60
8		2.74	18	2.61	2.47	28	2.53	2.40
9		2.75	19	2.30	2.60	29	2.55	2.40
10		2.86	20	2.42	2.82	30	2.50	2.30
						31		2.30

NOTE.—Nov. 20, mush ice running; Nov. 26, ice at gage; Dec. 3, almost continuous rain 18 hours previous to reading of gage; Dec. 5, 14, 17, mush ice running; Dec. 26, ice at gage.

EAST FORK OF CARSON RIVER NEAR GARDNERVILLE, NEV.

This station, which is located at Horseshoe Bend, in the NW. ¼ sec. 13, T. 11 N., R. 20 E., about 9 miles south of Gardnerville, Nev., was established October 17, 1900, at Rodenbah's ranch, about 5 miles southeast of Gardnerville, was removed to the present site (3 miles

[1] Gage height determined Nov. 13 from reference point.

above the old station) on March 27, 1908, and was abandoned December 26, 1910. It was below all tributaries and above all diversion ditches.

The station was equipped with an inclined staff gage and a cable and car from which discharge measurements were made.

The relation between gage height and discharge was probably not affected by ice during 1910.

The section is permanent, conditions are favorable, and results are good.

This station was maintained by the United States Reclamation Service.

Discharge measurements made by Stone & Webster Engineering Corporation have been furnished to the United States Geological Survey.

Discharge measurements of East Fork of Carson River near Gardnerville, Nev., in 1910.

Date.	Hydrographer.	Area of section.	Gage height.	Discharge.
		Sq. ft.	*Feet.*	*Sec.-ft.*
Mar. 29..	F. C. Schafer	105	3.20	385
Apr. 26..	Stone & Webster Engineering Corporation	283	4.93	1,460
June 2...	....do	185	3.92	850
21..	....do	135	3.31	504
July 19..	....do	110	3.10	370
26..	....do	69	2.71	184
Sept. 28.	....do	64	2.50	89
Dec. 12..	D. S. Stuver	65	2.68	154

Daily gage height, in feet, of East Fork of Carson River near Gardnerville, Nev., for 1910.

[H. M. Everett, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.0	2.8	3.2	3.3	4.1	5.1	3.2	2.6	2.5	2.5	2.5	2.55
2	3.0	2.8	3.2	3.3	4.1	4.9	3.1	2.55	2.5	2.5	2.5	2.55
3	2.8	2.8	3.2	3.3	4.0	4.6	3.1	2.5	2.5	2.5	2.5	2.9
4	2.7	2.8	3.2	3.4	4.0	4.4	3.1	2.5	2.5	2.5	2.5	2.9
5	2.7	2.8	3.5	4.0	3.7	4.1	3.1	2.5	2.5	2.5	2.5	2.8
6	2.7	2.8	3.4	4.3	3.9	4.3	3.1	2.45	2.5	2.5	2.5	2.7
7	2.7	2.8	3.4	4.4	4.3	4.0	3.0	2.45	2.5	2.5	2.5	2.7
8	2.7	2.8	3.4	4.5	4.6	3.9	3.0	2.45	2.5	2.5	2.5	2.6
9	2.7	2.8	3.4	4.2	5.0	3.9	3.0	2.45	2.5	2.5	2.5	2.6
10	2.7	2.8	3.4	4.0	5.5	3.7	2.9	2.45	2.5	2.5	2.5	2.6
11	2.7	2.9	3.4	4.1	4.8	3.8	2.9	2.45	2.5	2.5	2.5	2.6
12	2.7	2.9	3.4	3.7	4.6	3.9	2.9	2.45	2.5	2.5	2.5	2.6
13	2.7	2.7	3.4	3.9	4.5	3.8	2.8	2.45	2.5	2.5	2.5	2.6
14	2.7	2.7	3.6	4.1	4.5	3.8	2.8	2.45	2.55	2.5	2.5	2.6
15	2.7	2.7	3.4	4.0	4.7	3.7	2.7	2.45	2.6	2.5	2.5	2.6
16	2.7	2.7	3.4	4.0	4.6	3.6	2.7	2.45	2.6	2.5	2.5	2.6
17	2.7	2.7	3.4	4.5	3.9	3.6	2.7	2.45	2.55	2.5	2.5	2.6
18	2.7	2.7	4.3	4.7	4.5	3.5	3.25	2.45	2.55	2.5	2.5	2.6
19	2.7	2.7	4.5	4.8	4.5	3.5	3.0	2.45	2.55	2.5	2.5	2.6
20	2.7	2.8	4.2	5.0	4.5	3.4	3.25	2.45	2.5	2.5	2.5	2.6
21	2.7	2.8	3.9	4.6	4.6	3.3	3.0	2.45	2.5	2.5	2.5	2.6
22	3.5	2.8	3.8	4.7	4.8	3.3	2.9	2.45	2.5	2.5	2.5	2.6
23	3.7	2.8	3.5	4.7	4.9	3.3	2.9	2.45	2.5	2.5	2.5	2.55
24	2.8	2.8	3.3	4.9	5.6	3.3	2.9	2.45	2.5	2.5	2.5	2.55
25	2.7	2.8	3.2	5.0	4.5	3.3	2.8	2.5	2.5	2.5	2.5	2.55
26	2.7	2.8	3.2	5.1	4.6	3.3	2.75	2.5	2.5	2.5	2.5	2.55
27	2.7	2.8	3.2	5.2	4.9	3.3	2.7	2.5	2.5	2.5	2.55	.....
28	2.7	3.5	3.2	5.1	4.9	3.3	2.7	2.5	2.5	2.5	2.55	.....
29	2.7	.....	3.2	4.5	4.9	3.2	2.7	2.5	2.5	2.5	2.55	.....
30	2.8	.....	3.2	4.3	5.0	3.2	2.6	2.5	2.5	2.5	2.55	.....
31	2.8	.....	3.3	.....	5.1	.....	2.6	.....	.....	2.5	.....	.....

Daily discharge in second-feet of East Fork of Carson River near Gardnerville, Nev., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	290	200	390	440	900	1,620	390	123	90	90	90	106
2	290	200	390	440	900	1,460	340	106	90	90	90	106
3	200	200	390	440	840	1,240	340	90	90	90	90	245
4	160	200	390	493	840	1,100	340	90	90	90	90	245
5	160	200	546	840	660	900	340	90	90	90	90	200
6	160	200	493	1,030	780	1,030	340	75	90	90	90	160
7	160	200	493	1,100	1,030	840	290	75	90	90	90	160
8	160	200	493	1,170	1,240	780	290	75	90	90	90	123
9	160	200	493	960	1,540	780	290	75	90	90	90	123
10	160	200	493	840	1,940	660	245	75	90	90	90	123
11	160	245	493	900	1,380	720	245	75	90	90	90	123
12	160	245	493	660	1,240	780	245	75	90	90	90	123
13	160	160	493	780	1,170	720	200	75	90	90	90	123
14	160	160	600	900	1,170	720	200	75	106	90	90	123
15	160	160	493	840	1,310	660	160	75	123	90	90	123
16	160	160	493	840	1,240	600	160	75	123	90	90	123
17	160	160	493	1,170	780	600	160	75	106	90	90	123
18	160	160	1,030	1,310	1,170	546	415	75	106	90	90	123
19	160	160	1,170	1,380	1,170	546	290	75	106	90	90	123
20	160	200	960	1,540	1,170	493	415	75	90	90	90	123
21	160	200	780	1,240	1,240	440	290	75	90	90	90	123
22	546	200	720	1,310	1,380	440	245	75	90	90	90	123
23	660	200	546	1,310	1,460	440	245	75	90	90	90	106
24	200	200	440	1,460	2,020	440	245	75	90	90	90	106
25	160	200	390	1,540	1,170	440	200	90	90	90	90	106
26	160	200	390	1,620	1,240	440	180	90	90	90	90	106
27	160	200	390	1,700	1,460	440	160	90	90	90	106	106
28	160	546	390	1,620	1,460	440	160	90	90	90	106	106
29	160	.....	390	1,170	1,460	390	160	90	90	90	106	90
30	200	.....	390	1,030	1,540	390	123	90	90	90	106	90
31	200	.....	440	.....	1,620	.....	123	90	.....	90	.....	90

NOTE.—Daily discharge determined from a discharge rating curve fairly well defined for all stages. Discharge Dec. 27–31 estimated.

Monthly discharge of East Fork of Carson River near Gardnerville, Nev., for 1910.

[Drainage area, 361 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	660	160	202	0.560	0.65	12,400	B.
February	546	160	206	.571	.59	11,400	B.
March	1,170	390	534	1.48	1.71	32,800	A.
April	1,700	440	1,070	2.96	3.30	63,700	A.
May	2,020	660	1,240	3.43	3.95	76,200	A.
June	1,620	390	703	1.95	2.18	41,800	A.
July	415	123	252	.698	.80	15,500	A.
August	123	75	82.4	.228	.26	5,070	B.
September	123	90	94.3	.261	.29	5,610	B.
October	90	90	90.0	.249	.29	5,530	B.
November	106	90	92.1	.255	.28	5,480	B.
December	245	*a* 90	128	.355	.41	7,870	B.
The year	2,020	75	392	1.09	14.71	283,000	

a Estimated.

CARSON RIVER AND BRUNSWICK MILL POWER CANAL NEAR EMPIRE, NEV.

This station, which is located at the county bridge at Brunswick Mill, one-fourth mile below the diversion dam of the Brunswick Mill Power Co. and 2 miles below Empire, Nev., was originally established October 21, 1900, at a point three-fourths of a mile east of Brunswick Mill and 2½ miles east of Empire, Nev. The original gage was washed out by a flood March 19, 1907. On April 12, 1907, a new gage was installed on the crest of the diversion dam of the Brunswick Mill canal, 1½ miles below Empire and 6 miles east of Carson City, Nev. Only one measurement was referred to this gage, and elevation of the gage datum was not referred to the crest of the dam, therefore the daily discharge can not be computed from this time until June 7, 1907, when a new gage was installed at the present site.

An inclined gage is located under the bridge. All gage heights since June 7, 1907, refer to the same datum.

Discharge measurements are made from a car and cable located just above the highway bridge.

The power canal of the mill has diverted water past the gage on the river since April 12, 1907, so its discharge must be added to give the total. As records have been kept on the canal only since April 13, 1908, the total flow of the river prior to that time can be estimated only approximately. The power is now used to pump water for irrigation, although formerly it was used to run a stamp mill. The station on the canal is at the bridge crossing the canal directly opposite the cable in the river.

The records at this point show the discharge of the river below the Gardnerville Valley and above the Dayton Valley, and are of value to the United States Reclamation Service in connection with the Truckee-Carson project and to the State engineer of Nevada in the adjustment of water rights.

The relation between gage height and discharge is at times affected by ice, but was probably not so affected during the winter of 1910.

Good results have been obtained at the station on the river, but the gage in the canal is within the influence of backwater from the mill and is not always an index of the discharge. Determinations of discharge for the canal are therefore only approximate.

This station is maintained in cooperation with the United States Reclamation Service.

Discharge measurements of Carson River near Empire, Nev., for 1910.

Date.	Hydrographer.	Width	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 30	F. C. Schafer	121	412	5.10	563
Oct. 9[a]	H. D. McGlashan	24	36	2.72	26
Dec. 13	D. S. Stuver	116	235	4.14	253

[a] Made by wading 100 feet below dam.

Daily gage height, in feet, of Carson River near Empire, Nev., for 1910.

[John Lloyd and D. I. Patterson, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.7	4.9	5.1	5.0	6.0	6.0	3.8	3.0	2.3	2.5	3.2	3.5
2	5.6	4.8	5.2	5.1	5.9	6.0	3.7	2.9	2.3	2.5	3.0	3.6
3	5.0	4.6	5.2	5.2	5.8	6.0	3.6	2.8	2.3	2.5	3.1	3.7
4	4.0	4.4	5.2	5.2	5.8	5.7	3.6	2.9	2.3	2.5	3.1	3.9
5	3.6	4.2	5.3	5.2	5.6	5.6	3.5	2.8	2.3	2.6	3.1	4.1
6	4.2	4.2	5.3	5.3	5.5	5.4	3.4	2.8	2.3	2.6	2.9	4.0
7	4.9	4.2	5.3	5.4	5.4	5.3	3.2	2.7	2.3	2.6	3.0	3.9
8	4.4	4.4	5.3	5.5	5.5	5.1	3.2	2.7	2.3	2.6	3.0	3.8
9	4.4	4.6	5.2	5.6	5.7	4.9	3.1	2.6	2.3	2.7	3.1	3.9
10	4.4	4.5	5.3	5.9	6.2	4.9	3.2	2.6	2.3	2.7	3.2	3.9
11	4.3	4.5	5.3	5.9	6.4	5.0	3.1	2.5	2.3	2.7	3.2	4.0
12	4.0	4.7	5.3	5.9	6.3	5.0	3.1	2.5	2.3	2.7	3.2	4.1
13	4.0	4.9	5.3	5.6	6.2	5.0	2.9	2.5	2.3	2.8	3.3	4.1
14	4.3	5.9	5.4	5.6	6.1	4.8	2.9	2.5	2.3	2.8	3.5	4.0
15	4.3	5.8	5.4	5.6	6.1	4.7	2.9	2.5	2.4	2.9	3.6	4.0
16	4.4	5.4	5.3	5.5	6.2	4.7	2.9	2.4	2.5	2.9	3.6	3.9
17	4.5	5.0	5.2	5.6	6.1	4.7	2.8	2.4	2.6	3.0	3.5	3.9
18	4.3	5.0	5.3	5.9	5.9	4.6	2.8	2.4	2.5	3.0	3.5	3.9
19	4.3	5.3	5.5	6.1	5.9	4.5	3.6	2.4	2.5	3.0	3.4	3.4
20	4.3	5.5	6.0	6.3	5.9	4.4	3.8	2.3	2.5	2.9	3.4	3.3
21	4.4	5.3	6.2	6.4	5.9	4.3	4.3	2.3	2.5	3.0	3.4	3.4
22	4.4	5.2	5.9	6.2	5.9	4.2	4.0	2.3	2.5	3.0	3.4	3.5
23	4.4	5.1	5.6	6.2	6.0	4.2	3.6	2.3	2.5	3.1	3.4	3.5
24	4.6	5.2	5.5	6.3	6.1	4.1	3.4	2.3	2.4	3.2	3.4	3.4
25	4.9	5.4	5.4	6.3	6.2	4.0	3.4	2.3	2.4	3.1	3.4	3.5
26	4.6	5.2	5.3	6.4	6.1	4.0	3.2	2.3	2.5	3.1	3.5	3.5
27	4.5	4.9	5.3	6.5	6.0	4.0	3.1	2.3	2.5	3.1	3.5	3.4
28	4.5	4.9	5.2	6.6	6.1	4.2	3.0	2.3	2.5	3.1	3.5	3.1
29	4.9	.....	5.2	6.7	6.1	3.9	3.0	2.3	2.5	3.1	3.5	3.0
30	4.9	.....	5.0	6.4	6.2	3.9	2.9	2.3	2.5	3.1	3.5	3.2
31	4.9	.....	5.0	.....	6.2	.....	3.0	2.3	.....	3.2	.....	3.3

Daily discharge, in second-feet, of Carson River near Empire, Nev., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	864	482	563	521	1,050	1,050	174	48	7.5	14	70	116
2	805	445	606	563	985	1,050	153	39	7.5	14	48	134
3	521	379	606	606	924	1,050	134	31	7.5	14	58	153
4	219	320	606	606	924	864	134	39	7.5	14	58	196
5	134	268	651	606	805	805	116	31	7.5	18.5	58	243
6	268	268	651	651	750	699	99	31	7.5	18.5	39	219
7	482	268	651	699	699	651	70	24	7.5	18.5	48	196
8	320	320	651	750	750	563	70	24	7.5	18.5	48	174
9	320	379	606	805	864	482	58	18.5	7.5	24	58	196
10	320	348	651	985	1,190	482	70	18.5	7.5	24	70	196
11	293	348	651	985	1,340	521	58	14	7.5	24	70	219
12	219	411	651	985	1,260	521	58	14	7.5	24	70	243
13	219	482	651	805	1,190	521	39	14	7.5	31	84	243
14	293	985	699	805	1,120	445	39	14	7.5	31	116	219
15	293	924	699	805	1,120	411	39	14	10.5	39	134	219

Daily discharge, in second-feet, of Carson River near Empire, Nev., for 1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16	320	699	651	750	1,190	411	39	10.5	14	39	134	196
17	348	521	606	805	1,120	411	31	10.5	18.5	48	116	196
18	293	521	651	985	985	379	31	10.5	14	48	116	196
19	293	651	750	1,120	985	348	134	10.5	14	48	99	99
20	293	750	1,050	1,260	985	320	174	7.5	14	39	99	84
21	320	651	1,190	1,340	985	293	293	7.5	14	48	99	99
22	320	606	985	1,190	985	268	219	7.5	14	48	99	116
23	320	563	805	1,190	1,050	268	134	7.5	14	58	99	116
24	379	606	750	1,260	1,120	243	99	7.5	10.5	70	99	99
25	482	699	699	1,260	1,190	219	99	7.5	10.5	58	99	116
26	379	606	651	1,340	1,120	219	70	7.5	14	58	116	116
27	348	482	651	1,420	1,050	219	58	7.5	14	58	116	99
28	348	482	606	1,500	1,120	268	48	7.5	14	58	116	58
29	482	.....	606	1,580	1,120	196	48	7.5	14	58	116	48
30	482	.....	521	1,340	1,190	196	39	7.5	14	58	116	70
31	482	.....	521	.....	1,190	.....	48	7.5	.....	70	.....	84

NOTE.—Daily discharge determined from a discharge rating curve, fairly well defined below 1,200 second-feet. Discharge of the power canal should be added to that of the river station to ascertain total discharge of river.

Daily gage height, in feet, of Brunswick Mill power canal near Empire, Nev., for 1910.

[D. I. Patterson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.0	2.8	3.0	3.0	4.0	4.0	.....	.....	.....	.....	2.9	.....
2	2.9	2.8	3.0	3.0	4.0	4.0	.....	.....	.....	.....	2.0	.....
3	2.9	2.7	3.0	3.0	3.9	4.0	.....	.....	.....	.....	2.3	.....
4	3.0	2.6	3.0	3.0	3.9	3.9	.....	.....	.....	.....	2.4	.....
5	3.0	2.6	3.0	3.0	3.8	3.9	.....	.....	.....	.....	2.7	.....
6	3.0	2.6	3.0	3.0	3.8	3.9	.....	.....	.....	.....	2.2	.....
7	3.0	2.6	3.0	3.1	3.8	3.8	.....	.....	.....	.....	2.2	.....
8	3.0	2.6	3.0	3.2	3.8	3.8	.....	.....	.....	.....	2.4	.....
9	3.0	2.6	3.0	3.3	3.9	3.8	.....	.....	.....	.....	2.4	.....
10	3.0	2.6	3.0	4.0	4.0	3.8	.....	.....	.....	.....	2.5	.....
11	3.0	2.6	3.0	4.0	4.0	3.8	.....	.....	.....	1.7	2.5	.....
12	3.2	2.6	3.0	4.0	4.0	3.8	.....	.....	.....	2.6	2.5	.....
13	3.6	2.8	3.0	3.6	4.0	3.8	.....	.....	.....	2.7	2.6	.....
14	3.0	3.0	3.0	3.6	4.0	3.7	.....	.....	.....	2.7	.....	.....
15	2.7	3.0	3.0	3.6	4.0	3.6	.....	.....	.....	2.7	.....	.....
16	2.7	3.0	3.0	3.6	4.0	3.6	.....	.....	.....	2.7	.....	.....
17	2.7	3.0	3.0	3.8	4.0	3.6	.....	.....	.....	2.8	.....	.....
18	2.7	3.0	3.0	3.8	4.0	3.5	.....	.....	.....	2.8	.....	.....
19	2.7	3.0	3.0	3.8	4.0	3.5	.....	.....	.....	2.8	2.8	.....
20	2.7	3.0	3.2	4.0	4.0	3.4	3.6	.....	.....	2.6	2.9	.....
21	2.7	3.0	3.3	4.0	4.0	3.4	3.9	.....	.....	2.8	3.0	.....
22	2.7	3.0	3.2	4.0	4.0	3.2	3.7	.....	.....	2.8	3.0	.....
23	2.7	3.0	3.0	4.0	4.0	3.2	3.4	.....	.....	2.9	3.0	.....
24	2.7	3.0	3.0	4.0	4.0	3.2	3.0	.....	.....	3.0	3.0	.....
25	2.8	3.0	3.0	4.0	4.0	3.2	3.0	.....	.....	3.0	3.0	.....
26	2.7	3.0	3.0	4.0	4.0	.....	2.8	.....	.....	2.9	3.1	.....
27	2.7	3.0	3.0	4.0	4.0	.....	.....	.....	.....	2.9	.....	.....
28	2.7	3.0	3.0	4.1	4.0	.....	.....	.....	.....	2.9	.....	.....
29	2.8	.....	3.0	4.1	4.0	.....	.....	.....	.....	2.9	.....	.....
30	2.8	.....	3.0	4.0	4.0	.....	.....	.....	.....	2.9	.....	.....
31	2.8	.....	3.0	.....	4.0	.....	.....	.....	.....	2.9	.....	.....

NOTE.—No water running in canal June 26 to July 19, July 27 to Sept. 24, and Nov. 14 to 18.
NOTE.—Relation of gage heights to discharge affected by backwater caused by the closing of gates about 800 feet below the gage; records therefore afford merely an approximate index of true values. Gage heights from Jan. 1 to June 17 probably a fairly accurate index of discharge.
Gage readings discontinued after Nov. 26.

Daily discharge, in second-feet, of Brunswick Mill power canal near Empire, Nev., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	82	75	82	82	116	116	0	0	0	.....	78	.....
2	78	75	82	82	116	116	0	0	0	.....	50	.....
3	78	72	82	82	112	116	0	0	0	.....	59	.....
4	82	69	82	82	112	112	0	0	0	.....	62	.....
5	82	69	82	82	109	112	0	0	0	.....	72	.....
6	82	69	82	82	109	112	0	0	0	.....	56	.....
7	82	69	82	85	109	109	0	0	0	.....	56	.....
8	82	69	82	88	109	109	0	0	0	.....	62	.....
9	82	69	82	92	113	109	0	0	0	.....	62	.....
10	82	69	82	116	116	109	0	0	0	.....	66	.....
11	82	69	82	116	116	109	0	0	0	41	66	.....
12	88	69	82	116	116	109	0	0	0	69	66	.....
13	102	75	82	102	116	109	0	0	0	72	69	.....
14	82	82	82	102	116	105	0	0	0	72	0	.....
15	72	82	82	102	116	102	0	0	0	72	0	.....
16	72	82	82	102	116	102	0	0	0	72	0	.....
17	72	82	82	109	116	102	0	0	0	75	0	.....
18	72	82	82	109	116	99	0	0	0	75	0	.....
19	72	82	82	109	116	99	0	0	0	75	75	.....
20	72	82	88	116	116	96	102	0	0	69	78	.....
21	72	82	92	116	116	96	112	0	0	75	82	.....
22	72	82	88	116	116	88	105	0	0	75	82	.....
23	72	82	82	116	116	88	95	0	0	78	82	.....
24	72	82	82	116	116	88	82	0	0	82	82	.....
25	75	82	82	116	116	88	82	0	.....	82	82	.....
26	72	82	82	116	116	0	75	0	.....	78	85	.....
27	72	82	82	116	116	0	0	0	.....	78	.....	.....
28	72	82	82	120	116	0	0	0	.....	78	.....	.....
29	75	.....	82	120	116	0	0	0	.....	78	.....	.....
30	75	.....	82	116	116	0	0	0	.....	78	.....	.....
31	75	.....	82	.....	116	.....	0	0	.....	78	.....	.....

NOTE.—Daily discharge determined from a rating curve based on discharge measurements made during 1909, which are affected by backwater. The figures are subject to large error and should be used with caution. No water flowing in canal June 26 to July 19, July 27 to Sept. 24, and Nov. 14 to 18. Discharge estimated Sept. 25 to Oct. 10 and Nov. 27 to Dec. 31. (See monthly discharge table.)

Monthly discharge of Carson River and Brunswick Mill power canal near Empire, Nev., for 1910.

[Drainage area, 988 square miles.]

Month.	Discharge in second-feet.						Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Power canal, mean.	Total mean.	Per square mile.	Depth in inches on drainage area.	Total in in acre-feet.	
January	864	134	370	77.5	448	0.453	0.52	27,500	B.
February	985	268	517	76.7	594	.601	.63	33,000	B.
March	1,190	521	687	82.7	770	.779	.90	47,300	B.
April	1,580	521	984	104	1,090	1.10	1.23	64,900	B.
May	1,340	699	1,040	115	1,160	1.17	1.35	71,300	A.
June	1,050	196	479	86.7	566	.572	.64	33,700	B.
July	293	31	92.7	21.1	114	.115	.13	7,010	C.
August	48	7.5	16.3	0.0	16.3	.016	.02	1,000	B.
September	18.5	7.5	10.8	3.00	13.8	.014	.02	821	C.
October	70	14	38.4	54.9	93.3	.094	.11	5,740	C.
November	134	39	88.9	60.4	149	.151	.17	8,870	C.
December	243	48	153	86.1	239	.242	.28	14,700	C.
The year	1,580	7.5	372	63.9	436	.441	6.00	316,000	

NOTE.—Totals represent combined discharge of river and power canal. The canal records should be considered approximate, but the records of the river are reliable. The total run-off at the river station is 269,000 acre-feet; that of the power canal is 47,000 acre-feet.

Discharge of power canal Sept. 25–30, estimated at 15 second-feet; Oct. 1–10, estimated at 15 second-feet; Nov. 27–30, estimated at 85 second-feet.

CARSON RIVER NEAR HAZEN, NEV.

This station, which is located about 8 miles south of Hazen and about 1,500 feet above Truckee canal chute, in the SE. ¼ sec. 33 T. 19 N., R. 26 E., was established January 12, 1908, and abandoned December 5, 1910.

The Lahontan dam, under construction at this point by the United States Reclamation Service, will impound about 300,000 acre-feet of water and conserve the flood waters of the Carson and also the water delivered by the Truckee canal.

To avoid the effect of backwater from the canal chute the gage was moved upstream on April 28, 1908. Gage heights prior to that time are of no value and have not been published.

Discharge measurements are made by wading and from the cable, which is about 1,500 feet upstream from the chute at the end of the canal. An inclined gage is located on the left bank just below the cable.

The plotting of the discharge measurements indicates some shift in the channel. A fairly well-defined discharge rating curve has been developed, however. The 1908 gage heights are given in Water-Supply Paper 250, page 128.

This station was maintained by the United States Reclamation Service.

The following discharge measurement was made by wading by F. C. Schafer:

August 23, 1910: Width, 8 feet; gage height, 1.35 feet; discharge, 1.1 second-feet.

Daily gage height, in feet, of Carson River near Hazen, Nev., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.25	3.4	3.45	3.45	4.35	4.1	2.6	1.9	.....	.....	2.1	2.3
2	3.5	3.65	3.45	3.45	4.1	4.1	2.5	1.85	.....	.....	2.1	2.3
3	3.6	3.7	3.55	3.5	4.0	4.0	2.4	1.8	.....	.....	2.1	2.4
4	3.3	3.5	3.6	3.5	3.9	4.0	2.4	1.8	.....	.....	2.1	2.42
5	3.3	3.65	3.55	3.55	3.85	3.9	2.4	1.75	.....	.....	2.15	2.45
6	3.6	3.5	3.6	3.55	3.8	3.8	2.35	1.75	.....	1.65	2.15	.....
7	3.95	3.45	3.65	3.6	3.65	3.6	2.35	1.7	.....	1.7	2.15	.....
8	4.2	3.4	3.6	3.65	3.6	3.5	2.35	1.7	.....	1.7	2.15	.....
9	4.3	3.05	3.55	3.65	3.6	3.4	2.3	1.7	.....	1.75	2.15	.....
10	4.15	3.25	3.6	3.75	3.75	3.3	2.2	1.65	.....	1.75	2.15	.....
11	3.95	3.25	3.6	3.9	4.15	3.3	2.15	1.65	.....	1.75	2.2	.....
12	4.8	3.3	3.6	3.95	4.3	3.3	2.1	1.55	.....	1.75	2.2	.....
13	3.85	3.6	3.6	3.95	4.2	3.3	2.0	1.55	.....	1.8	2.2	.....
14	3.6	3.75	3.65	3.75	4.1	3.3	2.0	1.45	.....	1.85	2.25	.....
15	3.55	4.1	3.7	3.75	4.1	3.15	1.95	1.4	.....	1.9	2.25	.....
16	3.25	4.15	3.7	3.8	4.1	3.15	1.9	1.4	.....	1.9	2.3	.....
17	3.5	3.8	3.65	3.7	4.2	3.15	1.85	1.35	.....	1.9	2.3	.....
18	3.55	3.7	3.6	3.75	4.2	3.1	1.8	1.35	.....	1.9	2.35	.....
19	3.5	3.55	3.6	3.9	3.95	3.05	1.75	1.35	.....	1.95	2.3	.....
20	3.5	3.75	3.7	4.1	3.95	3.05	1.75	1.35	.....	2.0	2.3	.....
21	3.2	3.75	4.0	4.25	3.95	3.0	1.75	.....	.....	2.05	2.3	.....
22	3.05	3.75	4.25	4.35	3.9	2.95	1.75	.....	.....	2.05	2.3	.....
23	3.15	3.6	4.0	4.15	3.9	2.9	2.4	.....	.....	2.05	2.3	.....
24	3.25	3.6	3.85	4.2	3.95	2.85	2.35	.....	.....	2.1	2.3	.....
25	3.5	3.55	3.8	4.3	4.05	2.75	2.25	.....	.....	2.1	2.3	.....

Daily gage height, in feet, of Carson River near Hazen, Nev., for 1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
26	3.45	3.7	3.7	4.3	4.1	2.7	2.15	.....	.....	2.1	2.3	.....
27	3.5	3.65	3.7	4.3	4.15	2.65	2.15	.....	.....	2.1	2.3	.....
28	3.4	3.45	3.6	4.4	4.05	2.65	2.1	.....	.....	2.1	2.3	.....
29	3.3	.....	3.55	4.55	4.1	2.65	2.05	.....	.....	2.1	2.3	.....
30	3.4	.....	3.5	4.65	4.1	2.65	1.95	.....	.....	2.15	2.3	.....
31	3.4	.....	3.5	.....	4.1	.....	1.9	.....	.....	2.1	.....	.....

NOTE.—The river was dry from Aug. 21 to Oct. 5.

Daily discharge, in second-feet, of Carson River near Hazen, Nev., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	460	550	580	580	1,280	1,060	175	33	0	0	60	98
2	610	715	580	580	1,060	1,060	145	28	0	0	60	98
3	680	750	645	610	980	980	120	24	0	0	60	120
4	490	610	680	610	900	980	120	24	0	0	60	125
5	490	715	645	645	860	900	120	20	0	0	69	132
6	680	610	680	645	820	820	109	20	0	14	69	.....
7	940	580	715	680	715	680	109	17	0	17	69	.....
8	1,150	550	680	715	680	610	109	17	0	17	69	.....
9	1,240	355	645	715	680	550	98	17	0	20	69	.....
10	1,100	460	680	785	785	490	78	14	0	20	69	.....
11	940	460	680	900	1,100	490	69	14	0	20	78	.....
12	1,690	490	680	940	1,240	490	60	8	0	20	78	.....
13	860	680	680	940	1,150	490	45	8	0	24	78	.....
14	680	785	715	785	1,060	490	45	4	0	28	88	.....
15	645	1,060	750	785	1,060	405	39	2	0	33	88	.....
16	460	1,100	750	820	1,060	405	33	2	0	33	98	.....
17	610	820	715	750	1,150	405	28	1	0	33	98	.....
18	645	750	680	785	1,150	380	24	1	0	33	109	.....
19	610	645	680	900	940	355	20	1	0	39	98	.....
20	610	785	750	1,060	940	355	20	1	0	45	98	.....
21	430	785	980	1,200	940	330	20	0	0	52	98	.....
22	355	785	1,200	1,280	900	310	20	0	0	52	98	.....
23	405	680	980	1,100	900	290	120	0	0	52	98	.....
24	460	680	860	1,150	940	270	109	0	0	60	98	.....
25	610	645	820	1,240	1,020	230	88	0	0	60	98	.....
26	580	750	750	1,240	1,060	210	69	0	0	60	98	.....
27	610	715	750	1,240	1,100	192	69	0	0	60	98	.....
28	550	580	680	1,330	1,020	192	60	0	0	60	98	.....
29	490	.....	645	1,460	1,060	192	52	0	0	60	98	.....
30	550	.....	610	1,560	1,060	192	39	0	0	69	98	.....
31	550	.....	610	.....	1,060	.....	33	0	.....	60	.....	.....

NOTE.—Daily discharge determined from a well-defined discharge rating curve.

Monthly discharge of Carson River near Hazen, Nev., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	1,690	355	683	42,000	A.
February	1,100	355	682	37,900	A.
March	1,200	580	726	44,600	A.
April	1,560	580	934	55,600	A.
May	1,280	680	989	60,800	A.
June	1,060	192	493	29,300	A.
July	175	20	72.4	4,450	A.
August	33	0	8.26	508	B.
September	0	0	0	0	
October	69	0	33.6	2,070	B.
November	109	60	84.8	5,050	A.
Dec. 1–5	132	98	115	1,140	A.
The period				283,000	

SILVER CREEK NEAR MARKLEEVILLE, CAL.

Silver Creek is a tributary to East Carson River.

The gaging station, which is located in the SE. ¼ sec. 14, T. 9 N., R. 20 E., Mount Diablo base and meridian, in the Mono National Forest, at Silver Creek (an abandoned post office), 10 miles above Markleeville and 1¾ miles above the mouth of the river, was established November 12, 1910.

No water is diverted from this stream. Storage has been developed at the Upper and Lower Kinney lakes and Kinney Meadows by the Alpine Land & Reservoir Co.

The gage is a vertical staff fastened to a juniper tree on the right bank 75 feet below the bridge.

Discharge measurements are made from the footbridge.

The channel at the gage contains large bowlders and appears permanent. Both banks are high and will not overflow.

This station is maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. D. McGlashan by wading 20 feet above bridge:

November 12, 1910: Width, 12 feet; area, 5.3 square feet; gage height, 2.59 feet; discharge, 7 second-feet.

Daily gage height, in feet, of Silver Creek near Markleeville, Cal., for 1910.

[H. W. Jones, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1			11			21		
2			12	2.60		22		
3			13		2.81	23		2.80
4			14			24		
5			15			25		
6			16		2.95	26		
7		2.85	17		2.80	27		2.03
8			18			28		
9		2.87	19			29		
10			20		2.88	30		2.01
						31		

MARKLEEVILLE CREEK AT MARKLEEVILLE, CAL.

Markleeville Creek is formed by the union of Pleasant and Hot Springs creeks and flows northeastward to East Fork of Carson River three-fourths of a mile above the station.

The gaging station, which is located at the highway bridge at Markleeville, in the SE. ¼ sec. 21, T. 10 N., R. 20 E., Mount Diablo base and meridian, was established November 11, 1910.

Two ditches divert water from Hot Springs Creek. The upper one, which is small, irrigates the Hot Springs ranch; the lower, known as the Town ditch, was built in the early days to furnish water for domes-

tic use at Markleeville, then a large mining camp. Later this ditch was rebuilt and extended so as to irrigate land below the town.

The gage is a vertical staff on the left abutment of the highway bridge.

Discharge measurements are made from the bridge.

The channel is composed of gravel and bowlders. The banks are high and not subject to overflow.

This station is maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. D. McGlashan by wading 50 feet below highway bridge:

October 11, 1910: Width, 18 feet; area, 10 square feet; gage height,[1] 1.64 feet; discharge, 5.3 second-feet.

Daily gage height, in feet, of Markleeville Creek at Markleeville, Cal., for 1910.

[H. W. Jones, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1	.....	1.81	11	1.64	2.41	21	1.59	2.02
2	.....	1.83	12	1.70	2.28	22	1.62	2.07
3	.....	2.70	13	1.70	2.21	23	1.63	2.14
4	.....	2.10	14	1.70	2.06	24	1.86	1.99
5	.....	1.91	15	1.70	2.20	25	1.86	.....
6	.....	1.97	16	1.66	2.09	26	1.65	2.05
7	.....	2.03	17	1.63	1.98	27	1.93	2.32
8	.....	2.06	18	1.68	2.25	28	1.83	2.30
9	.....	2.11	19	1.62	2.33	29	1.81	2.35
10	.....	2.22	20	1.60	2.01	30	1.81	2.01
						31	.....	2.10

PLEASANT VALLEY CREEK AT MARKLEEVILLE, CAL.

Pleasant Valley Creek, a tributary of Markleeville Creek, rises in Alpine County, Cal., on the east slope of the Sierra Nevada, near the summit of the divide separating Carson River waters from those of the Mokelumne. Its course is northeastward to Hot Springs Creek, with which it unites to form Markleeville Creek.

The gaging station, which is located just above the footbridge 600 feet above the mouth of the creek, and about three-fourths mile southwest of Markleeville, in the NW. ¼ sec. 28, T. 10 N., R. 20 E., mount Diablo base and meridian, was established November 11, 1910.

Three irrigation ditches divert water from this stream. Two of these ditches irrigate about 300 acres of land and the return water enters the creek above the gage; the third heads about half a mile above the mouth and was originally constructed for use in placer mining along the East Carson River below Hangman's Bridge but is now used for irrigation near the mouth of Markleeville Creek.

[1] Water surface referenced and gage height deduced later.

Storage reservoirs are partly developed by the Alpine Land & Reservoir Co. at upper and lower Sunset Lakes, Tamarack Lake, Summit Lake, Raymond Lake, and Wet Meadows.

The gage is a vertical staff fastened to a cottonwood tree on the left bank, 25 feet above the footbridge.

At low and medium stages discharge measurements are made by wading; high-stage measurements are made from the footbridge.

A riffle, composed of large bowlders, is just below the gage and acts as a permanent control. The stream is rapid and the bed is rough.

This station is maintained in cooperation with the United States Forest Service.

The following discharge measurement was made by H. D. McGlashan by wading 150 feet above mouth:

November 11, 1910: Width, 14 feet; area, 8.4 square feet; gage height, 2.91 feet; discharge, 4.5 second feet.

Daily gage height, in feet, of Pleasant Valley Creek at Markleeville, Cal., for 1910.

[H. W. Jones, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1	.....	3.04	11	2.91	3.30	21	2.90	3.12
2	.....	3.04	12	2.91	3.23	22	2.91	3.10
3	.....	3.20	13	.....	3.19	23	2.92	3.07
4	.....	3.10	14	2.93	3.10	24	3.00	3.10
5	.....	2.98	15	.....	3.11	25	2.97	.....
6	.....	3.07	16	2.93	3.12	26	2.93	3.05
7	.....	3.10	17	2.92	3.10	27	2.91	3.08
8	.....	3.12	18	2.94	3.08	28	3.04	3.02
9	.....	3.04	19	2.92	3.10	29	3.04	3.01
10	.....	3.18	20	2.90	3.10	30	3.04	3.01
						31	.....	3.01

WEST FORK OF CARSON RIVER AT WOODFORDS, CAL.

West Fork of Carson River rises in Alpine County, Cal., on the eastern slope of the Sierra Nevada, heading well up toward the summit of the divide that separates Great Basin waters from those flowing through the Sacramento to the Pacific Ocean. It flows in a general northerly course and unites with East Fork in Douglas County, Nev.

The gaging station was originally established October 18, 1900, about one-half mile above the post office at Woodfords, Cal., and 200 feet from the main road between Woodfords and Blue Lake. Measurements were also made near this point in 1890, 1891, and 1892.[1] On May 18, 1907, the gage and benchmark were washed out. On June 8, 1907, the gage was reestablished near the highway bridge at Woodfords, one-half mile below the first location in SE. ¼ sec. 34, T. 11 N., R. 19 E., M. D. M., at a different datum. No change in

[1] See Thirteenth Ann. Report U. S. Geol. Survey, part III, p. 96.

location or datum has since been made. This is known as the bridge station.

No tributaries enter below the station. The records corrected for diversions show the amount of water available for storage in Hope Valley. As the stream is very swift at the bridge, the relation between gage height and discharge is probably not affected by ice. The present gage is a vertical staff on the left bank just above the highway bridge.

Discharge measurements are made from a car and cable about one-half mile above the gage.

During August, September, and October, 1910, three canals were diverting water between the former station at the cable and the gage at the bridge. A gage was installed one-fourth mile above the cable (cable gage) and three-fourths mile above Woodfords on the right bank above these diversions, and gage heights and measurements obtained by the Stone & Webster Engineering Corporation during this period. These, together with daily discharges and measurements of canal diversions, are published below.

Discharge measurements of West Fork of Carson River at Woodfords, Cal., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.		Discharge.
				Cable.	Bridge.	
		Feet.	*Sq. ft.*	*Feet.*	*Feet.*	*Sec.-ft.*
Mar. 30	F. C. Schafer	28	50	.....	2.25	132
July 27[a]	Stone & Webster Engineering Corporation	.....	.....	1.20	.....	47
Aug. 10[a]	....do	.....	.....	.80	.....	28
25[a]	....do	.....	.....	.70	.....	24
Oct. 11[a]	H. D. McGlashan	27	22	.78	.42	33
Dec. 12	D. S. Stuver	.....	32.5	.....	1.08	46

[a] Measurement made by wading near cable gage above all diversions.

Discharge measurements of canal diversions between cable and bridge gages at Woodfords, Cal., for 1910.

Date.	Upper canal.	Middle canal.	Lower canal.	Total diversion.
1910.	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*
July 27	8.7	0	13.5	22.2
Aug. 10	9.9	.95	8.6	19.45
Aug. 13	8.8	0	9.0	17.8
Aug. 25	6.3	1.6	10.8	18.7
Sept. 8	10.4	.4	7.8	18.6

NOTE.—Measurements made by Stone & Webster Engineering Corporation.

Daily gage height, in feet, of West Fork of Carson River at Woodfords, Cal., for 1910.

[Bridge station.]

[Bernice Merrill, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.6	1.6	1.9	3.1	3.65	2.8	1.6	0.9	0.9	0.8	0.9	.....
2	1.4	1.4	1.8	3.1	3.6	2.7	1.6	.....	.....	.....	.9	1.8
3	1.2	1.2	1.8	3.1	3.55	2.6	1.4	.85	.....	.0	.9	1.6
4	1.0	1.0	1.7	2.9	3.55	2.6	1.3	.....	.85	.....	.9	1.1
5	1.0	1.0	1.6	2.95	3.5	2.5	1.35	.8	.2	.....	.85	1.1
6	1.0	1.2	1.5	2.95	3.4	2.5	1.35	.....	.....	.....	.85	1.2
7	.98	1.1	1.4	3.0	3.2	2.55	1.4	.....	.0	.....	.7	1.3
8	.98	1.0	1.3	3.15	3.5	2.35	1.4	.4	.....	.....	.7	1.3
9	.99	1.0	1.3	3.4	3.6	2.25	1.4	.....	.....	.....	.7	1.3
10	1.0	1.0	1.3	3.55	3.6	2.2	1.3	.....	.....	.3	.7	1.3
11	.9	1.0	1.3	3.6	3.7	2.2	1.2	.3	.....	.4	.9	1.3
12	.96	1.2	1.4	3.6	3.8	2.3	1.2	.....	.9	.52	.9	1.4
13	.9	1.2	1.45	3.65	3.9	2.3	1.3	.4	.....	.65	1.0	1.4
14	1.1	1.4	1.5	3.7	3.8	2.4	1.4	.6	1.1	.....	1.0	1.2
15	1.1	1.6	1.5	3.7	3.7	2.4	1.6	.....	1.3	.....	.9	1.0
16	1.6	1.7	1.55	3.7	3.6	2.45	1.8	.....	1.2	.....	.85	1.0
17	1.8	1.8	1.55	3.75	3.4	2.3	1.9	.7	.....	.0	.85	.95
18	1.2	1.8	1.6	3.75	3.2	2.3	2.0	.....	1.1	.....	.8	.9
19	1.0	1.8	1.8	3.8	3.1	2.3	2.3	.....	.....	.....	.8	.95
20	1.0	1.8	2.3	3.8	3.1	2.4	2.3	.8	.0	.....	.7	.8
21	1.0	1.9	2.9	3.9	3.0	2.45	2.0	.....	.....	.....	.7	.8
22	1.0	1.9	3.3	3.9	2.9	2.4	1.8	.6	.....	.....	.75	.9
23	1.0	1.9	3.1	4.0	2.9	2.3	1.4	.....	.....	.....	.8	.9
24	1.0	1.95	2.8	3.95	2.95	2.3	1.3	.5	.....	.....	.8	1.0
25	.95	1.95	2.9	3.9	2.8	2.2	1.2	.3	.....	.....	.8	1.0
26	.95	1.9	2.9	3.9	2.8	2.1	1.2	.2	.8	.....	.8	.95
27	1.0	1.8	3.0	3.8	2.8	2.1	1.0	.....	.....	.....	.8	.9
28	1.0	1.8	3.0	3.75	2.7	1.95	1.1	.1	.7	.....	.95	.8
29	1.2	.....	3.0	3.7	2.7	1.8	1.0	.9	.....	.....	.95	.8
30	1.4	.....	3.0	3.7	2.8	1.8	.9	.....	.8	.....	.....	.8
31	1.5	.....	3.1	.....	2.95	.....	.9	.8	.....	.9	.....	.8

NOTE.—These gage heights represent the quantity of water remaining in the river below the canal diversions between the cable and bridge gages.

Water was being diverted between these gages prior to August 8 to 13, 22 to 28, September 5 to 13, 20 to 25, October 3 to 12, and 17 to 30.

Daily discharge, in second-feet, of West Fork of Carson River at Woodfords, Cal., for 1910.

[Bridge station.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	79	79	107	321	474	250	79	31	31	26	31	76
2	62	62	97	321	460	230	79	30	30	26	31	97
3	47	47	97	321	446	210	62	28	29	2	31	79
4	36	36	88	273	446	210	54	27	28	2	31	41
5	36	36	79	284	431	192	58	26	5	3	28	41
6	36	47	70	284	403	192	58	26	4	4	28	47
7	35	41	62	296	347	201	62	26	2	5	21	54
8	35	36	54	334	431	168	62	10	2	6	21	54
9	36	36	54	403	460	152	62	9	2	7	21	54
10	36	36	54	446	460	145	54	8	2	7	21	54
11	31	36	54	460	489	145	47	7	2	10	31	54
12	34	47	62	460	519	160	47	8	31	14	31	62
13	31	47	66	474	549	160	54	10	36	19	36	62
14	41	62	70	489	519	175	62	17	41	20	36	47
15	41	79	70	489	489	175	79	18	54	20	31	36
16	79	88	74	489	460	184	97	20	47	20	28	36
17	97	97	74	504	403	160	107	21	44	2	28	34
18	47	97	79	504	347	160	117	23	41	2	26	31
19	36	97	97	519	321	160	160	24	35	2	26	34
20	36	97	160	519	321	175	160	26	2	2	21	26

Daily discharge, in second-feet, of West Fork of Carson River at Woodfords, Cal., for 1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21	36	107	273	549	296	184	117	28	2	2	21	26
22	36	107	375	549	273	175	97	17	2	2	24	31
23	36	107	321	580	273	160	62	15	2	2	26	31
24	36	112	250	564	284	160	54	13	2	2	26	36
25	34	112	273	549	250	145	47	7	2	2	26	36
26	34	107	273	549	250	130	47	5	26	2	26	34
27	36	97	296	519	250	130	36	4	24	2	26	31
28	36	97	296	504	230	112	41	3	21	2	34	26
29	47	.....	296	489	230	97	36	31	24	2	34	26
30	62	.....	296	489	250	97	31	28	26	2	55	26
31	70	.....	321	.....	284	.....	31	26	.....	31	.....	26

NOTE.—Daily discharge determined from a discharge rating curve fairly well defined for all stages. Discharge interpolated or estimated for days on which gage was not read.

Daily gage height, in feet, and discharge, in second-feet, of West Carson River at Woodfords, Cal., for 1910.

[Cable station.]

Day.	Aug.		Sept.		Oct.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	1.0	36	0.7	24	0.7	24
2	.9	32	.7	24	.7	24
3	.9	32	.7	24	.....	24
4	.85	30	.7	24	.7	24
5	.....	29	.75	26	.....	24
6	.8	28	.7	24	.....	24
7	.8	28	.....	24	.7	24
8	.8	28	.7	24	.7	24
9	.....	28	.7	24	.....	25
10	.8	28	.7	24	.75	26
11	.8	28	.7	24	.75	26
12	.7	24	.7	24	.75	26
13	.6	20	.....	32	.75	26
14	.6	20	.....	39	.75	26
15	.8	28	1.2	47	.....	26
16	.....	26	1.2	47	.75	26
17	.7	24	1.1	42	.75	26
18	.7	24	.8	28	.75	26
19	.7	24	.75	26	.7	24
20	.....	26	.75	26	.75	26
21	.8	28	.7	24	.7	24
22	.8	28	.7	24	.7	24
23	.8	28	.7	24	.....	24
24	.8	28	.7	24	.....	24
25	.8	28	.7	24	.7	24
26	.8	28	.7	24	.7	24
27	.8	28	.7	24	.7	24
28	.8	28	.7	24	.....	23
29	.7	24	.7	24	.65	22
30	.7	24	.7	24	.....	22
31	.7	24	.....	.....	.65	22

NOTE.—Gage heights and daily discharge furnished by Stone & Webster Engineering Corporation.

Monthly discharge of West Fork of Carson River at Woodfords, Cal., for 1910.

[Drainage area, 70 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	97	31	44.3	0.633	0.73	2,720	B.
February	112	36	73.2	1.05	1.09	4,070	B.
March	375	54	156	2.23	2.57	9,590	B.
April	580	273	451	6.44	7.18	26,800	A.
May	549	230	376	5.37	6.19	23,100	A.
June	250	97	166	2.37	2.64	9,880	B.
July	160	31	69.6	.994	1.15	4,280	C.
August	36	20	27.1	.387	.45	1,670	C.
September	47	24	27.2	.389	.43	1,620	C.
October	26	22	24.5	.350	.40	1,510	B.
November	a 55	21	28.5	.407	.45	1,700	B.
December	97	26	43.5	.621	.72	2,670	B.
The year	580	20	124	1.77	24.00	89,600	

a Estimated.

NOTE.—Discharge Aug., Sept., and Oct. computed from daily discharge at the cable. Discharge second-feet per square mile and run-off depth in inches probably low during June and July due to diversions above the bridge gage.

HUMBOLDT RIVER BASIN.

GENERAL FEATURES.

Humboldt River rises in the northeastern part of Nevada and flows west and southwest a distance of about 350 miles to Humboldt Lake, in the western part of the State. The lake is but an expansion of the river that supplies it and is held by an immense gravel bank that was thrown completely across the valley by the currents of the lake that once occupied the region, at one time 500 feet deep at this point. The bank has been cut across by overflow of the lake and the breach partly filled by an artificial dam which has greatly increased the area of the lake. During the dry season the lake seldom overflows, but in times of excessive flood the waters escape southward to the northern part of Carson Desert, where they contribute to the water held by Carson Sink.

The entire area drained by the Humboldt is surrounded by high, rugged peaks, some of which rise 11,000 feet above the sea. The river is anomalous among the streams of the Great Basin in that both its source and its terminus are well within the area of interior drainage. Its valley is narrow, and its course and that of its tributaries lie in general through a barren region destitute of large trees and supporting few shrubs except scattered clusters of willows. The valley of the main stream affords the only east-west pass through the mountains of Nevada and is followed by the Southern Pacific Railroad.

During the early spring and summer months the run-off of the North and South forks is very heavy because of the melting of the snows at the headwaters; as soon as the snow is all gone the rivers are left without a source of supply and their channels gradually fall to a minimum discharge.

Several tributaries find their way into the main river, Rock Creek and Reese River entering near Battle Mountain, the North and South forks near Elko, and the Little Humboldt near Winnemucca.

Although opportunities for reclamation are many, the cost of the necessary work would be very great, owing to the engineering difficulties to be overcome. The basin affords several reservoir sites, where the flood waters could be collected and stored for use during the summer months.

Lovelock Valley is considered the most fertile valley in the basin, and the entire flow of the river is appropriated for irrigation.

Alfalfa and grass hay are the chief crops; the land is best adapted for grazing.

The availability of the stream for power development is small, owing to the slight fall. Possibly the best stream for this purpose is the South Fork.

HUMBOLDT RIVER NEAR GOLCONDA, NEV.

This station, which is located at the highway bridge 1¼ miles north of the town of Golconda, was established October 24, 1894, discontinued December 31, 1909, and reestablished September 8, 1910.

The station is below the central valley, below Reese River and Rock and Keely Creeks, and above all other important tributaries. Little Humboldt River enters about 12 miles below. Considerable water is diverted above the station, almost the entire low-water flow being used for irrigation.

During 1907 the staff gage was fastened to the bridge. The bridge and gage were washed out in December, 1907, and from January 1, 1908, to December 31, 1909, all readings were taken from the original inclined staff gage on the left bank, reading 0.1 foot higher than the gage on the bridge. A temporary staff gage was installed September 8, 1910, and on November 5, 1910, this was replaced by a permanent chain gage. The datum of this gage is 1.85 feet lower than the original inclined gage on the left bank.

Discharge measurements are made from the highway bridge or by wading.

The relation between gage height and discharge is believed not to be materially affected by ice, but information on this point is meager.

As the channel shifts somewhat the records are not of the best, but the station nevertheless probably affords more reliable data than are furnished by any other station on the Humboldt.

Discharge measurements of Humboldt River near Golconda, Nev., 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Sept. 8[a]	G. C. Baldwin	3.5	0.95	[b] 1.86	1.38
Nov. 5[a]	G. H. Canfield	27.5	10.3	1.82	1.20

[a] Wading measurements.
[b] Reading on temporary gage reduced to permanent chain gage.

Daily gage height, in feet, of Humboldt River near Golconda, Nev., for 1910.

[William Duyck, observer.]

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1			1.85	1.8	16	1.85		1.85	1.9
2			1.85	1.8	17	1.85		1.85	1.9
3			1.85	1.8	18	1.85		1.85	2.0
4			1.85	1.8	19	1.85		1.85	2.1
5			1.85	1.8	20	1.85		1.85	2.1
6			1.8	1.8	21	1.85	1.85	1.85	2.1
7			1.8	1.8	22	1.85	1.85	1.85	2.2
8	1.85			1.8	23	1.85	1.85	1.85	
9	1.85		1.8	1.8	24	1.85	1.85		2.4
10	1.85		1.8	1.8	25	1.85	1.85	1.85	2.5
11	1.85		1.8	1.8	26	1.85	1.85	1.8	2.6
12	1.85		1.8	1.8	27	1.85	1.85	1.8	2.6
13	1.85		1.85	1.8	28	1.85	1.85	1.8	2.6
14	1.85		1.85	1.8	29	1.85	1.85	1.8	2.6
15	1.85		1.85	1.85	30	1.85	1.85	1.8	2.6
					31			1.85	2.7

NOTE.—No ice reported during December, but relation of gage height to discharge was probably affected by ice Dec. 16–31.

Monthly discharge of Humboldt River near Golconda, Nev., for 1910.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Accuracy.
September	1.3	77.4	C.
October	1.3	79.9	C.
November	1.0	59.5	C.
December	1.0	61.5	C.
The period			

NOTE.—Monthly means estimated.

HUMBOLDT RIVER NEAR OREANA, NEV.

This station, which is located 1½ miles from Oreana railroad station, at the highway bridge on the upper road to Lovelock, was established January 27, 1896, at a point three-fourths mile above the present site, at which it was established September 7, 1910. Records at the original station were discontinued December 31, 1909.

Several staff gages with various datums have been in use at this station.

Discharge measurements of Humboldt River near Oreana, Nev., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Sept. 7	G. C. Baldwin	38	38	2.72	24
Nov. 4[a]	G. H. Canfield	54	32.5	3.42	25.1

[a] Measured ¾ mile upstream.

Daily gage height, in feet, of Humboldt River near Oreana, Nev., for 1910.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1	.....	2.55	3.35	2.85	16	2.7	2.8	3.0	2.95
2	.....	2.65	3.35	2.85	17	2.75	2.9	2.95	2.8
3	.....	2.65	3.4	2.9	18	2.75	2.9	2.95	2.8
4	.....	2.7	3.4	2.9	19	2.75	2.9	2.8	2.85
5	.....	2.7	3.3	2.9	20	2.7	3.0	2.8	2.9
6	.....	2.7	3.3	2.95	21	2.65	3.0	2.8	2.95
7	2.7	2.7	3.25	2.95	22	2.65	3.1	2.85	2.95
8	2.65	2.7	3.0	3.0	23	2.6	3.1	2.9	3.1
9	2.5	2.7	2.9	3.1	24	2.6	3.1	2.95	3.15
10	2.5	2.7	2.95	3.15	25	2.6	3.15	3.0	3.15
11	2.55	2.75	3.1	3.1	26	2.6	3.2	3.1	3.1
12	2.4	2.75	3.2	3.0	27	2.6	3.2	3.1	3.0
13	2.4	2.75	3.2	2.9	28	2.6	3.25	3.1	2.9
14	2.45	2.8	3.2	2.9	29	2.55	3.25	3.0	2.95
15	2.65	2.8	3.1	2.95	30	2.55	3.3	3.0	3.0
					31	.....	3.3	.....	3.15

NOTE.—Observer reports ice in stream after Dec. 19; relation of gage height to discharge probably affected by ice Dec. 20–31.

Monthly discharge of Humboldt River near Oreana, Nev., for 1910.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Accuracy.
September	20	1,190	C.
October	25	1,540	C.
November	20	1,190	C.
December	20	1,230	D.
The period	.....	.....	

NOTE.—Monthly means estimated.

BISHOP CREEK NEAR WELLS, NEV.

This station, which is located about 1 mile above the Pacific Reclamation Co.'s ranch house, 2 miles below the proposed dam site and about ½ mile below the point of diversion for the proposed main canal, in the center of sec. 27, T. 29 N., R. 62 E., Mount Diablo base and meridian, about 5 miles from Metropolis, Nev., and 10 miles from Wells, Nev., was established January 1, 1910, by the Pacific Reclamation Co.

Trout Creek enters from the north about 2 miles, and Burnt Creek, also from the north, 4½ miles below the weir.

The gage is a nail in the top of a post set level with the crest of the 20-foot Cipoletti weir by means of which discharge measurements are made. The head on the weir is measured by the foot rule. Moss collects on the crest of the weir and during the past year was not removed. The maximum discharge of this creek in 1910 was 176 feet on March 20. All data for this station have been furnished by the Pacific Reclamation Company.

Daily gage height, in feet, of Bishop Creek near Wells, Nev., for 1910

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.25	0.31	0.60	0.48	0.28	.....	.....	.....	.....	0.20	0.24
2	.....	.24	.32	.60	.46	.....	.....	.....	.....	0.19	.....	.23
3	.....	.24	.36	.....	.46	.....	0.21	.....	.....	.....	.21	.27
4	.....	.24	.40	.61	.51	.....	.....	.....	.....	.....	.21	.30
5	.....	.23	.44	.62	.78	.28	.....	0.18	.....	.20	.21	.25
6	.....	.....	.65	.....	.66	.....	.....	.....	.....	.....	.21	.25
7	.....	.24	.59	.60	.57	.27	.....	.....	.....	.....	.....	.25
8	.....	.24	.79	.60	.50	.27	.21	.....	.....	.....	.....	.25
9	.....	.24	.81	.65	.45	.26	.....	.....	.....	.20	.22	.27
10	.....	.24	.81	.71	.45	.26	.....	.....	.....	.....	.22	.30
11	.....	.24	.92	.66	.45	.26	.....	.....	0.19	.....	.....	.34
12	.....	.25	.96	.67	.44	.....	.....	.....	.....	.20	.23	.27
13	.....	.....	.93	.64	.43	.25	.....	.18	.....	.....	.....	.27
14	.....	.25	.98	.57	.....	.25	.20	.....	.20	.....	.....	.25
15	.....	.25	1.06	.54	.44	.25	.....	.....	.24	.....	.25	.24
16	.....	.25	1.10	.52	.43	.24	.....	.....	.20	.....	.....	.24
17	.....	.24	1.01	.50	.42	.24	.....	.....	.20	.....	.23	.24
18	.....	.23	1.23	.....	.40	.23	.....	.....	.....	.23	.....	.....
19	.....	.23	1.41	.49	.37	.....	.....	.....	.....	.....	.23	.21
20	.....	.....	1.90	.50	.35	.23	.19	.....	.....	.20	.....	.23
21	.....	.24	1.69	.49	.34	.22	.....	.....	.19	.....	.24	.22
22	0.25	.24	1.46	.49	.33	.....	.....	.....	.....	.20	.25	.19
23	.26	.24	1.04	.49	.....	.22	.....	.....	.....	.....	.28	.21
24	.26	.24	.92	.47	.31	.....	.....	.....	.....	.....	.25	.....
25	.25	.24	.83	.45	.30	.22	.....	.....	.....	.....	.23	.21
26	.25	.25	.96	.45	.....	.....	.....	.....	.19	.20	.22	.22
27	.25	.26	.87	.46	.30	.....	.....	.....	.....	.....	.22	.21
28	.26	.27	.75	.46	.29	.....	.....	.....	.....	.20	.24	.21
29	.26	.....	.61	.50	.29	.....	.....	.....	.....	.....	.25	.21
30	.25	.....	.60	.49	.29	.22	.....	.....	.....	.20	.24	.....
31	.25	.....	.61	.....	.....	.....	.....	.....	.....	.20	.....	.20

NOTE.—Gage heights represent the head in feet on the weir.

Daily discharge, in second-feet, of Bishop Creek near Wells, Nev., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.5	8.4	11.6	31.3	22.4	10.0	6.8	5.1	5.1	5.6	6.0	7.9
2	6.5	7.9	12.2	31.3	21.0	10.0	6.6	5.1	5.1	5.6	6.2	7.4
3	6.5	7.9	14.5	31.7	21.0	10.0	6.5	5.1	5.1	5.6	6.5	9.5
4	6.5	7.9	17.0	32.1	24.5	10.0	6.5	5.1	5.1	5.8	6.5	11.0
5	6.5	7.4	19.7	32.9	46.4	10.0	6.5	5.1	5.1	6.0	6.5	8.4
6	7.0	7.6	35.3	31.3	36.1	9.8	6.5	5.1	5.6	6.0	6.5	8.4
7	7.0	7.9	30.5	31.3	29.0	9.5	6.5	5.1	5.6	6.0	6.5	8.4
8	7.0	7.9	47.3	31.3	23.8	9.5	6.5	5.1	5.6	6.0	6.9	8.4
9	7.5	7.9	49.1	35.3	20.3	8.9	6.5	5.1	5.6	6.0	6.9	9.5
10	7.5	7.9	49.1	40.3	20.3	8.9	6.5	5.1	5.6	6.0	6.9	11.0
11	7.5	7.9	59.4	36.1	20.3	8.9	6.5	5.1	5.6	6.0	7.2	13.4
12	7.5	8.4	63.3	36.9	19.7	8.6	6.0	5.1	5.6	6.0	7.4	9.5
13	7.5	8.4	60.4	34.5	19.0	8.4	6.0	5.1	5.8	6.0	7.4	9.5
14	8.0	8.4	65.3	29.0	19.4	8.4	6.0	5.1	6.0	6.0	7.4	8.4
15	8.0	8.4	73.5	26.7	19.7	8.4	6.0	5.1	7.9	6.5	7.4	7.9
16	8.0	8.4	77.7	25.3	19.0	7.9	6.0	5.1	6.0	6.5	7.4	7.9
17	8.0	7.9	68.3	23.8	18.3	7.9	6.0	5.1	6.0	7.0	7.4	7.9
18	8.0	7.4	91.9	23.4	17.0	7.4	5.8	5.1	6.0	7.4	7.4	7.1
19	8.0	7.4	112.7	23.1	15.2	7.4	5.6	5.1	5.8	6.8	7.4	6.5
20	8.4	7.6	176.3	23.8	13.9	7.4	5.6	5.1	5.6	6.0	7.6	7.4
21	8.4	7.9	147.9	23.1	13.4	7.0	5.6	5.1	5.6	6.0	7.9	6.9
22	8.4	7.9	118.8	23.1	12.8	7.0	5.6	5.1	5.6	6.0	8.4	5.6
23	8.9	7.9	71.4	23.1	12.2	7.0	5.6	5.1	5.6	6.0	10.0	6.5
24	8.9	7.9	59.4	21.7	11.6	7.0	5.6	5.1	5.6	6.0	8.4	6.5
25	8.4	7.9	50.9	20.3	11.0	7.0	5.6	5.1	5.6	6.0	7.4	6.5
26	8.4	8.4	63.3	20.3	11.0	7.0	5.6	5.1	5.6	6.0	6.9	6.9
27	8.4	8.9	54.6	21.0	11.0	7.0	5.6	5.1	5.6	6.0	6.9	6.5
28	8.9	9.5	43.7	21.0	10.5	7.0	5.6	5.1	5.6	6.0	7.9	6.5
29	8.9	.....	32.1	23.8	10.5	7.0	5.6	5.1	5.6	6.0	8.4	6.5
30	8.4	.....	31.3	23.1	10.5	7.0	5.6	5.1	5.6	6.0	7.9	6.2
31	8.4	.....	32.1	.....	10.5	.....	5.6	5.1	.....	6.0	.....	6.0

NOTE.—Daily discharge computed by means of Francis weir formula. Discharge interpolated for days on which gage was not read.

Monthly discharge of Bishop Creek near Wells, Nev., for 1910.

[Drainage area, 125 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	8.9	6.5	7.80	0.062	0.07	480
February	9.5	7.4	8.04	.064	.07	447
March	176.3	11.6	59.4	.475	.55	3,650
April	40.3	20.3	27.7	.222	.25	1,650
May	46.4	10.5	18.4	.147	.17	1,130
June	10.0	7.0	8.24	.066	.07	490
July	6.8	5.6	6.02	.048	.06	370
August	5.1	5.1	5.10	.041	.05	314
September	7.9	5.1	5.66	.045	.05	337
October	7.4	5.6	6.09	.049	.06	374
November	10.0	6.0	7.32	.059	.07	436
December	11.0	5.6	7.94	.064	.07	488
The year	176.3	5.1	14.0	.112	1.54	10,200

NORTH FORK OF HUMBOLDT RIVER NEAR HALLECK, NEV.

This station, which is located one-fourth mile above the mouth of North Fork, 2 miles west of Elburz station on the Southern Pacific Railroad, and about 6 miles west of Halleck, the nearest post office,

was established October 10, 1902, discontinued December 31, 1909 and reestablished October 1, 1910.

A new gage, set to read the same as the old gage, was installed August 5, 1909.

Discharge measurements are made by means of a cable and car.

The relation between gage height and discharge seems to be affected by backwater from the main Humboldt. The river freezes during the winter, but information as to condition of the ice is very meager.

The channel shifts somewhat and the results are therefore only approximate.

The following discharge measurement was made by G. H. Canfield:

November 9, 1910: Width, 21 feet; area, 11.5 square feet; gage height, 2.98 feet; discharge, 10.0 second-feet.

Daily gage height, in feet, of North Fork of Humboldt River near Halleck, Nev., for 1910.

[F. R. Fowler, observer.]

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1		2.75	2.9	3.25	16		2.85	3.0	3.35
2		2.75	2.9	3.25	17		2.9	3.1	3.4
3		2.75	2.95	3.25	18		2.85	3.1	3.4
4		2.75	2.95	3.25	19		2.8	3.1	3.4
5		2.75	2.9	3.2	20		2.8	3.1	3.45
6		2.75	2.9	3.2	21		2.8	3.15	3.45
7		2.75	2.9	3.25	22		2.8	3.15	3.5
8		2.8	2.9	3.3	23		2.8	3.2	3.5
9		2.8	2.9	3.3	24		2.8	3.2	3.5
10		2.8	2.9	3.3	25		2.85	3.3	.....
11		2.8	2.95	3.3	26		2.9	3.3	.....
12		2.8	3.0	3.3	27		2.9	3.3	.....
13		2.8	3.0	3.3	28		2.9	3.25	.....
14		2.8	3.0	3.3	29		2.9	3.25	.....
15	2.6	2.8	3.0	3.35	30		2.9	3.25	.....
					31		2.9	.....	.....

NOTE.—Observer reports river frozen over Dec. 25; relation of gage height to discharge probably affected by ice Dec. 8 to 31.

Monthly discharge of North Fork of Humboldt River near Halleck, Nev., for 1910.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Accuracy.
September	8	476	C.
October	10	615	C.
November	8	476	C.
December	5	307	D.

NOTE.—Monthly means have been estimated.

SOUTH FORK OF HUMBOLDT RIVER NEAR ELKO, NEV.

This station, which is located about 12 miles southwest of Elko, Nev., 6 miles above the mouth of the river and above the proposed reservoir site of the United States Reclamation Service, was established August 29, 1896, discontinued December 31, 1909, and reestablished September 9, 1910.

The gage was removed February 26, 1907, about 1,000 feet upstream; and gage heights since that time bear no determined relation to previous readings.

Discharge measurements are made by means of a cable and car or by wading.

The river freezes during two or three months of the winter, the ice probably reaching a considerable thickness, but information as to winter flow is very meager.

The channel at the station shifts somewhat, but measurements define a fair discharge rating curve.

Discharge measurements of South Fork of Humboldt River near Elko, Nev., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Sept. 9	G. C. Baldwin			1.0	.0
Nov. 8	G. H. Canfield	17	7.50	1.37	9.38

Daily gage height, in feet, and discharge, in second-feet, of South Fork of Humboldt River near Elko, Nev., for 1910.

[James Cowling, observer.]

Day.	September.		October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1			1.4	13	1.4	13	1.55	
2			1.4	13	1.4	13	1.5	
3			1.4	13	1.4	13	1.5	
4			1.4	13	1.4	13	1.5	
5			1.4	13	1.4	13	1.55	
6			1.4	13	1.4	13	1.55	
7			1.4	13	1.4	13	1.5	
8			1.4	13	1.4	13	1.6	
9	1.0	0	1.4	13	1.4	13	1.7	
10		0	1.4	13	1.4	13	1.7	
11	1.0	0	1.4	13	1.4	13	1.8	
12	1.0	0	1.4	13	1.4	13	1.7	
13	1.0	0	1.4	13	1.4	13	1.6	
14	1.2	4	1.4	13	1.4	13	1.6	
15	2.4	114	1.4	13	1.4	13	1.75	
16	1.3	8	1.4	13	1.5		1.8	
17	1.2	4	1.4	13	1.5		1.8	
18	1.2	4	1.4	13	1.5		1.8	
19	1.2	4	1.4	13	1.5		1.8	
20	1.2	4	1.4	13	1.6		1.9	
21	1.2	4	1.4	13	1.6		2.0	
22	1.2	4	1.4	13	1.6		2.0	
23	1.2	4	1.4	13	1.5		2.0	
24	1.2	4	1.4	13	1.6		2.0	
25	1.2	4	1.4	13	1.6		2.0	
26	1.2	4	1.4	13	1.6		2.0	
27	1.2	4	1.4	13	1.6		2.0	
28	1.4	13	1.4	13	1.6		2.0	
29	1.4	13	1.4	13	1.7		2.0	
30	1.4	13	1.4	13	1.65		2.0	
31			1.4	13			2.0	

NOTE.—Observer reports much ice on Nov. 16; relation of gage height to discharge probably affected by ice Nov. 16 to Dec. 31.

Daily discharge determined by a fairly well defined discharge rating curve drawn through low-water discharge measurements made during 1909 and 1910.

Monthly discharge of South Fork of Humboldt River near Elko, Nev., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
September	114	0	8	476	C.
October	13	13	13	799	C.
November	.....	.....	12	714	C.
December [a]	.....	.....	8	492	D.

[a] Estimated.

NOTE.—Discharge Sept. 1–8 estimated at 2 second-feet; Nov. 16–30, estimated at 10 second-feet.

PYRAMID AND WINNEMUCCA LAKE BASINS.[1]

GENERAL FEATURES.

Pyramid and Winnemucca lakes occupy two long, narrow basins in Washoe and Humboldt counties, Nev., and receive the waters of Truckee River, which sends a stream to each lake. The first published account of the bifurcation of Truckee River so as to supply two lakes is given by King, who says:

At the time of our first visit to this region, in 1867, the river bifurcated; one half flowed into Pyramid Lake, and the other through a river 4 or 5 miles long into Winnemucca Lake. At that time the level of Pyramid Lake was 3,890 feet above the sea, and of Winnemucca about 80 feet lower. Later, owing to the disturbance of the balance between influx and evaporation already alluded to as expressing itself in Utah by the rise and expansion of Great Salt Lake, the basin of Pyramid Lake was filled up, and a backwater overflowed the former region of bifurcation, so that now the surplus waters go down the channel into Winnemucca Lake, and that basin is rapidly filling.

Between 1867, the time of my first visit, and 1871, the time of my last visit, the area of Winnemucca Lake had nearly doubled, and it has risen from its old altitude about 22 feet, Pyramid Lake in the same time having been raised about 9 feet. The outlines as given upon our topographical maps are according to the survey of 1867, and form interesting data for future comparison.

The differences in elevation between Pyramid and Winnemucca lakes as reported by King and determined by Russell in 1882 are as follows: In 1867 Pyramid was 80 feet higher than Winnemucca; in 1872 Pyramid was 67 feet higher than Winnemucca; in 1882 Pyramid was 12 feet higher than Winnemucca, as determined by engineer's level; in 1890, when the region was surveyed by the topographers of the United States Geological Survey, Pyramid was but 5 feet higher than Winnemucca. The waters of both lakes are alkaline and brackish. Their shores, like those of all the lakes in the lower portion of the Great Basin, are clothed only with scanty growths of desert vegetation.

[1] Abstracted from Russell, I. C., Geological history of Lake Lahontan, a Quaternary lake of northwestern Nevada: Mon. U. S. Geol. Survey, vol. 11, 1885, pp. 56–66.

In the southern part of Pyramid Lake the water is slightly discolored by multitudes of shining particles that are rendered visible when a ray of light is passed through it, the lack of transparency is apparently due to the suspended silt brought down by Truckee River. In the northern part of the lake the water is wonderfully clear, and at some distance from the land is deep blue in color.

The largest islands in Pyramid Lake are Pyramid and Anaho, which rise in its southern part near the eastern shore. Anaho Island rises 520 feet above the water level of 1890, and is surrounded by water 150 to 300 feet deep. Pyramid Island rises 320 feet above the water level of 1890 and the water near its base is 150 to 175 feet deep.

TRUCKEE RIVER BASIN.

GENERAL FEATURES.

The Truckee River system comprises the main river and several minor tributaries, all having as their chief sources of supply small mountain lakes. Truckee River itself is the natural outlet of Lake Tahoe, a beautiful mountain lake, 193 square miles in area, lying at an elevation of 6,225 feet above sea level, and noted as the largest body of fresh water in the United States at so high an altitude. Nearly three-fourths of the lake is in California and the rest is in Nevada.

Issuing from the northwest side of Lake Tahoe the Truckee flows almost due north to the town of Truckee, Cal., where it turns to the east. At Wadsworth, Nev., the river again turns north and discharges into Pyramid and Winnemucca lakes. From Lake Tahoe to Verdi, Nev., a distance of 35 miles, the country is heavily timbered with fir and pine; below Verdi barren wastes alternate with small and fertile valleys—the Verdi Valley, the Reno or Truckee Valley, and the Wadsworth Valley—all of which have a rich, productive soil. The total length of the Truckee is about 110 miles and its total fall is about 2,350 feet.

Donner Creek, the natural outlet of Donner Lake, is the first important tributary of the Truckee, which it enters at the town of Truckee. Prosser Creek, the second tributary, and the natural outlet of several small lakes, enters about 5 miles northeast of Truckee, and Little Truckee River, the natural outlet of Webber and Independence lakes, comes in at Boca, Cal., about 2 miles farther along. Each of these tributaries rises at an elevation of 6,000 feet above sea level, and each flows from a lake whose capacity can be enlarged by building a dam across its outlet. The region about the lakes is thickly forested and receives during the winter months very heavy snowfall. During the season of thaw this snow affords an immense run-off, almost all of which could be stored by enlarging the natural lakes.

Three power plants have been installed on the Truckee—the Farad (Mystic), Fleish, and Washoe plants—with an emergency plant near Reno, Nev. The plants have an average capacity of about 2,500 horsepower each and they supply practically all the power used by the towns of Verdi, Reno, Carson City, Yerington, Gardnerville, Sparks, and Virginia City, Nev. There are many falls on the headwaters of the small tributaries.

Almost all the minimum flow of the river is appropriated for irrigation, but further storage development would make more water available for both irrigation and power.

Within the period covered by the records, 1907 was by far the wettest year and 1900 the driest year. The ratio in the two years for the state-line station was about 3.4 to 1.

LAKE TAHOE AT TAHOE, CAL.

Records of the height of Lake Tahoe have been kept since 1900 to determine the amount of water drawn from storage and the possibility of further regulation of the outflow. All gage heights recorded in the following table have been referred to a datum 6,220.0 feet above sea level, the gage now in use being set at that datum. The gage heights for 1907 and 1908 as given in Water-Supply Paper 250, page 102, refer to a datum 6,225.5 feet above sea level. The gage is located near the outlet in SE. ¼ sec. 6, T. 15 N., R. 17 E., Mount Diablo base and meridian.

From 1889 until early in 1904 the floor of the outlet gates of the dam had a mean elevation of 6,223.3 feet, and the crest of the spillway at its highest point was 6,229.3 feet. Since 1904 the mean elevation of the floor of the gates has been 6,223.08, that of the lowest gate 6,223.04, and that of the lowest part of the spillway has been 6,229.50.

The following table summarizes the fluctuations of the lake for the last 23 years as far as they have been recorded:

Table showing fluctuation of Lake Tahoe from 1888 to 1910.

Year.	High water.		Low water.		Fluctuation.
	Gage height.	Date.	Gage height.	Date.	
	Feet.		*Feet.*		*Feet.*
1888	4.90	Sept. 8			
1889	4.60	Spring.	3.05	October.	1.55
1890	8.55±				
1895	9.02	July 7	7.55	[a]Dec. 17	1.47
1900	7.00	June 17	5.87	[b]Oct. 17	1.17
1901	8.43	July 27	6.10	Jan. 1	2.33
1902	9.02	June 22	6.97	Dec. 5	2.05
1903	8.90	July 5	6.80	Jan. 21	2.10
1904	10.40	June 22	7.10	Feb. 5	3.30
1905	8.70	June 18	6.20	Dec. 23	2.50
1906	9.87	July 21	6.16	Jan. 5	3.71
1907	11.26	July 14	7.80	Jan. 19	3.46
1908	8.40	Jan. 1	6.10	Dec. 31	2.28
1909	8.88	July 11	6.10	Jan. 1	2.78
1910	8.48	June 2–11	5.80	Dec. 1–2	2.68

[a] The lake was also low in January. [b] Lower earlier in year, no record.

NOTE.—Records for 1888 to 1890 were reported by W. H. Hall.

Daily gage height, in feet, of Lake Tahoe at Tahoe, Cal., for 1910.

[J. U. Haley, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	7.65	7.46	7.58	.....	8.46	8.30	7.87	.....	6.58	6.08	.....
2	7.70	7.63	7.47	7.58	.....	8.48	8.30	7.84	.....	.....	6.08	5.80
3	7.72	7.60	7.45	7.58	.....	8.48	8.26	7.80	7.10	6.50	6.08	5.88
4	7.72	7.59	7.45	7.58	8.06	8.48	8.23	7.78	.....	6.50	6.06	5.94
5	7.69	7.58	7.45	7.58	8.06	8.48	8.20	7.76	.....	.....	6.06	5.98
6	7.65	7.56	7.42	7.60	8.06	8.48	8.20	7.76	.....	6.45	6.05	.....
7	7.68	7.53	7.41	7.60	8.10	8.48	8.20	7.74	.....	6.45	6.05	.....
8	7.67	7.52	7.41	7.62	8.10	8.48	8.18	7.70	.....	6.45	6.05	6.00
9	7.65	7.52	7.40	7.64	.....	8.48	8.16	7.68	6.96	.....	.....	6.00
10	7.60	7.51	7.39	7.65	.....	8.48	8.16	7.67	.....	.....	.....	6.02
11	7.60	7.50	7.38	7.65	.....	8.48	8.16	7.63	.....	.....	6.04	.....
12	7.58	7.50	7.38	7.67	8.20	.....	8.15	7.60	.....	6.35	6.06	.....
13	.....	.....	7.38	7.67	8.17	.....	.....	7.60	.....	.....	6.04	5.98
14	.....	.....	7.42	.....	.....	.....	.....	7.58	6.85	.....	6.04	5.98
15	.....	7.50	7.40	.....	.....	.....	.....	7.56	6.85	.....	6.02	5.98
16	7.50	7.50	7.40	7.73	.....	8.38	8.09	7.54	.....	6.20	6.02	5.98
17	7.50	7.50	7.40	7.78	8.25	8.38	8.06	7.50	.....	6.20	6.02	5.98
18	7.50	.....	7.40	7.78	8.25	8.38	8.04	7.49	.....	.....	6.00	.....
19	7.50	.....	.....	7.82	8.28	8.38	8.04	7.42	.....	.....	6.00	.....
20	7.48	.....	.....	7.88	8.30	8.38	8.04	7.40	6.70	6.20	5.90	5.88
21	7.48	.....	7.48	7.88	8.30	8.38	8.04	7.40	6.70	6.18	5.90	5.89
22	7.48	.....	.....	7.88	8.30	8.38	8.04	7.39	6.70	6.18	5.88	5.87
23	7.50	.....	7.56	7.89	8.30	8.38	8.02	7.39	6.65	6.15	5.88	5.86
24	.....	7.45	.....	7.89	8.30	8.38	8.00	7.39	6.62	6.15	5.85	5.84
25	.....	7.45	7.58	.....	8.33	8.38	8.00	7.37	6.60	6.15	5.85	5.85
26	7.70	7.45	.....	.....	8.35	8.38	7.96	7.35	6.60	6.15	5.85	5.85
27	7.70	7.45	7.58	.....	8.36	.....	7.94	7.33	6.58	6.12	5.85	5.88
28	7.70	7.45	7.58	.....	8.38	.....	7.92	7.30	.....	6.12	5.85	5.85
29	7.70	.....	7.58	8.00	8.40	.....	7.90	.....	6.58	6.11	5.83	5.82
30	7.70	.....	7.58	.....	8.40	.....	7.88	7.20	6.58	6.10	5.80	5.81
31	7.67	.....	7.58	.....	8.42	.....	7.88	.....	.....	6.08	.....	5.81

NOTE.—Lake too rough to obtain accurate readings on days for which no gage readings are given.

TRUCKEE RIVER AT TAHOE, CAL.

This station, which is located at Tahoe, Cal., about one-fourth mile below the outlet of Lake Tahoe, in the NW. ¼ sec. 7, T. 15 N., R. 17 E., was established July 3, 1895, discontinued February 29, 1896, and reestablished June 17, 1900, to obtain information needed by the United States Reclamation Service in connection with the Truckee-Carson project.

A timber dam across the river about 500 feet from the lake completely regulates the flow of the river, sometimes causing sudden fluctuations and often cutting down the outflow to 15 or 20 second-feet, or the amount of leakage through the dam.

The station is equipped with a vertical staff gage and a cable and car, from which discharge measurements are made.

The channel is liable to shift only in a slight degree and records are reliable. The datum of the gage has not been changed. The flow is practically unaffected by ice.

Discharge measurements made by the Stone & Webster Engineering Corporation have been furnished to the United States Geological Survey for publication.

Discharge measurements of Truckee River at Tahoe, Cal., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 3	L. O. Murphy	68	96	0.75	59
4	do	85	278	2.77	637
4	do	90	308	3.05	758
4	do	90	301	2.92	725
5	do	90	330	3.16	815
Mar. 13	Williamson and Bumstedt	30	44	1.10	102
17	L. O. Murphy	73	106	1.10	110
17	do	80	160	1.55	225
18	do	82	209	1.99	350
18	do	84	234	2.23	439
18	do	85	246	2.43	493
19	do	85	261	2.56	555
19	do	85	269	2.67	588
Sept. 19[a]	T. W. Norcross	82	222	2.23	469

[a] Not reliable.

NOTE.—All measurements made by Stone & Webster Engineering Corporation except September 19.

Daily gage height, in feet, of Truckee River at Tahoe, Cal., for 1910.

[J. U. Haley, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.35	1.66	3.18	1.10	1.90	1.20	2.09	2.90	2.50	2.08	1.78	1.85
2	3.37	2.46	3.18	1.10	1.90	1.20	2.20	2.90	2.50	2 08	1.78	1.85
3	3.37	3.08	3.18	1.10	1.74	1.20	3.10	2.85	2.50	2.07	1.78	1.85
4	3.37	3.20	3.18	1.10	1.30	1.20	2.95	2.85	2.40	2.07	1.78	1.73
5	3.37	3.20	3.18	1.10	1.30	1.20	2.95	2.85	2.40	2.07	1.78	1.70
6	3.37	3.20	3.18	1.10	1.30	1.20	2.95	2.85	2.40	2.07	1.77	1.77
7	3.37	3.20	3.18	1.10	1.30	1.53	2.95	2.85	2.38	2.05	1.77	1.78
8	3.37	3.20	3.16	1.10	1.30	1.65	2.95	2.85	2.37	2.04	1.78	1.78
9	3.37	3.20	3.15	1.10	1.30	2.04	2.95	2.80	2.35	2.02	1.78	1.78
10	3.37	3.20	3.14	1.10	1.30	1.89	2.76	2.78	2.35	2.00	1.78	1.80
11	3.37	3.20	3.13	1.10	1.30	1.89	2.76	2.20	2.35	2.00	1.78	1.80
12	3.37	3.20	3.12	1.10	1.21	2.50	2.76	2.78	2.30	2.00	1.78	1.80
13	3.35	3.20	1.07	1.10	1.10	1.90	2.76	2.78	2.30	2.00	1.76	1.80
14	3.35	3.20	1.10	1.10	1.10	1.87	2.76	2.78	2.25	1.98	1.76	1.70
15	3.35	3.20	1.10	1.10	1.10	2.44	2.76	2.78	2.25	1.98	1.76	1.69
16	3.34	3.20	1.10	1.10	1.10	1.92	3.00	2.76	2.25	1.98	1.76	1.69
17	3.34	3.20	1.66	1.10	1.10	2.09	3.00	2.74	2.25	1.97	1.76	1.69
18	3.32	3.20	2.22	1.10	1.10	1.98	3.00	2.72	2.25	1.97	1.75	1.69
19	3.32	3.20	1.10	1.10	1.10	1.98	3.00	2.70	2.25	1.95	1.75	1.62
20	3.31	3.19	1.10	1.10	1.10	1.98	2.15	2.70	2.00	1.93	1.70	1.62
21	3.30	3.18	1.10	1.10	1.10	1.98	2.30	2.70	2.04	1.90	1.70	1.62
22	3.30	3.18	1.10	1.10	1.15	1.98	2.30	2.68	2.02	1.90	1.70	1.62
23	3.30	3.18	1.10	1.10	1.15	2.23	2.87	2.68	1.96	1.90	1.85	1.61
24	3.30	3.18	1.10	1.10	1.15	2.16	2.90	2.68	1.96	1.88	1.85	1.60
25	3.30	3.18	1.10	1.10	1.15	2.16	2.90	2.66	2.15	1.88	1.85	1.60
26	3.30	3.18	1.10	1.52	1.15	3.00	2.90	2.65	2.12	1.88	1.85	1.60
27	3.30	3.18	1.10	2.40	1.15	2.25	2.90	2.65	2.10	1.88	1.85	1.58
28	3.30	3.18	1.10	2.40	1.15	2.25	2.90	2.65	2.10	1.88	1.85	1.76
29	3.30	.....	1.10	1.52	1.15	2.09	2.90	2.63	2.10	1.86	1.81	1.75
30	3.30	.....	1.10	1.90	1.20	2 09	2.90	2.55	2.10	1.84	1.78	1.73
31	3.28	.....	1.10	.....	1.20	.....	2.90	2.50	.....	1.80	.....	1.68

Daily discharge, in second-feet, of Truckee River at Tahoe, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	890	247	819	114	318	134	381	701	534	377	281	302
2	898	518	819	114	318	134	419	701	534	377	281	302
3	898	777	819	114	270	134	785	680	534	374	281	302
4	898	827	819	114	156	134	722	680	494	374	281	267
5	898	827	819	114	156	134	722	680	494	374	281	258
6	898	827	819	114	156	134	722	680	494	374	278	278
7	898	827	819	114	156	212	722	680	486	367	278	281
8	898	827	810	114	156	244	722	680	483	364	281	281
9	898	827	806	114	156	364	722	659	475	357	281	281
10	898	827	802	114	156	315	642	651	475	350	281	287
11	898	827	798	114	156	315	642	419	475	350	281	287
12	898	827	793	114	136	534	642	651	456	350	281	287
13	890	827	108	114	114	318	642	651	456	350	275	287
14	890	827	114	114	114	309	642	651	438	344	275	258
15	890	827	114	114	114	510	642	651	438	344	275	255
16	886	827	114	114	114	324	743	642	438	344	275	255
17	886	827	247	114	114	381	743	634	438	340	275	255
18	877	827	426	114	114	344	743	625	438	340	272	255
19	877	827	114	114	114	344	743	●617	438	334	272	236
20	873	823	114	114	114	344	402	617	350	328	258	236
21	869	819	114	114	114	344	456	617	364	318	258	236
22	869	819	114	114	124	344	456	609	357	318	258	236
23	869	819	114	114	124	430	688	609	337	318	302	233
24	869	819	114	114	124	405	701	609	337	312	302	230
25	869	819	114	114	124	405	701	600	402	312	302	230
26	869	819	114	209	124	743	701	596	391	312	302	230
27	869	814	114	494	124	438	701	596	384	312	302	225
28	869	819	114	494	124	438	701	596	384	312	302	275
29	869	.....	114	209	124	381	701	588	384	306	290	272
30	869	.....	114	318	134	381	701	554	384	299	281	267
31	861	.....	114	.....	134	.....	701	534	.....	287	.....	252

NOTE.—Daily discharges determined from a discharge rating curve well defined for all stages.

Monthly discharge of Truckee River at Tahoe, Cal., for 1910.

[Drainage area, 519 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	898	861	883	1.70	1.96	54,300	B.
February	827	247	791	1.52	1.58	43,900	B.
March	819	108	398	.767	.88	24,500	A.
April	494	114	152	.293	.33	9,040	A.
May	318	114	148	.285	.33	9,100	A.
June	743	134	332	.640	.71	19,800	A.
July	785	381	656	1.26	1.45	40,300	A.
August	701	419	628	1.21	1.40	38,600	A.
September	534	337	436	.840	.94	25,900	A.
October	377	287	339	.653	.75	20,800	A.
November	302	258	281	.542	.60	16,700	A.
December	302	225	262	.505	.58	16,100	B.
The year	898	108	441	.85	11.51	319,000	

TRUCKEE RIVER AT NEVADA-CALIFORNIA STATE LINE.

This station, which is located 1 mile upstream from Calvada, a flag station on the Ogden route of the Southern Pacific Railroad near the Nevada-California State line, in California, 15 miles southwest, by railroad, of Reno, Nev., was established September 7, 1899, at Farad, 2½ miles farther upstream, and was moved to its present site June 14, 1909.

The station is below all tributaries which head in the Sierra Nevada and is above all diversions.

The station is equipped with an inclined staff gage and a cable and car, 50 feet upstream from the gage.

Flood measurements are made with difficulty owing to the high velocities of the current.

The flow is probably unaffected by ice. The channel shifts somewhat at each high-water period so that additional measurements must be made to define the low-water curve.

Records are fairly reliable.

This station is maintained in cooperation with the United States Reclamation Service.

Discharge measurements made by the Stone & Webster Engineering Corporation have been furnished to the United States Geological Survey for publication.

Discharge measurements of Truckee River at Nevada-California State line, for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 25	F. C. Schafer	115	414	3.40	1,280
Apr. 9	Stone & Webster Engineering Corporation	.....	487	4.11	2,020
May 7	.....do	.....	375	3.30	1,200
July 1	.....do	.....	348	2.92	815
30	.....do	.....	342	2.95	828
Aug 29	.....do	.....	283	2.47	479
Aug. 30	F. C. Schafer	112	309	2.70	683
Oct. 16	H. D. McGlashan	111	275	2.36	454
Nov. 13	Stone & Webster Engineering Corporation	.....	278	2.35	420
25	.....do	.....	298	2.54	540
Dec. 16	D. S. Stuver	112	298	2.44	505

Daily gage height, in feet, of Truckee River at Nevada-California State line, for 1910.

[E. C Bigelow, jr., observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.7	3.4	3.3	3.2	4.1	3.4	2.8	2.9	2.6	2.4	2.3	2.3
2	3.6	3.4	3.3	3.3	4.0	3.3	2.8	2.9	2.6	2.4	2.2	2.3
3	3.5	2.7	3.5	3.4	3.7	3.2	2.8	2.8	2.6	2.4	2.2	2.4
4	3.4	3.1	3.6	3.6	3.6	3.2	2.8	2.8	2.6	2.5	2.2	2.5
5	3.4	3.1	3.7	3.8	3.5	3.1	2.9	2.8	2.6	2.5	2.2	2.5
6	3.4	3.2	3.8	3.8	3.5	2.9	2.8	2.8	2.6	2.3	2.2	2.5
7	3.3	3.3	3.8	3.9	3.5	2.9	2.8	2.8	2.6	2.5	2.2	2.5
8	3.3	3.3	3.8	4.0	3.5	3.0	2.7	2.8	2.6	2.4	2.2	2.5
9	3.3	3.3	3.8	4.0	3.5	3.0	2.7	2.8	2.5	2.4	2.3	2.5
10	3.2	3.3	4.0	4.1	3.6	3.4	2.8	2.8	2.5	2.4	2.3	2.6
11	3.2	3.3	4.0	4.2	3.6	3.3	2.8	2.8	2.5	2.5	2.3	2.7
12	3.3	3.3	4.1	3.9	3.6	3.3	2.8	2.8	2.5	2.4	2.5	2.7
13	3.3	3.3	4.1	3.9	3.5	3.2	2.9	2.8	2.5	2.3	2.4	2.6
14	3.2	3.3	3.9	3.9	3.6	3.2	3.0	2.8	2.5	2.3	2.4	2.5
15	3.3	3.4	3.6	3.9	3.7	3.1	3.0	2.8	2.6	2.3	2.3	2.5
16	3.4	3.3	3.6	4.0	3.6	3.0	3.0	2.8	2.5	2.3	2.3	2.4
17	3.3	3.3	3.8	4.1	3.6	3.0	3.0	2.8	2.5	2.2	2.2	2.5
18	3.3	3.3	4.3	4.2	3.6	3.0	3.0	2.8	2.5	2.2	2.2	2.5
19	3.3	3.2	5.4	4.2	3.5	3.0	2.9	2.7	2.5	2.2	2.2	2.5
20	3.3	3.3	4.9	4.2	3.5	2.8	2.9	2.7	2.4	2.2	2.3	2.4
21	3.3	3.3	4.3	4.1	3.4	2.8	2.6	2.7	2.4	2.2	2.3	2.4
22	3.4	3.3	4.0	4.2	3.4	2.8	2.6	2.7	2.4	2.2	2.3	2.4
23	3.5	3.2	3.8	4.3	3.5	2.8	2.6	2.7	2.2	2.2	2.3	2.3
24	3.4	3.2	3.5	4.3	3.5	3.0	3.1	2.7	2.3	2.2	2.4	2.3
25	3.4	3.3	3.3	4.3	3.4	3.1	3.0	2.7	2.3	2.2	2.4	2.3
26	3.4	3.3	3.1	4.4	3.5	3.2	3.0	2.7	2.3	2.3	2.4	2.3
27	3.4	3.3	3.1	4.5	3.5	3.2	2.9	2.7	2.5	2.3	2.4	2.2
28	3.4	3.3	3.1	4.7	3.5	3.1	2.9	2.6	2.4	2.2	2.3	2.2
29	3.4	.....	3.0	4.4	3.5	2.8	2.9	2.6	2.3	2.3	2.3	2.2
30	3.4	.....	3.2	4.4	3.4	3.0	2.9	2.6	2.4	2.3	2.3	2.2
31	3.4	.....	3.2	.....	3.4	.....	2.9	2.6	.....	2.3	.....	2.3

Daily discharge, in second-feet, of Truckee River at Nevada-California State line for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	735	1,310	1,210	1,060	2,040	1,260	703	786	562	457	418	418
2	1,510	1,310	1,210	1,160	1,920	1,160	703	786	562	457	385	418
3	1,410	735	1,410	1,260	1,580	1,060	703	703	562	457	385	457
4	1,310	1,030	1,510	1,470	1,470	1,060	703	703	562	504	385	504
5	1,310	1,030	1,620	1,690	1,360	964	786	703	562	504	385	504
6	1,310	1,120	1,730	1,690	1,360	786	703	703	562	418	385	504
7	1,210	1,210	1,730	1,800	1,360	786	703	703	562	504	385	504
8	1,210	1,210	1,730	1,920	1,360	873	628	703	562	457	385	504
9	1,210	1,210	1,730	1,920	1,360	873	628	703	504	457	418	504
10	1,120	1,210	1,970	2,040	1,470	1,260	703	703	504	457	418	562
11	1,120	1,210	1,970	2,160	1,470	1,160	703	703	504	504	418	628
12	1,210	1,210	2,090	1,800	1,470	1,160	703	703	504	457	504	628
13	1,210	1,210	2,090	1,800	1,360	1,060	786	703	504	418	457	562
14	1,120	1,210	1,850	1,800	1,470	1,060	873	703	504	418	457	504
15	1,210	1,310	1,510	1,800	1,580	964	873	703	562	418	418	504
16	1,310	1,210	1,510	1,920	1,470	873	873	703	504	418	418	457
17	1,210	1,210	1,730	2,040	1,470	873	873	703	504	385	385	504
18	1,210	1,210	2,350	2,160	1,470	873	873	703	504	385	385	504
19	1,210	1,120	3,890	2,160	1,360	873	786	628	504	385	385	504
20	1,210	1,210	3,080	2,160	1,360	703	786	628	457	385	418	457
21	1,210	1,210	2,290	2,040	1,260	703	562	628	457	385	418	457
22	1,310	1,210	1,920	2,160	1,260	703	562	628	457	385	418	457
23	1,410	1,120	1,690	2,290	1,360	703	562	628	385	385	418	418
24	1,310	1,120	1,360	2,290	1,360	873	964	628	418	385	457	418
25	1,310	1,210	1,160	2,290	1,260	964	873	628	418	385	457	418
26	1,310	1,210	964	2,420	1,360	1,060	873	628	418	418	457	418
27	1,310	1,210	964	2,550	1,360	1,060	786	628	504	418	457	385
28	1,310	1,210	964	2,810	1,360	964	786	562	457	385	418	385
29	1,310	.....	873	2,420	1,360	703	786	562	418	418	418	385
30	1,310	.....	1,060	2,420	1,260	873	786	562	457	418	418	385
31	1,310	.....	1,060	.....	1,260	.....	786	562	.....	418	.....	418

NOTE.—Daily discharge determined from two discharge rating curves, one applicable Jan. 1 to Mar. 19, and the other Mar. 20 to Dec. 31; well defined above 700 second-feet.

Monthly discharge of Truckee River at Nevada-California State line for 1910.

[Drainage area, 955 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	1,510	735	1,250	1.31	1.51	76,900	B.
February	1,310	735	1,180	1.24	1.29	65,500	B.
March	3,890	873	1,680	1.76	2.03	103,000	B.
April	2,810	1,060	1,980	2.07	2.31	118,000	A.
May	2,040	1,260	1,430	1.50	1.73	87,900	B.
June	1,260	703	943	.988	1.10	56,100	B.
July	964	562	755	.791	.91	46,400	B.
August	786	562	668	.699	.81	41,100	B.
September	562	385	498	.521	.58	29,600	B.
October	504	385	427	.447	.52	26,300	C.
November	504	385	418	.438	.49	24,900	C.
December	628	385	473	.495	.57	29,100	B.
The year	3,890	385	974	1.02	13.85	705,000	

TRUCKEE RIVER AT RENO, NEV.

This station, which is located in the city of Reno, in SE. ¼ sec. 11, T. 19 N., R. 19 E., about 12 miles below the California-Nevada line, near the upper end of Truckee Meadows, was established July 1, 1906, by the United States Weather Bureau in connection with its measurements of snowfall in the high Sierra, and gage heights have been furnished by that bureau.

The station is above all return waters and below practically all tributaries except Steamboat Creek, which enters from the south 6 miles below.

The datum of the staff gage is 4,481.60 feet above sea level and has remained unchanged.

Discharge measurements are made from the Rock Street Bridge, about 800 feet downstream from the Virginia Street Bridge, where the vertical staff gage is located. Low-water measurements are made by wading.

This station is maintained in cooperation with the United States Reclamation Service and the United States Weather Bureau.

The stream bed is permanent. The relation between gage height and discharge is unaffected by ice, and the records are considered good. The discharge of the river is affected by storage and regulation at several power plants above the station.

Discharge measurements of Truckee River at Reno, Nev., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 25	F. C. Schafer	120	430	2.70	1,280
Aug. 29	do	119	344	1.40	324
Oct. 16	H. D. McGlashan	102	310	1.38	336
Dec. 10	D. S. Stuver	118	377	1.90	618

Daily gage height, in feet, of Truckee River at Reno, Nev., for 1910.

[United States Weather Bureau, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.0	2.7	2.8	3.0	3.1	2.3	1.1	1.5	1.4	1.4	1.3	1.5
2	2.9	2.7	2.9	3.2	2.9	2.3	1.1	1.5	1.5	1.4	1.2	1.5
3	2.8	2.6	2.9	3.1	2.8	2.3	1.1	1.5	1.5	1.4	1.4	1.6
4	2.7	2.6	3.0	3.1	2.7	2.0	1.7	1.5	1.5	1.4	1.4	2.0
5	2.6	2.6	3.1	3.2	2.4	1.9	1.8	1.5	1.5	1.4	1.4	1.8
6	2.6	2.6	3.2	3.2	2.4	1.6	1.8	1.5	1.5	1.4	1.4	1.6
7	2.6	2.6	3.2	3.2	2.3	1.6	1.7	1.5	1.5	1.4	1.4	1.6
8	2.6	2.6	3.2	3.4	2.7	1.6	1.8	1.5	1.5	1.4	1.4	1.6
9	2.6	2.5	3.3	3.5	2.9	1.5	1.8	1.5	1.5	1.4	1.5	1.6
10	2.6	2.5	3.3	3.5	3.0	1.5	1.8	1.5	1.4	1.3	1.5	1.9
11	2.5	2.5	3.4	3.5	3.0	1.5	1.8	1.5	1.4	1.3	1.5	2.4
12	2.5	2.5	3.5	3.3	2.9	1.5	1.8	1.4	1.4	1.3	1.3	2.0
13	2.5	2.5	3.6	3.3	2.8	2.0	1.8	1.4	1.4	1.3	1.5	1.8
14	2.6	2.8	3.2	3.3	2.8	1.4	1.5	1.5	1.3	1.4	1.5	1.7
15	2.6	2.5	3.2	3.2	2.8	1.4	1.5	1.4	1.4	1.4	1.5	1.6
16	2.5	2.5	3.2	3.2	2.8	1.3	1.5	1.5	1.5	1.5	1.5	1.6
17	2.5	2.5	3.1	3.2	2.6	1.2	1.8	1.5	1.5	1.5	1.5	1.6
18	2.5	2.5	3.8	3.3	2.5	1.2	1.8	1.5	1.5	1.4	1.4	1.6
19	2.5	2.5	4.3	3.5	2.5	1.2	2.0	1.5	1.5	1.4	1.3	1.6
20	2.5	2.5	4.2	3.6	2.5	1.4	2.1	1.5	1.5	1.4	1.3	1.5
21	2.5	2.5	3.8	3.4	2.5	1.2	2.0	1.5	1.4	1.5	1.4	1.5
22	2.7	2.5	3.4	3.3	2.6	1.2	1.5	1.4	1.4	1.5	1.5	1.5
23	2.7	2.5	3.3	3.4	2.6	1.1	1.5	1.5	1.4	1.6	1.6	1.5
24	2.8	2.5	3.1	3.4	2.6	1.1	1.5	1.5	1.3	1.5	1.6	1.5
25	2.8	2.5	2.7	3.4	2.5	1.1	1.7	1.5	1.3	1.5	1.5	1.5
26	2.7	2.5	2.7	3.5	2.4	1.1	1.7	1.5	1.3	1.4	1.5	1.5
27	2.7	2.5	2.7	3.8	2.4	1.8	1.6	1.5	1.4	1.4	1.5	1.5
28	2.7	2.6	2.7	3.8	2.4	1.3	1.7	1.5	1.4	1.3	1.5	1.5
29	2.7	.....	2.7	3.6	2.4	1.1	1.5	1.4	1.4	1.4	1.4	1.4
30	2.7	.....	2.7	3.3	2.4	1.2	1.6	1.5	1.4	1.4	1.5	1.4
31	2.7	.....	2.8	.....	2.4	.....	1.5	1.5	.....	1.3	.....	1.5

Daily discharge, in second-feet, of Truckee River at Reno, Nev., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,630	1,320	1,420	1,630	1,740	940	215	388	338	338	293	388
2	1,520	1,320	1,520	1,850	1,520	940	215	388	388	338	250	388
3	1,420	1,220	1,520	1,740	1,420	940	215	388	388	338	338	441
4	1,320	1,220	1,630	1,740	1,320	700	500	388	388	338	338	700
5	1,220	1,220	1,740	1,850	1,030	630	562	388	388	338	338	562
6	1,220	1,220	1,850	1,850	1,030	441	562	388	388	338	338	441
7	1,220	1,220	1,850	1,850	940	441	500	388	388	338	338	441
8	1,220	1,220	1,850	2,070	1,320	441	562	388	388	338	338	441
9	1,220	1,120	1,960	2,200	1,520	388	562	388	388	338	388	441
10	1,220	1,120	1,960	2,200	1,630	388	562	388	338	293	388	630
11	1,120	1,120	2,070	2,200	1,630	388	562	388	338	293	388	1,030
12	1,120	1,120	2,200	1,960	1,520	388	562	338	338	293	293	700
13	1,120	1,120	2,330	1,960	1,420	700	562	338	338	293	388	562
14	1,220	1,420	1,850	1,960	1,420	338	388	388	293	338	388	500
15	1,220	1,120	1,850	1,850	1,420	338	388	338	338	338	388	441
16	1,120	1,120	1,850	1,850	1,420	293	388	388	388	388	388	441
17	1,120	1,120	1,740	1,850	1,220	250	562	388	388	388	388	441
18	1,120	1,120	2,600	1,960	1,120	250	562	388	388	338	338	441
19	1,120	1,120	3,360	2,200	1,120	250	700	388	388	338	293	441
20	1,120	1,120	3,200	2,330	1,120	338	780	388	388	338	293	388
21	1,120	1,120	2,600	2,070	1,120	250	700	388	338	388	338	388
22	1,320	1,120	2,070	1,960	1,220	250	388	338	338	388	388	388
23	1,320	1,120	1,960	2,070	1,220	215	388	388	338	441	441	388
24	1,420	1,120	1,740	2,070	1,220	215	388	388	293	388	441	388
25	1,420	1,120	1,320	2,070	1,120	215	500	388	293	388	388	388
26	1,320	1,120	1,320	2,200	1,030	215	500	388	293	338	388	388
27	1,320	1,120	1,320	2,600	1,030	562	441	388	338	338	388	388
28	1,320	1,220	1,320	2,600	1,030	293	500	388	338	293	388	388
29	1,320	.....	1,320	2,330	1,030	215	388	338	338	338	338	338
30	1,320	.....	1,320	1,960	1,030	250	441	388	338	338	388	338
31	1,320	.....	1,420	.....	1,030	.....	388	388	.....	293	.....	388

NOTE.—Daily discharges determined from a discharge rating curve well defined for all stages.

Monthly discharge of Truckee River at Reno, Nev., for 1910.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	1,630	1,120	1,260	77,500	A.
February	1,420	1,120	1,170	65,000	A.
March	3,360	1,320	1,870	115,000	A.
April	2,600	1,630	2,030	121,000	A.
May	1,740	940	1,260	77,500	A.
June	940	215	415	24,700	A.
July	780	215	482	29,600	A.
August	388	338	380	23,400	A.
September	388	293	354	21,100	A.
October	441	293	342	21,000	A.
November	441	250	359	21,400	A.
December	1,030	338	465	28,600	A.
The year	3,360	215	864	626,000	

TRUCKEE RIVER AT CLARKS, NEV.

This station, which is located in the SE. ¼ sec. 26, T. 20 N., R. 22 E., at the highway bridge about 600 feet from the Southern Pacific Railroad station at Clarks, was established August 1, 1910, to replace the station formerly maintained at Derby dam.

The gage is a vertical rod fastened to the south abutment of the bridge.

Discharge measurements are made from the bridge.

The river is regulated by storage and power plants above the station. Water is diverted above the gage for irrigation in Truckee Valley.

This station is maintained by the United States Reclamation Service. Discharge measurements are made and furnished by the Stone & Webster Engineering Corporation.

Discharge measurements of Truckee River at Clarks, Nev., in 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Sept. 1	Stone & Webster Engineering Corporation	64	324	2.80	431
28	do	64	304	2.51	342

Daily gage height, in feet, and discharge, in second-feet, of Truckee River at Clarks, Nev., for 1910.

[E. R. Dack, observer.]

Day.	August.		September.		October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	2.7	420	2.6	380	2.6	380	2.8	460	2.9	500
2	2.7	420	2.6	380	2.6	380	2.7	420	2.9	500
3	2.7	420	2.6	380	2.5	350	2.6	380	3.4	730
4	2.7	420	2.6	380	2.6	380	2.6	380	3.8	960
5	2.7	420	3.2	630	2.7	420	2.6	380	3.2	630
6	2.6	380	3.0	540	2.6	380	2.6	380	3.2	630
7	2.6	380	3.0	540	2.7	420	2.7	420	3.1	580
8	2.7	420	2.6	380	2.6	380	2.7	420	3.2	630
9	2.7	420	2.6	380	2.6	380	2.7	420	3.1	580
10	2.7	420	2.6	380	2.5	350	2.7	420	3.2	630
11	2.7	420	2.5	350	2.6	380	2.7	420	4.2	1,210
12	2.6	380	2.5	350	2.8	460	2.7	420	3.6	840
13	2.7	420	2.4	320	2.7	420	3.1	580	3.4	730
14	2.7	420	2.5	350	2.8	460	3.0	540	3.3	680
15	2.8	460	2.6	380	3.0	540	2.8	460	3.1	580
16	2.7	420	3.0	540	2.9	500	2.8	460	3.1	580
17	2.7	420	2.8	460	2.9	500	2.8	460	3.1	580
18	2.7	420	2.7	420	2.8	460	2.8	460	3.1	580
19	2.7	420	2.7	420	2.7	420	2.7	420	3.1	580
20	2.7	420	2.7	420	2.7	420	2.7	420	3.0	540
21	2.7	420	2.7	420	2.8	460	2.7	420	3.0	540
22	2.7	420	2.6	380	2.8	460	2.7	420	2.8	460
23	2.7	420	2.6	380	2.8	460	2.7	420	2.7	420
24	2.7	420	2.5	350	2.8	460	2.8	460	2.7	420
25	2.7	420	2.5	350	2.7	420	3.2	630	2.7	420
26	2.7	420	2.4	320	2.7	420	3.1	580	2.7	420
27	2.6	380	2.5	350	2.7	420	3.0	540	2.7	420
28	2.6	380	2.5	350	2.7	420	2.9	500	2.6	380
29	2.6	380	2.6	380	2.7	420	2.9	500	2.7	420
30	2.6	380	2.6	380	2.7	420	2.9	500	2.9	500
31	2.6	380	.....	.....	2.8	460	.....	.....	2.9	500

NOTE.—Daily discharges determined from a discharge rating curve well defined for all stages.

Monthly discharge of Truckee River at Clarks, Nev., for 1910.

[Drainage area, 1,740 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
August	460	380	411	0.236	0.27	25,300	A.
September	630	320	401	.230	.26	23,900	A.
October	540	350	426	.245	.28	26,200	A.
November	630	380	456	.262	.29	27,100	A.
December	1,210	380	586	.337	.39	36,000	A.

TRUCKEE RIVER AT DERBY DAM, NEV.

This station, which is located about 2 miles east of Clarks, Nev., three-fourths of a mile above the Reclamation Service diversion dam for the main canal of the Truckee-Carson project, was established July 1, 1907, to determine the amount of water available for the

canal and the amount in excess of the requirements of the water users in the Wadsworth Valley, and was discontinued June 6, 1910, in favor of the station at Clarks. The station replaced the station at Vista, giving practically the same record.

The station is equipped with an inclined staff gage in two sections, the datum of which has remained unchanged, and a cable and car from which discharge measurements are made.

The relation between gage heights and discharge at this point was at times evidently affected by backwater. The river is regulated by storage and power plants above the station. Water is diverted above the gage for irrigation in Truckee Valley.

The station was maintained by the United States Reclamation Service.

The following discharge measurement was made by F. C. Schafer:

March 26, 1910: Width, 115 feet; area, 438 square feet; gage height, 6.00 feet; discharge 1,780 second-feet.

Daily gage height, in feet, of Truckee River at Derby dam, Nev., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	5.6	5.8	5.8	5.9	6.5	5.7
2	6.8	5.8	6.0	6.3	6.4	5.6
3	6.7	6.0	6.2	6.4	6.0	5.5
4	5.9	6.0	6.2	6.2	5.9	5.4
5	5.8	5.8	6.3	6.2	5.4	5.1
6	5.8	5.8	6.4	6.9	5.4	4.9
7	5.75	6.0	6.5	6.6	5.9	.....
8	5.8	6.0	6.6	6.5	6.0	.....
9	5.65	6.0	6.7	6.9	6.4	.....
10	5.8	6.0	6.7	6.7	6.4	.....
11	5.9	6.0	6.7	6.8	6.8	.....
12	5.8	6.0	6.7	6.5	6.8	.....
13	5.8	6.0	6.75	6.6	6.4	.....
14	5.8	6.4	6.9	6.6	6.4	.....
15	5.8	6.5	6.7	6.4	6.2	.....
16	5.8	6.5	6.4	6.2	6.0	.....
17	5.9	6.2	6.0	6.8	5.8	.....
18	5.85	6.0	6.0	6.9	5.6	.....
19	5.85	5.9	7.3	7.1	5.6	.....
20	5.85	5.5	8.5	6.9	5.7	.....
21	5.8	5.5	7.3	7.0	5.7	.....
22	5.75	5.5	6.6	6.8	5.6	.....
23	5.8	5.5	6.6	7.0	5.7	.....
24	5.8	5.6	6.0	6.9	5.8	.....
25	5.8	6.0	5.9	6.8	6.1	.....
26	5.75	5.8	5.7	7.0	6.0	.....
27	5.6	5.7	5.6	7.1	5.9	.....
28	5.75	5.6	5.6	7.0	5.8	.....
29	5.75	.....	5.6	6.9	5.8	.....
30	5.75	.....	5.4	6.8	5.8	.....
31	5.8	.....	5.6	.....	5.8	.....

Daily discharge, in second-feet, of Truckee River at Derby dam, Nev., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	1,220	1,340	1,340	1,410	1,840	1,280
2	2,070	1,340	1,480	1,700	1,770	1,220
3	2,000	1,480	1,620	1,770	1,480	1,150
4	1,410	1,480	1,620	1,620	1,410	1,090
5	1,340	1,340	1,700	1,620	1,090	910
6	1,340	1,340	1,770	2,150	1,090	800
7	1,310	1,480	1,840	1,920	1,410	.....
8	1,340	1,480	1,920	1,840	1,480	.....
9	1,250	1,480	2,000	2,150	1,770	.....
10	1,340	1,480	2,000	2,000	1,770	.....
11	1,410	1,480	2,000	2,070	2,070	.....
12	1,340	1,480	2,000	1,840	2,070	.....
13	1,340	1,480	2,030	1,920	1,770	.....
14	1,340	1,770	2,150	1,920	1,770	.....
15	1,340	1,840	2,000	1,770	1,620	.....
16	1,340	1,840	1,770	1,620	1,480	.....
17	1,410	1,620	1,480	2,070	1,340	.....
18	1,380	1,480	1,480	2,150	1,220	.....
19	1,380	1,410	2,470	2,310	1,220	.....
20	1,380	1,150	3,440	2,150	1,280	.....
21	1,340	1,150	2,470	2,230	1,280	.....
22	1,310	1,150	1,920	2,070	1,220	.....
23	1,340	1,150	1,920	2,230	1,280	.....
24	1,340	1,220	1,480	2,150	1,340	.....
25	1,340	1,480	1,410	2,070	1,550	.....
26	1,310	1,340	1,280	2,230	1,480	.....
27	1,220	1,280	1,220	2,310	1,410	.....
28	1,310	1,220	1,220	2,230	1,340	.....
29	1,310	.....	1,220	2,150	1,340	.....
30	1,310	.....	1,090	2,070	1,340	.....
31	1,340	.....	1,220	.....	1,340	.....

NOTE.—Daily discharge determined from a discharge rating curve fairly well defined for 1907–1909, but defined during 1910 by only one measurement which does not plot on the curve.

Monthly discharge of Truckee River at Derby dam, Nev., for 1910.

[Drainage area, 1,740 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	2,070	1,220	1,380	0.794	0.92	84,800	B.
February	1,840	1,150	1,420	.816	.85	78,900	B.
March	3,440	1,090	1,760	1.01	1.16	108,000	B.
April	2,310	1,410	1,990	1.14	1.27	118,000	B.
May	2,070	1,090	1,480	.851	.98	91,000	B.
June (1–6)	1,280	800	1,080	.621	.14	12,800	B.
The period	.....	.....	.....	.....	.....	494,000	

DONNER CREEK NEAR TRUCKEE, CAL.

Donner Creek flows from the east end of Donner Lake eastward into Truckee River about 1½ miles above Truckee, Cal., its length being about 2 miles.

The gaging station, which is located 150 feet below the dam of the Donner Creek Ice Co., 1½ miles west of Truckee, Cal., and below the mouth of Cold Creek, the principal tributary, was established October

23, 1902, to determine the amount of water available for storage in Donner Lake for use on the Truckee-Carson project.

Four different gages were used during 1909. Previous to June 1 all gage heights are referred to the datum of the old gage. Beginning June 1, 1909, they refer to a permanent inclined gage installed September 12, 1909, about 40 feet downstream from the old gage.

Discharge measurements are made from a cable and car.

The relation between gage height and discharge is probably not greatly affected by ice, but it is affected by the raising and lowering of the gates of the storage dam at the outlet of Donner Lake.

The record is considered reliable.

This station is maintained in cooperation with the United States Reclamation Service.

Discharge measurements of Donner Creek near Truckee, Cal., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 21	F. C. Schafer	45	97	1.60	228
Aug. 20[a]	do	5	1.8	.00	1.4
Sept. 20[a]	T. W. Norcross	4	1.5	.13	2.6
Dec. 14[a]	D. S. Stuver	40	46	.42	20.3

[a] Wading measurement.

Daily gage height, in feet, of Donner Creek near Truckee, Cal., for 1910.

[W. O. Blinn, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.9	0.85	0.85	1.3	1.8	1.3	0.4	0.1	0.0	0.1	0.05	0.4
2	.9	.85	.85	1.3	1.6	1.3	.4	.1	.0	.1	.0	.3
3	.8	.85	.9	1.3	1.5	1.2	.4	.1	.0	.1	.0	.3
4	.8	.85	1.05	1.3	1.45	1.1	.4	.0	.0	.1	.0	.3
5	.8	.85	1.0	1.35	1.4	1.05	.4	.1	.0	.1	.0	.3
6	.8	.85	1.05	1.4	1.4	.85	.4	.0	.0	.1	.0	.3
7	.7	.85	1.1	1.4	1.5	.85	.4	.0	.0	.1	.0	.4
8	.8	.85	1.1	1.4	1.5	.8	.3	.0	.0	.1	.0	.4
9	.8	.85	1.1	1.55	1.5	.8	.3	.0	.0	.1	.3	.5
10	.8	1.0	1.15	1.6	1.6	.8	.3	.0	.0	.1	.2	.7
11	.8	1.0	1.2	1.6	1.7	.8	.3	.0	.0	.1	.2	.7
12	.8	1.4	1.25	1.5	1.7	.75	.3	.05	.0	.1	.1	.6
13	.8	1.15	1.3	1.6	1.7	.75	.3	.05	.0	.1	.0	.55
14	.8	1.0	1.3	1.6	1.7	.7	.3	.0	.0	.1	.0	.45
15	.8	.95	1.3	1.6	1.5	.7	.2	.0	.1	.1	.1	.4
16	.8	.9	1.3	1.65	1.5	.7	.2	.0	.1	.1	.1	.4
17	.8	.85	1.3	1.7	1.5	.7	.2	.0	.1	.1	.1	.4
18	.8	.85	1.35	1.7	1.55	.7	.15	.0	.1	.1	.15	.4
19	.8	.85	1.7	1.7	1.6	.7	.2	.0	.1	.1	.2	.4
20	.8	.8	1.75	1.8	1.6	.7	.15	.0	.1	.1	.2	.4
21	.9	.8	1.65	1.7	1.5	.65	.2	.0	.1	.1	.2	.4
22	1.1	.8	1.6	1.9	1.5	.6	.15	.0	.1	.1	.2	.4
23	1.1	.8	1.5	1.9	1.55	.55	.2	.0	.1	.1	.2	.4
24	1.05	.75	1.4	1.9	1.55	.5	.1	.0	.1	.1	.5	.4
25	1.0	.75	1.35	2.0	1.5	.5	.1	.0	.1	.1	.45	.4
26	.9	.75	1.3	2.0	1.45	.5	.1	.0	.1	.1	.4	.4
27	.9	.75	1.3	2.0	1.4	.5	.1	.0	.1	.1	.4	.4
28	.9	.8	1.3	2.0	1.4	.5	.1	.0	.1	.1	.5	.4
29	.9	.....	1.2	2.0	1.4	.4	.5	.0	.1	.1	.4	.4
30	.9	.....	1.2	1.9	1.4	.4	.45	.0	.1	.1	.4	.4
31	.9	.....	1.25	.....	1.4	.....	.1	.0	.....	.1	.....	.4

Daily discharge, in second-feet, of Donner Creek near Truckee, Cal., for 1909 and 1910.

Day.	Jan.	Nov.	Dec.	Day.	Jan.	Nov.	Dec.	Day.	Jan.	Nov.	Dec.
1909.											
1		4	862	11		4	215	21	574	255	93
2		4	674	12		4	202	22	410	315	70
3		4	447	13		4	202	23	288	345	50
4		4	447	14	326	4	190	24	43	489	50
5		4	326	15	652	4	177	25	43	447	50
6		4	326	16	812	4	153	26	43	365	50
7		4	308	17	752	4	142	27	43	290	50
8		4	290	18	752	4	131	28	43	290	50
9		4	274	19	652	106	93	29	43	326	50
10		4	257	20	612	230	93	30	34	674	50
								31	34		63

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	77	70	70	153	230	153	18	2.5	1.2	2.5	1.8	18
2	77	70	70	153	228	153	18	2.5	1.2	2.5	1.2	11
3	63	70	77	153	202	131	18	2.5	1.2	2.5	1.2	11
4	63	70	102	153	190	111	18	1.2	1.2	2.5	1.2	11
5	63	70	93	165	177	102	18	2.5	1.2	2.5	1.2	11
6	63	70	102	177	177	70	18	1.2	1.2	2.5	1.2	11
7	50	70	111	177	202	70	18	1.2	1.2	2.5	1.2	18
8	63	70	111	177	202	63	11	1.2	1.2	2.5	1.2	18
9	63	70	111	215	202	63	11	1.2	1.2	2.5	11	27
10	63	93	121	228	228	63	11	1.2	1.2	2.5	5.5	50
11	63	93	131	228	257	63	11	1.2	1.2	2.5	5.5	50
12	63	177	142	202	257	56	11	1.8	1.2	2.5	2.5	38
13	63	121	153	228	257	56	11	1.8	1.2	2.5	1.2	32
14	63	93	153	228	257	50	11	1.2	1.2	2.5	1.2	22
15	63	85	153	228	202	50	5.5	1.2	2.5	2.5	2.5	18
16	63	77	153	242	202	50	5.5	1.2	2.5	2.5	2.5	18
17	63	70	153	257	202	50	5.5	1.2	2.5	2.5	2.5	18
18	63	70	165	257	215	50	4.0	1.2	2.5	2.5	4.0	18
19	63	70	257	257	228	50	5.5	1.2	2.5	2.5	5.5	18
20	63	63	274	290	228	50	4.0	1.2	2.5	2.5	5.5	18
21	77	63	242	257	202	44	5.5	1.2	2.5	2.5	5.5	18
22	111	63	228	326	202	38	4.0	1.2	2.5	2.5	5.5	18
23	111	63	202	326	215	32	5.5	1.2	2.5	2.5	5.5	18
24	102	56	177	326	215	27	2.5	1.2	2.5	2.5	27	18
25	93	56	165	365	202	27	2.5	1.2	2.5	2.5	22	18
26	77	56	153	365	190	27	2.5	1.2	2.5	2.5	18	18
27	77	56	153	365	177	27	2.5	1.2	2.5	2.5	18	18
28	77	63	153	365	177	27	2.5	1.2	2.5	2.5	27	18
29	77	.....	131	365	177	18	27	1.2	2.5	2.5	18	18
30	77	.....	131	326	177	18	22	1.2	2.5	2.5	18	18
31	77	.....	142	.....	177	.....	2.5	1.2	.....	2.5	.....	18

NOTE.—Table of daily discharge for 1909 supersedes that published in Water-Supply Paper 270; an error discovered in the data for January, 1909, is here corrected; discharge determined from a revised curve fairly well defined for period after Nov. 23. Daily discharge for 1910 determined from a discharge rating curve fairly well defined for all stages.

Monthly discharge of Donner Creek near Truckee, Cal., for 1909 and 1910.

[Drainage area, 30 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1909.							
January	812	8	214	7.13	8.22	13,200	B.
February	43	30	38.2	1.27	1.32	2,120	B.
March	62	43	51.0	1.70	1.96	3,140	A.
April	276	52	150	5.00	5.58	8,930	A.
May	410	196	264	8.80	10.14	16,200	B.
June	285	58	176	5.87	6.55	10,500	B.
July	180	23	69.2	2.31	2.66	4,250	A.
August	20	7	11.8	.393	.45	726	D.
September	7	1	4.9	.163	.18	292	D.
October	7	1	3.4	.113	.13	209	D.
November	674	4	140	4.67	5.21	8,330	C.
December	862	50	208	6.93	7.99	12,800	B.
The year	862	1	111	3.70	50.39	80,700	
1910.							
January	111	50	72.0	2.40	2.77	4,430	C.
February	177	56	75.6	2.52	2.62	4,200	C.
March	274	70	148	4.93	5.69	9,100	B.
April	365	153	252	8.40	9.37	15,000	B.
May	290	177	210	7.00	8.07	12,900	B.
June	153	18	59.6	1.99	2.22	3,550	B.
July	27	2.5	10.1	.337	.39	621	C.
August	2.5	1.2	1.41	.047	.05	86.7	D.
September	2.5	1.2	1.89	.063	.07	112	D.
October	2.5	2.5	2.50	.083	.10	154	D.
November	27	1.2	7.47	.249	.28	444	D.
December	50	11	20.5	.683	.79	1,260	C.
The year	365	1.2	71.6	2.39	32.42	51,900	

NOTE.—Data for January, November, and December, 1909, supersede those published in Water-Supply Paper 270.

PROSSER CREEK NEAR HOBART MILLS, CAL.

Prosser Creek, a stream about 14 miles long, enters Truckee River from the west about 2 miles southwest of Boca.

The gaging station, which is located just below Alder Creek, about 2 miles above the mouth of Prosser Creek, 4 miles north of Truckee, and 3 miles below Hobart Mills, Cal., was established June 27, 1903, discontinued October 15, 1904, and reestablished September 23, 1907. Some miscellaneous measurements were made at this point in the meantime.

The present gage is painted on the northeast iron pier of the bridge, and has been used since January 15, 1909.

Discharge measurements are made from a wagon bridge or by means of a car and cable 150 feet below the bridge.

The section is subject to change between floods, and the relation between gage height and discharge is at times affected by ice.

This station is maintained in cooperation with the United States Reclamation Service.

Discharge measurements of Prosser Creek near Hobart Mills, Cal., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 21	F. C. Schafer	54	85.5	4.00	308
Aug. 26	do[a]	16.5	10.7	2.10	10
Sept. 21	T. W. Norcross[a]	.....	.....	[b].89	[c] 16.6
Dec. 15	D. S. Stuver[a]	45	48.1	2.62	34.4

[a] Wading measurement.
[b] Refers to Stone and Webster gage at cable 150 feet below the regular gage at the bridge. Bridge gage not readable.
[c] Measurement was made above Alder Creek, which was carrying 3.5 second-feet; but it is included in above discharge.

Daily gage height, in feet, of Prosser Creek near Hobart Mills, Cal., for 1910.

[A. A. Wilcox, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3 9	3.75	3.5	3.65	3.9	3.8	2.85	2.1	2.1	2.1	2.1	2.3
2	3.8	3.85	3.35	3.7	3.85	3.8	2.8	2.1	2.1	2.1	2.2	2.3
3	3.8	3.85	3.25	3.8	3.8	3.7	2.7	2.1	2.1	2.1	2.2	2.5
4	3.85	3.8	3.25	3.75	3.75	3.75	2.7	2.1	2.1	2.1	2.2	2.6
5	3.8	3.8	3.4	3.75	3.55	3.7	2.7	2.1	2.1	2.1	2.2	2.5
6	3.9	3.8	3.45	3.75	3.5	3.7	2.7	2.1	2.1	2.1	2.2	2.4
7	3.9	3.8	3.45	3.95	3.5	3.65	2.7	2.1	2.1	2.1	2.2	2.4
8	3.8	3.8	3.4	4.05	3.6	3.6	2.7	2.1	2.1	2.1	2.2	2.3
9	3.8	3.7	3.4	4.05	3.75	3.6	2.6	2.1	2.1	2.1	2.25	2.4
10	3.8	3.7	3.4	4.05	3.8	3.6	2.6	2.1	2.1	2.1	2.3	2.5
11	3.8	3.7	3.55	4.05	3.85	3.6	2.6	2.1	2.1	2.1	2.3	2.7
12	3.75	3.75	3.6	4.05	3.8	3.55	2.5	2.1	2.1	2.1	2.4	2.5
13	3.75	3.75	3.75	3.95	3.75	3.55	2.5	2.1	2.1	2.1	2.3	2.5
14	3.7	3.75	3.8	3.95	3.65	3.5	2.4	2.1	2.1	2.2	2.2	2.3
15	3.7	3.7	3.75	3.95	3.65	3.5	2.4	2.1	2.1	2.2	2.2	2.4
16	3.6	3.8	3.75	3.8	3.7	3.5	2.4	2.1	2.3	2.2	2.2	2.4
17	3.6	3.8	3.95	3.85	3.7	3.45	2.4	2.1	2.3	2.2	2.2	2.4
18	3.6	3.8	4.0	4.05	3.7	3.4	2.4	2.1	2.1	2.2	2.3	2.6
19	3.6	3.8	4.4	4.05	3.6	3.35	2.4	2.1	2.1	2.2	2.3	2.5
20	3.6	3.8	4.25	4.15	3.6	3.3	2.4	2.1	2.1	2.2	2.3	2.5
21	3.7	3.8	4.0	4.15	3.6	3.3	2.4	2.1	2.1	2.2	2.3	2.5
22	3.7	3.8	3.8	4.05	3.6	3.3	2.4	2.1	2.1	2.2	2.3	2.4
23	3.7	3.8	3.8	4.05	3.7	3.3	2.4	2.1	2.1	2.1	2.4	2.4
24	3.75	3.8	3.75	4.05	3.65	3.3	2.2	2.1	2.1	2.1	2.5	2.3
25	3.8	3.8	3.45	4.05	3.65	3.3	2.2	2.1	2.1	2.1	2.4	2.3
26	3.8	3.8	3.45	4.05	3.7	3.3	2.2	2.1	2.1	2.1	2.4	2.3
27	3.6	3.7	3.45	4.05	3.7	3.2	2.1	2.1	2.1	2.1	2.4	2.3
28	3.65	3.6	3.4	4.15	3.7	3.1	2.1	2.1	2.1	2.1	2.4	2.3
29	3.6	.....	3.4	4.05	3.7	3.0	2.0	2.1	2.1	2.1	2.4	2.4
30	3.7	.....	3.4	4.0	3.7	2.9	2.0	2.1	2.1	2.1	2.3	2.4
31	3.65	.....	3.4	.....	3.7	.....	2.0	2.1	.....	2.1	.....	2.4

NOTE.—Probably slight effect from ice the last part of December.

Daily discharge, in second-feet, of Prosser Creek near Hobart Mills, Cal., for 1909 and 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1	60	89	105	114	665	483	224	76	7	20	63	480
2	67	76	97	132	640	568	188	58	7	24	63	403
3	67	89	97	151	692	524	188	52	7	30	63	305
4	67	89	105	151	692	483	178	47	10	30	63	264
5	67	70	105	151	640	524	168	47	14	30	76	227
6	114	58	97	151	640	483	168	47	14	38	76	204
7	105	52	89	151	640	483	158	38	12	38	63	204
8	96	47	97	151	581	483	158	34	12	38	63	182
9	88	42	114	172	545	503	158	30	12	38	63	182
10	114	42	114	216	545	369	139	30	14	38	63	161
11	122	38	114	264	502	352	158	24	14	38	63	161
12	140	38	114	370	480	386	158	24	14	47	63	161
13	210	34	132	440	460	386	148	24	14	47	63	151
14	347	34	132	460	460	386	158	24	14	47	63	141
15	879	58	123	480	460	369	148	17	14	47	52	141
16	1,290	89	132	523	422	352	158	17	14	47	52	141
17	764	114	123	545	422	305	148	14	20	47	52	161
18	560	123	114	665	386	276	139	14	20	47	52	161
19	393	114	132	640	386	276	139	10	20	47	63	161
20	393	105	132	480	370	276	129	10	20	47	204	161
21	470	132	123	386	353	330	129	10	20	47	900	151
22	344	141	123	386	321	330	129	10	20	47	403	141
23	298	172	114	422	321	330	129	10	17	47	305	141
24	284	172	97	386	291	330	114	10	17	52	305	123
25	246	161	89	386	276	300	114	7	20	52	264	123
26	246	141	89	422	305	300	105	7	20	52	252	123
27	210	132	89	523	305	300	89	7	24	52	216	123
28	186	123	97	640	320	260	89	7	24	63	172	123
29	136	.....	105	640	336	248	97	7	24	70	161	141
30	118	.....	105	665	369	236	97	7	24	70	161	161
31	118	.....	97	.....	443	.....	89	7	.....	76	.....	305
1910.												
1	277	240	182	216	277	252	70	10	10	10	10	20
2	252	264	151	227	264	252	63	10	10	10	14	20
3	252	264	132	252	252	227	52	10	10	10	14	34
4	264	252	132	240	240	240	52	10	10	10	14	42
5	252	252	161	240	193	227	52	10	10	10	14	34
6	277	252	172	240	182	227	52	10	10	10	14	27
7	277	252	172	291	182	216	52	10	10	10	14	27
8	252	252	161	321	204	204	52	10	10	10	14	20
9	252	227	161	321	240	204	42	10	10	10	17	27
10	252	227	161	321	252	204	42	10	10	10	20	34
11	252	227	193	321	264	204	42	10	10	10	20	52
12	240	240	204	321	252	193	34	10	10	10	27	34
13	240	240	240	291	240	193	34	10	10	10	20	34
14	227	240	252	291	216	182	27	10	10	14	14	20
15	227	227	240	291	216	182	27	10	10	14	14	27
16	204	252	240	252	227	182	27	10	20	14	14	27
17	204	252	291	264	227	172	27	10	20	14	14	27
18	204	252	305	321	227	161	27	10	10	14	20	42
19	204	252	440	321	204	151	27	10	10	14	20	34
20	204	252	386	354	204	141	27	10	10	14	20	34
21	227	252	305	354	204	141	27	10	10	14	20	34
22	227	252	252	321	204	141	27	10	10	14	20	27
23	227	252	252	321	227	141	27	10	10	10	27	27
24	240	252	240	321	216	141	14	10	10	10	34	20
25	252	252	172	321	216	141	14	10	10	10	27	20
26	252	252	172	321	227	141	14	10	10	10	27	20
27	204	227	172	321	227	123	10	10	10	10	27	20
28	216	204	161	354	227	105	10	10	10	10	27	20
29	204	.....	161	321	227	89	7	10	10	10	27	27
30	227	.....	161	305	227	76	7	10	10	10	20	27
31	216	.....	161	.....	227	.....	7	10	.....	10	.....	27

NOTE.—Daily discharge table for 1909 supersedes that published in Water-Supply Paper 270, p. 130, which was based on an unreliable curve. Discharge revised from a set of parallel curves drawn through scattered discharge measurements, using 1910 curve as standard.

Daily discharge for 1910 determined from a discharge rating curve well defined for all stages. Discharge estimated for days on which gage was not read.

No correction made for ice effect during December, 1910.

Monthly discharge of Prosser Creek near Hobart Mills, Cal., for 1909 and 1910.

[Drainage area, 48 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1909.							
January	1,290	60	277	5.77	6.65	17,000	C.
February	172	34	92.0	1.92	2.00	5,110	B.
March	132	89	110	2.29	2.64	6,760	B.
April	665	114	375	7.81	8.71	22,300	C.
May	692	276	460	9.58	11.04	28,300	C.
June	568	236	374	7.79	8.69	22,300	C.
July	224	89	142	2.96	3.41	8,730	B.
August	76	7	23.4	.488	.56	1,440	A.
September	24	7	16.1	.335	.37	958	A.
October	76	20	45.6	.950	1.10	2,800	A.
November	900	52	151	3.15	3.51	8,980	B.
December	480	123	187	3.90	4.50	11,500	B.
The year	1,290	7	188	3.92	53.18	136,000	
1910.							
January	277	204	236	4.92	5.67	14,500	C.
February	264	204	245	5.10	5.31	13,600	B.
March	440	132	212	4.42	5.10	13,000	B.
April	354	216	299	6.23	6.95	17,800	B.
May	277	182	226	4.71	5.43	13,900	B.
June	252	76	175	3.65	4.07	10,400	A.
July	42	7	32.0	.667	.69	1,970	C.
August	10	10	10.0	.208	.24	615	C.
September	20	10	10.7	.223	.25	637	C.
October	14	10	11.2	.233	.27	689	C.
November	34	10	19.5	.406	.45	1,160	B.
December	52	20	27.7	.577	.66	1,700	B.
The year	440	7	124	2.58	35.09	90,000	

LITTLE TRUCKEE RIVER AT STARR, CAL.

Little Truckee River rises on the eastern slope of the Sierra Nevada, in northwestern Nevada County, Cal., flows north, then east, and then south, and unites with the Truckee at the town of Boca, Cal.

The gaging station, which is located at Starr, Cal., about 5 miles north of Boca, the nearest post office, was established June 25, 1903, at Bruhn's mill, or Pine station, on the Boca & Loyalton Railroad, was removed to its present site on January 1, 1908, and was discontinued October 22, 1910. The flow is practically the same at both places.

The station is below all tributaries except Dry Creek, and furnished data necessary to determine the quantity of water available for storage at Independence and Webber lakes and along the course of the stream and also for power development.

A new inclined gage was established August 3, 1909, with a datum 1 foot lower than that of the original gage. The creek freezes during parts of the winter.

Discharge measurements are made from a cable and car.

Daily discharge for April 18, 19, and 29, May 5 and 6, and June 3, 4, and 5, 1909, as published in Water-Supply Paper 270, should be reduced 100 second-feet, as an error was found in values published for these dates.

This station was maintained by the United States Reclamation Service.

Discharge measurements of Little Truckee River at Starr, Cal., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 24	F. C. Schafer	86	124	2.60	519
Aug. 27	do	32	14.6	.70	13
Sept. 22[a]	T. W. Norcross	40	23	.77	20
Dec. 15	D. S. Stuver	40	38.4	1.33	81.8

[a] Wading measurement.

Daily gage height, in feet, of Little Truckee River at Starr, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	2.25	2.45	1.9	2.85	2.85	2.5	1.3	0.7	0.65	0.8
2	2.2	2.35	1.85	2.95	2.75	2.55	1.2	.75	.65	.8
3	2.1	2.5	1.95	2.9	2.75	2.45	1.2	.7	.7	.8
4	2.1	2.65	2.0	2.8	2.6	2.4	1.2	.75	.7	.8
5	2.05	2.95	2.1	2.75	2.45	2.2	1.15	.7	.7	.8
6	2.3	3.1	2.1	2.95	2.45	2.05	1.05	.7	.7	.8
7	2.2	3.2	2.2	2.95	2.55	2.0	1.05	.7	.65	.8
8	2.1	2.95	2.3	3.05	2.75	1.95	1.0	.7	.7	.8
9	1.95	3.1	2.3	3.1	2.9	1.85	1.0	.7	.7	.8
10	1.95	2.75	2.4	3.15	3.0	1.85	1.0	.7	.7	.8
11	1.95	2.65	2.5	3.05	3.0	1.9	1.0	.75	.65	.85
12	1.95	2.7	2.55	2.95	3.0	1.8	.95	.75	.7	.9
13	2.05	2.55	2.6	3.0	2.95	1.65	.95	.7	.7	.9
14	2.05	2.5	2.7	2.9	2.9	1.7	.95	.7	.75	.8
15	2.0	2.1	2.6	2.95	2.75	1.7	.95	.7	.8	.85
16	2.1	2.4	2.55	2.95	2.75	1.7	.9	.7	1.05	.85
17	2.25	2.75	2.65	3.0	2.7	1.65	.9	.7	.9	.85
18	2.3	2.65	2.9	3.1	2.7	1.65	1.0	.7	.8	.85
19	2.4	2.45	3.75	3.25	2.7	1.6	1.0	.7	.8	.8
20	2.3	2.7	3.6	3.35	2.55	1.55	1.0	.7	.8	.8
21	2.4	2.85	3.05	3.2	2.55	1.55	.85	.7	.8	.8
22	2.4	2.8	2.85	3.2	2.65	1.5	.85	.7	.8	.8
23	2.4	2.55	2.7	3.2	2.65	1.55	.85	.65	.8	.....
24	2.5	2.5	2.5	3.25	2.7	1.45	.85	.65	.8	.....
25	2.4	2.5	2.35	3.3	2.65	1.4	.8	.65	.8	.....
26	2.8	2.0	2.55	3.35	2.55	1.45	.85	.65	.8	.....
27	2.7	2.5	2.4	3.35	2.5	1.4	.8	.65	.8	.....
28	2.7	2.2	2.35	3.45	2.6	1.25	.8	.65	.8	.....
29	2.65	.....	2.35	3.1	2.35	1.30	.75	.65	.8	.....
30	2.7	.....	2.6	3.05	2.35	1.30	.8	.7	.8	.....
31	2.65	.....	2.7	.....	2.5	.....	.75	.7	.....	.....

Daily discharge, in second-feet, of Little Truckee River at Starr, Cal., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	342	433	211	641	641	457	72	13	11	19
2	321	386	196	698	586	482	58	16	11	19
3	281	457	228	669	586	433	58	13	13	19
4	281	533	244	613	507	409	58	16	13	19
5	262	698	281	586	433	321	52	13	13	19
6	364	790	281	698	433	262	41	13	13	19
7	321	855	321	698	482	244	41	13	11	19
8	281	698	364	759	586	228	36	13	13	19
9	228	790	364	790	669	196	36	13	13	19
10	228	586	409	822	728	196	36	13	13	19
11	228	533	457	759	728	211	36	16	11	23
12	228	559	482	698	728	180	32	16	13	27
13	262	482	507	728	698	140	32	13	13	27
14	262	457	559	669	669	152	32	13	16	19
15	244	281	507	698	586	152	32	13	19	23
16	281	409	482	698	586	152	27	13	41	23
17	342	586	533	728	559	140	27	13	27	23
18	364	533	669	790	559	140	36	13	19	23
19	409	433	1,240	888	559	128	36	13	19	19
20	364	559	1,130	956	482	118	36	13	19	19
21	409	641	759	855	482	118	23	13	19	19
22	409	613	641	855	533	107	23	13	19	19
23	409	482	559	855	533	118	23	11	19	.....
24	457	457	457	888	559	98	23	11	19	.....
25	409	457	386	922	533	88	19	11	19	.....
26	613	244	482	956	482	98	23	11	19	.....
27	559	457	409	956	457	88	19	11	19	.....
28	559	321	386	1,030	507	65	19	11	19	.....
29	533	.....	386	790	386	72	16	11	19	.....
30	559	.....	507	759	386	72	19	13	19	.....
31	533	.....	559	.....	457	.....	16	13	.....	.....

Monthly discharge of Little Truckee River at Starr, Cal., for 1910.

[Drainage area, 166 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	613	228	366	2.20	2.54	22,500	D.
February	855	244	526	3.17	3.30	29,200	D.
March	1,240	196	484	2.92	3.37	29,800	B.
April	1,030	586	782	4.71	5.26	46,500	B.
May	728	386	552	3.33	3.84	33,900	B.
June	482	65	189	1.14	1.27	11,200	B.
July	72	16	33.5	.202	.23	2,060	A.
August	16	11	12.9	.078	.09	793	B.
September	41	11	17.0	.102	.11	1,010	B.
Oct. 1-22	.....	.....	19.7	.119	.10	898	B.
The period	.....	.....	.....	.....	.....	178,000	

WARNER LAKE BASIN.

GENERAL FEATURES.

The Warner Lake basin includes a chain of lakes and marshes extending in a general north and south direction between two high escarpments in the southeastern portion of Lake County. The waters of these lakes flow from south to north. The total drop between the

water surface of Crump and Bluejoint lakes, as determined in 1911, was about 11 feet. There is almost no point where a well-defined channel or an appreciable velocity of current can be found, the greatest concentrated drop being at the lower end of Hart Lake. The lakes in the southern end of the valley are therefore fresh, while those at the northern end are alkaline. The larger lakes in the area from south to north are Crump Lake, Hart Lake, Flagstaff Lake, and Bluejoint Lake. The general elevation of the water surface is about 4,550 feet.

The total area topographically tributary to Warner Lake comprises 2,100 square miles, of which 360 lie in the valley. Practically the entire run-off is contributed by an area of about 600 square miles in the south and west edges of the basin.

The principal perennial streams in this basin are Twentymile Creek, flowing from the south, Deep Creek (formerly called Warner Creek), and Honey Creek, flowing from the west. These streams rise on the eastern slope of the Warner Mountains, a range which extends southward into California.

Deep Creek is the most important, and its run-off is the best maintained during the summer. Honey Creek and Twentymile Creek each appear to furnish about half as much water as Deep Creek. In addition to these, a number of intermittent streams enter from both sides of the valley, of which Rabbit Creek, which drains an area north of Honey Creek, is perhaps the most important. Protected by the high ridges that border it on both sides, this valley has reached a fairly high stage of agricultural development. At the base of the hills bordering the western shores of Hart and Crump lakes are a number of prosperous ranches whose products include fruit, grains, and nearly all agricultural crops. The water of all three streams is largely used for irrigation, both in their upper reaches and in the valley. Any additional irrigation development will require construction of storage reservoirs on their headwaters.

Around the west side and north end of the valley is a large area of agricultural land which is now growing sagebrush. The Warner Lake Irrigation Co. has a preliminary contract for the reclamation of these lands under the provision of the Carey Act. Its plans contemplate the pumping of water from Hart Lake or Flagstaff Lake by hydroelectric power developed on the lower portion of Deep Creek, where the stream passes over an escarpment and has a large concentrated fall. The low-water flow of the stream will be augmented by storage in Big Valley, a large marsh lying near its headwaters at an elevation of over 1,000 feet above Warner Valley.

A number of springs, some of them thermal, issue along the edge of the escarpment on both sides of the valley. On the west side these are found in a belt extending about 10 miles north and 3 miles south

of Adel. On the east side they are limited to 3 or 4 miles near the line between Tps. 37 and 38 S. The water of these springs is used for irrigation, and some of them probably discharge nearly a second-foot.

TWENTYMILE CREEK NEAR WARNER LAKE, OREG.

Twentymile Creek rises in Oregon near the California boundary line and flows eastward and northward into the marsh at the head of Warner Valley. About midway its course it receives Twelvemile Creek, which drains an area in California and Nevada considerably larger than that directly tributary to the main stream. Cowhead Lake, which lies just north of the low divide between the headwaters of Twelvemile Creek and the streams which drain southward to Surprise Valley, receives the water of Eightmile Creek and drains northward into Twelvemile Creek. This lake can probably be used as a storage reservoir by diverting the water of the other streams into it.

The gaging station, which is located about 2 miles above Warner Lake post office, in sec. 25, T. 40 S., R. 23 E., and below all tributaries, was established March 1, 1910.

Except for a small amount of water diverted in two ditches just above, the total run-off from the drainage area is shown by the records.

The first gage (lower gage) was installed at the bridge, where the readings were affected by the operation of a dam below after April 19. The second or present staff gage, established June 3, 1910, at a new datum (upper gage), is located about one-fourth mile above the bridge and above a fall in the stream. The datum of the second gage has probably changed since it was installed.

Discharge measurements are made from the highway bridge and by wading.

Records derived from observations at the lower gage are rendered somewhat uncertain by the effect of the dam and by the diurnal fluctuation normal to the early spring. Records obtained at the upper gage are more reliable, except between measurements made July 8 and September 30, when a change in datum of about 0.3 foot is assumed to have occurred. The most probable date of occurrence of this change is believed to be September 16.

Discharge measurements of Twentymile Creek near Warner Lake, Oreg., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
	LOWER GAGE.				
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 1	Warner Lake Irrigation Co	127	455	4.80	2,610
7	....do	61	229	1.80	396
10	....do	57	212	1.60	328
24	....do	53	139	1.30	157
24	....do	54	146	1.40	179
May 19	Stevens and Allen	59	150	[a] 1.73	55
	UPPER GAGE.				
May 19	Stevens and Allen	59	150	1.62	55
June 13	Warner Lake Irrigation Co	50	105	1.30	33
14[b]	....do	23	32	.85	19
23[b]	....do	22	10.8	.48	11.6
July 8[b]	....do	6.3	4.4	.11	5.7
Sept. 30[b]	Allen and Davenport	20	96	.12	3.9

[a] Gage height affected by backwater from dam. [b] Measured by wading.

Daily gage height, in feet, of Twentymile Creek near Warner Lake, Oreg., for 1910.

[Warner Lake Irrigation Co., observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	4.8	1.2	.....	.....	+0.2	0.0	−0.1	0.1	0.2	0.5
2	.....	.....	4.2	.....	.....	.....	+ .2	.0	− .1	.1	.2	.4
3	.....	.....	3.0	.....	.....	1.3	.05	.0	− .1	.2	.2	.7
4	.....	.....	2.3	1.1	.....	1.2	.05	.0	− .1	.2	.2	1.0
5	.....	.....	2.2	1.0	.....	1.2	.05	.0	− .1	.2	.2	.7
6	.....	.....	1.9	1.1	.....	1.15	.2	.0	− .1	.2	.2	.5
7	.....	.....	1.8	1.1	.....	1.1	.1	.0	− .1	.2	.2	.5
8	.....	.....	1.7	1.2	.....	1.05	.1	.0	.0	.2	.2	.7
9	.....	.....	1.7	1.1	.....	.95	.1	− .1	.0	.2	.4	2.3
10	.....	.....	1.7	1.1	.....	.9	.05	− .15	− .05	.2	.4	4.1
11	.....	.....	1.8	1.1	.....	.9	− .1	− .15	− .05	.2	.4	2.4
12	.....	.....	1.7	1.1	.....	.9	− .1	− .15	− .05	.2	.5	1.7
13	.....	.....	1.7	1.1	.....	.85	− .15	− .1	− .05	.2	.3	1.0
14	.....	.....	1.6	1.0	.....	.8	− .05	− .1	− .05	.2	.3	.8
15	.....	.....	1.6	1.0	.....	.8	.0	− .15	− .05	.2	.3	.7
16	.....	.....	1.7	1.0	.....	.8	.1	− .1	.2	.2	.3	.6
17	.....	.....	1.8	1.0	.....	.8	.05	− .1	.05	.2	.3	.6
18	.....	.....	1.7	1.1	.....	.7	− .05	− .1	.05	.2	.3	.6
19	.....	.....	1.9	1.1	.....	.65	− .05	− .1	.1	.2	.3	.6
20	.....	.....	1.8	.....	.....	.6	.2	− .2	.1	.2	.3	.6
21	.....	.....	1.7	.....	.....	.5	.1	− .2	.2	.2	.3	.6
22	.....	.....	1.7	.....	.....	.5	.05	− .1	.2	.2	.5	.6
23	.....	.....	1.5	.....	.....	.5	.0	− .1	.1	.2	.6	.6
24	.....	.....	1.3	.....	.....	.4	.0	− .2	.1	.2	.7	.6
25	.....	.....	1.4	.....	.....	.4	.0	− .2	.1	.2	.8	.6
26	.....	.....	1.4	.....	.....	.35	.0	− .2	.1	.2	.5	.5
27	.....	.....	1.4	.....	.....	.35	.0	− .2	.1	.2	.5	.5
28	.....	.....	1.2	.....	.....	.3	.1	− .2	.1	.2	.4	.5
29	.....	.....	1.1	.....	.....	.25	.1	− .1	.1	.2	.4	.5
30	.....	.....	1.2	.....	.....	.25	.05	− .1	.1	.2	.5	.5
31	.....	.....	1.1	.....	.....	.....	.0	− .1	.....	.2	.....	.5

NOTE.—Readings for March and April made at the bridge (lower) gage; those beginning in June at the upper gage. Readings on bridge gage after Apr. 19 discarded, as they indicate backwater from the diversion dam below. Probably no ice at this station during period covered by records. Readings for Mar. 1 and 2 may have been made in the afternoon and are probably higher than the true daily mean.

Daily discharge, in second feet, of Twentymile Creek near Warner Lake, Oreg., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1			2,610	134	112	36	7	5	4	3	4	9
2			2,020	134	99	35	7	5	4	3	4	7
3			1,020	134	99	34	5.5	5	4	4	4	13
4			600	115	99	30	5.5	5	4	4	4	19
5			550	98	87	30	5.5	5	4	4	4	13
6			432	115	73	28	7	5	4	4	4	9
7			396	115	62	26	6	5	4	4	4	9
8			362	134	62	24	6	5	5	4	4	13
9			362	115	62	22	6	4	5	4	7	120
10			362	115	91	20	5.5	3.5	4.5	4	7	486
11			380	115	91	20	4	3.5	4.5	4	7	134
12			350	115	80	20	4	3.5	4.5	4	9	54
13			350	115	80	19	3.5	4	4.5	4	5	19
14			300	98	80	18	4.5	4	4.5	4	5	15
15			300	98	70	18	5	3.5	4.5	4	5	13
16			330	98	70	18	6	4	4	4	5	11
17			350	98	62	18	5.5	4	2.5	4	5	11
18			320	115	55	16	4.5	4	2.5	4	5	11
19			390	115	55	15	4.5	4	3	4	5	11
20			340	148	55	14	7	3	3	4	5	11
21			310	126	55	12	6	3	4	4	5	11
22			310	118	50	12	5.5	4	4	4	9	11
23			260	118	48	12	5	4	3	4	11	11
24			156	118	48	10	5	3	3	4	13	11
25			180	129	48	10	5	3	3	4	15	11
26			180	139	48	9	5	3	3	4	9	9
27			180	132	48	9	5	3	3	4	9	9
28			134	123	46	8	6	3	3	4	7	9
29			115	109	42	7.5	6	4	3	4	7	9
30			134	118	38	7.5	5.5	4	3	4	9	9
31			115	.....	37	.....	5	4	.....	4	.....	9

NOTE.—Daily discharge determined as follows: Mar. 1 to 10, from a fairly well defined discharge rating curve; Mar. 11 to 23, by indirect method for shifting channels; Mar. 24 to Apr. 19, from a poorly defined curve; Apr. 20 to June 2, by means of a hydrograph drawn through the measurement of May 19 and following the rise and fall of Deep Creek near Adel; June 3 to Sept. 15, from a curve well defined above 5 second-feet; Sept. 16 to Dec. 31, from a rating curve well defined (by measurement of Sept. 30, 1910, and measurements in 1911) between 3 and 600 second-feet.

Determinations for the early part of March, especially the first two days, are liable to considerable error, resulting from reading the gage but once daily during a time when there was considerable diurnal fluctuations normal to the early spring.

Monthly discharge of Twentymile Creek near Warner Lake, Oreg., for 1910.

[Drainage area, 126 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Mean per square Mile.	Depth in inches.	Total in acre-feet.	
March	2,610	115	458	3.63	4.18	28,200	C.
April	148	98	118	.936	1.04	7,020	C.
May	112	37	66.2	.525	.61	4,070	C.
June	36	7.5	18.6	.148	.17	1,110	B.
July	7	3.5	5.44	.043	.05	334	B.
August	5	3	3.97	.032	.04	244	C.
September	4.5	2.5	3.73	.030	.03	222	C.
October	4	3	3.94	.031	.04	242	B.
November	15	4	6.53	.052	.06	389	B.
December	486	7	35.5	.282	.33	2,180	B.
The period	.....	.....	.....	.....	.....	44,000	

DEEP CREEK[1] AT ADEL, OREG.

Deep Creek rises on the east slope of the high escarpment that lies just east of the Goose Lake Valley, and flows eastward into the marshes that form the upper portion of Warner Valley. The mountains at its headwaters reach an elevation of over 7,000 feet.

Its principal tributaries are Camas Creek, which enters from the north just above the escarpment, and Drake Creek, a small stream just below Camas. Mud, Blue, and Sagehen Creeks are tributaries of Camas Creek. There are reservoir sites on Deep Creek at Big Valley, on Camas Creek with dam site below Mud Creek, and at Crane Lake on Crane Creek, a tributary of Sagehen Creek.

The gaging station, which is located at Adel, in the SE. ¼ NW. ¼ sec. 21, T. 39 S., R. 24 E., below all tributaries, was established May 11, 1909.

Several small ditches divert water for irrigation near the headwaters of the stream. Two or three thousand acres are watered by natural flooding in Big Valley and Crane Lake, but much of the water thus diverted probably returns to the stream. Five ditches take out within 6 or 8 miles above the station and divert water around it to irrigate several hundred acres of land. The combined capacity of these ditches is about 30 second-feet. Measurements of their combined discharge were made in June, 1910, and April and July, 1911, and gave 25, 20, and 18 second-feet respectively.

The staff gage (upper gage) is located about 500 feet above the bridge and above a series of rapids; its datum has remained unchanged. A second gage (lower gage) was established by the Warner Lake Irrigation Co., February 28, 1910, at the bridge and read about 7 weeks.

Discharge measurements are made from the county bridge 300 yards north of Adel post office and by wading. Below the bridge the grade of the stream is very flat, and the water is diverted into the M–C. ditch by means of a temporary dam, which is repaired at the beginning of each irrigation season. The upper gage is out of the influence of this dam, but the relation of gage height to discharge at the lower gage location is liable to be disturbed by changes in and operation of this dam.

The relation between gage heights and discharge is affected by ice during periods of extreme cold weather, and occasionally by ice jams.

Conditions at this station are fairly good, although a diurnal fluctuation during the spring renders the determination of the mean gage height rather difficult.

The station is maintained in cooperation with the Warner Lake Irrigation Co., which has furnished part of the gage heights and discharge measurements.

[1] Formerly called Warner Creek.

Discharge measurements of Deep Creek at Adel, Oreg., for 1909–10.

UPPER GAGE.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1909.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 12	R. B. Post	49	183	4.30	510
Dec. 5	do	30	80	3.52	129
1910.					
Mar. 1	Warner Lake Irrigation Co	119	473	7.80	3,340
May 19	Stevens and Allen	57	179	3.85	206
June 3	Warner Lake Irrigation Co	40	156	3.50	127
June 14[a]	do	27	29	3.10	59
July 8[a]	do	23	18.7	2.81	11.3
Sept. 29[a]	Allen and Davenport	23	19.4	2.87	14.9

[a] Measured by wading.

Daily gage height, in feet, of Deep Creek at Adel, Oreg., for 1910.

UPPER GAGE.

[J. J. Van Keulen, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.2	.....	6.8	4.4	4.4	3.5	2.85	2.7	2.8	2.85	2.9	3.25
2	3.6	.....	7.3	4.4	4.3	3.5	2.8	2.7	2.8	2.85	2.9	3.3
3	3.6	.....	5.65	4.1	4.3	3.5	2.8	2.7	2.8	2.85	2.9	3.55
4	3.9	.....	5.3	4.1	4.3	3.4	2.8	2.7	2.8	2.85	2.9	3.55
5	3.8	.....	5.4	4.1	4.2	3.35	2.8	2.7	2.8	2.85	2.9	3.5
6	3.6	.....	4.9	4.3	4.1	3.3	2.8	2.7	2.8	2.9	2.9	3.3
7	3.6	.....	4.9	4.4	4.0	3.3	2.8	2.7	2.8	2.9	2.9	3.4
8	3.4	3.1	4.7	4.5	4.0	3.3	2.8	2.7	2.8	2.9	3.0	3.55
9	3.3	3.1	4.6	4.5	4.0	3.2	2.8	2.7	2.8	2.9	3.2	3.5
10	3.2	3.1	4.5	4.5	4.2	3.1	2.8	2.7	2.8	2.9	3.2	4.3
11	3.2	3.0	4.5	4.5	4.2	3.1	2.8	2.7	2.8	2.9	3.0	4.55
12	3.2	3.0	4.7	4.5	4.1	3.1	2.8	2.7	2.8	2.9	3.2	4.8
13	3.3	3.0	4.8	4.5	4.1	3.1	2.8	2.8	2.8	2.9	3.3	4.8
14	3.3	3.0	4.9	4.4	4.1	3.1	2.8	2.8	2.8	2.9	3.05	4.35
15	3.3	3.0	4.9	4.4	4.0	3.1	2.7	2.8	2.8	2.9	2.95	4.0
16	3.3	3.0	5.0	4.4	4.0	3.1	2.7	2.8	2.9	2.9	3.0	3.35
17	3.2	3.0	5.0	4.5	3.9	3.1	2.7	2.8	2.9	2.9	3.1	3.1
18	3.2	2.9	5.1	4.5	3.9	3.1	2.7	2.7	2.9	2.9	3.0	3.05
19	3.2	2.9	5.0	4.5	3.8	3.1	2.7	2.7	2.9	2.9	3.0	3.4
20	3.1	2.9	5.0	4.7	3.8	3.05	2.7	2.75	2.9	2.9	3.0	3.35
21	3.1	2.9	5.0	4.55	3.8	3.0	2.9	2.75	2.9	2.9	3.1	3.3
22	3.5	2.9	5.0	4.5	3.8	3.0	2.9	2.75	2.9	2.9	3.1	3.3
23	8.8	3.0	4.9	4.5	3.7	3.0	2.8	2.75	2.9	2.9	3.25	3.25
24	.....	3.0	4.5	4.5	3.7	3.0	2.8	2.75	2.9	2.9	3.4	3.45
25	.....	3.2	4.5	4.55	3.7	3.0	2.7	2.75	2.9	2.9	3.35	3.35
26	.....	3.1	4.4	4.6	3.7	3.0	2.7	2.75	2.9	2.9	3.2	3.2
27	.....	3.1	4.4	4.55	3.7	3.0	2.7	2.75	2.9	2.9	3.05	3.15
28	.....	4.4	4.3	4.5	3.65	2.9	2.7	2.75	2.9	2.9	3.1	3.25
29	.....	.....	4.2	4.4	3.6	2.85	2.7	2.75	2.9	2.9	3.0	3.3
30	.....	.....	4.2	4.45	3.5	2.85	2.7	2.75	2.85	2.9	3.25	3.25
31	.....	.....	4.2	.....	3.5	.....	2.7	2.75	.....	2.9	.....	3.2

NOTE.—Gage heights probably raised by ice Jan. 2–9. Gage carried out by flood and ice jam Jan. 23 and replaced by observer Feb. 8. Creek somewhat obstructed by ice Feb. 8 to 14, after which obstruction not probable. Gage heights Feb. 28 to Mar. 2 are the mean of several readings a day. The highest stage reached was 9.0 feet at 6 p. m. Mar. 2. Subsequent readings were made about noon each day when the creek was at about its lowest stage in the diurnal cycle, and are therefore not fairly representative of the daily mean.

Discharge measurements of Deep Creek at Adel, Oreg., for 1910.

LOWER GAGE.

Date.	Time.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
			Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 1	8 a. m.	Warner Lake Irrigation Co	60	248	3.45	1,630
1	6.30 p. m.	do	119	473	6.50	3,340
3	5 p. m.	do	97	377	5.10	2,290
4	8 a. m.	do	60	187	2.80	1,080
4	5 p. m.	do	58	265	4.00	1,550
5	8 a. m.	do	60	184	2.80	1,070
7	do	do	53	136	1.70	667
7	5 p. m.	do	57	156	2.00	836
8	7.40 a. m.	do	55	139	1.60	676
10	8 a. m.	do	55	104	.50	468

Daily gage height, in feet, of Deep Creek at Adel, Oreg., for 1910.

LOWER GAGE.

[Warner Lake Irrigation Co., observer.]

Day.	Feb.	Mar.	Apr.	Day.	Feb.	Mar.	Apr.	Day.	Feb.	Mar.	Apr.
1		5.0	1.2	11		1.6	1.4	21		2.5	
2		5.2	1.2	12		1.7	1.4	22		1.9	
3		5.1	.8	13		1.7	1.4	23		1.7	
4		2.8	.9	14		1.9	1.3	24		1.6	
5		4.0	1.0	15		2.0	1.2	25		1.4	
6		2.4	1.0	16		1.8	1.1	26		1.3	
7		2.0	1.1	17		2.0	1.1	27		1.3	
8		2.2	1.4	18		2.2	1.3	28	1.1	1.2	
9		1.6	1.4	19		2.8	1.5	29		1.1	
10		.5	1.4	20		2.7	1.4	30		1.0	
								31		1.0	

NOTE.—Gage heights observed on bridge gage probably affected by backwater from the diversion dam below after about Apr. 1; time of observation not known, but it probably varied from day to day.

Daily discharge, in second-feet, of Deep Creek at Adel, Oreg., for 1909–10.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1						600	130	13	5	23	35	370
2						700	130	13	5	23	86	122
3						750	130	8	5	23	50	122
4						750	86	8	5	23	35	122
5						750	86	8	18	23	35	99
6						650	130	8	13	23	50	99
7						550	130	8	5	23	42	99
8						510	107	8	8	13	35	122
9						470	86	8	8	13	50	199
10						430	86	8	8	13	35	145
11					550	430	86	8	8	13	35	122
12					510	430	66	8	13	13	23	122
13					510	430	66	5	13	13	13	171
14					510	430	66	5	13	13	13	99
15					510	390	50	5	13	13	13	80
16					470	390	50	5	13	13	35	80
17					470	350	35	5	13	13	50	80
18					470	310	35	5	13	13	35	61
19					510	350	23	5	13	13	66	61
20					510	390	23	5	13	18	750	61
21					550	310	23	5	13	18	1,700	61
22					510	270	23	5	13	18	1,100	80
23					510	240	13	5	13	13	1,800	80
24					390	240	13	5	13	13	1,610	80
25					390	210	13	5	13	13	1,020	99

Daily discharge, in second-feet, of Deep Creek at Adel, Oreg., for 1909–10—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
26	.....	.....	.....	.....	470	210	13	5	13	13	490	99
27	.....	.....	.....	.....	650	182	13	5	13	13	410	99
28	.....	.....	.....	.....	700	182	13	5	23	13	330	99
29	.....	.....	.....	.....	600	156	13	5	23	13	330	80
30	.....	.....	.....	.....	470	130	13	5	23	13	370	80
31	.....	.....	.....	.....	510	.....	13	5	.....	18	.....	61
1910.												
1	61	60	2,020	410	410	122	14	7	11	14	18	70
2	61	50	2,400	410	370	122	11	7	11	14	18	80
3	61	40	1,580	295	370	122	11	7	11	14	18	134
4	61	30	1,280	295	370	99	11	7	11	14	18	134
5	61	30	1,080	295	330	90	11	7	11	14	18	122
6	61	25	771	370	295	80	11	7	11	18	18	80
7	61	25	766	410	260	80	11	7	11	18	18	99
8	61	20	671	450	260	80	11	7	11	18	30	134
9	61	20	588	450	260	61	11	7	11	18	61	122
10	61	20	484	450	330	44	11	7	11	18	61	370
11	61	25	565	450	330	44	11	7	11	18	30	470
12	61	25	622	450	295	44	11	7	11	18	61	590
13	80	25	648	450	295	44	11	11	11	18	80	590
14	80	30	702	410	295	44	11	11	11	18	37	390
15	80	30	718	410	260	44	7	11	11	18	24	260
16	80	30	712	410	260	44	7	11	18	18	30	90
17	61	30	742	450	229	44	7	11	18	18	44	44
18	61	18	802	450	229	44	7	7	18	18	30	37
19	61	18	875	450	199	44	7	7	18	18	30	99
20	44	18	855	540	199	37	7	9	18	18	30	90
21	44	18	822	470	199	30	18	9	18	18	44	80
22	122	18	728	450	199	30	18	9	18	18	44	80
23	2,500	30	672	450	171	30	11	9	18	18	70	70
24	1,000	30	565	450	171	30	11	9	18	18	99	110
25	800	61	540	470	171	30	7	9	18	18	90	90
26	600	44	508	490	171	30	7	9	18	18	61	61
27	400	44	508	470	171	30	7	9	18	18	37	52
28	300	410	478	450	158	18	7	9	18	18	44	70
29	200	.....	448	410	145	14	7	9	18	18	30	80
30	100	.....	438	430	122	14	7	9	14	18	70	70
31	80	.....	438	.....	122	.....	7	9	.....	18	.....	61

NOTE.—Daily discharge, except as noted, based on readings of the upper gage as published. Discharge May 11 to Nov. 20, 1909, determined from a discharge rating curve fairly well defined above 50 second-feet; curve is based on one measurement in May and the form of the curve for the period following, but it gives results consistent with the daily discharge for low water of 1910. Discharge from Nov. 21, 1909, to Dec. 31, 1910, determined from a rating curve well defined between 10 and 1,500 second-feet.

Special methods used as follows: Jan. 2 to 9, discharge interpolated because of ice; Jan. 23, estimated, because of ice jam, at about one-half of open channel discharge; Jan. 24 to Feb. 7 estimated, assuming that creek fell rather rapidly after the high water; Feb. 8 to 13, estimate reduced on account of ice; Mar. 1 to 10, discharge taken from a hydrograph drawn by plotting as coordinates with time the discharge corresponding to gage readings on the upper gage and the measurements made by engineers of the Warner Lake Irrigation Co., probably represents the daily mean fairly well; Mar. 11 to 31, mean discharge determined from the two sets of gage readings on upper and bridge gage.

The maximum discharge recorded, 4,950 second-feet, at 6 p. m. Mar. 2, 1910.

Monthly discharge of Deep Creek at Adel, Oreg., for 1909 and 1910.

[Drainage area, 272 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Mean per square mile.	Depth in inches.	Total in acre-feet.	
1909.							
May 11–31	700	390	513	1.89	1.48	21,400	B.
June	750	130	406	1.49	1.66	24,200	B.
July	130	13	56.9	.209	.24	3,500	B.
August	13	5	6.48	.024	.03	398	C.
September	23	5	12.2	.045	.05	726	C.
October	23	13	15.9	.058	.07	978	B.
November	1,800	13	355	1.31	1.46	21,100	C.
December	370	61	108	.397	.46	6,640	C.
The period						78,900	
1910.							
January	2,500	44	240	0.882	1.02	14,800	D.
February	410	18	43.7	.161	.17	2,430	C.
March	2,400	438	807	2.97	3.42	49,600	C.
April	540	295	428	1.57	1.75	25,500	B.
May	410	122	247	.908	1.05	15,200	B.
June	122	14	53.0	.195	.22	3,150	B.
July	18	7	9.77	.036	.04	601	B.
August	11	7	8.42	.031	.04	518	B.
September	18	10	15.0	.055	.06	893	B.
October	18	14	17.4	.064	.07	1,070	B.
November	99	18	42.1	.155	.17	2,510	B.
December	590	37	156	.574	.66	9,590	B.
The year	2,500	7	174	.636	8.67	126,000	

HONEY CREEK NEAR PLUSH, OREG.

Honey Creek drains a high area lying between the escarpments that border the valleys of Warner Lake and Lake Abert. The main stream rises on the north slope of Crooks Peak. Snyder Creek from the north and Twelvemile Creek from the south are its principal tributaries. McDowell Creek is a tributary of Twelvemile. Storage is available on Snyder Creek, and water can be diverted into the reservoir from the upper portion of Honey Creek.

The gaging station, which is located at the mouth of the canyon 1 mile above the bridge in the SW. ¼ sec. 20, T. 36 S., R. 24 E. was established May 13, 1909, at a wagon bridge one-fourth mile north of Plush in NE. ¼ sec. 29 of the same township. It is below all tributaries.

The gage first used was a vertical staff fastened to the wagon bridge, and measurements were made from the bridge, but the gage heights were affected by a temporary dam used below the station to divert water into an irrigation ditch, and on February 24, 1910, a new gage was installed at the present site by the Warner Lake Irrigation Co. Since the new station was established the datum of the gage has remained unchanged.

At high and ordinary stages discharge measurements are made from a cable at the gage; at extreme low stages measurements are made by wading.

The records at the new site show the total run-off of the creek except for a small amount of water used for the irrigation of a few hundred acres on the headwaters of the stream and are fairly reliable, although the accuracy is vitiated by diurnal fluctuations which have been only partly covered by gage readings.

Discharge measurements of Honey Creek near Plush, Oreg., for 1910.

Date.	Time.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
			Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Feb. 24	6 a. m.	Warner Lake Irrigation Co	88	318	6.30	2,240
25	10 a. m.	do	24	38	1.50	125
25	4 p. m.	do	41	60	2.00	204
26	11.40 a. m.	do	20	22	.70	64
26	3 p. m.	do	22	31	1.30	91
26	5 p. m.	do	22	38	1.40	104
Mar. 2	1 p. m.	do	64	191	4.00	702
2	5 p. m.	do	65	176	4.30	933
5	6 p. m.	do	37	72	2.40	243
8	3.20 p. m.	do	26	41	1.50	129
9	9.30 a. m.	do	23	39	1.50	116
12	9.45 a. m.	do	25	46	1.60	128
May 19		Stevens and Allen	18	28	+ .65	39
June 11		Warner Lake Irrigation Co	15	11.6	− .10	13.0
July 18		do	6	1.15	− .46	.94
Oct. 1		Allen and Davenport	14	3.5	− .38	1.9

Daily gage height, in feet, of Honey Creek near Plush, Oreg., for 1910.

[C. E. Oliver, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1			5.2	1.5	1.7	0.3	−0.4			−0.4	−0.25	2.4
2			4.5	1.5	1.7	.25	− .4			− .35	− .2	
3			3.5	1.4	1.65	.25	− .4			− .35	− .15	2.3
4			3.0	1.4	1.6	.25	− .4			− .35		2.35
5			2.2	1.5	1.5	.2	− .3			− .35	− .2	2.2
6			2.2	1.4	1.3	.2	− .3			− .35	− .2	2.2
7			2.0	1.5	1.2	.2	− .35			− .35	− .15	2.15
8			1.8	1.7	1.0	.2	− .4			− .35	− .1	2.05
9			1.5	2.0	.8	.1	− .4			− .35	− .1	2.1
10			1.5	2.2	1.4	0	− .45			− .35		2.15
11			1.6	2.2	1.3	− .1	− .5			− .35	− .05	2.05
12			1.6	2.0	1.2	− .2	− .4			− .35	− .05	1.9
13			2.8	1.8	1.1	− .2	− .45			− .35	.3	1.9
14			1.8	1.8	1.1	− .1	− .4			− .35	.35	1.85
15			1.8	1.9	1.0	− .1	− .4			− .3	.35	1.85
16			2.0	2.0	.9	− .2	− .45			− .3	.6	1.7
17			2.0	1.9	.8	− .2				− .3	.65	1.55
18	4.3		2.1	1.8	.8	− .2				− .3	.7	1.45
19	4.4		2.2	1.8	.7	− .25				− .3	.8	1.45
20	4.5		2.6	1.8	.75	− .25					.9	1.4
21	4.5		2.1	1.8	.9	− .25				− .3	1.4	1.35
22	8.15		1.9	1.7	.8	− .25				− .3	1.7	1.35
23	8.6		1.8	1.7	.65	− .2				− .3	1.8	1.2
24		3.6	1.7	1.8	.6	− .2				− .3	2.05	1.2
25		2.6	1.6	1.8	.7	− .25				− .3	2.4	1.05
26		1.4	1.4	1.8	.6	− .25				− .3	2.7	.9
27		1.6	1.3	1.9	.5	− .3					2.6	.8
28		3.9	1.2	1.9	.4	− .3				− .35	2.65	
29			.9	1.8	.3	− .3				− .35	2.6	
30			1.1	1.8	.3	− .3					2.5	
31			1.3		.3					− .35		− .2

NOTE.—Bridge gage read Jan. 1 to Apr. 16, gage in poor condition and flow affected by ice part of the time; gage heights can not be used except for period Jan. 18 to 23.

Gage at the mouth of the canyon read from Feb. 24. Gage heights Feb. 24 to Mar. 5 taken from a hydrograph plotted from both the direct readings on the upper gage and the readings on the lower gage reduced to corresponding heights on the upper by means of a curve of relation. Gage heights beginning Mar. 6 represent one reading daily; no observations July 17 to Sept. 30. Gage heights for portions of November and December somewhat questionable. Probably no ice at the upper gage during the period of records.

Daily discharge, in second-feet, of Honey Creek near Plush, Oreg., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	20	30	1,540	120	150	20	2	.....	.....	2	4	278
2	20	30	1,060	120	150	18	2	.....	.....	2.5	5	268
3	20	30	600	108	142	18	2	.....	.....	2.5	6	258
4	20	30	470	108	134	18	2	.....	.....	2.5	6	268
5	20	30	234	120	120	16	3	.....	.....	2.5	5	238
6	20	30	238	108	97	16	3	.....	.....	2.5	5	238
7	20	30	200	120	86	16	2.5	.....	.....	2.5	6	228
8	20	30	166	150	66	16	2	.....	.....	2.5	7	209
9	20	30	120	200	50	12	2	.....	.....	2.5	7	218
10	20	30	120	238	108	9	1.5	.....	.....	2.5	8	228
11	30	30	134	238	97	7	1	.....	.....	2.5	8	209
12	30	30	134	200	86	5	2	.....	.....	2.5	8	183
13	30	30	372	166	76	5	1.5	.....	.....	2.5	20	183
14	30	30	166	166	76	7	2	.....	.....	2.5	22	174
15	30	30	166	183	66	7	2	.....	.....	3	22	174
16	30	30	200	200	58	5	1.5	.....	.....	3	36	150
17	30	30	200	183	50	5	1.5	.....	.....	3	40	127
18	30	30	218	166	50	5	1.5	.....	.....	3	43	114
19	30	30	238	166	43	4	1.5	.....	.....	3	50	114
20	50	30	322	166	46	4	1.5	.....	.....	3	58	108
21	100	30	218	166	58	4	1.5	.....	.....	3	108	102
22	1,000	30	183	150	50	4	1.5	.....	.....	3	150	102
23	1,200	30	166	150	40	5	1.5	.....	.....	3	166	86
24	800	1,030	150	166	36	5	1.5	.....	.....	3	209	86
25	500	407	134	166	43	4	1.5	.....	.....	3	278	71
26	300	120	108	166	36	4	1.5	.....	.....	3	346	58
27	200	150	97	183	30	3	1.5	.....	.....	3	322	50
28	100	884	86	183	25	3	1.5	.....	.....	2.5	334	39
29	50	.....	58	166	20	3	1.5	.....	.....	2.5	322	28
30	50	.....	76	166	20	3	1.5	.....	.....	2.5	300	16
31	50	.....	97	.....	20	.....	1.5	.....	.....	2.5	.....	5

NOTE.—Daily discharge Feb. 24 to Dec. 31 determined from a fairly well defined discharge rating curve. Daily discharge Feb. 24 to Mar. 5—a period of great diurnal fluctuation—determined by applying the rating table to gage heights taken at 3-hour intervals from a hydrograph and using the mean of the 8 determinations of discharge as the discharge for the day. This method gives results considerably larger than those obtained by applying the rating table to the mean of the gage heights.

Daily discharge for high-water period in January determined by assuming a discharge of 30 second-feet for the gage reading of Jan. 19 on the lower gage, and extending a curve through this point parallel to the curve derived from the relation of the gages in February and March; values Jan. 22 and 23 reduced arbitrarily for assumed affect of ice jam; discharge was further assumed to have fallen rather rapidly.

Mean discharge for Feb. 1 to 23 estimated at 30 second-feet.

Daily discharge July 17 to Sept. 30 estimated at 1.5 second-feet.

Monthly discharge of Honey Creek near Plush, Oreg., for 1910.

[Drainage area, 232 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Mean per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1910.							
January	1,200	20	157	0.677	0.78	9,650	D.
February	1,030	30	117	.504	.52	6,500	C.
March	1,540	58	267	.115	1.33	16,400	C.
April	238	108	163	.703	.78	9,700	C.
May	150	20	68.7	.296	.34	4,220	B.
June	20	3	8.4	.036	.04	500	B.
July	3	1.5	1.8	.0078	.009	111	B.
August	.....	.....	a 1.5	.0064	.007	92	D.
September	.....	.....	a 1.5	.0064	.007	89	D.
October	3	2	2.7	.012	.01	166	B.
November	346	4	76.7	.331	.37	4,560	C.
December	278	5	149	.642	.74	9,160	D.
The year	1,540	1.5	89.5	.386	4.93	61,100	

a Estimated.

MISCELLANEOUS STATIONS IN WARNER VALLEY.

A number of gaging stations were established by the Warner Lake Irrigation Co. in June, 1910, on Deep and Honey creeks and their tributaries, and records obtained for about six weeks. The records of the measurements and gage heights have been furnished by the company, but discharges have been computed by the United States Geological Survey.

Miscellaneous discharge measurements in Warner Lake drainage basin in 1910.

[By Warner Lake Irrigation Co.]

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
June 14	Deep Creek	Crump Lake	At Big Valley, NE. ¼ sec. 4, T. 40 S., R. 22 E.	1.43	52.3
July 7	do	do	do	.93	16.6
June 16	Camas Creek	Deep Creek	Above Mud Creek, Sec. 6, T. 39 S., R. 22 E.	.96	2.5
26	do	do	do	.91	1.4
17	Mud Creek	Camas Creek	Sec. 32, T. 38 S., R. 22 E	1.09	10.0
July 8	do	do	do	.88	5.9
June 15	Blue Creek	do	do	.44	2.7
15	Drake Creek	Deep Creek	Sec. 9, T. 39 S., R. 23 E	1.13	10.0
24	do	do	do	1.12	8.8
20	Honey Creek	Hart Lake	Above Snyder Creek, sec. 13, T. 36 S., R. 22 E.	.58	3.2

Daily gage height, in feet, and discharge, in second-feet, of streams in Warner Valley, Oreg., for 1910.

	Deep Creek at Big Valley.				Camas Creek above Mud Creek.				Mud Creek near mouth.			
	June.		July.		June.		July.		June.		July.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1			1.04	22			0.88	1.0			0.94	6.9
2			1.02	21			.87	.8			.92	6.6
3			1.00	20			.87	.8			.91	6.4
4			.98	19			.86	.7			.90	6.2
5			.96	18			.86	.7			.89	6.1
6			.95	18			.85	.6			.88	5.9
7			.93	17			.85	.6			.88	5.9
8			.91	16			.85	.6			.87	5.8
9			.90	16			.85	.6			.87	5.8
10			.90	16			.85	.6			.87	5.8
11			.89	16			.85	.6			.87	5.8
12			.89	16			.85	.6			.87	5.8
13			.88	15			.85	.6			.86	5.6
14			.87	15			.85	.6			.86	5.6
15	1.43	53	.87	15	1.00	3.6	.85	.6	1.10	10.2	.86	5.6
16	1.40	50	.86	14	.96	2.6	.85	.6	1.10	10.2	.86	5.6
17	1.38	48	.85	14	.96	2.6	.85	.6	1.09	10.0	.85	5.5
18	1.35	45	.84	14	.95	2.4	.84	.5	1.09	10.0	.85	5.5
19	1.30	40	.83	13	.94	2.2	.84	.5	1.08	9.8	.85	5.5
20	1.28	38	.82	13	.93	1.9	.84	.5	1.08	9.8	.85	5.5
21	1.26	37	.80	12	.93	1.9			1.07	9.5		
22	1.22	34	.79	12	.92	1.7			1.06	9.3		
23	1.20	32	.78	11	.92	1.7			1.06	9.3		
24	1.19	31	.78	11	.91	1.4			1.05	9.1		
25	1.17	30			91	1.4			1.04	8.9		

Daily gage height, in feet, and discharge, in second-feet, of streams in Warner Valley, Oreg., for 1910—Continued.

	Deep Creek at Big Valley.				Camas Creek above Mud Creek.				Mud Creek near mouth.			
	June.		July.		June.		July.		June.		July.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
26	1.15	29			0.90	1.2			1.02	8.4		
27	1.12	27			.90	1.2			1.00	8.0		
28	1.10	26			.89	1.1			.99	7.8		
29	1.08	25			.89	1.1			.97	7.5		
30	1.06	24			.89	1.1			.95	7.1		
Mean		35.5		14.8		1.82		0.64		9.06		5.87
Run-off in acre-feet		1,130		705		57.6		25.4		2.87		2.33

	Blue Creek near mouth.				Drake Creek near mouth.				Honey Creek above Snyder Creek.			
	June.		July.		June.		July.		June.		July.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1			0.41				1.11	8			0.64	4.7
2			.41				1.11	8			.64	4.7
3			.40				1.11	8			.63	4.5
4			.40				1.10	7			.63	4.5
5			.40				1.10	7			.62	4.2
6			.40				1.10	7			.61	4.0
7			.40				1.10	7			.60	3.8
8			.41				1.10	7			.59	3.6
9			.41				1.10	7			.58	3.4
10			.41				1.10	7			.58	3.4
11			.42				1.10	7			.57	3.2
12			.42				1.10	7			.56	3.0
13			.42				1.10	7			.55	2.8
14			.43				1.10	7			.54	2.6
15	0.44		.43		1.13	10	1.10	7	0.60	3.8	.53	2.4
16	.44		.43		1.13	10	1.10	7	.60	3.8	.52	2.2
17	.44		.44		1.13	10	1.10	7	.60	3.8	.50	1.8
18	.44		.45		1.13	10	1.10	7	.60	3.8	.50	1.8
19	.44		.45		1.13	10	1.10	7	.60	3.8	.49	1.6
20	.43		.45		1.13	10	1.10	7	.58	3.4	.48	1.4
21	.43		.45		1.13	10	1.10	7	.60	3.8	.48	1.4
22	.43		.45		1.13	10	1.10	7	.61	4.0	.48	1.4
23	.43				1.12	9	1.10	7	.62	4.2	.47	1.3
24	.42				1.12	9			.63	4.5		
25	.42				1.12	9			.64	4.7		
26	.42				1.12	9			.65	4.9		
27	.42				1.12	9			.65	4.9		
28	.42				1.12	9			.65	4.9		
29	.42				1.11	8			.65	4.9		
30	.42				1.11	8			.65	4.9		
Mean						9.5		7.1		4.26		2.94
Run-off in acre-feet						301		330		135		134

ABERT LAKE BASIN.

GENERAL FEATURES.

Abert Lake is a strongly alkaline body of water lying near the central part of Lake County at an elevation of 4,210 feet above sea level. It has a surface area of 60 square miles and a tributary basin of 926 square miles. The waters are supplied mostly by Chewaucan River and its tributaries, Coyote and Crooked creeks.

Chewaucan River rises on the high divide in the southern part of Lake County and flows northward into Chewaucan Marsh, through which it meanders in a southeasterly direction and flows into Abert Lake at its southern extremity.

The principal agricultural development in the basin consists of the hay lands in the Chewaucan Marsh and the area of irrigated lands bordering the marsh on the south and along Chewaucan River in the vicinity of Paisley.

An irrigation project is being developed under the Carey Act which will water about 12,000 acres just north of Paisley with water stored on the upper portion of Chewaucan River. The development of this project, however, has been hindered by certain water-right claims of the owners of hay lands in Chewaucan Marsh. The general practice here has been to flood the lands during the spring and winter to a depth of several feet. As all the waters are claimed for this flooding, no development work can proceed until the water rights have been settled. There is undoubtedly sufficient water for all interests if it is wisely used.

CHEWAUCAN RIVER AT PAISLEY, OREG.

This station, which is located in the SE. ¼ sec. 23, T. 33 S., R. 18 E., one-fourth mile upstream from Paisley, was established January 4, 1905. On account of insufficient funds observations were suspended from January 1, 1908, to January 17, 1909.

Near the station are several irrigation ditches. George Conn's ditch, which heads about 2½ miles above the station, diverts water around the gage. Conn's mill ditch diverts water from the left bank 250 feet below the gage, where a low timber dam has been constructed. This dam increases the gage heights artificially, but it is fairly permanent, and the accuracy of the records is not greatly affected by it. A short distance below Conn's mill ditch the Brattain ditch diverts water from the right bank. It follows the foothills for many miles down the river valley, and its water is used to irrigate land immediately around Paisley and large areas of hay land in Chewaucan marsh.

The gage is a vertical staff on the right bank.

Discharge measurements are made from a cable 60 feet below the gage.

The left bank is high; the right bank is low and will overflow at high stages for a distance of 500 feet or more.

Discharge measurements of Chewaucan River at Paisley, Oreg., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 3	L. R. Allen	43	108	5.59	423
16	do	41	86	5.06	260
Sept. 26[a]	Allen and Davenport	34	42.4	3.74	38.4
26[a]	do	34	43	3.74	38.3

[a] Measured by wading.

Daily gage height, in feet, of Chewaucan River at Paisley, Oreg., for 1910.

[Miss Lula Banister, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	4.9	7.6	5.5	6.1	4.4	.....	.....	.....	3.7	3.9	3.9
2	.....	4.6	6.2	5.4	5.8	4.3	.....	.....	.....	3.7	3.9	4.0
3	.....	4.4	6.9	5.2	5.6	4.3	.....	.....	.....	4.1	3.9	4.5
4	.....	4.4	6.8	5.3	5.5	4.3	.....	.....	.....	4.2	3.9	.....
5	.....	4.5	6.2	5.5	5.5	4.3	.....	.....	.....	4.0	3.9	4.0
6	.....	4.5	6.0	5.6	5.4	4.2	.....	.....	.....	3.8	3.9	3.9
7	.....	4.4	5.5	5.7	5.4	4.2	.....	.....	.....	3.8	.....	3.8
8	.....	4.4	5.4	5.9	5.3	4.1	.....	.....	.....	3.8	3.9	3.8
9	.....	4.5	5.4	6.1	5.3	4.1	.....	.....	.....	3.8	3.9	4.0
10	.....	4.4	5.5	6.0	5.4	4.0	.....	.....	.....	3.8	4.1	4.5
11	6.4	4.4	5.5	6.0	5.3	4.0	.....	.....	.....	3.7	4.2	4.4
12	6.4	4.5	5.4	6.1	.....	4.0	.....	.....	.....	3.7	4.2	4.4
13	6.5	4.5	5.4	6.0	5.3	4.0	.....	.....	.....	3.7	4.2	4.0
14	6.4	4.6	5.4	5.3	5.2	4.0	.....	.....	.....	3.7	4.0	3.9
15	6.4	4.6	5.5	5.2	5.1	4.0	.....	.....	.....	3.7	3.9	3.8
16	6.5	4.3	5.4	6.0	5.0	4.0	.....	.....	.....	3.7	3.9	3.8
17	6.4	4.4	5.7	6.0	5.0	4.0	.....	.....	.....	3.6	4.0	3.8
18	6.4	4.5	5.8	6.0	5.0	4.0	.....	.....	.....	3.6	4.0	3.8
19	6.5	4.4	5.9	6.3	5.0	3.9	.....	.....	.....	3.6	4.0	.....
20	6.7	4.4	6.0	6.3	5.0	3.9	.....	.....	.....	3.7	4.0	.....
21	7.9	4.4	6.0	6.3	4.9	3.9	.....	.....	.....	3.7	4.0	3.8
22	9.1	4.5	5.2	6.4	4.8	3.9	.....	.....	.....	3.7	4.2	3.9
23	7.8	4.4	6.1	6.3	4.8	3.9	.....	.....	.....	3.8	4.5	4.1
24	6.6	4.5	6.1	6.3	4.8	3.9	.....	.....	.....	3.8	.....	4.0
25	6.6	4.7	5.2	6.4	4.8	3.9	.....	.....	.....	3.8	4.1	.....
26	6.6	4.6	5.9	6.3	.....	3.9	.....	.....	3.7	3.9	4.1	.....
27	6.4	4.6	5.7	6.4	4.6	3.9	.....	.....	.....	3.9	4.1	3.8
28	6.1	4.6	5.6	6.5	4.6	3.9	.....	.....	.....	3.9	4.2	3.8
29	5.2	.....	5.4	6.5	4.5	.....	.....	.....	.....	3.9	4.2	3.8
30	4.8	.....	5.5	6.6	4.4	.....	.....	.....	.....	3.9	4.0	3.8
31	5.0	.....	5.5	.....	4.4	.....	.....	.....	.....	3.9	.....	3.8

NOTE.—Heavy ice jam below gage Jan. 1 to about Feb. 1; ice was not taken out by the rise of Jan. 20 to 23, but it became gradually thinner; ice 9 inches thick Feb. 5 and 6 inches thick Feb. 10; ice went out Feb. 16. Relation between gage height and discharge probably not appreciably affected by ice in December.

Readings suspended June 29 to Sept. 30 as gage could not be read easily.

Gage heights for 1910 may have been slightly affected by the raising of a dam which diverts water into a mill canal about 250 feet below the gage.

Daily discharge, in secona-feet, of Chewaucan River at Paisley, Oreg., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	154	1,530	387	616	120	.....	.....	.....	35	54	54
2	.....	125	662	355	495	104	.....	.....	.....	35	54	65
3	.....	96	1,050	295	421	104	.....	.....	.....	77	54	137
4	.....	102	992	325	387	104	.....	.....	.....	90	54	100
5	.....	116	662	387	387	104	.....	.....	.....	65	54	65
6	.....	116	573	421	355	90	.....	.....	.....	44	54	54
7	.....	102	387	457	355	90	.....	.....	.....	44	54	44
8	.....	108	355	533	325	77	.....	.....	.....	44	54	44
9	.....	123	355	616	325	77	.....	.....	.....	44	54	65
10	.....	108	387	573	355	65	.....	.....	.....	44	77	137
11	.....	120	387	573	325	65	.....	.....	.....	35	90	120
12	.....	137	355	616	325	65	.....	.....	.....	35	90	120
13	.....	137	355	573	325	65	.....	.....	.....	35	90	65
14	.....	156	355	325	295	65	.....	.....	.....	35	65	54
15	.....	156	387	295	268	65	.....	.....	.....	35	54	44
16	.....	104	355	573	243	65	.....	.....	.....	35	54	44
17	.....	120	457	573	243	65	.....	.....	.....	27	65	44
18	.....	137	495	573	243	65	.....	.....	.....	27	65	44
19	.....	120	533	712	243	54	.....	.....	.....	27	65	44
20	104	120	573	712	243	54	.....	.....	.....	35	65	44
21	457	120	573	712	220	54	.....	.....	.....	35	65	44
22	1,180	137	295	764	197	54	.....	.....	.....	35	90	54
23	495	120	616	712	197	54	.....	.....	.....	44	137	77
24	156	137	616	712	197	54	.....	.....	.....	44	104	65
25	156	176	295	764	197	54	.....	.....	.....	44	77	54
26	156	156	533	712	176	54	.....	.....	35	54	77	54
27	220	156	457	764	156	54	.....	.....	.....	54	77	44
28	220	156	421	818	156	54	.....	.....	.....	54	90	44
29	90	.....	355	818	137	50	.....	.....	.....	54	90	44
30	77	.....	387	874	120	50	.....	.....	.....	54	65	44
31	137	.....	387	.....	120	.....	.....	.....	.....	54	.....	44

NOTE.—Daily discharge determined from a discharge rating curve well defined between 35 and 1,000 second-feet. Mean discharge Jan. 1 to 19 estimated at 70 second-feet. Ice obstruction Jan. 20 to Feb. 10 estimated from the observer's notes; daily discharge for this period only approximate.

Monthly discharge of Chewaucan River, at Paisley, Oreg., for 1910.

[Drainage area, 272 square miles.]

Month	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Mean per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	1,180	[a]70	154	0.566	0.65	9,470	D.
February	156	96	129	.474	.49	7,160	C.
March	1,530	355	521	1.92	2.21	32,000	A.
April	874	295	584	2.15	2.40	34,800	A.
May	616	120	279	1.03	1.19	17,200	A.
June	120	.....	69.8	.257	.29	4,150	A.
July	.....	.....	[b]35.0	.129	.15	2,150	C.
August	.....	.....	[b]23.0	.085	.10	1,410	D.
September	.....	.....	[b]35.0	.129	.14	2,080	C.
October	90	27	45.0	.165	.19	2,770	A.
November	90	54	71.3	.262	29	4,240	A.
December	137	44	63.1	.232	.27	3,880	B.
The year	1,530	.....	168	.617	8.37	121,000	

[a] Estimated. [b] Estimated by comparison with records for previous years.

SUMMER LAKE BASIN.

GENERAL FEATURES.

Summer Lake is a strongly alkaline body of water with a surface area of about 70 square miles, at an elevation of 4,300 feet above sea level. The water is derived largely from Ana River, a stream 7 miles long, which heads in five large springs on the northern border of the valley. These springs supply a continuous flow of about 145 second-feet. The water has a nearly constant temperature of 65°.

The water surface of the upper spring is 39.3 feet above normal water surface in Summer Lake; the water surface of the fifth or lower spring is 7.5 feet above that of Summer Lake. Below the second spring an attempt has been made to raise the water by an earth dam sufficiently high to divert it into a ditch for the irrigation of lands on the right or south side of the stream. This dam will raise the water 58 feet. The project is being developed by persons owning desert claims in the vicinity.

The agricultural development in this basin is limited to a narrow strip lying at the foot of a high escarpment along the western shore of Summer Lake. This narrow strip is the most favored section in central Oregon and in it agriculture has been practiced extensively since 1848. The escarpment is effective protection against the cold winds from the west and north, which in passing over make an eddy drawing the warm air of the lake over the lands and serving to equalize the temperature. The region has long been famous for its fruit. Apples, pears, peaches, cherries, and berries of all kinds are grown in abundance.

Along the eastern shore of the lake and extending eastward into the wide valley adjoining Chewaucan marsh is a large area of agricultural land, a portion of which could undoubtedly be watered from Ana River and another portion from Chewaucan River.

ANA RIVER NEAR SUMMER LAKE, OREG.

This station, which is located near the head of Ana River, in the NW. ¼ SE. ¼ sec. 6, T. 30 S., R. 17 E., about 6 miles northwest of the town of Summer Lake, Oreg., was established March 28, 1905. No continuous observations of gage heights were obtained until January 14, 1909. It was found, however, that fluctuations in the gage heights were caused by temporary diversion dams in the stream about 3 miles below the gage. Discharge measurements indicate that the flow is practically constant and equal to 145 second-feet. On this account observations of gage heights were suspended February 9, 1910.

The following measurement was made by Allen and Davenport:

September 25, 1910: Width, 27 feet; area, 68 square feet; gage height, 3.95 feet; discharge, 141 second-feet.

SILVER LAKE BASIN.

GENERAL FEATURES.

Silver Lake is a body of fresh water approximately 15 square miles in area, at an elevation of 4,340 feet. The western, southern, and eastern borders of the lake consist of high escarpments; to the northwest is Pauline marsh.

Silver Creek, Bridge Creek, and Bear Creek flow from Yamsay and Hagar mountains northward into Pauline marsh and thence southeastward into Silver Lake.

The water surface in the lake fluctuates considerably. During a succession of high-water years the water rises sufficiently to overflow into Thorn Lake and cover a small portion of the desert to the east. This fact perhaps accounts for the freshness of the lake. After a succession of dry years the lake surface diminishes and the waters become more and more alkaline until freshened again by another overflow.

The principal agricultural development at the present consists of hay lands in Pauline marsh and small irrigated tracts bordering the streams. During recent years all land suitable for agriculture has been taken as homesteads, and dry farming has been practiced with more or less success.

To the northeast and practically connected with Summer Lake drainage basin is Christmas Lake Valley, a flat alluvial area comprising 300,000 acres. This valley has no surface streams, but contains two or three small lakes. Alkaline Flat, near the northeastern part of the valley, is an intermittent lake; south of it Christmas Lake is a perennial body of water, at an elevation of 4,296 feet. North of Christmas Lake is Fossil Lake, and in the extreme southwestern portion and practically connected with Silver Lake basin is Thorn Lake. Nearly all the lands of Christmas Lake Valley have been taken as homesteads. Dry farming is practiced extensively and good crops of grain and potatoes and other crops have been raised. Water for domestic purposes is found in comparatively shallow wells. Near the eastern border of the valley, however, wells 40 feet in depth have encountered salt water.

SILVER CREEK NEAR SILVER LAKE, OREG.

This station, which is located 1½ miles southwest of Silver Lake post office, in sec. 28, T. 28 S., R. 14 E., was established December 29, 1904, abandoned March 31, 1907, for lack of funds, and reestablished January 11, 1909.

The gage is an inclined staff on the right bank. The elevation of the gage has been verified from time to time by means of a bench mark near it at elevation 18.12. The gage was found in April,

1910, to have been raised from the true position, and some of the 1909 gage readings are therefore liable to error.

Discharge measurements are made from a cable near the gage.

The bed and banks of the stream are fairly permanent. The country through which the creek flows is more or less arid, and the natural summer flow of nearly all the streams is appropriated for present irrigation requirements. Any additional development will require storage. Several fairly good storage sites are available on Silver Creek, and below it lie areas of agricultural land that could easily be irrigated from stored waters.

The conditions at the station are favorable for good results and the records are believed to be reliable.

Discharge measurements of Silver Creek near Silver Lake, Oreg., for 1909–10.

Date:	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1909.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 28	R. B. Post	45	94	3.48	292
Dec. 12	do	17	26	[b]1.29	42
1910.					
Apr. 29	L. R. Allen	23	38	1.64	78
Sept. 24[a]	Allen and Davenport	20	19.2	.70	14.9
Nov. 22	R. W. Davenport	19	21.1	.81	21.4

[a] Measured by wading at regular section.
[b] This gage height supersedes that published in Water-Supply Paper 270, p. 179.

Daily gage height, in feet, of Silver Creek near Silver Lake, Oreg., for 1909.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		1.7	11		1.2	21		1.2
2		1.55	12		1.2	22		1.4
3		1.55	13		1.15	23		1.55
4		1.25	14		1.1	24	5.5	1.45
5		1.25	15		1.2	25	5.05	1.55
6		1.3	16		1.5	26	4.75	1.25
7		1.25	17		1.5	27	4.2	1.2
8		1.8	18		1.5	28	1.9	.9
9		1.25	19		1.15	29	2.0	1.0
10		1.2	20		1.15	30	2.05	1.2
						31		1.15

Daily gage height, in feet, of Silver Creek near Silver Lake, Oreg., for 1910.

[J. H. Gowdy, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.05	1.45	3.15	2.6	1.75	1.0	0.9	0.75	0.7	0.7	0.7	1.0
2	.9	2.4	3.9	2.1	1.7	.95	.9	.75	.7	.7	.7	1.0
3	1.9	2.75	4.75	2.1	1.7	.95	.9	.75	.7	.7	.7	1.1
4	2.3	2.8	4.35	2.05	1.7	.9	.85	.75	.7	.7	.7	1.05
5	2.1	2.95	3.9	2.5	1.6	.9	.85	.75	.7	.7	.7	1.05
6	1.5	2.75	4.25	2.6	1.5	.9	.8	.75	.7	.7	.7	1.0
7	1.0	2.6	4.7	2.6	1.5	.9	.8	.75	.7	.7	.7	1.0
8	.9	2.1	4.65	3.4	1.5	.9	.8	.7	.7	.7	.75	1.0
9	.9	1.45	2.95	4.0	1.45	.9	.8	.7	.7	.7	.85	1.0
10	.9	1.25	4.65	4.05	1.4	.9	.8	.7	.7	.7	.85	1.0
11	.9	1.35	5.05	3.15	1.3	.9	.8	.7	.7	.7	.9	.95
12	.9	1.6	3.8	2.6	1.25	.9	.8	.7	.7	.75	.8	.95
13	.95	1.65	3.85	2.6	1.2	.9	.8	.7	.7	.75	.8	.9
14	.9	1.65	3.95	2.4	1.15	.9	.75	.7	.7	.75	.8	.85
15	.9	1.15	3.9	2.3	1.15	.9	.75	.7	.7	.75	.8	.85
16	.9	1.35	4.0	2.3	1.15	.9	.75	.7	.75	.7	.75	.85
17	.9	1.35	3.95	2.3	1.15	.9	.75	.7	.75	.7	.75	.85
18	.95	1.55	4.0	2.4	1.1	.9	.75	.7	.95	.7	.7	.85
19	.9	1.7	4.35	2.3	1.1	.9	.75	.7	1.0	.7	.7	.8
20	.95	1.65	4.15	2.2	1.1	.85	.75	.7	1.2	.7	.7	.8
21	1.0	1.6	4.1	2.2	1.1	.85	.75	.7	1.05	.7	.7	.8
22	3.05	1.45	3.8	2.2	1.1	.85	.75	.7	1.0	.7	.7	.75
23	2.5	1.25	3.4	2.0	1.1	.85	.75	.7	.9	.7	.7	.75
24	2.3	3.6	3.15	2.0	1.05	.85	.75	.7	.8	.7	.7	.75
25	2.2	1.25	2.65	1.9	1.05	.85	.75	.7	.7	.7	.7	.75
26	2.05	1.35	3.15	1.9	1.0	.85	.75	.7	.7	.7	.7	.7
27	1.6	1.15	2.75	1.95	1.0	.85	.75	.7	.7	.7	.8	.7
28	1.6	1.55	2.5	1.9	1.0	.85	.75	.7	.7	.7	.8	.65
29	1.45	.....	2.5	1.65	1.0	.85	.75	.7	.7	.7	.85	.6
30	1.6	.....	2.65	1.65	1.0	.85	.75	.7	.7	.7	.9	.6
31	1.55	.....	2.5	.....	1.0	.....	.75	.7	.....	.7	.....	.6

NOTE.—Gage heights Nov. 24 to Dec. 31, 1909, supersede those for the same period published in Water-Supply Paper 270, p. 179; gage was found to be in error Apr. 29, 1910, and was corrected. The best evidence indicates that the change occurred about the time of the flood of November, 1909, and hence gage heights are uncertain Nov., 1909, to Apr. 29, 1910. Creek probably frozen Jan. 1 to Feb. 1, 1910. Rise Feb. 2 to 8 caused by an ice jam; probably no ice after this except a little during the latter part of December.

On Apr. 29, 1910, the gage was found to have been moved from its true elevation and was corrected; gage heights prior to this date have been corrected but are somewhat uncertain.

Daily discharge, in second-feet, of Silver Creek near Silver Lake, Oreg., for 1909–10.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1	.....	24	29	199	177	48	19	15	15	13	15	80
2	.....	22	24	210	210	41	19	13	13	13	13	68
3	.....	56	38	245	257	41	19	11	13	15	13	68
4	.....	56	64	147	352	48	22	11	13	13	13	44
5	.....	68	52	117	368	41	24	11	13	15	13	44
6	.....	64	52	107	269	35	26	13	15	15	11	48
7	.....	52	41	117	221	35	19	11	13	15	11	44
8	.....	41	29	147	188	29	22	11	11	13	11	89
9	.....	41	26	177	188	41	19	11	11	13	13	44
10	.....	29	29	199	167	29	24	11	13	13	13	41
11	.....	15	24	157	147	26	22	11	11	13	13	41
12	.....	24	22	316	107	26	19	13	11	15	11	41
13	.....	26	24	245	107	24	19	13	11	15	13	38
14	.....	26	41	269	107	29	19	11	11	15	22	35
15	.....	24	98	295	98	26	15	11	11	13	29	41
16	30	78	147	309	107	29	13	11	13	15	32	64
17	84	107	167	337	89	29	15	13	11	15	26	48
18	117	102	98	309	64	29	13	11	11	11	29	48
19	107	48	56	257	127	38	13	11	11	11	32	26
20	157	44	60	257	89	35	15	11	13	11	41	26
21	210	35	41	177	89	29	13	13	13	11	72	29
22	147	26	52	157	72	24	15	13	13	11	127	41
23	89	26	41	167	64	24	17	11	13	11	865	52
24	72	26	41	257	64	22	15	11	13	11	652	44
25	44	19	107	221	48	19	15	13	13	11	540	52
26	29	26	117	309	56	22	13	15	15	11	473	32
27	64	24	167	295	56	19	13	15	13	11	368	29
28	38	35	199	257	64	19	13	13	13	13	98	15
29	19	.....	199	210	48	19	15	11	13	11	107	19
30	26	.....	107	182	89	19	15	11	13	11	112	29
31	26	.....	194	.....	48	.....	15	11	.....	13	.....	26
1910.												
1	22	44	227	167	84	29	24	17	15	15	15	29
2	15	50	323	117	80	26	24	17	15	15	15	29
3	80	50	473	117	80	26	24	17	15	15	15	35
4	117	60	394	112	80	24	22	17	15	15	15	32
5	98	60	323	157	72	24	22	17	15	15	15	32
6	48	60	376	167	64	24	19	17	15	15	15	29
7	19	60	462	167	64	24	19	17	15	15	15	29
8	15	60	451	257	64	24	19	15	15	15	17	29
9	15	60	204	337	60	24	19	15	15	15	22	29
10	15	44	451	344	56	24	19	15	15	15	22	29
11	15	52	540	227	48	24	19	15	15	15	24	26
12	15	72	309	167	44	24	19	15	15	17	19	26
13	17	76	316	167	41	24	19	15	15	17	19	24
14	15	76	330	147	38	24	17	15	15	17	19	22
15	15	38	323	137	38	24	17	15	15	17	19	22
16	15	52	337	137	38	24	17	15	17	15	17	22
17	15	52	330	137	38	24	17	15	17	15	17	22
18	17	68	337	147	35	24	17	15	26	15	15	22
19	15	80	394	137	35	24	17	15	29	15	15	19
20	17	76	360	127	35	22	17	15	41	15	15	19
21	19	72	352	127	35	22	17	15	32	15	15	19
22	194	60	309	127	35	22	17	15	29	15	15	17
23	137	44	257	107	35	22	17	15	24	15	15	17
24	117	282	227	107	32	22	17	15	19	15	15	17
25	107	44	172	98	32	22	17	15	15	15	15	17
26	94	52	227	98	29	22	17	15	15	15	15	15
27	56	38	182	102	29	22	17	15	15	15	19	15
28	56	68	157	98	29	22	17	15	15	15	19	13
29	44	.....	157	76	29	22	17	15	15	15	22	11
30	56	.....	172	76	29	22	17	15	15	15	24	11
31	52	.....	157	.....	29	.....	17	15	.....	15	.....	11

NOTE.—Daily discharge determined from a fairly well-defined discharge rating curve. Values for 1909 supersede those published in Water-Supply Paper 270, p. 180.

The following estimates and corrections have been made: Jan. 1 to 16, 1909, discharge estimated 30 second-feet. Gage heights Dec. 16, 1909, to Feb. 1, 1910, reduced 0.2 foot before applying rating curve, to allow for ice obstruction. Discharge Feb. 2 to 8 interpolated on account of ice jam.

Monthly discharge of Silver Creek near Silver Lake, Oreg., for 1909–10.

[Drainage area, 221 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Mean per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1909.							
January	210	19	55.1	0.249	0.29	3,390	C.
February	107	15	41.6	.188	.20	2,310	B.
March	199	22	77.0	.348	.40	4,730	B.
April	337	107	222	1.00	1.12	13,200	B.
May	368	48	133	.602	.69	8,180	B.
June	48	19	27.5	.124	.14	1,640	B.
July	26	13	17.3	.078	.09	1,060	B.
August	15	11	12.0	.054	.06	738	B.
September	15	11	12.5	.057	.06	744	B.
October	15	11	12.8	.058	.07	787	B.
November	865	11	126	.570	.64	7,500	B.
December	80	15	43.4	.196	.23	2,670	C.
The year	865	11	64.9	.294	3.99	46,900	
1910.							
January	194	15	49.4	0.224	0.26	3,040	C.
February	282	38	66.1	.299	.31	3,670	C.
March	473	157	311	1.41	1.63	19,100	C.
April	344	76	150	.679	.76	8,930	B.
May	84	29	46.4	.210	.24	2,850	B.
June	29	22	23.6	.107	.12	1,400	B.
July	24	17	18.5	.084	.10	1,140	B.
August	17	15	15.5	.070	.08	953	B.
September	41	15	18.3	.083	.09	1,090	B.
October	17	15	15.3	.069	.08	941	B.
November	24	15	17.3	.078	.09	1,030	B.
December	35	11	22.2	.100	.12	1,360	B.
The year	473	11	62.8	.284	3.88	45,500	

BRIDGE CREEK NEAR SILVER LAKE, OREG.

Bridge Creek lies between Silver and Bear creeks and is tributary to the latter near the edge of Pauline Marsh.

The gaging station, which is located at the county bridge 2 miles west of Silver Lake, Oreg., in SW. ¼ sec. 20, T. 28 S., R. 14 E., was established January 21, 1905, discontinued July 21, 1906, and reestablished in cooperation with the United States Forest Service September 24, 1910.

The staff gage was established at the same datum as that of the original gage.

Discharge measurements are made by wading near the gage.

The bed of the creek shifts, and the occasional gage readings that have been obtained since the station was reestablished serve only to give a general idea of the behavior of the stream.

Discharge measurements of Bridge Creek near Silver Lake, Oreg., for 1910.

Date.	Hydrographer.	Area of section.	Gage height.	Discharge.
		Sq. ft.	*Feet.*	*Sec.-ft.*
Sept. 24[a]	Allen and Davenport	[a] 0.50	1.60	[a] 0.40
Nov. 22	R. W. Davenport	3.0	1.72	1.40

[a] Estimated.

Daily gage height, in feet, of Bridge Creek near Silver Lake, Oreg., in 1910.

[U. S. Forest Service, observer.]

Oct.	6	1.6
	15	1.6
	22	1.6
Nov.	11	1.7
	17	1.6
	23	1.7
Dec.	3	1.7
	10	1.6
	17[1]	2.3

BEAR CREEK[2] NEAR SILVER LAKE, OREG.

This station, which is located 3 miles southwest of Silver Lake post office, at the county highway bridge, in sec. 17, T. 28 S., R. 14 E., was established January 21, 1905, discontinued July 21, 1906, and reestablished January 11, 1909.

Water is diverted by a dam above the station, and below several brush dams, put in each year, divert water for use in small ditches or for flooding hay lands. The brush dams cause backwater at the gage. Gage heights have been corrected for effect of backwater and daily and monthly discharge records for the whole period of observations are published herewith.

The results obtained from observations at this station are only approximate and chiefly of local interest. The waters of the stream are appropriated during the summer months for irrigation, and have been the cause of considerable litigation.

[1] Creek frozen Dec. 15 to 31.

[2] Locally known as Buck Creek.

Discharge measurements of Bear Creek near Silver Lake, Oreg., in 1905–1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
1905.					
Jan. 24	I. Lande	7	4.6	4.15	14.4
Feb. 23	.....do	11	7.4	4.60	23.6
Mar. 17	.....do	8	5.1	4.00	11.7
May 31	.....do	27	37.0	5.48	50.0
June 15	.....do	28	25.0	5.25	46.0
Aug. 7	.....do	11	8.7	3.90	6.3
Oct. 4	.....do	10	7.0	3.85	5.0
24	.....do	10	6.1	3.92	6.4
Nov. 11	.....do	9	6.4	4.03	6.8
1906.					
Apr. 9	I. Lande	10.5	13	4.48	27
May 29	.....do	17.5	22	4.87	30
June 22	Stevens and Lande	18.7	29	[a]6.23	65
1909.					
Apr. 28	R. B. Post	34	83.4	5.79	39.7
1910.					
Apr. 29	L. R. Allen	34.5	10.6	6.05	56.1
Sept. 24	Allen and Davenport	15	8.15	3.93	6.6
Nov. 22	R. W. Davenport	16.5	11.0	4.09	10.5

[a] Observer's gage reading of 5.35 has been used in computations.

NOTE.—Most of the low-water measurements have been made by wading at different sections.

Daily gage height, in feet, of Bear Creek near Silver Lake, Oreg., for 1905, 1906, 1909, and 1910.

[Cliff Smith, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.[a]												
1	.....	4.1	3.95	4.1	5.0	5.45	5.05	3.9	3.8	3.85	3.9	3.9
2	.....	4.1	4.35	4.0	4.95	5.4	5.0	3.9	3.8	3.85	3.9	3.9
3	.....	4.1	4.55	3.95	4.9	5.45	4.95	3.85	3.8	3.85	3.9	3.9
4	.....	4.1	4.0	3.95	4.9	5.45	4.95	3.85	3.8	3.85	3.9	3.9
5	.....	4.1	4.0	3.95	4.9	5.35	4.9	3.8	3.8	3.85	3.6	3.9
6	.....	4.1	3.95	4.0	4.95	5.25	4.9	3.9	3.8	3.85	3.6	3.9
7	.....	4.1	3.95	4.0	4.95	5.2	4.9	3.9	3.8	3.95	3.8	3.9
8	.....	4.1	3.95	4.0	5.05	5.4	4.85	3.9	3.8	3.95	3.95	3.9
9	.....	4.1	3.95	4.0	5.05	5.4	4.8	3.85	3.8	3.95	4.1	3.9
10	.....	4.1	3.95	4.0	5.0	5.4	4.8	3.85	3.8	3.9	4.1	3.7
11	.....	4.1	3.95	4.0	4.95	5.45	4.8	3.8	3.8	3.9	4.1	3.65
12	.....	4.1	3.95	4.0	5.0	5.45	4.75	3.8	3.8	3.9	4.0	3.65
13	.....	4.1	4.0	4.0	4.95	5.4	4.75	3.8	3.8	3.9	4.0	3.7
14	.....	4.1	4.0	4.85	4.95	5.35	4.8	3.8	3.8	3.9	3.9	3.85
15	.....	4.1	3.95	4.85	5.05	5.3	4.8	3.8	3.8	3.9	3.9	3.9
16	.....	4.1	4.0	4.85	5.25	5.2	4.8	3.85	3.8	3.9	3.9	3.95
17	.....	4.55	4.0	4.85	5.05	5.05	4.8	3.85	3.8	3.9	3.9	3.95
18	.....	4.55	4.0	4.8	5.15	5.05	4.8	3.85	3.75	3.9	3.85	3.95
19	.....	4.5	4.0	4.8	5.15	5.0	4.8	3.85	3.75	3.9	3.75	4.0
20	.....	4.85	4.0	4.8	5.1	4.95	3.9	3.8	3.75	3.9	3.7	4.0
21	4.2	5.0	4.0	4.8	5.0	5.35	3.9	3.8	3.75	3.9	3.7	4.1
22	4.2	4.8	4.0	4.8	4.95	5.35	3.9	3.8	3.75	3.9	3.6	4.1
23	4.2	4.6	4.05	4.75	4.9	5.3	3.9	3.8	3.75	3.9	3.65	4.0
24	4.4	4.4	3.95	4.8	5.0	5.3	3.9	3.8	3.75	3.9	3.7	3.6
25	4.4	4.4	3.95	4.95	5.1	5.25	3.9	3.8	3.75	3.9	3.7	4.0
26	4.2	4.0	3.95	4.9	5.2	5.2	3.9	3.8	3.75	3.9	3.85	4.6
27	4.2	4.1	3.95	4.9	5.4	5.2	3.9	3.8	3.75	3.9	3.85	4.6
28	4.1	4.0	3.95	4.95	5.4	5.3	3.9	3.8	3.75	3.9	3.9	4.2
29	4.1	.....	3.95	4.75	5.4	5.25	3.9	3.8	3.75	3.9	3.9	4.2
30	4.1	.....	3.85	5.0	5.5	5.05	3.9	3.8	3.75	3.9	3.9	4.2
31	4.1	.....	3.75	.....	5.5	.....	3.9	3.8	.....	3.9	.....	4.2

[a] See Water Supply Paper 175, p. 132.

Daily gage height, in feet, of Bear Creek near Silver Lake, Oreg., for 1905, 1906, 1909, and 1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.[a]												
1	4.2	4.2	4.2	4.3	5.1	4.9	5.15	.....	.....	.....	.....	.....
2	4.2	4.2	4.1	4.1	5.2	4.95	5.1	.....	.....	.....	.....	.....
3	4.2	4.0	4.1	4.1	5.3	4.95	5.2	.....	.....	.....	.....	.....
4	4.2	4.0	4.1	4.4	5.35	5.35	5.2	.....	.....	.....	.....	.....
5	4.2	4.0	4.1	4.4	5.4	5.2	5.3	.....	.....	.....	.....	.....
6	4.2	4.0	4.1	4.6	5.4	5.15	5.2	.....	.....	.....	.....	.....
7	4.2	4.2	4.1	4.6	5.45	5.0	5.2	.....	.....	.....	.....	.....
8	4.2	4.2	4.1	4.3	5.5	4.95	5.2	.....	.....	.....	.....	.....
9	4.2	4.2	4.2	4.2	5.6	5.35	5.0	.....	.....	.....	.....	.....
10	4.2	4.2	4.3	4.0	5.8	5.35	5.0	.....	.....	.....	.....	.....
11	4.2	4.2	4.3	4.25	5.9	5.4	5.0	.....	.....	.....	.....	.....
12	4.2	4.2	4.3	4.25	5.65	5.75	4.85	.....	.....	.....	.....	.....
13	4.2	4.2	4.3	4.25	5.4	5.5	4.85	.....	.....	.....	.....	.....
14	4.2	4.2	4.3	4.3	5.4	5.45	4.8	.....	.....	.....	.....	.....
15	4.2	4.2	4.3	4.35	5.3	5.4	4.4	.....	.....	.....	.....	.....
16	4.2	4.2	4.1	4.4	5.3	5.75	4.3	.....	.....	.....	.....	.....
17	4.2	4.2	4.0	4.35	5.2	5.6	4.4	.....	.....	.....	.....	.....
18	4.2	4.4	4.0	4.3	5.1	5.5	4.2	.....	.....	.....	.....	.....
19	4.2	4.4	4.1	4.9	5.0	5.5	4.1	.....	.....	.....	.....	.....
20	4.2	5.0	4.1	5.0	5.2	5.4	.....	.....	.....	.....	.....	.....
21	4.2	5.0	4.1	5.15	5.05	5.4	.....	.....	.....	.....	.....	.....
22	4.2	5.0	4.2	5.2	4.95	5.35	.....	.....	.....	.....	.....	.....
23	4.2	4.4	4.2	5.2	4.7	5.2	.....	.....	.....	.....	.....	.....
24	4.2	4.4	5.15	5.0	4.7	5.2	.....	.....	.....	.....	.....	.....
25	4.2	4.4	5.2	4.95	5.0	5.2	.....	.....	.....	.....	.....	.....
26	4.2	4.4	5.1	4.95	5.1	5.35	.....	.....	.....	.....	.....	.....
27	4.2	4.4	4.6	4.9	5.1	5.5	.....	.....	.....	.....	.....	.....
28	4.2	4.4	4.5	5.0	5.1	5.3	.....	.....	.....	.....	.....	.....
29	4.2	.....	4.4	5.0	5.0	5.05	.....	.....	.....	.....	.....	.....
30	4.2	.....	5.1	5.0	4.85	5.25	.....	.....	.....	.....	.....	.....
31	4.2	.....	4.95	.....	4.9	.....	.....	.....	.....	.....	.....	.....
1909.[b]												
1	.....	4.6	4.1	4.4	5.7	6.1	5.9	3.9	3.8	3.8	3.9	4.6
2	.....	4.4	4.1	4.4	5.7	6.3	5.9	3.9	3.8	3.8	3.9	4.6
3	.....	6.1	4.2	4.5	5.7	6.3	5.9	3.9	3.8	3.8	3.9	4.6
4	.....	4.8	4.3	4.6	5.8	6.3	5.9	3.9	3.8	3.8	3.9	4.6
5	.....	4.5	4.0	4.5	5.9	6.3	5.9	3.9	3.8	3.8	3.9	4.4
6	.....	4.2	4.1	4.5	5.9	6.3	5.9	3.9	3.8	3.8	3.9	4.4
7	.....	4.3	4.1	4.4	5.9	6.2	5.9	3.9	3.8	3.8	3.9	4.6
8	.....	4.3	4.2	4.3	5.9	6.1	5.8	3.9	3.8	3.8	3.9	4.4
9	.....	4.2	4.0	4.3	5.9	6.1	5.8	3.9	3.8	3.8	3.9	4.7
10	.....	4.2	4.0	4.5	5.9	6.1	5.8	3.9	3.8	3.8	3.9	4.6
11	.....	4.3	4.0	4.6	5.9	6.1	5.8	3.9	3.8	3.8	3.9	4.4
12	3.9	4.3	4.0	4.6	5.9	6.1	5.8	3.9	3.8	3.8	3.9	4.4
13	3.9	4.3	4.0	4.6	5.8	6.2	5.7	3.9	3.8	3.8	3.9	4.4
14	3.9	4.2	4.0	4.7	5.8	6.2	5.7	3.9	3.8	3.8	3.9	4.2
15	4.2	4.2	4.6	4.7	5.8	6.2	5.7	3.8	3.8	3.8	3.9	4.0
16	4.7	5.3	4.6	4.7	5.8	6.2	5.7	3.8	3.8	3.8	3.9	4.0
17	5.2	7.5	4.6	5.9	5.9	6.2	5.7	3.8	3.8	3.8	4.0	4.0
18	6.0	5.9	4.1	5.8	5.9	6.2	4.3	3.8	3.8	3.8	4.0	4.0
19	5.7	4.9	4.0	5.8	5.9	6.2	4.2	3.8	3.8	3.8	4.0	4.2
20	7.6	4.5	4.0	5.8	5.9	6.2	4.1	3.8	3.8	3.8	4.3	4.2
21	8.0	4.0	4.0	5.7	5.9	6.2	4.1	3.8	3.8	3.8	4.5	4.2
22	6.2	4.0	4.0	5.7	5.9	6.0	4.1	3.8	3.8	3.8	5.0	4.2
23	6.4	3.9	4.0	5.7	5.9	6.0	4.1	3.8	3.8	3.8	8.4	4.2
24	5.6	4.1	4.0	5.7	5.9	6.0	4.1	3.8	3.8	3.9	7.1	4.2
25	4.9	3.8	4.4	5.7	5.9	6.0	4.0	3.8	3.8	3.9	6.1	4.2
26	4.6	4.0	4.4	5.8	6.0	6.0	4.0	3.8	3.8	3.9	5.4	4.3
27	4.2	4.1	4.3	5.8	6.0	6.0	4.0	3.8	3.8	3.9	5.0	4.3
28	4.6	4.0	4.4	5.8	6.0	5.9	4.0	3.8	3.8	3.9	4.9	4.4
29	4.2	.....	4.6	5.7	6.0	5.9	4.0	3.8	3.8	3.9	4.7	4.5
30	4.1	.....	4.4	5.7	6.0	5.9	4.0	3.8	3.8	3.9	4.6	4.5
31	4.4	.....	4.2	.....	6.1	.....	4.0	3.8	.....	3.9	.....	4.5

[a] See Water-Supply Paper 212, p. 89.
[b] Backwater from irrigation dam April 17 to July 17.

Daily gage height, in feet, of Bear Creek near Silver Lake, Oreg., for 1905, 1906, 1909, and 1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	4.5	5.5	7.7	4.6	5.9	6.0	5.5	.....	.....	.....	.....	.....
2	4.5	5.0	7.5	4.6	6.0	6.0	5.8	.....	.....	.....	.....	.....
3	4.6	4.5	6.0	4.5	6.0	6.0	5.8	.....	.....	.....	.....	4.15
4	4.6	4.4	6.1	4.4	6.0	6.0	5.6	.....	.....	.....	.....	.....
5	4.6	4.4	5.9	4.4	5.9	6.0	5.6	.....	.....	.....	.....	.....
6	4.6	5.0	5.3	4.4	5.8	6.0	5.6	.....	.....	4.05	.....	.....
7	4.6	5.0	5.0	4.4	5.9	5.9	.....	.....	.....	.....	.....	.....
8	4.6	5.0	5.0	4.4	5.9	5.9	.....	.....	.....	.....	.....	.....
9	4.6	4.8	4.8	4.4	6.1	5.9	.....	.....	.....	.....	.....	.....
10	5.0	4.8	4.8	4.5	6.1	5.9	.....	.....	.....	.....	.....	4.15
11	5.0	4.7	4.8	4.5	6.0	5.9	.....	.....	.....	.....	4.35	.....
12	4.4	4.7	4.9	4.5	6.0	5.9	.....	.....	.....	.....	.....	.....
13	4.4	5.7	4.9	4.5	6.0	5.9	.....	.....	.....	.....	.....	.....
14	4.4	7.0	5.0	4.5	6.0	5.9	.....	.....	.....	.....	.....	.....
15	4.4	5.6	5.0	4.5	6.0	5.9	.....	.....	.....	4.05	.....	.....
16	4.4	4.7	5.0	5.8	6.0	5.9	.....	.....	.....	.....	.....	.....
17	4.4	4.5	5.0	5.9	6.0	5.9	.....	.....	.....	.....	4.15	4.15
18	4.4	4.5	5.0	5.9	6.0	5.9	.....	.....	.....	.....	.....	.....
19	4.4	4.5	5.0	6.0	6.0	5.8	.....	.....	.....	.....	.....	.....
20	4.4	4.6	5.1	6.0	6.0	5.8	.....	.....	.....	.....	.....	.....
21	4.4	4.5	5.1	6.0	6.0	5.8	.....	.....	.....	.....	.....	.....
22	4.4	4.5	5.1	6.0	6.0	5.8	.....	.....	.....	4.05	4.1	.....
23	5.0	4.5	5.1	6.0	6.0	5.8	.....	.....	.....	.....	4.15	.....
24	6.8	7.0	5.2	6.0	6.0	5.8	.....	.....	3.93	.....	.....	.....
25	5.2	6.8	5.1	6.1	6.0	5.8	.....	.....	.....	.....	.....	.....
26	5.2	5.9	5.1	6.2	6.0	5.7	.....	.....	.....	.....	.....	.....
27	4.7	5.6	4.9	6.2	6.0	5.7	.....	.....	.....	.....	.....	.....
28	4.7	8.4	4.7	6.1	6.0	5.6	.....	.....	.....	.....	.....	.....
29	4.7	.....	4.7	6.0	6.0	5.5	.....	.....	.....	.....	.....	.....
30	4.7	.....	4.6	6.0	6.0	5.5	.....	.....	.....	.....	.....	.....
31	6.4	.....	4.6	.....	6.0	.....	.....	.....	.....	.....	.....	.....

NOTE.—Creek frozen Jan. 1 to Mar. 1 and during part of December preceding; Feb. 6, ice about 20 inches thick; relation of gage height to discharge probably little affected by ice after the thaw at the end of February.

The rise Apr. 16 was caused by backwater from a temporary brush dam which is placed each year to divert water into canals. The dam was not removed until after records were suspended July 6. No records July 6 to Sept. 24; records after Sept. 24 made by United States Forest Service. The maximum stage was 10.0 feet at 8 p. m. Feb. 24.

Daily discharge, in second-feet, of Bear Creek near Silver Lake, Oreg., for 1905, 1906, 1909, and 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.												
1	.....	12	8	12	19	50	27	6	4	5	6	6
2	.....	12	21	9	17	48	25	6	4	5	6	6
3	.....	12	29	8	17	50	21	5	4	5	6	6
4	.....	12	9	8	17	52	21	5	4	5	6	6
5	.....	12	9	8	17	48	19	4	4	5	2	6
6	.....	12	8	9	19	42	19	6	4	5	2	6
7	.....	12	8	9	19	40	17	6	4	8	4	6
8	.....	12	8	9	25	50	15	6	4	8	4	6
9	.....	12	8	9	25	50	14	5	4	8	5	6
10	.....	12	8	9	23	52	12	5	4	6	6	3
11	.....	12	8	9	21	55	12	4	4	6	7	2.5
12	.....	12	8	9	23	55	9	4	4	6	6	2.5
13	.....	12	9	9	23	52	9	4	4	6	6	3
14	.....	12	9	9	23	52	9	4	4	6	6	5
15	.....	12	8	9	27	50	9	4	4	6	6	6
16	.....	12	9	9	35	45	9	5	4	6	6	6
17	.....	29	9	9	27	35	8	5	4	6	6	6
18	.....	29	9	9	31	35	8	5	3.5	6	5	6
19	.....	27	9	9	31	33	6	5	3.5	6	3.5	6
20	.....	42	9	9	25	31	6	4	3.5	6	3	6

Daily discharge, in second-feet, of Bear Creek near Silver Lake, Oreg., for 1905, 1906, 1909, and 1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.												
21	15	50	9	9	27	48	6	4	3.5	6	3	6
22	15	40	9	9	25	48	6	4	3.5	6	2	6
23	15	31	10	9	23	45	6	4	3.5	6	2.5	6
24	23	23	8	10	27	42	6	4	3.5	6	3	6
25	23	23	8	15	31	40	6	4	3.5	6	3	6
26	15	9	8	14	35	38	6	4	3.5	6	5	7
27	15	12	8	14	45	35	6	4	3.5	6	5	7
28	12	9	8	17	45	40	6	4	3.5	6	6	7
29	12	.....	8	10	48	38	6	4	3.5	6	6	7
30	12	.....	5	19	52	27	6	4	3.5	6	6	7
31	12	.....	4	.....	52	.....	6	4	.....	6	.....	7
1906.												
1	8	8	8	19	31	33	58	.....	.....	.....	.....	.....
2	8	8	6	12	35	35	55	.....	.....	.....	.....	.....
3	8	4	6	12	40	35	60	.....	.....	.....	.....	.....
4	8	4	6	23	45	55	60	.....	.....	.....	.....	.....
5	8	4	6	23	48	48	65	.....	.....	.....	.....	.....
6	8	4	6	31	48	48	60	.....	.....	.....	.....	.....
7	8	8	6	31	50	40	60	.....	.....	.....	.....	.....
8	8	8	6	19	52	38	60	.....	.....	.....	.....	.....
9	8	8	8	15	58	58	50	.....	.....	.....	.....	.....
10	8	8	10	9	71	58	50	.....	.....	.....	.....	.....
11	8	8	10	17	77	62	50	.....	.....	.....	.....	.....
12	8	8	10	17	62	83	42	.....	.....	.....	.....	.....
13	8	8	10	17	50	68	42	.....	.....	.....	.....	.....
14	8	8	10	19	50	65	40	.....	.....	.....	.....	.....
15	8	8	10	21	45	62	23	.....	.....	.....	.....	.....
16	8	8	6	23	45	83	19	.....	.....	.....	.....	.....
17	8	8	4	21	40	77	23	.....	.....	.....	.....	.....
18	8	12	4	19	38	71	15	.....	.....	.....	.....	.....
19	8	12	6	19	33	71	12	.....	.....	.....	.....	.....
20	8	35	6	23	42	65	10	.....	.....	.....	.....	.....
21	8	35	12	29	35	65	10	.....	.....	.....	.....	.....
22	8	35	15	33	31	62	10	.....	.....	.....	.....	.....
23	8	12	15	33	21	58	10	.....	.....	.....	.....	.....
24	8	12	58	25	23	58	10	.....	.....	.....	.....	.....
25	8	12	60	23	35	58	8	.....	.....	.....	.....	.....
26	8	12	55	23	40	65	8	.....	.....	.....	.....	.....
27	8	12	31	21	40	74	8	.....	.....	.....	.....	.....
28	8	12	27	27	40	62	8	.....	.....	.....	.....	.....
29	8	.....	23	27	35	50	6	.....	.....	.....	.....	.....
30	8	.....	55	27	29	60	6	.....	.....	.....	.....	.....
31	8	.....	48	.....	31	.....	6	.....	.....	.....	.....	.....
1909.												
1	6	31	12	23	35	65	35	6	4	4	6	31
2	6	23	12	23	35	77	35	6	4	4	6	31
3	6	115	15	27	35	77	35	6	4	4	6	31
4	6	40	19	31	45	77	35	6	4	4	6	31
5	6	27	9	27	50	77	35	6	4	4	6	23
6	6	15	12	27	50	77	35	6	4	4	6	23
7	6	19	12	23	50	65	35	6	4	4	6	31
8	6	19	15	19	50	60	31	6	4	4	6	23
9	6	15	9	19	50	60	27	6	4	4	6	35
10	6	15	9	27	50	60	27	6	4	4	6	31
11	6	19	9	31	50	60	27	6	4	4	6	23
12	6	19	9	31	50	60	27	6	4	4	6	23
13	6	19	9	31	45	65	23	6	4	4	6	23
14	6	15	9	35	45	65	23	6	4	4	6	15
15	15	15	31	35	45	65	23	4	4	4	6	9
16	35	65	31	35	45	65	19	4	4	4	6	9
17	60	213	31	35	50	60	19	4	4	4	9	9
18	108	101	12	31	55	60	19	4	4	4	9	9
19	89	45	9	31	55	60	15	4	4	4	9	9
20	220	27	9	31	55	60	12	4	4	4	19	9
21	249	9	9	31	55	60	12	4	4	4	27	9
22	122	9	9	31	55	50	12	4	4	4	50	9
23	136	6	9	31	55	50	12	4	4	4	281	9
24	83	12	9	31	55	50	12	4	4	6	185	9
25	45	4	23	31	55	50	9	4	4	6	115	9

Daily discharge, in second-feet, of Bear Creek near Silver Lake, Oreg., for 1905, 1906, 1909, and 1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
26	31	9	23	40	60	45	9	4	4	6	71	9
27	15	12	19	40	60	45	9	4	4	6	50	9
28	31	9	23	40	60	40	9	4	4	6	45	9
29	15	.....	31	35	60	40	9	4	4	6	35	9
30	12	.....	23	40	60	40	9	4	4	6	31	9
31	23	.....	15	.....	65	.....	9	4	.....	6	.....	9
1910.												
1	9	45	227	31	50	65	23	.....	.....	8	10	14
2	9	23	213	31	55	65	35	.....	.....	8	10	14
3	12	6	108	27	55	65	35	.....	.....	8	10	14
4	12	4	115	23	55	65	27	.....	.....	8	10	14
5	12	4	101	23	55	65	27	.....	.....	8	10	14
6	12	23	65	23	50	65	27	.....	.....	10	10	14
7	12	23	50	23	50	55	26	.....	.....	10	10	14
8	12	23	50	23	50	55	24	.....	.....	10	10	14
9	12	15	40	23	65	55	22	.....	.....	10	10	14
10	27	15	40	27	65	55	20	.....	.....	10	10	14
11	27	12	40	27	60	55	20	.....	.....	10	21	14
12	6	12	45	27	60	55	18	.....	.....	10	20	14
13	6	55	45	27	60	50	16	.....	.....	10	20	14
14	6	136	50	27	65	50	14	.....	.....	10	18	14
15	6	50	50	27	65	50	12	.....	.....	10	18	14
16	6	12	50	27	65	50	12	.....	.....	10	16	14
17	6	6	50	31	65	50	10	.....	.....	10	14	14
18	6	6	50	31	65	50	10	.....	.....	10	14	14
19	6	6	50	35	65	45	10	.....	.....	10	14	14
20	6	9	55	40	65	45	10	.....	.....	10	12	14
21	6	6	55	40	65	45	9	.....	.....	10	12	14
22	6	6	55	40	65	40	9	.....	.....	10	12	14
23	27	6	55	45	65	40	9	.....	.....	10	14	12
24	129	136	60	45	65	40	9	.....	6.6	10	14	12
25	35	122	55	50	65	40	9	.....	.....	10	14	10
26	35	101	55	60	65	35	8	.....	.....	10	14	10
27	15	83	45	60	65	35	8	.....	.....	10	14	10
28	15	281	35	55	65	31	8	.....	.....	10	14	8
29	15	.....	35	50	65	23	8	.....	.....	10	14	8
30	15	.....	31	50	65	23	6	.....	.....	10	14	8
31	101	.....	31	.....	65	.....	6	.....	.....	10	.....	6

NOTE.—Daily discharge for periods of unobstructed channel determined from a discharge rating curve fairly well defined between 4 and 50 second-feet, but uncertain above on account of the lack of high-water measurements during winter floods.

Due allowance has been made for backwater caused by a temporary dam below the gage for the following periods: Apr. 18 to July 20, 1905; Apr. 19 to June 30, 1906; Apr. 17 to July 18, 1909; Apr. 16 to July 6, 1910. The correction curve is defined by the rise in stage when the dam is put in, the fall when it is removed, and by one or two measurements each year.

Corrections have been made for ice during the following periods, using the best data available: Nov. 8 to 13, Dec. 16 to 31, 1905; Jan. 1 to Mar. 20, 1906; Dec. 19 to 31, 1909; Jan. 1 to Feb. 24 and Dec. 19 to 31, 1910. Discharge estimated July 20 to 31, 1906, Jan. 1 to 11, 1909, and July 7 to Sept. 30, 1910.

Monthly discharge of Bear Creek near Silver Lake, Oreg., for 1905, 1906, 1909, and 1910.

[Drainage area, 77 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Mean per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1905.						
January	.....	.....	[a]15.0	0.195	0.22	922
February	50	9	18.4	.239	.25	1,020
March	29	4	9.3	.121	.14	572
April	19	8	10.2	.132	.15	607
May	52	17	28.2	.366	.42	1,730
June	55	27	44.2	.574	.64	2,630
July	27	6	11.0	.143	.16	676
August	6	4	4.6	.060	.07	283
September	4	3.5	3.78	.049	.05	225
October	8	5	6.0	.078	.09	369
November	7	2	4.77	.062	.07	284
December	7	2.5	5.74	.075	.09	353
The year	.....	.....	13.4	.174	2.35	9,670
1906.						
January	.....	.....	[a]8.0	.104	.12	492
February	35	4	11.1	.144	.15	616
March	60	4	17.5	.227	.26	1,080
April	33	9	21.9	.284	.32	1,300
May	77	21	42.6	.553	.64	2,620
June	83	33	58.9	.765	.85	3,500
July	65	6	34.5	.448	.52	2,120
The period (212 days)	.....	.....	.....	.....	2.83	11,700
1909.						
January	249	6	44.3	.575	.66	2,720
February	213	4	33.0	.429	.45	1,830
March	31	9	15.4	.200	.23	947
April	40	19	30.7	.399	.45	1,830
May	65	35	51.1	.664	.77	3,140
June	77	40	59.5	.773	.86	3,540
July	35	9	20.9	.271	.31	1,290
August	6	4	4.9	.064	.07	301
September	4	4	4.0	.052	.06	238
October	6	4	4.5	.058	.07	277
November	281	6	34.4	.447	.50	2,050
December	35	9	17.0	.221	.25	1,050
The year	281	4	26.5	.344	4.68	19,200
1910.						
January	129	6	19.6	.255	.29	1,210
February	281	4	43.8	.569	.59	2,430
March	227	31	64.7	.840	.97	3,980
April	60	23	34.9	.453	.51	2,080
May	65	50	61.3	.796	.92	3,770
June	65	23	48.7	.632	.71	2,900
July	35	.....	15.7	.204	.24	965
August	.....	.....	[a]4.0	.052	.06	246
September	.....	.....	[a]6.0	.078	.09	357
October	10	.....	9.7	.126	.15	596
November	21	10	13.4	.174	.19	797
December	14	6	12.6	.164	.19	775
The year	281	.....	27.8	.361	4.91	20,100

[a] Estimated.

NOTE.—Values only approximate; some of the monthly means may be 25 per cent or more in error, but the yearly totals are probably considerably more accurate.

MALHEUR AND HARNEY LAKE BASINS.

GENERAL FEATURES.

Malheur and Harney lakes, which are in Harney County, occupy a large basin at a general elevation of 4,100 feet and rimmed by mountain ranges whose elevation is between 5,000 and 7,000 feet. They are connected by a small strait known as The Narrows, through which the water of Malheur flows into Harney Lake. For this reason the water of Malheur Lake is practically fresh, while that of Harney Lake is alkaline. The average rainfall is about 10 inches; on the summit of the divide it is probably about 18 inches or more.

The agricultural lands in this basin comprise nearly 700,000 acres of flat alluvial soil, forming a circular valley surrounding the lakes and extending like fingers into the valleys of tributary streams.

The lower lands are more or less swampy and have for years been utilized as hay flats. During the spring months, when water is abundant, small rock and brush dams sufficiently high to cause the streams to overflow their banks are constructed at convenient points. Much of the meadow lands may thus be covered by a foot or more of running water during five or six weeks of the season. As the stream flow diminishes the swamp and hay lands gradually drain until the middle of July, when they are sufficiently dry to permit the cutting of hay.

Comparatively small areas are cultivated, and on these the crops are limited to rye, oats, and barley. The principal industry of the region has been stock raising, and this has afforded a ready market for all grain and hay that could be raised. During recent years, however, much of the hay lands have been taken as homesteads and the better lands are rapidly being developed.

The principal streams in this basin are Donner und Blitzen River from the south and Silvies River from the north flowing into Malheur Lake; and Silver Creek flowing from the northwest into Harney Lake. South of Silver Creek in a flat valley lies Silver Lake, a small playa which is supplied by overflow from Silver Creek. Donner und Blitzen River, with its principal tributaries Keiger, McCoy, and Mud creeks, drain the western slope of Steins Mountain. This mountain, which is the most prominent topographic feature in the area, is a long timberless ridge, extending northeast and southwest, with a crest length of 60 miles or more. The eastern slope forms an abrupt escarpment; the western slope, which forms a gradual ascent is deeply cut by canyons into which enormous quantities of snow are drifted each year, thus serving as efficient storage reservoirs for winter precipitation. The snows melt gradually and the flow of the streams draining the western slope of the mountain is therefore well maintained throughout the year.

Silvies River drains the northern part of the Malheur-Harney basin, rising in the heart of the Blue Mountains, flowing generally southward through a broken country to Harney Valley, which it traverses in a southeasterly direction, and emptying into swamp lands bordering the northern shores of Malheur Lake. A large part of its drainage area is heavily timbered. The stream is very "flashy," being subject to sudden floods which as suddenly subside. The summer flow is practically nothing.

Silver Creek heads in a spur of the Blue Mountains and flows southeastward through Silver Creek valley into Harney Basin. The upper portion of its drainage area is well timbered, but the lower portion is bare. The stream is subject to sudden floods and in summer its flow practically ceases.

Between Silvies River and Silver Creek and flowing in the same general direction is Sagehen Creek, a small stream heading in a spur of the Blue Mountains and draining a rough, broken country. It empties into the marsh surrounding the northern end of Malheur Lake near the point where Silvies River enters this marsh.

The eastern rim of Harney Valley is broken by a low pass known as Malheur Gap. Through this gap a drainage canal could be excavated that at the deepest portion would not require a cut of more than 18 or 20 feet. This canal would carry the waters of the lakes into Malheur River by way of a tributary of the South Fork. Such a project was at one time begun, but riparian owners of the lake border feared that the absence of these large bodies of water would have an unwholesome effect on the climate of the basin. Accordingly an injunction was issued restraining the company from building the project.

SILVIES RIVER NEAR SILVIES, OREG.

This station, which is located at the proposed dam site about 3 miles southwest of Silvies, Oreg., in sec. 14, T. 19 S., R. 31 E., was established June 16, 1903. Observations were suspended from December 31, 1904, to January 8, 1909, for lack of funds. It is now maintained in cooperation with the Silver Valley Irrigation Co.

An inclined gage is located on the left bank under the cable. The right bank is a berm over which the water flows for 400 feet at an elevation of 5 feet on the gage. The cable spans the entire channel.

At the site of the station a dam can be constructed which will impound all the annual run-off from the drainage area above it. The water so stored could be diverted from the stream for the irrigation of lands in Harney Valley. This project was under investigation at one time by the United States Reclamation Service.

The conditions at the station are not favorable for highly accurate results. The banks of the stream are covered with heavy brush

which serves to create unstable conditions to a certain extent. The bed is sandy, and some changes occur at flood times. During the winter months ice interferes materially with the determination of flow, but due allowance for such conditions has been made, using comparisons with the Burns station, when no other data are available.

Discharge measurements of Silvies River near Silvies, Oreg., for 1908–1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1909.[a]		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 11	R. B. Post	41	104	3.37	58
July 12	.....do	14.5	6.2	2.45	6.8
1910.					
Mar. 26	L. R. Allen	64	368	8.12	699
Oct. 22[b]	R. W. Davenport	14.5	10.1	2.23	4.6

[a] These measurements republished with corrected gage heights on account of error of gage.
[b] Measured by wading, 50 feet above gage.

Daily gage height, in feet, of Silvies River near Silvies, Oreg., for 1909–10.

[David Craddock, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1	.....	.....	5.0	4.9	4.8	3.9	2.65	2.25	2.05	2.35	.....	3.05
2	.....	.....	4.8	5.2	4.8	3.8	2.55	2.35	2.15	2.35	.....	2.85
3	.....	4.3	5.0	5.4	4.4	3.8	2.55	2.25	2.15	2.35	2.45	2.95
4	.....	.....	5.3	5.5	4.5	3.7	2.45	2.15	2.15	2.35	2.45	2.95
5	.....	.....	5.4	5.2	4.6	3.8	2.45	2.15	2.25	2.45	2.75	2.95
6	.....	.....	4.5	5.0	4.6	3.8	2.45	2.25	2.15	2.45	2.75	2.85
7	.....	.....	4.4	4.7	4.6	3.7	2.45	2.25	2.15	2.45	2.65	2.85
8	3.2	.....	4.3	4.5	4.7	3.7	2.35	2.25	2.15	2.35	2.45	2.95
9	3.5	.....	3.8	4.7	4.5	3.6	2.35	2.15	2.25	2.35	2.55	2.95
10	.....	4.3	3.9	4.5	4.4	3.5	2.25	2.15	2.25	2.35	2.65	.....
11	.....	.....	3.3	5.1	4.3	3.5	2.35	2.15	2.25	2.45	2.65	2.95
12	.....	.....	4.0	5.1	4.3	3.4	2.45	2.25	2.25	2.45	2.55	2.95
13	.....	.....	3.5	5.2	4.3	3.4	2.45	2.25	2.35	2.45	2.55	3.05
14	.....	.....	3.9	5.4	4.3	3.3	2.45	2.25	2.35	2.45	2.45	2.95
15	3.5	.....	4.3	5.4	4.2	3.3	2.45	2.15	2.35	2.45	2.55	2.95
16	5.7	10.0	4.5	5.4	3.9	3.2	2.45	2.05	2.35	2.45	2.45	2.95
17	6.3	9.3	5.0	5.4	3.9	3.2	2.45	2.05	2.25	2.45	2.45	2.95
18	7.3	7.1	4.7	5.4	3.9	3.3	2.35	2.15	2.25	2.45	2.55	2.95
19	8.5	6.5	4.4	5.3	3.9	3.2	2.35	2.15	2.25	2.45	2.85	2.95
20	9.9	5.9	4.3	5.3	3.9	3.3	2.25	2.15	2.25	2.65	2.65	2.95
21	9.95	5.2	4.1	6.0	3.8	3.3	2.25	2.15	2.35	2.45	.....	2.95
22	8.0	4.7	3.9	4.9	3.7	3.2	2.35	2.05	2.35	2.55	3.0	2.95
23	7.6	4.6	3.9	4.9	3.8	3.1	2.35	2.05	2.25	2.55	3.2	2.95
24	6.4	4.9	4.0	4.8	3.8	3.25	2.25	2.05	2.25	2.55	3.2	2.95
25	5.4	4.4	4.3	4.9	3.7	3.15	2.25	2.05	2.25	2.55	3.2	2.95
26	4.7	4.3	4.5	4.8	3.5	3.15	2.25	2.05	2.25	2.45	3.2	3.05
27	4.5	4.2	4.7	4.9	3.6	3.05	2.35	1.95	2.25	2.55	3.15	3.05
28	.....	4.9	5.1	5.0	3.8	2.95	2.35	2.05	2.35	2.55	2.95	3.05
29	4.3	.....	5.2	5.1	3.9	2.85	2.25	2.05	2.35	2.45	2.95	3.05
30	.....	.....	5.0	4.8	5.1	2.75	2.25	1.95	2.35	2.45	2.95	3.05
31	4.3	.....	4.7	.....	5.0	.....	2.25	1.95	.....	2.45	.....	3.05
1910.												
1	3.05	4.2	10.5	6.3	5.0	2.85	2.15	2.05	.....	2.05	.....	2.85
2	3.05	4.2	10.5	6.4	5.0	2.65	2.15	2.05	.....	2.15	.....	2.9
3	3.05	.....	9.8	6.6	4.8	2.65	2.15	2.05	.....	2.15	.....	2.8
4	.....	.....	8.6	6.5	4.7	2.65	2.15	1.95	.....	2.15	.....	2.8
5	3.05	4.2	7.0	6.6	4.9	2.65	.....	1.95	.....	2.15	2.3	2.7

Daily gage height, in feet, of Silvies River near Silvies, Oreg., for 1909–10—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
6			7.2	6.5	4.8	2.65		1.95		2.25		3.05
7	3.05		6.1	6.6	4.7	2.55	2.15	1.95		2.25		2.8
8			5.6	6.5	4.5	2.55	2.15	1.95		2.25		2.8
9		4.2	5.0	6.4	4.3	2.45	2.15	1.95		2.15		2.8
10	3.05		5.5	6.5	4.3	2.45	2.05	1.95		2.15		2.8
11		4.2	5.2	6.5	3.9	2.45	2.05	1.85		2.15		2.75
12		4.2	5.4	6.7	4.1	2.45	2.05	1.85	Dry.		2.5	2.75
13	3.05		6.2	6.4	3.9	2.45	2.05	1.85	1.85			2.5
14			6.7	6.3	3.9	2.25		1.85	1.95			2.8
15	3.05	4.2	7.2	6.1	3.9	2.25	2.05	1.85	2.05	2.25		2.7
16			7.1	5.9	3.5	2.25	2.05	1.85	2.05	2.25		2.7
17	3.05	4.2	7.2	5.8	3.4	2.25	2.05	1.85	2.05	2.25		2.7
18			7.4	5.6	3.3	2.25	2.05	1.85	2.15	2.25		2.7
19	3.05	4.2	7.8	5.5	3.4	2.25	2.05	1.85	2.15	2.25	2.4	2.6
20			10.0	5.5	3.1	2.25	2.05		2.05	2.25		2.7
21	3.05		10.9	5.5	3.2	2.25	2.05	1.85	2.05	2.25		2.7
22	3.05	4.2	10.1	5.4	3.1	2.25	2.05	Dry.	2.05	2.2		2.7
23	3.55		10.0	5.4	3.0	2.25	2.05		2.05			2.7
24	4.4	4.2	9.9	5.3	3.0	2.25	2.05		2.05	2.3		2.7
25	4.5	4.2	8.9	5.3	2.8	2.15			2.05		2.6	2.75
26	4.6	4.5	8.2	5.1	2.9	2.15	2.15		2.05			
27	4.5	4.8	8.0	5.0	3.0	2.15	2.05		2.05			
28	4.4	5.2	7.5	4.9	3.1	2.15	2.05		2.15			
29	4.3		7.0	4.8	3.1	2.15	2.05		2.15	2.3		
30	4.3		6.5	4.9	3.0	2.15			2.05			2.75
31	4.3		6.3		2.9							2.75

NOTE.—Gage heights for 1909 supersede those published in Water-Supply Paper 270, p. 159. In October, 1910, the gage was found to have been raised from its true position, and the evidence indicates that the change occurred prior to the reestablishment of the station in January, 1909.

River reported frozen Jan. 28 to Feb. 15, and Dec. 2–31, 1909.

River frozen over Jan. 1 to Mar. 1, 1910, when the ice began to break; ice gone Mar. 4; a rise caused by a warm spell about Jan. 22 did not take out the ice; water running over the ice Feb. 26 to 28. River frozen Dec. 25 to 31.

Stream bed dry Aug. 22 to Sept. 12, 1910.

Daily discharge, in second-feet, of Silvies River near Silvies, Oreg., for 1909–10.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1	6	88	220	208	197	107	14	4.2	2.0	6	8	34
2	8	88	197	242	197	97	10	6	3.0	6	8	22
3	10	88	220	265	157	97	10	4.2	3.0	6	8	28
4	12	88	254	276	167	87	8	3.0	3.0	6	8	28
5	14	88	265	242	177	97	8	3.0	4.2	8	18	28
6	20	88	167	220	177	97	8	4.2	3.0	8	18	22
7	30	88	157	187	177	87	8	4.2	3.0	8	14	22
8	45	88	147	167	187	87	6	4.2	3.0	6	8	28
9	70	88	97	187	167	78	6	3.0	4.2	6	10	28
10	50	88	107	167	157	70	4.2	3.0	4.2	6	14	28
11	30	88	53	231	147	70	6	3.0	4.2	8	14	28
12	20	88	117	231	147	62	8	4.2	4.2	8	10	28
13	30	88	70	242	147	62	8	4.2	6	8	10	34
14	30	88	107	265	147	53	8	4.2	6	8	8	28
15	42	88	147	265	137	53	8	3.0	6	8	10	28
16	179	697	167	265	107	45	8	2.0	6	8	8	28
17	221	882	220	265	107	45	8	2.0	4.2	8	8	28
18	294	465	187	265	107	53	6	3.0	4.2	8	10	28
19	413	393	157	254	107	45	6	3.0	4.2	8	22	28
20	667	322	147	254	107	53	4.2	3.0	4.2	14	14	28
21	684	242	127	334	97	53	4.2	3.0	6	8	22	28
22	359	187	107	208	87	45	6	2.0	6	10	31	28
23	319	177	107	208	97	37	6	2.0	4.2	10	45	28
24	228	208	117	197	97	49	4.2	2.0	4.2	10	45	28
25	159	157	147	208	87	41	4.2	2.0	4.2	10	45	28

Daily discharge, in second-feet, of Silvies River near Silvies, Oreg., for 1909–10—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
26	112	147	167	197	70	41	4.2	2.0	4.2	8	45	34
27	100	137	187	208	78	34	6	1.2	4.2	10	41	34
28	94	208	231	220	97	28	6	2.0	6	10	28	34
29	88	.....	242	231	107	22	4.2	2.0	6	8	28	34
30	88	.....	220	197	231	18	4.2	1.2	6	8	28	34
31	88	.....	187	.....	220	.....	4.2	1.2	.....	8	.....	34
1910.												
1	.....	.....	1,430	369	220	22	3.0	2.0	0	2.0	5	22
2	.....	.....	1,430	381	220	14	3.0	2.0	0	3.0	5	25
3	.....	.....	1,060	405	197	14	3.0	2.0	0	3.0	5	20
4	.....	.....	708	393	187	14	3.0	1.2	0	3.0	5	20
5	.....	.....	453	405	208	14	3.0	1.2	0	3.0	5	16
6	.....	.....	477	393	197	14	3.0	1.2	0	4.2	5	34
7	.....	.....	346	405	187	10	3.0	1.2	0	4.2	6	20
8	.....	.....	288	393	167	10	3.0	1.2	0	4.2	7	20
9	.....	.....	220	381	147	8	3.0	1.2	0	3.0	7	20
10	.....	.....	276	393	147	8	2.0	1.2	0	3.0	8	20
11	.....	.....	242	393	107	8	2.0	.7	0	3.0	9	18
12	.....	.....	265	417	127	8	2.0	.7	0	3.5	9	18
13	.....	.....	358	381	107	8	2.0	.7	.7	3.5	9	9
14	.....	.....	417	369	107	4.2	2.0	.7	1.2	3.5	8	20
15	.....	.....	477	346	107	4.2	2.0	.7	2.0	4.2	8	16
16	.....	.....	465	322	70	4.2	2.0	.7	2.0	4.2	8	16
17	.....	.....	477	311	62	4.2	2.0	.7	2.0	4.2	8	16
18	.....	.....	504	288	53	4.2	2.0	.7	3.0	4.2	7	16
19	.....	.....	563	276	62	4.2	2.0	.7	3.0	4.2	7	12
20	.....	.....	1,160	276	37	4.2	2.0	.7	2.0	4.2	8	16
21	.....	.....	1,650	276	45	4.2	2.0	.7	2.0	4.2	9	16
22	.....	.....	1,210	265	37	4.2	2.0	0	2.0	3.5	9	16
23	.....	.....	1,160	265	31	4.2	2.0	0	2.0	4.2	10	16
24	.....	.....	1,110	254	31	4.2	2.0	0	2.0	5	11	16
25	.....	.....	774	254	20	3.0	2.5	0	2.0	5	12	18
26	.....	130	634	231	25	3.0	3.0	0	2.0	5	14	18
27	.....	160	598	220	31	3.0	2.0	0	2.0	5	15	18
28	.....	200	518	208	37	3.0	2.0	0	3.0	5	17	18
29	.....	.....	453	197	37	3.0	2.0	0	3.0	5	18	18
30	.....	.....	393	208	31	3.0	2.0	0	2.0	5	20	18
31	.....	.....	369	.....	25	.....	2.0	0	.....	5	.....	18

NOTE.—Daily discharge determined from a fairly well-defined discharge rating curve. Values for 1909 supersede those published in Water-Supply Paper 270, page 160 (see note to daily gage heights).

Discharge Jan. 1 to 14, 1909, estimated because of presence of ice. Determinations of discharge Jan. 15 to Feb. 16 were compared with discharge at Burns Station, where there was little ice, and reduced 40 per cent from values derived from open-channel curve.

Mean discharge estimated at 30 second-feet Jan. 1 to Feb. 25, 1910; discharge determined from open-channel curve Feb. 26 to 28 reduced, as ice was still in bottom of river.

No correction Mar. 1 to 4. Determinations may be somewhat too high as ice was present.

Monthly discharge of Silvies River near Silvies, Oreg., for 1909–10.

[Drainage area, 450 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Mean per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1909.							
January	.....	.....	145	0.322	0.37	8,920	D.
February	882	.....	198	.440	.46	11,000	D.
March	265	53	163	.362	.42	10,000	B.
April	334	167	230	.511	.57	13,700	B.
May	231	70	138	.307	.35	8,480	B.
June	107	18	60.4	.134	.15	3,590	B.
July	14	4.2	6.64	.015	.02	408	B.
August	6	1.2	2.94	.0065	.007	181	C.
September	6	2	4.43	.0098	.01	264	B.
October	14	6	8.13	.018	.02	500	B.
November	45	8	19.5	.043	.05	1,160	B.
December	34	22	29	.064	.07	1,780	C.
The year	882	1.2	82.9	.184	2.50	60,000	
1910.							
January	.....	.....	[a] 30	.067	.08	1,840	D.
February	.....	.....	[a] 44.3	.098	.10	2,460	D.
March	1,650	220	661	1.47	1.70	40,600	B.
April	417	197	322	.716	.80	19,200	B.
May	220	20	98.9	.220	.25	6,080	B.
June	22	3	7.21	.016	.02	429	B.
July	3	2	2.34	.0052	.006	144	C.
August	2	0	.71	.0016	.002	44	C.
September	3	0	1.26	.0028	.003	75	C.
October	5	2	3.97	.0088	.01	244	B.
November	20	5	9.1	.020	.02	541	C.
December	34	9	18.2	.040	.05	1,120	C.
The year	1,650	0	101	.224	3.04	72,800	

[a] Estimated.

SILVIES RIVER NEAR BURNS, OREG.

This station, which is located at a wagon bridge near Parker's house, 10 miles upstream from Burns, was established August 14, 1903, but lack of funds caused suspension of observations from July 24, 1906, to December 11, 1908.

The cable from which discharge measurements are made is at Lampshire's ranch, 1 mile above the staff gage, in the NW. ¼ sec. 6, T 22 S., R. 30 E.

The conditions at the cable are not favorable for accurate measurements. The stream flows through a flat, alluvial bottom. The banks are lined with a dense growth of willows and underbrush. The right bank is subject to overflow for about 600 feet. The left bank is high and will not overflow.

The water of Silvies River is used largely for the flood irrigation of hay lands in Harney Valley. As even the flood discharge of the stream is used for this purpose, the development of an irrigation project that would contemplate the diversion of the water would involve the settlement of accrued water rights.

Discharge measurements of Silvies River near Burns, Oreg., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Mar. 29	L. R. Allen	73	637	12.72	943
Oct. 17 [a]	R. W. Davenport	35	21	2.64	19.6
Dec. 12 [a]	.....do.....	39	30	2.87	48

[a] Waded 10 feet below gage.

Daily gage height, in feet, of Silvies River near Burns, Oreg., for 1910.

[Mrs. Leona Parker, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.65	3.05	6.85	11.2	6.2	2.65	2.5	2.35	2.35	2.55	2.65	2.85
2	2.65	3.05	12.25	11.2	6.2	2.65	2.5	2.35	2.35	2.55	2.65	2.85
3	2.65	3.05	14.9	11.2	6.2	2.65	2.5	2.35	2.35	2.55	2.65	2.85
4	2.65	3.0	15.1	11.2	6.2	2.65	2.5	2.35	2.35	2.55	2.65	2.85
5	2.65	3.0	14.55	11.2	6.1	2.65	2.5	2.35	2.35	2.55	2.65	2.85
6	2.65	3.0	13.9	10.9	6.1	2.65	2.5	2.35	2.35	2.55	2.65	2.9
7	2.7	3.0	13.0	10.9	6.1	2.65	2.5	2.35	2.35	2.55	2.65	2.9
8	2.7	3.05	11.7	11.1	5.6	2.65	2.5	2.3	2.35	2.55	2.75	2.9
9	2.75	3.05	11.8	11.1	5.1	2.65	2.5	2.3	2.35	2.55	2.75	2.9
10	2.75	3.05	11.6	11.2	5.0	2.65	2.45	2.3	2.35	2.55	2.75	2.9
11	2.75	3.05	11.6	11.3	4.8	2.65	2.45	2.3	2.45	2.55	2.75	2.9
12	2.75	3.0	11.6	11.2	4.7	2.65	2.45	2.3	2.45	2.55	2.75	2.9
13	2.75	3.0	12.15	10.9	4.5	2.65	2.45	2.3	2.45	2.55	2.75	.....
14	2.75	3.0	12.6	10.9	4.5	2.65	2.45	2.35	2.55	2.55	2.75	.....
15	2.75	3.0	13.4	10.4	4.2	2.65	2.4	2.35	2.55	2.55	2.7	.....
16	2.85	3.0	13.6	9.9	4.1	2.65	2.4	2.35	2.55	2.65	2.7	.....
17	2.85	3.0	14.2	9.5	3.9	2.6	2.4	2.35	2.55	2.65	2.7	.....
18	2.8	3.0	14.25	9.3	3.7	2.6	2.4	2.35	2.55.	2.65	2.75	.....
19	2.9	3.0	14.7	9.0	3.2	2.55	2.4	2.35	2.55	2.65	2.75	.....
20	2.9	3.0	15.7	8.6	3.0	2.55	2.4	2.35	2.55	2.65	2.75	2.8
21	2.95	3.0	15.7	8.0	3.05	2.55	2.4	2.35	2.55	2.65	2.8	2.7
22	2.95	3.0	15.7	7.9	3.05	2.55	2.4	2.35	2.53	2.65	2.8	2.65
23	2.95	3.0	15.3	7.6	3.05	2.55	2.4	2.35	2.55	2.65	2.8	2.65
24	2.95	3.0	14.9	7.3	3.0	2.55	2.35	2.35	2.55	2.65	2.8	2.65
25	2 95	3.0	14.7	7.0	3.0	2.55	2.35	2.35	2.55	2.65	2.8	2.6
26	2.95	3.0	14.5	6.9	3.0	2.55	2.35	2.35	2.55	2.65	2.8	2.6
27	2.9	3.1	13.9	6.8	2.95	2.5	2.35	2.35	2.55	2.65	2.8	2.6
28	2.9	3.4	13.6	6.6	2.95	2.5	2.35	2.35	2.55	2.65	2.8	2.6
29	2.9	.....	12.8	6.5	2.85	2.5	2.35	2.35	2.55	2.65	2.85	2.6
30	3.05	.....	11.8	6.3	2.65	2.5	2.35	2.35	2.55	2.65	2.85	2.6
31	3.2	.....	11.6	.....	2.65	.....	2.35	2.35	.....	2.65	.....	2.6

NOTE.—No ice reported by observer; river probably somewhat obstructed by ice from about Jan. 30 to Feb. 26.
Gage readings Dec. 13 to 19 were questionable and have been discarded.

Daily discharge, in second-feet, of Silvies River near Burns, Oreg., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	21	.....	382	803	327	21	11	6	6	14	21	40
2	21	.....	937	803	327	21	11	6	6	14	21	40
3	21	.....	2,170	803	327	21	11	6	6	14	21	40
4	21	.....	2,390	803	327	21	11	6	6	14	21	40
5	21	.....	1,810	803	319	21	11	6	6	14	21	40
6	21	.....	1,340	768	319	21	11	6	6	14	21	45
7	25	.....	1,080	768	319	21	11	6	6	14	21	45
8	25	.....	863	791	278	21	11	4	6	14	30	45
9	30	.....	875	791	237	21	11	4	6	14	30	45
10	30	.....	851	803	229	21	9	4	6	14	30	45
11	30	.....	851	815	213	21	9	4	9	14	30	45
12	30	.....	851	803	205	21	9	4	9	14	30	45
13	30	.....	922	768	189	21	9	4	9	14	30	45
14	30	.....	1,000	768	189	21	9	6	14	14	30	45
15	30	.....	1,170	713	163	21	7	6	14	14	25	40
16	40	.....	1,230	660	154	21	7	6	14	21	25	40
17	40	.....	1,520	620	136	17	7	6	14	21	25	40
18	35	.....	1,560	601	119	17	7	6	14	21	30	35
19	45	.....	1,960	574	73	14	7	6	14	21	30	35
20	45	.....	3,050	538	54	14	7	6	14	21	30	35
21	50	.....	3,050	484	59	14	7	6	14	21	35	25
22	50	.....	3,050	475	59	14	7	6	14	21	35	21
23	50	.....	2,610	448	59	14	7	6	14	21	35	21
24	50	.....	2,170	421	54	14	6	6	14	21	35	21
25	50	.....	1,960	394	54	14	6	6	14	21	35	17
26	50	.....	1,760	386	54	14	6	6	14	21	35	17
27	45	64	1,340	377	50	11	6	6	14	21	35	17
28	45	92	1,230	361	50	11	6	6	14	21	35	17
29	45	.....	1,040	352	40	11	6	6	14	21	40	17
30	.....	.....	875	336	21	11	6	6	14	21	40	17
31	.....	.....	851	.....	21	.....	6	6	.....	21	.....	17

NOTE.—Daily discharge determined from a discharge rating curve fairly well defined between 15 and 2,800 second-feet. Mean discharge Jan. 30 to Feb. 26 estimated at 40 second-feet. Discharge Dec. 13 to 19 interpolated.

Monthly discharge of Silvies River near Burns, Oreg., for 1910.

[Drainage area, 865 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Mean per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	50	21	35.7	0.041	0.05	2,200	D.
February	92	40	42.7	.049	.05	2,370	D.
March	3,050	382	1,510	1.75	2.02	92,800	B.
April	815	336	628	.726	.81	37,400	B.
May	327	21	162	.187	.22	9,960	B.
June	21	11	17.5	.020	.02	1,040	B.
July	11	6	8.2	.0095	.01	504	C.
August	6	4	5.6	.0065	.007	344	C.
September	14	6	10.8	.012	.01	643	C.
October	21	14	17.6	.020	.02	1,080	B.
November	40	21	29.4	.034	.04	1,750	B.
December	45	17	33.4	.039	.04	2,050	C.
The year	3,050	4	210	.243	3.30	152,000	

DONNER UND BLITZEN RIVER NEAR DIAMOND, OREG.

The water of Donner und Blitzen River is used to irrigate hay lands in the Donner und Blitzen swamp, which embraces nearly 100,000 acres of land extending from the P ranch to Narrows. The ranch is owned by the William Hanley Co., which has cooperated by observations of gage heights.

The gaging station, which is located at the mouth of the canyon in sec. 20, T. 32 S., R. 32½ E., above all irrigation ditches, was established Jan. 27, 1909, at a private wagon bridge near the P ranch buildings, 25 miles southwest of Diamond and near the point where the river enters the swamp. The station was removed to the present site, 2 miles farther upstream, May 23, 1910.

The gage at the original site was a vertical staff fastened to the right bank just below the bridge from which discharge measurements were made. Five irrigation ditches divert water from the stream above the bridge, and a brush and rock dam about 300 feet below the bridge is used to divert water into another ditch. When water is to be diverted the dams are repaired and raised by adding more rock and brush. Two of these ditches run water during the entire year, three of them only during the irrigation season. No record has been kept of the actual time of operation. The flow at this point is considerably less than the natural flow of the stream, particularly during the irrigation season.

From a point near the mouth of the canyon, 5 miles above the P ranch, the banks of the stream are subject to overflow during times of flood. They are covered with a dense growth of willows and underbrush, and it is almost impossible to find a place where the stream can be measured in a single channel even at moderate stages.

At the upper station, discharge measurements are made from a cable and conditions are fairly good for obtaining accurate results. There is considerable daily fluctuation on this river during the spring, and the water from the snow melting in the daytime may pass the station at night when no record can be obtained.

The upper gage was read occasionally during the summer of 1910. By computing the discharge for the days on which the gage was read and subtracting the discharge at the lower station on these days, the net diversion above the old station is determined. These diversions are thus found to vary from 118 second-feet on June 19 to 13 second-feet on October 4. The amount diverted has been estimated for each month and added to the determined discharge at the lower station, thus affording an approximate estimate of the total run-off.

A diversion dam below the old station caused backwater at the lower gage during the summer of 1910. As no discharge measurements were made between June and December, 1909, the influence of

the dam during that year is uncertain, but the low-water estimates based on gage heights for that period (published in Water-Supply Paper 270, p. 165) were probably rendered somewhat too large. The summer discharge for 1910 has, therefore, been estimated from observations in 1911, when continuous records were obtained at the upper station.

Discharge measurements of Donner und Blitzen River near Diamond, Oreg., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
	LOWER GAGE.	*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 21	Stevens and Allen	35	96	3.50	195
Oct. 4	Allen and Davenport	32	48	2.10	39
	UPPER GAGE.				
May 22	Stevens and Allen	55	101	3.51	334
Oct. 4[a]	Allen and Davenport	25	21	2.61	49

[a] Measured by wading.

Daily gage height, in feet, of Donner und Blitzen River near Diamond, Oreg., for 1910.

[Lower gage. J. P. Jefferson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	1.68	2.80	4.85	4.40	.....	3.90	2.08	.....	.....	.....	1.56
2	1.72	2.70	5.60	3.85	.....	3.92	2.00	.....	.....	.....	1.62
3	1.62	2.92	5.30	4.05	.....	3.52	2.05	.....	.....	.....	1.68
4	1.60	2.70	4.35	4.60	3.60	3.10	1.96	.....	.....	.....	1.68
5	1.88	2.60	4.22	4.70	3.25	3.00	1.90	.....	.....	.....	1.52
6	1.68	2.60	4.05	4.55	3.45	3.15	1.92	.....	.....	.....	1.50
7	1.62	2.78	3.50	4.20	3.35	2.80	1.98	.....	.....	.....	1.58
8	1.52	3.02	4.15	4.12	3.35	2.30	1.68	.....	.....	.....	1.58
9	1.48	2.90	3.95	4.10	4.05	2.50	1.75	.....	.....	.....	1.55
10	1.60	2.68	3.45	4.25	4.20	2.60	1.78	.....	.....	.....	1.48
11	2.02	2.75	3.55	4.20	4.15	2.70	1.78	.....	.....	.....	1.52
12	1.52	2.88	3.75	4.50	4.15	2.65	1.82	.....	.....	.....	1.55
13	1.42	2.90	3.90	4.48	4.25	2.51	1.80	.....	.....	.....	.....
14	1.40	2.75	4.30	4.55	3.95	2.42	1.80	.....	.....	.....	.....
15	1.35	2.58	4.25	4.30	4.15	2.48	1.78	.....	.....	.....	.....
16	1.32	2.15	4.40	4.05	3.90	2.56	1.82	.....	.....	.....	.....
17	1.50	1.72	4.35	4.10	3.65	2.48	1.68	.....	.....	.....	.....
18	1.42	1.58	4.50	4.22	3.85	2.38	1.70	.....	.....	.....	.....
19	1.32	1.42	5.00	4.35	3.95	2.15	1.74	.....	.....	.....	.....
20	1.42	1.35	5.65	4.05	3.65	2.20	1.75	.....	.....	.....	.....
21	1.45	1.38	5.40	4.30	3.60	2.12	1.82	.....	.....	.....	.....
22	3.45	1.48	5.00	4.20	3.70	2.05	1.70	.....	.....	.....	.....
23	5.70	1.42	5.05	4.30	3.98	2.05	1.68	.....	.....	.....	.....
24	3.05	2.10	4.45	4.65	4.05	2.00	1.65	.....	.....	.....	.....
25	2.65	2.28	4.40	5.15	3.92	2.11	1.62	.....	.....	.....	.....
26	2.52	2.02	4.30	5.40	3.65	2.05	1.59	.....	.....	.....	.....
27	2.52	2.15	4.25	5.00	3.75	2.06	1.60	.....	.....	.....	.....
28	2.40	3.75	4.15	4.20	3.75	2.22	1.62	.....	.....	.....	.....
29	2.38	.....	4.05	.....	3.68	2.10	1.59	.....	.....	.....	.....
30	2.62	.....	4.15	.....	3.82	1.98	1.58	.....	.....	.....	.....
31	2.42	.....	4.15	.....	3.86	.....	.....	.....	.....	.....	.....

NOTE.—Gage heights from about Jan. 24 to Feb. 7 increased by effect of a driftwood jam on a riffle below. A dam about a mile below the gage, used to divert water into a canal, was raised prior to the measurement on May 21, probably some time in March or April; it had evidently been lowered prior to the November readings and seem to have remained stable.

Relation of gage height to discharge probably not affected by ice.

Daily discharge, in second-feet, of Donner und Blitzen River near Diamond, Oreg., for 1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	62	64	510	338	258	257	37
2	66	56	637	249	242	260	32
3	58	94	586	281	226	198	35
4	56	82	425	372	210	141	30
5	80	64	404	389	160	129	27
6	62	64	377	364	188	148	28
7	58	80	289	305	174	106	31
8	50	217	393	292	174	53	17
9	48	200	361	289	281	73	20
10	56	169	282	313	305	84	21
11	94	179	297	305	297	95	21
12	50	197	329	355	297	91	23
13	43	200	353	352	313	74	22
14	42	179	417	364	265	64	22
15	38	156	409	321	297	71	21
16	36	107	433	281	257	80	23
17	49	66	425	289	218	71	17
18	43	55	450	308	249	60	18
19	36	43	535	330	265	42	20
20	43	38	646	281	218	45	20
21	46	41	513	321	210	39	23
22	282	48	441	305	225	35	18
23	654	43	450	321	270	35	17
24	97	102	346	380	281	32	16
25	68	121	338	468	260	39	16
26	58	94	321	513	218	35	15
27	58	107	313	441	233	36	15
28	49	329	297	305	233	46	16
29	48	.....	281	290	222	38	15
30	66	.....	297	274	244	31	14
31	50	.....	297	.....	251	.....	14

NOTE.—Daily discharge Jan. 1 to Mar. 20 determined from a discharge rating curve fairly well defined by measurements in 1909. Discharge Mar. 21 to July 30 determined from a poorly defined curve. The change between this curve and the previous one was caused by a diversion dam; the stability of this dam and the exact period of its operation are uncertain.

Daily discharge for November can not be computed. Determinations reduced arbitrarily Jan 24 to Feb. 7 to allow for effect of wood jam. Values show only unappropriated flow at this point and are somewhat less than the total flow of the river.

Monthly discharge of Donner und Blitzen River near Diamond, Oreg., for 1910.

[Lower gage.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	654	36	82.1	5,050	C.
February	329	38	114	6,330	C.
March	646	281	402	24,700	B.
April	513	249	333	19,800	C.
May	313	160	243	14,900	B.
June	260	31	83.6	4,980	B.
July	37	14	21.4	1,320	B.
The period	.....	.....	.....	77,100	

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Daily gage height, in feet, and discharge, in second-feet, of Donner und Blitzen River near Diamond, Oreg., for 1910.

[Upper gage.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Feet.*		*Feet.*	*Feet.*
May 22	3.51	292	July 3	2.90	106
29	3.42	261	10	2.75	75
June 5	3.32	228	16	2.65	58
12	3.10	160	24	2.60	50
19	3.10	160	Oct. 4	2.61	52
26	2.92	111	Nov. 6	2.60	50

NOTE.—Daily discharge determined from a discharge rating curve well defined by measurements, most of which were made in 1911. They represent the total flow of the river.

Monthly discharge of Donner und Blitzen River near Diamond, Oreg., for 1909–10.

[Drainage area, 238 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Lower station.	Canals.	Total.	Mean per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
January			a 80.0	0.336	0.39	4,920
February	63.9	10	73.9	.310	.32	4,100
March	105	10	115	.483	.56	7,070
April	155	30	185	.777	.87	11,000
May	185	60	145	.609	.70	8,920
June	298	90	388	1.63	1.82	23,100
July			a 95	.399	.46	5,840
August			a 41	.172	.20	2,520
September			a 40	.168	.19	2,380
October	47.1	15	62.1	.261	.30	3,820
November	92.7	10	103	.433	.48	6,130
December	66.8	10	76.8	.322	.37	4,720
The year			117	.492	6.66	84,500
1910.						
January	82.1	10	92.1	.387	.45	5,660
February	114	10	124	.521	.54	6,890
March	402	10	412	1.73	1.99	25,300
April	333	30	363	1.53	1.71	21,600
May	243	60	303	1.27	1.46	18,600
June	82.7	90	173	.727	.81	10,300
July	21.3	50	71.3	.300	.35	4,380
August			a 41	.172	.20	2,520
September			a 40	.168	.19	2,380
October			a 50	.210	.24	3,070
November			a 50	.210	.23	2,980
December			a 60	.252	.29	3,690
The year			148	.623	8.46	107,000

a Estimated.

NOTE.—Monthly discharge computed by adding the estimated diversion of the canal to the discharge determined from observation at the lower station. Discharge for January and July to September, 1909, and August to December, 1910, estimated by comparison with records derived from observations at other stations and by assuming that the low-water discharge in 1911 was fairly representative of that in previous years. Figures published for the lower station for July to September, 1909, have been discarded as probably too high, for the channel was obstructed during that period.

The figures for each month are liable to considerable error, but they afford a basis for an approximate estimate of the total yearly discharge.

KEIGER CREEK NEAR DIAMOND, OREG.

The waters of Keiger Creek are used to irrigate hay land in the Diamond swamp.

The gaging station, which is located 3 miles south of Diamond post office, in sec. 10, T. 30 S., R. 33 E., above all present irrigation ditches, was established January 26, 1909. Observation of gage heights was suspended May 31, 1910, as the observer moved away.

The gage is a vertical staff on the right bank.

Discharge measurements are made by wading at any convenient point near the gage. No facilities have been provided for making measurements at high stages.

The stream flows through an alluvial bottom on a flat grade. The banks are subject to overflow and are covered with a dense growth of willows and underbrush, which trail in the water, catch débris, and form obstructions that produce unstable conditions at the gage. For this reason the results do not possess a high degree of accuracy, but they suffice for a general study of the behavior of the stream.

The following discharge measurement was made by Stevens and Allen by wading above the gage:

May 23, 1910: Width, 20 feet; area, 32 square feet; gage height, 1.67 feet; discharge, 54 second-feet.

Daily gage height, in feet, of Keiger Creek near Diamond, Oreg., for 1910.

[H. D. Pugsley, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	Day.	Jan.	Feb.	Mar.	Apr.	May.
1	0.9	1.0	2.0	1.8	1.9	16	0.6	0.5	1.7	1.9	2.0
2	.8	1.0	1.6	1.8	1.8	17	.5	.6	1.8	1.9	1.8
3	.8	1.0	1.4	1.8	1.75	18	.5	.7	1.8	1.9	1.8
4	.8	.5	2.0	1.8	1.75	19	.6	.8	2.0	2.1	1.8
5	.9	1.5	1.6	1.75	1.8	20	.6	.8	2.1	2.2	1.75
6	.9	1.0	1.5	1.75	1.9	21	.8	.8	2.0	2.3	1.7
7	.9	.75	1.5	1.75	2.0	22	2.0	.8	1.9	2.4	1.8
8	.9	.5	1.5	1.8	2.1	23	2.0	1.0	1.9	2.6	1.8
9	.9	.6	1.6	1.8	2.3	24	1.0	1.2	1.8	2.75	1.8
10	.9	.6	1.55	1.8	2.4	25	.9	2.0	1.8	2.8	2.1
11	.9	.6	1.5	1.9	2.1	26	.8	1.9	2.0	3.3	2.1
12	.8	.65	1.7	1.9	2.0	27	.8	2.0	1.9	3.2	2.15
13	.8	.65	1.7	2.0	2.1	28	.8	2.0	1.9	2.8	2.3
14	.75	.6	1.6	2.0	2.1	29	.8	.....	1.8	2.3	2.5
15	.7	.6	1.6	2.0	2.0	30	1.5	.....	1.8	2.0	2.6
						31	1.5	.....	1.8	.....	2.7

NOTE.—Relation between gage height and discharge at this station is probably little or not at all affected by ice.

Daily discharge, in second-feet, of Keiger Creek near Diamond, Oreg., for 1909–10.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.											
1	26	16	47	96	215	81	14	9.2	10	12	19
2	24	16	47	104	239	62	13	12	10	12	18
3	19	16	62	140	251	52	12	14	12	12	18
4	14	16	57	150	251	47	12	12	14	12	18
5	13	16	47	150	245	43	12	10	14	13	47
6	24	18	57	150	245	35	12	14	14	14	47
7	19	19	43	150	181	32	12	10	14	12	43
8	19	19	47	150	181	32	12	10	12	12	52
9	13	12	47	150	176	32	12	12	12	14	57
10	22	10	62	160	160	35	12	9.2	12	14	24
11	20	14	60	140	160	34	12	9.2	12	14	19
12	14	14	47	140	131	32	11	10	10	14	43
13	14	18	68	131	140	30	11	12	10	14	18
14	12	20	74	122	150	29	10	9.2	10	14	18
15	12	18	88	113	150	29	10	10	10	16	16
16	19	18	122	104	150	29	10	10	10	16	16
17	30	26	113	108	140	29	10	9.2	10	16	43
18	24	26	113	104	140	28	9.2	8.2	10	20	29
19	23	24	113	108	140	26	9.2	8.5	9.2	22	29
20	18	24	104	122	122	26	9.2	9.2	10	26	29
21	18	26	104	113	122	26	9.2	9.2	10	43	29
22	39	26	96	108	140	25	9.2	9.2	12	43	29
23	22	24	104	104	122	24	9.2	9.2	11	43	29
24	14	113	96	108	113	18	9.2	9.2	12	43	24
25	14	44	113	113	104	18	9.2	9.2	12	43	26
26	13	39	140	113	104	19	9.2	9.2	12	39	26
27	10	43	140	131	81	19	9.2	9.2	12	35	26
28	16	35	140	131	74	18	9.2	9.2	12	26	26
29	.....	35	131	122	74	18	9.2	10	12	20	28
30	.....	35	96	181	74	18	9.0	10	12	20	29
31	.....	39	.....	203	.....	18	9.0	.....	12	.....	29

Day.	Jan.	Feb.	Mar.	Apr.	May.	Day.	Jan.	Feb.	Mar.	Apr.	May.
1910.						1910.					
1	26	29	74	62	68	16	20	18	57	68	74
2	24	29	52	62	62	17	18	20	62	68	62
3	24	29	43	62	60	18	18	22	62	68	62
4	24	18	74	62	60	19	20	24	74	81	62
5	26	47	52	60	62	20	20	24	81	88	60
6	26	29	47	60	68	21	24	24	74	96	57
7	26	23	47	60	74	22	74	24	68	104	62
8	26	18	47	62	81	23	74	29	68	122	62
9	26	20	52	62	96	24	29	35	62	136	62
10	26	20	50	62	104	25	26	74	62	140	81
11	26	20	47	68	81	26	24	68	74	192	81
12	24	21	57	68	74	27	24	74	68	181	84
13	24	21	57	74	81	28	24	74	68	140	96
14	23	20	52	74	81	29	24	.....	62	96	113
15	22	20	52	74	74	30	47	.....	62	74	122
						31	47	.....	62	.....	131

NOTE.—Daily discharge determined from a discharge rating curve fairly well defined between 10 and 120 second-feet, but very uncertain above. Determination for the winter period somewhat uncertain, as ice affected to a slight degree the relation of gage height to discharge.

Monthly discharge of Keiger Creek near Diamond, Oreg., for 1909–10.

[Drainage area, 50 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Mean per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1909.							
February	39	10	18.8	0.376	0.39	1,040	C.
March	113	10	26.4	.528	.61	1,620	B.
April	140	43	82.2	1.64	1.83	4,890	B.
May	203	96	130	2.60	3.00	7,990	C.
June	251	74	152	3.04	3.39	9,040	C.
July	81	18	31.1	.622	.72	1,910	B.
August	14	9	10.5	.210	.24	646	B.
September	14	8.2	10.0	.200	.22	595	B.
October	14	9.2	11.4	.228	.26	701	B.
November	43	12	21.8	.436	.49	1,300	B.
December	57	16	29.2	.584	.67	1,800	
The period						31,500	
1910.							
January	74	18	28.6	0.572	0.66	1,760	C.
February	74	18	31.2	.624	.65	1,730	B.
March	81	43	60.3	1.21	1.40	3,710	B.
April	192	60	87.5	1.75	1.95	5,210	B.
May	131	57	77.7	1.55	1.79	4,780	B.
The period						17,200	

McCOY CREEK NEAR DIAMOND, OREG.

This station, which is located at Kesterson's ranch, in sec. 12, T. 30 S., R. 32 E., and above all present irrigation ditches, was established January 27, 1909, at a point three-fourths of a mile west of Diamond ranch house and 3 miles from Diamond post office, and was removed to the present site, 2½ miles above the old one, on May 23, 1910, observations at the original site having been suspended June 30, 1909, for lack of an observer.

Several irrigation ditches divert water above the original station for hay lands in the Diamond swamp, but no estimate has been made of the flow of these ditches, and the results obtained during 1909 do not represent the natural flow of the stream. The figures published for that year, therefore, are only of general interest and do not possess a high degree of accuracy.

At the new station conditions are favorable for good results. Discharge measurements are made by wading or from a footbridge 25 yards above the vertical staff gage.

Discharge measurements of McCoy Creek near Diamond, Oreg., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 23	Stevens and Allen	25	37	3.64	80
Oct. 7	R. W. Davenport	11.5	4	1.79	3.6

Daily gage height, in feet, of McCoy Creek near Diamond, Oreg., for 1910.

[Mrs. Grant Kesterson, observer.]

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	3.4	2.0	1.65	1.6	1.8	.....	1.85
2	.....	3.3	1.95	1.65	1.6	1.8	1.8	1.85
3	.....	2.8	1.95	1.65	1.6	1.85	1.8	1.85
4	.....	2.8	2.0	1.65	1.6	1.9	1.8	1.85
5	.....	2.8	1.95	1.65	1.6	1.85	1.8	1.85
6	.....	2.8	1.95	1.65	1.6	1.85	1.8	1.85
7	.....	2.8	1.95	1.65	1.6	1.8	1.8	1.85
8	.....	2.7	1.9	1.65	1.6	1.8	1.85	1.85
9	.....	2.5	1.9	1.6	1.6	1.8	1.9	2.0
10	.....	2.5	1.8	1.6	1.6	1.8	1.85	2.0
11	.....	2.5	1.8	1.6	1.6	1.8	1.9	2.1
12	.....	2.45	1.8	1.6	1.6	1.8	1.95	2.1
13	.....	2.4	1.8	1.6	1.7	1.8	1.95	1.9
14	.....	2.4	1.8	1.6	1.7	1.8	1.9	1.9
15	.....	2.4	1.8	1.6	1.7	1.85	1.9	1.9
16	.....	2.4	1.8	1.6	1.8	1.85	1.85	2.0
17	.....	2.4	1.8	1.6	1.8	1.85	1.85	1.9
18	.....	2.4	1.8	1.6	1.75	1.85	1.9	1.9
19	.....	2.4	1.8	1.6	1.7	1.9	1.85	2.0
20	.....	2.3	1.8	1.6	1.7	1.85	1.8	2.0
21	.....	2.2	1.9	1.6	1.7	1.8	1.9	2.0
22	.....	2.2	1.8	1.6	1.7	1.8	2.0	1.9
23	3.65	2.15	1.75	1.6	1.7	1.8	1.95	1.85
24	.....	2.15	1.75	1.6	1.7	1.8	2.0	.....
25	.....	2.1	1.7	1.6	1.7	1.8	2.0	.....
26	.....	2.1	1.7	1.6	.....	1.8	.....	1.8
27	.....	2.05	1.7	1.6	.....	.....	1.95	1.8
28	3.45	2.05	1.7	1.6	.....	.....	2.0	1.8
29	3.2	2.0	1.7	1.6	.....	.....	1.95	1.85
30	3.6	2.0	1.7	1.6	.....	.....	1.9	1.85
31	3.6	.....	1.65	1.6	.....	.....	.....	1.85

NOTE.—No ice reported in December.

Daily discharge, in second-feet, of McCoy Creek near Diamond, Oreg., for 1910.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	65	7	1.5	1.0	3.5	3.5	4.2
2	.....	59	6	1.5	1.0	3.5	3.5	4.2
3	.....	33	6	1.5	1.0	4.2	3.5	4.2
4	.....	33	7	1.5	1.0	5	3.5	4.2
5	.....	33	6	1.5	1.0	4.2	3.5	4.2
6	.....	33	6	1.5	1.0	4.2	3.5	4.2
7	.....	33	6	1.5	1.0	3.5	3.5	4.2
8	.....	29	5	1.5	1.0	3.5	4.2	4.2
9	.....	21	5	1.0	1.0	3.5	5	7
10	.....	21	3.5	1.0	1.0	3.5	4.2	7
11	.....	21	3.5	1.0	1.0	3.5	5	9
12	.....	20	3.5	1.0	1.0	3.5	6	9
13	.....	18	3.5	1.0	2.0	3.5	6	5
14	.....	18	3.5	1.0	2.0	3.5	5	5
15	.....	18	3.5	1.0	2.0	4.2	5	5
16	.....	18	3.5	1.0	3.5	4.2	4.2	7
17	.....	18	3.5	1.0	3.5	4.2	4.2	5
18	.....	18	3.5	1.0	2.8	4.2	5	5
19	.....	18	3.5	1.0	2.0	5.0	4.2	7
20	.....	15	3.5	1.0	2.0	4.2	3.5	7
21	.....	12	5	1.0	2.0	3.5	5	7
22	.....	12	3.5	1.0	2.0	3.5	7	5
23	80	10	2.8	1.0	2.0	3.5	6	4.2
24	78	10	2.8	1.0	2.0	3.5	7	4.2
25	75	9	2.0	1.0	2.0	3.5	7	3.5
26	72	9	2.0	1.0	2.0	3.5	6	3.5
27	70	8	2.0	1.0	2.8	3.5	6	3.5
28	68	8	2.0	1.0	2.8	3.5	7	3.5
29	53	7	2.0	1.0	2.8	3.5	6	4.2
30	77	7	2.0	1.0	3.5	3.5	5	4.2
31	77	.....	1.5	1.0	.....	3.5	.....	4.2

NOTE.—Daily discharge determined from a fairly well-defined discharge rating curve. Discharge May 24 to 27 interpolated.

Monthly discharge of McCoy Creek near Diamond, Oreg., for 1910.

[Drainage area, 56 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
May 23-31	80	53	72.2	1.29	0.43	1,290	B.
June	65	7	21.1	.376	.42	1,260	B.
July	7	1.5	3.87	.069	.08	238	B.
August	1.5	1.0	1.13	.020	.02	69	B.
September	3.5	1.0	1.86	.033	.04	111	B.
October	5	3.5	3.78	.068	.08	232	B.
November	7	3.5	4.93	.088	.10	293	B.
December	9	3.5	5.12	.091	.10	315	B.
The period						3,810	

SILVER CREEK NEAR RILEY, OREG.

This station, which is located about 200 feet above the bridges across the Silver Creek on Cecil's ranch, about 12 miles north of Riley, Oreg., on the main stage road from Prineville to Burns, was established April 19, 1904. Observations were suspended from July 14, 1906, to January 14, 1909, and from December 13, 1909, to April 6, 1910. The station is now maintained in cooperation with the Silver Valley Irrigation Co.

When the station was reestablished January 14, 1909, it was practically impossible to install a permanent gage; temporary gages have therefore been used, all referring to the same datum except the one read during December, 1910.

Discharge measurements are made from a cable installed in January, 1909.

One hundred feet below the cable is a brush and rock dam which diverts water into three channels. Stable relations between discharge and gage heights can be established only during the irrigating seasons and the time between first fall flood, when the dam is washed out, and the spring when it is reconstructed. Usually only the brush, earth, and smaller stones are washed away. For this reason results at this station will be only approximate, but it is the only site that can be utilized that is within practical distance of an observer.

The waters of Silver Creek are now largely used for the irrigation of hay lands in Silver Creek valley. The Silver Creek reservoir site, which was investigated by the Reclamation Service, and later by the Silver Valley Irrigation Co., is 3 or 4 miles above the station. At this point a large quantity of water can be stored. Below the station on both sides of the stream are large areas of agricultural land which could be irrigated from stored water.

Discharge measurements of Silver Creek near Riley, Oreg., for 1910.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Apr. 6	L. R. Allen	63	257	3.89	191
May 29	Stevens and Allen	16	13	1.52	14
Oct. 19	R. W. Davenport	20	5	1.25	2.4
Dec. 9	.....do	13	4	*a* 1.16	6.1

a Silver Valley Irrigation Co. gage read 0.50. Some ice at old gage.

Daily gage height, in feet, of Silver Creek near Riley, Oreg., for 1910.

[Mrs. W. C. Cecil, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Dec.	Day.	Apr.	May.	June.	July.	Aug.	Dec.
1	.....	2.0	1.4	1.0	0.2	0.45	16	2.9	1.8	1.2	0.5	.....	0.5
2	.....	2.0	1.4	.9	.1	.5	17	2.8	1.8	1.1	.6	.....	.45
3	.....	2.1	1.4	.9	.....	.5	18	2.7	1.8	1.1	.6	.....	.4
4	.....	2.2	1.3	.9	.....	.45	19	2.6	1.7	1.2	.5	.....	.....
5	.....	2.1	1.3	.9	.....	.4	20	2.4	1.8	1.2	.5	.....	.....
6	3.9	2.0	1.3	.9	.....	.5	21	2.3	1.8	1.2	.4	.....	.....
7	.....	1.9	1.3	.9	.....	.5	22	2.2	1.7	1.2	.4	.....	.....
8	3.6	1.9	1.3	.9	.....	.5	23	2.4	1.7	1.2	.4	.....	.....
9	3.6	1.8	1.3	.9	.....	.5	24	2.3	1.5	1.1	.4	.....	.....
10	3.6	2.0	1.3	.8	.....	.5	25	2.2	1.5	1.1	.4	.....	.....
11	3.5	2.0	1.3	.8	.....	.5	26	2.2	1.6	1.1	.4	.....	.....
12	3.4	1.9	1.3	.7	.....	.5	27	2.1	1.6	1.0	.4	.....	.....
13	3.3	1.9	1.3	.7	.....	.5	28	2.0	1.5	1.0	.35	.....	.....
14	3.2	1.9	1.3	.7	.....	.5	29	2.0	1.5	1.0	.3	.....	.....
15	3.1	1.8	1.3	.6	.....	.5	30	2.0	1.5	1.0	.25	.....	.....
							31	.....	1.5	.....	.25	.....	.....

NOTE.—Creek dry Aug. 3 until abont Oct. 1. Gage readings for December refer to new gage with datum different from that of old. Water below gage Dec. 19 to 31. Gage heights somewhat affected by backwater from a dam below; observer notes changes in dam Apr. 23 and May 20 which no doubt, caused the increase in stage on those days.

Daily discharge, in second-feet, of Silver Creek near Riley, Oreg., for 1909.

Day.	Feb.[a]	Mar.	Apr.	May.	June.	July.	Aug.	Oct.	Nov.	Dec.
1	.....	16	201	52	19	5	2.5	0.0	9	7
2	.....	20	283	48	19	4	2.1	0.0	9	7
3	.....	24	344	44	16	4	2.1	0.1	8	8
4	.....	26	268	40	16	4	2.1	3	8	8
5	.....	16	254	42	14	4	2.1	4	5	8
6	.....	28	147	40	8	5	1.4	4	7	8
7	.....	25	121	36	9	5	1.1	4	7	8
8	.....	24	121	36	11	6	1.1	4	7	8
9	.....	22	167	32	9	6	0.8	3	6	8
10	.....	25	227	28	12	7	0.6	3	6	8
11	.....	24	201	28	11	12	0.2	4	5	8
12	.....	22	227	34	11	10	0.1	4	5	8
13	.....	22	313	34	10	8	0.1	5	5	7
14	.....	28	344	32	10	7	0.1	5	6	7
15	40	38	328	25	9	6	.1	4	6	7
16	178	52	283	36	9	4	.1	4	6	7
17	184	73	268	34	10	3	.1	4	6	7
18	52	62	201	28	10	3	.1	4	6	7
19	38	48	167	26	10	2.5	0	4	6	7
20	44	46	138	25	10	2.5	0	5	8	7
21	30	42	129	22	10	2.5	0	5	8	6
22	19	40	113	22	8	2.1	0	5	8	6
23	20	42	99	24	8	1.4	0	4	13	6
24	19	48	92	22	8	1.4	0	6	13	6
25	16	48	73	25	8	1.1	0	6	14	6
26	22	110	73	22	8	1.1	0	6	13	6
27	19	129	67	26	7	2.5	0	5	13	6
28	16	189	62	30	7	2.5	0	4	8	6
29	.....	201	62	30	6	2.5	0	5	6	6
30	.....	157	52	25	6	2.5	0	5	6	6
31	.....	157	.....	16	.....	2.5	0	6	.....	6

[a] Estimated mean Feb. 1 to 14, 25 second-feet.

Daily discharge, in second-feet, of Silver Creek near Riley, Oreg., for 1910.

Day.	Apr.	May.	June.	July.	Aug.	Dec.	Day.	Apr.	May.	June.	July.	Aug.	Dec.
1	.....	30	11	4	0.2	5	16	88	22	7	1	.....	6
2	.....	30	11	3	.1	6	17	79	22	5	2	.....	5
3	.....	35	11	3	0	6	18	71	22	5	2	.....	4
4	.....	40	9	3	.....	5	19	63	19	7	1	.....	3
5	.....	35	9	3	.....	4	20	50	22	7	1	.....	3
6	195	30	9	3	.....	6	21	45	22	7	.7	.....	3
7	177	26	9	3	.....	6	22	40	19	7	.7	.....	3
8	159	26	9	3	.....	6	23	50	19	7	.7	.....	3
9	159	22	9	3	.....	6	24	45	13	5	.7	.....	3
10	159	30	9	2	.....	6	25	40	13	5	.7	.....	3
11	148	30	9	2	.....	6	26	40	16	5	.7	.....	3
12	137	26	9	2	.....	6	27	35	16	4	.7	.....	3
13	127	26	9	2	.....	6	28	30	13	4	.6	.....	3
14	117	26	9	2	.....	6	29	30	13	4	.4	.....	3
15	107	22	9	2	.....	6	30	30	13	4	.3	.....	3
							31	.....	13	.....	.3	.....	3

NOTE.—Daily discharge for 1909 determined from a poorly defined discharge rating curve; determinations for individual days or weeks are liable to fairly large errors, but the mean for the whole period may not be much in error.

Mean daily discharge Feb. 1 to 14, 1909, estimated at 25 second-feet. Discharge derived from open-channel curve Dec. 13 to 31, 1909, reduced on account of ice.

Daily discharge April to August, 1910, determined from a fairly well-defined discharge rating curve. The curve for December is fairly well defined by measurements in 1911. Mean discharge Apr. 1 to 5, 1910, estimated at 200 second-feet; mean discharge Dec. 19 to 31, 1910, estimated at 3 second-feet.

Monthly discharge of Silver Creek near Riley, Oreg., for 1909–10.

[Drainage area, 266 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Mean per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1909.							
February	184	16	37.4	0.141	0.15	2,080	C.
March	201	16	58.2	.219	.25	3,580	C.
April	344	52	181	.680	.76	10,800	C.
May	52	16	31.1	.117	.13	1,910	C.
June	19	6	10.3	.039	.04	613	C.
July	12	1.1	4.20	.016	.02	258	C.
August	2.5	0	.54	.0020	.002	33	C.
September	0	0	0	0	0	0	C.
October	6	0	4.04	.015	.02	248	C.
November	14	5	7.77	.029	.03	462	C.
December	8	6	6.97	.026	.03	429	C.
The period	344	0	30.8	.116	1.43	20,800	
1910.							
April	.....	30	107	.402	.45	6,360	C.
May	40	13	22.9	.086	.10	1,410	C.
June	11	4	7.47	.028	.03	444	C.
July	4	.3	1.73	.0065	.007	106	C.
August	.2	0	.01	0	0	0	
September	0	0	0	0	0	0	
October	.....	.....	[a] 1.74	.0065	.007	107	C.
November	.....	.....	[a] 4.00	.015	.02	238	C.
December	6	.....	4.52	.017	.02	278	C.
The period	.....	0	16.4	.062	.63	8,940	

[a] Estimated.

GOOSE LAKE BASIN.

Consideration of the Goose Lake basin has been transferred to the report on the Sacramento drainage area owing to the fact that in times of exceptionally high water the lake has overflowed southward to the North Fork of Pit River, and to the possibility that considerable water may pass from the lake to the river by underground channels in the porous lava.

Data regarding the following gaging stations will be found in Water-Supply Paper 291:

Cottonwood Creek near Lakeview, Oreg.
Drews Creek near Lakeview, Oreg.

MISCELLANEOUS MEASUREMENTS.

The following miscellaneous discharge measurements were made in the Great Basin drainage area during 1910:

Miscellaneous measurements in the Great Basin for 1909–10.

Date.	Stream.	Tributary to.	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
1909.					
June 3	Peteetneet Creek	Utah Lake	3 miles from Payson, Utah		7.1
1910.					
Mar. 7	do	do	do		11.3
7	do	do	do		10.8
22	do	do	do		28.7
22	do	do	do		37.9
May 26	do	do	do		19.6
June 5	do	do	do		6.1
7	do	do	do		12.4
July 5	do	do	do		3.0
7	do	do	do		11.0
May 20	Tunnel drain	Diamond Fork, Utah	Strawberry tunnel		.51
Aug. 26	Owens River	Owens Lake	Hand ranch, Cal		76
Mar. 8	Horton Creek	Owens River	At road crossing, road from Round Valley to Bishop; SE. ¼ T. 6 S., R. 21 E., Cal.		7.4
Apr. 21	do	do	do		5.3
Aug. 12	Thibaut Creek	do	1 mile west of county road between Independence and Big Pine, Cal.		a.15 a.20
Sept. 6	do	do	do		a.20
May 19	Symmes Creek	do	2 miles west of county road near Independence, Cal.		3.5
June 22	do	do	do		3.8
July 16	do	do	do		a.1
Aug. 8	do	do	do		1.6
Sept. 7	do	do	do		0
May 25	Carroll Creek	Owens Lake	At highway crossing on Lone Pine-Olancha Road, Cal.		1.2
Oct. 11	West Carson River	Carson Lake	Woodfords, Cal., above all diversions.		33
Aug. 5	Clear Creek		State weir, at mouth of canyon, near Carson, Nev.		1.9
9	do		do		3.0
Oct. 9	do		do		5.1
Aug. 18	Carson River		Heiton Bridge		80
Nov. 11	Town Ditch	Carson River	Markleeville, Cal		6.1
Sept. 21	Adler Creek		Near mouth	0.69	3.5
21	Trout Creek		do		a.5
21	South Prosser Creek		Euers Valley	.23	.9
20	Donner Creek		Outlet of lake	.45	.5
19	Squaw Creek		Near mouth	1.69	1.3
Oct. 12	Long Valley Creek b		Red Rock, Cal		4.0

a Estimated. b By floats.

Miscellaneous measurements in Quinn River basin, Nev., for 1906.

[By E. D. Boyle, State engineer.]

Date.	Stream.	Locality.	Discharge per square mile.
			Sec.-ft.
May 5	Eightmile Creek	McConnell field	33
20	do	do	8
6	Flat Creek	Above Upper Flat Creek ranch	21
19	do	do	21
6	North Fork Flat Creek	Main road crossing	2.2
6	South Fork Flat Creek	do	12
7	Quinn River	400 feet below junction of main channel with Hardin slough.	84
20	do	do	62
5	Twelvemile Creek	Main road crossing	2.0
19	do	do	.8
19	do	Above all diversions	2.9

Miscellaneous measurements in Humboldt River basin, Nev., for 1910.

[By E. D. Boyle, State engineer.]

Date.	Stream.	Locality.	Discharge per square mile.
			Sec.-ft.
June 6	Bishop Creek	Below U-7 ranch [a]	8.6
Nov. 7	Duckwater Creek	Duckwater	24
Oct. 21	do	Brown Mills near Duckwater	6
June 2	Spring Creek	Divine ranch	1.9
1	Tom Cain Creek	Treutt ranch	4.1
4	Trout Creek	NW. ¼ SE. ¼ NW. ¼ sec. 11, T. 38 N., R. 61 E.	6.2
Oct. 29	Willard Creek	At Osceola ditch crossing, west side of Wheeler Peak.	1.0

[a] By floats.

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R.

T.

Y.